Journal of Physical and Chemical Reference Data

Microwave spectral tables II. Triatomic molecules

Cite as: Journal of Physical and Chemical Reference Data **7**, 1445 (1978); https://doi.org/10.1063/1.555588
Published Online: 15 October 2009

Frank J. Lovas

View Online
Export Citation

ARTICLES YOU MAY BE INTERESTED IN

Microwave Spectral Tables I. Diatomic Molecules
Journal of Physical and Chemical Reference Data **3**, 609 (1974); https://doi.org/10.1063/1.3253146

Microwave Spectra of Molecules of Astrophysical Interest VI. Carbonyl Sulfide and Hydrogen Cyanide
Journal of Physical and Chemical Reference Data **3**, 221 (1974); https://doi.org/10.1063/1.3253139

Tables of molecular vibrational frequencies
Journal of Physical and Chemical Reference Data **7**, 1323 (1978); https://doi.org/10.1063/1.555587

© 1978 American Institute of Physics for the National Institute of Standards and Technology.

Microwave Spectral Tables
II. Triatomic Molecules

Frank J. Lovas

National Measurement Laboratory, National Bureau of Standards, Washington, D.C. 20234

All of the rotational spectral lines observed and reported in the open literature for 54 triatomic molecules have been tabulated. The isotopic molecular species, assigned quantum numbers, observed frequency, estimated measurement uncertainty and reference are given for each transition reported. In addition to correcting a number of misprints and errors in the literature cited, the spectral lines for approximately 15 molecules have been refit to produce a comprehensive and consistent analysis of all the data extracted from various literature sources. Both measured and predicted transition frequencies are listed for several isotopic forms of HCN, H_2O, H_2S, OCS, SO_2, and O_3. The derived molecular properties, such as rotational and centrifugal distortion constants, hyperfine structure constants, electric dipole moments, and rotational *g*-factors are listed with one standard deviation uncertainty for all values.

Key words: Dipole moments; hyperfine structure; internuclear distance; microwave spectra; rotational constants; rotational spectral lines; triatomic molecules.

Contents

Page

1. Introduction 1448
   - 1.1. General Description of the Tables 1448
     - a. Molecular Constant Tables 1448
     - b. Spectral Line Tables 1448
   - 1.2. Molecular Parameters and Energy Level Formulation 1449
     - a. Linear Triatomic Molecules 1449
     - b. Non-Linear Triatomic Molecules 1450
       - 1) Selection Rules 1450
       - 2) Rotational and Centrifugal Distortion Constants 1451
     - c. Molecules with Doublet Electronic Ground States 1451
   - 1.3. Evaluation of the Spectral Data 1452
     - a. General Procedure 1452
     - b. Discussion of Specific Corrections and Reanalysis of the Data 1452
       - 1) ArClF 1452
       - 2) HBS 1452
       - 3) BrCN 1452
       - 4) ClCN 1452
       - 5) HCN and OCS 1452
       - 6) OCSe 1452
       - 7) ClNO 1453
       - 8) NSCl 1453
       - 9) Cl_2O 1453
       - 10) HOF 1453
       - 11) FNO 1453
       - 12) NSF 1453
       - 13) GeF_2 1453
       - 14) NF_2 1454
       - 15) F_2O 1454
       - 16) SF_2 and SiF_2 1454
       - 17) H_2O and H_2S 1454
       - 18) H_2Se 1454
       - 19) S_2O 1454
       - 20) SO_2 1454
       - 21) O_3 1455
   - 1.4. List of Symbols 1456
     - a. Quantum Numbers 1456
     - b. Molecular Constants 1456
     - c. Other 1457
   - 1.5. Special Units, Fundamental Constants, and Useful Conversion Factors 1457
     - a. Special Units 1457
     - b. Fundamental Constants and Conversion Factors 1457
   - 1.6. Acknowledgments 1457
   - 1.7. References to the Introduction 1457
2. Molecular Constants and Spectral Line Tables 1458
   (See List of Tables below)
3. References to Spectral Data 1739
4. Appendix 1746
   - 4.1. Molecular Structures for Triatomic Molecules 1746
   - 4.2. Discussion of Centrifugal Distortion Analysis of F_2O 1746

© 1978 by the U.S. Secretary of Commerce on behalf of the United States. This copyright is assigned to the American Institute of Physics and the American Chemical Society.

List of Tables

Table		Page
ArClF		
1.	Molecular parameters for ArClF	1458
1.1.	The microwave spectrum of ArClF	1458
ArClH		
2.	Molecular parameters for ArClH	1459
2.1.	The microwave spectrum of ArClH	1459
ArFH		
3.	Molecular parameters for ArFH	1459
3.1.	The microwave spectrum of ArFH	1460
BHS		
4.	Rotational constants for HBS	1460
4.1.	Hyperfine and Zeeman constants and electric dipole moment for HBS	1460
4.2.	The microwave spectrum of HBS	1461
BrNO		
5.	Molecular parameters for BrNO	1462
5.1.	The microwave spectrum of BrNO	1462
CBrN		
6.	Molecular parameters for $^{79}Br^{12}C^{14}N$ and $^{81}Br^{12}C^{14}N$	1465
6.1.	Rotational constants for ^{13}C and ^{15}N species of BrCN	1465
6.2.	Molecular Zeeman parameters for BrCN	1465
6.3.	The microwave spectrum of BrCN	1466
CClN		
7.	Rotational constants for ClCN	1471
7.1.	Ground state hyperfine constants and dipole moment for ClCN	1471
7.2.	Hyperfine constants and dipole moment for $v_2=1$ of ^{35}ClCN	1472
7.3.	Zeeman parameters for ClCN	1472
7.4.	The microwave spectrum of ClCN	1473
CFN		
8.	Rotational constants for FCN	1477
8.1.	Hyperfine structure, dipole moment, and Zeeman parameters for FCN	1477
8.2.	The microwave spectrum of FCN	1478
CF_2		
9.	Rotational and centrifugal distortion constants and dipole moment for $^{12}C^{19}F_2$	1479
9.1.	The microwave spectrum of CF_2	1480
CHN		
10.	Rotational constants of HCN, DCN, and TCN	1481
10.1.	Hyperfine constants, electric dipole moment, and Zeeman constants for HCN	1482
10.2.	The microwave spectrum of HCN	1483
CHN		
11.	Molecular parameters for HNC	1487
11.1.	The microwave spectrum of HNC	1488
CHO		
12.	Molecular parameters for HCO	1488
12.1.	The microwave spectrum of HCO	1489
CHO^+		
13.	Rotational constants for HCO^+	1489
13.1.	The microwave spectrum of HCO^+	1489
CHP		
14.	Molecular parameters for HCP	1490
14.1.	The microwave spectrum of HCP	1490
CIN		
15.	Molecular parameters for ICN	1491
15.1.	The microwave spectrum of ICN	1492
CNO		
16.	Molecular parameters for NCO	1500
16.1.	The microwave spectrum of NCO	1501
COS		
17.	Rotational constants for OCS	1502
17.1.	Electric dipole moments, Zeeman constants, and hyperfine constants for OCS	1504
17.2.	Additional references for OCS divided into general categories	1504
17.3.	The microwave spectrum of OCS	1505
COSe		
18.	Rotational constants for OCSe	1512
18.1.	Hyperfine constants, electric dipole moments, and Zeeman constants for OCSe	1513
18.2.	The microwave spectrum of OCSe	1513
CSSe		
19.	Molecular parameters for SCSe	1515
19.1.	The microwave spectrum of SCSe	1516
CSTe		
20.	Rotational constants and dipole moment for SCTe	1516
20.1.	The microwave spectrum of SCTe	1517
C_2H		
21.	Molecular parameters for HCC	1517
21.1.	The microwave spectrum of HCC	1517
ClFKr		
21a.	Molecular parameters for KrClF	1517
21a.1.	The microwave spectrum of KrClF	1518
ClHO		
22.	Rotational, centrifugal distortion, and hyperfine constants for $H^{16}O^{35}Cl$	1518
22.1.	Molecular parameters for HOCl	1519
22.2.	The microwave spectrum of HOCl	1519
ClNO		
23.	Rotational, centrifugal distortion, and hyperfine constants for ^{35}ClNO and ^{37}ClNO	1521
23.1.	Rotational constants for the ground and vibrationally excited states of ClNO	1521
23.2.	Hyperfine constants and dipole moment of ClNO	1521
23.3.	The microwave spectrum of ClNO	1522
ClNS		
24.	Rotational and centrifugal distortion constants for $^{14}N^{32}S^{35}Cl$	1525
24.1.	Rotational constants, hyperfine constants, and electric dipole moment for NSCl	1526
24.2.	The microwave spectrum of NSCl	1526
ClO_2		
25.	Molecular parameters for ClO_2	1528
25.1.	Centrifugal distortion constants for $^{35}Cl^{16}O_2$	1529
25.2.	The microwave spectrum of ClO_2	1530
Cl_2O		
26.	Rotational and centrifugal distortion constants of Cl_2O from reanalysis	1535
26.1.	Molecular parameters for Cl_2O	1536
26.2.	The microwave spectrum of Cl_2O	1536
Cl_2S		
27.	Molecular parameters for $^{35}Cl_2{}^{32}S$	1540
27.1.	The microwave spectrum of Cl_2S	1540
CsHO		
28.	Rotational constants and electric dipole moment of CsOH	1541
28.1.	The microwave spectrum of CsOH	1542
FHO		
29.	Rotational and centrifugal distortion constants for HOF and DOF from the present analysis	1543
29.1.	Molecular parameters for HOF and DOF including the rotational analysis of Pearson and Kim	1544
29.2.	The microwave spectrum of HOF	1544

List of Tables—Continued

Table — Page

FNO

30. Rotational and centrifugal distortion constants of $^{19}F^{14}N^{16}O$ ... 1546
30.1. Molecular parameters for FNO ... 1547
30.2. The microwave spectrum of FNO ... 1547

FNS

31. Rotational and centrifugal distortion constants for NSF ... 1550
31.1. Hyperfine constants and electric dipole moment of $^{14}N^{32}S^{19}F$ ... 1551
31.2. The microwave spectrum of NSF ... 1551

F_2Ge

32. Rotational constants for GeF_2 ... 1554
32.1. Rotational and centrifugal distortion constants for GeF_2 ... 1555
32.2. The microwave spectrum of GeF_2 ... 1556

F_2N

33. Rotational and centrifugal distortion constants for $^{14}N^{19}F_2$ ... 1560
33.1. Spin-rotation and spin-spin interaction constants and electric dipole moment of $^{14}N^{19}F_2$ ... 1561
33.2. The microwave spectrum of NF_2 ... 1561

F_2O

34. Rotational and centrifugal distortion constants for $^{19}F_2{}^{16}O$ ... 1566
34.1. Rotational constants for the excited vibrational states of F_2O ... 1567
34.2. Zeeman constants, spin-rotation constants, and electric dipole moment of $^{19}F_2{}^{16}O$ ... 1567
34.3. The microwave spectrum of F_2O ... 1568

F_2S

35. Rotational and centrifugal distortion constants for $^{32}S^{19}F_2$ ... 1570
35.1. Rotational constants and electric dipole moment for SF_2 ... 1571
35.2. The microwave spectrum of SF_2 ... 1571

F_2Si

36. Rotational and centrifugal distortion constants for $^{28}Si^{19}F_2$ ... 1573
36.1. Rotational constants and electric dipole moment for SiF_2 ... 1574
36.2. The microwave spectrum of SiF_2 ... 1574

HKO

37. Rotational constants for $^{39}K^{16}OH$ ... 1576
37.1. Rotational constants for $^{41}K^{16}OH$ and $^{39}K^{16}OD$ ... 1577
37.2. Rotation-vibration interaction constants for KOH ... 1577
37.3. The microwave spectrum of KOH ... 1578

HLiO

38. Rotational and hyperfine constants and electric dipole moments for $^{7}Li^{16}OH$ and $^{7}Li^{16}OD$ ... 1581
38.1. The microwave spectrum of LiOH ... 1581

HNO

39. Molecular parameters for $H^{14}N^{16}O$ and $D^{14}N^{16}O$ ... 1582
39.1. The microwave spectrum of HNO ... 1582

HN_2^+

40. Molecular constants for HN_2^+ ... 1583
40.1. The microwave spectrum of HN_2^+ ... 1583

HNaO

41. Rotational constants of $^{23}Na^{16}OH$ ... 1583
41.1. The microwave spectrum of NaOH ... 1583

HORb

42. Rotational and hyperfine constants for $^{85}RbOH$ ... 1584
42.1. Rotational and hyperfine constants for $^{87}RbOh$ ... 1584
42.2. The Λ-doubling constants for RbOH ... 1584
42.3. The microwave spectrum of RbOH ... 1585

HO_2

43. Molecular parameters for HO_2 ... 1587
43.1. The microwave spectrum of HO_2 ... 1588

H_2N

44. Molecular parameters for NH_2 ... 1589
44.1. The microwave spectrum of NH_2 ... 1589

H_2O

45. Rotational and centrifugal distortion constants for $H_2{}^{16}O$, $H_2{}^{17}O$ and $H_2{}^{18}O$ ... 1590
45.1. Rotational and centrifugal distortion constants for HDO and HTO ... 1591
45.2. Rotational and centrifugal distortion constants for DTO and T_2O ... 1592
45.3. Rotational and centrifugal distortion constants for $D_2{}^{16}O$ ... 1593
45.4. Rotational and centrifugal distortion constants for $D_2{}^{17}O$ and $D_2{}^{18}O$ ... 1594
45.5. Rotational and centrifugal distortion constants for $HD^{18}O$ and the (0,1,0) state of $HD^{16}O$ ... 1595
45.6. Hyperfine constants for various isotopic species of H_2O in individual rotational states ... 1595
45.7. Diagonal components of the hyperfine tensors for H_2O ... 1596
45.8. Zeeman constants and electric dipole moments for H_2O ... 1596
45.9. Additional references for H_2O ... 1596
45.10. The microwave spectrum of H_2O ... 1597

H_2S

46. Rotational and centrifugal distortion constants for $H_2{}^{32}S$, $HD^{32}S$ and $D_2{}^{32}S$ ... 1606
46.1. Hyperfine constants and electric dipole moments for H_2S ... 1607
46.2. Molecular *g*-factors for H_2S ... 1607
46.3. The microwave spectrum of H_2S ... 1608

H_2Se

47. Rotational and centrifugal distortion constants for $H_2{}^{78}Se$ and $H_2{}^{80}Se$ ... 1613
47.1. Rotational and centrifugal distortion constants for $H_2{}^{76}Se$, $H_2{}^{77}Se$ and $H_2{}^{82}Se$ ... 1614
47.2. Rotational and centrifugal distortion constants for D_2Se ... 1614
47.3. Rotational and centrifugal distortion constants for HDSe ... 1615
47.4. Hyperfine constants and electric dipole moments for $HD^{80}Se$ ... 1615
47.5. The microwave spectrum of H_2Se ... 1616

NO_2

48. Rotational and centrifugal distortion constants for NO_2 ... 1619
48.1. Spin-rotation and hyperfine constants for NO_2 ... 1620
48.2. Rotational constants for $^{14}NO_2$ ground state and (0,1,0) state from combined infrared and microwave spectra ... 1620
48.3. The microwave spectra of NO_2 ... 1621

N_2O

49. Rotational and centrifugal distortion constants for N_2O ... 1627
49.1. Molecular constants for $^{14}N_2{}^{16}O$ ... 1628
49.2. Molecular constants for $^{14}N^{15}N^{16}O$, $^{15}N^{14}N^{16}O$ and $^{14}N_2{}^{18}O$ ... 1628
49.3. Hyperfine and Zeeman constants and electric dipole moments for N_2O ... 1628
49.4. The microwave spectrum of N_2O ... 1629

OS_2

50. Rotational and centrifugal distortion constants for $^{32}S_2{}^{16}O$ ... 1635
50.1. Rotational constants for $^{34}S^{32}S^{16}O$ and $^{32}S^{34}S^{16}O$ ... 1635
50.2. The microwave spectrum of S_2O ... 1636

O_2S

51. Rotational and centrifugal distortion constants for the ground vibrational state of $^{32}S^{16}O_2$ and $^{33}S^{16}O_2$ ... 1639
51.1. Rotational and centrifugal distortion constants for the (1,0,0) and (0,0,1) vibrational states of $^{32}S^{16}O_2$ ... 1640
51.2. Rotational and centrifugal distortion constants for the (0,1,0) and (0,2,0) vibrational states of $^{32}S^{16}O_2$ ... 1641
51.3. Rotational and centrifugal distortion constants for the ground and (0,1,0) vibrational states of $^{34}S^{16}O_2$ ... 1642
51.4. Rotational and quartic distortion constants for all isotopic species and vibrational states analyzed for SO_2 by the Kivelson and Wilson method ... 1643

List of Tables—Continued

Table		Page
O_2S		
51.5.	Hyperfine coupling constants, Zeeman constants and electric dipole moment for SO_2	1644
51.6.	Additional references for SO_2 divided into general categories	1644
51.7.	The microwave spectrum of SO_2	1645
O_2Se		
52.	Rotational and centrifugal distortion constants for $^{80}SeO_2$ and $^{78}SeO_2$ in the ground vibrational state	1713
52.1.	Rotational constants for SeO_2	1714
52.2.	The microwave spectrum of SeO_2	1714
O_3		
53.	Rotational and centrifugal distortion constants for $^{16}O_3$, $^{18}O^{18}O^{16}O$, and $^{16}O^{16}O^{18}O$	1716
53.1.	Rotational and centrifugal distortion constants for $^{18}O^{16}O^{18}O$, $^{16}O^{18}O^{18}O$, and $^{18}O_3$	1717
53.2.	Rotational and centrifugal distortion constants for $^{16}O_3$ in the $v_1=1$, $v_2=1$, and $v_3=1$ vibrational states	1718
53.3.	Molecular Zeeman constants and electric dipole moment of $^{16}O_3$	1719
53.4.	The microwave spectrum of O_3	1719
A.1.	The molecular structures of triatomic molecules	1747
A.2.	Centrifugal distortion analysis of F_2O	1749
A.2.1.	New millimeter measurements on F_2O	1750

1. Introduction

These tables represent the second part of a series of critical reviews on molecular rotational spectra in the microwave frequency region. The present review on triatomic molecules is a partial revision of the previous tabulation on polyatomic species, NBS Monograph 70, Vol. IV (1968) [1][1]. The primary aim of the present critical review is directed at detecting errors, misprints and incomplete analyses in the literature. The coverage includes microwave rotational spectra and molecular properties derived therefrom for all the triatomic species observed in the centimeter and millimeter wavelength region of the spectrum. There are two objectives which this review hopes to achieve: first, to provide an up-to-date and complete tabulation of the microwave spectra for triatomic molecules, and second, to provide the best set of molecular properties which can be derived from the observed spectra. Although the spectral line frequencies are limited to the radio and microwave frequency region, derived molecular constants are included from a variety of sources, e.g., molecular beam electric resonance, electron paramagnetic resonance and infrared spectroscopy, in order to provide the most complete set of properties presently available. All unpublished data communicated privately have been included, and the open literature has been searched through June 1976.

1.1. General Description of the Tables

Two types of tables are presented for each molecular species. The first tables contain the derived molecular constants for each isotopic form which has been studied, and the table following these constant tables contains the observed microwave spectral transition frequencies for all isotopic forms and vibrational states for which data are available. The ordering of the tables follows an alphabetic sequence in empirical molecular formulas. The sequence of the tables is indicated in the List of Tables shown in the Contents.

The molecular spectral data tables of section 2 are followed in section 3 with the references to these data. The appendix found in section 4 contains molecular structure information taken directly from the literature, and a discussion of the analysis of the F_2O spectrum. Literature references are labeled with 5-digit numerals. This system has been formulated such that the first two digits refer to the year of publication of the work while the remaining three digits correspond to a chronological ordering within the year as required for referencing purposes here. Since this system was introduced in the first part of this series [2], these reference numbers follow the sequence established in the earlier work.

a. Molecular Constant Tables

Since a uniform format could not be readily constructed for these tables, they were composed in variable format depending on the type and amount of information available. In general, the rotational constants are listed first, followed by the centrifugal distortion parameters, hyperfine structure data, electric dipole moments and rotational g-factors. In cases where extensive data are available, several individual tables are used to present the molecular constants. A more detailed description of the molecular constants and their symbols is given in section 1.2. In order to reduce the occurrence of misprints, these tables were photographically reproduced from the original final typewritten copy.

b. Spectral Line Tables

The spectral tables contain all of the data intrinsic to an assigned molecular transition. The first column of these tables contains the isotopic molecular species to which the data pertain. The next columns contain the assigned quantum numbers for the transition in the sequence: rotational and the hyperfine for the upper state, rotational and hyperfine for the lower state, and vibrational state designation. Since the vibrational state remains unchanged for nearly all transitions, a single set of quantum numbers, (v_1,v_2^{ℓ},v_3), is sufficient. The next columns contain the observed transition frequency, its estimated uncertainty, and finally the reference to the original source of the data. Since the maximum number of significant figures beyond the decimal point was fixed at three for the transition frequency and two for uncertainties, in a few cases it was

[1] Figures in brackets indicate literature references.

necessary to round off the measured data. This situation occurs primarily in the reproduction of molecular beam measurements. When the uncertainty in the measurement is less than 0.01 MHz, the exponential notation is employed. Thus, an uncertainty of 0.005 MHz appears as 5E-3, which represents 5×10^{-3} MHz. When uncertainties were not given in the original source, an uncertainty was assigned on the basis of the internal consistency of all the data available for the molecule in question. Predicted transition frequencies have been given for several isotopic forms of HCN, H_2O, H_2S, OCS, SO_2, and O_3. In order to distinguish these from measured transitions, an asterisk (*) was placed in front of the estimated uncertainty, which is twice the standard deviation from the fit.

An effort was made to locate all of the essential references through mid-1976. In situations where multiple measurements have been reported, the sources not directly cited here are included as additional references at the end of the molecular constant tables. These additional references also include publications which are indirectly related to the frequency measurements and which contain intensity measurements.

1.2. Molecular Parameters and Energy Level Formulation

The treatment of the rotational energy levels and transition frequencies for polyatomic molecules is more complicated than the formulations applied to diatomic molecules [2]. However, since triatomic molecules are the simplest class of polyatomic species, they demonstrate the simplest spectra and interactions that non-rigid polyatomic species are capable of exhibiting. The triatomic molecules can be readily divided into three types as characterized by their spectral properties. These three classes, linear molecules, non-linear molecules and molecules having doublet (or multiplet) ground electronic states, will be described separately and in that order, since each successive type shows increasingly complex interactions through their rotational spectra.

In spite of the fact that triatomic molecules are the simplest polyatomic species, a thorough discussion of the theoretical background of their rotational spectra and energy level interactions would entail an extensive text in itself, and would require repetition of many excellent treatments readily available. Thus, the discussion which follows deals with the most common cases which will provide the user with the essential definition of quantum numbers, molecular parameters and basic relations employed in the analysis of rotational spectra. For the reader interested in a more detailed description of polyatomic rotational spectral measurements and analysis, we refer to texts on this subject by Townes and Schawlow [3], Gordy and Cook [4], Wollrab [5] and Kroto [6] which have both detailed and excellent discussions of all facets of rotational spectra. The spectroscopic notation employed follows, as closely as possible, the recommendations of the Joint Commission for Spectroscopy of the International Astronomical Union and the International Union of Pure and Applied Physics [7].

a. Linear Triatomic Molecules

The principal moments of inertia of a linear rigid rotor are along the molecular bond or a-axis for which the inertial moment is zero, and perpendicular to the bond axis in two orthogonal planes through the center-of-mass of the molecule. These are called the b- and c-axis whereby $I_c>I_b>I_a$ determines the labeling of the principal axes. For linear molecules $I_b=I_c$ and $I_a=0$, and the rotational constant, B, is related to the moment of the inertia as

$$B = \frac{h^2}{8\pi^2 I_b} .$$

The selection rules for rotational transitions of a linear polyatomic molecule are $\Delta J=0$, ±1, and $\Delta\ell=0$, ±1 where J is the total angular momentum quantum number excluding nuclear spin and ℓ is the vibrational angular momentum quantum number which arises in degenerate bending vibrational states.

Since molecules are not rigid, the effects of molecular vibrations and centrifugal distortion must be included in the model in order to accurately fit the observed rotational spectra. The rotational energy levels are represented as:

$$F(J) = B_v[J(J+1)-\ell^2]-D_v[J(J+1)-\ell^2]^2 + H_v[J(J+1)-\ell^2]^3,$$

where B_v is the rotational constant for the vth vibrational state, and D_v and H_v are the centrifugal distortion constants. The rotational constant can be expressed in terms of its equilibrium value, B_e, and rotation-vibration interaction constants, α_i, as:

$$B_v = B_{v_1,v_2,v_3} = B_e - \sum_{i=1,2,3} \alpha_i\left(v_i+\frac{d_i}{2}\right)+\cdots,$$

neglecting higher order terms. Within this level of approximation rotational transitions from lower state J'' to upper state J' are expressed:

$$\nu_{J'\leftarrow J''} = 2B_vJ'-4D_v[(J')^3-J'\ell^2]+6J'H_v[(J')^4-2(J')^2\ell^2+\ell^4].$$

The treatment of rotational transitions in excited vibrational states requires additional terms to account for the rotation-vibration interactions. The symmetry species of excited vibrational states are designated as Σ, Π, Δ, etc., when $\ell=0$, ±1, ±2, etc., respectively. One of the most common rotation-vibration interactions is ℓ-type doubling in Π states. In this case each $J\rightarrow J+1$ transition has two components which are indicated as L (lower) and U (upper) components in the tables which follow. The doublet separation is represented as: $q_v(v+1)(J+1)$. In addition $\Delta J=0$ transitions are observable with the frequency expressed as: $\nu=(q_v/2)(v+1)J(J+1)$. These transitions are also included in the spectral tables. Other rotation-vibration interactions, such as Fermi resonance, often must be

included for particular measurements. Since the level of approximation and method of analysis is dependent on the extent and quality of the spectral measurements available, the user should refer to the literature references cited in the tables for details concerning the analysis. For more general treatments of ℓ-type doubling and resonance interactions see the texts mentioned earlier [3-6] or the recent review by D. R. Lide [8].

Hyperfine structure is observable in a majority of the linear molecules tabulated here. Hyperfine structure stems from nuclear electric quadrupole interaction with the electric field gradient at the nucleus, magnetic interaction of nuclear spin with the field produced by molecular rotation, and interaction between the two nuclear spins. Basically, only the nuclear quadrupole and spin-rotation effects have been observed in microwave rotational spectra, while all of the hyperfine structure interactions of a number of triatomics have been determined from molecular beam electric resonance studies. Since the treatment of these effects can become quite complex and often handled individually for each case, the reader is referred to the literature cited for particular formulations. Rather detailed general treatments of hyperfine structure in molecular spectra can be found in references [3-6] as well as in references to laboratory studies of individual species.

The most common case observed is that for triatomic molecules which contain one nucleus with nuclear spin, $I \geqslant 1$. In this case, the nuclear electric quadrupole and spin-rotation interactions from first order perturbation theory add to the rotational energy via:

$$W_{\text{hfs}} = eq_vQ\left[\frac{3\ell^2}{J(J+1)}-1\right] f(I,J,F)$$

$$+ (c/2)[F(F+1) - I(I+1) - J(J=1)],$$

where $f(I,J,F)$ is Casimir's function which is tabulated in Appendix I of reference [3] and Appendix IV of reference [4]. Here F is the total angular momentum quantum number, where $F=J+I, J+I-1, \ldots\ |J=I|$. The additional selection rule for transitions between rotational levels split by hyperfine structure is $\Delta F=0, \pm 1$.

When the molecule exhibits hyperfine splittings from more than one nucleus, an exact matrix diagonalization of the Hamiltonian is usually required. Although the vector coupling model to be employed varies according to the magnitude of the interaction between J, I_1 and I_2, the typical case is to label the nucleus causing the largest interaction as I_1, thus

$$F_1 = J+I_1,\ J+I_1-1,\ \text{etc.}$$

and

$$F = F_1+I_2,\ F_1+I_2-1,\ \text{etc.}$$

For detailed discussions of the coupling schemes and matrix elements for multiple nuclear electric quadrupole interactions see [4] and [5].

b. Non-Linear Triatomic Molecules

The majority of polyatomic molecules fall in the asymmetric-top category. When the three principal moments of inertia of a molecule differ, the molecule is classified as an asymmetric top. The energy level formulation for a rigid asymmetric top is considerably more complex than that for symmetric-tops or linear molecules. With the exception of low rotational levels, the rotational energy and transitions cannot be conveniently expressed in simple algebraic terms. Since references [3-6] provide excellent discussions of the usual methods employed in solving the basic rigid asymmetric rotor Hamiltonian: $\mathscr{H}_2=A\ \mathbf{P}_a^2+B\ \mathbf{P}_b^2+C\ \mathbf{P}_c^2$ as well as the more complex Hamiltonian which includes centrifugal distortion $\mathscr{H}=\mathscr{H}_2+\mathscr{H}_4+\mathscr{H}_6+\ldots$, we will not delve into any details of the quantum mechanical formulation, but concentrate on describing the quantum number designations employed in the tables to follow, and provide the basic relationships between the different molecular constant notations used by various authors.

The rotational energy levels are characterized by the three quantum numbers $J_{K_{-1},K_{+1}}$ in the King-Hainer-Cross notation. Here, since $S=0$, J is used rather than N for the rotational angular momentum. When $S\neq 0$ we will use $N_{K_{-1},K_{+1}}$ to designate the rotational state and J for rotation plus electron spin and orbital angular momenta. The K_{-1} subscript is the K value in the limiting case of prolate symmetric-top and K_{+1} corresponds to the limiting case for an oblate symmetric-top. Ray's asymmetry parameter, κ, is often used to characterize the degree of asymmetry:

$$\kappa = \frac{2B-A-C}{A-C}.$$

When $A \approx B$, κ approaches $+1$ for the oblate case and when $B \approx C$ κ approaches -1 for the prolate case.

1) Selection Rules

In general an asymmetric rotor can exhibit three types of pure rotational transitions if the molecule has non-zero components of the electric dipole moment in the direction of the a, b, and c principal axes. Since triatomic molecules are planar, the dipole moment components can only occur in the a- and b-axis directions. For an asymmetric rotor the selection rules for a-type transitions are:

$$\Delta J=0,\ \pm 1;\ \Delta K_{-1}=0,\ \pm 2,\ \ldots;\ \Delta K_{+1}=\pm 1,\ \pm 3,\ \ldots$$

and b-type transitions follow the selection rules

$$\Delta J=0,\ \pm 1;\ \Delta K_{-1}=\pm 1,\ \pm 3;\ \Delta K_{+1}=\mp 1,\ \mp 3,\ \ldots\ .$$

When a triatomic molecule has a symmetry axis, for example in the XY_2 molecules, only b-type transitions can occur. In these cases one must also examine the nuclear spin statistics which influence both the selection rules and population of the rotational levels.

2) Rotational and Centrifugal Distortion Constants

Until approximately 1970 the Kivelson and Wilson [9] formulation of the Hamiltonian for a non-rigid asymmetric rotor was widely employed in analyzing rotational spectra. With the parameter notation employed by Kirchhoff [10] the Kivelson-Wilson Hamiltonian is:

$$\mathscr{H} = A'P_a^2+B'P_b^2+C'P_c^2+1/4 \sum_{\alpha,\beta} \tau'_{\alpha\alpha\beta\beta}P_\alpha^2P_\beta^2 \quad ,$$

where $\alpha,\beta = a,b$, or c. For a planar molecule the following planarity relations reduce the six linear combinations of distortion constants to four and provide the determinable parameters shown in column 1 of table 1.2.1:

$$\tau_{acac} = \tau_{bcbc} = 0,$$
$$\tau_{aacc} = \frac{C^2}{A^2}\tau_{aaaa} + \frac{C^2}{B^2}\tau_{aabb} ,$$
$$\tau_{bbcc} = \frac{C^2}{B^2}\tau_{bbbb} + \frac{C^2}{A^2}\tau_{aabb} ,$$
$$\tau_{cccc} = \frac{C^2}{A^2}\tau_{aacc} + \frac{C^2}{B^2}\tau_{bbcc} .$$

For non-planar molecules Dreizler et al. [11,12] found the Kivelson-Wilson distortion constants were indeterminant. Watson [13,14] introduced a new relationship which allows the Kivelson-Wilson Hamiltonian to be expressed in terms of five independent centrifugal distortion coefficients, or linear combination of taus, which eliminates the indeterminancy noted by Dreizler et al. Much of the recent analysis of rotational spectra follow Watson's reformulation [15,16] in the form of a reduced Hamiltonian which simplified the computation of the energy levels.

Since there is not a unique unitary transformation which allows the nine Kivelson-Wilson parameters to be reduced to eight determinable parameters, several variations of the Watson reduced Hamiltonians are commonly employed in practice. The two most often employed result in the determinable parameters listed in columns 2 and 3 of table 1.2.1. In reanalyzing the microwave spectra of triatomic molecules, Kirchhoff's [10] formulation has been used and the planarity conditions have been invoked in the spectral fitting process to fix τ_3. See reference [10] for additional details. The second commonly used formulation is described in detail by Gordy and Cook [4]. Yamada and Winnewisser [17] have examined the effects of employing different reductions for the three King, Hainer and Cross axis representations I^r, II^r, and III^r [18]. They provide a useful set of relations between the spectroscopic constants determined in the various reduction procedures and discuss the implications of the τ defect when employing the planarity conditions. When the spectral data requires a higher order Hamiltonian, such as inclusion of P^6 terms, generally the first-order perturbation treatment suggested by Watson [16] has been used. For some light molecules such as H_2O and H_2S even higher order terms were needed. See Gordy and Cook [4] or the sources of the spectroscopic constants quoted in the tables on these species.

c. Molecules with Doublet Electronic Ground States

The spectra and spectral analysis for molecules with one or more unpaired electrons are substantially more complex, particularly for non-linear free radicals, than for molecules with zero resultant electronic spin. The triatomic species which have doublet, $S=1/2$, ground states are HCO, NCO, HC_2, ClO_2, HO_2, NF_2, NH_2, and NO_2. In addition to the molecular rotational angular momentum, N, the interactions from electronic spin, S, and nuclear spin, I, must be included in the Hamiltonian. Depending on the magnitude of the various interactions, one of the following three coupling schemes are used in limiting cases:

TABLE 1.2.1. Determinable rotational and centrifugal distortion constants (P^4) employed by various workers[a]

Kivelson-Wilson parameters for planar molecules	Kirchhoff parameters (following Watson [15])	Watson parameters [16]
A'	$A''=A'-1/2\tau'_{bbcc}$	$\mathscr{A}$
B'	$B''=B'-1/2\tau'_{aacc}$	$\mathscr{B}$
C'	$C''=C'-1/2\tau'_{aabb}$	$\mathscr{C}$
τ_{aaaa}	τ_{aaaa}	Δ_J
τ_{bbbb}	τ_{bbbb}	Δ_{JK}
τ_{abab}	τ_{cccc}	Δ_K
τ_{aabb}	$\tau_1=\tau'_{aabb}+\tau'_{bbcc}+\tau'_{ccaa}$	δ_J
	$\tau_2=(A'/S)\tau'_{bbcc}+(B'/S)\tau'_{aacc}+(C'/S)\tau'_{aabb}$	δ_K
	$\tau_3=[S/(B'-A')]\tau'_{aabb}+[S/(A'-C')]\tau'_{aacc}$ $+[S/(C'-B')]\tau'_{bbcc}$ where $S=A'+B'+C'$	

[a] For conversion between the various sets of parameters see references [4], [9], [10], and [17].

a) $N + S = J$; $J + I = F$
b) $S + I = G$; $G + N = F$
c) $N + I = E$; $E + S = F$

These interactions and the Hamiltonian for such molecules are discussed by Lin [19], Van Vleck [20], Curl and Kinsey [21] and others. Curl and Kinsey [21] have summarized the spectroscopic constant notation employed in the various formulations and developed an alternate method which can be applied to the triatomic species. Since none of these species have been reanalyzed in the present work, the notation employed in the publications cited is followed in the present tables of spectroscopic constants.

1.3. Evaluation of the Spectral Data

The evaluation has a two-fold purpose, first, the selection of the best set of measured transition frequencies and, second, selection or calculation of consistent and reliable spectroscopic constants. Since measured or calculated uncertainties are the best indicators of the quality of the data, a substantial portion of the critical evaluation effort has gone into determining these uncertainties.

a. General Procedure

Generally, the selection of the most reliable transition frequencies posed few problems since there were relatively few cases where duplicate measurements have been reported for the same transition. In cases where this did occur, the selection was based on both the overall consistency of the measurement in question with the other spectral data available, and on the reported uncertainty in the measurements. In nearly all cases the measurements with the smallest uncertainties reported by the authors were found to be the most reliable.

The determination of the most reliable molecular constants posed more severe difficulties. Occasionally inconsistencies arose in cases where data were reported by several independent workers who studied quite different regions of the spectrum, e.g., molecular beam measurements vs. microwave measurements or centimeter vs. millimeter-wave measurements. If all of the available data had not been analyzed simultaneously in these instances, a complete reanalysis was carried out to eliminate the discrepancies. These calculations also resulted in the detection of a number of misprints in the literature which were not obvious through simple inspection of the reported assignments and transition frequencies. Since a question might arise concerning the correct value when a difference is noted between the present compilation and the reference cited, the following section summarizes the typographical errors, changes in notation and other errors rectified in the present work.

b. Discussion of Specific Corrections and Reanalysis of the Data

The discussion of corrections and reanalysis follows the order of the spectral data tables of section 2. For molecular species which are not mentioned here, no corrections or reanalysis were necessary and the data reported should be identical to that given in the original work. Note that for all linear molecules the lower frequency stretching vibration is labeled ν_3.

1) ArClF

The transition reported at 5328.445 in table III of reference [74009] should read 5428.445.

2) HBS

Several errors have been corrected in table IV of reference [73027]. The rotational quantum numbers (J) for $H^{10}B^{32}S$ have been changed to $J=6$–5 from $J=5$–4 for the transitions near 241 GHz. The misprint in the $D^{11}B^{32}S$ $J=8$–7 transition shown as 225 827.68 MHz has been corrected to read 255 827.68 MHz. These did not affect the derived spectral constants reported in reference [73027].

3) BrCN

The most complete rotational analysis is that reported by Tetenbaum [52000] for the $J=6$–5 lines, Burrus and Gordy [56003] for the millimeter transitions and Oka and Hirakawa [57002] for the $J=1$–0 and $J=2$–1 transitions. Although the small differences in the rotational and hyperfine constants reported in these independent studies might be eliminated by refitting the entire data set, the magnitude of such an effort could not be justified in light of the slight improvements foreseen. Note that the frequency for the upper ℓ-doublet of $^{79}BrCN$ in table IX of Burrus and Gordy [56005] should read 223 150.44. Also the present tables have labeled the vibrational state for the Br–C stretch as ν_3 rather than ν_1 which was used in the references cited.

4) ClCN

The frequency for the $\nu_2=1$, $J=2$–1, $F=7/2$–5/2 transition of $^{35}Cl^{12}C^{14}N$ given by Townes et al. [48002] should read 23938.6 MHz and not 23928.6 MHz. In table IV of reference [51003] the column headings should be reversed for the observed transitions. In table IX of reference [56005] the $J=18$–17 transitions for $^{37}ClCN$ are not consistent with the other observations. These are not included in the present work. The Cl–C stretching vibration is labeled ν_3 here rather than ν_1 as given in the literature.

5) HCN and OCS

The substance of the present HCN and OCS tables was taken from the excellent review by A. Maki [74001]. This has been supplemented with new data from several recent publications. It should be noted that the calculated hypothetical transition frequency for the $J=2$–1 of $H^{13}C^{14}N$ given in table 16 of [74011] is erroneous. The correct measured frequency is given in table 10.2 here. The asterisks shown in the uncertainty columns of the spectral line table for HCN and OCS indicate that the transition frequency is a calculated rather than a measured value.

6) OCSe

In calculating B_v the centrifugal distortion term was included for all cases. Several errors in the original work have been corrected. In [49000] the $J=3$–2 transition of

$OC^{74}Se$ (00^00) should read 24574.67 MHz, in [50012] the $J=3$–2 transition of $OC^{77}Se$ (00^00) should read 24331.38 MHz and in [67010] the $J=4$–3 transition of $^{18}O^{12}C^{80}Se$ (00^00) should read 29781.5 MHz. This last line has been remeasured in [76015]. The value of $eqQ(^{79}Se)$ and $c(^{79}Se)$ given in [55005] should be positive rather than negative as shown.

7) ClNO

In the reanalysis of $^{35}ClNO$, two measured lines were excluded from the fit since they show significant deviations. The $10_{9,2}$–$9_{9,1}$ transition reported in [66012] at 111213.25 MHz is calculated 1.48 MHz higher in frequency with an uncertainty of 0.14 MHz and the $18_{0,18}$–$17_{0,17}$ line reported in [66012] at 198798.54 MHz is calculated 15.62 MHz lower in frequency with an uncertainty of 0.18 MHz. The error in the $4_{1,3}$–$4_{0,4}$ transition frequency reported in [75010] has been corrected to read 83635.88 MHz. Very poor agreement was obtained in the centrifugal distortion fit to the $2_{0,2}$–$1_{0,1}$ transition and hyperfine splittings for $^{37}ClNO$. The strongest components, the unresolved pair $F=7/2$–5/2 and $F=5/2$–3/2, are calculated 0.80 MHz higher than observed and the $F=3/2$–3/2 transition is calculated 1.32 MHz higher than observed. The hyperfine analysis included the three components of the $1_{0,1}$–$0_{0,0}$ transition and the three unblended components of the $2_{1,2}$–$1_{1,1}$ and $2_{1,1}$–$1_{1,0}$ transitions. The discrepancy could arise from ignoring the ^{14}N hyperfine splitting, although this appears unlikely since these splittings were apparently unresolved.

8) NSCl

The $12_{2,10}$–$13_{1,13}$ frequency in reference [72045] has been corrected to read 31601.97 MHz.

9) Cl_2O

Three isotopic forms of Cl_2O have been refit. For $^{35}Cl_2O$ four of the measured transitions were not included in the centrifugal distortion fit since they showed poor agreement with the calculated values. The transitions excluded were the following:

	ν_{obs}(MHz)	$\Delta\nu$(Obs–calc)
$12_{2,11}$–$13_{1,12}$	10 358.5	–2.16
$17_{1,16}$–$16_{2,15}$	26 581.0	–0.75
$32_{4,28}$–$33_{3,31}$	36 359.5	0.72
$32_{4,29}$–$33_{3,30}$	24 543.6	–0.52

For $^{35}ClO^{37}Cl$ all observed lines were refit. Although the fit was relatively poor as can be seen from the standard deviation of the fit (table 26), none of the transitions could be excluded based on the analysis. However, for $^{37}Cl_2O$ one measurement clearly was not consistent with the rest of the data. When excluded from the centrifugal distortion analysis, the $16_{2,14}$–$17_{1,17}$ transition with reported center frequency of 26895.0 MHz was calculated as 26883.9±1.0 MHz. The other lines agreed rather well.

10) HOF

In reanalyzing HOF and DOF, one transition of each species was excluded. In each case the statistical deviations noted were sufficiently small; thus, the decision to remove these from the analysis was borderline. For HOF the $7_{1,7}$–$6_{1,6}$ at 361349.55 was not fit and calculated at 361350.22±0.12. For DOF the line excluded was the $5_{3,2}$–$4_{3,1}$ measured at 245734.60 and calculated at 245735.11±0.03. Several typographical errors in reference [72030] were corrected. In table I of [72030] the quantum numbers for the 365648.94 transition should read $6_{0,6}$–$7_{0,7}$. In table IV the decimal point in the τ_{aaaa} value of DOF is misplaced and should read –106.53.

11) FNO

One transition was not included in the P^6 centrifugal distortion analysis since it shows a large deviation from the calculated value. In particular, the $14_{2,12}$–$15_{1,15}$ transition is calculated at 27632.73(30) MHz but is reported 2.15 MHz higher in frequency. Several other transitions listed below show fairly large $\Delta\nu$(obs-calc):

Transition	$\Delta\nu$(obs–calc) MHz
$18_{2,16}$–$17_{3,15}$	0.486
$12_{2,10}$–$13_{1,13}$	0.481
$8_{0,8}$ – $7_{1,7}$	–0.449
$8_{5,4}$ – $7_{5,3}$	0.640
$7_{3,5}$ – $6_{3,4}$	0.696
$7_{1,6}$ – $6_{1,5}$	0.436
$7_{5,3}$ – $6_{5,2}$	–0.430
$5_{0,5}$ – $4_{1,4}$	–0.606

Based on the students t test, which ranged from 2 to 3 for these lines they could not be excluded but the measurement accuracy is questionable in these cases.

12) NSF

Three transitions fit poorly and were excluded from the final analysis. Their calculated frequencies are shown below along with $\Delta\nu$ which is $\nu_{obs}-\nu_{calc}$:

$1_{1,0}$ – $1_{0,1}$	42324.390(14) MHz	$\Delta\nu=0.400$ MHz
$15_{2,13}$–$16_{1,16}$	20474.989(22) MHz	$\Delta\nu=0.229$ MHz
$15_{4,12}$–$16_{3,13}$	20649.868(19) MHz	$\Delta\nu=0.218$ MHz

The centrifugal distortion results given are identical to those reported by Kirchhoff [72031], however, the molecular constants are quoted with more significant figures. An improved analysis of the nuclear quadrupole interaction of ^{14}N was obtained from a fit to 33 hyperfine components with a standard deviation of 0.047 MHz.

13) GeF_2

Three isotopic forms of GeF_2 were reanalyzed. All the transitions reported for $^{70}GeF_2$ were fit. The $3_{0,3}$–$2_{1,2}$ transition of $^{72}GeF_2$ showed substantial deviation, calculated 0.76 MHz higher than observed, and was excluded.

Similarly, two lines of $^{74}GeF_2$ had large t test values. The lines excluded were the $7_{3,4}-7_{2,5}$ reported at 33146.39 and calculated at 33147.87(18) and the $7_{4,3}-6_{5,2}$ line measured at 17098.86 and calculated at 17099.64(6).

14) NF_2

All but one transition reported by Brown et al. [74003] was employed in the present centrifugal distortion analysis. The $14_{2,12}-15_{1,15}$ transition, which was excluded, was calculated at 16510.07±8.80 MHz which is 174 MHz higher in frequency than reported. Brown et al. indicated that the reported center frequency is uncertain since the observed multiplet pattern was incomplete.

15) F_2O

The spectrum analysis of F_2O by Kirchhoff has been reexamined in the present work. Details of the present centrifugal distortion fit and comparison with Kirchhoff's results are given in the Appendix (sec. A.2). Although some improvement resulted from this analysis, it should be noted that in both cases all the sextic centrifugal distortion constants are not well determined but necessary to obtain a fit which is consistent with the measurement accuracy. New measurements have allowed further improvement in the constants given in table 34.

16) SF_2 and SiF_2

For SF_2 the centrifugal distortion analysis reported by Kirchhoff, Johnson, and Powell [73035] is given in table 35. For SiF_2 the results Kirchhoff [72031] reported are given, however, the values of the determinable parameters are quoted to the number of significant figures required to reproduce the calculated transition frequencies.

17) H_2O and H_2S

The microwave spectrum of both H_2O and H_2S were recently critically reviewed by DeLucia et al. [74005] and Helminger et al. [73040]. Due to the importance of these molecules in atmospheric, interstellar, and laboratory studies, the measured and calculated spectral lines reported in these reviews for HDO, H_2S, and HDS are included in the spectral tables. Also the measured spectral lines reported for isotopic forms of these molecules, which were not included in the earlier reviews, are included in the present tables. An asterisk in the uncertainty column indicates that the frequency given is calculated rather than measured.

18) H_2Se

A misprint in table III of [50011] was corrected. The quantum number heading for the first column should read $1_{0,1}-1_{1,0}$.

19) S_2O

Some of the rotational lines of S_2O were measured independently by Tiemann et al. [74006] and Cook et al. [73041]. These measurements were examined to obtain the best data set. The $^{32}S_2O$ transitions given in table 50.2 were selected as the best set based both on the reported measurement uncertainty and their agreement in the analysis reported in [74006]. The centrifugal distortion analysis of this set of transitions provided the slightly improved rotational and distortion constants shown in table 50.

20) SO_2

The number of rotational transitions of the 19 isotopic forms of SO_2 which have been reported exceeds 3000. Unfortunately, in the majority of the papers published on SO_2 no measurement uncertainties are given, and in spite of detailed centrifugal distortion analyses no standard deviations of the molecular constants are reported. For this reason and the importance of SO_2 in laboratory and astronomical studies, reanalysis of the most abundant isotopic forms of SO_2 was carried out. For $^{32}S^{16}O_2$ the spectrum of the ground vibrational state, ν_1, ν_2, $2\nu_2$, and ν_3 were refit. Due to limitations in the computer program employed, all calculations were restricted to $J \leqslant 60$. For the ground state of $^{32}S^{16}O_2$ 198 transitions were least-squares fit to the P^6 Hamiltonian. The SO_2 spectral line table lists all the measured transitions and the predicted transition frequencies of lines not measured up to 360 GHz $J \leqslant 60$. Both the observed and predicted frequencies are given for transitions which were not included due to limited program size. Comparison of the observed and predicted frequencies of these lines indicated that little improvement in the fit would be obtained in an extended analysis. It should be noted that the unpublished data communicated privately by Schonk was assigned to the ground and ν_2 states of $^{32}SO_2$ from preliminary calculations, and was included in the final fit.

The data base for the remaining vibrational states and isotopic species of SO_2 was the limiting factor in the reanalysis. The number of transitions, maximum J and frequency range of the calculations are summarized in table 1.3.1. Due to the wide range in the data available, the predicted transitions, given in table 51.7, were restricted to a maximum standard deviation in frequency as shown in the last line of table 1.3.1 here. No predicted frequencies are provided for $^{33}SO_2$, since the hyperfine split lines would make the table quite voluminous. If these are of interest, the predicted values may be obtained from the author. The factor which determined which vibrational states and isotopic forms to be reanalyzed was the estimated population at room temperature was ~0.3 percent or greater. In all cases the predicted transitions are indicated with an asterisk in the uncertainty column.

In Vol. IV of NBS Monograph 70 [1] the SO_2 dipole moment was erroneously listed as μ_a rather than μ_b. Unfortunately this error has led to several radio-astronomical searches for non-existent a-type transitions of SO_2. B. E. Turner, M. A. Gordon and G. T. Wrixon (Astrophys. J. **177**, 609 (1972)) reported a negative result from a search for the $2_{02}-1_{01}$ transition and T. Cato, J. Ellder, B. Höglund, O. E. H. Rydbeck, B. Rönnäng and A. Sume (Onsala Space Observatory, Chalmers University of Technology, Research Report No. 109 (1972)) report a search for the $1_{10}-1_{11}$ transition. Since SO_2 was subsequently detected in interstellar sources (L. E. Snyder, J. M. Hollis, B. L. Ulich, F. J. Lovas, D. R. Johnson, and D. Buhl, Astrophys. J. (Letters) **198**, L81 (1975)), the

TABLE 1.3.1. Limits employed in the analysis of SO_2 and transition frequency predictions

Molecular species	Number of transitions fit	J_{max}	Maximum frequency	Maximum standard deviation (employed in limiting the predicted transitions)
$^{32}SO_2$ gnd.	198	60	360 GHz	no limit
$^{32}SO_2$ ν_1	41	46	360 GHz	2 MHz
$^{32}SO_2$ ν_2	90	60	360 GHz	5 MHz
$^{32}SO_2$ ν_3	33	42	360 GHz	2 MHz
$^{32}SO_2$ $2\nu_2$	52	53	360 GHz	2 MHz
$^{33}SO_2$ gnd.	40	40	130 GHz	no predictions
$^{34}SO_2$ gnd.	59	50	350 GHz	5 MHz
$^{34}SO_2$ ν_2	24	38	50 GHz	no limit

detailed listing of the measured and calculated rotational spectrum of SO_2 presented in table 51.7 should provide guidance for further astronomical observations. Also, this complete list of the SO_2 spectral lines should benefit laboratory studies. Sulfur dioxide is often formed as a gas-phase by-product from the decomposition of sulfate impurities in many refractory compounds employed in high temperature microwave studies. The SO_2 spectrum may also serve for calibration of sub-millimeter spectrometers where a reference spectrum is often required to determine the frequency scale. The SO_2 data in table 51.7 were limited to a frequency of 360 GHz, however, calculations on the $^{32}S^{16}O_2$ ground state have been extended to 1500 GHz for transitions up to $J=60$. These results are available from the author upon request.

21) O_3

Due to the importance of ozone in both laboratory and atmospheric studies, several of the more abundant isotopic forms were reanalyzed in order to provide predicted transition frequencies where no measurements are available. Only $^{16}O_3$, $^{16}O^{16}O^{18}O$, and $^{16}O^{18}O^{16}O$ were included. For $^{16}O_3$ eight of the measured lines were not fit due to large statistical deviations. For $^{16}O^{18}O^{16}O$ two transitions were not fit and three of the $^{16}O^{16}O^{18}O$ transitions were excluded. These are listed in table 1.3.2 along with the $\Delta\nu$(obs–calc) and $t(\Delta\nu)$ values. Predictions were carried to $J=42$ for $^{16}O_3$, to $J=43$ for $^{16}O^{16}O^{18}O$, and to $J=38$ for $^{16}O^{18}O^{16}O$. The calculated values ranged up to 400 GHz. No predicted lines were eliminated from inclusion in table 53.4 due to large predicted uncertainties since the largest encountered was $\sim$0.7 MHz. The molecular constants resulting from this analysis are shown in table 53. The spectra from $^{18}O^{16}O^{18}O$, $^{16}O^{18}O^{18}O$, and $^{18}O_3$ were also refit, but predicted transitions for these rarer forms were not included in the spectral tables. All measurements reported for these species were included in the analysis which resulted in the parameters given in table 53.1.

TABLE 1.3.2. Transitions excluded in analysis of ozone

Molecule	Transition	Measured frequency (MHz)	$\Delta\nu$ (MHz)	$t(\Delta\nu)^a$
$^{16}O_3$	$8_{3,5}-9_{2,8}$	244 158.04	0.39	6.6
	$10_{1,9}-9_{2,8}$	10 226.00	0.27	4.7
	$9_{3,7}-10_{2,8}$	210 803.80	-0.58	-10.1
	$21_{2,20}-20_{3,17}$	9 201.00	0.71	12.2
	$23_{4,20}-24_{3,21}$	14 866.00	0.62	10.5
	$27_{3,25}-26_{4,22}$	16 163.00	0.61	10.4
	$38_{6,32}-39_{5,35}$	25 511.00	-0.83	12.2
	$41_{5,37}-40_{6,34}$	27 862.00	-0.57	- 7.5
$^{16}O^{18}O^{16}O$	$9_{2,8}-9_{1,9}$	295 318.60	0.10	3.5
	$26_{6,20}-27_{5,23}$	258 336.50	-0.13	- 4.2
$^{16}O^{16}O^{18}O$	$26_{2,24}-26_{1,25}$	295 432.72	-0.14	- 3.9
	$26_{6,21}-27_{5,22}$	367 444.09	0.15	3.8
	$35_{3,32}-35_{2,33}$	368 074.31	-0.30	- 3.8

[a] $t(\Delta\nu)=\Delta\nu/\sigma(\Delta\nu)$ where $\sigma(\Delta\nu)=\{\sigma^2+\sigma^2(\nu_{calc})\}^{\frac{1}{2}}$ and σ is the standard deviation of the fit.

1.4. List of Symbols

a. Quantum Numbers

J	Resultant total angular momentum quantum number, excluding nuclear spins.
N	Rotational angular momentum quantum number, excluding electron and nuclear spins, in the case where electron spin is present.
K	Projection of J (or N) on the symmetry axis in the limiting prolate or oblate symmetric top.
F_1	Resultant angular momentum quantum number including nuclear spin for one nucleus.
F	Resultant total angular momentum quantum number.
λ or ϵ	Quantum number employed when F_1 is not a good quantum number. This value simply numbers the levels from lowest to highest energy for the same F quantum number.
ν_1,ν_2,ν_3 v_1,v_2,v_3	Vibrational modes (ν) and quantum numbers (v). ν_1 is the highest energy symmetric stretching mode, ν_2 is the bending mode, and ν_3 is the asymmetric stretch for XY_2 molecules or lowest energy stretch for XYZ molecules.
U or L	Upper or lower energy level or transition frequency.
′ or ″	Prime or double prime is used to distinguish the upper (′) and lower (″) levels in a transition. They occur as superscripts on the quantum numbers.
ℓ	Quantum number for vibrational angular momentum.
I (or I_i)	Angular momentum quantum number of nuclear spin for one (or ith) nucleus.
S	Resultant angular momentum number of electron spins. Σ is the projection of S on the molecular axis.
Λ	Absolute values of the projection of the resultant orbital angular momentum on the molecular axis.
Ω	Absolute value of the projection of the total electronic angular momentum on the molecular axis.
Σ, Π, Δ	Electronic state designation for which $\Lambda=0,1,2$, respectively.

b. Molecular Constants

A,B,C $\mathscr{A},\mathscr{B},\mathscr{C}$	Rotational constants (MHz). These are related to the principal moments of inertia: $A=h/8\pi^2 I_a$, etc.
$\bar{B}$	B-bar equals $(B+C)/2$.
τ, Δ, δ, D	Quartic centrifugal distortion constants (MHz or kHz).
H, h	Sextic centrifugal distortion constants (MHz or kHz).
L, ℓ, G, g	Octic centrifugal distortion constants (MHz).
P, p, F	Dectic centrifugal distortion constants (MHz).
eqQ_{aa}(X),... χ_{aa}(X),...	Nuclear electric quadrupole coupling constant along principal axis indicated for nucleus X (MHz).
$eqQ\eta$	Product of the nuclear quadrupole coupling constant and the asymmetry parameter for the bending vibrational state.
$\mu_{a,b}$	Components of the electric dipole moment along the a- or b-principal axes.
α_v, γ_{vv}	Rotation-vibration coefficients in the power series representing B_v (see text).
q_v	ℓ-doubling constant (MHz).
$\sigma_{\parallel},\sigma_{\perp}$	Components of the magnetic shielding tensor which are parallel and perpendicular to the molecular axis, respectively.
Q	Molecular quadrupole moment relative to the center of mass (esu·cm^2).
$\alpha_{\parallel}-\alpha_{\perp}$	Electric polarizability anisotropy (cm^3).
$\chi_{\perp},\chi_{\parallel}$	Components of the magnetic susceptibility tensor which are respectively perpendicular and parallel to the molecular axis (erg/G^2·mol).
$\chi_{xx}-\chi_{yy}$	Magnetic susceptibility anisotropy.
$g_{\perp},g_{\parallel}$	Components of the molecular **G** tensor which are respectively perpendicular and parallel to the molecular axis. $g_{\perp}$ is sometimes denoted g or g_J for linear molecules in the ground state (μ_N).
$g_{xx}-g_{yy}$	Anisotropy of the molecular **G** tensor perpendicular to the molecular axis (μ_N).
c_X or M	Spin rotation constant related to nucleus X (kHz).
S_{XY}	Spin-spin interaction constant between nucleus X and nucleus Y (kHz).

α_p, β_p — Ω-type doubling parameters,

$$\alpha_p = 4\Sigma(-1)^S \times \frac{\langle \Pi | (A+2B)L_y | \Sigma \rangle \langle \Sigma | BL_y | \Pi \rangle}{E_\Sigma - E_\Pi}$$

$$\beta_p = 4\Sigma(-1)^S \times \frac{|\langle \Pi | BL_y | \Sigma \rangle|^2}{E_\Sigma - E_\Pi}$$

p_{eff} — Λ-type doubling constant in the $^2\Pi_{1/2}$ state (MHz).

a,b,c,d — Magnetic hyperfine coupling constants (MHz) where,

$$a = 2\mu_B g_N \mu_N \langle 1/r^3 \rangle,$$

$$b = -\mu_B g_N \mu_N \left\langle \frac{3\cos^2\chi - 1}{r^3} \right\rangle + \frac{16}{3}\pi\, \mu_B g_N \mu_N\, \Psi^2(0),$$

$$c = 3\mu_B g_N \mu_N \left\langle \frac{3\cos^2\chi - 1}{r^3} \right\rangle,$$

$$d = 3\mu_B g_N \mu_N \left\langle \frac{\sin^2\chi}{r^3} \right\rangle.$$

Here μ_B is the Bohr magneton, μ_N is the nuclear magneton, and g_N is the nuclear g-value.

A — Spin-orbit coupling constants defined by the power series expansion, $A = A_e + A_{(1)}\xi + A_{(2)}\xi^2 + \ldots$.

$(O)_S$ — Spin-rotation interaction constant (ref. [21]). Coefficient in the Hamiltonian term $(O)_S\, N{\cdot}S$. This is related to ϵ_{ii}'s in Lin's notation [19] as $(O)_S = 1/3(\epsilon_{xx}+\epsilon_{yy}+\epsilon_{zz})$.

$(ij)_S, T_{ij}$ — Spin-rotation interaction constants where i and j are a, b, or c and the Hamiltonian term is $\Sigma(ij)_S N_i S_j$. See Curl and Kinsey [21] and Bowater et al. [22] (for T_{ij} notation) for correspondence to the notation of other workers.

$(O)_I, a_I$ — Fermi interaction constant and coefficient of the $I{\cdot}S$ operator. $(O)_I = (16\pi/3) g_I \mu_B \mu_N [\Psi(O)]^2$.

$(ij)_I$ — Magnetic dipole-dipole interaction constant in the Hamiltonian term $(ij)_I S_i I_j$ where i and j are a, b, or c. $(ij)_S = g_S g_I \mu_B \mu_N [\delta_{ij} - 3r_i r_j / r^3]_{Av}$.

$(ij)_Q$ — Nuclear electric quadrupole interaction constant in the term $(ij)_Q I_i I_j$ where i and j are a, b, or c and $(ij)_Q = [eQ/2I(2I-1)](\partial^2 V/\partial i \partial j)$.

A_S, B_S, C_S — Combination of spin-rotation constants where $A_S = (aa)_S + (O)_I$, $B_S = (bb)_S + (O)_I$ and $C_S = (cc)_S + (O)_I$.

c. Other

X — Refers to unknown uncertainty when appearing in the uncertainty column.

* — Asterisks in the uncertainty column indicate that the transition frequency is calculated rather than measured.

(...) — Parentheses in the numerical listings contain measured or estimated uncertainties. For example, the value 1.407(83) should be interpreted as 1.407±0.083. Thus the value in parentheses refers to the last significant digits given.

a,b,c — Designate principal axes corresponding to A, B, and C, respectively.

r(X–Y) — Distance between centers of mass of atoms X and Y (Å).

∠XYZ — Angle formed by atoms X, Y, and Z (degrees).

1.5. Special Units, Fundamental Constants, and Useful Conversion Factors

a. Special Units

D — Abbreviation for Debye units (1 D$=10^{-18}$ electrostatic units of charge × centimeters, or 1 D$=3.33564\times10^{-30}$ coulomb-meter).

cm^{-1} — Reciprocal wavelength (wave number) employed as a unit proportional to energy.

Å — Angstrom abbreviation for the unit of length in bond distances (1 Å$=10^{-10}$ m).

b. Fundamental Constants and Conversion Factors [23]

$A{\cdot}I_a$	$= 5.0537905(85)\times10^5$ MHz·u·Å^2,
h	$= 6.626176(36)\times10^{-34}$ J·s,
c	$= 2.99792458(1)\times10^8$ m·s^{-1}
1 cm^{-1}	$= 1.986478(11)\times10^{-23}$ J,
	$= 11.96266$ J mol^{-1},
	$= 29\,979.2458$ MHz,
1 u	$= 1.6605655(86)\times10^{-27}$ kg.

1.6. Acknowledgments

The author is grateful to the many Microwave Spectroscopists who provided reprints, preprints, and data prior to publication. This review has benefited from Dr. W. H. Kirchhoff's earlier work in developing computer programs for spectral analysis and formating the spectral tables. Mrs. Gloria Rotter deserves a special acknowledgment for carrying out many of the tedious tasks involving manuscript typing, keypunching the spectral data, literature searching, and proofreading the SO_2 spectral tables.

1.7. References to the Introduction

[1] M. S. Cord, J. D. Peterson, M. S. Lojko and R. H. Haas, NBS Monograph 70, Vol. IV (1968).

[2] F. J. Lovas and E. Tiemann, J. Phys. Chem. Ref. Data **3**, 609 (1974).
[3] C. H. Townes and A. L. Schawlow, *Microwave Spectroscopy*, McGraw-Hill, New York, 1955.
[4] W. Gordy and R. L. Cook, *Microwave Molecular Spectra in Techniques of Organic Chemistry*, Vol. IX, Pt. II, Second Ed., Interscience Publ., New York, 1970.
[5] J. E. Wollrab, *Rotational Spectra and Molecular Structure*, Academic Press, New York, 1967.
[6] H. W. Kroto, *Molecular Rotation Spectra*, John Wiley & Sons, New York, 1975.
[7] "Report on Notation for the Spectra of Polyatomic Molecules," J. Chem. Phys. **23**, 1997 (1955).
[8] D. R. Lide, Jr., "Microwave Spectroscopy," in *Methods of Experimental Physics*, Vol. 3, Molecular Physics, 2d Ed., Pt. A, Academic Press, New York, 1974.
[9] D. Kivelson and E. B. Wilson, Jr., J. Chem. Phys. **20**, 1575 (1952).
[10] W. H. Kirchhoff, J. Mol. Spectrosc. **41**, 333 (1972).
[11] H. Dreizler and G. Dendl, Z. Naturforsch. **20a**, 30 (1965).
[12] H. Dreizler and H. D. Rudolph, Z. Naturforsch. **20a**, 749 (1965).
[13] J. K. G. Watson, J. Chem. Phys. **45**, 1360 (1966).
[14] J. K. G. Watson, J. Chem. Phys. **48**, 181 (1968).
[15] J. K. G. Watson, J. Chem. Phys. **46**, 1935 (1967).
[16] J. K. G. Watson, J. Chem. Phys. **48**, 4517 (1968).
[17] K. Yamada and M. Winnewisser, Z. Naturforsch. **31a**, 131 (1976).
[18] G. W. King, R. M. Hainer and P. C. Cross, J. Chem. Phys. **11**, 27 (1943).
[19] C. C. Lin, Phys. Rev. **116**, 903 (1959).
[20] J. H. Van Vleck, Rev. Modern Phys. **23**, 213 (1951).
[21] R. F. Curl, Jr. and J. L. Kinsey, J. Chem. Phys. **35**, 1758 (1961).
[22] I. C. Bowater, J. M. Brown and A. Carrington, Proc. R. Soc. London A **333**, 265 (1973).
[23] E. R. Cohen and B. N. Taylor, J. Phys. Chem. Ref. Data **2**, 663 (1973).

2. Molecular Constants and Spectral Line Tables

As described in section 1.1, the data tables for each molecule consist of a table of derived molecular constants followed by the spectral line table. These are ordered alphabetically by the empirical formula.

The molecular constants are presented for each isotopic species in the order: rotational constants, hyperfine structure constants, electric and magnetic dipole moments and, when appropriate, additional references which were not utilized in the tabulation.

The spectral line tables are organized first by isotopic species. For each species the transitions are listed by increasing frequency. The references to all data can be found in section 3.

Table 1. Molecular parameters for ArClF [74009].

Parameter	$Ar^{35}ClF$ Value	$Ar^{37}ClF$ Value
$\bar{B}$ (MHz)	1327.113(5)	1319.650(5)
D_J (kHz)	4.66(20)	4.72(20)
eqQ (MHz)	-140.869(15)	-111.053(15)
S_{ClF} (kHz)	2.556[a]	
c_{Cl} (kHz)	1.85[a]	
c_F (kHz)	-1.943[a]	
μ_a (D)	1.053(3)	

[a] Obtained from the parameters for ClF.

TABLE 1.1. The microwave spectrum of ArClF

Isotopic species	$J',K' - J'',K''$	F'	F_1'	F''	F_1''	(v_1,v_2^{ℓ},v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{40}Ar^{35}Cl^{19}F$	2, 0 - 1, 0		1/2		1/2	$(0,0^0,0)$	5308.305	(5E-3)	[74009]
	2, 0 - 1, 0		1/2		3/2	$(0,0^0,0)$	5371.730	(5E-3)	[74009]
	3, 0 - 2, 0		3/2		1/2	$(0,0^0,0)$	7955.168	(5E-3)	[74009]
	3, 0 - 2, 0		9/2		7/2	$(0,0^0,0)$	7963.868	(5E-3)	[74009]
$^{40}Ar^{37}Cl^{19}F$	2, 0 - 1, 0		1/2		1/2	$(0,0^0,0)$	5378.450	(5E-3)	[74009]
	2, 0 - 1, 0		1/2		3/2	$(0,0^0,0)$	5428.445	(5E-3)	[74009]
	3, 0 - 2, 0		3/2		1/2	$(0,0^0,0)$	7911.860	(5E-3)	[74009]

Table 2. Molecular parameters for ArClH [73026]

Parameter	$Ar^{35}ClH$ Value	$Ar^{37}ClH$ Value	$Ar^{35}ClD$ Value	$Ar^{37}ClD$ Value
$\bar{B}$ (MHz)	1678.511(5)	1631.604	1657.627[a]	1611.904[a]
D_J (kHz)[a]	20.0(4)	19.0(4)	17.1(4)	16.4(4)
$eqQ_{Cl}(J=1)$(MHz)	-23.027(10)	-18.173[b]	-36.250(20)	-28.587[a]
$eqQ_{Cl}(J=2)$(MHz)	-23.025(20)		-36.262(30)	
eqQ_D (J=2)(kHz)			102.3(50)	
μ_a(J=1)(D)	0.81144(10)			
μ_a(J=2)(D)	0.81121(10)		1.00355(70)	

[a] From reference [76029].

[b] Derived from eqQ for the ^{35}Cl species and $Q_{^{35}Cl}/Q_{^{37}Cl}$ = 1.2688.

TABLE 2.1. The microwave spectrum of ArClH

Isotopic species	$J',K' - J'',K''$	F'	F_1'	F''	F_1''	(v_1,v_2^{ℓ},v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{40}Ar^{35}ClH$	1, 0 - 0, 0		5/2		3/2	$(0,0^0,0)$	3358.090	(0.01)	[73026]
	1, 0 - 0, 0		1/2		3/2	$(0,0^0,0)$	3362.698	(0.01)	[73026]
	2, 0 - 1, 0		1/2		1/2	$(0,0^0,0)$	6713.394	(0.01)	[73026]
	2, 0 - 1, 0		1/2		3/2	$(0,0^0,0)$	6723.756	(0.01)	[73026]
	3, 0 - 2, 0		3/2		1/2	$(0,0^0,0)$	10067.732	(0.01)	[76029]
	4, 0 - 3, 0					$(0,0^0,0)$	13417.	(X)	[73026]
	4, 0 - 3, 0					$(0,0^0,0)$	13418.	(X)	[73026]
	4, 0 - 3, 0					$(0,0^0,0)$	13422.	(X)	[73026]
	4, 0 - 3, 0					$(0,0^0,0)$	13424.	(X)	[73026]
	5, 0 - 4, 0					$(0,0^0,0)$	16769.	(X)	[73026]
	5, 0 - 4, 0					$(0,0^0,0)$	16775.	(X)	[73026]
$^{40}Ar^{37}ClH$	1, 0 - 0, 0		5/2		3/2	$(0,0^0,0)$	3264.	(X)	[73026]
	1, 0 - 0, 0		1/2		3/2	$(0,0^0,0)$	3267.670	(0.01)	[73026]
	2, 0 - 1, 0					$(0,0^0,0)$	6522.	(X)	[73026]
	2, 0 - 1, 0					$(0,0^0,0)$	6526.	(X)	[73026]
	2, 0 - 1, 0		1/2		3/2	$(0,0^0,0)$	6533.973	(0.01)	[76029]
$^{40}Ar^{35}ClD$	1, 0 - 0, 0		5/2		3/2	$(0,0^0,0)$	3317.002	(0.01)	[73026]
	1, 0 - 0, 0		1/2		1/2	$(0,0^0,0)$	3324.255	(0.01)	[73026]
	2, 0 - 1, 0					$(0,0^0,0)$	6630.	(X)	[73026]
	2, 0 - 1, 0		1/2		3/2	$(0,0^0,0)$	6646.273	(0.01)	[76029]
$^{40}Ar^{37}ClD$	1, 0 - 0, 0		1/2		1/2	$(0,0^0,0)$	3230.895	(0.01)	[73026]
	2, 0 - 1, 0		1/2		1/2	$(0,0^0,0)$	6447.092	(0.01)	[76029]
	2, 0 - 1, 0		1/2		3/2	$(0,0^0,0)$	6459.957	(0.01)	[76029]

Table 3. Molecular parameters for ArFH [74021].

Parameter	Value
$\bar{B}$ (MHz)	3065.719(2)
D_J (kHz)	72.1(2)
S_{HF} (kHz)	29.2(15)
μ_a (D)	1.332(2)

TABLE 3.1. The microwave spectrum of ArFH

Isotopic species	$J',K' - J'',K''$	F'	F_1'	F''	F_1''	(v_1,v_2^{ℓ},v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{40}Ar^{19}FH$	1, 0 - 0, 0	1		1		$(0,0^0,0)$	6131.134	(2E-3)	[74021]
	1, 0 - 0, 0	1		1		$(0,0^0,0)$	6131.153	(2E-3)	[74021]
	1, 0 - 0, 0	2		1		$(0,0^0,0)$	6131.153	(2E-3)	[74021]
	1, 0 - 0, 0	0		1		$(0,0^0,0)$	6131.178	(2E-3)	[74021]
	2, 0 - 1, 0	2		0		$(0,0^0,0)$	12260.525	(4E-3)	[74021]
	2, 0 - 1, 0	1		0		$(0,0^0,0)$	12260.555	(4E-3)	[74021]
	2, 0 - 1, 0	2		1		$(0,0^0,0)$	12260.555	(4E-3)	[74021]
	2, 0 - 1, 0	1		1		$(0,0^0,0)$	12260.581	(4E-3)	[74021]
	2, 0 - 1, 0	2		1		$(0,0^0,0)$	12260.581	(4E-3)	[74021]

Table 4. Rotational constants for HBS [73027].

Isotopic Species	Vib. State v_1 v_2^{ℓ} v_3	B_v (MHz)	D_v (MHz)	q_v (MHz)
$H^{11}B^{32}S$	0 0^0 0	19083.006(4)	0.02189(4)	
	1 0^0 0	18994.33(42)[a]	---	
	0 1^1 0	19106.472(20)	0.0219[b]	46.45(1)
$H^{10}B^{32}S$	0 0^0 0	20080.234(9)	0.02422(9)	
	1 0^0 0	19979.0(12)[a]	---	
	0 1^1 0	20108.482(30)	0.0240[b]	50.80(5)
$H^{11}B^{34}S$	0 0^0 0	18791.623(10)	0.02125(10)	
	1 0^0 0	18704.4(12)[a]	---	
$H^{10}B^{34}S$	0 0^0 0	19793.168(15)	0.02318(25)	
	1 0^0 0	19693.5(18)[a]	---	
$D^{11}B^{32}S$	0 0^0 0	15937.934(7)	0.01425(4)	
	0 1^1 0	15970.719(20)	0.0143[b]	40.65(6)
$D^{10}B^{32}S$	0 0^0 0	16563.378(11)	0.01561(6)	
	0 1^1 0	16600.733(30)	0.0156[b]	43.16(2)
$D^{11}B^{34}S$	0 0^0 0	15686.936(12)	0.01402(8)	
$D^{10}B^{34}S$	0 0^0 0	16317.465(18)	0.01497(14)	

[a] Calculated from $\Delta B = B'-B''$ given by Sams and Maki [75013].

[b] The ground state value of D_v was assumed to derive B_v from the data in Ref. [73027]. The B_v values given may not represent the true value due to a lack of information on the possible Fermi resonance between the $(0,2^0,0)$ and $(0,0^0,1)$ excited states.

Table 4.1. Hyperfine and Zeeman constants and electric dipole moment for HBS [74039].

Parameter	Value	Zeeman Constants	$H^{11}B^{32}S$ Value	$D^{11}B^{32}S$ Value
eqQ (^{11}B)	-3.72 (3) MHz	$g_\perp$ (μ_N)	-0.0414(2)	-0.0356(2)
eqQ (^{10}B)	-7.91 (3) MHz	$\chi_\perp - \chi_\parallel$ (erg/G^2.mole)	$7.2(5)\times10^{-6}$	$9.8(21)\times10^{-6}$
$M_\perp$ (^{11}B)	-7.2 (30) kHz	$Q_\parallel$ (esu·cm^2)	$2.7(6)\times10^{-26}$	
$M_\perp$ (^{10}B)	-2.6 (10) kHz			
μ_0	1.298(5) D			

TABLE 4.2. The microwave spectrum of HBS

Isotopic species	$J' - J''$	F'	F'_1	F''	F''_1	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{11}B^{32}S$	1 - 0		3/2		3/2	$(0,0^0,0)$	38165.250	(0.05)	[74039]
	1 - 0		5/2		3/2	$(0,0^0,0)$	38166.198	(0.05)	[74039]
	1 - 0		1/2		3/2	$(0,0^0,0)$	38166.907	(0.05)	[74039]
	3 - 2					$(0,0^0,0)$	114495.62	(0.10)	[73027]
	4 - 3					$(0,0^0,0)$	152658.42	(0.10)	[73027]
	4 - 3					$(0,1^{L1},0)$	152660.72	(0.10)	[73027]
	4 - 3					$(0,1^{U1},0)$	153032.27	(0.10)	[73027]
	5 - 4					$(0,0^0,0)$	190819.16	(0.10)	[73027]
	5 - 4					$(0,1^{L1},0)$	190821.95	(0.10)	[73027]
	5 - 4					$(0,1^{U1},0)$	191286.54	(0.10)	[73027]
	6 - 5					$(0,0^0,0)$	228977.17	(0.10)	[73027]
	7 - 6					$(0,0^0,0)$	267132.04	(0.10)	[73027]
	8 - 7					$(0,0^0,0)$	305283.24	(0.10)	[73027]
$H^{10}B^{32}S$	3 - 2					$(0,0^0,0)$	120478.83	(0.10)	[73027]
	4 - 3					$(0,0^0,0)$	160635.60	(0.10)	[73027]
	4 - 3					$(0,1^{L1},0)$	160658.99	(0.10)	[73027]
	4 - 3					$(0,1^{U1},0)$	161065.00	(0.10)	[73027]
	5 - 4					$(0,0^0,0)$	200790.34	(0.10)	[73027]
	6 - 5					$(0,0^0,0)$	240942.09	(0.10)	[73027]
	6 - 5					$(0,1^{L1},0)$	240976.72	(0.10)	[73027]
	6 - 5					$(0,1^{U1},0)$	241586.84	(0.10)	[73027]
	7 - 6					$(0,0^0,0)$	281090.43	(0.10)	[73027]
	8 - 7					$(0,0^0,0)$	321234.47	(0.10)	[73027]
$H^{11}B^{34}S$	4 - 3					$(0,0^0,0)$	150327.46	(0.10)	[73027]
	5 - 4					$(0,0^0,0)$	187905.55	(0.10)	[73027]
	6 - 5					$(0,0^0,0)$	225481.26	(0.10)	[73027]
	7 - 6					$(0,0^0,0)$	263053.63	(0.10)	[73027]
	8 - 7					$(0,0^0,0)$	300622.37	(0.10)	[73027]
$H^{10}B^{34}S$	4 - 3					$(0,0^0,0)$	158339.37	(0.10)	[73027]
	5 - 4					$(0,0^0,0)$	197920.14	(0.10)	[73027]
	6 - 5					$(0,0^0,0)$	237497.97	(0.10)	[73027]
$D^{11}B^{32}S$	1 - 0		3/2		3/2	$(0,0^0,0)$	31875.045	(0.05)	[74039]
	1 - 0		5/2		3/2	$(0,0^0,0)$	31875.997	(0.05)	[74039]
	1 - 0		1/2		3/2	$(0,0^0,0)$	31876.720	(0.05)	[74039]
	6 - 5					$(0,0^0,0)$	191242.95	(0.10)	[73027]
	6 - 5					$(0,1^{L1},0)$	191392.80	(0.10)	[73027]
	6 - 5					$(0,1^{U1},0)$	191880.68	(0.10)	[73027]
	7 - 6					$(0,0^0,0)$	223111.60	(0.10)	[73027]
	7 - 6					$(0,1^{L1},0)$	223286.28	(0.10)	[73027]
	7 - 6					$(0,1^{U1},0)$	223855.38	(0.10)	[73027]
	8 - 7					$(0,0^0,0)$	254977.61	(0.10)	[73027]
	8 - 7					$(0,1^{L1},0)$	255177.36	(0.10)	[73027]
	8 - 7					$(0,1^{U1},0)$	255827.68	(0.10)	[73027]
	9 - 8					$(0,0^0,0)$	286841.17	(0.10)	[73027]
	10 - 9					$(0,0^0,0)$	318701.70	(0.10)	[73027]
	11 - 10					$(0,0^0,0)$	350558.67	(0.10)	[73027]
$D^{10}B^{32}S$	1 - 0		3		3	$(0,0^0,0)$	33125.526	(0.05)	[74039]
	1 - 0		4		3	$(0,0^0,0)$	33127.098	(0.05)	[74039]
	1 - 0		2		3	$(0,0^0,0)$	33127.627	(0.05)	[74039]
	6 - 5					$(0,0^0,0)$	198746.91	(0.10)	[73027]
	6 - 5					$(0,1^{L1},0)$	198936.73	(0.10)	[73027]
	6 - 5					$(0,1^{U1},0)$	199454.76	(0.10)	[73027]
	7 - 6					$(0,0^0,0)$	231865.83	(0.10)	[73027]
	7 - 6					$(0,1^{L1},0)$	232087.24	(0.10)	[73027]
	7 - 6					$(0,1^{U1},0)$	232691.23	(0.10)	[73027]
	8 - 7					$(0,0^0,0)$	264982.11	(0.10)	[73027]
	9 - 8					$(0,0^0,0)$	298095.49	(0.10)	[73027]
	10 - 9					$(0,0^0,0)$	331205.11	(0.10)	[73027]
	11 - 10					$(0,0^0,0)$	364311.10	(0.10)	[73027]
$D^{11}B^{34}S$	6 - 5					$(0,0^0,0)$	188231.04	(0.10)	[73027]
	7 - 6					$(0,0^0,0)$	219598.05	(0.10)	[73027]
	8 - 7					$(0,0^0,0)$	250962.16	(0.10)	[73027]
	9 - 8					$(0,0^0,0)$	282323.97	(0.10)	[73027]
	10 - 9					$(0,0^0,0)$	313682.67	(0.10)	[73027]

TABLE 4.2. The microwave spectrum of HBS—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$D^{10}B^{34}S$	6 - 5					$(0,0^0,0)$	195796.56	(0.10)	[73027]
	7 - 6					$(0,0^0,0)$	228424.12	(0.10)	[73027]
	8 - 7					$(0,0^0,0)$	261048.69	(0.10)	[73027]
	9 - 8					$(0,0^0,0)$	293670.72	(0.10)	[73027]

Table 5. Molecular parameters for BrNO.

Parameter	$^{79}Br^{14}N^{16}O$	$^{81}Br^{14}N^{16}O$	$^{79}Br^{15}N^{16}O$	$^{81}Br^{15}N^{16}O$	Reference
A[a] (MHz)	83560.	83550.	79820.	79810.	[70018]
B (MHz)	3747.12(10)	3722.25(10)	3694.67(10)	3669.75(10)	[70018]
C (MHz)	3586.09(10)	3563.49(10)	3531.21(10)	3508.42(10)	[70018]
D_J (kHz)	3.05(10)	---	---	---	[66012]
D_{JK}(kHz)	-54.8(20)	---	---	---	[66012]
eqQ_{aa}(Br)(MHz)	388.9(7)	324.5(7)	390.8(10)	325.8(10)	[65007],[70018]
eqQ_{bb}(Br)(MHz)	-239.7(10)	-199.0(10)	-238.3(10)	-199.6(10)	[65007],[70018]
eqQ_{aa}(N) (MHz)	0.4(3)	0.6(5)	---	---	[65007]
eqQ_{bb}(N) (MHz)	-4.4(3)	-4.4(3)	---	---	[65007]
μ_a (D)	1.8	---	---	---	[66011]

[a] Calculated from B and C assuming a rigid planar structure.

Additional references: [56004], [59000], and [75014].

TABLE 5.1. The microwave spectrum of BrNO

Isotopic species	$J'(K_-',K_+') - J''(K_-'',K_+'')$	F'	F_1'	F''	F_1''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{79}Br^{14}N^{16}O$	1(0, 1) - 0(0, 0)		1/2		3/2	(0,0,0)	7236.12	(0.10)	[70018]
	1(0, 1) - 0(0, 0)		5/2		3/2	(0,0,0)	7313.78	(0.10)	[70018]
	1(0, 1) - 0(0, 0)		3/2		3/2	(0,0,0)	7410.90	(0.10)	[70018]
	2(1, 2) - 1(1, 1)	7/2	5/2	7/2	5/2	(0,0,0)	14520.40	(0.01)	[65007]
	2(1, 2) - 1(1, 1)	5/2	5/2	5/2	5/2	(0,0,0)	14520.92	(0.01)	[65007]
	2(1, 2) - 1(1, 1)	3/2	3/2	3/2	3/2	(0,0,0)	14552.57	(0.01)	[65007]
	2(1, 2) - 1(1, 1)	5/2	3/2	5/2	3/2	(0,0,0)	14553.47	(0.01)	[65007]
	2(1, 2) - 1(1, 1)	3/2	3/2	1/2	3/2	(0,0,0)	14554.10	(0.10)	[65007]
	2(1, 2) - 1(1, 1)	5/2	5/2	3/2	3/2	(0,0,0)	14578.99	(0.01)	[65007]
	2(1, 2) - 1(1, 1)	7/2	5/2	5/2	3/2	(0,0,0)	14580.33	(0.01)	[65007]
	2(1, 2) - 1(1, 1)	3/2	5/2	1/2	3/2	(0,0,0)	14581.20	(0.01)	[65007]
	2(1, 1) - 1(1, 0)	9/2	7/2	7/2	5/2	(0,0,0)	14802.79	(0.01)	[65007]
	2(1, 1) - 1(1, 0)	7/2	7/2	5/2	5/2	(0,0,0)	14803.08	(0.10)	[65007]
	2(1, 1) - 1(1, 0)	5/2	3/2	5/2	3/2	(0,0,0)	14857.58	(0.01)	[65007]
	2(1, 1) - 1(1, 0)	3/2	3/2	3/2	3/2	(0,0,0)	14858.38	(0.01)	[65007]
	2(1, 1) - 1(1, 0)	7/2	5/2	7/2	5/2	(0,0,0)	14862.16	(0.01)	[65007]
	2(1, 1) - 1(1, 0)	3/2	5/2	1/2	3/2	(0,0,0)	14899.00	(0.01)	[65007]
	2(1, 1) - 1(1, 0)	7/2	5/2	5/2	3/2	(0,0,0)	14899.82	(0.01)	[65007]
	2(1, 1) - 1(1, 0)	5/2	5/2	3/2	3/2	(0,0,0)	14901.11	(0.01)	[65007]
	3(1, 3) - 2(1, 2)		3/2		3/2	(0,0,0)	21708.47	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		5/2		5/2	(0,0,0)	21743.00	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		3/2		1/2	(0,0,0)	21744.99	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		9/2		7/2	(0,0,0)	21747.76	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		5/2		3/2	(0,0,0)	21769.92	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		7/2		5/2	(0,0,0)	21771.76	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		7/2		7/2	(0,0,0)	21809.50	(0.10)	[70018]
	3(2, 2) - 2(2, 1)		9/2		7/2	(0,0,0)	21972.29	(0.50)	[56004]
	3(2, 1) - 2(2, 0)		9/2		7/2	(0,0,0)	21972.29	(0.50)	[56004]
	3(0, 3) - 2(0, 2)		9/2		7/2	(0,0,0)	21993.86	(0.50)	[56004]

TABLE 5.1. The microwave spectrum of BrNO—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{79}Br^{14}N^{16}O$	3(2, 2) - 2(2, 1)		5/2		3/2	(0,0,0)	22001.07	(0.50)	[56004]
	3(2, 1) - 2(2, 0)		5/2		3/2	(0,0,0)	22001.07	(0.50)	[56004]
	3(0, 3) - 2(0, 2)		5/2		3/2	(0,0,0)	22016.97	(0.50)	[56004]
	3(2, 2) - 2(2, 1)		7/2		5/2	(0,0,0)	22069.77	(0.50)	[56004]
	3(2, 1) - 2(2, 0)		7/2		5/2	(0,0,0)	22069.77	(0.50)	[56004]
	3(1, 2) - 2(1, 1)		3/2		3/2	(0,0,0)	22173.58	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		5/2		5/2	(0,0,0)	22214.92	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		9/2		7/2	(0,0,0)	22229.87	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		7/2		5/2	(0,0,0)	22254.14	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		7/2		7/2	(0,0,0)	22313.90	(0.10)	[70018]
	12(1,12) - 11(1,11)					(0,0,0)	86996.99	(X)	[66012]
	12(0,12) - 11(0,11)					(0,0,0)	87909.16	(X)	[66012]
	12(5, 8) - 11(5, 7)					(0,0,0)	88013.99	(X)	[66012]
	12(5, 7) - 11(5, 6)					(0,0,0)	88013.99	(X)	[66012]
	12(6, 7) - 11(6, 6)					(0,0,0)	88027.63	(X)	[66012]
	12(6, 6) - 11(6, 5)					(0,0,0)	88027.63	(X)	[66012]
	12(2,10) - 11(2, 9)					(0,0,0)	88039.45	(X)	[66012]
	12(7, 6) - 11(7, 5)					(0,0,0)	88044.15	(X)	[66012]
	12(7, 5) - 11(7, 4)					(0,0,0)	88044.15	(X)	[66012]
	13(1,13) - 12(1,12)					(0,0,0)	94240.11	(X)	[66012]
	13(0,13) - 12(0,12)					(0,0,0)	95218.47	(X)	[66012]
	13(3,10) - 12(3, 9)					(0,0,0)	95329.59	(X)	[66012]
	13(5, 9) - 12(5, 8)					(0,0,0)	95345.31	(X)	[66012]
	13(5, 8) - 12(5, 7)					(0,0,0)	95345.31	(X)	[66012]
	13(6, 8) - 12(6, 7)					(0,0,0)	95359.95	(X)	[66012]
	13(6, 7) - 12(6, 6)					(0,0,0)	95359.95	(X)	[66012]
	13(7, 7) - 12(7, 6)					(0,0,0)	95377.65	(X)	[66012]
	13(7, 6) - 12(7, 5)					(0,0,0)	95377.65	(X)	[66012]
	13(2,11) - 12(2,10)					(0,0,0)	95382.99	(X)	[66012]
	13(8, 6) - 12(8, 5)					(0,0,0)	95398.16	(X)	[66012]
	13(8, 5) - 12(8, 4)					(0,0,0)	95398.16	(X)	[66012]
	13(9, 5) - 12(9, 4)					(0,0,0)	95421.11	(X)	[66012]
	13(9, 4) - 12(9, 3)					(0,0,0)	95421.11	(X)	[66012]
	13(1,12) - 12(1,11)					(0,0,0)	96329.69	(X)	[66012]
	14(1,14) - 13(1,13)					(0,0,0)	101481.72	(X)	[66012]
	14(2,12) - 13(2,11)					(0,0,0)	102620.70	(X)	[66012]
	14(3,12) - 13(3,11)					(0,0,0)	102659.42	(X)	[66012]
	14(6, 9) - 13(6, 8)					(0,0,0)	102691.46	(X)	[66012]
	14(6, 8) - 13(6, 7)					(0,0,0)	102691.46	(X)	[66012]
	14(7, 8) - 13(7, 7)					(0,0,0)	102710.43	(X)	[66012]
	14(7, 7) - 13(7, 6)					(0,0,0)	102710.43	(X)	[66012]
	14(2,13) - 13(2,12)					(0,0,0)	102728.20	(X)	[66012]
	14(8, 7) - 13(8, 6)					(0,0,0)	102732.41	(X)	[66012]
	14(8, 6) - 13(8, 5)					(0,0,0)	102732.41	(X)	[66012]
	14(9, 6) - 13(9, 5)					(0,0,0)	102757.19	(X)	[66012]
	14(9, 5) - 13(9, 4)					(0,0,0)	102757.19	(X)	[66012]
	14(1,13) - 13(1,12)					(0,0,0)	103731.39	(X)	[66012]
$^{81}Br^{14}N^{16}O$	1(0, 1) - 0(0, 0)		1/2		3/2	(0,0,0)	7204.64	(0.10)	[70018]
	1(0, 1) - 0(0, 0)		5/2		3/2	(0,0,0)	7269.50	(0.10)	[70018]
	1(0, 1) - 0(0, 0)		3/2		3/2	(0,0,0)	7350.65	(0.10)	[70018]
	2(1, 2) - 1(1, 1)	7/2	5/2	7/2	5/2	(0,0,0)	14425.01	(0.01)	[65007]
	2(1, 2) - 1(1, 1)	5/2	5/2	5/2	5/2	(0,0,0)	14425.55	(0.01)	[65007]
	2(1, 2) - 1(1, 1)	3/2	3/2	3/2	3/2	(0,0,0)	14451.86	(0.01)	[65007]
	2(1, 2) - 1(1, 1)	5/2	3/2	5/2	3/2	(0,0,0)	14452.66	(0.01)	[65007]
	2(1, 2) - 1(1, 1)	5/2	5/2	3/2	3/2	(0,0,0)	14473.91	(0.01)	[65007]
	2(1, 2) - 1(1, 1)	7/2	5/2	5/2	3/2	(0,0,0)	14475.18	(0.01)	[65007]
	2(1, 2) - 1(1, 1)	3/2	5/2	1/2	3/2	(0,0,0)	14476.13	(0.01)	[65007]
	2(1, 1) - 1(1, 0)	9/2	7/2	7/2	5/2	(0,0,0)	14709.97	(0.01)	[65007]
	2(1, 1) - 1(1, 0)	3/2	5/2	1/2	3/2	(0,0,0)	14790.24	(0.10)	[65007]
	2(1, 1) - 1(1, 0)	7/2	5/2	5/2	3/2	(0,0,0)	14790.90	(0.10)	[65007]
	2(1, 1) - 1(1, 0)	5/2	5/2	3/2	3/2	(0,0,0)	14792.25	(0.01)	[65007]
	3(1, 3) - 2(1, 2)		3/2		3/2	(0,0,0)	21577.52	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		5/2		5/2	(0,0,0)	21606.75	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		3/2		1/2	(0,0,0)	21608.49	(0.50)	[56004]
	3(1, 3) - 2(1, 2)		9/2		7/2	(0,0,0)	21610.46	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		5/2		3/2	(0,0,0)	21629.30	(0.10)	[70018]

TABLE 5.1. The microwave spectrum of BrNO—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{81}Br^{14}N^{16}O$	3(1, 3) - 2(1, 2)		7/2		5/2	(0,0,0)	21630.47	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		7/2		7/2	(0,0,0)	21662.02	(0.10)	[70018]
	3(2, 2) - 2(2, 1)		9/2		7/2	(0,0,0)	21835.19	(0.50)	[56004]
	3(2, 1) - 2(2, 0)		9/2		7/2	(0,0,0)	21835.19	(0.50)	[56004]
	3(0, 3) - 2(0, 2)		9/2		7/2	(0,0,0)	21852.23	(0.50)	[56004]
	3(2, 2) - 2(2, 1)		5/2		3/2	(0,0,0)	21858.69	(0.50)	[56004]
	3(2, 1) - 2(2, 0)		5/2		3/2	(0,0,0)	21858.69	(0.50)	[56004]
	3(0, 3) - 2(0, 2)		5/2		3/2	(0,0,0)	21871.10	(0.50)	[56004]
	3(2, 2) - 2(2, 1)		7/2		5/2	(0,0,0)	21916.77	(0.50)	[56004]
	3(2, 1) - 2(2, 0)		7/2		5/2	(0,0,0)	21916.77	(0.50)	[56004]
	3(1, 2) - 2(1, 1)		5/2		5/2	(0,0,0)	22073.50	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		9/2		7/2	(0,0,0)	22085.98	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		7/2		5/2	(0,0,0)	22106.20	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		5/2		3/2	(0,0,0)	22108.88	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		7/2		7/2	(0,0,0)	22155.70	(0.10)	[70018]
$^{79}Br^{15}N^{16}O$	1(0, 1) - 0(0, 0)		5/2		3/2	(0,0,0)	7206.34	(0.10)	[70018]
	1(0, 1) - 0(0, 0)		3/2		3/2	(0,0,0)	7304.03	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		3/2		3/2	(0,0,0)	21381.88	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		9/2		7/2	(0,0,0)	21421.99	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		5/2		3/2	(0,0,0)	21444.06	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		7/2		5/2	(0,0,0)	21446.16	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		7/2		7/2	(0,0,0)	21483.92	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		3/2		3/2	(0,0,0)	21854.67	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		5/2		5/2	(0,0,0)	21895.96	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		9/2		7/2	(0,0,0)	21911.11	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		3/2		1/2	(0,0,0)	21914.16	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		7/2		5/2	(0,0,0)	21935.38	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		5/2		3/2	(0,0,0)	21938.81	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		7/2		7/2	(0,0,0)	21994.89	(0.10)	[70018]
	1(0, 1) - 0(0, 0)		5/2		3/2	(0,0,0)	7161.89	(0.10)	[70018]
	1(0, 1) - 0(0, 0)		3/2		3/2	(0,0,0)	7243.34	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		3/2		3/2	(0,0,0)	21250.13	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		5/2		5/2	(0,0,0)	21279.36	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		3/2		1/2	(0,0,0)	21281.45	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		9/2		7/2	(0,0,0)	21283.50	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		5/2		3/2	(0,0,0)	21301.92	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		7/2		5/2	(0,0,0)	21303.68	(0.10)	[70018]
	3(1, 3) - 2(1, 2)		7/2		7/2	(0,0,0)	21335.30	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		3/2		3/2	(0,0,0)	21719.40	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		5/2		5/2	(0,0,0)	21753.78	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		9/2		7/2	(0,0,0)	21766.25	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		3/2		1/2	(0,0,0)	21769.14	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		7/2		5/2	(0,0,0)	21786.76	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		5/2		3/2	(0,0,0)	21789.60	(0.10)	[70018]
	3(1, 2) - 2(1, 1)		7/2		7/2	(0,0,0)	21836.59	(0.10)	[70018]

Table 6. Molecular parameters for $^{79}Br^{12}C^{14}N$ and $^{81}Br^{12}C^{14}N$.

Parameter	Vib. State $v_1\ v_2^\ell\ v_3$	$^{79}Br^{12}C^{14}N$ Value	$^{81}Br^{12}C^{14}N$ Value	Reference
B_v (MHz)	0 0^0 0	4120.198(9)	4096.788(7)	[52008]
B_v (MHz)	0 1^1 0	4131.762(7)	4108.264(6)	[52008]
B_v (MHz)	0 2^0 0	4139.132(7)[a]	4115.697(7)[a]	[52008]
B_v (MHz)	0 2^2 0	4143.254(8)	4119.701(6)	[52008]
B_v (MHz)	0 0^0 1	4108.807(7)[a]	4085.339(7)[a]	[52008]
B_v (MHz)	0 1^1 1	4122.67(2)[b]	---	[52008]
eqQ(N)(MHz)	all	-3.89	-3.89	[57002]
eqQ(Br)(MHz)	0 0^0 0	685.6(4)	572.8(2)	[57002]
eqQ(Br)(MHz)	0 1^1 0	682.84(21)	570.44(17)	[52008]
eqQ(Br)(MHz)	0 2^0 0	681.6(7)	568.9(15)	[57002]
eqQ(Br)(MHz)	0 0^0 1	687.9(6)	576.1(9)	[57002]
q_v (MHz)	0 1^1 0	3.918	3.874	[52008]
D_v (kHz)	0 0^0 0	0.8844	0.8716	[56005]

[a] A correction of +49.75 MHz and -49.75 MHz due to Fermi resonance was applied to the J = 6-5 transition frequencies of $^{79}BrCN$ for the $(0,0^0,1)$ and $(0,2^0,0)$ states respectively. A value of ±48.37 was employed for $^{81}BrCN$.

[b] The J = 6-5 transition of $^{79}BrCN$ for the $(0,1^1,1)$ state was corrected by +77.00 MHz to account for the Fermi resonance interaction with the $(0,3^1,0)$ state.

Table 6.1. Rotational constants for ^{13}C and ^{15}N species of BrCN.

Isotopic Species	Vib. State $v_1\ v_2^\ell\ v_3$	B_v (MHz)	Reference
$^{79}Br^{13}C^{14}N$	0 0^0 0	4073.373(7)	[52008]
$^{79}Br^{12}C^{15}N$	0 0^0 0	3944.846(9)	[52008]
$^{81}Br^{13}C^{14}N$	0 0^0 0	4049.608(7)	[52008]
$^{81}Br^{12}C^{15}N$	0 0^0 0	3921.787(10)	[52008]

Table 6.2. Molecular Zeeman parameters for BrCN.

Parameters	$^{79}Br^{12}C^{14}N$	$^{81}Br^{12}C^{14}N$	$^{79}Br^{12}C^{15}N$	$^{81}Br^{12}C^{15}N$
$g_I(1-\sigma)$ (μ_N)	1.3978(30)	1.5080(30)	1.4004(15)	1.5098(30)
$g_\perp$ (μ_N)	-0.0325(2)	-0.0320(3)	-0.03165(50)	-0.02981(75)
$\chi_\perp - \chi_\parallel$ $(10^{-6}erg/G^2\cdot mole)$	11.8(5)	12.7(5)	11.37(150)	10.47(300)
Q $(10^{-26}esu\cdot cm^2)$	-6.02(110)	-5.29(110)	-6.46(175)	-6.48(400)
$\langle a^2\rangle - \langle c^2\rangle$ $(10^{-16}\ cm^2)$	-60.2(2)	-60.3(2)	-60.9(4)	-61.0(3)
Reference	[72011]	[72011]	[73028]	[73028]

Additional references: [47001], [47002], [47003], [47004], [47005], [55000], [55001], [65008], [73048].

TABLE 6.3. The microwave spectrum of BrCN

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{79}Br^{12}C^{14}N$	1 - 0		1/2		3/2	$(0,0^0,1)$	8047.08	(0.10)	[57002]
	1 - 0		1/2		3/2	$(0,0^0,0)$	8070.43	(0.10)	[57002]
	1 - 0		1/2		3/2	$(0,2^0,0)$	8109.78	(0.10)	[57002]
	1 - 0		5/2		3/2	$(0,0^0,1)$	8183.87	(0.10)	[57002]
	1 - 0	5/2	5/2	5/2	3/2	$(0,0^0,0)$	8206.18	(0.10)	[57002]
	1 - 0	7/2	5/2	5/2	3/2	$(0,0^0,0)$	8206.92	(0.10)	[57002]
	1 - 0	3/2	5/2	5/2	3/2	$(0,0^0,0)$	8207.39	(0.10)	[57002]
	1 - 0		5/2		3/2	$(0,2^0,0)$	8245.29	(0.10)	[57002]
	1 - 0		3/2		3/2	$(0,0^0,1)$	8356.48	(0.10)	[57002]
	1 - 0	5/2	3/2	3/2	3/2	$(0,0^0,0)$	8377.95	(0.10)	[57002]
	1 - 0	3/2	3/2	3/2	3/2	$(0,0^0,0)$	8378.58	(0.10)	[57002]
	1 - 0	1/2	3/2	3/2	3/2	$(0,0^0,0)$	8379.38	(0.10)	[57002]
	1 - 0		3/2		3/2	$(0,2^0,0)$	8416.30	(0.10)	[57002]
	2 - 1	3/2	1/2	3/2	3/2	$(0,0^0,0)$	16172.30	(0.10)	[57002]
	2 - 1	3/2	1/2	5/2	3/2	$(0,0^0,0)$	16172.90	(0.10)	[57002]
	2 - 1	3/2	1/2	1/2	3/2	$(0,0^0,0)$	16173.40	(0.10)	[57002]
	2 - 1		3/2		3/2	$(0,0^0,1)$	16299.07	(0.10)	[57002]
	2 - 1	5/2	3/2	5/2	3/2	$(0,0^0,0)$	16345.38	(0.10)	[57002]
	2 - 1	3/2	3/2	3/2	3/2	$(0,0^0,0)$	16346.17	(0.10)	[57002]
	2 - 1		7/2		5/2	$(0,0^0,1)$	16420.97	(0.10)	[57002]
	2 - 1		5/2		3/2	$(0,0^0,1)$	16420.97	(0.10)	[57002]
	2 - 1		1/2		1/2	$(0,0^0,1)$	16435.3	(0.10)	[57002]
	2 - 1		7/2		5/2	$(0,0^0,0)$	16466.35	(0.10)	[57002]
	2 - 1		5/2		3/2	$(0,0^0,0)$	16466.35	(0.10)	[57002]
	2 - 1		1/2		1/2	$(0,0^0,0)$	16480.92	(0.10)	[57002]
	2 - 1		3/2		5/2	$(0,0^0,0)$	16517.8	(0.10)	[57002]
	2 - 1		7/2		5/2	$(0,2^0,0)$	16542.45	(0.10)	[57002]
	2 - 1		5/2		3/2	$(0,2^0,0)$	16542.45	(0.10)	[57002]
	2 - 1		1/2		1/2	$(0,2^0,0)$	16556.67	(0.10)	[57002]
	2 - 1		5/2		5/2	$(0,0^0,1)$	16593.38	(0.10)	[57002]
	2 - 1		3/2		1/2	$(0,0^0,1)$	16608.6	(0.10)	[57002]
	2 - 1		5/2		5/2	$(0,0^0,0)$	16638.40	(0.10)	[57002]
	2 - 1		3/2		1/2	$(0,0^0,0)$	16653.58	(0.10)	[57002]
	2 - 1		5/2		5/2	$(0,2^0,0)$	16712.9	(0.10)	[57002]
	2 - 1		3/2		1/2	$(0,2^0,0)$	16727.97	(0.10)	[57002]
	3 - 2		3/2		3/2	$(0,0^0,0)$	24583.00	(0.20)	[48002]
	3 - 2		5/2		5/2	$(0,0^0,0)$	24633.71	(0.20)	[48002]
	3 - 2		3/2		1/2	$(0,0^0,1)$	24687.11	(0.20)	[48002]
	3 - 2		5/2		3/2	$(0,0^0,1)$	24687.11	(0.20)	[48002]
	3 - 2		7/2		5/2	$(0,0^0,0)$	24713.05	(0.20)	[48002]
	3 - 2		9/2		7/2	$(0,0^0,0)$	24713.05	(0.20)	[48002]
	3 - 2		3/2		1/2	$(0,0^0,0)$	24755.22	(0.20)	[48002]
	3 - 2		5/2		3/2	$(0,0^0,0)$	24755.22	(0.20)	[48002]
	3 - 2		3/2		1/2	$(0,1^{L1},0)$	24760.76	(0.20)	[48002]
	3 - 2		9/2		7/2	$(0,1^{L1},0)$	24760.76	(0.20)	[48002]
	3 - 2		3/2		1/2	$(0,1^{U1},0)$	24784.02	(0.20)	[48002]
	3 - 2		9/2		7/2	$(0,1^{U1},0)$	24784.02	(0.20)	[48002]
	3 - 2		5/2		3/2	$(0,1^{L1},0)$	24803.00	(0.20)	[48002]
	3 - 2		7/2		5/2	$(0,1^{L1},0)$	24803.00	(0.20)	[48002]
	3 - 2		5/2		3/2	$(0,1^{U1},0)$	24826.70	(0.20)	[48002]
	3 - 2		7/2		5/2	$(0,1^{U1},0)$	24826.70	(0.20)	[48002]
	3 - 2		7/2		7/2	$(0,0^0,0)$	24884.57	(0.20)	[48002]
	4 - 3		5/2		5/2	$(0,0^0,0)$	32804.56	(0.10)	[48003]
	4 - 3		11/2		9/2	$(0,0^0,0)$	32956.68	(0.10)	[48003]
	4 - 3		9/2		7/2	$(0,0^0,0)$	32956.68	(0.10)	[48003]
	4 - 3		7/2		5/2	$(0,0^0,0)$	32976.40	(0.10)	[48003]
	4 - 3		5/2		3/2	$(0,0^0,0)$	32976.40	(0.10)	[48003]
	6 - 5		9/2		9/2	$(0,0^0,0)$	49274.99	(0.10)	[52008]
	6 - 5		13/2		11/2	$(0,0^0,1)$	49302.27	(0.10)	[52008]
	6 - 5		15/2		13/2	$(0,0^0,1)$	49302.27	(0.10)	[52008]
	6 - 5		9/2		7/2	$(0,0^0,1)$	49310.06	(0.10)	[52008]
	6 - 5		11/2		9/2	$(0,0^0,1)$	49310.06	(0.10)	[52008]
	6 - 5		11/2		11/2	$(0,0^0,0)$	49398.90	(0.10)	[52008]
	6 - 5		9/2		9/2	$(0,1^{L1},0)$	49403.74	(0.15)	[52008]
	6 - 5	13/2	13/2	13/2	11/2	$(0,0^0,0)$	49438.01	(0.15)	[52008]

TABLE 6.3. The microwave spectrum of BrCN—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	(v_1,v_2^{ℓ},v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{79}Br^{12}C^{14}N$	6 - 5	15/2	15/2	15/2	13/2	$(0,0^0,0)$	49438.01	(0.15)	[52008]
	6 - 5		13/2		11/2	$(0,0^0,0)$	49439.12	(0.10)	[52008]
	6 - 5		15/2		13/2	$(0,0^0,0)$	49439.12	(0.10)	[52008]
	6 - 5	11/2	13/2	11/2	11/2	$(0,0^0,0)$	49440.40	(0.15)	[52008]
	6 - 5	13/2	15/2	13/2	13/2	$(0,0^0,0)$	49440.40	(0.15)	[52008]
	6 - 5		15/2		13/2	$(0,1^{L1},1)$	49443.83	(0.20)	[52008]
	6 - 5	9/2	9/2	9/2	7/2	$(0,0^0,0)$	49445.65	(0.15)	[52008]
	6 - 5	11/2	11/2	11/2	9/2	$(0,0^0,0)$	49445.65	(0.15)	[52008]
	6 - 5		11/2		9/2	$(0,0^0,0)$	49446.90	(0.10)	[52008]
	6 - 5	7/2	9/2	7/2	7/2	$(0,0^0,0)$	49448.31	(0.15)	[52008]
	6 - 5		13/2		11/2	$(0,1^{L1},1)$	49448.31	(0.20)	[52008]
	6 - 5	9/2	11/2	9/2	9/2	$(0,0^0,0)$	49448.31	(0.15)	[52008]
	6 - 5		9/2		9/2	$(0,1^{U1},0)$	49452.59	(0.15)	[52008]
	6 - 5		9/2		7/2	$(0,1^{U1},1)$	49496.11	(0.20)	[52008]
	6 - 5		11/2		9/2	$(0,1^{U1},1)$	49501.09	(0.20)	[52008]
	6 - 5		11/2		11/2	$(0,1^{L1},0)$	49520.03	(0.15)	[52008]
	6 - 5		15/2		13/2	$(0,1^{L1},0)$	49552.62	(0.10)	[52008]
	6 - 5		13/2		11/2	$(0,1^{L1},0)$	49557.49	(0.10)	[52008]
	6 - 5		9/2		7/2	$(0,1^{L1},0)$	49558.32	(0.10)	[52008]
	6 - 5		11/2		9/2	$(0,1^{L1},0)$	49563.28	(0.10)	[52008]
	6 - 5		11/2		11/2	$(0,1^{U1},0)$	49567.45	(0.15)	[52008]
	6 - 5		15/2		13/2	$(0,1^{U1},0)$	49599.57	(0.10)	[52008]
	6 - 5		13/2		11/2	$(0,1^{U1},0)$	49604.35	(0.10)	[52008]
	6 - 5		9/2		7/2	$(0,1^{U1},0)$	49605.29	(0.10)	[52008]
	6 - 5		13/2		13/2	$(0,0^0,0)$	49610.43	(0.15)	[52008]
	6 - 5		11/2		9/2	$(0,1^{U1},0)$	49610.43	(0.15)	[52008]
	6 - 5		13/2		11/2	$(0,2^0,0)$	49666.19	(0.10)	[52008]
	6 - 5		15/2		13/2	$(0,2^0,0)$	49666.19	(0.10)	[52008]
	6 - 5		9/2		7/2	$(0,2^0,0)$	49673.93	(0.10)	[52008]
	6 - 5		11/2		7/2	$(0,2^0,0)$	49673.93	(0.10)	[52008]
	6 - 5		9/2		7/2	$(0,2^2,0)$	49709.00	(0.10)	[52008]
	6 - 5		15/2		13/2	$(0,2^2,0)$	49709.00	(0.10)	[52008]
	6 - 5		13/2		13/2	$(0,1^{L1},0)$	49712.00	(0.15)	[52008]
	6 - 5		13/2		11/2	$(0,2^2,0)$	49728.46	(0.10)	[52008]
	6 - 5		11/2		9/2	$(0,2^2,0)$	49728.46	(0.10)	[52008]
	6 - 5		13/2		13/2	$(0,1^{U1},0)$	49757.39	(0.15)	[52008]
	9 - 8		15/2		13/2	$(0,0^0,0)$	74159.48	(0.18)	[50005]
	9 - 8		17/2		15/2	$(0,0^0,0)$	74159.48	(0.18)	[50005]
	9 - 8		19/2		17/2	$(0,0^0,0)$	74162.76	(0.18)	[50005]
	9 - 8		21/2		19/2	$(0,0^0,0)$	74162.76	(0.18)	[50005]
	10 - 9					$(0,0^0,0)$	82405.	(2.)	[49001]
	12 - 11					$(0,0^0,0)$	98879.19	(0.20)	[56005]
	12 - 11					$(0,1^{L1},0)$	99108.45	(0.20)	[56005]
	12 - 11					$(0,1^{L1},0)$	99109.06	(0.20)	[56005]
	12 - 11					$(0,1^{L1},0)$	99110.12	(0.20)	[56005]
	12 - 11					$(0,1^{L1},0)$	99110.75	(0.20)	[56005]
	12 - 11					$(0,1^{U1},0)$	99203.06	(0.20)	[56005]
	12 - 11					$(0,1^{U1},0)$	99204.09	(0.20)	[56005]
	12 - 11					$(0,1^{U1},0)$	99204.70	(0.20)	[56005]
	15 - 14					$(0,0^0,0)$	123594.73	(0.25)	[56005]
	15 - 14					$(0,1^{L1},0)$	123881.78	(0.25)	[56005]
	15 - 14					$(0,1^{L1},0)$	123882.90	(0.25)	[56005]
	15 - 14					$(0,1^{U1},0)$	123999.22	(0.25)	[56005]
	15 - 14					$(0,1^{U1},0)$	124000.30	(0.25)	[56005]
	18 - 17					$(0,0^0,0)$	148307.36	(0.30)	[56005]
	18 - 17					$(0,1^{L1},0)$	148652.01	(0.30)	[56005]
	18 - 17					$(0,1^{L1},0)$	148652.83	(0.30)	[56005]
	18 - 17					$(0,1^{U1},0)$	148792.99	(0.30)	[56005]
	18 - 17					$(0,1^{U1},0)$	148793.79	(0.30)	[56005]
	21 - 20					$(0,0^0,0)$	173016.45	(0.35)	[56005]
	21 - 20					$(0,1^{L1},0)$	173418.77	(0.35)	[56005]
	21 - 20					$(0,1^{U1},0)$	173583.26	(0.35)	[56005]
	24 - 23					$(0,0^0,0)$	197721.69	(0.40)	[56005]
	24 - 23					$(0,1^{L1},0)$	198181.25	(0.40)	[56005]
	24 - 23					$(0,1^{U1},0)$	198368.79	(0.40)	[56005]

TABLE 6.3. The microwave spectrum of BrCN—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	(v_1,v_2^{ℓ},v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{79}Br^{12}C^{14}N$	27 - 26					$(0,0^0,0)$	222422.34	(0.45)	[56005]
	27 - 26					$(0,1^{L1},0)$	222939.11	(0.45)	[56005]
	27 - 26					$(0,1^{U1},0)$	223150.44	(0.45)	[56005]
	30 - 29					$(0,0^0,0)$	247117.75	(0.50)	[56005]
	30 - 29					$(0,1^{L1},0)$	247691.48	(0.50)	[56005]
	30 - 29					$(0,1^{U1},0)$	247925.95	(0.50)	[56005]
	33 - 32					$(0,0^0,0)$	271807.59	(0.55)	[56005]
	36 - 35					$(0,0^0,0)$	296490.86	(0.60)	[56005]
	39 - 38					$(0,0^0,0)$	321167.1	(0.7)	[56005]
	42 - 41					$(0,0^0,0)$	345837.0	(1.0)	[56005]
$^{81}Br^{12}C^{14}N$	1 - 0		1/2		3/2	$(0,0^0,1)$	8028.04	(0.10)	[57002]
	1 - 0		1/2		3/2	$(0,0^0,0)$	8051.48	(0.10)	[57002]
	1 - 0		1/2		3/2	$(0,2^0,0)$	8090.25	(0.10)	[57002]
	1 - 0		5/2		3/2	$(0,0^0,1)$	8142.89	(0.10)	[57002]
	1 - 0	5/2	5/2	5/2	3/2	$(0,0^0,0)$	8164.96	(0.10)	[57002]
	1 - 0	7/2	5/2	5/2	3/2	$(0,0^0,0)$	8165.68	(0.10)	[57002]
	1 - 0		3/2		3/2	$(0,0^0,1)$	8286.87	(0.10)	[57002]
	1 - 0	5/2	3/2	3/2	3/2	$(0,0^0,0)$	8308.27	(0.10)	[57002]
	1 - 0	3/2	3/2	3/2	3/2	$(0,0^0,0)$	8308.89	(0.10)	[57002]
	1 - 0	1/2	3/2	3/2	3/2	$(0,0^0,0)$	8309.67	(0.10)	[57002]
	1 - 0		3/2		3/2	$(0,2^0,0)$	8346.07	(0.10)	[57002]
	2 - 1		1/2		3/2	$(0,0^0,0)$	16129.96	(0.10)	[57002]
	2 - 1		3/2		3/2	$(0,0^0,1)$	16227.73	(0.10)	[57002]
	2 - 1	5/2	3/2	5/2	3/2	$(0,0^0,0)$	16273.00	(0.10)	[57002]
	2 - 1	5/2	3/2	5/2	3/2	$(0,0^0,0)$	16273.62	(0.10)	[57002]
	2 - 1	3/2	3/2	1/2	3/2	$(0,0^0,0)$	16274.38	(0.10)	[57002]
	2 - 1		7/2		5/2	$(0,0^0,1)$	16329.72	(0.10)	[57002]
	2 - 1		5/2		3/2	$(0,0^0,1)$	16329.72	(0.10)	[57002]
	2 - 1		7/2		5/2	$(0,0^0,0)$	16375.43	(0.10)	[57002]
	2 - 1		5/2		3/2	$(0,0^0,0)$	16375.43	(0.10)	[57002]
	2 - 1		1/2		1/2	$(0,0^0,0)$	16387.20	(0.10)	[57002]
	2 - 1		3/2		5/2	$(0,0^0,0)$	16417.0	(0.10)	[57002]
	2 - 1		7/2		5/2	$(0,2^0,0)$	16451.27	(0.10)	[57002]
	2 - 1		5/2		3/2	$(0,2^0,0)$	16451.27	(0.10)	[57002]
	2 - 1		5/2		5/2	$(0,0^0,1)$	16473.20	(0.10)	[57002]
	2 - 1		3/2		1/2	$(0,0^0,1)$	16486.04	(0.10)	[57002]
	2 - 1		5/2		5/2	$(0,0^0,0)$	16518.62	(0.10)	[57002]
	2 - 1		3/2		1/2	$(0,0^0,0)$	16531.31	(0.10)	[57002]
	2 - 1		3/2		1/2	$(0,2^0,0)$	16605.92	(0.10)	[57002]
	3 - 2		3/2		3/2	$(0,0^0,0)$	24465.33	(0.20)	[48002]
	3 - 2		7/2		5/2	$(0,0^0,1)$	24506.75	(0.20)	[48002]
	3 - 2		9/2		7/2	$(0,0^0,1)$	24506.75	(0.20)	[48002]
	3 - 2		5/2		5/2	$(0,0^0,0)$	24507.38	(0.20)	[48002]
	3 - 2		3/2		1/2	$(0,0^0,1)$	24541.18	(0.20)	[48002]
	3 - 2		5/2		3/2	$(0,0^0,1)$	24541.18	(0.20)	[48002]
	3 - 2		7/2		5/2	$(0,0^0,0)$	24573.86	(0.20)	[48002]
	3 - 2		9/2		7/2	$(0,0^0,0)$	24573.86	(0.20)	[48002]
	3 - 2		3/2		1/2	$(0,0^0,0)$	24608.92	(0.20)	[48002]
	3 - 2		5/2		3/2	$(0,0^0,0)$	24608.92	(0.20)	[48002]
	3 - 2		3/2		1/2	$(0,1^{L1},0)$	24622.93	(0.20)	[48002]
	3 - 2		9/2		7/2	$(0,1^{L1},0)$	24622.93	(0.20)	[48002]
	3 - 2		3/2		1/2	$(0,1^{U1},0)$	24645.82	(0.20)	[48002]
	3 - 2		9/2		7/2	$(0,1^{U1},0)$	24645.82	(0.20)	[48002]
	3 - 2		3/2		3/2	$(0,1^{L1},0)$	24658.89	(0.20)	[48002]
	3 - 2		7/2		5/2	$(0,1^{L1},0)$	24658.89	(0.20)	[48002]
	3 - 2		5/2		3/2	$(0,1^{U1},0)$	24682.13	(0.20)	[48002]
	3 - 2		7/2		5/2	$(0,1^{U1},0)$	24682.13	(0.20)	[48002]
	3 - 2		7/2		7/2	$(0,0^0,0)$	24717.19	(0.20)	[48002]
	4 - 3		5/2		5/2	$(0,0^0,0)$	32643.13	(0.10)	[48003]
	4 - 3		7/2		7/2	$(0,0^0,0)$	32720.28	(0.10)	[48003]
	4 - 3		11/2		9/2	$(0,0^0,0)$	32770.13	(0.10)	[48003]
	4 - 3		9/2		7/2	$(0,0^0,0)$	32770.13	(0.10)	[48003]
	4 - 3		7/2		5/2	$(0,0^0,0)$	32786.65	(0.10)	[48003]
	4 - 3		5/2		3/2	$(0,0^0,0)$	32786.65	(0.10)	[48003]
	4 - 3		9/2		9/2	$(0,0^0,0)$	32913.24	(0.10)	[48003]

TABLE 6.3. The microwave spectrum of BrCN—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	(v_1,v_2^l,v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{81}Br^{12}C^{14}N$	6 - 5		15/2		13/2	$(0,0^0,1)$	49021.91	(0.10)	[52008]
	6 - 5		13/2		11/2	$(0,0^0,1)$	49021.91	(0.10)	[52008]
	6 - 5		9/2		9/2	$(0,0^0,0)$	49021.91	(0.10)	[52008]
	6 - 5		9/2		7/2	$(0,0^0,1)$	49028.32	(0.10)	[52008]
	6 - 5		11/2		9/2	$(0,0^0,1)$	49028.32	(0.10)	[52008]
	6 - 5		11/2		11/2	$(0,0^0,0)$	49125.04	(0.10)	[52008]
	6 - 5		9/2		9/2	$(0,1^{L1},0)$	49147.47	(0.15)	[52008]
	6 - 5	15/2	15/2	15/2	13/2	$(0,0^0,0)$	49157.27	(0.15)	[52008]
	6 - 5	13/2	13/2	13/2	11/2	$(0,0^0,0)$	49157.27	(0.15)	[52008]
	6 - 5		15/2		13/2	$(0,0^0,0)$	49158.64	(0.10)	[52008]
	6 - 5		13/2		11/2	$(0,0^0,0)$	49158.64	(0.10)	[52008]
	6 - 5	13/2	15/2	13/2	13/2	$(0,0^0,0)$	49159.85	(0.15)	[52008]
	6 - 5	11/2	13/2	11/2	11/2	$(0,0^0,0)$	49159.85	(0.15)	[52008]
	6 - 5	11/2	11/2	11/2	9/2	$(0,0^0,0)$	49163.82	(0.15)	[52008]
	6 - 5	9/2	9/2	9/2	7/2	$(0,0^0,0)$	49163.82	(0.15)	[52008]
	6 - 5		11/2		9/2	$(0,0^0,0)$	49165.10	(0.10)	[52008]
	6 - 5		9/2		7/2	$(0,0^0,0)$	49165.10	(0.10)	[52008]
	6 - 5	9/2	11/2	9/2	9/2	$(0,0^0,0)$	49166.56	(0.15)	[52008]
	6 - 5	7/2	9/2	7/2	7/2	$(0,0^0,0)$	49166.56	(0.15)	[52008]
	6 - 5		9/2		9/2	$(0,1^{U1},0)$	49195.39	(0.15)	[52008]
	6 - 5		11/2		11/2	$(0,1^{L1},0)$	49244.47	(0.15)	[52008]
	6 - 5		15/2		13/2	$(0,1^{L1},0)$	49271.73	(0.10)	[52008]
	6 - 5		13/2		11/2	$(0,1^{L1},0)$	49275.67	(0.10)	[52008]
	6 - 5		9/2		7/2	$(0,1^{L1},0)$	49276.54	(0.10)	[52008]
	6 - 5		11/2		9/2	$(0,1^{L1},0)$	49280.69	(0.10)	[52008]
	6 - 5		11/2		11/2	$(0,1^{U1},0)$	49291.25	(0.15)	[52008]
	6 - 5		13/2		13/2	$(0,0^0,0)$	49301.67	(0.10)	[52008]
	6 - 5		15/2		13/2	$(0,1^{U1},0)$	49318.15	(0.10)	[52008]
	6 - 5		13/2		11/2	$(0,1^{U1},0)$	49322.08	(0.10)	[52008]
	6 - 5		9/2		7/2	$(0,1^{U1},0)$	49323.03	(0.10)	[52008]
	6 - 5		11/2		9/2	$(0,1^{U1},0)$	49327.08	(0.10)	[52008]
	6 - 5		13/2		11/2	$(0,2^0,0)$	49385.48	(0.10)	[52008]
	6 - 5		15/2		13/2	$(0,2^0,0)$	49385.48	(0.10)	[52008]
	6 - 5		9/2		7/2	$(0,2^0,0)$	49391.95	(0.10)	[52008]
	6 - 5		11/2		9/2	$(0,2^0,0)$	49391.95	(0.10)	[52008]
	6 - 5		13/2		13/2	$(0,1^{L1},0)$	49404.69	(0.15)	[52008]
	6 - 5		9/2		7/2	$(0,2^2,0)$	49427.87	(0.10)	[52008]
	6 - 5		15/2		13/2	$(0,2^2,0)$	49427.87	(0.10)	[52008]
	6 - 5		11/2		9/2	$(0,2^2,0)$	49444.30	(0.10)	[52008]
	6 - 5		13/2		11/2	$(0,2^2,0)$	49444.30	(0.10)	[52008]
	6 - 5		13/2		13/2	$(0,1^{U1},0)$	49449.98	(0.15)	[52008]
	9 - 8		15/2		13/2	$(0,0^0,0)$	73738.42	(0.18)	[50005]
	9 - 8		17/2		15/2	$(0,0^0,0)$	73738.42	(0.18)	[50005]
	9 - 8		19/2		17/2	$(0,0^0,0)$	73741.20	(0.18)	[50005]
	9 - 8		21/2		19/2	$(0,0^0,0)$	73741.20	(0.18)	[50005]
	10 - 9					$(0,0^0,0)$	81936.	(2.)	[49001]
	12 - 11					$(0,0^0,0)$	98317.37	(0.20)	[56005]
	12 - 11					$(0,1^{L1},0)$	98545.65	(0.20)	[56005]
	12 - 11					$(0,1^{L1},0)$	98546.18	(0.20)	[56005]
	12 - 11					$(0,1^{L1},0)$	98547.08	(0.20)	[56005]
	12 - 11					$(0,1^{L1},0)$	98547.63	(0.20)	[56005]
	12 - 11					$(0,1^{U1},0)$	98638.49	(0.20)	[56005]
	12 - 11					$(0,1^{U1},0)$	98639.01	(0.20)	[56005]
	12 - 11					$(0,1^{U1},0)$	98639.95	(0.20)	[56005]
	12 - 11					$(0,1^{U1},0)$	98640.42	(0.20)	[56005]
	15 - 14					$(0,0^0,0)$	122892.50	(0.25)	[56005]
	15 - 14					$(0,1^{L1},0)$	123178.33	(0.25)	[56005]
	15 - 14					$(0,1^{L1},0)$	123179.40	(0.25)	[56005]
	15 - 14					$(0,1^{U1},0)$	123294.38	(0.25)	[56005]
	15 - 14					$(0,1^{U1},0)$	123295.31	(0.25)	[56005]
	18 - 17					$(0,0^0,0)$	147464.71	(0.30)	[56005]
	18 - 17					$(0,1^{L1},0)$	147807.77	(0.30)	[56005]
	18 - 17					$(0,1^{L1},0)$	147808.49	(0.30)	[56005]
	18 - 17					$(0,1^{U1},0)$	147947.11	(0.30)	[56005]
	18 - 17					$(0,1^{U1},0)$	147947.85	(0.30)	[56005]

TABLE 6.3. The microwave spectrum of BrCN—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	(v_1,v_2^{ℓ},v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{81}Br^{12}C^{14}N$	21 - 20					$(0,0^0,0)$	172033.53	(0.35)	[56005]
	21 - 20					$(0,1^{L1},0)$	172434.07	(0.35)	[56005]
	21 - 20					$(0,1^{U1},0)$	172596.70	(0.35)	[56005]
	24 - 23					$(0,0^0,0)$	196598.50	(0.40)	[56005]
	24 - 23					$(0,1^{L1},0)$	197055.84	(0.40)	[56005]
	24 - 23					$(0,1^{U1},0)$	197241.70	(0.40)	[56005]
	27 - 26					$(0,0^0,0)$	221158.86	(0.45)	[56005]
	27 - 26					$(0,1^{L1},0)$	221693.17	(0.45)	[56005]
	27 - 26					$(0,1^{U1},0)$	221881.84	(0.45)	[56005]
	30 - 29					$(0,0^0,0)$	245714.32	(0.50)	[56005]
	33 - 32					$(0,0^0,0)$	270263.95	(0.55)	[56005]
	36 - 35					$(0,0^0,0)$	294807.52	(0.60)	[56005]
	39 - 38					$(0,0^0,0)$	319345.52	(1.0)	[56005]
	42 - 41					$(0,0^0,0)$	343873.0	(1.5)	[56005]
	48 - 47					$(0,0^0,0)$	392907.0	(0.9)	[60005]
	52 - 51					$(0,0^0,0)$	425575.9	(0.9)	[60005]
	56 - 55					$(0,0^0,0)$	458226.2	(0.9)	[60005]
$^{79}Br^{13}C^{14}N$	3 - 2		11/2		9/2	$(0,0^0,0)$	32581.73	(0.10)	[48003]
	3 - 2		9/2		7/2	$(0,0^0,0)$	32581.73	(0.10)	[48003]
	3 - 2		7/2		5/2	$(0,0^0,0)$	32601.46	(0.10)	[48003]
	3 - 2		5/2		3/2	$(0,0^0,0)$	32601.46	(0.10)	[48003]
	6 - 5		13/2		11/2	$(0,0^0,0)$	48877.11	(0.10)	[52008]
	6 - 5		15/2		13/2	$(0,0^0,0)$	48877.11	(0.10)	[52008]
	6 - 5		9/2		7/2	$(0,0^0,0)$	48884.82	(0.10)	[52008]
	6 - 5		11/2		9/2	$(0,0^0,0)$	48884.82	(0.10)	[52008]
$^{81}Br^{13}C^{14}N$	3 - 2		11/2		9/2	$(0,0^0,0)$	32392.59	(0.10)	[48003]
	3 - 2		9/2		7/2	$(0,0^0,0)$	32392.59	(0.10)	[48003]
	3 - 2		7/2		5/2	$(0,0^0,0)$	32409.06	(0.10)	[48003]
	3 - 2		5/2		3/2	$(0,0^0,0)$	32409.06	(0.10)	[48003]
	6 - 5		15/2		13/2	$(0,0^0,0)$	48592.37	(0.10)	[52008]
	6 - 5		13/2		11/2	$(0,0^0,0)$	48592.37	(0.10)	[52008]
	6 - 5		9/2		7/2	$(0,0^0,0)$	48598.93	(0.10)	[52008]
	6 - 5		11/2		9/2	$(0,0^0,0)$	48598.93	(0.10)	[52008]
$^{79}Br^{12}C^{15}N$	1 - 0		5/2		3/2	$(0,0^0,0)$	7855.959	(0.05)	[73028]
	2 - 1		7/2		5/2	$(0,0^0,0)$	15764.89	(0.05)	[73028]
	6 - 5		13/2		11/2	$(0,0^0,0)$	47334.84	(0.10)	[52008]
	6 - 5		15/2		13/2	$(0,0^0,0)$	47334.84	(0.10)	[52008]
	6 - 5		9/2		7/2	$(0,0^0,0)$	47342.44	(0.10)	[52008]
	6 - 5		11/2		9/2	$(0,0^0,0)$	47342.44	(0.10)	[52008]
$^{81}Br^{12}C^{15}N$	1 - 0		5/2		3/2	$(0,0^0,0)$	7815.292	(0.05)	[73028]
	2 - 1		7/2		5/2	$(0,0^0,0)$	15674.89	(0.05)	[73028]
	6 - 5		13/2		11/2	$(0,0^0,0)$	47058.19	(0.10)	[52008]
	6 - 5		15/2		13/2	$(0,0^0,0)$	47058.19	(0.10)	[52008]
	6 - 5		9/2		7/2	$(0,0^0,0)$	47064.86	(0.15)	[52008]
	6 - 5		11/2		9/2	$(0,0^0,0)$	47064.86	(0.15)	[52008]

Table 7. Rotational constants for ClCN.

Isotopic Species	Vib. state $v_1\ v_2^\ell\ v_3$	B_v(MHz)	D_v(kHz)	Reference
$^{35}Cl^{12}C^{14}N$	0 0^0 0	5970.840(16)	1.663	[65009,56005]
	0 1^1 0 c	5983.442	1.680	[65009]
	0 1^1 0 d	5990.903	1.687	[65009]
	0 0^0 1	5970.84(5)	---	[65009]
	0 2^0 0	5978.76	---	[65009]
	0 2^2 0	6003.38	---	[65009]
$^{37}Cl^{12}C^{14}N$	0 0^0 0	5847.258(14)	1.608	[65009,56005]
	0 1^1 0 c	5859.655	1.618	[65009]
	0 1^1 0 d	5866.831	1.652	[65009]
	0 0^0 1	5844.65	---	[65009]
	0 2^0 0	5857.95	---	[65009]
	0 2^2 0	5879.15	---	[65009]
$^{35}Cl^{13}C^{14}N$	0 0^0 0	5939.775(30)	---	[48002]
$^{37}Cl^{13}C^{14}N$	0 0^0 0	5814.705(30)	---	[48002]
$^{35}Cl^{12}C^{15}N$	0 0^0 0	5748.061(30)	---	[63005]
$^{37}Cl^{12}C^{15}N$	0 0^0 0	5626.425(30)	---	[63005]

	$^{35}Cl^{12}C^{14}N$	$^{37}Cl^{12}C^{14}N$	
B_e(MHz)	5982.96(8)	5859.02(12)	[65009]
q_v(MHz)	7.467532(16)[a]	7.17_6	[76035,56005]
α_1(MHz)	32.15(6)	31.60(11)	[65009]
α_2(MHz)	-16.33(2)	-15.99(2)	[56005]
α_3(MHz)	24.74(5)	23.90(2)	[65009]

[a] In reference [76035] the rotational dependence of q_v is given as -0.0183(15) J(J+1) kHz.

Table 7.1. Ground state hyperfine constants and dipole moment for ClCN.

Parameter	$^{35}Cl^{12}C^{14}N$ Value	$^{37}Cl^{12}C^{14}N$ Value	$^{35}Cl^{12}C^{15}N$,gnd. Value	$^{35}Cl^{12}C^{15}N,v_2=1$ Value
eqQ(Cl)(MHz)	-83.27519(40)	-65.82(16)	-83.280(20)	-82.825(15)
c(Cl)(kHz)	1.706(45)	---	3.5(6)	3.5(6)
eqQ(N)(MHz)	-3.62277(90)	-3.35(22)	---	---
c(N)(kHz)	1.32(18)	---	---	---
μ(D)	2.83312(15)	---	---	---
Reference	[76035]	[65009]	[55005]	[55005]

Table 7.2. Hyperfine constants and dipole moment for V_2=1 of ^{35}ClCN [76035].

Parameter		$^{35}Cl^{12}C^{14}N$
$eqQ(^{35}Cl)$	(MHz)	-82.81554(55)
$eqQ\eta(^{35}Cl)$	(MHz)	-0.92784(49)
$c_{\perp}(^{35}Cl)$	(kHz)	1.695(48)
$c_{\parallel}-c_{\perp}(^{35}Cl)$	(kHz)	7.38(35)
$eqQ(^{14}N)$	(MHz)	-3.70219(40)
$eqQ\eta(^{14}N)$	(MHz)	0.25600(41)
$c_{\perp}(^{14}N)$	(kHz)	1.243(67)
$c_{\parallel}-c_{\perp}(^{14}N)$	(kHz)	2.20(53)
$\mu(0,1,0)$	(D)	2.804(3)

Table 7.3. Zeeman parameters for ClCN [72011].

Parameter	$^{35}Cl^{12}C^{15}N$ Value	$^{37}Cl^{12}C^{15}N$ Value	$^{35}Cl^{12}C^{14}N$ Value
$g_I(1-\sigma)(\mu_N)$	0.5476(10)	0.4549(10)	
$g_{\perp}(\mu_N)$	-0.0385(2)	-0.0379(2)	-0.04121(13)[a]
$\chi_{\perp}-\chi_{\parallel}(10^{-6}\mathrm{erg}\cdot G^{-2}\cdot\mathrm{mole})$	10.8(5)	10.8(5)	11.10(12)[a]
$Q_{\parallel}(10^{26}\mathrm{esu}\cdot\mathrm{cm}^2)$	-3.87(100)	-4.01(100)	
$\langle a^2\rangle-\langle c^2\rangle(10^{-16}\ \mathrm{cm}^2)$	-42.7(2)	-42.3(2)	

[a] Reference [76035].

Additional references: [47003], [47004], [47005], [51002].

TABLE 7.4. The microwave spectrum of ClCN

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	(v_1,v_2^{ℓ},v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{35}Cl^{12}C^{14}N$	2 - 2	5/2		5/2		$(0,1^{L1},0)$	41.533	(3E-4)	[76035]
	2 - 2	5/2		3/2		$(0,1^{L1},0)$	41.552	(3E-4)	[76035]
	2 - 2	7/2		5/2		$(0,1^{L1},0)$	42.156	(3E-4)	[76035]
	2 - 2	5/2		7/2		$(0,1^{L1},0)$	44.064	(3E-4)	[76035]
	2 - 2	9/2		7/2		$(0,1^{L1},0)$	44.212	(3E-4)	[76035]
	2 - 2	7/2		7/2		$(0,1^{L1},0)$	44.687	(3E-4)	[76035]
	2 - 2	9/2		9/2		$(0,1^{L1},0)$	44.756	(3E-4)	[76035]
	2 - 2	3/2		1/2		$(0,1^{L1},0)$	44.764	(3E-4)	[76035]
	2 - 2	5/2		5/2		$(0,1^{L1},0)$	44.782	(3E-4)	[76035]
	2 - 2	3/2		5/2		$(0,1^{L1},0)$	44.790	(3E-4)	[76035]
	2 - 2	5/2		5/2		$(0,1^{L1},0)$	44.804	(3E-4)	[76035]
	2 - 2	3/2		3/2		$(0,1^{L1},0)$	44.809	(3E-4)	[76035]
	2 - 2	5/2		3/2		$(0,1^{L1},0)$	44.824	(3E-4)	[76035]
	2 - 2	7/2		9/2		$(0,1^{L1},0)$	45.231	(3E-4)	[76035]
	2 - 2	5/2		3/2		$(0,1^{L1},0)$	45.238	(3E-4)	[76035]
	2 - 2	7/2		5/2		$(0,1^{L1},0)$	45.405	(3E-4)	[76035]
	2 - 2	5/2		7/2		$(0,1^{L1},0)$	47.335	(3E-4)	[76035]
	2 - 2	3/2		5/2		$(0,1^{L1},0)$	48.039	(3E-4)	[76035]
	2 - 2	5/2		5/2		$(0,1^{L1},0)$	48.053	(3E-4)	[76035]
	2 - 2	3/2		1/2		$(0,1^{U1},0)$	52.149	(3E-4)	[76035]
	2 - 2	3/2		5/2		$(0,1^{U1},0)$	52.175	(3E-4)	[76035]
	2 - 2	3/2		3/2		$(0,1^{U1},0)$	52.195	(3E-4)	[76035]
	2 - 2	7/2		5/2		$(0,1^{U1},0)$	52.234	(3E-4)	[76035]
	2 - 2	5/2		5/2		$(0,1^{U1},0)$	52.432	(3E-4)	[76035]
	2 - 2	5/2		3/2		$(0,1^{U1},0)$	52.452	(3E-4)	[76035]
	2 - 2	7/2		7/2		$(0,1^{U1},0)$	54.764	(3E-4)	[76035]
	2 - 2	5/2		7/2		$(0,1^{U1},0)$	54.963	(3E-4)	[76035]
	2 - 2	3/2		3/2		$(0,1^{U1},0)$	55.038	(3E-4)	[76035]
	2 - 2	5/2		3/2		$(0,1^{U1},0)$	55.051	(3E-4)	[76035]
	2 - 2	7/2		9/2		$(0,1^{U1},0)$	55.308	(3E-4)	[76035]
	2 - 2	3/2		5/2		$(0,1^{U1},0)$	55.424	(3E-4)	[76035]
	2 - 2	5/2		5/2		$(0,1^{U1},0)$	55.681	(3E-4)	[76035]
	3 - 3	9/2		9/2		$(0,1^{L1},0)$	89.474	(3E-4)	[76035]
	3 - 3	11/2		11/2		$(0,1^{L1},0)$	89.552	(3E-4)	[76035]
	3 - 3	5/2		5/2		$(0,1^{L1},0)$	89.628	(3E-4)	[76035]
	3 - 3	7/2		7/2		$(0,1^{L1},0)$	89.666	(3E-4)	[76035]
	3 - 3	3/2		3/2		$(0,1^{L1},0)$	89.679	(3E-4)	[76035]
	3 - 3	5/2		7/2		$(0,1^{L1},0)$	90.093	(3E-4)	[76035]
	3 - 3	5/2		3/2		$(0,1^{L1},0)$	90.262	(3E-4)	[76035]
	3 - 3	9/2		11/2		$(0,1^{L1},0)$	90.362	(3E-4)	[76035]
	3 - 3	5/2		5/2		$(0,1^{L1},0)$	96.330	(3E-4)	[76035]
	3 - 3	5/2		7/2		$(0,1^{L1},0)$	96.796	(3E-4)	[76035]
	3 - 3	9/2		7/2		$(0,1^{L1},0)$	96.931	(3E-4)	[76035]
	3 - 3	5/2		3/2		$(0,1^{L1},0)$	96.964	(3E-4)	[76035]
	3 - 3	7/2		5/2		$(0,1^{L1},0)$	97.051	(3E-4)	[76035]
	3 - 3	7/2		7/2		$(0,1^{L1},0)$	97.516	(3E-4)	[76035]
	3 - 3	3/2		3/2		$(0,1^{U1},0)$	104.343	(3E-4)	[76035]
	3 - 3	7/2		9/2		$(0,1^{U1},0)$	104.977	(3E-4)	[76035]
	3 - 3	7/2		5/2		$(0,1^{U1},0)$	105.073	(3E-4)	[76035]
	3 - 3	9/2		11/2		$(0,1^{U1},0)$	105.279	(3E-4)	[76035]
	3 - 3	5/2		7/2		$(0,1^{U1},0)$	105.347	(3E-4)	[76035]
	3 - 3	5/2		5/2		$(0,1^{U1},0)$	105.500	(3E-4)	[76035]
	3 - 3	7/2		7/2		$(0,1^{U1},0)$	106.068	(3E-4)	[76035]
	17 - 17					$(0,1^{L1},0)$	2283.698	(0.01)	[57003]
	17 - 17					$(0,1^{U1},0)$	2283.906	(0.01)	[57003]
	18 - 18					$(0,1^{L1},0)$	2552.224	(0.01)	[57003]
	18 - 18					$(0,1^{U1},0)$	2552.448	(0.01)	[57003]
	19 - 19					$(0,1^{L1},0)$	2835.622	(0.01)	[57003]
	19 - 19					$(0,1^{U1},0)$	2835.829	(0.01)	[57003]
	23 - 23					$(0,1^{L1},0)$	4117.869	(0.02)	[57003]
	23 - 23					$(0,1^{U1},0)$	4118.067	(0.02)	[57003]
	1 - 0	1/2	3/2	1/2	3/2	$(0,0^{0},0)$	11924.33	(0.05)	[65009]
	1 - 0	3/2	3/2	5/2	3/2	$(0,0^{0},0)$	11924.89	(0.05)	[65009]
	1 - 0	3/2	3/2	3/2	3/2	$(0,0^{0},0)$	11925.57	(0.05)	[65009]
	1 - 0		3/2		3/2	$(0,2^{0},0)$	11940.92	(0.10)	[65009]

TABLE 7.4. The microwave spectrum of ClCN—Continued

Isotopic species	$J' - J''$	F'	F'_1	F''	F''_1	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{35}Cl^{12}C^{14}N$	1 - 0	5/2	5/2	3/2	3/2	$(0,0^0,0)$	11945.27	(0.05)	[65009]
	1 - 0	7/2	5/2	5/2	3/2	$(0,0^0,0)$	11946.06	(0.05)	[65009]
	1 - 0	3/2	5/2	3/2	3/2	$(0,0^0,0)$	11946.32	(0.05)	[65009]
	1 - 0		5/2		3/2	$(0,2^0,0)$	11961.06	(0.20)	[65009]
	1 - 0	3/2	1/2	3/2	3/2	$(0,0^0,0)$	11962.56	(0.05)	[65009]
	1 - 0		1/2		3/2	$(0,2^0,0)$	11978.27	(0.10)	[65009]
	2 - 1	5/2	3/2	3/2	1/2	$(0,0^0,0)$	23862.409	(3E-3)	[55005]
	2 - 1	3/2	3/2	1/2	1/2	$(0,0^0,0)$	23862.487	(3E-3)	[55005]
	2 - 1	5/2	5/2	3/2	5/2	$(0,0^0,0)$	23863.416	(2E-3)	[55005]
	2 - 1	5/2	5/2	7/2	5/2	$(0,0^0,0)$	23863.724	(3E-3)	[55005]
	2 - 1	3/2	5/2	3/2	5/2	$(0,0^0,0)$	23863.959	(3E-3)	[55005]
	2 - 1	7/2	5/2	7/2	5/2	$(0,0^0,0)$	23864.138	(3E-3)	[55005]
	2 - 1	5/2	5/2	5/2	5/2	$(0,0^0,0)$	23864.479	(3E-3)	[55005]
	2 - 1	7/2	5/2	5/2	5/2	$(0,0^0,0)$	23864.888	(3E-3)	[55005]
	2 - 1	3/2	5/2	5/2	5/2	$(0,0^0,0)$	23865.015	(3E-3)	[55005]
	2 - 1	1/2	3/2	3/2	5/2	$(0,0^0,0)$	23878.795	(4E-3)	[55005]
	2 - 1	3/2	3/2	3/2	5/2	$(0,0^0,0)$	23878.795	(4E-3)	[55005]
	2 - 1	5/2	3/2	7/2	5/2	$(0,0^0,0)$	23878.930	(3E-3)	[55005]
	2 - 1	3/2	1/2	3/2	1/2	$(0,0^0,0)$	23883.246	(0.03)	[55005]
	2 - 1	1/2	1/2	3/2	1/2	$(0,0^0,0)$	23883.246	(0.03)	[55005]
	2 - 1	3/2	1/2	1/2	1/2	$(0,0^0,0)$	23883.246	(0.03)	[55005]
	2 - 1	7/2	7/2	7/2	5/2	$(0,0^0,0)$	23884.197	(3E-3)	[55005]
	2 - 1	5/2	5/2	3/2	3/2	$(0,0^0,0)$	23884.197	(3E-3)	[55005]
	2 - 1	3/2	5/2	3/2	3/2	$(0,0^0,0)$	23884.735	(3E-3)	[55005]
	2 - 1	7/2	7/2	5/2	5/2	$(0,0^0,0)$	23884.891	(2E-3)	[55005]
	2 - 1	9/2	7/2	7/2	5/2	$(0,0^0,0)$	23885.142	(2E-3)	[55005]
	2 - 1	5/2	7/2	3/2	5/2	$(0,0^0,0)$	23885.142	(2E-3)	[55005]
	2 - 1	7/2	5/2	5/2	3/2	$(0,0^0,0)$	23885.298	(2E-3)	[55005]
	2 - 1	3/2	5/2	1/2	3/2	$(0,0^0,0)$	23885.988	(2E-3)	[55005]
	2 - 1	5/2	7/2	5/2	5/2	$(0,0^0,0)$	23886.210	(2E-3)	[55005]
	2 - 1	1/2	3/2	3/2	3/2	$(0,0^0,0)$	23899.362	(3E-3)	[55005]
	2 - 1	5/2	3/2	3/2	3/2	$(0,0^0,0)$	23899.362	(3E-3)	[55005]
	2 - 1	3/2	3/2	3/2	3/2	$(0,0^0,0)$	23899.421	(3E-3)	[55005]
	2 - 1	5/2	3/2	5/2	3/2	$(0,0^0,0)$	23900.090	(2E-3)	[55005]
	2 - 1	3/2	3/2	5/2	3/2	$(0,0^0,0)$	23900.090	(2E-3)	[55005]
	2 - 1	1/2	3/2	1/2	3/2	$(0,0^0,0)$	23900.624	(2E-3)	[55005]
	2 - 1	3/2	3/2	1/2	3/2	$(0,0^0,0)$	23900.695	(2E-3)	[55005]
	2 - 1		5/2		3/2	$(0,1^{L1},0)$	23917.9	(0.20)	[48002]
	2 - 1	3/2	1/2	3/2	3/2	$(0,0^0,0)$	23920.233	(3E-3)	[55005]
	2 - 1	1/2	1/2	3/2	3/2	$(0,0^0,0)$	23920.233	(3E-3)	[55005]
	2 - 1	3/2	1/2	5/2	3/2	$(0,0^0,0)$	23920.912	(2E-3)	[55005]
	2 - 1	1/2	1/2	1/2	3/2	$(0,0^0,0)$	23921.520	(4E-3)	[55005]
	2 - 1		3/2		3/2	$(0,1^{L1},0)$	23925.5	(0.20)	[48002]
	2 - 1		5/2		5/2	$(0,1^{L1},0)$	23928.7	(0.20)	[48002]
	2 - 1		7/2		5/2	$(0,1^{L1},0)$	23938.6	(0.20)	[48002]
	2 - 1		3/2		1/2	$(0,1^{L1},0)$	23944.4	(0.20)	[48002]
	2 - 1		5/2		3/2	$(0,1^{U1},0)$	23948.2	(0.20)	[48002]
	2 - 1		1/2		1/2	$(0,1^{L1},0)$	23954.5	(0.20)	[48002]
	2 - 1		3/2		3/2	$(0,1^{U1},0)$	23954.5	(0.20)	[48002]
	2 - 1		5/2		5/2	$(0,1^{U1},0)$	23958.4	(0.20)	[48002]
	2 - 1		7/2		5/2	$(0,1^{U1},0)$	23968.6	(0.20)	[48002]
	2 - 1		3/2		1/2	$(0,1^{U1},0)$	23974.4	(0.20)	[48002]
	2 - 1		1/2		1/2	$(0,1^{U1},0)$	23984.6	(0.20)	[48002]
	3 - 2		7/2		7/2	$(0,0^0,0)$	35805.09	(0.30)	[48003]
	3 - 2		5/2		3/2	$(0,0^0,0)$	35820.93	(0.10)	[63005]
	3 - 2		3/2		1/2	$(0,0^0,0)$	35820.93	(0.10)	[63005]
	3 - 2		9/2		7/2	$(0,0^0,0)$	35825.77	(0.10)	[63005]
	3 - 2		7/2		5/2	$(0,0^0,0)$	35825.77	(0.10)	[63005]
	3 - 2		5/2		5/2	$(0,0^0,0)$	35835.74	(0.30)	[48003]
	3 - 2		7/2		5/2	$(0,2^2,0)$	36005.79	(0.10)	[65009]
	3 - 2		5/2		5/2	$(0,2^2,0)$	36005.79	(0.10)	[65009]
	3 - 2		3/2		5/2	$(0,2^2,0)$	36005.79	(0.10)	[65009]
	3 - 2		5/2		3/2	$(0,2^2,0)$	36019.85	(0.10)	[65009]
	3 - 2		3/2		3/2	$(0,2^2,0)$	36019.85	(0.10)	[65009]
	3 - 2		9/2		7/2	$(0,2^2,0)$	36026.15	(0.10)	[65009]

TABLE 7.4. The microwave spectrum of ClCN—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	(v_1,v_2^{ℓ},v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{35}Cl^{12}C^{14}N$	3 - 2		7/2		7/2	$(0,2^2,0)$	36026.15	(0.10)	[65009]
	3 - 2		5/2		7/2	$(0,2^2,0)$	36026.15	(0.10)	[65009]
	3 - 2		3/2		1/2	$(0,2^2,0)$	36041.15	(0.10)	[65009]
	8 - 7					$(0,0^0,0)$	95529.86	(0.20)	[56005]
	8 - 7					$(0,1^{L1},0)$	95731.52	(0.20)	[56005]
	8 - 7					$(0,1^{U1},0)$	95850.88	(0.20)	[56005]
	10 - 9					$(0,0^0,0)$	119409.82	(0.25)	[56005]
	10 - 9					$(0,1^{L1},0)$	119662.15	(0.25)	[56005]
	10 - 9					$(0,1^{U1},0)$	119811.35	(0.25)	[56005]
	12 - 11					$(0,0^0,0)$	143288.45	(0.30)	[56005]
	12 - 11					$(0,1^{L1},0)$	143591.01	(0.30)	[56005]
	12 - 11					$(0,1^{U1},0)$	143770.23	(0.30)	[56005]
	14 - 13					$(0,0^0,0)$	167165.15	(0.35)	[56005]
	14 - 13					$(0,1^{L1},0)$	167517.88	(0.35)	[56005]
	14 - 13					$(0,1^{U1},0)$	167726.78	(0.35)	[56005]
	16 - 15					$(0,0^0,0)$	191039.44	(0.40)	[56005]
	16 - 15					$(0,1^{L1},0)$	191442.66	(0.40)	[56005]
	16 - 15					$(0,1^{U1},0)$	191681.13	(0.40)	[56005]
	18 - 17					$(0,0^0,0)$	214911.20	(0.45)	[56005]
	18 - 17					$(0,1^{L1},0)$	215364.77	(0.45)	[56005]
	18 - 17					$(0,1^{U1},0)$	215633.04	(0.45)	[56005]
	20 - 19					$(0,0^0,0)$	238780.22	(0.50)	[56005]
	20 - 19					$(0,1^{L1},0)$	239283.85	(0.50)	[56005]
	20 - 19					$(0,1^{U1},0)$	239582.25	(0.50)	[56005]
	22 - 21					$(0,0^0,0)$	262645.82	(0.55)	[56005]
	24 - 23					$(0,0^0,0)$	286507.95	(0.60)	[56005]
	26 - 25					$(0,0^0,0)$	310365.90	(0.65)	[56005]
	28 - 27					$(0,0^0,0)$	334219.5	(1.5)	[56005]
$^{37}Cl^{12}C^{14}N$	1 - 0		3/2		3/2	$(0,0^0,1)$	11676.01	(0.05)	[65009]
	1 - 0	1/2	3/2	1/2	3/2	$(0,0^0,0)$	11680.70	(0.05)	[65009]
	1 - 0	3/2	3/2	5/2	3/2	$(0,0^0,0)$	11681.23	(0.05)	[65009]
	1 - 0	3/2	3/2	3/2	3/2	$(0,0^0,0)$	11681.89	(0.05)	[65009]
	1 - 0		5/2		3/2	$(0,0^0,1)$	11692.72	(0.05)	[65009]
	1 - 0	5/2	5/2	3/2	3/2	$(0,0^0,0)$	11697.23	(0.05)	[65009]
	1 - 0	7/2	5/2	5/2	3/2	$(0,0^0,0)$	11698.00	(0.05)	[65009]
	1 - 0		3/2		3/2	$(0,2^0,0)$	11702.84	(0.05)	[65009]
	1 - 0		1/2		3/2	$(0,0^0,1)$	11705.77	(0.05)	[65009]
	1 - 0	3/2	1/2	3/2	3/2	$(0,0^0,0)$	11710.98	(0.05)	[65009]
	1 - 0		5/2		3/2	$(0,2^0,0)$	11719.15	(0.05)	[65009]
	1 - 0		1/2		3/2	$(0,2^0,0)$	11732.22	(0.05)	[65009]
	2 - 1	5/2	3/2	3/2	1/2	$(0,0^0,0)$	23372.72	(0.10)	[48002]
	2 - 1		1/2		1/2	$(0,0^0,0)$	23389.00	(0.10)	[48002]
	2 - 1	5/2	5/2	3/2	3/2	$(0,0^0,0)$	23389.61	(0.10)	[48002]
	2 - 1	9/2	7/2	7/2	5/2	$(0,0^0,0)$	23390.53	(0.10)	[48002]
	2 - 1	5/2	7/2	3/2	5/2	$(0,0^0,0)$	23390.53	(0.10)	[48002]
	2 - 1	5/2	3/2	5/2	3/2	$(0,0^0,0)$	23402.47	(0.10)	[48002]
	3 - 2		7/2		7/2	$(0,0^0,0)$	35067.99	(0.10)	[48003]
	3 - 2		5/2		3/2	$(0,0^0,0)$	35080.32	(0.10)	[63005]
	3 - 2		3/2		1/2	$(0,0^0,0)$	35080.32	(0.10)	[63005]
	3 - 2		9/2		7/2	$(0,0^0,0)$	35084.14	(0.10)	[63005]
	3 - 2		7/2		5/2	$(0,0^0,0)$	35084.14	(0.10)	[63005]
	3 - 2		5/2		5/2	$(0,0^0,0)$	35091.97	(0.10)	[48003]
	3 - 2		7/2		5/2	$(0,2^2,0)$	35263.35	(0.10)	[65009]
	3 - 2		5/2		5/2	$(0,2^2,0)$	35263.35	(0.10)	[65009]
	3 - 2		3/2		5/2	$(0,2^2,0)$	35263.35	(0.10)	[65009]
	3 - 2		5/2		3/2	$(0,2^2,0)$	35274.82	(0.10)	[65009]
	3 - 2		3/2		3/2	$(0,2^2,0)$	35274.82	(0.10)	[65009]
	3 - 2		9/2		7/2	$(0,2^2,0)$	35279.83	(0.10)	[65009]
	3 - 2		7/2		7/2	$(0,2^2,0)$	35279.83	(0.10)	[65009]
	3 - 2		5/2		7/2	$(0,2^2,0)$	35279.83	(0.10)	[65009]
	3 - 2		3/2		1/2	$(0,2^2,0)$	35290.98	(0.10)	[65009]
	8 - 7					$(0,0^0,0)$	93552.59	(0.20)	[56005]
	8 - 7					$(0,1^{L1},0)$	93751.28	(0.20)	[56005]
	8 - 7					$(0,1^{U1},0)$	93865.98	(0.20)	[56005]
	10 - 9					$(0,0^0,0)$	116938.45	(0.25)	[56005]

TABLE 7.4. The microwave spectrum of ClCN—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	(v_1,v_2^l,v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{37}Cl^{12}C^{14}N$	10 - 9					$(0,1^{L1},0)$	117186.54	(0.25)	[56005]
	10 - 9					$(0,1^{U1},0)$	117329.90	(0.25)	[56005]
	12 - 11					$(0,0^0,0)$	140322.75	(0.30)	[56005]
	12 - 11					$(0,1^{L1},0)$	140620.55	(0.30)	[56005]
	12 - 11					$(0,1^{U1},0)$	140792.59	(0.30)	[56005]
	14 - 13					$(0,0^0,0)$	163705.31	(0.35)	[56005]
	14 - 13					$(0,1^{L1},0)$	164052.55	(0.35)	[56005]
	14 - 13					$(0,1^{U1},0)$	164253.26	(0.35)	[56005]
	16 - 15					$(0,0^0,0)$	187085.58	(0.40)	[56005]
	16 - 15					$(0,1^{L1},0)$	187482.50	(0.40)	[56005]
	16 - 15					$(0,1^{U1},0)$	187711.52	(0.40)	[56005]
	18 - 17					$(0,0^0,0)$	210463.24	(0.45)	[56005]
	20 - 19					$(0,0^0,0)$	233838.30	(0.50)	[56005]
	22 - 21					$(0,0^0,0)$	257210.28	(0.55)	[56005]
	24 - 23					$(0,0^0,0)$	280578.92	(0.60)	[56005]
	26 - 25					$(0,0^0,0)$	303943.87	(0.65)	[56005]
$^{35}Cl^{13}C^{14}N$	1 - 0		5/2		3/2	$(0,0^0,0)$	11879.	(2.00)	[51003]
	2 - 1	9/2	7/2	7/2	5/2	$(0,0^0,0)$	23760.98	(0.10)	[48002]
	3 - 2		7/2		7/2	$(0,0^0,0)$	35618.81	(0.10)	[48003]
	3 - 2		5/2		3/2	$(0,0^0,0)$	35634.85	(0.10)	[48003]
	3 - 2		3/2		1/2	$(0,0^0,0)$	35634.85	(0.10)	[48003]
	3 - 2		9/2		7/2	$(0,0^0,0)$	35639.78	(0.10)	[48003]
	3 - 2		7/2		5/2	$(0,0^0,0)$	35639.78	(0.10)	[48003]
	3 - 2		5/2		5/2	$(0,0^0,0)$	35649.56	(0.10)	[48003]
$^{37}Cl^{13}C^{14}N$	2 - 1	9/2	7/2	7/2	5/2	$(0,0^0,0)$	23260.31	(0.20)	[48002]
	3 - 2		9/2		7/2	$(0,0^0,0)$	34889.05	(0.10)	[48003]
$^{35}Cl^{13}C^{15}N$	1 - 0		3/2		3/2	$(0,0^0,0)$	11479.52	(0.10)	[72011]
	1 - 0		5/2		3/2	$(0,0^0,0)$	11500.34	(0.10)	[72011]
	1 - 0		1/2		3/2	$(0,0^0,0)$	11516.99	(0.10)	[72011]
	2 - 1		5/2		5/2	$(0,0^0,0)$	22973.205	(3E-3)	[55005]
	2 - 1		1/2		1/2	$(0,0^0,0)$	22992.235	(3E-3)	[55005]
	2 - 1		5/2		3/2	$(0,0^0,0)$	22994.038	(2E-3)	[55005]
	2 - 1		7/2		5/2	$(0,0^0,0)$	22994.038	(2E-3)	[55005]
	2 - 1		3/2		3/2	$(0,0^0,0)$	23008.896	(3E-3)	[55005]
	2 - 1		5/2		3/2	$(0,1^{L1},0)$	23026.264	(3E-3)	[55005]
	2 - 1		1/2		3/2	$(0,0^0,0)$	23029.709	(3E-3)	[55005]
	2 - 1		3/2		3/2	$(0,1^{L1},0)$	23033.745	(2E-3)	[55005]
	2 - 1		7/2		5/2	$(0,1^{L1},0)$	23046.962	(3E-3)	[55005]
	2 - 1		3/2		1/2	$(0,1^{L1},0)$	23052.177	(4E-3)	[55005]
	2 - 1		1/2		1/2	$(0,1^{L1},0)$	23062.643	(2E-3)	[55005]
	3 - 2		3/2		1/2	$(0,0^0,0)$	34484.32	(0.20)	[63005]
	3 - 2		5/2		3/2	$(0,0^0,0)$	34484.32	(0.20)	[63005]
	3 - 2		9/2		7/2	$(0,0^0,0)$	34489.21	(0.20)	[63005]
	3 - 2		7/2		5/2	$(0,0^0,0)$	34489.21	(0.20)	[63005]
$^{37}Cl^{13}C^{15}N$	3 - 2		3/2		1/2	$(0,0^0,0)$	33755.32	(0.20)	[63005]
	3 - 2		5/2		3/2	$(0,0^0,0)$	33755.32	(0.20)	[63005]
	3 - 2		9/2		7/2	$(0,0^0,0)$	33759.18	(0.20)	[63005]
	3 - 2		7/2		5/2	$(0,0^0,0)$	33759.18	(0.20)	[63005]
$^{36}Cl^{12}C^{14}N$	2 - 1		2		1	$(0,0^0,0)$	23625.60	(0.10)	[49002]
	2 - 1		3		3	$(0,0^0,0)$	23625.60	(0.10)	[49002]
	2 - 1		2		2	$(0,0^0,0)$	23629.84	(1.00)	[49002]
	2 - 1		2		3	$(0,0^0,0)$	23629.84	(1.00)	[49002]
	2 - 1		3		3	$(0,0^0,0)$	23629.84	(1.00)	[49002]
	2 - 1		4		3	$(0,0^0,0)$	23629.84	(0.20)	[49002]
	2 - 1		1		1	$(0,0^0,0)$	23629.84	(1.00)	[49002]
	2 - 1		0		1	$(0,0^0,0)$	23629.84	(1.00)	[49002]
	2 - 1		3		2	$(0,0^0,0)$	23629.84	(1.00)	[49002]
	2 - 1		1		2	$(0,0^0,0)$	23634.68	(0.10)	[49002]

Table 8. Rotational constants for FCN.

Isotopic Species	Vib. State v_1 v_2^{ℓ} v_3	B_v(MHz)	D_v(kHz)	Reference
$^{19}F^{12}C^{14}N$	0 0^0 0	10554.20(2)	5.3(5)	[63005]
	0 1^1 0 c	10574.79(2)[a]		[67000]
	0 1^1 0 d	10594.44(2)[a]		[67000]
	0 2^0 0	10610.64(2)		[67000]
	0 2^2 0	10614.75(5)		[67000]
	0 3^1 0 c	10618.60(5)		[67000]
	0 3^1 0 d	10656.63(5)		[67000]
	0 3^3 0	10644.71(1)		[67000]
	0 4^0 0	10662.01(10)		[67000]
	0 0^0 1	10510.85(2)		[67000]
	0 1^1 1 c	10532.67(5)		[67000]
	0 2^0 1	10574.63(10)		[67000]
	0 0^0 2	10469.81(10)		[67000]
$^{19}F^{13}C^{14}N$	0 0^0 0	10547.73(2)		[67000]
	0 2^0 0	10602.80(5)		[67000]
	0 0^0 1	10502.71(5)		[67000]
$^{19}F^{12}C^{15}N$	0 0^0 0	10186.42(5)		[63005]

[a] The value q_{010} = 19.68421(34) MHz and μ_{010} = -5.656(3)×10^{-5} MHz were derived from the observation of ℓ-type doubling transitions [68013]. The observed frequencies were fit to the formula: $\nu = \frac{1}{2}[q_{010}+\mu_{010}J(J+1)](v_2+1)J(J+1)$.

Table 8.1. Hyperfine structure, dipole moment and Zeeman parameters for FCN.

Parameter	$^{19}F^{12}C^{14}N$ Value	$^{19}F^{12}C^{15}N$ Value	Reference
eqQ(N)(MHz)	-2.67(5)[a]	---	[60001]
μ(D)	2.17(5)	---	[63005]
$g_\perp$ (μ_N)	---	-0.0504(8)	[73029]
$\chi_\perp - \chi_\parallel$ (10^{-6}erg/G^2·mole)	---	7.2(8)	[73029]
$Q_\parallel$ (10^{-26}esu·cm^2)	---	-3.7(10)	[73029]

[a] All of the transitions observed in vibrationally excited states show hyperfine splittings consistent with the ground state value of eqQ given here.

TABLE 8.2. The microwave spectrum of FCN

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{19}F^{12}C^{14}N$	20 - 20					$(0,1^1,0)$	8257.58	(0.05)	[68013]
	21 - 21					$(0,1^1,0)$	9082.29	(0.05)	[68013]
	22 - 22					$(0,1^1,0)$	9945.96	(0.05)	[68013]
	23 - 23					$(0,1^1,0)$	10848.78	(0.05)	[68013]
	24 - 24					$(0,1^1,0)$	11790.52	(0.05)	[68013]
	25 - 25					$(0,1^1,0)$	12771.27	(0.05)	[68013]
	26 - 26					$(0,1^1,0)$	13790.88	(0.05)	[68013]
	27 - 27					$(0,1^1,0)$	14849.51	(0.05)	[68013]
	28 - 28					$(0,1^1,0)$	15946.96	(0.05)	[68013]
	29 - 29					$(0,1^1,0)$	17083.23	(0.05)	[68013]
	30 - 30					$(0,1^1,0)$	18258.29	(0.05)	[68013]
	31 - 31					$(0,1^1,0)$	19472.10	(0.05)	[68013]
	32 - 32					$(0,1^1,0)$	20742.52	(0.05)	[68013]
	1 - 0					$(0,0^0,2)$	20939.62	(0.50)	[76001]
	1 - 0					$(1,0^0,0)$	20953.77	(0.50)	[76001]
	1 - 0					$(0,0^0,1)$	21021.62	(0.05)	[76001]
	1 - 0		1		1	$(0,0^0,0)$	21107.73	(0.03)	[76001]
	1 - 0		2		1	$(0,0^0,0)$	21108.53	(0.03)	[76001]
	1 - 0		0		1	$(0,0^0,0)$	21109.72	(0.03)	[76001]
	1 - 0					$(0,2^0,1)$	21149.25	(0.30)	[76001]
	1 - 0		1		1	$(0,1^0,0)$	21220.59	(0.05)	[76001]
	1 - 0		2		1	$(0,1^0,0)$	21221.40	(0.05)	[76001]
	1 - 0		1		1	$(0,4^0,0)$	21323.45	(0.10)	[76001]
	1 - 0		2		1	$(0,4^0,0)$	21324.21	(0.10)	[76001]
	1 - 0		0		1	$(0,4^0,0)$	21325.32	(0.10)	[76001]
	33 - 33					$(0,1^1,0)$	22015.74	(0.05)	[68013]
	34 - 34					$(0,1^1,0)$	23345.53	(0.05)	[68013]
	35 - 35					$(0,1^1,0)$	24713.90	(0.05)	[68013]
	36 - 36					$(0,1^1,0)$	26120.72	(0.05)	[68013]
	37 - 37					$(0,1^1,0)$	27566.22	(0.05)	[68013]
	38 - 38					$(0,1^1,0)$	29050.01	(0.05)	[68013]
	2 - 1					$(0,0^0,1)$	42043.12	(0.10)	[76001]
	2 - 1					$(0,1^{U1},1)$	42130.57	(0.20)	[76001]
	2 - 1		2		2	$(0,0^0,0)$	42215.86	(0.05)	[76001]
	2 - 1		1		0	$(0,0^0,0)$	42215.86	(0.05)	[76001]
	2 - 1		2		1	$(0,0^0,0)$	42216.62	(0.05)	[76001]
	2 - 1		3		2	$(0,0^0,0)$	42216.62	(0.05)	[76001]
	2 - 1		1		1	$(0,0^0,0)$	42217.91	(0.05)	[76001]
	2 - 1					$(0,1^{L1},0)$	42299.04	(0.05)	[76001]
	2 - 1					$(0,1^{U1},0)$	42377.61	(0.05)	[76001]
	2 - 1		3		2	$(0,2^0,0)$	42441.60	(0.10)	[76001]
	2 - 1		2		1	$(0,2^0,0)$	42441.60	(0.10)	[76001]
	2 - 1		1		0	$(0,2^0,0)$	42442.46	(0.10)	[76001]
	2 - 1		2		2	$(0,2^0,0)$	42442.46	(0.10)	[76001]
	2 - 1					$(0,3^{L1},0)$	42474.28	(0.20)	[76001]
	2 - 1					$(0,3^{U1},0)$	42626.52	(0.20)	[76001]
	3 - 2					$(0,0^0,0)$	63324.68	(0.10)	[76001]
	3 - 2					$(0,1^{L1},0)$	63448.31	(0.20)	[76001]
	3 - 2					$(0,1^{U1},0)$	63566.23	(0.20)	[76001]
	3 - 2					$(0,2^0,0)$	63663.52	(0.20)	[76001]
	3 - 2					$(0,2^2,0)$	63687.47	(0.30)	[76001]
	3 - 2					$(0,3^{U1},0)$	63940.01	(0.30)	[76001]
	4 - 3					$(0,0^0,0)$	84432.23	(0.20)	[76001]
	4 - 3					$(0,2^0,0)$	84883.65	(0.30)	[76001]
	4 - 3					$(0,2^2,0)$	84917.66	(0.50)	[76001]
	4 - 3					$(0,3^3,0)$	85157.08	(0.30)	[76001]
	4 - 3					$(0,3^{U1},0)$	85252.56	(0.20)	[76001]
$^{19}F^{13}C^{14}N$	1 - 0					$(0,0^0,1)$	21005.42	(0.10)	[76001]
	1 - 0		1		1	$(0,0^0,0)$	21094.84	(0.05)	[76001]
	1 - 0		2		1	$(0,0^0,0)$	21095.59	(0.05)	[76001]
	1 - 0		0		1	$(0,0^0,0)$	21096.84	(0.05)	[76001]
	1 - 0		1		1	$(0,2^0,0)$	21204.95	(0.10)	[76001]
	1 - 0		2		1	$(0,2^0,0)$	21205.72	(0.10)	[76001]
	2 - 1					$(0,1^{L1},0)$	42266.10	(0.50)	[76001]
	2 - 1					$(0,1^{U1},0)$	42346.81	(0.50)	[76001]

TABLE 8.2. The microwave spectrum of FCN—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	(v_1,v_2^{ℓ},v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{19}F^{12}C^{15}N$	1 - 0					$(0,0^0,0)$	20372.58	(0.05)	[76001]
	2 - 1					$(0,0^0,0)$	40745.29	(0.20)	[76001]
	2 - 1					$(0,1^{l1},0)$	40826.68	(0.30)	[76001]
	2 - 1					$(0,1^{u1},0)$	40899.70	(0.30)	[76001]

Table 9. Rotational and centrifugal distortion constants for $^{12}C^{19}F_2$ [73030].

Watson's Determinable Parameters	Value[a] (MHz)	Derived Parameters (assuming planarity conditions)	Value[a] (MHz)
A''	88 355.0942±0.066	A'	88 355.071±0.066
B''	12 507.5392±0.010	B'	12 507.605±0.010
C''	10 932.3151±0.009	C'	10 932.336±0.010
τ_1	0.126447±0.011	τ'_{bbcc}	-0.0468±0.0005
τ_2	-0.0181803±0.0015	τ'_{ccaa}	0.1323±0.003
τ_3 [b]	3.45±0.04	τ'_{aabb}	0.0410±0.008
τ_{aaaa}	-11.2778±0.036	$\tau_{aabb}(1)$	0.3993±0.0046
τ_{bbbb}	-0.0691387±0.0005	$\tau_{aabb}(2)$	0.3878±0.0040
τ_{cccc}	-0.0340714±0.0004	$\tau_{aabb}(3)$	0.3878±0.0040
H_J	$(0.1162\pm0.2)\times10^{-6}$	$\tau_{abab}(1)$	-0.1784±0.0016
H_{JK}	$(-0.0013\pm0.6)\times10^{-5}$	$\tau_{abab}(2)$	-0.1681±0.0038
H_{KJ}	$(-0.2555\pm0.5)\times10^{-4}$	$\tau_{abab}(3)$	-0.1668±0.0041
H_K	$(0.3337\pm0.4)\times10^{-3}$	$\Delta\tau$	$(-0.215\pm0.07)\times10^{-3}$
h_J [c]	$(0.132\pm0.4)\times10^{-7}$	S	0.82
h_{JK}	$(0.4325\pm0.3)\times10^{-5}$	σ_{rms}	0.109
h_K	$(-0.1580\pm0.14)\times10^{-3}$	μ(D)	0.469(26)

[a] The uncertainties quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

[c] Watson uses $2h_J$ for this parameter.

TABLE 9.1. The microwave spectrum of CF_2

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{12}C^{19}F_2$	33(6,28) - 34(5,29)	(0,0,0)	18635.9	(0.30)	[73030]
	13(2,11) - 14(1,14)	(0,0,0)	19191.45	(0.20)	[73030]
	24(3,22) - 23(4,19)	(0,0,0)	20930.7	(0.10)	[73030]
	27(5,22) - 28(4,25)	(0,0,0)	21179.35	(0.10)	[73030]
	21(4,17) - 22(3,20)	(0,0,0)	21240.62	(0.10)	[73030]
	4(0, 4) - 3(1, 3)	(0,0,0)	21500.1	(0.10)	[66013]
	12(2,10) - 13(1,13)	(0,0,0)	23114.62	(0.10)	[73030]
	36(5,32) - 35(6,29)	(0,0,0)	23589.37	(0.10)	[73030]
	29(4,25) - 28(5,24)	(0,0,0)	25719.86	(0.10)	[73030]
	13(3,11) - 14(2,12)	(0,0,0)	25894.0	(0.10)	[73030]
	30(4,27) - 29(5,24)	(0,0,0)	26194.73	(0.10)	[73030]
	33(6,27) - 34(5,30)	(0,0,0)	26290.25	(0.10)	[73030]
	17(2,15) - 18(1,18)	(0,0,0)	27883.9	(0.20)	[73030]
	1(1, 1) - 2(0, 2)	(0,0,0)	28989.6	(0.20)	[66013]
	11(2, 9) - 12(1,12)	(0,0,0)	29340.6	(0.10)	[73030]
	15(3,12) - 16(2,15)	(0,0,0)	29651.62	(0.10)	[73030]
	20(2,19) - 19(3,16)	(0,0,0)	30220.6	(0.10)	[73030]
	26(5,22) - 27(4,23)	(0,0,0)	31669.8	(0.10)	[73030]
	39(7,32) - 40(6,35)	(0,0,0)	34165.7	(0.30)	[73030]
	16(2,14) - 15(3,13)	(0,0,0)	37171.55	(0.10)	[73030]
	10(2, 8) - 11(1,11)	(0,0,0)	37747.2	(0.10)	[73030]
	25(3,23) - 24(4,20)	(0,0,0)	40826.15	(0.10)	[73030]
	21(2,20) - 20(3,17)	(0,0,0)	40949.2	(0.10)	[73030]
	20(4,16) - 21(3,19)	(0,0,0)	43257.57	(0.10)	[73030]
	19(4,16) - 20(3,17)	(0,0,0)	43639.2	(0.20)	[73030]
	6(2, 5) - 7(1, 6)	(0,0,0)	44286.6	(0.10)	[66013]
	26(5,21) - 27(4,24)	(0,0,0)	45212.6	(0.20)	[73030]
	10(1, 9) - 9(2, 8)	(0,0,0)	45822.8	(0.10)	[73030]
	19(2,17) - 20(1,20)	(0,0,0)	46920.063	(0.04)	[73030]
	5(0, 5) - 4(1, 4)	(0,0,0)	47650.55	(0.10)	[73030]
	23(3,20) - 22(4,19)	(0,0,0)	47701.9	(0.20)	[73030]
	14(3,11) - 15(2,14)	(0,0,0)	47950.8	(0.20)	[73030]
	9(2, 7) - 10(1,10)	(0,0,0)	48186.2	(0.20)	[73030]
	28(2,27) - 27(3,24)	(0,0,0)	50664.596	(0.15)	[73030]
	38(7,31) - 39(6,34)	(0,0,0)	59466.578	(0.09)	[73030]
	26(3,24) - 25(4,21)	(0,0,0)	59733.478	(0.09)	[73030]
	20(2,18) - 21(1,21)	(0,0,0)	59935.200	(0.09)	[73030]
	24(2,23) - 23(3,20)	(0,0,0)	60113.905	(0.09)	[73030]
	8(2, 6) - 9(1, 9)	(0,0,0)	60493.616	(0.09)	[73030]
	1(1, 0) - 1(0, 1)	(0,0,0)	77419.8	(0.20)	[66013]
	2(1, 1) - 2(0, 2)	(0,0,0)	79019.8	(0.20)	[66013]
	3(1, 2) - 3(0, 3)	(0,0,0)	81464.6	(0.20)	[66013]
	4(1, 3) - 4(0, 4)	(0,0,0)	84808.3	(0.20)	[66013]

Table 10. Rotational constants for HCN [74001][a], DCN [74001][a] and TCN [75007].

Isotopic Species	Vib. State v_1 v_2^ℓ v_3	B_v(MHz)	D_v(kHz)	q_v(kHz)
$H^{12}C^{14}N$[b]	0 0^0 0	44 315.9757(4)	87.24(6)	
	0 1^1 0	44 422.437(30)	89.4	224 476.57(30) - 2.65865(292) J(J+1) + 3.602(620)×10^{-5} $J^2(J+1)^2$
	0 2^0 0	44 544.033(60)	91.6	
	0 3^1 0			231 120.(4) - 2.98(9) J(J+1) + 3.6×10^{-5} $J^2(J+1)^2$
	0 0^0 1	44 013.775(100)	86.9	
$H^{13}C^{14}N$	0 0^0 0	43 170.09(6)	83.0	
	0 1^1 0			214 837.4(14) - 2.436(17) J(J+1)
$H^{12}C^{15}N$	0 0^0 0	43 027.69(5)	82.3	
	0 $1^1$0			211 938.1(52) - 2.392(72) J(J+1)
$D^{12}C^{14}N$[c]	0 0^0 0	36 207.4627(2)	57.83(4)	
	0 1^1 0	36 337.037(30)	61.1	186 191.58(50) - 2.20697(380) J(J+1) + 4.790(620)×10^{-5} $J^2(J+1)^2$
	0 2^0 0	36 474.259(50)	64.3	
	0 3^1 0			190 916.(2) - 2.44(2) J(J+1) + 4.8×10^{-5} $J^2(J+1)^2$
	0 0^0 1	36 011.116(100)	57.4	
$D^{13}C^{14}N$	0 0^0 0	35 587.62(5)	55.7	
	0 1^1 0			182 294.2(12) - 2.082(12) J(J+1).
	0 2^0 0	35 833.92(20)	59.5	
$D^{12}C^{15}N$	0 0^0 0	35 169.85(5)	54.5	
	0 1^1 0			176 079.9(22) - 2.019(22) J(J+1)
	0 2^0 0	35 427.09(15)	58.4	
$T^{12}C^{14}N$	0 0^0 0	30 954.080(8)	43.82(10)	
	0 1^1 0	31 080.410(5)	45.82(8)	150 809.(7) - 4.1(2) J(J+1)
$T^{13}C^{14}N$	0 0^0 0	30 591.036(7)	42.45(9)	
	0 1^1 0	30 709.082(12)	44.37(16)	149 744.(17) - 3.2(4) J(J+1)
$T^{12}C^{15}N$	0 0^0 0	30 064.400(12)	41.19(14)	
	0 1^1 0	30 186.560(8)	43.00(14)	142 674.(12) - 4.2(4) J(J+1)

[a] Original data from [71021], [69021], [67006], and [61001]. Note that this table uses a different vibrational numbering from that used in the primary references as explained in the Introduction.

[b] For $H^{12}C^{14}N$ D_v(kHz) = 87.24 - 0.83 v_1 + 2.13 v_2 + 0.22 v_3 kHz and
q_v(MHz) = 221.1550 + 2.10 v_1 + 3.3215 v_2 - 0.03 v_3 - (0.002495 + 0.000163 v_2) J(J+1) + 3.6×10^{-8} $J^2(J+1)^2$

[c] For $D^{12}C^{14}N$ D_v(kHz) = 57.83 - 0.27 v_1 + 2.10 v_2 - 0.03 v_3
q_v(MHz) = 183.8294 - 4.41 v_1 + 2.3622 v_2 + 4.53 v_3 - (0.002089 + 0.000118 v_2) J(J+1) + 4.8×10^{-8} $J^2(J+1)^2$

Additional References: [49001], [50007], [50008], [50009], [50010], [50011], [51004], [52009], [52010], [52011], [53006], [53007], [54000], [54001], [55003], [55004], [60002], [60004], [61002], [61003], [64007], [67007], [67008], [67009], [68031], [69023], [69050], [70053], [73032], [74012], [74015], [75033].

Table 10.1. Hyperfine constants, electric dipole moment and Zeeman constants for HCN [74001].

Parameters	HCN 00^00 J=1-0	HCN 01^10 J=2-1	HCN 02^00 J=1-0	HCN 02^20 J=3-2	$HC^{15}N$ 00^00 J=1-0	DCN 00^00 J=1-0	$D^{13}C^{14}N$ 00^00 J=1-0
Hyperfine Constants[a]							
eqQ (N) (kHz)	-4707.89(8)	-4807.9(19)	-4899.0(21)	...	...	-4703.96(47)	...
eqQ (D) (kHz)	...	...	...	...	...	202.23(50)	c
c_N	10.13(3)	12.07(27)	10.70(78)	...	...	8.23(18)	...
c_H or c_D (kHz)	-4.32(7)	-27.4(6)	-3.8(15)	...	...	-0.57(25)	-0.6(3)
$c_{^{13}C}$ (kHz)	...	...	...	...	...	...	15.0(10)
S_{HN} (kHz)	0.154(19)	...	...	...	...	...	...
$\lvert eqQ_\eta \rvert$ (kHz)		395.1(27)					
Electric Dipole Moment[a]							
μ	2.984594(1500)	2.941642(1500)	2.89865(150)	2.89813(150)	...	2.990198(1500)	...
$\frac{\mu}{\mu(H^{12}C^{14}N)}$	1.	0.9856088(80)	0.971204(36)	0.97103(17)	...	1.0018776(70)	...
Zeeman Constants[b]							
$g_\perp$ (μ_N)	-0.0980(40)	-0.100(2)	...	...	-0.0904(6)	...	...
$g_\parallel$ (μ_N)	...	+0.38(12)	...	...	...	...	...
$\chi_\perp - \chi_\parallel$ (erg/G^2·mole)	...	...	...	...	$7.2(8)\times10^{-6}$	...	...
$Q_\parallel$ (esu·cm^2)	...	...	...	...	$3.1(12)\times10^{-26}$	...	...

[a] Original data from [70057] and [74014]. Values refer to the upper J state.

[b] Original data from [73010], [73033] and [70019].

[c] A value of eqQ(D) = 194.4(22) was assumed from the DCN measurements of DeLucia and Gordy [69021]. The spin-rotation constants shown for $D^{13}CN$ are from [74014].

TABLE 10.2. The microwave spectrum of HCN

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	(v_1,v_2^{ℓ},v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{12}C^{14}N$	1 - 1	3/2	1	5/2	2	$(0,1^1,0)$	448.200	(3E-4)	[70046]
	1 - 1	1/2	1	3/2	2	$(0,1^1,0)$	448.213	(5E-4)	[70046]
	1 - 1	3/2	1	3/2	2	$(0,1^1,0)$	448.233	(6E-3)	[70046]
	1 - 1	1/2	1	3/2	1	$(0,1^1,0)$	448.825	(3E-3)	[70046]
	1 - 1	3/2	1	3/2	1	$(0,1^1,0)$	448.845	(4E-4)	[70046]
	1 - 1	1/2	1	1/2	1	$(0,1^1,0)$	448.845	(4E-4)	[70046]
	1 - 1	3/2	1	1/2	1	$(0,1^1,0)$	448.864	(3E-3)	[70046]
	1 - 1	3/2	2	5/2	2	$(0,1^1,0)$	448.929	(3E-3)	[70046]
	1 - 1	3/2	2	3/2	2	$(0,1^1,0)$	448.963	(1E-4)	[70046]
	1 - 1	5/2	2	5/2	2	$(0,1^1,0)$	448.963	(1E-4)	[70046]
	1 - 1	5/2	2	3/2	2	$(0,1^1,0)$	448.996	(3E-3)	[70046]
	1 - 1	3/2	2	3/2	1	$(0,1^1,0)$	449.574	(3E-3)	[70046]
	1 - 1	3/2	2	1/2	1	$(0,1^1,0)$	449.594	(4E-4)	[70046]
	1 - 1	5/2	2	3/2	1	$(0,1^1,0)$	449.608	(2E-4)	[70046]
	1 - 1	1/2	0	3/2	1	$(0,1^1,0)$	450.802	(3E-4)	[70046]
	1 - 1	1/2	0	1/2	1	$(0,1^1,0)$	450.821	(5E-4)	[70046]
	2 - 2		2		2	$(0,1^1,0)$	1346.677	(5E-3)	[56006]
	2 - 2		3		3	$(0,1^1,0)$	1346.796	(5E-3)	[56006]
	2 - 2		1		1	$(0,1^1,0)$	1346.796	(5E-3)	[56006]
	3 - 3		3		2	$(0,1^1,0)$	2691.757	(8E-3)	[56006]
	3 - 3		3		4	$(0,1^1,0)$	2692.071	(6E-3)	[56006]
	3 - 3		3		3	$(0,1^1,0)$	2693.250	(0.01)	[56006]
	3 - 3		4		4	$(0,1^1,0)$	2693.395	(6E-3)	[56006]
	3 - 3		2		2	$(0,1^1,0)$	2693.395	(6E-3)	[56006]
	3 - 3		4		3	$(0,1^1,0)$	2694.582	(0.01)	[56006]
	3 - 3		2		3	$(0,1^1,0)$	2694.954	(0.01)	[56006]
	4 - 4		4		3	$(0,1^1,0)$	4486.762	(0.01)	[56006]
	4 - 4		4		5	$(0,1^1,0)$	4487.000	(6E-3)	[56006]
	4 - 4		4		4	$(0,1^1,0)$	4488.381	(0.02)	[56006]
	4 - 4		5		5	$(0,1^1,0)$	4488.522	(0.02)	[56006]
	4 - 4		3		3	$(0,1^1,0)$	4488.522	(0.02)	[56006]
	5 - 5		5		5	$(0,1^1,0)$	6731.793	(0.01)	[56006]
	5 - 5		6		6	$(0,1^1,0)$	6731.925	(0.01)	[56006]
	5 - 5		4		4	$(0,1^1,0)$	6731.925	(0.01)	[56006]
	16 - 16					$(0,2^2,0)$	8292.88	(0.10)	[67006]
	3 - 3					$(0,5^1,0)$	8557.50	(0.10)	[61001]
	4 - 4					$(0,3^1,0)$	9242.20	(0.10)	[61001]
	6 - 6					$(0,1^1,0)$	9423.32	(0.02)	[61001]
	17 - 17					$(0,2^2,0)$	10464.07	(0.10)	[67006]
	7 - 7					$(0,1^1,0)$	12562.32	(0.03)	[61001]
	18 - 18					$(0,2^2,0)$	13019.97	(0.10)	[67006]
	5 - 5					$(0,3^1,0)$	13861.45	(0.10)	[61001]
	19 - 19					$(0,2^2,0)$	15995.82	(0.10)	[67006]
	8 - 8					$(0,1^1,0)$	16148.55	(0.05)	[61001]
	4 - 4					$(0,5^1,0)$	19224.60	(0.10)	[61001]
	6 - 6					$(0,3^1,0)$	19402.20	(0.10)	[61001]
	20 - 20					$(0,2^2,0)$	19426.18	(0.10)	[67006]
	9 - 9					$(0,1^1,0)$	20181.40	(0.05)	[61001]
	21 - 21					$(0,2^2,0)$	23343.70	(0.15)	[67006]
	10 - 10					$(0,1^1,0)$	24660.31	(0.04)	[67006]
	7 - 7					$(0,3^1,0)$	25863.35	(0.10)	[61001]
	22 - 22					$(0,2^2,0)$	27778.92	(0.15)	[67006]
	11 - 11					$(0,1^1,0)$	29584.66	(0.04)	[67006]
	23 - 23					$(0,2^2,0)$	32759.76	(0.15)	[67006]
	12 - 12					$(0,1^1,0)$	34953.76	(0.05)	[67006]
	24 - 24					$(0,2^2,0)$	38311.12	(0.15)	[67006]
	13 - 13					$(0,1^1,0)$	40766.90	(0.05)	[67006]
	25 - 25					$(0,2^2,0)$	44454.32	(0.15)	[67006]
	14 - 14					$(0,1^1,0)$	47023.20	(0.08)	[67006]
	15 - 15					$(0,1^1,0)$	53721.78	(0.08)	[67006]
	16 - 16					$(0,1^1,0)$	60861.63	(0.08)	[67006]
	17 - 17					$(0,1^1,0)$	68441.92	(*0.04)	[74001]
	18 - 18					$(0,1^1,0)$	76461.43	(0.10)	[67006]
	19 - 19					$(0,1^1,0)$	84919.16	(*0.07)	[74001]
	1 - 0					$(0,0^0,1)$	88027.20	(0.20)	[71021]

TABLE 10.2. The microwave spectrum of HCN—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{12}C^{14}N$	1 - 0		1		1	$(0,0^0,0)$	88630.416	(1E-3)	[69021]
	1 - 0		2		1	$(0,0^0,0)$	88631.847	(1E-3)	[69021]
	1 - 0		0		1	$(0,0^0,0)$	88633.936	(1E-3)	[69021]
	1 - 0		1		1	$(0,2^0,0)$	89086.53	(0.15)	[71021]
	1 - 0		2		1	$(0,2^0,0)$	89087.92	(0.10)	[71021]
	1 - 0		0		1	$(0,2^0,0)$	89090.13	(0.15)	[71021]
	20 - 20					$(0,1^1,0)$	93813.85	(0.10)	[67006]
	21 - 21					$(0,1^1,0)$	103144.25	(*0.15)	[74001]
	22 - 22					$(0,1^1,0)$	112909.10	(*0.23)	[74001]
	2 - 1		2		1	$(0,1^{L1},0)$	177237.45	(0.15)	[71021]
	2 - 1		1		1	$(0,1^{L1},0)$	177238.96	(0.10)	[71021]
	2 - 1		3		2	$(0,1^{L1},0)$	177238.96	(0.10)	[71021]
	2 - 1		1		0	$(0,1^{L1},0)$	177240.65	(0.15)	[71021]
	2 - 1		2		2	$(0,0^0,0)$	177259.677	(2E-3)	[69021]
	2 - 1		1		0	$(0,0^0,0)$	177259.923	(2E-3)	[69021]
	2 - 1		2		1	$(0,0^0,0)$	177261.110	(2E-3)	[69021]
	2 - 1		3		2	$(0,0^0,0)$	177261.223	(2E-3)	[69021]
	2 - 1		1		2	$(0,0^0,0)$	177262.012	(*2E-3)	[74001]
	2 - 1		1		1	$(0,0^0,0)$	177263.445	(2E-3)	[69021]
	2 - 1		2		1	$(0,1^{U1},0)$	178135.25	(0.15)	[71021]
	2 - 1		1		1	$(0,1^{U1},0)$	178136.76	(0.10)	[71021]
	2 - 1		3		2	$(0,1^{U1},0)$	178136.76	(0.10)	[71021]
	2 - 1		1		0	$(0,1^{U1},0)$	178138.37	(0.15)	[71021]
	3 - 2		2		1	$(0,0^0,0)$	265886.18	(0.55)	[56005]
	3 - 2		3		2	$(0,0^0,0)$	265886.18	(0.55)	[56005]
	3 - 2		4		3	$(0,0^0,0)$	265886.18	(0.55)	[56005]
$H^{13}C^{14}N$	6 - 6					$(0,1^1,0)$	9018.87	(0.05)	[61001]
	7 - 7					$(0,1^1,0)$	12023.25	(0.05)	[61001]
	8 - 8					$(0,1^1,0)$	15455.64	(0.10)	[61001]
	9 - 9					$(0,1^1,0)$	19315.70	(0.10)	[61001]
	10 - 10					$(0,1^1,0)$	23602.60	(0.10)	[61001]
	1 - 0		1		1	$(0,0^0,0)$	86338.767	(0.03)	[76025]
	1 - 0		2		1	$(0,0^0,0)$	86340.184	(0.03)	[76025]
	1 - 0		0		1	$(0,0^0,0)$	86342.274	(0.03)	[76025]
	2 - 1		2		2	$(0,0^0,0)$	172676.573	(0.05)	[76025]
	2 - 1		1		0	$(0,0^0,0)$	172676.573	(0.05)	[76025]
	2 - 1		2		1	$(0,0^0,0)$	172677.959	(0.05)	[76025]
	2 - 1		3		2	$(0,0^0,0)$	172677.959	(0.05)	[76025]
	2 - 1		1		1	$(0,0^0,0)$	172680.209	(0.05)	[76025]
	3 - 2					$(0,0^0,0)$	259011.58	(*0.35)	[74001]
$H^{13}C^{15}N$	1 - 0					$(0,0^0,0)$	83727.590	(0.03)	[76025]
	2 - 1					$(0,0^0,0)$	167453.285	(0.05)	[76025]
$H^{12}C^{15}N$	6 - 6					$(0,1^1,0)$	8897.20	(0.10)	[61001]
	7 - 7					$(0,1^1,0)$	11861.0	(0.1)	[61001]
	8 - 8					$(0,1^1,0)$	15247.1	(0.2)	[61001]
	9 - 9					$(0,1^1,0)$	19055.4	(0.3)	[61001]
	10 - 10					$(0,1^1,0)$	23284.1	(0.3)	[61001]
	1 - 0					$(0,0^0,0)$	86054.961	(0.03)	[76025]
	2 - 1					$(0,0^0,0)$	172107.956	(0.05)	[76025]
	3 - 2					$(0,0^0,0)$	258157.1	(0.2)	[66014]
$D^{12}C^{14}N$	1 - 1					$(0,1^1,0)$	372.374	(*1E-3)	[74001]
	2 - 2					$(0,1^1,0)$	1117.070	(*3E-3)	[74001]
	3 - 3					$(0,1^1,0)$	2233.981	(*6E-3)	[74001]
	4 - 4					$(0,1^1,0)$	3722.98	(0.02)	[56007]
	5 - 5					$(0,1^1,0)$	5583.75	(0.02)	[56007]
	3 - 3					$(0,5^1,0)$	7050.92	(0.10)	[61001]
	4 - 4					$(0,3^1,0)$	7634.45	(0.10)	[61001]
	6 - 6					$(0,1^1,0)$	7816.18	(0.02)	[56007]
	15 - 15					$(0,2^2,0)$	8306.60	(0.10)	[67006]
	24 - 24					$(0,3^3,0)$	9570.98	(0.20)	[67006]
	7 - 7					$(0,1^1,0)$	10419.81	(0.03)	[61001]
	16 - 16					$(0,2^2,0)$	10586.85	(0.10)	[67006]
	5 - 5					$(0,3^1,0)$	11449.55	(0.10)	[61001]
	4 - 4					$(0,5^1,0)$	11680.55	(0.10)	[61001]
	25 - 25					$(0,3^3,0)$	12033.46	(0.20)	[67006]

TABLE 10.2. The microwave spectrum of HCN—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$D^{12}C^{14}N$	17 - 17					$(0,2^2,0)$	13272.45	(0.10)	[67006]
	8 - 8					$(0,1^1,0)$	13394.36	(0.03)	[67006]
	26 - 26					$(0,3^3,0)$	14958.90	(0.20)	[67006]
	6 - 6					$(0,3^1,0)$	16025.35	(0.10)	[61001]
	18 - 18					$(0,2^2,0)$	16393.87	(0.10)	[67006]
	9 - 9					$(0,1^1,0)$	16739.39	(0.03)	[67006]
	27 - 27					$(0,3^3,0)$	18396.45	(0.20)	[67006]
	19 - 19					$(0,2^2,0)$	19977.48	(0.10)	[67006]
	10 - 10					$(0,1^1,0)$	20454.40	(0.05)	[61001]
	7 - 7					$(0,3^1,0)$	21360.15	(0.10)	[61001]
	28 - 28					$(0,3^3,0)$	22392.32	(0.20)	[67006]
	20 - 20					$(0,2^2,0)$	24045.83	(0.10)	[67006]
	11 - 11					$(0,1^1,0)$	24538.92	(0.05)	[61001]
	29 - 29					$(0,3^3,0)$	26989.05	(0.20)	[67006]
	8 - 8					$(0,3^1,0)$	27450.96	(0.20)	[67006]
	21 - 21					$(0,2^2,0)$	28616.97	(0.15)	[67006]
	12 - 12					$(0,1^1,0)$	28992.37	(0.04)	[67006]
	30 - 30					$(0,3^3,0)$	32224.05	(0.20)	[67006]
	22 - 22					$(0,2^2,0)$	33704.62	(0.15)	[67006]
	13 - 13					$(0,1^1,0)$	33814.03	(0.05)	[67006]
	9 - 9					$(0,3^1,0)$	34294.02	(0.20)	[67006]
	31 - 31					$(0,3^3,0)$	38128.05	(0.20)	[67006]
	14 - 14					$(0,1^1,0)$	39003.36	(0.05)	[67006]
	23 - 23					$(0,2^2,0)$	39317.87	(0.15)	[67006]
	10 - 10					$(0,3^1,0)$	41884.00	(0.20)	[67006]
	15 - 15					$(0,1^1,0)$	44559.55	(0.05)	[67006]
	24 - 24					$(0,2^2,0)$	45462.56	(0.15)	[67006]
	16 - 16					$(0,1^1,0)$	50481.79	(0.08)	[67006]
	17 - 17					$(0,1^1,0)$	56769.32	(0.08)	[67006]
	18 - 18					$(0,1^1,0)$	63421.28	(0.08)	[67006]
	19 - 19					$(0,1^1,0)$	70436.84	(0.10)	[67006]
	1 - 0					$(0,0^0,1)$	72022.00	(0.20)	[71021]
	1 - 0	1	1	2	1	$(0,0^0,0)$	72413.484	(1E-3)	[69021]
	1 - 0	1	1	1	1	$(0,0^0,0)$	72413.484	(1E-3)	[69021]
	1 - 0	1	1	0	1	$(0,0^0,0)$	72413.484	(1E-3)	[69021]
	1 - 0	2	1	1	1	$(0,0^0,0)$	72413.514	(1E-3)	[69021]
	1 - 0	2	1	2	1	$(0,0^0,0)$	72413.514	(1E-3)	[69021]
	1 - 0	0	1	1	1	$(0,0^0,0)$	72413.558	(1E-3)	[69021]
	1 - 0	1	2	0	1	$(0,0^0,0)$	72414.905	(1E-3)	[69021]
	1 - 0	1	2	1	1	$(0,0^0,0)$	72414.905	(1E-3)	[69021]
	1 - 0	1	2	2	1	$(0,0^0,0)$	72414.905	(1E-3)	[69021]
	1 - 0	3	2	2	1	$(0,0^0,0)$	72414.927	(1E-3)	[69021]
	1 - 0	2	2	2	1	$(0,0^0,0)$	72414.973	(1E-3)	[69021]
	1 - 0	2	2	1	1	$(0,0^0,0)$	72414.973	(1E-3)	[69021]
	1 - 0	1	0	0	1	$(0,0^0,0)$	72417.030	(1E-3)	[69021]
	1 - 0	1	0	1	1	$(0,0^0,0)$	72417.030	(1E-3)	[69021]
	1 - 0	1	0	2	1	$(0,0^0,0)$	72417.030	(1E-3)	[69021]
	1 - 0		1		1	$(0,2^0,0)$	72947.16	(0.10)	[71021]
	1 - 0		2		1	$(0,2^0,0)$	72948.48	(0.10)	[71021]
	1 - 0		0		1	$(0,2^0,0)$	72950.57	(0.10)	[71021]
	20 - 20					$(0,1^1,0)$	77814.65	(0.10)	[67006]
	21 - 21					$(0,1^1,0)$	85554.169	(*0.09)	[74001]
	22 - 22					$(0,1^1,0)$	93654.08	(0.10)	[67006]
	2 - 1		2		2	$(0,0^0,0)$	144826.573	(*2E-3)	[74001]
	2 - 1	2	1	1	0	$(0,0^0,0)$	144826.810	(1E-3)	[69021]
	2 - 1	1	1	1	0	$(0,0^0,0)$	144826.841	(1E-3)	[69021]
	2 - 1		2		1	$(0,0^0,0)$	144828.000	(*2E-3)	[74001]
	2 - 1		3		2	$(0,0^0,0)$	144828.109	(*2E-3)	[74001]
	2 - 1		1		1	$(0,0^0,0)$	144830.336	(*2E-3)	[74001]
	2 - 1		2		1	$(0,1^{L1},0)$	144973.18	(0.15)	[71021]
	2 - 1		1		1	$(0,1^{L1},0)$	144974.64	(0.10)	[71021]
	2 - 1		3		2	$(0,1^{L1},0)$	144974.64	(0.10)	[71021]
	2 - 1		1		0	$(0,1^{L1},0)$	144976.17	(0.10)	[71021]
	2 - 1		2		1	$(0,1^{U1},0)$	145717.85	(0.15)	[71021]
	2 - 1		1		1	$(0,1^{U1},0)$	145719.28	(0.10)	[71021]

TABLE 10.2. The microwave spectrum of HCN—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$D^{12}C^{14}N$	2 - 1		3		2	$(0,1^{U1},0)$	145719.28	(0.10)	[71021]
	2 - 1		1		0	$(0,1^{U1},0)$	145720.76	(0.10)	[71021]
	2 - 1		2		2	$(0,2^{0},0)$	145889.98	(0.15)	[71021]
	2 - 1		1		0	$(0,2^{0},0)$	145889.98	(0.15)	[71021]
	2 - 1		2		1	$(0,2^{0},0)$	145891.42	(0.10)	[71021]
	2 - 1		3		2	$(0,2^{0},0)$	145891.42	(0.10)	[71021]
	3 - 2					$(0,0^{0},0)$	217238.40	(0.45)	[56005]
	4 - 3					$(0,0^{0},0)$	289644.67	(0.60)	[56005]
$D^{13}C^{14}N$	6 - 6					$(0,1^{1},0)$	7652.70	(0.05)	[61001]
	7 - 7					$(0,1^{1},0)$	10201.95	(0.05)	[61001]
	8 - 8					$(0,1^{1},0)$	13114.35	(0.10)	[61001]
	9 - 9					$(0,1^{1},0)$	16389.63	(0.10)	[61001]
	10 - 10					$(0,1^{1},0)$	20027.10	(0.10)	[61001]
	11 - 11					$(0,1^{1},0)$	24026.60	(0.10)	[61001]
	1 - 0		1		1	$(0,0^{0},0)$	71173.89	(0.10)	[71021]
	1 - 0		2		1	$(0,0^{0},0)$	71175.22	(0.10)	[71021]
	1 - 0		0		1	$(0,0^{0},0)$	71177.36	(0.10)	[71021]
	1 - 0					$(0,2^{0},0)$	71667.6	(0.4)	[71021]
	2 - 1		2		2	$(0,0^{0},0)$	142347.540	(0.03)	[76025]
	2 - 1		1		0	$(0,0^{0},0)$	142347.540	(0.03)	[76025]
	2 - 1		2		1	$(0,0^{0},0)$	142348.883	(0.03)	[76025]
	2 - 1		3		2	$(0,0^{0},0)$	142348.883	(0.03)	[76025]
	2 - 1		1		1	$(0,0^{0},0)$	142351.129	(0.03)	[76025]
	3 - 2					$(0,0^{0},0)$	213519.926	(0.05)	[76025]
	4 - 3					$(0,0^{0},0)$	284687.32	(0.20)	[76025]
$D^{12}C^{15}N$	6 - 6					$(0,1^{1},0)$	7391.80	(0.10)	[61001]
	7 - 7					$(0,1^{1},0)$	9854.15	(0.10)	[61001]
	8 - 8					$(0,1^{1},0)$	12667.25	(0.10)	[61001]
	9 - 9					$(0,1^{1},0)$	15830.90	(0.10)	[61001]
	10 - 10					$(0,1^{1},0)$	19344.30	(0.10)	[61001]
	11 - 11					$(0,1^{1},0)$	23207.45	(0.20)	[61001]
	1 - 0					$(0,0^{0},0)$	70339.48	(0.10)	[71021]
	1 - 0					$(0,2^{0},0)$	70853.95	(0.30)	[71021]
	2 - 1					$(0,0^{0},0)$	140677.446	(0.05)	[76025]
	3 - 2					$(0,0^{0},0)$	211012.926	(0.07)	[76025]
	4 - 3					$(0,0^{0},0)$	281344.55	(0.08)	[76025]
$D^{13}C^{15}N$	2 - 1					$(0,0^{0},0)$	138123.515	(0.03)	[76025]
	3 - 2					$(0,0^{0},0)$	207182.140	(0.06)	[76025]
	4 - 3					$(0,0^{0},0)$	276237.239	(0.07)	[76025]
$T^{12}C^{14}N$	2 - 1					$(0,0^{0},0)$	123814.96	(0.10)	[75007]
	2 - 1					$(0,1^{L1},0)$	124018.95	(0.10)	[75007]
	2 - 1					$(0,1^{U1},0)$	124622.14	(0.10)	[75007]
	3 - 2					$(0,0^{0},0)$	185719.73	(0.10)	[75007]
	3 - 2					$(0,1^{L1},0)$	186025.70	(0.10)	[75007]
	3 - 2					$(0,1^{U1},0)$	186930.45	(0.10)	[75007]
	4 - 3					$(0,0^{0},0)$	247621.36	(0.10)	[75007]
	4 - 3					$(0,1^{L1},0)$	248029.20	(0.10)	[75007]
	4 - 3					$(0,1^{U1},0)$	249235.29	(0.10)	[75007]
	5 - 4					$(0,0^{0},0)$	309518.91	(0.10)	[75007]
	5 - 4					$(0,1^{L1},0)$	310028.49	(0.10)	[75007]
	5 - 4					$(0,1^{U1},0)$	311535.75	(0.10)	[75007]
	6 - 5					$(0,0^{0},0)$	371411.07	(0.10)	[75007]
	6 - 5					$(0,1^{L1},0)$	372022.34	(0.10)	[75007]
	6 - 5					$(0,1^{U1},0)$	373830.55	(0.10)	[75007]
	7 - 6					$(0,0^{0},0)$	433297.01	(0.10)	[75007]
	7 - 6					$(0,1^{L1},0)$	434009.72	(0.10)	[75007]
	8 - 7					$(0,0^{0},0)$	495175.55	(0.10)	[75007]
$T^{13}C^{14}N$	2 - 1					$(0,0^{0},0)$	122362.83	(0.10)	[75007]
	3 - 2					$(0,0^{0},0)$	183541.66	(0.10)	[75007]
	3 - 2					$(0,1^{L1},0)$	183801.12	(0.10)	[75007]
	3 - 2					$(0,1^{U1},0)$	184699.31	(0.10)	[75007]
	4 - 3					$(0,0^{0},0)$	244717.36	(0.10)	[75007]
	4 - 3					$(0,1^{L1},0)$	245063.09	(0.10)	[75007]
	4 - 3					$(0,1^{U1},0)$	246260.85	(0.10)	[75007]
	5 - 4					$(0,0^{0},0)$	305889.14	(0.10)	[75007]

TABLE 10.2. The microwave spectrum of HCN—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	(v_1,v_2^{ℓ},v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$T^{13}C^{14}N$	5 - 4					$(0,1^{L1},0)$	306321.09	(0.10)	[75007]
	5 - 4					$(0,1^{U1},0)$	307817.88	(0.10)	[75007]
	6 - 5					$(0,0^{0},0)$	367055.82	(0.10)	[75007]
	6 - 5					$(0,1^{L1},0)$	367573.91	(0.10)	[75007]
	6 - 5					$(0,1^{U1},0)$	369369.70	(0.10)	[75007]
	7 - 6					$(0,0^{0},0)$	428216.34	(0.10)	[75007]
	7 - 6					$(0,1^{L1},0)$	428820.22	(0.10)	[75007]
	7 - 6					$(0,1^{U1},0)$	430914.75	(0.10)	[75007]
	8 - 7					$(0,0^{0},0)$	489369.57	(0.10)	[75007]
$T^{12}C^{15}N$	2 - 1					$(0,0^{0},0)$	120256.55	(0.10)	[75007]
	2 - 1					$(0,1^{L1},0)$	120459.89	(0.10)	[75007]
	2 - 1					$(0,1^{U1},0)$	121030.54	(0.10)	[75007]
	3 - 2					$(0,0^{0},0)$	180382.20	(0.10)	[75007]
	3 - 2					$(0,1^{L1},0)$	180687.28	(0.10)	[75007]
	3 - 2					$(0,1^{U1},0)$	181543.14	(0.10)	[75007]
	4 - 3					$(0,0^{0},0)$	240505.19	(0.10)	[75007]
	4 - 3					$(0,1^{L1},0)$	240911.68	(0.10)	[75007]
	4 - 3					$(0,1^{U1},0)$	242052.66	(0.10)	[75007]
	5 - 4					$(0,0^{0},0)$	300624.06	(0.10)	[75007]
	5 - 4					$(0,1^{L1},0)$	301131.94	(0.10)	[75007]
	5 - 4					$(0,1^{U1},0)$	302557.99	(0.10)	[75007]
	6 - 5					$(0,0^{0},0)$	360737.94	(0.10)	[75007]
	6 - 5					$(0,1^{L1},0)$	361347.36	(0.10)	[75007]
	6 - 5					$(0,1^{U1},0)$	363057.83	(0.10)	[75007]
	7 - 6					$(0,0^{0},0)$	420845.91	(0.10)	[75007]
	8 - 7					$(0,0^{0},0)$	480947.01	(0.10)	[75007]

*Calculated transition frequency.

Table 11. Molecular parameters for HNC.

Isotopic Species	Vib. State v_1	v_2^{ℓ}	v_3	B_v(MHz)	D_v(MHz)	Reference
$H^{14}N^{12}C$	0	0^0	0	45 331.999(40)	0.1012(50)	[76025]
	1	0^0	0	45 032.70(6)	0.10[a]	[76012]
	0	0^0	1	44 996.81(4)	0.10[a]	[76012]
	0	0^0	2	44 660.90(4)	0.10[a]	[76012]
$H^{14}N^{13}C$	0	0^0	0	43 545.616(40)	0.0955(50)	[76011]
$H^{15}N^{12}C$	0	0^0	0	44 433.052(40)	0.0973(50)	[76025]
$D^{14}N^{12}C$	0	0^0	0	38 153.004(40)	0.0700(50)	[76011]
$D^{14}N^{13}C$	0	0^0	0	36 684.003(25)	0.0628(20)	[76025]
$D^{15}N^{12}C$	0	0^0	0	37 643.521(30)	0.0675(20)	[76025]
$H^{15}N^{13}C$	0	0^0	0	42 629.642(40)	0.0902(50)	[76025]
$D^{15}N^{13}C$	0	0^0	0	36 155.521(25)	0.0619(20)	[76025]

Electric dipole moment [76009]:

$$\mu_0(H^{14}N^{12}C) = 3.05(10)\ D$$

[a] Assumed value.

Additional References: [76002], [76004] and [76010].

TABLE 11.1. The microwave spectrum of HNC

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{14}N^{12}C$	1 - 0					$(0,0^0,2)$	89321.397	(0.04)	[76012]
	1 - 0					$(0,0^0,1)$	89993.222	(0.04)	[76012]
	1 - 0					$(1,0^0,0)$	90064.991	(0.08)	[76012]
	1 - 0					$(0,0^0,0)$	90663.602	(0.05)	[76011]
	2 - 1					$(0,0^0,0)$	181324.758	(0.10)	[76011]
$H^{14}N^{13}C$	1 - 0					$(0,0^0,0)$	87090.851	(0.05)	[76011]
	2 - 1					$(0,0^0,0)$	174179.411	(0.10)	[76011]
$H^{15}N^{12}C$	1 - 0					$(0,0^0,0)$	88865.692	(0.03)	[76012]
	2 - 1					$(0,0^0,0)$	177729.094	(0.05)	[76025]
$D^{14}N^{12}C$	1 - 0					$(0,0^0,0)$	76305.727	(0.05)	[76011]
	2 - 1					$(0,0^0,0)$	152609.774	(0.10)	[76011]
$D^{14}N^{13}C$	2 - 1					$(0,0^0,0)$	146734.002	(0.08)	[76025]
	3 - 2					$(0,0^0,0)$	220097.238	(0.12)	[76025]
$D^{15}N^{12}C$	2 - 1					$(0,0^0,0)$	150571.926	(0.09)	[76025]
	3 - 2					$(0,0^0,0)$	225853.841	(0.12)	[76025]
$H^{15}N^{13}C$	1 - 0					$(0,0^0,0)$	85258.923	(0.08)	[76025]
	2 - 1					$(0,0^0,0)$	170515.680	(0.11)	[76025]
$D^{15}N^{13}C$	2 - 1					$(0,0^0,0)$	144620.101	(0.08)	[76025]
	3 - 2					$(0,0^0,0)$	216926.436	(0.10)	[76025]

Table 12. Molecular parameters for HCO.

Parameter	$H^{12}C^{16}O$ Value (MHz)	Reference	$D^{12}C^{16}O$ Value (MHz)	Reference
B+C	86 718.4(2)	[72025]	73 533.9(2)	[72025]
B-C	2 836.38(45)	[74022]	3 290.7(20)	[73047]
B	44 777.4(5)	[74022]	38 412.3(10)	[73047]
C	41 941.0(5)	[74022]	35 121.6(10)	[73047]
$\epsilon_{yy}-\epsilon_{xx}$	224.62(65)	[74022]	179.4(4)	[73047]
$\epsilon_{yy}+\epsilon_{xx}$	-190.4(4)	[72035]	-168.4(4)	[72025]
$\lvert\epsilon_{zz}\rvert$	8.12(48) 10^3	[74022]	$6.45(70)\times10^3$	[73047]
ϵ_{yy}	17.1(7)	[74022]	5.45(3)	[73047]
ϵ_{xx}	-207.5(7)	[74022]	-173.9(3)	[73047]
a_F	372.2(4)	[72022]	58.7(2)	[72025]
$T_{bb}-T_{cc}$			3.0(15)	[73047]
$T_{bb}+T_{cc}$			-1.4(4)	[72025]
τ	5.06(13)	[74022]	...	
D	0.049(19)	[74022]	...	

TABLE 12.1. The microwave spectrum of HCO

Isotopic species	$N'(K'_-,K'_+)$ - $N''(K''_-,K''_+)$	J'	F'	J''	F''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{12}C^{16}O$	1(1, 0) - 1(1, 1)	1/2	1	1/2	1	(0,0,0)	2733.41	(0.05)	[74022]
	1(1, 0) - 1(1, 1)	3/2	1	3/2	1	(0,0,0)	2888.78	(0.05)	[74022]
	1(1, 0) - 1(1, 1)	3/2	2	3/2	2	(0,0,0)	2891.78	(0.05)	[74022]
	2(1, 1) - 2(1, 2)	3/2	2	3/2	2	(0,0,0)	8340.7	(0.5)	[74022]
	2(1, 1) - 2(1, 2)	3/2	1	3/2	1	(0,0,0)	8347.7	(0.3)	[74022]
	2(1, 1) - 2(1, 2)	5/2	2	5/2	2	(0,0,0)	8620.6	(0.3)	[74022]
	2(1, 1) - 2(1, 2)	5/2	3	5/2	3	(0,0,0)	8624.7	(0.3)	[74022]
	3(1, 2) - 3(1, 3)	5/2	3	5/2	3	(0,0,0)	16798.9	(0.8)	[74022]
	3(1, 2) - 3(1, 3)	5/2	2	5/2	2	(0,0,0)	16804.2	(0.8)	[74022]
	3(1, 2) - 3(1, 3)	7/2	3	7/2	3	(0,0,0)	17190.4	(0.9)	[74022]
	3(1, 2) - 3(1, 3)	7/2	4	7/2	4	(0,0,0)	17196.4	(0.9)	[74022]
	1(0, 1) - 0(0, 0)	3/2	2	1/2	1	(0,0,0)	86670.55	(0.20)	[72025]
	1(0, 1) - 0(0, 0)	3/2	1	1/2	0	(0,0,0)	86707.87	(0.20)	[72025]
	1(0, 1) - 0(0, 0)	1/2	1	1/2	1	(0,0,0)	86777.58	(0.20)	[72025]
$D^{12}C^{16}O$	2(1, 1) - 2(1, 2)	3/2	5/2	3/2	5/2	(0,0,0)	9736.67	(0.51)	[73047]
	2(1, 1) - 2(1, 2)	3/2	3/2	3/2	3/2	(0,0,0)	9737.92	(0.23)	[73047]
	2(1, 1) - 2(1, 2)	3/2	1/2	3/2	1/2	(0,0,0)	9739.16	(0.32)	[73047]
	2(1, 1) - 2(1, 2)	5/2	3/2	5/2	3/2	(0,0,0)	9961.02	(0.31)	[73047]
	2(1, 1) - 2(1, 2)	5/2	5/2	5/2	5/2	(0,0,0)	9961.69	(0.44)	[73047]
	2(1, 1) - 2(1, 2)	5/2	7/2	5/2	7/2	(0,0,0)	9961.85	(0.57)	[73047]
	1(0, 1) - 0(0, 0)	3/2	3/2	1/2	3/2	(0,0,0)	73429.57	(0.20)	[72025]
	1(0, 1) - 0(0, 0)	3/2	5/2	1/2	3/2	(0,0,0)	73491.66	(0.10)	[72025]
	1(0, 1) - 0(0, 0)	3/2	1/2	1/2	1/2	(0,0,0)	73498.24	(0.10)	[72025]
	1(0, 1) - 0(0, 0)	3/2	3/2	1/2	1/2	(0,0,0)	73518.05	(0.10)	[72025]
	1(0, 1) - 0(0, 0)	1/2	3/2	1/2	3/2	(0,0,0)	73592.71	(0.20)	[72025]
	1(0, 1) - 0(0, 0)	1/2	1/2	1/2	3/2	(0,0,0)	73610.92	(0.20)	[72025]
	1(0, 1) - 0(0, 0)	1/2	3/2	1/2	1/2	(0,0,0)	73680.43	(0.30)	[72025]

Table 13. Rotational constants for HCO^+.

Isotopic Species	B_0-$2D_0$ (MHz)	Reference
$H^{12}C^{16}O^+$	44 594.262(10)	[76013]
$H^{13}C^{16}O^+$	43 377.165(25)	[76006]
$H^{12}C^{18}O^+$	42 581.079(25)	[76006]
$D^{12}C^{16}O^+$	36 019.677(20)	[76013]
$D^{13}C^{16}O^+$	35 366.607(20)	[76013]
$D^{12}C^{18}O^+$	34 413.697(20)	[76013]

Additional references: [75002], [75003], [76002], [76003].

TABLE 13.1. The microwave spectrum of HCO^+

Isotopic species	J' - J''	F'	F'_1	F''	F''_1	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{12}C^{16}O^+$	1 - 0					$(0,0^0,0)$	89188.523	(0.02)	[76013]
$H^{13}C^{16}O^+$	1 - 0					$(0,0^0,0)$	86754.330	(0.05)	[76006]
$H^{12}C^{18}O^+$	1 - 0					$(0,0^0,0)$	85162.157	(0.05)	[76006]
$D^{12}C^{16}O^+$	1 - 0					$(0,0^0,0)$	72039.354	(0.04)	[76013]
$D^{13}C^{16}O^+$	1 - 0					$(0,0^0,0)$	70733.214	(0.04)	[76013]
$D^{12}C^{18}O^+$	1 - 0					$(0,0^0,0)$	68827.393	(0.04)	[76013]

Table 14. Molecular parameters for HCP.

Isotopic Species	Vib. State $v_1\ v_2^\ell\ v_3$	B_v (MHz)	Rotational Constants[a] D_v (MHz)	q_v (MHz)	$g_\perp$ (μ_N)	Zeeman Constants[b] $\chi_\perp - \chi_\parallel$ (erg/G^2·mole)	$Q_\parallel$ (esu·cm^2)	Stark[c] μ (D)
$H^{12}C^{31}P$	0 0^0 0	19 976.005(9)	0.02123(10)	0	-0.0430(10)	$8.4(9)\times10^{-6}$	$4.4(12)\times10^{-26}$	0.390(5)
$H^{13}C^{31}P$	0 0^0 0	19 139.29	0.028[d]	0	....	....	....	....
$D^{12}C^{31}P$	0 0^0 0	16 984.375(12)	0.01449(21)	0	....	....	....	0.397(5)
	0 1^1 0	17 017.227(48)	0.0152(12)	44.86(7)	....	....	....	....
$D^{13}C^{31}P$	0 0^0 0	16 427.53	0.016[d]	0	....	....	....	....

[a] Data for the ^{12}C isotopic species is taken from Johns et al. [71020] and for the ^{13}C isotopic species from Tyler [64002].

[b] Reference [73010].

[c] Reference [64002].

[d] Assumed value.

TABLE 14.1. The microwave spectrum of HCP

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	(v_1, v_2^ℓ, v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{12}C^{31}P$	1 - 0					$(0,0^0,0)$	39951.98	(0.05)	[64002]
	2 - 1					$(0,0^0,0)$	79903.31	(0.05)	[71020]
	3 - 2					$(0,0^0,0)$	119853.67	(0.05)	[71020]
	4 - 3					$(0,0^0,0)$	159802.56	(0.07)	[71020]
	5 - 4					$(0,0^0,0)$	199749.42	(0.10)	[71020]
	6 - 5					$(0,0^0,0)$	239693.82	(0.15)	[71020]
	7 - 6					$(0,0^0,0)$	279634.66	(0.30)	[71020]
	8 - 7					$(0,0^0,0)$	319573.03	(0.50)	[71020]
	9 - 8					$(0,0^0,0)$	359506.14	(0.50)	[71020]
$H^{13}C^{31}P$	1 - 0					$(0,0^0,0)$	38278.46	(0.10)	[64002]
$D^{12}C^{31}P$	1 - 0					$(0,0^0,0)$	33968.73	(0.05)	[64002]
	2 - 1					$(0,0^0,0)$	67937.07	(0.05)	[64002]
	3 - 2					$(0,0^0,0)$	101904.66	(0.05)	[71020]
	3 - 2					$(0,1^{L1},0)$	101967.08	(0.20)	[71020]
	3 - 2					$(0,1^{U1},0)$	102236.32	(0.20)	[71020]
	4 - 3					$(0,0^0,0)$	135871.21	(0.10)	[71020]
	5 - 4					$(0,0^0,0)$	169836.50	(0.15)	[71020]
	5 - 4					$(0,1^{L1},0)$	169940.49	(0.40)	[71020]
	5 - 4					$(0,1^{U1},0)$	170388.96	(0.40)	[71020]
	6 - 5					$(0,0^0,0)$	203799.94	(0.20)	[71020]
	7 - 6					$(0,0^0,0)$	237761.20	(0.25)	[71020]
	8 - 7					$(0,0^0,0)$	271720.66	(0.40)	[71020]
	9 - 8					$(0,0^0,0)$	305676.46	(0.50)	[71020]
$D^{13}C^{31}P$	1 - 0					$(0,0^0,0)$	32855.00	(0.10)	[64002]

Table 15. Molecular parameters for ICN [72026].

Isotopic Species	Vib. State $v_1\ v_2^\ell\ v_3$	B_v (MHz)	D_v (kHz)	q_v (MHz)	$eq_{zz}Q$ (I) (MHz)	$\eta eq_{zz}Q$ (I) (MHz)	Zeeman parameters for $I^{12}C^{14}N$ $(0,0^0,0)$[b]
$^{127}I^{12}C^{14}N$	$0\ 0^0\ 0$	3 225.542(1)	0.589(5)		-2 420.5(1)		$g_\perp = -0.0325(2)\mu_N$
	$0\ 1^1\ 0$	3 235.039(1)	0.600(4)	2.659(1)	-2 411.5(1)	-21.1(2)	$\chi_\perp - \chi_\parallel = 16.4(5)\times10^{-6}$ erg/G^2·mole
	$0\ 2^0\ 0$	3 242.006(1)	0.611[a]		-2 404.8(4)		$g_I\ (1-\sigma) = 1.1175(20)\mu_N$
	$0\ 2^2\ 0$	3 244.516(1)	0.611[a]		-2 402.6(5)		$Q_\parallel = -7.33(110)\times10^{-26}$ esu·cm^2
	$0\ 3^1\ 0$	3 249.548(2)	0.622[a]	2.551(2)	-2 395(2)	-37(3)	
	$0\ 3^3\ 0$	3 253.986(2)	0.622[a]		-2 395.0(4)		
	$0\ 0^0\ 1$	3 216.177(1)	0.611(7)		-2 426.9(2)		
	$0\ 0^0\ 2$	3 206.992(2)	0.633[a]		-2 429(2)		
	$0\ 1^1\ 1$	3 227.380(1)	0.605[a]	2.938(3)	-2 413(2)	-21(3)	
$^{127}I^{13}C^{14}N$	$0\ 0^0\ 0$	3 177.043(1)	0.575[a]		-2 420(1)		
$^{127}I^{12}C^{15}N$	$0\ 0^0\ 0$	3 082.668(1)	0.533[a]		-2 419.6(1)		
	$0\ 1^1\ 0$	3 091.852(1)	0.543[a]	2.449(1)	-2 410.7(1)	-21.7(2)	
	$0\ 2^0\ 0$	3 098.653(1)	0.553[a]		-2 402.9(2)		
	$0\ 2^2\ 0$	3 101.016(2)	0.553[a]		-2 401.4(4)		
	$0\ 3^1\ 0$	3 105.988(2)	0.563[a]	2.351(2)	-2 402(2)	-40(3)	
	$0\ 3^3\ 0$	3 110.171(2)	0.563[a]		-2 391.7(4)		
	$0\ 0^0\ 1$	3 073.958(1)	0.553[a]		-2 426.3(3)		
	$0\ 0^0\ 2$	3 065.402(2)	0.573[a]		-2 432(3)		
	$0\ 1^1\ 1$	3 084.746(2)	0.550[a]	2.699(3)	-2 418(1)	-19(2)	
$^{127}I^{13}C^{15}N$	$0\ 0^0\ 0$	3 039.327(1)	0.520[a]		-2 419(2)		

[a] Assumed value held constant.

[b] Reference [72011].

Additional references: [47002], [48003], [48004], [48005], [48006], [50005], [63005], [73031].

Note that this table uses a different vibrational numbering from that used in the primary references as explained in the Introduction.

TABLE 15.1. The microwave spectrum of ICN

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	(v_1,v_2^{ℓ},v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{127}I^{12}C^{14}N$	1 - 0		5/2		5/2	$(0,0^0,1)$	6051.36	(0.50)	[57004]
	1 - 0		5/2		5/2	$(0,0^0,0)$	6070.66	(0.50)	[57004]
	1 - 0		5/2		5/2	$(0,0^0,0)$	6071.61	(0.50)	[57004]
	1 - 0		5/2		5/2	$(0,2^0,0)$	6106.71	(0.50)	[57004]
	1 - 0		7/2		5/2	$(0,0^0,1)$	6559.63	(0.50)	[57004]
	1 - 0		7/2		5/2	$(0,0^0,0)$	6577.06	(0.50)	[57004]
	1 - 0		7/2		5/2	$(0,0^0,0)$	6577.95	(0.50)	[57004]
	1 - 0		7/2		5/2	$(0,2^0,0)$	6610.24	(0.50)	[57004]
	1 - 0		3/2		5/2	$(0,0^0,1)$	6782.16	(0.50)	[57004]
	1 - 0		3/2		5/2	$(0,0^0,0)$	6799.79	(0.50)	[57004]
	1 - 0		3/2		5/2	$(0,2^0,0)$	6830.47	(0.50)	[57004]
	2 - 1		5/2		3/2	$(0,0^0,0)$	12400.35	(0.50)	[57004]
	2 - 1		5/2		3/2	$(0,0^0,0)$	12401.33	(0.50)	[57004]
	2 - 1		7/2		7/2	$(0,0^0,1)$	12451.36	(0.50)	[57004]
	2 - 1		7/2		7/2	$(0,0^0,0)$	12489.27	(0.50)	[57004]
	2 - 1		7/2		7/2	$(0,0^0,0)$	12489.88	(0.50)	[57004]
	2 - 1		7/2		7/2	$(0,2^0,0)$	12558.38	(0.50)	[57004]
	2 - 1		5/2		7/2	$(0,0^0,0)$	12622.19	(0.50)	[57004]
	2 - 1		3/2		3/2	$(0,0^0,1)$	12699.69	(0.50)	[57004]
	2 - 1		3/2		3/2	$(0,0^0,0)$	12737.22	(0.50)	[57004]
	2 - 1		9/2		7/2	$(0,0^0,0)$	12956.38	(0.50)	[57004]
	2 - 1		7/2		5/2	$(0,0^0,1)$	12959.17	(0.50)	[57004]
	2 - 1		7/2		5/2	$(0,0^0,0)$	12994.98	(0.50)	[57004]
	2 - 1		7/2		5/2	$(0,0^0,0)$	12996.50	(0.50)	[57004]
	2 - 1		7/2		5/2	$(0,0^0,0)$	12996.93	(0.50)	[57004]
	2 - 1		1/2		3/2	$(0,0^0,1)$	13011.34	(0.50)	[57004]
	2 - 1		9/2		7/2	$(0,2^0,0)$	13021.92	(0.50)	[57004]
	2 - 1		1/2		3/2	$(0,0^0,0)$	13048.33	(0.50)	[57004]
	2 - 1		5/2		5/2	$(0,0^0,0)$	13129.36	(0.50)	[57004]
	2 - 1		5/2		5/2	$(0,0^0,0)$	13129.68	(0.50)	[57004]
	2 - 1		5/2		5/2	$(0,2^0,0)$	13193.32	(0.50)	[57004]
	2 - 1		3/2		5/2	$(0,0^0,1)$	13429.80	(0.50)	[57004]
	2 - 1		3/2		5/2	$(0,0^0,0)$	13465.77	(0.50)	[57004]
	2 - 1		3/2		5/2	$(0,2^0,0)$	13527.88	(0.50)	[57004]
	4 - 3	9/2	11/2	9/2	11/2	$(0,0^0,0)$	25393.517	(0.05)	[55000]
	4 - 3	13/2	11/2	13/2	11/2	$(0,0^0,0)$	25393.517	(0.05)	[55000]
	4 - 3	11/2	11/2	11/2	11/2	$(0,0^0,0)$	25393.776	(0.05)	[55000]
	4 - 3	13/2	11/2	13/2	11/2	$(0,1^{L1},0)$	25542.856	(0.05)	[55000]
	4 - 3	9/2	11/2	9/2	11/2	$(0,1^{L1},0)$	25542.856	(0.05)	[55000]
	4 - 3	11/2	11/2	11/2	11/2	$(0,1^{L1},0)$	25542.856	(0.05)	[55000]
	4 - 3	11/2	11/2	11/2	11/2	$(0,1^{U1},0)$	25567.571	(0.05)	[55000]
	4 - 3	13/2	11/2	13/2	11/2	$(0,1^{U1},0)$	25567.571	(0.05)	[55000]
	4 - 3	9/2	11/2	9/2	11/2	$(0,1^{U1},0)$	25567.571	(0.05)	[55000]
	4 - 3		5/2		3/2	$(0,0^0,0)$	25711.50	(0.10)	[48002]
	4 - 3		7/2		5/2	$(0,0^0,0)$	25728.77	(0.10)	[48002]
	4 - 3		13/2		11/2	$(0,0^0,1)$	25748.18	(0.10)	[48002]
	4 - 3		3/2		1/2	$(0,0^0,0)$	25752.65	(0.10)	[48002]
	4 - 3		11/2		9/2	$(0,0^0,1)$	25763.23	(0.10)	[48002]
	4 - 3		9/2		7/2	$(0,0^0,0)$	25783.50	(0.10)	[48002]
	4 - 3		9/2		9/2	$(0,0^0,0)$	25789.85	(0.10)	[48002]
	4 - 3		7/2		5/2	$(0,1^{L1},0)$	25802.92	(0.10)	[48002]
	4 - 3		5/2		3/2	$(0,1^{L1},0)$	25815.34	(0.10)	[48002]
	4 - 3		13/2		11/2	$(0,0^0,0)$	25823.08	(0.10)	[48002]
	4 - 3		9/2		7/2	$(0,1^{L1},0)$	25829.31	(0.10)	[48002]
	4 - 3		11/2		9/2	$(0,0^0,0)$	25837.64	(0.10)	[48002]
	4 - 3		9/2		7/2	$(0,1^{U1},0)$	25850.78	(0.10)	[48002]
	4 - 3		11/2		9/2	$(0,1^{L1},0)$	25872.24	(0.10)	[48002]
	4 - 3		11/2		9/2	$(0,1^{U1},0)$	25893.73	(0.10)	[48002]
	4 - 3		13/2		11/2	$(0,1^{L1},0)$	25906.28	(0.10)	[48002]
	4 - 3		13/2		11/2	$(0,1^{U1},0)$	25927.66	(0.10)	[48002]
	4 - 3		7/2		7/2	$(0,0^0,0)$	25954.36	(0.10)	[48002]
	4 - 3		3/2		3/2	$(0,0^0,0)$	25969.58	(0.10)	[48002]
	4 - 3		13/2		11/2	$(0,2^0,0)$	25979.72	(0.10)	[55002]
	4 - 3		5/2		5/2	$(0,0^0,0)$	25991.92	(0.10)	[48002]
	4 - 3		13/2		11/2	$(0,2^2,0)$	26046.32	(0.10)	[48002]

TABLE 15.1. The microwave spectrum of ICN—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{127}I^{12}C^{14}N$	4 - 3	5/2		7/2		$(0,1^{L1},0)$	26196.540	(0.02)	[55000]
	4 - 3	7/2		9/2		$(0,1^{L1},0)$	26196.931	(0.02)	[55000]
	4 - 3	5/2		7/2		$(0,1^{L1},0)$	26197.588	(0.02)	[55000]
	4 - 3	5/2		7/2		$(0,1^{U1},0)$	26216.380	(0.02)	[55000]
	4 - 3	7/2		9/2		$(0,1^{U1},0)$	26216.771	(0.02)	[55000]
	4 - 3	5/2		7/2		$(0,1^{U1},0)$	26217.428	(0.02)	[55000]
	4 - 3	5/2	3/2	7/2	5/2	$(0,1^{L1},0)$	26247.900	(0.02)	[55000]
	4 - 3	5/2	3/2	5/2	5/2	$(0,1^{L1},0)$	26247.900	(0.02)	[55000]
	4 - 3	3/2	3/2	5/2	5/2	$(0,1^{L1},0)$	26248.238	(0.02)	[55000]
	4 - 3	3/2	3/2	3/2	5/2	$(0,1^{L1},0)$	26248.238	(0.02)	[55000]
	4 - 3	1/2	3/2	3/2	5/2	$(0,1^{L1},0)$	26248.300	(0.02)	[55000]
	4 - 3	3/2	3/2	5/2	5/2	$(0,0^{0},0)$	26248.971	(0.02)	[55000]
	4 - 3	5/2	3/2	7/2	5/2	$(0,1^{U1},0)$	26265.210	(0.02)	[55000]
	4 - 3	5/2	3/2	5/2	5/2	$(0,1^{U1},0)$	26265.210	(0.02)	[55000]
	4 - 3	3/2	3/2	3/2	5/2	$(0,1^{U1},0)$	26265.548	(0.02)	[55000]
	4 - 3	3/2	3/2	5/2	5/2	$(0,1^{U1},0)$	26265.548	(0.02)	[55000]
	4 - 3	1/2	3/2	3/2	5/2	$(0,1^{U1},0)$	26265.610	(0.02)	[55000]
	5 - 4		11/2		13/2	$(0,0^{0},0)$	31770.734	(0.10)	[72026]
	5 - 4		13/2		13/2	$(0,0^{0},0)$	31848.732	(0.10)	[72026]
	5 - 4		13/2		13/2	$(0,1^{L1},0)$	31982.970	(0.10)	[72026]
	5 - 4		13/2		13/2	$(0,1^{U1},0)$	32013.035	(0.10)	[72026]
	5 - 4		13/2		13/2	$(0,2^{0},0)$	32015.975	(0.10)	[72026]
	5 - 4		7/2		5/2	$(0,0^{0},2)$	32017.500	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,0^{0},2)$	32029.765	(0.10)	[72026]
	5 - 4		5/2		3/2	$(0,0^{0},2)$	32040.900	(0.10)	[72026]
	5 - 4		11/2		9/2	$(0,0^{0},2)$	32062.690	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,0^{0},2)$	32082.720	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,0^{0},2)$	32092.940	(0.10)	[72026]
	5 - 4		11/2		11/2	$(0,0^{0},1)$	32106.760	(0.10)	[72026]
	5 - 4		7/2		5/2	$(0,0^{0},1)$	32109.584	(0.10)	[72026]
	5 - 4		5/2		3/2	$(0,0^{0},1)$	32132.720	(0.10)	[72026]
	5 - 4		11/2		9/2	$(0,0^{0},1)$	32154.640	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,0^{0},1)$	32174.500	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,0^{0},1)$	32184.750	(0.10)	[72026]
	5 - 4		11/2		11/2	$(0,0^{0},0)$	32200.496	(0.10)	[72026]
	5 - 4		7/2		5/2	$(0,0^{0},0)$	32203.340	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,0^{0},0)$	32215.460	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,1^{L1},1)$	32218.460	(0.10)	[72026]
	5 - 4		7/2		5/2	$(0,1^{L1},1)$	32220.330	(0.10)	[72026]
	5 - 4		5/2		3/2	$(0,0^{0},0)$	32226.544	(0.10)	[72026]
	5 - 4		11/2		9/2	$(0,1^{L1},1)$	32240.020	(0.10)	[72026]
	5 - 4		11/2		9/2	$(0,0^{0},0)$	32248.354	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,1^{U1},1)$	32248.380	(0.10)	[72026]
	5 - 4		7/2		5/2	$(0,1^{U1},1)$	32249.960	(0.10)	[72026]
	5 - 4		13/2		13/2	$(0,2^{2},0)$	32251.300	(0.10)	[72026]
	5 - 4		5/2		3/2	$(0,1^{L1},1)$	32254.200	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,0^{0},0)$	32268.174	(0.10)	[72026]
	5 - 4		11/2		9/2	$(0,1^{U1},1)$	32269.649	(0.10)	[72026]
	5 - 4		11/2		11/2	$(0,1^{L1},0)$	32275.650	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,0^{0},0)$	32278.330	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,1^{L1},1)$	32281.838	(0.10)	[72026]
	5 - 4		5/2		3/2	$(0,1^{U1},1)$	32283.732	(0.10)	[72026]
	5 - 4		9/2		9/2	$(0,0^{0},1)$	32292.700	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,1^{L1},0)$	32296.570	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,1^{U1},1)$	32297.700	(0.10)	[72026]
	5 - 4		7/2		5/2	$(0,1^{L1},0)$	32298.280	(0.10)	[72026]
	5 - 4		11/2		11/2	$(0,1^{U1},0)$	32302.730	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,1^{U1},1)$	32311.110	(0.10)	[72026]
	5 - 4		11/2		9/2	$(0,1^{L1},0)$	32318.078	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,1^{U1},0)$	32323.530	(0.10)	[72026]
	5 - 4		7/2		5/2	$(0,1^{U1},0)$	32325.339	(0.10)	[72026]
	5 - 4		5/2		3/2	$(0,1^{L1},0)$	32332.016	(0.10)	[72026]
	5 - 4		9/2		11/2	$(0,0^{0},0)$	32338.070	(0.10)	[72026]
	5 - 4		11/2		9/2	$(0,1^{U1},0)$	32344.780	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,1^{L1},0)$	32346.620	(0.10)	[72026]

TABLE 15.1. The microwave spectrum of ICN—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{127}I^{12}C^{14}N$	5 - 4		5/2		3/2	$(0,1^{U1},0)$	32358.990	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,1^{L1},0)$	32359.780	(0.10)	[72026]
	5 - 4		11/2		11/2	$(0,2^{0},0)$	32365.380	(0.10)	[72026]
	5 - 4		11/2		11/2	$(0,2^{2},0)$	32366.386	(0.10)	[72026]
	5 - 4		7/2		5/2	$(0,2^{0},0)$	32368.320	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,1^{U1},0)$	32373.080	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,2^{0},0)$	32380.300	(0.10)	[72026]
	5 - 4		9/2		9/2	$(0,0^{0},0)$	32386.030	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,1^{U1},0)$	32386.345	(0.10)	[72026]
	5 - 4		11/2		9/2	$(0,2^{2},0)$	32390.234	(0.10)	[72026]
	5 - 4		9/2		11/2	$(0,1^{L1},0)$	32399.591	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,2^{2},0)$	32403.568	(0.10)	[72026]
	5 - 4		11/2		9/2	$(0,2^{0},0)$	32412.910	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,2^{2},0)$	32415.407	(0.10)	[72026]
	5 - 4		11/2		9/2	$(0,3^{3},0)$	32424.190	(0.10)	[72026]
	5 - 4		9/2		11/2	$(0,1^{U1},0)$	32425.480	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,3^{L1},0)$	32429.518	(0.10)	[72026]
	5 - 4		7/2		5/2	$(0,3^{L1},0)$	32431.320	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,2^{0},0)$	32432.655	(0.10)	[72026]
	5 - 4		9/2		9/2	$(0,1^{L1},0)$	32441.980	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,2^{0},0)$	32442.783	(0.10)	[72026]
	5 - 4		7/2		5/2	$(0,2^{2},0)$	32447.286	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,3^{3},0)$	32447.286	(0.10)	[72026]
	5 - 4		11/2		9/2	$(0,3^{L1},0)$	32451.084	(0.10)	[72026]
	5 - 4		7/2		7/2	$(0,0^{0},0)$	32466.102	(0.10)	[72026]
	5 - 4		9/2		9/2	$(0,1^{U1},0)$	32467.530	(0.10)	[72026]
	5 - 4		9/2		9/2	$(0,2^{2},0)$	32471.987	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,3^{L1},0)$	32479.546	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,3^{U1},0)$	32481.215	(0.10)	[72026]
	5 - 4		5/2		5/2	$(0,0^{0},0)$	32484.625	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,3^{L1},0)$	32492.581	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,3^{3},0)$	32495.974	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,2^{2},0)$	32497.328	(0.10)	[72026]
	5 - 4		11/2		9/2	$(0,3^{U1},0)$	32502.074	(0.10)	[72026]
	5 - 4		5/2		3/2	$(0,2^{2},0)$	32512.510	(0.10)	[72026]
	5 - 4		7/2		7/2	$(0,1^{L1},0)$	32523.069	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,3^{U1},0)$	32530.100	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,3^{U1},0)$	32543.400	(0.10)	[72026]
	5 - 4		7/2		7/2	$(0,1^{U1},0)$	32547.750	(0.10)	[72026]
	5 - 4		9/2		9/2	$(0,2^{0},0)$	32549.670	(0.10)	[72026]
	5 - 4		5/2		5/2	$(0,1^{L1},0)$	32552.187	(0.10)	[72026]
	5 - 4		7/2		7/2	$(0,2^{2},0)$	32554.456	(0.10)	[72026]
	5 - 4		5/2		5/2	$(0,1^{U1},0)$	32576.752	(0.10)	[72026]
	5 - 4		5/2		5/2	$(0,2^{2},0)$	32616.015	(0.10)	[72026]
	5 - 4		7/2		7/2	$(0,2^{0},0)$	32629.437	(0.10)	[72026]
	5 - 4		7/2		9/2	$(0,0^{0},0)$	32636.749	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,3^{3},0)$	32640.109	(0.10)	[72026]
	5 - 4		7/2		9/2	$(0,1^{L1},0)$	32668.466	(0.10)	[72026]
	5 - 4		7/2		9/2	$(0,1^{U1},0)$	32691.625	(0.10)	[72026]
	5 - 4		5/2		3/2	$(0,3^{3},0)$	32728.701	(0.10)	[72026]
	5 - 4		5/2		7/2	$(0,0^{0},0)$	32747.449	(0.10)	[72026]
	5 - 4		5/2		7/2	$(0,1^{L1},0)$	32776.787	(0.10)	[72026]
	5 - 4		5/2		7/2	$(0,1^{U1},0)$	32799.030	(0.10)	[72026]
	6 - 5		15/2		15/2	$(0,0^{0},1)$	38190.075	(0.10)	[72026]
	6 - 5		15/2		15/2	$(0,0^{0},0)$	38303.568	(0.10)	[72026]
	6 - 5		15/2		15/2	$(0,1^{L1},0)$	38437.434	(0.10)	[72026]
	6 - 5		9/2		7/2	$(0,0^{0},2)$	38450.090	(0.10)	[72026]
	6 - 5		11/2		9/2	$(0,0^{0},2)$	38459.200	(0.10)	[72026]
	6 - 5		15/2		15/2	$(0,1^{U1},0)$	38472.820	(0.10)	[72026]
	6 - 5		13/2		11/2	$(0,0^{0},2)$	38481.326	(0.10)	[72026]
	6 - 5		17/2		15/2	$(0,0^{0},2)$	38492.897	(0.10)	[72026]
	6 - 5		15/2		13/2	$(0,0^{0},2)$	38500.394	(0.10)	[72026]
	6 - 5		13/2		13/2	$(0,0^{0},1)$	38513.520	(0.10)	[72026]
	6 - 5		9/2		7/2	$(0,0^{0},1)$	38560.512	(0.10)	[72026]
	6 - 5		11/2		9/2	$(0,0^{0},1)$	38569.400	(0.10)	[72026]

TABLE 15.1. The microwave spectrum of ICN—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	(v_1,v_2^{ℓ},v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{127}I^{12}C^{14}N$	6 - 5		7/2		5/2	$(0,0^0,1)$	38575.200	(0.10)	[72026]
	6 - 5		13/2		11/2	$(0,0^0,1)$	38591.560	(0.10)	[72026]
	6 - 5		17/2		15/2	$(0,0^0,1)$	38603.160	(0.10)	[72026]
	6 - 5		15/2		13/2	$(0,0^0,1)$	38610.680	(0.10)	[72026]
	6 - 5		13/2		13/2	$(0,0^0,0)$	38626.068	(0.10)	[72026]
	6 - 5		9/2		7/2	$(0,0^0,0)$	38672.900	(0.10)	[72026]
	6 - 5		11/2		9/2	$(0,0^0,0)$	38681.886	(0.10)	[72026]
	6 - 5		9/2		7/2	$(0,1^{L1},1)$	38682.900	(0.10)	[72026]
	6 - 5		11/2		9/2	$(0,1^{L1},1)$	38684.304	(0.10)	[72026]
	6 - 5		7/2		5/2	$(0,0^0,0)$	38687.658	(0.10)	[72026]
	6 - 5		13/2		11/2	$(0,1^{L1},1)$	38701.035	(0.10)	[72026]
	6 - 5		13/2		11/2	$(0,0^0,0)$	38704.000	(0.10)	[72026]
	6 - 5		7/2		5/2	$(0,1^{L1},1)$	38704.701	(0.10)	[72026]
	6 - 5		11/2		11/2	$(0,0^0,1)$	38707.392	(0.10)	[72026]
	6 - 5		17/2		15/2	$(0,0^0,0)$	38715.562	(0.10)	[72026]
	6 - 5		9/2		7/2	$(0,1^{U1},1)$	38718.390	(0.10)	[72026]
	6 - 5		11/2		9/2	$(0,1^{U1},1)$	38719.833	(0.10)	[72026]
	6 - 5		15/2		13/2	$(0,1^{L1},1)$	38720.650	(0.10)	[72026]
	6 - 5		15/2		13/2	$(0,0^0,0)$	38723.030	(0.10)	[72026]
	6 - 5		17/2		15/2	$(0,1^{L1},1)$	38726.073	(0.10)	[72026]
	6 - 5		13/2		11/2	$(0,1^{U1},1)$	38736.252	(0.10)	[72026]
	6 - 5		7/2		5/2	$(0,1^{U1},1)$	38740.074	(0.10)	[72026]
	6 - 5		15/2		13/2	$(0,1^{U1},1)$	38755.713	(0.10)	[72026]
	6 - 5		13/2		13/2	$(0,1^{U1},0)$	38756.380	(0.10)	[72026]
	6 - 5		17/2		15/2	$(0,1^{U1},1)$	38761.210	(0.10)	[72026]
	6 - 5		9/2		7/2	$(0,1^{L1},0)$	38776.539	(0.10)	[72026]
	6 - 5		11/2		9/2	$(0,1^{L1},0)$	38778.021	(0.10)	[72026]
	6 - 5		13/2		11/2	$(0,1^{L1},0)$	38794.690	(0.10)	[72026]
	6 - 5		7/2		5/2	$(0,1^{L1},0)$	38798.223	(0.10)	[72026]
	6 - 5		9/2		7/2	$(0,1^{U1},0)$	38808.753	(0.10)	[72026]
	6 - 5		11/2		9/2	$(0,1^{U1},0)$	38810.118	(0.10)	[72026]
	6 - 5		9/2		9/2	$(0,0^0,1)$	38811.873	(0.10)	[72026]
	6 - 5		15/2		13/2	$(0,1^{L1},0)$	38814.220	(0.10)	[72026]
	6 - 5		11/2		11/2	$(0,0^0,0)$	38819.612	(0.10)	[72026]
	6 - 5		17/2		15/2	$(0,1^{L1},0)$	38819.657	(0.10)	[72026]
	6 - 5		13/2		13/2	$(0,2^0,0)$	38824.080	(0.10)	[72026]
	6 - 5		13/2		11/2	$(0,1^{U1},0)$	38826.577	(0.10)	[72026]
	6 - 5		7/2		5/2	$(0,1^{U1},0)$	38830.232	(0.10)	[72026]
	6 - 5		15/2		13/2	$(0,1^{U1},0)$	38845.998	(0.10)	[72026]
	6 - 5		17/2		15/2	$(0,1^{U1},0)$	38851.497	(0.10)	[72026]
	6 - 5		7/2		7/2	$(0,0^0,1)$	38857.268	(0.10)	[72026]
	6 - 5		9/2		7/2	$(0,2^0,0)$	38870.568	(0.10)	[72026]
	6 - 5		11/2		9/2	$(0,2^0,0)$	38879.538	(0.10)	[72026]
	6 - 5		7/2		5/2	$(0,2^0,0)$	38885.294	(0.10)	[72026]
	6 - 5		13/2		11/2	$(0,2^0,0)$	38901.530	(0.10)	[72026]
	6 - 5		11/2		11/2	$(0,1^{L1},0)$	38901.944	(0.10)	[72026]
	6 - 5		11/2		9/2	$(0,2^2,0)$	38902.263	(0.10)	[72026]
	6 - 5		13/2		11/2	$(0,2^2,0)$	38902.462	(0.10)	[72026]
	6 - 5		17/2		15/2	$(0,2^0,0)$	38913.010	(0.10)	[72026]
	6 - 5		15/2		13/2	$(0,2^0,0)$	38920.420	(0.10)	[72026]
	6 - 5		9/2		7/2	$(0,2^2,0)$	38923.600	(0.10)	[72026]
	6 - 5		15/2		13/2	$(0,2^2,0)$	38923.600	(0.10)	[72026]
	6 - 5		9/2		9/2	$(0,0^0,0)$	38923.630	(0.10)	[72026]
	6 - 5		11/2		11/2	$(0,1^{U1},0)$	38932.823	(0.10)	[72026]
	6 - 5		9/2		7/2	$(0,3^{L1},0)$	38935.960	(0.10)	[72026]
	6 - 5		11/2		9/2	$(0,3^{L1},0)$	38937.560	(0.10)	[72026]
	6 - 5		7/2		5/2	$(0,3^{L1},0)$	38957.500	(0.10)	[72026]
	6 - 5		7/2		5/2	$(0,2^2,0)$	38965.776	(0.10)	[72026]
	6 - 5		17/2		15/2	$(0,2^2,0)$	38967.464	(0.10)	[72026]
	6 - 5		7/2		7/2	$(0,0^0,0)$	38969.020	(0.10)	[72026]
	6 - 5		15/2		13/2	$(0,3^{L1},0)$	38973.560	(0.10)	[72026]
	6 - 5		17/2		15/2	$(0,3^{L1},0)$	38979.000	(0.10)	[72026]
	6 - 5		13/2		11/2	$(0,3^3,0)$	38979.400	(0.10)	[72026]
	6 - 5		11/2		11/2	$(0,2^2,0)$	38983.920	(0.10)	[72026]
	6 - 5		9/2		7/2	$(0,3^{U1},0)$	38997.680	(0.10)	[72026]

TABLE 15.1. The microwave spectrum of ICN—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{127}I^{12}C^{14}N$	6 - 5		11/2		9/2	$(0,3^{U1},0)$	38999.136	(0.10)	[72026]
	6 - 5		9/2		9/2	$(0,1^{L1},0)$	39002.960	(0.10)	[72026]
	6 - 5		15/2		13/2	$(0,3^{3},0)$	39004.520	(0.10)	[72026]
	6 - 5		11/2		9/2	$(0,3^{3},0)$	39006.200	(0.10)	[72026]
	6 - 5		13/2		11/2	$(0,3^{U1},0)$	39015.440	(0.10)	[72026]
	6 - 5		11/2		11/2	$(0,2^{0},0)$	39016.240	(0.10)	[72026]
	6 - 5		7/2		5/2	$(0,3^{U1},0)$	39019.120	(0.10)	[72026]
	6 - 5		9/2		9/2	$(0,1^{U1},0)$	39032.880	(0.10)	[72026]
	6 - 5		17/2		15/2	$(0,3^{U1},0)$	39040.100	(0.10)	[72026]
	6 - 5		7/2		7/2	$(0,1^{L1},0)$	39052.055	(0.10)	[72026]
	6 - 5		9/2		11/2	$(0,0^{0},0)$	39061.221	(0.10)	[72026]
	6 - 5		9/2		7/2	$(0,3^{3},0)$	39065.895	(0.10)	[72026]
	6 - 5		9/2		9/2	$(0,2^{2},0)$	39074.480	(0.10)	[72026]
	6 - 5		7/2		7/2	$(0,1^{U1},0)$	39081.680	(0.10)	[72026]
	6 - 5		17/2		15/2	$(0,3^{3},0)$	39110.730	(0.10)	[72026]
	6 - 5		7/2		7/2	$(0,2^{2},0)$	39134.580	(0.10)	[72026]
	6 - 5		7/2		5/2	$(0,3^{3},0)$	39142.359	(0.10)	[72026]
	10 - 9		17/2		15/2	$(0,0^{0},1)$	64310.803	(0.10)	[72026]
	10 - 9		19/2		17/2	$(0,0^{0},1)$	64314.581	(0.10)	[72026]
	10 - 9		15/2		13/2	$(0,0^{0},1)$	64315.429	(0.10)	[72026]
	10 - 9		21/2		19/2	$(0,0^{0},1)$	64322.190	(0.10)	[72026]
	10 - 9		25/2		23/2	$(0,0^{0},1)$	64324.956	(0.10)	[72026]
	10 - 9		23/2		21/2	$(0,0^{0},1)$	64327.970	(0.10)	[72026]
	10 - 9		21/2		21/2	$(0,0^{0},0)$	64382.522	(0.10)	[72026]
	10 - 9		17/2		15/2	$(0,0^{0},0)$	64498.246	(0.10)	[72026]
	10 - 9		19/2		17/2	$(0,0^{0},0)$	64502.006	(0.10)	[72026]
	10 - 9		15/2		13/2	$(0,0^{0},0)$	64502.826	(0.10)	[72026]
	10 - 9		21/2		19/2	$(0,0^{0},0)$	64509.583	(0.10)	[72026]
	10 - 9		25/2		23/2	$(0,0^{0},0)$	64512.352	(0.10)	[72026]
	10 - 9		23/2		21/2	$(0,0^{0},0)$	64515.362	(0.10)	[72026]
	10 - 9		17/2		15/2	$(0,1^{L1},0)$	64662.085	(0.10)	[72026]
	10 - 9		19/2		17/2	$(0,1^{L1},0)$	64664.356	(0.10)	[72026]
	10 - 9		15/2		13/2	$(0,1^{L1},0)$	64668.420	(0.10)	[72026]
	10 - 9		21/2		19/2	$(0,1^{L1},0)$	64671.271	(0.10)	[72026]
	10 - 9		25/2		23/2	$(0,1^{L1},0)$	64677.120	(0.10)	[72026]
	10 - 9		23/2		21/2	$(0,1^{L1},0)$	64677.624	(0.10)	[72026]
	10 - 9		17/2		15/2	$(0,1^{U1},0)$	64715.284	(0.10)	[72026]
	10 - 9		19/2		17/2	$(0,1^{U1},0)$	64717.564	(0.10)	[72026]
	10 - 9		15/2		13/2	$(0,1^{U1},0)$	64721.627	(0.10)	[72026]
	10 - 9		21/2		19/2	$(0,1^{U1},0)$	64724.387	(0.10)	[72026]
	10 - 9		25/2		23/2	$(0,1^{U1},0)$	64730.282	(0.10)	[72026]
	10 - 9		23/2		21/2	$(0,1^{U1},0)$	64730.756	(0.10)	[72026]
	10 - 9		17/2		15/2	$(0,2^{0},0)$	64827.546	(0.10)	[72026]
	10 - 9		19/2		17/2	$(0,2^{0},0)$	64831.293	(0.10)	[72026]
	10 - 9		15/2		13/2	$(0,2^{0},0)$	64832.095	(0.10)	[72026]
	10 - 9		21/2		19/2	$(0,2^{0},0)$	64838.854	(0.10)	[72026]
	10 - 9		25/2		23/2	$(0,2^{0},0)$	64841.579	(0.10)	[72026]
	10 - 9		23/2		21/2	$(0,2^{0},0)$	64844.550	(0.10)	[72026]
	10 - 9		19/2		17/2	$(0,2^{2},0)$	64877.606	(0.10)	[72026]
	10 - 9		17/2		15/2	$(0,2^{2},0)$	64879.608	(0.10)	[72026]
	10 - 9		21/2		19/2	$(0,2^{2},0)$	64882.385	(0.10)	[72026]
	10 - 9		23/2		21/2	$(0,2^{2},0)$	64890.447	(0.10)	[72026]
	10 - 9		15/2		13/2	$(0,2^{2},0)$	64891.233	(0.10)	[72026]
	10 - 9		25/2		23/2	$(0,2^{2},0)$	64897.533	(0.10)	[72026]
	11 - 10		19/2		17/2	$(0,0^{0},0)$	70950.507	(0.10)	[72026]
	11 - 10		21/2		19/2	$(0,0^{0},0)$	70953.604	(0.10)	[72026]
	11 - 10		17/2		15/2	$(0,0^{0},0)$	70954.155	(0.10)	[72026]
	11 - 10		23/2		21/2	$(0,0^{0},0)$	70959.870	(0.10)	[72026]
	11 - 10		27/2		25/2	$(0,0^{0},0)$	70962.031	(0.10)	[72026]
	11 - 10		25/2		23/2	$(0,0^{0},0)$	70964.570	(0.10)	[72026]
	12 - 11		21/2		19/2	$(0,0^{0},1)$	77177.150	(0.10)	[72026]
	12 - 11		25/2		23/2	$(0,0^{0},1)$	77185.077	(0.10)	[72026]
	12 - 11		29/2		27/2	$(0,0^{0},1)$	77186.803	(0.10)	[72026]
	12 - 11		27/2		25/2	$(0,0^{0},1)$	77188.927	(0.10)	[72026]
	12 - 11		21/2		19/2	$(0,0^{0},0)$	77402.118	(0.10)	[72026]

TABLE 15.1. The microwave spectrum of ICN—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	(v_1,v_2^{ℓ},v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{127}I^{12}C^{14}N$	12 - 11		23/2		21/2	$(0,0^0,0)$	77404.756	(0.10)	[72026]
	12 - 11		19/2		17/2	$(0,0^0,0)$	77405.167	(0.10)	[72026]
	12 - 11		25/2		23/2	$(0,0^0,0)$	77409.960	(0.10)	[72026]
	12 - 11		29/2		27/2	$(0,0^0,0)$	77411.694	(0.10)	[72026]
	12 - 11		27/2		25/2	$(0,0^0,0)$	77413.868	(0.10)	[72026]
	12 - 11		21/2		19/2	$(0,1^{L1},0)$	77598.200	(0.10)	[72026]
	12 - 11		23/2		21/2	$(0,1^{L1},0)$	77600.120	(0.10)	[72026]
	12 - 11		19/2		17/2	$(0,1^{L1},0)$	77602.314	(0.10)	[72026]
	12 - 11		25/2		23/2	$(0,1^{L1},0)$	77605.011	(0.10)	[72026]
	12 - 11		29/2		27/2	$(0,1^{L1},0)$	77608.511	(0.10)	[72026]
	12 - 11		27/2		25/2	$(0,1^{L1},0)$	77609.274	(0.10)	[72026]
	12 - 11		21/2		19/2	$(0,1^{U1},0)$	77662.093	(0.10)	[72026]
	12 - 11		23/2		21/2	$(0,1^{U1},0)$	77663.978	(0.10)	[72026]
	12 - 11		19/2		17/2	$(0,1^{U1},0)$	77666.231	(0.10)	[72026]
	12 - 11		25/2		23/2	$(0,1^{U1},0)$	77668.784	(0.10)	[72026]
	12 - 11		29/2		27/2	$(0,1^{U1},0)$	77672.288	(0.10)	[72026]
	12 - 11		27/2		25/2	$(0,1^{U1},0)$	77673.042	(0.10)	[72026]
	13 - 12					$(0,0^0,0)$	83864.	(1.0)	[49001]
$^{127}I^{13}C^{14}N$	1 - 0		5/2		5/2	$(0,0^0,0)$	5974.43	(0.5)	[57004]
	1 - 0		7/2		5/2	$(0,0^0,0)$	6480.72	(0.5)	[57004]
	1 - 0		3/2		5/2	$(0,0^0,0)$	6703.25	(0.5)	[57004]
	5 - 4		11/2		11/2	$(0,0^0,0)$	31715.412	(0.10)	[72026]
	5 - 4		7/2		5/2	$(0,0^0,0)$	31718.296	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,0^0,0)$	31730.384	(0.10)	[72026]
	5 - 4		5/2		3/2	$(0,0^0,0)$	31741.424	(0.10)	[72026]
	5 - 4		11/2		9/2	$(0,0^0,0)$	31763.344	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,0^0,0)$	31783.184	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,0^0,0)$	31793.310	(0.10)	[72026]
	5 - 4		9/2		9/2	$(0,0^0,0)$	31901.070	(0.10)	[72026]
	6 - 5		11/2		9/2	$(0,0^0,0)$	38099.958	(0.10)	[72026]
	6 - 5		7/2		5/2	$(0,0^0,0)$	38105.810	(0.10)	[72026]
	6 - 5		13/2		11/2	$(0,0^0,0)$	38122.040	(0.10)	[72026]
	6 - 5		17/2		15/2	$(0,0^0,0)$	38133.550	(0.10)	[72026]
	6 - 5		15/2		13/2	$(0,0^0,0)$	38140.975	(0.10)	[72026]
$^{127}I^{12}C^{15}N$	5 - 4		13/2		13/2	$(0,0^0,1)$	30331.926	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,0^0,0)$	30353.210	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,0^0,0)$	30406.081	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,0^0,0)$	30416.179	(0.10)	[72026]
	5 - 4		13/2		13/2	$(0,1^{L1},0)$	30552.346	(0.10)	[72026]
	5 - 4		13/2		13/2	$(0,1^{U1},0)$	30580.464	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,0^0,2)$	30666.963	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,0^0,2)$	30677.018	(0.10)	[72026]
	5 - 4		11/2		11/2	$(0,0^0,1)$	30684.701	(0.10)	[72026]
	5 - 4		7/2		5/2	$(0,0^0,1)$	30687.254	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,0^0,1)$	30699.460	(0.10)	[72026]
	5 - 4		5/2		3/2	$(0,0^0,1)$	30710.512	(0.10)	[72026]
	5 - 4		11/2		9/2	$(0,0^0,1)$	30732.486	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,0^0,1)$	30752.460	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,0^0,1)$	30762.627	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,1^{L1},1)$	30793.325	(0.10)	[72026]
	5 - 4		7/2		5/2	$(0,1^{L1},1)$	30795.183	(0.10)	[72026]
	5 - 4		11/2		9/2	$(0,1^{L1},1)$	30814.912	(0.10)	[72026]
	5 - 4		13/2		13/2	$(0,2^2,0)$	30816.640	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,1^{U1},1)$	30820.598	(0.10)	[72026]
	5 - 4		7/2		5/2	$(0,1^{U1},1)$	30822.382	(0.10)	[72026]
	5 - 4		5/2		3/2	$(0,1^{L1},1)$	30828.867	(0.10)	[72026]
	5 - 4		11/2		9/2	$(0,1^{U1},1)$	30841.709	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,1^{L1},1)$	30843.462	(0.10)	[72026]
	5 - 4		11/2		11/2	$(0,1^{L1},0)$	30844.974	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,1^{L1},1)$	30856.784	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,1^{L1},0)$	30865.792	(0.10)	[72026]
	5 - 4		7/2		5/2	$(0,1^{L1},0)$	30867.504	(0.10)	[72026]
	5 - 4		11/2		11/2	$(0,1^{U1},0)$	30870.006	(0.10)	[72026]
	5 - 4		9/2		9/2	$(0,0^0,1)$	30870.460	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,1^{U1},1)$	30870.460	(0.10)	[72026]

TABLE 15.1. The microwave spectrum of ICN—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{127}I^{12}C^{15}N$	5 - 4		15/2		13/2	$(0,1^{U1},1)$	30883.690	(0.10)	[72026]
	5 - 4		11/2		9/2	$(0,1^{L1},0)$	30887.219	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,1^{U1},0)$	30890.605	(0.10)	[72026]
	5 - 4		7/2		5/2	$(0,1^{U1},0)$	30892.488	(0.10)	[72026]
	5 - 4		5/2		3/2	$(0,1^{L1},0)$	30901.286	(0.10)	[72026]
	5 - 4		11/2		9/2	$(0,1^{U1},0)$	30911.798	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,1^{L1},0)$	30915.824	(0.10)	[72026]
	5 - 4		5/2		3/2	$(0,1^{U1},0)$	30925.952	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,1^{L1},0)$	30929.091	(0.10)	[72026]
	5 - 4		11/2		11/2	$(0,2^{2},0)$	30931.360	(0.10)	[72026]
	5 - 4		11/2		11/2	$(0,2^{0},0)$	30932.093	(0.10)	[72026]
	5 - 4		7/2		5/2	$(0,2^{0},0)$	30934.720	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,1^{U1},0)$	30940.083	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,2^{0},0)$	30946.730	(0.10)	[72026]
	5 - 4		7/2		7/2	$(0,0^{0},1)$	30950.893	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,1^{U1},0)$	30953.496	(0.10)	[72026]
	5 - 4		11/2		9/2	$(0,2^{2},0)$	30955.267	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,2^{2},0)$	30968.550	(0.10)	[72026]
	5 - 4		11/2		9/2	$(0,2^{0},0)$	30979.494	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,2^{2},0)$	30980.294	(0.10)	[72026]
	5 - 4		11/2		9/2	$(0,3^{3},0)$	30986.243	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,3^{L1},0)$	30995.814	(0.10)	[72026]
	5 - 4		7/2		5/2	$(0,3^{L1},0)$	30997.351	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,2^{0},0)$	30999.226	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,2^{0},0)$	31009.286	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,3^{3},0)$	31009.286	(0.10)	[72026]
	5 - 4		9/2		9/2	$(0,1^{L1},0)$	31011.283	(0.10)	[72026]
	5 - 4		7/2		5/2	$(0,2^{2},0)$	31012.196	(0.10)	[72026]
	5 - 4		11/2		9/2	$(0,3^{L1},0)$	31017.290	(0.10)	[72026]
	5 - 4		5/2		3/2	$(0,3^{L1},0)$	31031.333	(0.10)	[72026]
	5 - 4		9/2		9/2	$(0,1^{U1},0)$	31034.569	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,3^{U1},0)$	31043.654	(0.10)	[72026]
	5 - 4		7/2		5/2	$(0,3^{U1},0)$	31045.233	(0.10)	[72026]
	5 - 4		13/2		11/2	$(0,3^{L1},0)$	31045.939	(0.10)	[72026]
	5 - 4		9/2		7/2	$(0,3^{3},0)$	31057.948	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,3^{L1},0)$	31059.046	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,2^{2},0)$	31062.286	(0.10)	[72026]
	5 - 4		11/2		9/2	$(0,3^{U1},0)$	31064.419	(0.10)	[72026]
	5 - 4		5/2		3/2	$(0,2^{2},0)$	31077.424	(0.10)	[72026]
	5 - 4		7/2		7/2	$(0,3^{3},0)$	31085.219	(0.10)	[72026]
	5 - 4		7/2		7/2	$(0,1^{L1},0)$	31092.086	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,3^{U1},0)$	31105.847	(0.10)	[72026]
	5 - 4		7/2		7/2	$(0,1^{U1},0)$	31114.701	(0.10)	[72026]
	5 - 4		9/2		9/2	$(0,2^{0},0)$	31116.214	(0.10)	[72026]
	5 - 4		7/2		7/2	$(0,2^{2},0)$	31119.408	(0.10)	[72026]
	5 - 4		5/2		5/2	$(0,1^{L1},0)$	31121.174	(0.10)	[72026]
	5 - 4		5/2		5/2	$(0,1^{U1},0)$	31143.581	(0.10)	[72026]
	5 - 4		7/2		5/2	$(0,3^{3},0)$	31172.682	(0.10)	[72026]
	5 - 4		5/2		5/2	$(0,2^{2},0)$	31180.902	(0.10)	[72026]
	5 - 4		15/2		13/2	$(0,3^{3},0)$	31201.830	(0.10)	[72026]
	5 - 4		5/2		3/2	$(0,3^{3},0)$	31290.224	(0.10)	[72026]
	6 - 5		9/2		7/2	$(0,0^{0},0)$	36438.300	(0.10)	[72026]
	6 - 5		11/2		9/2	$(0,0^{0},0)$	36447.269	(0.10)	[72026]
	6 - 5		7/2		5/2	$(0,0^{0},0)$	36453.263	(0.10)	[72026]
	6 - 5		13/2		11/2	$(0,0^{0},0)$	36469.463	(0.10)	[72026]
	6 - 5		17/2		15/2	$(0,0^{0},0)$	36480.986	(0.10)	[72026]
	6 - 5		15/2		13/2	$(0,0^{0},0)$	36488.500	(0.10)	[72026]
	6 - 5		15/2		15/2	$(0,1^{L1},1)$	36632.797	(0.10)	[72026]
	6 - 5		15/2		15/2	$(0,1^{L1},0)$	36720.521	(0.10)	[72026]
	6 - 5		9/2		7/2	$(0,0^{0},2)$	36750.996	(0.10)	[72026]
	6 - 5		15/2		15/2	$(0,1^{U1},0)$	36753.570	(0.10)	[72026]
	6 - 5		11/2		9/2	$(0,0^{0},2)$	36760.067	(0.10)	[72026]
	6 - 5		7/2		5/2	$(0,0^{0},2)$	36766.034	(0.10)	[72026]
	6 - 5		13/2		11/2	$(0,0^{0},2)$	36782.235	(0.10)	[72026]
	6 - 5		15/2		15/2	$(0,2^{0},0)$	36783.792	(0.10)	[72026]

TABLE 15.1. The microwave spectrum of ICN—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{127}I^{12}C^{15}N$	6 - 5		17/2		15/2	$(0,0^0,2)$	36793.931	(0.10)	[72026]
	6 - 5		15/2		13/2	$(0,0^0,2)$	36801.415	(0.10)	[72026]
	6 - 5		13/2		13/2	$(0,0^0,1)$	36807.133	(0.10)	[72026]
	6 - 5		9/2		7/2	$(0,0^0,1)$	36853.862	(0.10)	[72026]
	6 - 5		11/2		9/2	$(0,0^0,1)$	36862.793	(0.10)	[72026]
	6 - 5		7/2		5/2	$(0,0^0,1)$	36868.678	(0.10)	[72026]
	6 - 5		13/2		11/2	$(0,0^0,1)$	36885.008	(0.10)	[72026]
	6 - 5		17/2		15/2	$(0,0^0,1)$	36896.661	(0.10)	[72026]
	6 - 5		15/2		13/2	$(0,0^0,1)$	36904.114	(0.10)	[72026]
	6 - 5		13/2		13/2	$(0,1^{L1},1)$	36919.921	(0.10)	[72026]
	6 - 5		15/2		15/2	$(0,2^2,0)$	36955.979	(0.10)	[72026]
	6 - 5		13/2		11/2	$(0,1^{L1},1)$	36990.894	(0.10)	[72026]
	6 - 5		7/2		5/2	$(0,1^{L1},1)$	36994.480	(0.10)	[72026]
	6 - 5		9/2		7/2	$(0,1^{U1},1)$	37005.420	(0.10)	[72026]
	6 - 5		13/2		13/2	$(0,1^{L1},0)$	37006.896	(0.10)	[72026]
	6 - 5		15/2		13/2	$(0,1^{L1},1)$	37010.445	(0.10)	[72026]
	6 - 5		17/2		15/2	$(0,1^{L1},1)$	37015.981	(0.10)	[72026]
	6 - 5		13/2		11/2	$(0,1^{U1},1)$	37023.324	(0.10)	[72026]
	6 - 5		7/2		5/2	$(0,1^{U1},1)$	37027.000	(0.10)	[72026]
	6 - 5		13/2		13/2	$(0,1^{U1},0)$	37036.980	(0.10)	[72026]
	6 - 5		15/2		13/2	$(0,1^{U1},1)$	37042.802	(0.10)	[72026]
	6 - 5		17/2		15/2	$(0,1^{U1},1)$	37048.388	(0.10)	[72026]
	6 - 5		9/2		7/2	$(0,1^{L1},0)$	37059.583	(0.10)	[72026]
	6 - 5		13/2		11/2	$(0,1^{L1},0)$	37077.724	(0.10)	[72026]
	6 - 5		9/2		7/2	$(0,1^{U1},0)$	37089.317	(0.10)	[72026]
	6 - 5		11/2		9/2	$(0,1^{U1},0)$	37090.635	(0.10)	[72026]
	6 - 5		15/2		13/2	$(0,1^{L1},0)$	37097.304	(0.10)	[72026]
	6 - 5		17/2		15/2	$(0,1^{L1},0)$	37102.768	(0.10)	[72026]
	6 - 5		13/2		11/2	$(0,1^{U1},0)$	37107.124	(0.10)	[72026]
	6 - 5		7/2		5/2	$(0,1^{U1},0)$	37110.841	(0.10)	[72026]
	6 - 5		15/2		13/2	$(0,1^{U1},0)$	37126.515	(0.10)	[72026]
	6 - 5		11/2		11/2	$(0,1^{U1},1)$	37129.850	(0.10)	[72026]
	6 - 5		13/2		13/2	$(0,2^2,0)$	37131.488	(0.10)	[72026]
	6 - 5		17/2		15/2	$(0,1^{U1},0)$	37132.088	(0.10)	[72026]
	6 - 5		7/2		7/2	$(0,0^0,1)$	37150.489	(0.10)	[72026]
	6 - 5		9/2		7/2	$(0,2^0,0)$	37150.489	(0.10)	[72026]
	6 - 5		11/2		9/2	$(0,2^0,0)$	37159.420	(0.10)	[72026]
	6 - 5		13/2		13/2	$(0,3^{L1},0)$	37163.120	(0.10)	[72026]
	6 - 5		7/2		5/2	$(0,2^0,0)$	37165.203	(0.10)	[72026]
	6 - 5		11/2		9/2	$(0,2^2,0)$	37180.363	(0.10)	[72026]
	6 - 5		13/2		11/2	$(0,2^2,0)$	37180.363	(0.10)	[72026]
	6 - 5		13/2		11/2	$(0,2^0,0)$	37181.373	(0.10)	[72026]
	6 - 5		11/2		11/2	$(0,1^{L1},0)$	37185.047	(0.10)	[72026]
	6 - 5		7/2		5/2	$(0,2^0,0)$	37192.886	(0.10)	[72026]
	6 - 5		15/2		13/2	$(0,2^0,0)$	37200.268	(0.10)	[72026]
	6 - 5		9/2		7/2	$(0,2^2,0)$	37201.629	(0.10)	[72026]
	6 - 5		15/2		13/2	$(0,2^2,0)$	37201.629	(0.10)	[72026]
	6 - 5		11/2		11/2	$(0,1^{U1},0)$	37213.424	(0.10)	[72026]
	6 - 5		9/2		7/2	$(0,3^{L1},0)$	37215.762	(0.10)	[72026]
	6 - 5		11/2		9/2	$(0,3^{L1},0)$	37217.190	(0.10)	[72026]
	6 - 5		13/2		11/2	$(0,3^{L1},0)$	37233.822	(0.10)	[72026]
	6 - 5		7/2		5/2	$(0,3^{L1},0)$	37237.318	(0.10)	[72026]
	6 - 5		13/2		13/2	$(0,3^3,0)$	37241.858	(0.10)	[72026]
	6 - 5		7/2		5/2	$(0,2^2,0)$	37243.756	(0.10)	[72026]
	6 - 5		17/2		15/2	$(0,2^2,0)$	37245.499	(0.10)	[72026]
	6 - 5		7/2		7/2	$(0,1^{L1},1)$	37248.855	(0.10)	[72026]
	6 - 5		15/2		13/2	$(0,3^{L1},0)$	37253.313	(0.10)	[72026]
	6 - 5		17/2		15/2	$(0,3^{L1},0)$	37258.800	(0.10)	[72026]
	6 - 5		9/2		7/2	$(0,3^{U1},0)$	37272.740	(0.10)	[72026]
	6 - 5		11/2		9/2	$(0,3^{U1},0)$	37273.986	(0.10)	[72026]
	6 - 5		15/2		13/2	$(0,3^3,0)$	37278.717	(0.10)	[72026]
	6 - 5		11/2		9/2	$(0,3^3,0)$	37280.625	(0.10)	[72026]
	6 - 5		9/2		9/2	$(0,1^{L1},0)$	37285.949	(0.10)	[72026]
	6 - 5		13/2		11/2	$(0,3^{U1},0)$	37290.341	(0.10)	[72026]
	6 - 5		11/2		11/2	$(0,2^0,0)$	37296.098	(0.10)	[72026]

TABLE 15.1. The microwave spectrum of ICN—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	(v_1,v_2^{ℓ},v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{127}I^{12}C^{15}N$	6 - 5		15/2		13/2	$(0,3^{U1},0)$	37309.501	(0.10)	[72026]
	6 - 5		9/2		9/2	$(0,1^{U1},0)$	37313.396	(0.10)	[72026]
	6 - 5		17/2		15/2	$(0,3^{U1},0)$	37315.036	(0.10)	[72026]
	6 - 5		7/2		7/2	$(0,1^{L1},0)$	37334.969	(0.10)	[72026]
	6 - 5		9/2		7/2	$(0,3^{3},0)$	37340.156	(0.10)	[72026]
	6 - 5		9/2		9/2	$(0,2^{2},0)$	37352.485	(0.10)	[72026]
	6 - 5		7/2		7/2	$(0,1^{U1},0)$	37361.979	(0.10)	[72026]
	6 - 5		17/2		15/2	$(0,3^{3},0)$	37385.011	(0.10)	[72026]
	6 - 5		9/2		9/2	$(0,2^{0},0)$	37399.443	(0.10)	[72026]
	6 - 5		9/2		11/2	$(0,1^{L1},0)$	37409.988	(0.10)	[72026]
	6 - 5		7/2		5/2	$(0,3^{3},0)$	37416.583	(0.10)	[72026]
	6 - 5		7/2		7/2	$(0,2^{0},0)$	37444.432	(0.10)	[72026]
$^{127}I^{13}C^{15}N$	5 - 4		11/2		13/2	$(0,0^{0},0)$	30342.429	(0.20)	[72026]
	5 - 4		13/2		13/2	$(0,0^{0},0)$	30420.132	(0.20)	[72026]
	5 - 4		11/2		11/2	$(0,0^{0},0)$	30771.939	(0.20)	[72026]
	5 - 4		7/2		5/2	$(0,0^{0},0)$	30774.609	(0.20)	[72026]
	5 - 4		9/2		7/2	$(0,0^{0},0)$	30786.641	(0.20)	[72026]
	5 - 4		5/2		3/2	$(0,0^{0},0)$	30797.745	(0.20)	[72026]
	5 - 4		11/2		9/2	$(0,0^{0},0)$	30819.640	(0.20)	[72026]
	5 - 4		15/2		13/2	$(0,0^{0},0)$	30839.536	(0.20)	[72026]
	5 - 4		13/2		11/2	$(0,0^{0},0)$	30849.690	(0.20)	[72026]
	5 - 4		9/2		11/2	$(0,0^{0},0)$	30909.647	(0.20)	[72026]
	5 - 4		9/2		9/2	$(0,0^{0},0)$	30957.251	(0.20)	[72026]
	5 - 4		7/2		7/2	$(0,0^{0},0)$	31037.378	(0.20)	[72026]
	5 - 4		5/2		5/2	$(0,0^{0},0)$	31055.745	(0.20)	[72026]
	5 - 4		7/2		9/2	$(0,0^{0},0)$	31207.972	(0.20)	[72026]
	6 - 5		13/2		13/2	$(0,0^{0},0)$	36911.836	(0.20)	[72026]
	6 - 5		9/2		7/2	$(0,0^{0},0)$	36958.453	(0.20)	[72026]
	6 - 5		11/2		9/2	$(0,0^{0},0)$	36967.486	(0.20)	[72026]
	6 - 5		7/2		5/2	$(0,0^{0},0)$	36973.292	(0.20)	[72026]
	6 - 5		13/2		11/2	$(0,0^{0},0)$	36989.549	(0.20)	[72026]
	6 - 5		17/2		15/2	$(0,0^{0},0)$	37001.207	(0.20)	[72026]
	6 - 5		15/2		13/2	$(0,0^{0},0)$	37008.659	(0.20)	[72026]
	6 - 5		11/2		13/2	$(0,0^{0},0)$	37027.404	(0.20)	[72026]
	6 - 5		11/2		11/2	$(0,0^{0},0)$	37105.132	(0.20)	[72026]
	6 - 5		9/2		9/2	$(0,0^{0},0)$	37209.147	(0.20)	[72026]
	6 - 5		7/2		7/2	$(0,0^{0},0)$	37254.420	(0.20)	[72026]
	6 - 5		9/2		11/2	$(0,0^{0},0)$	37346.825	(0.20)	[72026]
	6 - 5		7/2		9/2	$(0,0^{0},0)$	37505.103	(0.20)	[72026]

Table 16. Molecular parameters for NCO.

Parameters		$^{14}N^{12}C^{16}O$ Gnd. ($^2\Pi$)	$^{14}N^{12}C^{16}O$ v_2=1 ($^2\Delta$)	Reference
B_0	(MHz)	11 677.40(10)	...	[70020]
D_0	(MHz)	0.0071(15)	...	[70020]
$B(^2\Delta_{\frac{3}{2}})$	(MHz)	...	11 756.32(8)	[72027]
$B(^2\Delta_{\frac{5}{2}})$	(MHz)	...	11 660.25(9)	[72027]
p_{eff}	(MHz)	76.8(11)	...	[70020]
a	(MHz)	64.31(64)	60.47(26)	[72027]
b+c	(MHz)	-21.20(126)	-17.33(50)	[72027]
d	(MHz)	90.96(109)	...	[72027]
eqQ (N)	(MHz)	-1.85(40)	-2.11(54)	[72027]
A_{eff}	(cm^{-1})	-95.26(1)	...	[70020]
A	(cm^{-1})	-95.86(1)	...	[70020]
α_p	(MHz)	-38.33(55)	...	[70020]
μ	(D)	0.64(8)	...	[70020]

TABLE 16.1. The microwave spectrum of NCO

Isotopic species	J' – J''	F_1'	F_1''	(ν_1,ν_2,ν_3)	Parity	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{14}N^{12}C^{16}O$ $^2\Pi_{3/2}$	5/2 – 3/2	5/2	5/2	(0,0,0)		58108.23	(0.21)	[70020]
	5/2 – 3/2	3/2	3/2	(0,0,0)		58139.05	(0.30)	[72027]
	5/2 – 3/2	7/2	5/2	(0,0,0)		58140.76	(0.10)	[70020]
	5/2 – 3/2	5/2	3/2	(0,0,0)		58161.68	(0.15)	[70020]
	5/2 – 3/2	3/2	1/2	(0,0,0)		58171.77	(0.28)	[70020]
	7/2 – 5/2	7/2	7/2	(0,0,0)		81380.88	(0.20)	[72027]
	7/2 – 5/2	9/2	7/2	(0,0,0)		81404.09	(0.07)	[70020]
	7/2 – 5/2	7/2	5/2	(0,0,0)		81413.15	(0.28)	[70020]
	7/2 – 5/2	5/2	3/2	(0,0,0)		81418.46	(0.23)	[70020]
$^{14}N^{12}C^{16}O$ $^2\Pi_{1/2}$	5/2 – 3/2	7/2	5/2	(0,0,0)	a	58577.90	(0.14)	[70020]
	5/2 – 3/2	5/2	3/2	(0,0,0)	a	58581.96	(0.20)	[70020]
	5/2 – 3/2	3/2	1/2	(0,0,0)	a	58588.98	(0.14)	[70020]
	5/2 – 3/2	3/2	3/2	(0,0,0)	a	58611.15	(0.20)	[72027]
	5/2 – 3/2	5/2	5/2	(0,0,0)	a	58617.30	(0.20)	[72027]
	5/2 – 3/2	3/2	3/2	(0,0,0)	b	58627.54	(0.20)	[72027]
	5/2 – 3/2	7/2	5/2	(0,0,0)	b	58660.01	(0.28)	[70020]
	5/2 – 3/2	3/2	1/2	(0,0,0)	b	58674.90	(0.28)	[70020]
$^{14}N^{12}C^{16}O$ $^2\Delta_{3/2}$	5/2 – 3/2	7/2	5/2	(0,1,0)		58769.73	(0.20)	[72027]
	5/2 – 3/2	5/2	3/2	(0,1,0)		58796.56	(0.20)	[72027]
	5/2 – 3/2	3/2	1/2	(0,1,0)		58809.69	(0.20)	[72027]
	7/2 – 5/2	9/2	7/2	(0,1,0)		82287.07	(0.20)	[72027]
	7/2 – 5/2	7/2	5/2	(0,1,0)		82298.75	(0.20)	[72027]
	7/2 – 5/2	5/2	3/2	(0,1,0)		82305.69	(0.20)	[72027]
$^{14}N^{12}C^{16}O$ $^2\Delta_{5/2}$	7/2 – 5/2	9/2	7/2	(0,1,0)		81613.04	(0.20)	[72027]
	7/2 – 5/2	7/2	5/2	(0,1,0)		81627.30	(0.20)	[72027]
	7/2 – 5/2	5/2	3/2	(0,1,0)		81636.35	(0.20)	[72027]

Table 17. Rotational constants for OCS [74001][a]

Isotopic Species	Vib. State v_1 v_2^{ℓ} v_3	B_v (MHz)	D_v (kHz)	q_v (MHz)
$^{16}O^{12}C^{32}S$	0 0^0 0	6 081.492475(81)[b]	1.301777(90)[b]	
	0 1^1 0 c	6 088.89837(28)	1.32374(47)	6.36141271(161)[c]
	0 1^1 0 d	6 095.25802(54)	1.32344(93)	
	0 2^0 0	6 100.19105(46)	1.0964(12)	
	0 2^2 0 c	6 102.55846(33)	1.5720(9)	
	0 2^2 0 d	6 102.56019(44)	1.3440(12)	
	0 3^1 0	6 108.626(12)		6.18838(17)[d]
	0 3^3 0	6 112.925(12)		
	0 4^0 0	6 114.723(20)		
	0 4^2 0	6 117.310(20)		
	0 4^4 0	6 123.244(20)		
	0 5^1 0	6 121.724(30)		6.055(30)
	0 0^0 1	6 063.35748(70)	1.3274(18)	
	0 1^1 1	6 075.503(15)		6.856(20)
	0 2^0 1	6 084.385(20)		
	0 2^2 1	6 087.227(20)		
	0 3^1 1	6 093.56(10)		6.50(10)
	0 0^0 2	6 044.873(20)		
	0 1^1 2	6 058.536(30)		7.285(20)
	1 0^0 0	6 045.051(20)		
	1 1^1 0	6 056.259(30)		6.450(20)
$^{16}O^{12}C^{34}S$	0 0^0 0	5 932.8379(50)	1.2691(370)	
	0 1^1 0	5 943.158(10)		6.0688022(100)[c]
	0 2^0 0	5 951.273(10)		
	0 2^2 0	5 953.392(10)		
	0 0^0 1	5 915.152(10)		
	0 0^0 2	5 897.120(20)		
	1 0^0 0	5 897.390(20)		
$^{16}O^{13}C^{32}S$	0 0^0 0	6 061.92510(59)	1.2993(16)	
	0 1^1 0	6 071.913(4)		6.5078418(52)[c]
	0 2^0 0	6 079.250(5)	1.133(38)	
	0 2^2 0	6 081.801(7)	1.363(46)[e]	
	0 3^1 0	6 087.031(5)		6.287(5)
	0 3^3 0	6 091.583(5)		
	0 4^0 0	6 092.200(17)		
	0 4^2 0	6 095.070(8)		
	0 4^4 0	6 101.262(9)		
	0 0^0 1	6 043.949(5)	1.403(35)	
	0 1^1 1	6 055.610(8)		7.066(14)
	0 2^0 1	6 063.680(13)		
	0 2^2 1	6 066.811(17)		
	0 0^0 2	6 025.643(12)		
	1 0^0 0	6 027.649(19)		

[a] Original sources of data are: [48007], [49005], [51011], [67021], [67020], [72036], [73045], [74028], [74033]. Note that this table uses a different vibrational numbering from that used in the primary references as explained in the Introduction.

[b] The value of $H_v = -0.25(14)\times10^{-4}$ Hz [74033].

[c] For rotational dependence of q_v see insert in lower portion of table.

[d] Reference [74035].

[e] The value D_v ($02^{2c}0$) = 1.597(46) kHz for $^{16}O^{13}C^{32}S$ and 1.335(20) kHz for $^{18}O^{12}C^{32}S$. The values shown in the table are D_v ($02^{2d}0$).

Table 17. Rotational constants for OCS [74001][a]. (continued)

Isotopic Species	Vib. State v_1 v_2^ℓ v_3	B_v (MHz)	D_v (kHz)	q_v (MHz)
$^{16}O^{12}C^{33}S$	0 0^0 0	6 004.922(6)		
	0 1^1 0	6 015.47(20)		6.209878(31)[c]
	0 2^0 0	6 023.11(25)		
	0 0^0 1	5 986.86(25)		
$^{18}O^{12}C^{32}S$	0 0^0 0	5 704.8607(4)	1.1353(160)	
	0 1^1 0	5 714.995(4)	1.198(15)	5.6530026(101)[c]
	0 2^0 0	5 722.924(5)	1.020(33)	
	0 2^2 0	5 725.024(4)	1.156(20)[e]	
	0 3^1 0	5 731.142(7)		5.504(7)
	0 3^3 0	5 734.973(5)	1.304(24)	
	0 4^0 0	5 737.002(10)		
	0 4^2 0	5 739.504(10)		
	0 4^4 0	5 744.819(10)	1.284(71)	
	0 0^0 1	5 688.653(5)	1.170(25)	
	0 1^1 1	5 700.182(6)		6.053(11)
	0 2^0 1	5 708.826(12)		
	0 2^2 1	5 711.369(17)	1.386(81)	
	0 0^0 2	5 672.140(10)		
	1 0^0 0	5 669.854(20)		
$^{16}O^{13}C^{34}S$	0 0^0 0	5 911.733(4)		
	0 1^1 0	5 921.462(15)		6.199(15)
	0 2^0 0	5 928.866(10)		
	0 2^2 0	5 931.050(10)		
	0 0^0 1	5 894.148(10)		
$^{17}O^{12}C^{32}S$	0 0^0 0	5 883.675(120)		
$^{18}O^{13}C^{32}S$	0 0^0 0	5 691.069(5)		
	0 1^1 0	5 700.627(20)		5.800(20)
	0 0^0 1	5 674.994(40)		
$^{18}O^{12}C^{34}S$	0 0^0 0	5 559.971(5)		
	0 1^1 0	5 569.845(13)		5.393(13)
	0 2^0 0	5 577.726(15)		
	0 0^0 1	5 544.199(10)		
$^{18}O^{13}C^{34}S$	0 0^0 0	5 544.864(20)		
$^{16}O^{12}C^{36}S$	0 0^0 0	5 799.680(25)		
$^{16}O^{12}C^{35}S$	0 0^0 0	5 864.371(7)		
$^{16}O^{14}C^{32}S$	0 0^0 0	6 043.26(50)		
	0 1^1 0	6 052.65(80)		6.70(20)

Rotational dependence of q_v:

q_v ($^{16}O^{12}C^{32}S$) = $6.36141271(161)-4.2720(177)\times10^{-6}J(J+1)+9.3(91)\times10^{-12}J^2(J+1)^2$

q_v ($^{16}O^{12}C^{34}S$) = $6.0688022(100)-3.926(260)\times10^{-6}J(J+1)$

q_v ($^{16}O^{13}C^{32}S$) = $6.5078418(52)-4.4890(843)\times10^{-6}J(J+1)+2.2(48)\times10^{-11}J^2(J+1)^2$

q_v ($^{18}O^{12}C^{32}S$) = $5.6530026(101)-3.5940(676)\times10^{-6}J(J+1)+3.0(30)\times10^{-11}J^2(J+1)^2$

q_v ($^{16}O^{12}C^{33}S$) = $6.209878(31)-4.4(11)\times10^{-6}J(J+1)$ [74028].

Table 17.1. Electric dipole moments, Zeeman constants and hyperfine constants for OCS [74001].

Parameter	$^{16}O^{12}C^{32}S$	$^{16}O^{12}C^{34}S$	$^{16}O^{13}C^{32}S$	$^{18}O^{12}C^{33}S$	$^{16}O^{12}C^{33}S$	References
μ (v_2=0) (D)	0.71519(3)					[74028]
μ (v_2=1) (D)	0.70433(3)					[74028]
μ ($V_2=2^2$) (D)	0.6936(3)					[74035]
μ (v_2=0)/μ ($^{16}O^{12}C^{32}S$,v_2=0)	1.	1.00031(2)	1.00017(2)	0.99904(3)	1.00024(25)	[74028]
μ (v_2=1)/μ ($^{16}O^{12}C^{32}S$,v_2=1)	1.	1.00033(2)	1.00067(2)	0.99907(4)	1.00012(9)	[74028]
$\alpha_{\parallel}-\alpha_{\perp}$ (cm^3)	$4.67(16)\times10^{-24}$					[70029]
$g_{\perp}$ (v_2=0,J=1) (μ_N)	-0.028839(6)[a]	-0.028242(10)	-0.028710(15)			[70049]
$g_{\perp}$ (v_2=1,J-1) (μ_N)	-0.02930(4)					[72036]
$g_{\parallel}-g_{\perp}$ (v_2=1) (μ_N)	0.0905(5)					[72036]
$\chi_{\perp}-\chi_{\parallel}$ (v_2=0) (erg/G^2·mole)	$9.369(12)\times10^{-6}$	$9.345(20)\times10^{-6}$	$9.417(36)\times10^{-6}$			[70049]
$\chi_{\perp}$ $\chi_{\parallel}$ (v_2=1) (erg/G^2·mole)	$9.50(40)\times10^{-6}$					[72036]
Q (esu·cm^2)	$-0.786(14)\times10^{-26}$	$-0.858(23)\times10^{-26}$	$-0.716(40)\times10^{-26}$			[70049]
$\sigma_{\parallel}-\sigma_{\perp}$ (ppm)			372(42)			[70049]
Hyperfine constants: eqQ	(^{17}O) for $^{17}O^{12}C^{32}S$	= -1.32(14)	MHz	[52014]		
eqQ	(^{33}S) for $^{16}O^{12}C^{33}S$	(v_2=0) = -29.1184(12)	MHz	[74028]		
eq_1Q	(^{33}S) for $^{16}O^{12}C^{33}S$	(v_2=1) = -28.6825(18)	MHz	[74028]		
eq_2Q	(^{33}S) for $^{16}O^{12}C^{33}S$	(v_2=1) = -1.1808(18)	MHz	[74028]		
eqQ	(^{35}S) for $^{16}O^{12}C^{35}S$	= 21.90(8)	MHz	[54005]		
$c_{\perp}$	(^{13}C) for $^{16}O^{13}C^{32}S$	= 3.1(2)	kHz	[70049]		
$c_{\perp}$	(^{33}S) for $^{16}O^{12}C^{33}S$	(v_2=0) = 0.87(5)	kHz	[74028]		
$c_{\perp}$	(^{33}S) for $^{16}O^{12}C^{33}S$	(v_2=1) = 1.16(8)	kHz	[74028]		

[a] The rotational dependence of g has been measured for $^{16}O^{12}C^{32}S$ for J=1 to J=5 with the overage value $|g_J|$ = 0.028827(12) μ_N and centrifugal distortion term $D_g < 3\times10^{-7}$ μ_N.

Table 17.2. Additional references for OCS divided into general categories.

Microwave Spectrum	Stark Effect	Zeeman Effect	Hyperfine Structure	Pressure Broadening Line Width (T_1,T_2)	Other
[46000]	[50016]	[51008]	[48008]	[52016] [68018] [74007]	[54004]
[47001]	[51012]	[51009]	[49007]	[54003] [69044] [74013]	[59008]
[47005]	[55008]	[52013]	[50017]	[54009] [70050] [74030]	[59015]
[47007]	[57007]	[56013]	[54008]	[55001] [70051] [74031]	[64006]
[48002]	[61009]	[67019]	[55005]	[55007] [70058] [74040]	[64007]
[49006]	[65013]	[68019]		[56012] [71006] [74045]	[66024]
[50011]	[67016]	[69010]		[59009] [71027] [75021]	[68033]
[50007]	[68020]	[70019]		[64003] [71028] [75022]	[72040]
[51010]	[72038]	[73054]		[64004] [71031] [75024]	[74012]
[51013]				[64005] [72039] [75025]	[75023]
[53011]				[65000] [72041] [75032]	
[54006]				[66022] [72053] [76016]	
[55002]				[66023] [73043] [76021]	
[56005]				[67015] [73044]	
[58002]				[68009] [73053]	
[69022]				[68015] [73055]	
[74041]				[68016] [73064]	

TABLE 17.3. The microwave spectrum of OCS

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	(v_1,v_2^{ℓ},v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{12}C^{32}S$	4 - 4					$(0,2^2,0)$	0.0818	(1E-4)	[74035]
	5 - 5					$(0,2^2,0)$	0.1909	(1E-4)	[74035]
	6 - 6					$(0,2^2,0)$	0.3817	(1E-4)	[74035]
	7 - 7					$(0,2^2,0)$	0.6870	(1E-4)	[74035]
	8 - 8					$(0,2^2,0)$	1.1452	(1E-4)	[74035]
	9 - 9					$(0,2^2,0)$	1.7999	(1E-4)	[74035]
	10 - 10					$(0,2^2,0)$	2.7005	(1E-4)	[74035]
	11 - 11					$(0,2^2,0)$	3.9018	(1E-4)	[74035]
	12 - 12					$(0,2^2,0)$	5.4641	(1E-4)	[74035]
	13 - 13					$(0,2^2,0)$	7.4535	(1E-4)	[74035]
	14 - 14					$(0,2^2,0)$	9.9416	(1E-4)	[74035]
	1 - 1					$(0,1^1,0)$	12.77288	(1E-4)	[72036]
	15 - 15					$(0,2^2,0)$	13.0054	(1E-4)	[74035]
	16 - 16					$(0,2^2,0)$	16.7279	(1E-4)	[74035]
	17 - 17					$(0,2^2,0)$	21.1977	(1E-4)	[74035]
	1 - 1					$(0,3^1,0)$	24.7535	(5E-4)	[74035]
	18 - 18					$(0,2^2,0)$	26.5088	(1E-4)	[74035]
	19 - 19					$(0,2^2,0)$	32.7613	(1E-4)	[74035]
	2 - 2					$(0,1^1,0)$	38.16836	(1E-4)	[72036]
	20 - 20					$(0,2^2,0)$	40.0611	(1E-4)	[74035]
	2 - 2					$(0,3^1,0)$	74.262	(1E-3)	[74035]
	3 - 3					$(0,1^1,0)$	76.33632	(1E-4)	[72036]
	4 - 4					$(0,1^1,0)$	127.22648	(1E-4)	[72036]
	5 - 5					$(0,1^1,0)$	190.83850	(1E-4)	[72036]
	6 - 6					$(0,1^1,0)$	267.17186	(1E-4)	[72036]
	7 - 7					$(0,1^1,0)$	356.22585	(1E-3)	[72036]
	8 - 8					$(0,1^1,0)$	457.99960	(1E-4)	[72036]
	9 - 9					$(0,1^1,0)$	572.49246	(2E-4)	[72036]
	10 - 10					$(0,1^1,0)$	699.70355	(2E-4)	[72036]
	11 - 11					$(0,1^1,0)$	839.63220	(2E-4)	[72036]
	12 - 12					$(0,1^1,0)$	992.27600	(2E-3)	[72036]
	35 - 35					$(0,1^1,0)$	8008.57	(0.20)	[67020]
	36 - 36					$(0,1^1,0)$	8465.84	(0.20)	[67020]
	37 - 37					$(0,1^1,0)$	8935.76	(0.20)	[67020]
	38 - 38					$(0,1^1,0)$	9418.21	(0.20)	[67020]
	39 - 39					$(0,1^1,0)$	9913.34	(0.20)	[67020]
	40 - 40					$(0,1^1,0)$	10421.23	(0.20)	[67020]
	41 - 41					$(0,1^1,0)$	10941.70	(0.20)	[67020]
	42 - 42					$(0,1^1,0)$	11474.84	(0.20)	[67020]
	43 - 43					$(0,1^1,0)$	12020.52	(0.20)	[67020]
	1 - 0					$(0,0^0,0)$	12162.979	(1E-3)	[74032]
	1 - 0					$(0,4^0,0)$	12229.44	(0.08)	[67021]
	44 - 44					$(0,1^1,0)$	12578.89	(0.20)	[67020]
	45 - 45					$(0,1^1,0)$	13149.92	(0.20)	[67020]
	46 - 46					$(0,1^1,0)$	13733.48	(0.20)	[67020]
	47 - 47					$(0,1^1,0)$	14329.70	(0.20)	[67020]
	48 - 48					$(0,1^1,0)$	14938.59	(0.20)	[67020]
	49 - 49					$(0,1^1,0)$	15559.98	(0.20)	[67020]
	50 - 50					$(0,1^1,0)$	16194.00	(0.20)	[67020]
	2 - 1					$(0,0^0,2)$	24179.46	(0.08)	[67021]
	2 - 1					$(1,0^0,0)$	24180.17	(0.08)	[67021]
	2 - 1					$(0,1^{Ll},2)$	24219.54	(0.12)	[67021]
	2 - 1					$(0,1^{Ul},2)$	24248.68	(0.12)	[67021]
	2 - 1					$(0,0^0,1)$	24253.38	(0.04)	[67021]
	2 - 1					$(0,1^{Ll},1)$	24288.36	(0.06)	[67021]
	2 - 1					$(0,1^{Ul},1)$	24315.82	(0.06)	[67021]
	2 - 1					$(0,0^0,0)$	24325.927	(1E-3)	[73052]
	2 - 1					$(0,2^0,1)$	24337.50	(0.08)	[67021]
	2 - 1					$(0,3^{Ll},1)$	24348.2	(0.4)	[67021]
	2 - 1					$(0,1^{Ll},0)$	24355.58	(0.04)	[67021]
	2 - 1					$(0,1^{Ul},0)$	24381.00	(0.04)	[67021]
	2 - 1					$(0,3^{Ul},1)$	24400.2	(0.4)	[67021]
	2 - 1					$(0,2^0,0)$	24400.72	(0.04)	[67021]
	2 - 1					$(0,3^{Ll},0)$	24409.74	(0.05)	[67021]
	2 - 1					$(0,3^{Ul},0)$	24459.20	(0.05)	[67021]

TABLE 17.3. The microwave spectrum of OCS—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	(v_1,v_2^{ℓ},v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{12}C^{32}S$	3 - 2					$(1,1^{L1},0)$	36318.08	(0.18)	[67021]
	3 - 2					$(1,1^{U1},0)$	36356.78	(0.18)	[67021]
	3 - 2					$(0,1^{L1},1)$	36432.39	(0.09)	[67021]
	3 - 2					$(0,1^{U1},1)$	36473.47	(0.09)	[67021]
	3 - 2					$(0,0^{0},0)$	36488.813	(2E-3)	[69048]
	3 - 2					$(0,2^{2},1)$	36523.38	(0.12)	[67021]
	3 - 2					$(0,1^{L1},0)$	36533.38	(0.06)	[67021]
	3 - 2					$(0,1^{U1},0)$	36571.36	(0.06)	[67021]
	3 - 2					$(0,2^{0},0)$	36601.11	(0.06)	[67021]
	3 - 2					$(0,2^{2},0)$	36615.23	(0.06)	[67021]
	3 - 2					$(0,5^{L1},0)$	36675.75	(0.18)	[67021]
	3 - 2					$(0,4^{2},0)$	36703.77	(0.12)	[67021]
	3 - 2					$(0,5^{U1},0)$	36784.74	(0.18)	[67021]
	4 - 3					$(1,0^{0},0)$	48360.195	(0.03)	[75018]
	4 - 3					$(0,0^{0},1)$	48506.24	(0.40)	[52017]
	4 - 3					$(0,0^{0},0)$	48651.64	(0.05)	[49004]
	4 - 3					$(0,1^{L1},0)$	48710.80	(0.40)	[52017]
	4 - 3					$(0,1^{U1},0)$	48761.55	(0.40)	[52017]
	4 - 3					$(0,2^{0},0)$	48801.08	(0.40)	[52017]
	4 - 3					$(0,2^{2},0)$	48819.92	(0.40)	[52017]
	5 - 4					$(1,0^{0},0)$	60449.97	(0.10)	[74029]
	5 - 4					$(1,1^{L1},0)$	60530.2	(0.5)	[67021]
	5 - 4					$(1,1^{U1},0)$	60594.3	(0.5)	[67021]
	5 - 4					$(0,1^{L1},1)$	60720.4	(0.5)	[67021]
	5 - 4					$(0,1^{U1},1)$	60788.3	(0.5)	[67021]
	5 - 4					$(0,0^{0},0)$	60814.270	(0.02)	[74033]
	5 - 4					$(0,2^{0},1)$	60843.48	(0.15)	[67021]
	5 - 4					$(0,2^{2},1)$	60871.68	(0.15)	[67021]
	5 - 4					$(0,1^{L1},0)$	60888.35	(0.10)	[67021]
	5 - 4					$(0,1^{U1},0)$	60951.94	(0.10)	[67021]
	5 - 4					$(0,3^{U1},1)$	61000.1	(0.50)	[67021]
	5 - 4					$(0,2^{0},0)$	61001.48	(0.10)	[67021]
	5 - 4					$(0,2^{2},0)$	61024.96	(0.10)	[67021]
	5 - 4					$(0,3^{3},0)$	61128.86	(0.12)	[67021]
	5 - 4					$(0,4^{2},0)$	61172.69	(0.15)	[67021]
	5 - 4					$(0,4^{4},0)$	61231.85	(0.15)	[67021]
	6 - 5					$(1,0^{0},0)$	72539.62	(0.10)	[74029]
	6 - 5					$(0,0^{0},0)$	72976.796	(0.02)	[74033]
	7 - 6					$(0,0^{0},1)$	84885.188	(0.02)	[74033]
	7 - 6					$(0,0^{0},0)$	85139.121	(0.01)	[74033]
	7 - 6					$(0,1^{L1},0)$	85242.800	(0.02)	[74033]
	7 - 6					$(0,1^{U1},0)$	85331.824	(0.02)	[74033]
	7 - 6					$(0,2^{0},0)$	85401.177	(0.02)	[74033]
	7 - 6					$(0,2^{L2},0)$	85433.833	(0.02)	[74033]
	7 - 6					$(0,2^{U2},0)$	85434.156	(0.02)	[74033]
	8 - 7					$(1,0^{0},0)$	96718.345	(0.06)	[75018]
	8 - 7					$(0,0^{0},0)$	97301.212	(0.02)	[74033]
	9 - 8					$(0,0^{0},0)$	109463.063	(0.01)	[70036]
	10 - 9					$(1,0^{0},0)$	120896.08	(0.06)	[75018]
	10 - 9					$(0,0^{0},1)$	121261.832	(0.02)	[74033]
	10 - 9					$(0,0^{0},0)$	121624.638	(0.01)	[70036]
	10 - 9					$(0,1^{L1},0)$	121772.716	(0.02)	[74033]
	10 - 9					$(0,1^{U1},0)$	121899.928	(0.02)	[74033]
	10 - 9					$(0,2^{0},0)$	121999.429	(0.02)	[74033]
	10 - 9					$(0,2^{L2},0)$	122045.138	(0.02)	[74033]
	10 - 9					$(0,2^{U2},0)$	122046.037	(0.02)	[74033]
	11 - 10					$(1,0^{0},0)$	132984.42	(0.06)	[75018]
	11 - 10					$(0,0^{0},0)$	133785.900	(0.01)	[70036]
	12 - 11					$(1,0^{0},0)$	145072.35	(0.06)	[75018]
	12 - 11					$(0,0^{0},0)$	145946.821	(0.01)	[70036]
	13 - 12					$(1,0^{0},0)$	157160.13	(0.06)	[75018]
	13 - 12					$(0,0^{0},0)$	158107.360	(0.01)	[70036]
	14 - 13					$(0,0^{0},1)$	169759.449	(0.02)	[74033]
	14 - 13					$(0,0^{0},0)$	170267.494	(0.01)	[70036]
	14 - 13					$(0,1^{L1},0)$	170474.706	(0.02)	[74033]

TABLE 17.3. The microwave spectrum of OCS—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	(v_1,v_2^{ℓ},v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{12}C^{32}S$	14 - 13					$(0,1^{U1},0)$	170652.759	(0.02)	[74033]
	14 - 13					$(0,2^{0},0)$	170793.315	(0.02)	[74033]
	14 - 13					$(0,2^{L2},0)$	170854.734	(0.02)	[74033]
	14 - 13					$(0,2^{U2},0)$	170857.232	(0.02)	[74033]
	15 - 14					$(0,0^{0},1)$	181882.798	(0.02)	[74033]
	15 - 14					$(0,0^{0},0)$	182427.198	(0.01)	[70036]
	15 - 14					$(0,1^{L1},0)$	182649.161	(0.02)	[74033]
	15 - 14					$(0,1^{U1},0)$	182839.968	(0.02)	[74033]
	15 - 14					$(0,2^{0},0)$	182990.933	(0.02)	[74033]
	15 - 14					$(0,2^{L2},0)$	183055.908	(0.02)	[74033]
	15 - 14					$(0,2^{U2},0)$	183058.987	(0.02)	[74033]
	16 - 15					$(0,0^{0},0)$	194586.433	(0.01)	[70036]
	17 - 16					$(0,0^{0},0)$	206745.161	(0.01)	[70036]
	18 - 17					$(0,0^{0},0)$	218903.374	(0.03)	[74033]
	19 - 18					$(0,0^{0},0)$	231061.022	(0.03)	[74033]
	20 - 19					$(0,0^{0},0)$	243218.040	(0.01)	[70036]
	20 - 19					$(0,1^{L1},0)$	243513.679	(0.03)	[74033]
	20 - 19					$(0,1^{U1},0)$	243768.075	(0.03)	[74033]
	21 - 20					$(0,0^{0},0)$	255374.461	(0.01)	[70036]
	22 - 21					$(0,0^{0},0)$	267530.239	(0.03)	[74033]
	23 - 22					$(0,0^{0},0)$	279685.318	(0.03)	[74033]
	24 - 23					$(0,0^{0},0)$	291839.686	(0.03)	[74033]
	25 - 24					$(0,0^{0},0)$	303993.242	(0.02)	[74033]
	26 - 25					$(0,0^{0},0)$	316144.7	(2.0)	[54007]
	28 - 27					$(0,0^{0},0)$	340449.2	(2.0)	[54007]
	30 - 29					$(0,0^{0},0)$	364747.5	(3.0)	[54007]
	32 - 31					$(0,0^{0},0)$	389041.	(4.)	[54007]
	40 - 39					$(0,0^{0},0)$	486184.2	(3.0)	[56014]
	42 - 41					$(0,0^{0},0)$	510457.3	(3.0)	[56014]
	58 - 57					$(0,0^{0},0)$	704437.052	(0.03)	[70007]
	59 - 58					$(0,0^{0},0)$	716546.559	(0.03)	[70007]
	66 - 65					$(0,0^{0},0)$	801259.782	(0.03)	[70007]
	67 - 66					$(0,0^{0},0)$	813353.706	(0.03)	[70007]
$^{16}O^{12}C^{34}S$	1 - 1					$(0,1^{1},0)$	12.13773	(2E-4)	[74028]
	2 - 2					$(0,1^{1},0)$	36.41273	(2E-4)	[74028]
	3 - 3					$(0,1^{1},0)$	72.82507	(2E-4)	[74028]
	4 - 4					$(0,1^{1},0)$	121.37446	(2E-4)	[74028]
	5 - 5					$(0,1^{1},0)$	182.06049	(2E-4)	[74028]
	6 - 6					$(0,1^{1},0)$	243.88278	(2E-4)	[74028]
	7 - 7					$(0,1^{1},0)$	339.84058	(2E-3)	[74028]
	8 - 8					$(0,1^{1},0)$	436.93348	(1E-3)	[74028]
	1 - 0					$(0,0^{0},0)$	11865.712	(0.05)	[67018]
	2 - 1					$(0,0^{0},2)$	23588.44	(0.08)	[67021]
	2 - 1					$(1,0^{0},0)$	23589.52	(0.08)	[67021]
	2 - 1					$(0,0^{0},1)$	23660.56	(0.04)	[67021]
	2 - 1					$(0,0^{0},0)$	23731.302	(0.02)	[73045]
	2 - 1					$(0,1^{L1},0)$	23760.48	(0.04)	[67021]
	2 - 1					$(0,1^{U1},0)$	23784.74	(0.04)	[67021]
	2 - 1					$(0,2^{0},0)$	23804.97	(0.04)	[67021]
	3 - 2					$(0,0^{0},1)$	35490.77	(0.06)	[67021]
	3 - 2					$(0,0^{0},0)$	35596.91	(0.03)	[67021]
	3 - 2					$(0,1^{L1},0)$	35640.66	(0.06)	[67021]
	3 - 2					$(0,1^{U1},0)$	35676.98	(0.06)	[67021]
	3 - 2					$(0,2^{0},0)$	35707.50	(0.06)	[67021]
	3 - 2					$(0,2^{2},0)$	35720.27	(0.06)	[67021]
	4 - 3					$(0,0^{0},0)$	47462.40	(0.20)	[49004]
	5 - 4					$(0,0^{0},0)$	59327.745	(*0.04)	[74001]
	6 - 5					$(0,0^{0},0)$	71192.959	(*0.04)	[74001]
	7 - 6					$(0,0^{0},0)$	83057.990	(*0.05)	[74001]
	8 - 7					$(0,0^{0},0)$	94922.81	(*0.06)	[74001]
	9 - 8					$(0,0^{0},0)$	106787.38	(*0.08)	[74001]
	10 - 9					$(0,0^{0},0)$	118651.68	(0.08)	[73045]
	11 - 10					$(0,0^{0},0)$	130515.68	(*0.15)	[74001]
	12 - 11					$(0,0^{0},0)$	142379.34	(*0.20)	[74001]
	13 - 12					$(0,0^{0},0)$	154242.63	(*0.27)	[74001]

TABLE 17.3. The microwave spectrum of OCS—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	(v_1,v_2^{ℓ},v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{12}C^{34}S$	14 - 13					$(0,0^0,0)$	166105.53	(*0.53)	[74001]
	15 - 14					$(0,0^0,0)$	177968.00	(*0.43)	[74001]
	16 - 15					$(0,0^0,0)$	189830.02	(*0.53)	[74001]
	17 - 16					$(0,0^0,0)$	201691.55	(*0.64)	[74001]
	18 - 17					$(0,0^0,0)$	213552.56	(*0.77)	[74001]
	19 - 18					$(0,0^0,0)$	225413.02	(*0.92)	[74001]
	20 - 19					$(0,0^0,0)$	237272.91	(*1.08)	[74001]
	21 - 20					$(0,0^0,0)$	249132.18	(*1.26)	[74001]
	22 - 21					$(0,0^0,0)$	260990.82	(*1.46)	[74001]
	23 - 22					$(0,0^0,0)$	272848.78	(*1.68)	[74001]
	24 - 23					$(0,0^0,0)$	284706.04	(*1.92)	[74001]
	25 - 24					$(0,0^0,0)$	296562.58	(*2.18)	[74001]
$^{16}O^{13}C^{32}S$	1 - 1					$(0,1^1,0)$	13.01592	(5E-4)	[74028]
	2 - 2					$(0,1^1,0)$	39.04683	(5E-4)	[74028]
	3 - 3					$(0,1^1,0)$	78.09336	(5E-4)	[74028]
	4 - 4					$(0,1^1,0)$	130.15495	(5E-4)	[74028]
	5 - 5					$(0,1^1,0)$	195.23106	(6E-4)	[74028]
	6 - 6					$(0,1^1,0)$	273.32135	(6E-4)	[74028]
	7 - 7					$(0,1^1,0)$	364.42517	(6E-4)	[74028]
	8 - 8					$(0,1^1,0)$	468.54143	(6E-4)	[74028]
	9 - 9					$(0,1^1,0)$	585.66942	(*3E-4)	[74001]
	10 - 10					$(0,1^1,0)$	715.80831	(*5E-4)	[74001]
	11 - 11					$(0,1^1,0)$	858.95695	(*8E-4)	[74001]
	12 - 12					$(0,1^1,0)$	1015.11416	(*1E-3)	[74001]
	35 - 35					$(0,1^1,0)$	8192.77	(0.20)	[67020]
	36 - 36					$(0,1^1,0)$	8660.53	(0.20)	[67020]
	37 - 37					$(0,1^1,0)$	9141.14	(0.20)	[67020]
	38 - 38					$(0,1^1,0)$	9634.86	(0.20)	[67020]
	39 - 39					$(0,1^1,0)$	10141.34	(0.20)	[67020]
	40 - 40					$(0,1^1,0)$	10660.91	(0.20)	[67020]
	41 - 41					$(0,1^1,0)$	11193.26	(0.20)	[67020]
	42 - 42					$(0,1^1,0)$	11738.66	(0.20)	[67020]
	1 - 0					$(0,0^0,0)$	12123.845	(*2E-3)	[74001]
	43 - 43					$(0,1^1,0)$	12296.918	(*0.06)	[74001]
	44 - 44					$(0,1^1,0)$	12868.15	(0.20)	[67020]
	45 - 45					$(0,1^1,0)$	13452.195	(*0.09)	[74001]
	46 - 46					$(0,1^1,0)$	14049.196	(*0.12)	[74001]
	47 - 47					$(0,1^1,0)$	14659.100	(*0.15)	[74001]
	48 - 48					$(0,1^1,0)$	15281.901	(*0.19)	[74001]
	49 - 49					$(0,1^1,0)$	15917.59	(*0.23)	[74001]
	50 - 50					$(0,1^1,0)$	16566.18	(*0.28)	[74001]
	2 - 1					$(0,0^0,2)$	24102.54	(0.04)	[73045]
	2 - 1					$(1,0^0,0)$	24110.60	(0.10)	[73045]
	2 - 1					$(0,0^0,1)$	24175.751	(0.02)	[73045]
	2 - 1					$(0,1^{L1},1)$	24208.276	(0.04)	[73045]
	2 - 1					$(0,1^{U1},1)$	24236.538	(0.04)	[73045]
	2 - 1					$(0,0^0,0)$	24247.668	(0.01)	[73045]
	2 - 1					$(0,2^0,1)$	24254.68	(0.05)	[73045]
	2 - 1					$(0,1^{L1},0)$	24274.60	(0.05)	[73045]
	2 - 1					$(0,1^{U1},0)$	24300.64	(0.05)	[73045]
	2 - 1					$(0,2^0,0)$	24316.962	(0.02)	[73045]
	2 - 1					$(0,3^{L1},0)$	24322.92	(0.04)	[73045]
	2 - 1					$(0,4^0,0)$	24368.76	(0.10)	[73045]
	2 - 1					$(0,3^{U1},0)$	24373.26	(0.05)	[73045]
	3 - 2					$(0,0^0,2)$	36153.67	(0.10)	[73045]
	3 - 2					$(1,0^0,0)$	36165.72	(0.10)	[73045]
	3 - 2					$(0,0^0,1)$	36263.46	(0.10)	[73045]
	3 - 2					$(0,0^0,0)$	36371.390	(0.03)	[73045]
	3 - 2					$(0,2^2,1)$	36400.79	(0.10)	[73045]
	3 - 2					$(0,1^{U1},0)$	36450.876	(0.02)	[73045]
	3 - 2					$(0,2^0,0)$	36475.38	(0.10)	[73045]
	3 - 2					$(0,3^{L1},0)$	36484.348	(0.03)	[73045]
	3 - 2					$(0,2^2,0)$	36490.723	(0.04)	[73045]
	3 - 2					$(0,3^{U1},0)$	36559.81	(0.10)	[73045]
	4 - 3					$(0,0^0,0)$	48494.76	(0.40)	[52017]

TABLE 17.3. The microwave spectrum of OCS—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{13}C^{32}S$	5 - 4					$(0,0^0,0)$	60618.600	(*7E-3)	[74001]
	5 - 4					$(0,3^3,0)$	60915.415	(0.02)	[73045]
	5 - 4					$(0,3^{U1},0)$	60932.540	(0.03)	[73045]
	5 - 4					$(0,4^2,0)$	60950.15	(0.06)	[73045]
	5 - 4					$(0,4^4,0)$	61012.39	(0.09)	[73045]
	6 - 5					$(0,0^0,0)$	72741.977	(*8E-3)	[74001]
	7 - 6					$(0,0^0,0)$	84865.166	(0.01)	[74033]
	8 - 7					$(0,0^0,0)$	96988.139	(*9E-3)	[74001]
	9 - 8					$(0,0^0,0)$	109110.862	(*9E-3)	[74001]
	10 - 9					$(0,0^0,1)$	120873.34	(0.05)	[73045]
	10 - 9					$(0,0^0,0)$	121233.301	(0.01)	[74033]
	10 - 9					$(0,2^0,0)$	121580.46	(0.07)	[73045]
	10 - 9					$(0,2^{L2},0)$	121629.93	(0.10)	[73045]
	10 - 9					$(0,2^{U2},0)$	121630.78	(0.10)	[73045]
	11 - 10					$(0,0^0,0)$	133355.434	(*8E-3)	[74001]
	12 - 11					$(0,0^0,0)$	145477.221	(*7E-3)	[74001]
	13 - 12					$(0,0^0,0)$	157598.634	(*7E-3)	[74001]
	14 - 13					$(0,0^0,0)$	169719.648	(0.01)	[74033]
	15 - 14					$(0,0^0,0)$	181840.209	(0.01)	[74033]
	16 - 15					$(0,0^0,0)$	193960.317	(*0.01)	[74001]
	17 - 16					$(0,0^0,0)$	206079.922	(*0.02)	[74001]
	18 - 17					$(0,0^0,0)$	218198.997	(*0.03)	[74001]
	19 - 18					$(0,0^0,0)$	230217.510	(*0.03)	[74001]
	20 - 19					$(0,0^0,0)$	242435.432	(*0.04)	[74001]
	21 - 20					$(0,0^0,0)$	254552.730	(*0.05)	[74001]
	22 - 21					$(0,0^0,0)$	266669.373	(*0.06)	[74001]
	23 - 22					$(0,0^0,0)$	278785.330	(*0.07)	[74001]
	24 - 23					$(0,0^0,0)$	290900.570	(*0.09)	[74001]
$^{16}O^{12}C^{33}S$	1 - 1		5/2		3/2	$(0,1^1,0)$	8.94085	(1E-3)	[74028]
	1 - 1		5/2		5/2	$(0,1^1,0)$	12.36085	(1E-3)	[74028]
	1 - 1		3/2		3/2	$(0,1^1,0)$	12.65645	(1E-3)	[74028]
	1 - 1		3/2		5/2	$(0,1^1,0)$	16.07590	(1E-3)	[74028]
	1 - 1		3/2		1/2	$(0,1^1,0)$	18.85435	(1E-3)	[74028]
	2 - 2		7/2		7/2	$(0,1^1,0)$	37.17495	(1E-3)	[74028]
	2 - 2		3/2		3/2	$(0,1^1,0)$	37.25870	(1E-3)	[74028]
	2 - 2		3/2		5/2	$(0,1^1,0)$	39.91853	(1E-3)	[74028]
	2 - 2		1/2		3/2	$(0,1^1,0)$	40.69360	(2E-3)	[74028]
	2 - 2		7/2		5/2	$(0,1^1,0)$	40.91805	(1E-3)	[74028]
	3 - 3		9/2		9/2	$(0,1^1,0)$	74.41935	(5E-4)	[74028]
	3 - 3		5/2		5/2	$(0,1^1,0)$	74.57740	(5E-4)	[74028]
	3 - 3		5/2		7/2	$(0,1^1,0)$	77.14858	(5E-4)	[74028]
	3 - 3		3/2		5/2	$(0,1^1,0)$	79.80285	(7E-4)	[74028]
	3 - 3		9/2		7/2	$(0,1^1,0)$	79.95391	(8E-4)	[74028]
	4 - 4		11/2		11/2	$(0,1^1,0)$	124.08806	(5E-4)	[74028]
	4 - 4		7/2		7/2	$(0,1^1,0)$	124.27980	(1E-3)	[74028]
	4 - 4		7/2		9/2	$(0,1^1,0)$	126.46180	(5E-4)	[74028]
	4 - 4		5/2		7/2	$(0,1^1,0)$	130.22205	(5E-4)	[74028]
	4 - 4		11/2		9/2	$(0,1^1,0)$	130.33988	(5E-4)	[74028]
	5 - 5		13/2		13/2	$(0,1^1,0)$	186.17853	(5E-4)	[74028]
	5 - 5		7/2		9/2	$(0,1^1,0)$	192.69020	(5E-4)	[74028]
	5 - 5		13/2		11/2	$(0,1^1,0)$	192.78980	(5E-4)	[74028]
	2 - 1					$(0,0^0,1)$	23947.4	(0.10)	[68038]
	2 - 1		3/2		1/2	$(0,0^0,0)$	24012.292	(0.01)	[51011]
	2 - 1		5/2		5/2	$(0,0^0,0)$	24012.974	(0.01)	[51011]
	2 - 1		3/2		5/2	$(0,0^0,0)$	24018.13	(0.05)	[52015]
	2 - 1		1/2		1/2	$(0,0^0,0)$	24019.641	(0.01)	[51011]
	2 - 1		5/2		3/2	$(0,0^0,0)$	24020.264	(0.01)	[51011]
	2 - 1		7/2		5/2	$(0,0^0,0)$	24020.264	(0.01)	[51011]
	2 - 1		1/2		3/2	$(0,0^0,0)$	24032.68	(0.05)	[52015]
	2 - 1		3/2		3/2	$(0,0^0,0)$	24025.467	(0.01)	[51011]
	2 - 1		5/2		3/2	$(0,1^{L1},0)$	24044.0	(0.10)	[68038]
	2 - 1		5/2		5/2	$(0,1^{L1},0)$	24046.9	(0.10)	[68038]
	2 - 1		3/2		3/2	$(0,1^{L1},0)$	24046.9	(0.10)	[68038]
	2 - 1		7/2		5/2	$(0,1^{L1},0)$	24051.2	(0.10)	[68038]
	2 - 1		5/2		3/2	$(0,1^{U1},0)$	24069.2	(0.10)	[68038]

TABLE 17.3. The microwave spectrum of OCS—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	(v_1,v_2^{ℓ},v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{12}C^{33}S$	2 - 1		5/2		5/2	$(0,1^{U1},0)$	24072.0	(0.10)	[68038]
	2 - 1		3/2		3/2	$(0,1^{U1},0)$	24072.0	(0.10)	[68038]
	2 - 1		7/2		5/2	$(0,1^{U1},0)$	24075.7	(0.10)	[68038]
	2 - 1					$(0,2^{0},0)$	24092.4	(0.10)	[68038]
	4 - 3		5/2		3/2	$(0,0^{0},0)$	48038.19	(0.40)	[52017]
	4 - 3		7/2		5/2	$(0,0^{0},0)$	48038.19	(0.40)	[52017]
	4 - 3		9/2		7/2	$(0,0^{0},0)$	48039.13	(0.40)	[52017]
	4 - 3		11/2		9/2	$(0,0^{0},0)$	48039.13	(0.40)	[52017]
$^{18}O^{12}C^{32}S$	1 - 1					$(0,1^{1},0)$	11.30655	(5E-4)	[74028]
	2 - 2					$(0,1^{1},0)$	33.91795	(1E-3)	[74028]
	3 - 3					$(0,1^{1},0)$	67.83550	(1E-3)	[74028]
	4 - 4					$(0,1^{1},0)$	113.05850	(1E-3)	[74028]
	5 - 5					$(0,1^{1},0)$	169.58685	(1E-3)	[74028]
	6 - 6					$(0,1^{1},0)$	237.41975	(1E-3)	[74028]
	7 - 7					$(0,1^{1},0)$	316.55685	(1E-3)	[74028]
	8 - 8					$(0,1^{1},0)$	406.99756	(*7E-4)	[74001]
	9 - 9					$(0,1^{1},0)$	508.74114	(*8E-4)	[74001]
	10 - 10					$(0,1^{1},0)$	621.78683	(*1E-3)	[74001]
	11 - 11					$(0,1^{1},0)$	746.13378	(*1E-3)	[74001]
	12 - 12					$(0,1^{1},0)$	881.78105	(*2E-3)	[74001]
	35 - 35					$(0,1^{1},0)$	7117.137	(*0.04)	[74001]
	36 - 36					$(0,1^{1},0)$	7523.494	(*0.05)	[74001]
	37 - 37					$(0,1^{1},0)$	7941.100	(*0.05)	[74001]
	38 - 38					$(0,1^{1},0)$	8369.97	(0.14)	[73045]
	39 - 39					$(0,1^{1},0)$	8810.00	(0.14)	[73045]
	40 - 40					$(0,1^{1},0)$	9261.36	(0.14)	[73045]
	41 - 41					$(0,1^{1},0)$	9723.966	(*0.05)	[74001]
	42 - 42					$(0,1^{1},0)$	10197.81	(0.14)	[73045]
	43 - 43					$(0,1^{1},0)$	10682.819	(*0.04)	[74001]
	44 - 44					$(0,1^{1},0)$	11179.10	(0.20)	[73045]
	1 - 0					$(0,0^{0},0)$	11409.717	(*6E-3)	[74001]
	45 - 45					$(0,1^{1},0)$	11686.59	(0.20)	[73045]
	46 - 46					$(0,1^{1},0)$	12205.295	(*0.04)	[74001]
	47 - 47					$(0,1^{1},0)$	12735.24	(0.14)	[73045]
	48 - 48					$(0,1^{1},0)$	13276.41	(0.14)	[73045]
	49 - 49					$(0,1^{1},0)$	13828.724	(*0.08)	[74001]
	50 - 50					$(0,1^{1},0)$	14392.20	(0.20)	[73045]
	2 - 1					$(1,0^{0},0)$	22679.38	(0.08)	[73045]
	2 - 1					$(0,0^{0},2)$	22688.524	(0.04)	[73045]
	2 - 1					$(0,0^{0},1)$	22754.570	(0.02)	[73045]
	2 - 1					$(0,1^{L1},1)$	22788.585	(0.04)	[73045]
	2 - 1					$(0,1^{U1},1)$	22812.773	(0.04)	[73045]
	2 - 1					$(0,0^{0},0)$	22819.404	(0.02)	[73045]
	2 - 1					$(0,2^{0},1)$	22835.26	(0.10)	[73045]
	2 - 1					$(0,1^{L1},0)$	22848.653	(0.02)	[73045]
	2 - 1					$(0,1^{U1},0)$	22871.228	(0.02)	[73045]
	2 - 1					$(0,2^{0},0)$	22891.663	(0.02)	[73045]
	2 - 1					$(0,3^{L1},0)$	22902.513	(0.03)	[73045]
	2 - 1					$(0,3^{U1},0)$	22946.543	(0.04)	[73045]
	2 - 1					$(0,4^{0},0)$	22947.972	(0.04)	[73045]
	3 - 2					$(0,0^{0},1)$	34131.83	(0.10)	[73045]
	3 - 2					$(0,1^{L1},1)$	34182.85	(0.15)	[73045]
	3 - 2					$(0,1^{U1},1)$	34219.151	(0.03)	[73045]
	3 - 2					$(0,0^{0},0)$	34229.045	(0.03)	[73045]
	3 - 2					$(0,2^{0},1)$	34252.84	(0.07)	[73045]
	3 - 2					$(0,2^{2},1)$	34268.13	(0.10)	[73045]
	3 - 2					$(0,1^{L1},0)$	34272.920	(0.03)	[73045]
	3 - 2					$(0,1^{U1},0)$	34306.73	(0.10)	[73045]
	3 - 2					$(0,2^{0},0)$	34337.45	(0.10)	[73045]
	3 - 2					$(0,2^{2},0)$	34350.073	(0.03)	[73045]
	3 - 2					$(0,3^{L1},0)$	34353.748	(0.04)	[73045]
	3 - 2					$(0,3^{U1},0)$	34419.83	(0.15)	[73045]
	3 - 2					$(0,4^{0},0)$	34421.89	(0.15)	[73045]
	4 - 3					$(0,0^{0},0)$	45638.595	(*0.02)	[74001]
	5 - 4					$(0,0^{0},0)$	57048.039	(*0.02)	[74001]

TABLE 17.3. The microwave spectrum of OCS—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	(v_1,v_2^{ℓ},v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{18}O^{12}C^{32}S$	5 - 4					$(0,3^3,0)$	57349.313	(0.03)	[73045]
	5 - 4					$(0,4^2,0)$	57394.56	(0.08)	[73045]
	5 - 4					$(0,4^4,0)$	57447.96	(0.10)	[73045]
	6 - 5					$(0,0^0,0)$	68457.347	(*0.02)	[74001]
	7 - 6					$(0,0^0,0)$	79866.492	(*0.03)	[74001]
	8 - 7					$(0,0^0,0)$	91275.445	(*0.03)	[74001]
	9 - 8					$(0,0^0,0)$	102684.181	(*0.03)	[74001]
	10 - 9					$(0,0^0,0)$	114092.672	(*0.03)	[74001]
	11 - 10					$(0,0^0,1)$	125144.13	(0.08)	[73045]
	11 - 10					$(0,0^0,0)$	125500.89	(0.03)	[73045]
	11 - 10					$(0,2^2,1)$	125642.98	(0.15)	[73045]
	11 - 10					$(0,1^{L1},0)$	125661.45	(0.03)	[73045]
	11 - 10					$(0,2^0,0)$	125898.90	(0.13)	[73045]
	11 - 10					$(0,2^{L2},0)$	125943.69	(0.04)	[73045]
	11 - 10					$(0,2^{U2},0)$	125944.57	(0.03)	[73045]
	11 - 10					$(0,3^3,0)$	126162.98	(0.07)	[73045]
	11 - 10					$(0,4^4,0)$	126380.09	(0.20)	[73045]
	12 - 11					$(0,0^0,0)$	136908.808	(*0.06)	[74001]
	13 - 12					$(0,0^0,0)$	148316.400	(*0.08)	[74001]
	14 - 13					$(0,0^0,0)$	159723.64	(*0.11)	[74001]
	15 - 14					$(0,0^0,0)$	171130.49	(*0.14)	[74001]
	16 - 15					$(0,0^0,0)$	182536.94	(*0.17)	[74001]
	17 - 16					$(0,0^0,0)$	193942.95	(*0.22)	[74001]
	18 - 17					$(0,0^0,0)$	205348.50	(*0.26)	[74001]
	19 - 18					$(0,0^0,0)$	216753.56	(*0.32)	[74001]
	20 - 19					$(0,0^0,0)$	228158.10	(*0.38)	[74001]
	21 - 20					$(0,0^0,0)$	239562.09	(*0.44)	[74001]
	22 - 21					$(0,0^0,0)$	250965.51	(*0.52)	[74001]
	23 - 22					$(0,0^0,0)$	262368.34	(*0.60)	[74001]
	24 - 23					$(0,0^0,0)$	273770.53	(*0.69)	[74001]
	25 - 24					$(0,0^0,0)$	285172.07	(*0.79)	[74001]
	26 - 25					$(0,0^0,0)$	296572.94	(*0.90)	[74001]
$^{16}O^{13}C^{34}S$	2 - 1					$(0,0^0,1)$	23576.55	(0.03)	[73045]
	2 - 1					$(0,0^0,0)$	23646.888	(0.01)	[73045]
	2 - 1					$(0,1^{L1},0)$	23673.41	(0.06)	[74001]
	2 - 1					$(0,1^{U1},0)$	23698.20	(0.06)	[74001]
	3 - 2					$(0,0^0,0)$	35470.264	(0.02)	[73045]
	3 - 2					$(0,2^0,0)$	35573.06	(0.04)	[73045]
	3 - 2					$(0,2^2,0)$	35586.22	(0.04)	[73045]
$^{17}O^{12}C^{32}S$	2 - 1		5/2		3/2	$(0,0^0,0)$	23534.101	(0.03)	[52014]
	2 - 1		7/2		7/2	$(0,0^0,0)$	23534.164	(0.02)	[52014]
	2 - 1		1/2		3/2	$(0,0^0,0)$	23534.308	(0.02)	[52014]
	2 - 1		7/2		5/2	$(0,0^0,0)$	23534.422	(0.02)	[52014]
	2 - 1		9/2		7/2	$(0,0^0,0)$	23534.422	(0.02)	[52014]
	2 - 1		3/2		3/2	$(0,0^0,0)$	23534.481	(0.03)	[52014]
	2 - 1		5/2		5/2	$(0,0^0,0)$	23534.481	(0.03)	[52014]
$^{18}O^{13}C^{32}S$	2 - 1					$(0,0^0,1)$	22699.94	(0.15)	[73045]
	2 - 1					$(0,0^0,0)$	22764.240	(0.02)	[73045]
	2 - 1					$(0,1^{L1},0)$	22790.88	(0.08)	[73045]
	2 - 1					$(0,1^{U1},0)$	22814.034	(0.06)	[73045]
	3 - 2					$(0,1^{U1},0)$	34221.116	(0.06)	[73045]
$^{18}O^{12}C^{34}S$	2 - 1					$(0,0^0,1)$	22176.76	(0.03)	[73045]
	2 - 1					$(0,0^0,0)$	22239.850	(0.02)	[73045]
	2 - 1					$(0,1^{L1},0)$	22268.57	(0.05)	[73045]
	2 - 1					$(0,1^{U1},0)$	22290.14	(0.05)	[73045]
	2 - 1					$(0,2^0,0)$	22310.87	(0.06)	[73045]
$^{18}O^{13}C^{34}S$	2 - 1					$(0,0^0,0)$	22179.42	(0.08)	[73045]
$^{16}O^{12}C^{36}S$	2 - 1					$(0,0^0,0)$	23198.67	(0.10)	[49005]
$^{16}O^{12}C^{35}S$	2 - 1		5/2		5/2	$(0,0^0,0)$	23452.444	(0.02)	[54005]
	2 - 1		3/2		3/2	$(0,0^0,0)$	23453.055	(0.02)	[54005]
	2 - 1		5/2		3/2	$(0,0^0,0)$	23456.963	(0.02)	[51011]
	2 - 1		7/2		5/2	$(0,0^0,0)$	23456.963	(0.02)	[51011]
	2 - 1		3/2		1/2	$(0,0^0,0)$	23462.906	(0.02)	[54005]
$^{16}O^{14}C^{32}S$	2 - 1					$(0,0^0,0)$	24173.0	(2.0)	[48007]

*Calculated transition frequency.

Table 18. Rotational constants for OCSe.

Isotopic Species	Vib. State v_1 v_2^ℓ v_3	B_v (MHz)	q_v (MHz)	Reference
$^{16}O^{12}C^{74}Se$[a]	0 0^0 0	4 095.806(5)		[50012]
	0 0^1 0	4 102.89(5)	3.17	[67010]
	0 0^0 1	4 082.18(5)		[67010]
$^{16}O^{12}C^{75}Se$[a]	0 0^0 0	4 081.938(10)		[55006]
$^{16}O^{12}C^{76}Se$[b]	0 0^0 0	4 068.438(10)		[56005]
	0 1^1 0	4 075.46(5)	3.24	[49003]
	0 2^0 0	4 081.66(6)		[67010]
	0 2^2 0	4 082.37(6)		[67010]
	0 0^0 1	4 054.96(2)		[67010]
$^{16}O^{12}C^{77}Se$[c]	0 0^0 0	4 055.241(3)		[56005]
	0 1^1 0	4 062.28(5)	3.21	[67010]
	0 2^2 0	4 069.08(6)		[67010]
	0 0^0 1	4 041.82(5)		[49003]
$^{16}O^{12}C^{78}Se$[d]	0 0^0 0	4 042.413(3)		[56005]
	0 1^1 0	4 049.41(5)	3.19	[67010]
	0 2^0 0	4 055.55(5)		[67010]
	0 2^2 0	4 056.26(5)		[67010]
	0 3^1 0	4 061.83(6)	3.38	[67010]
	0 0^0 1	4 029.06(5)		[49003]
	0 1^1 1	4 036.38(6)	3.30	[67010]
	0 0^0 2	4 015.46(6)		[67010]
$^{16}O^{12}C^{79}Se$	0 0^0 0	4 029.848(1)		[55005]
$^{16}O^{12}C^{80}Se$[e]	0 0^0 0	4 017.650(3)		[76015]
	1 0^0 0	3 995.859(25)		[76015]
	0 1^1 0	4 024.556(3)	3.172(2)	[76015]
	0 2^0 0	4 030.674(40)		[76015]
	0 2^2 0	4 031.370(40)		[76015]
	0 3^1 0	4 036.734(60)	3.20	[67010]
	0 0^0 1	4 004.389(40)		[76015]
	0 1^1 1	4 011.709(60)	3.25	[67010]
	0 0^0 2	3 990.92(5)		[67010]
$^{16}O^{12}C^{82}Se$[f]	0 0^0 0	3 994.064(3)		[56005]
	0 1^1 0	4 000.95(5)	3.12	[49003]
	0 2^0 0	4 007.06(6)		[67010]
	0 2^2 0	4 007.68(6)		[67010]
	0 0^0 1	3 980.972(50)		[49003]
	0 1^1 1	3 988.15(6)	3.35	[67010]
$^{16}O^{13}C^{76}Se$[b]	0 0^0 0	4 031.43(6)		[67010]
$^{16}O^{13}C^{77}Se$[c]	0 0^0 0	4 018.12(6)		[67010]
$^{16}O^{13}C^{78}Se$[d]	0 0^0 0	4 005.11(5)		[67010]
$^{16}O^{13}C^{80}Se$[g]	0 0^0 0	3 979.9918(15)		[76015]
	1 0^0 0	3 959.5582(60)		[76015]
	0 1^1 0	3 986.4500(20)	3.1952(40)	[76015]
	0 2^0 0	3 992.1789(50)		[76015]
	0 2^2 0	3 992.8295(30)		[76015]
	0 0^0 1	3 966.7858(30)		[76015]
$^{16}O^{13}C^{82}Se$[f]	0 0^0 0	3 956.05(6)		[67010]
$^{18}O^{12}C^{78}Se$[h]	0 0^0 0	3 746.86(6)		[67010]
$^{18}O^{12}C^{80}Se$[h]	0 0^0 0	3 722.6821(10)		[76015]
	1 0^0 0	3 702.0201(60)		[76015]
	0 1^1 0	3 729.2448(40)	2.7530(50)	[76015]
	0 2^0 0	3 735.1216(60)		[76015]
	0 2^2 0	3 735.745(10)		[76015]
	0 0^0 1	3 711.0384(40)		[76015]

[a] Assumed D_v = 0.70 kHz.

[b] D_0 = 0.6846 kHz [56005] was assumed for the vibrational states.

[c] D_0 = 0.6834 kHz [56005] was assumed for the vibrational states.

[d] D_0 = 0.6771 kHz [56005] was assumed for the vibrational states.

[e] D_0 = 0.6695 kHz [56005] was assumed for the vibrational states.

[f] D_0 = 0.6640 kHz [56005] was assumed for the vibrational states.

[g] $D(00^00)$ = 0.665(4) kHz, $D(01^10)$ = 0.671(4) kHz, and $D(00^01)$ = 0.665 kHz (assumed)[76015].

[h] $D(00^00)$ = 0.566(4) kHz, and $D(01^10)$ = 0.580(40) kHz [76015].

Table 18.1. Hyperfine constants, electric dipole moments and Zeeman constants for OCSe.

Parameter	Isotopic Species	Vib. State v_1 v_2^ℓ v_3	Value	Reference
eqQ (^{79}Se)	$^{16}O^{12}C^{79}Se$	0 0^0 0	752.21(2) MHz	[55005]
eqQ (^{75}Se)	$^{16}O^{12}C^{75}Se$	0 0^0 0	946 MHz	[55006]
$c_{^{79}Se}$	$^{16}O^{12}C^{79}Se$	0 0^0 0	3.2(15) kHz	[55005]
μ	$^{16}O^{12}C^{80}Se$	0 0^0 0	0.754 D	[49003]
μ	$^{16}O^{12}C^{80}Se$	0 1^1 0	0.730 D	[49003]
μ	$^{16}O^{12}C^{80}Se$	0 0^0 1	0.728 D	[49003]
$g_\perp$	$^{16}O^{12}C^{76}Se$	0 0^0 0	$-0.01969(20)\mu_N$	[70037]
$g_\perp$	$^{16}O^{12}C^{80}Se$	0 0^0 0	$-0.01952(10)\mu_N$	[70037]
$\chi_\perp - \chi_\parallel$ [a]	$OC^{76}Se$, $OC^{77}Se$	0 0^0 0	$10.06(18)\times10^{-6}$	[70037]

[a] Units are erg/G^2·mole.

Additional reference: [52012].

TABLE 18.2. The microwave spectrum of OCSe

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	(v_1,v_2^ℓ,v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{12}C^{74}Se$	3 - 2					$(0,0^0,0)$	24574.76	(0.02)	[50012]
	4 - 3					$(0,0^0,1)$	32657.3	(0.20)	[67010]
	4 - 3					$(0,1^{L1},0)$	32809.7	(0.20)	[67010]
	4 - 3					$(0,1^{U1},0)$	32836.1	(0.20)	[67010]
$^{16}O^{12}C^{75}Se$	3 - 2		5/2		5/2	$(0,0^0,0)$	24429.58	(0.05)	[55006]
	3 - 2		3/2		3/2	$(0,0^0,0)$	24455.21	(0.05)	[55006]
	3 - 2		9/2		7/2	$(0,0^0,0)$	24471.31	(0.05)	[55006]
	3 - 2		11/2		9/2	$(0,0^0,0)$	24480.45	(0.05)	[55006]
	3 - 2		7/2		5/2	$(0,0^0,0)$	24517.93	(0.05)	[55006]
	3 - 2		5/2		3/2	$(0,0^0,0)$	24565.87	(0.05)	[55006]
$^{16}O^{12}C^{76}Se$	1 - 0					$(0,0^0,0)$	8136.9	(0.10)	[70037]
	3 - 2					$(0,0^0,0)$	24410.48	(0.02)	[50012]
	3 - 2					$(0,1^{L1},0)$	24442.98	(0.30)	[49003]
	3 - 2					$(0,1^{U1},0)$	24462.42	(0.30)	[49003]
	4 - 3					$(0,0^0,1)$	32439.52	(0.10)	[67010]
	4 - 3					$(0,2^0,0)$	32653.1	(0.50)	[67010]
	4 - 3					$(0,2^2,0)$	32658.8	(0.50)	[67010]
	12 - 11					$(0,0^0,0)$	97637.78	(0.20)	[56005]
	15 - 14					$(0,0^0,0)$	122043.90	(0.25)	[56005]
	18 - 17					$(0,0^0,0)$	146447.90	(0.30)	[56005]
	21 - 20					$(0,0^0,0)$	170849.06	(0.35)	[56005]
	24 - 23					$(0,0^0,0)$	195247.17	(0.40)	[56005]
	27 - 26					$(0,0^0,0)$	219641.79	(0.45)	[56005]
	30 - 29					$(0,0^0,0)$	244032.33	(0.50)	[56005]
$^{16}O^{12}C^{77}Se$	3 - 2					$(0,0^0,1)$	24250.84	(0.30)	[49003]
	3 - 2					$(0,0^0,0)$	24331.38	(0.02)	[50012]
	3 - 2					$(0,1^{L1},0)$	24363.97	(0.30)	[49003]
	3 - 2					$(0,1^{U1},0)$	24383.21	(0.30)	[49003]
	4 - 3					$(0,2^2,0)$	32552.5	(0.50)	[67010]
	12 - 11					$(0,0^0,0)$	97321.07	(0.20)	[56005]
	15 - 14					$(0,0^0,0)$	121647.98	(0.25)	[56005]
	18 - 17					$(0,0^0,0)$	145972.74	(0.30)	[56005]
	21 - 20					$(0,0^0,0)$	170294.80	(0.35)	[56005]
	24 - 23					$(0,0^0,0)$	194613.75	(0.40)	[56005]
	27 - 26					$(0,0^0,0)$	218929.21	(0.45)	[56005]
$^{16}O^{12}C^{78}Se$	3 - 2					$(0,0^0,1)$	24174.30	(0.30)	[49003]
	3 - 2					$(0,0^0,0)$	24254.43	(0.02)	[50012]
	3 - 2					$(0,1^{L1},0)$	24286.82	(0.30)	[49003]
	3 - 2					$(0,1^{U1},0)$	24305.95	(0.30)	[49003]
	4 - 3					$(0,0^0,2)$	32123.5	(0.50)	[67010]
	4 - 3					$(0,1^{L1},1)$	32277.7	(0.50)	[67010]
	4 - 3					$(0,1^{U1},1)$	32304.1	(0.50)	[67010]

TABLE 18.2. The microwave spectrum of OCSe—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{12}C^{78}Se$	4 - 3					$(0,2^0,0)$	32444.20	(0.20)	[67010]
	4 - 3					$(0,2^2,0)$	32449.94	(0.20)	[67010]
	4 - 3					$(0,3^{L1},0)$	32467.4	(0.50)	[67010]
	4 - 3					$(0,3^{U1},0)$	32521.5	(0.50)	[67010]
	6 - 5					$(0,0^0,0)$	48508.88	(0.30)	[49003]
	7 - 6					$(0,0^0,0)$	56593.16	(0.30)	[49003]
	12 - 11					$(0,0^0,0)$	97013.24	(0.20)	[56005]
	15 - 14					$(0,0^0,0)$	121263.28	(0.25)	[56005]
	18 - 17					$(0,0^0,0)$	145511.08	(0.30)	[56005]
	21 - 20					$(0,0^0,0)$	169756.27	(0.35)	[56005]
	24 - 23					$(0,0^0,0)$	193998.34	(0.40)	[56005]
	27 - 26					$(0,0^0,0)$	218236.97	(0.45)	[56005]
	30 - 29					$(0,0^0,0)$	242471.47	(0.50)	[56005]
	33 - 32					$(0,0^0,0)$	266701.93	(0.55)	[56005]
$^{16}O^{12}C^{79}Se$	3 - 2		7/2		7/2	$(0,0^0,0)$	24153.201	(4E-3)	[55005]
	3 - 2		11/2		9/2	$(0,0^0,0)$	24159.928	(4E-3)	[55005]
	3 - 2		1/2		3/2	$(0,0^0,0)$	24159.928	(4E-3)	[55005]
	3 - 2		13/2		11/2	$(0,0^0,0)$	24170.179	(3E-3)	[55005]
	3 - 2		9/2		7/2	$(0,0^0,0)$	24190.772	(4E-3)	[55005]
	3 - 2		3/2		3/2	$(0,0^0,0)$	24204.692	(0.01)	[53008]
	3 - 2		7/2		5/2	$(0,0^0,0)$	24234.352	(5E-3)	[55005]
$^{16}O^{12}C^{80}Se$	1 - 0					$(0,0^0,0)$	8035.3	(0.10)	[70037]
	3 - 2					$(0,0^0,1)$	24026.26	(0.30)	[49003]
$^{16}O^{12}C^{80}Se$	3 - 2					$(0,0^0,0)$	24105.85	(0.02)	[50012]
	3 - 2					$(0,1^{L1},0)$	24137.80	(0.30)	[55002]
	3 - 2					$(0,1^{U1},0)$	24156.46	(0.30)	[55002]
	3 - 2					$(0,2^0,0)$	24184.97	(0.30)	[55002]
	3 - 2					$(0,2^2,0)$	24188.97	(0.30)	[55002]
	4 - 3					$(0,0^0,2)$	31927.15	(0.30)	[67010]
	4 - 3					$(0,1^{L1},1)$	32080.5	(0.50)	[67010]
	4 - 3					$(0,1^{U1},1)$	32106.5	(0.50)	[67010]
	4 - 3					$(0,2^0,0)$	32245.38	(0.30)	[67010]
	4 - 3					$(0,2^2,0)$	32251.05	(0.30)	[67010]
	4 - 3					$(0,3^{L1},0)$	32268.1	(0.50)	[67010]
	4 - 3					$(0,3^{U1},0)$	32319.3	(0.50)	[67010]
	6 - 5					$(0,0^0,0)$	48211.46	(0.30)	[49003]
	7 - 6					$(0,0^0,0)$	56246.47	(0.30)	[49003]
	12 - 11					$(0,0^0,0)$	96418.95	(0.20)	[56005]
	12 - 11					$(0,1^{L1},0)$	96546.60	(0.20)	[56005]
	12 - 11					$(0,1^{U1},0)$	96622.76	(0.20)	[56005]
	15 - 14					$(0,0^0,0)$	120520.40	(0.25)	[56005]
	15 - 14					$(0,1^{L1},0)$	120679.98	(0.25)	[56005]
	15 - 14					$(0,1^{U1},0)$	120775.11	(0.25)	[56005]
	18 - 17					$(0,0^0,0)$	144619.81	(0.30)	[56005]
	18 - 17					$(0,1^{L1},0)$	144811.06	(0.30)	[56005]
	18 - 17					$(0,1^{U1},0)$	144925.26	(0.30)	[56005]
	21 - 20					$(0,0^0,0)$	168716.41	(0.35)	[56005]
	21 - 20					$(0,1^{L1},0)$	168939.60	(0.35)	[56005]
	21 - 20					$(0,1^{U1},0)$	169072.81	(0.35)	[56005]
	24 - 23					$(0,0^0,0)$	192810.17	(0.40)	[56005]
	24 - 23					$(0,1^{L1},0)$	193065.08	(0.40)	[56005]
	24 - 23					$(0,1^{U1},0)$	193217.26	(0.40)	[56005]
	27 - 26					$(0,0^0,0)$	216900.38	(0.45)	[56005]
	27 - 26					$(0,1^{L1},0)$	217186.90	(0.45)	[56005]
	27 - 26					$(0,1^{U1},0)$	217358.18	(0.45)	[56005]
	30 - 29					$(0,0^0,0)$	240986.62	(0.50)	[56005]
	33 - 32					$(0,0^0,0)$	265068.60	(0.55)	[56005]
	36 - 35					$(0,0^0,0)$	289145.50	(0.60)	[56005]
	39 - 38					$(0,0^0,0)$	313217.57	(0.65)	[56005]
$^{16}O^{12}C^{82}Se$	3 - 2					$(0,0^0,1)$	23885.76	(0.30)	[49003]
	3 - 2					$(0,0^0,0)$	23964.33	(0.02)	[50012]
	3 - 2					$(0,1^{L1},0)$	23996.26	(0.30)	[49003]
	3 - 2					$(0,1^{U1},0)$	24014.97	(0.30)	[49003]
	4 - 3					$(0,1^{L1},1)$	31891.6	(0.50)	[67010]
	4 - 3					$(0,1^{U1},1)$	31918.4	(0.50)	[67010]
	4 - 3					$(0,2^0,0)$	32056.3	(0.50)	[67010]

TABLE 18.2. The microwave spectrum of OCSe—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	(v_1,v_2^{ℓ},v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{12}C^{82}Se$	4 - 3					$(0,2^2,0)$	32061.3	(0.50)	[67010]
	7 - 6					$(0,0^0,0)$	55916.19	(0.30)	[49003]
	12 - 11					$(0,0^0,0)$	95852.94	(0.20)	[56005]
	15 - 14					$(0,0^0,0)$	119812.89	(0.25)	[56005]
	18 - 17					$(0,0^0,0)$	143770.82	(0.30)	[56005]
	21 - 20					$(0,0^0,0)$	167726.08	(0.35)	[56005]
	24 - 23					$(0,0^0,0)$	191678.34	(0.40)	[56005]
	27 - 26					$(0,0^0,0)$	215627.18	(0.45)	[56005]
	30 - 29					$(0,0^0,0)$	239572.08	(0.50)	[56005]
	33 - 32					$(0,0^0,0)$	263512.90	(0.55)	[56005]
$^{16}O^{13}C^{76}Se$	4 - 3					$(0,0^0,0)$	32251.3	(0.50)	[67010]
$^{16}O^{13}C^{77}Se$	4 - 3					$(0,0^0,0)$	32144.8	(0.50)	[67010]
$^{16}O^{13}C^{78}Se$	3 - 2					$(0,0^0,0)$	24030.58	(0.30)	[49003]
$^{16}O^{13}C^{80}Se$	3 - 2					$(0,0^0,1)$	23800.634	(0.03)	[76015]
	3 - 2					$(0,0^0,0)$	23879.891	(0.02)	[76015]
	3 - 2					$(0,1^{L1},0)$	23909.100	(0.03)	[76015]
	3 - 2					$(0,1^{U1},0)$	23928.239	(0.03)	[76015]
	4 - 3					$(0,0^0,1)$	31734.128	(0.02)	[76015]
	4 - 3					$(0,0^0,0)$	31839.760	(0.01)	[76015]
	4 - 3					$(0,1^{L1},0)$	31878.643	(0.01)	[76015]
	4 - 3					$(0,1^{U1},0)$	31904.215	(0.01)	[76015]
	4 - 3					$(0,2^0,0)$	31937.261	(0.03)	[76015]
$^{16}O^{13}C^{80}Se$	4 - 3					$(0,2^2,0)$	31942.508	(0.01)	[76015]
$^{16}O^{13}C^{82}Se$	4 - 3					$(0,0^0,0)$	31648.2	(0.50)	[67010]
$^{18}O^{12}C^{78}Se$	4 - 3					$(0,0^0,0)$	29974.7	(0.50)	[67010]
$^{18}O^{12}C^{80}Se$	3 - 2					$(0,0^0,1)$	22266.19	(0.09)	[76015]
	3 - 2					$(0,0^0,0)$	22336.032	(0.03)	[76015]
	3 - 2					$(0,1^{L1},0)$	22367.186	(0.05)	[76015]
	3 - 2					$(0,1^{U1},0)$	22383.680	(0.05)	[76015]
	3 - 2					$(0,2^0,0)$	22410.68	(0.06)	[76015]
	3 - 2					$(0,2^2,0)$	22414.43	(0.06)	[76015]
	4 - 3					$(0,0^0,1)$	29688.158	(0.03)	[76015]
	4 - 3					$(0,0^0,0)$	29781.312	(0.01)	[76015]
	4 - 3					$(0,1^{L1},0)$	29822.800	(0.03)	[76015]
	4 - 3					$(0,1^{U1},0)$	29844.832	(0.03)	[76015]
	4 - 3					$(0,2^0,0)$	29880.832	(0.05)	[76015]
	4 - 3					$(0,2^2,0)$	29885.86	(0.08)	[76015]
	5 - 4					$(0,0^0,1)$	37110.09	(0.10)	[76015]
	5 - 4					$(0,0^0,0)$	37226.535	(0.03)	[76015]
	5 - 4					$(0,2^0,0)$	37350.90	(0.10)	[76015]

Table 19. Molecular parameters for SCSe [71022].

Parameter	Vib. State $v_1\ v_2^{\ell}\ v_3$	$^{32}S^{12}C^{82}Se$	$^{32}S^{12}C^{80}Se$	$^{32}S^{12}C^{78}Se$	$^{32}S^{12}C^{76}Se$
B_v (MHz)[a]	0 0^0 0	2 027.113	2 043.310	2 060.321	2 078.190
B_v (MHz)	0 1^1 0	2 031.229(5)	2 047.443(3)	2 064.490(3)	2 082.405(5)
B_v (MHz)	0 2^2 0	2 035.345(5)	2 051.576(3)	2 068.659(3)	2 086.620(5)
q_v (MHz)	0 1^1 0	0.996(5)	1.005(3)	1.021(3)	1.041(5)
D_J (kHz)		...	0.163(40)	0.225(150)	...
μ (D)	0 2^2 0	...	0.031(5)	...	...

[a] The rotational constants for the ground vibrational state were extrapolated from those derived for the excited vibrational states. These are believed to be more accurate than the vales derived from measurements reported in [50013].

TABLE 19.1. The microwave spectrum of SCSe

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	(v_1,v_2^{ℓ},v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{32}S^{12}C^{82}Se$	8 - 7					$(0,1^{L1},0)$	32491.00	(0.05)	[71022]
	8 - 7					$(0,1^{U1},0)$	32506.95	(0.05)	[71022]
	8 - 7					$(0,2^2,0)$	32564.60	(0.05)	[71022]
	9 - 8					$(0,1^{L1},0)$	36552.28	(0.05)	[71022]
	9 - 8					$(0,1^{U1},0)$	36570.20	(0.03)	[71022]
	9 - 8					$(0,2^2,0)$	36635.05	(0.05)	[71022]
$^{32}S^{12}C^{80}Se$	7 - 6					$(0,1^{L1},0)$	28656.94	(0.01)	[71022]
	7 - 6					$(0,1^{U1},0)$	28671.00	(0.01)	[71022]
	7 - 6					$(0,2^2,0)$	28721.86	(0.01)	[71022]
	8 - 7					$(0,1^{L1},0)$	32750.70	(0.01)	[71022]
	8 - 7					$(0,1^{U1},0)$	32766.80	(0.01)	[71022]
	8 - 7					$(0,2^2,0)$	32824.92	(0.01)	[71022]
	9 - 8					$(0,1^{L1},0)$	36844.45	(0.01)	[71022]
	9 - 8					$(0,1^{U1},0)$	36862.55	(0.01)	[71022]
	9 - 8					$(0,2^2,0)$	36927.93	(0.01)	[71022]
$^{32}S^{12}C^{78}Se$	7 - 6					$(0,1^{L1},0)$	28895.44	(0.03)	[71022]
	7 - 6					$(0,1^{U1},0)$	28909.71	(0.03)	[71022]
	7 - 6					$(0,2^2,0)$	28960.95	(0.05)	[71022]
	8 - 7					$(0,1^{L1},0)$	33023.19	(0.01)	[71022]
	8 - 7					$(0,1^{U1},0)$	33039.55	(0.01)	[71022]
	8 - 7					$(0,2^2,0)$	33098.06	(0.01)	[71022]
	9 - 8					$(0,1^{L1},0)$	37151.01	(0.01)	[71022]
	9 - 8					$(0,1^{U1},0)$	37169.39	(0.01)	[71022]
	9 - 8					$(0,2^2,0)$	37235.24	(0.01)	[71022]
$^{32}S^{12}C^{76}Se$	8 - 7					$(0,1^{L1},0)$	33309.48	(0.05)	[71022]
	8 - 7					$(0,1^{U1},0)$	33326.08	(0.05)	[71022]
	8 - 7					$(0,2^2,0)$	33385.00	(0.05)	[71022]
	9 - 8					$(0,1^{L1},0)$	37473.00	(0.05)	[71022]
	9 - 8					$(0,1^{U1},0)$	37491.82	(0.03)	[71022]
	9 - 8					$(0,2^2,0)$	37558.10	(0.05)	[71022]

Table 20. Rotational constants and dipole moment for SCTe [54002][a].

Isotopic Species	B_{00^00} [b] (MHz)	α_2 (MHz)	q_v (MHz)
$SC^{130}Te$	1 559.9303(30)	3.2446(30)	0.6599(30)
$SC^{128}Te$	1 565.7022(30)	3.2551(30)	0.6649(30)
$SC^{126}Te$	1 571.6524(30)	3.2657(30)	0.6706(30)
$SC^{125}Te$	1 574.6925(30)	3.2712(30)	0.6728(30)
$SC^{124}Te$	1 577.7898(30)	3.2764(30)	0.6752(30)
$SC^{123}Te$	1 580.9261(30)	3.2818(30)	0.6776(30)
$SC^{122}Te$	1 584.1224(30)	3.2870(30)	0.6786(30)
μ_{SCTe} = 0.172(2) D			

[a] This work reports the observation of the J=6←5, J=7←6 and J= 8←7 transitions for the $(0,0^0,0)$, $(0,1^1,0)$ and $(0,2^2,0)$ states. However, observed frequencies are given only for the J=8←7 transitions for the $(0,1^1,0)$ state.

[b] D_v=0.095 kHz was used for all isotopic species.

TABLE 20.1. The microwave spectrum of SCTe

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	(v_1,v_2^{ℓ},v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{32}S^{12}C^{130}Te$	8 - 7					$(0,1^{L1},0)$	25005.326	(0.04)	[54002]
	8 - 7					$(0,1^{U1},0)$	25015.884	(0.04)	[54002]
$^{32}S^{12}C^{128}Te$	8 - 7					$(0,1^{L1},0)$	25097.805	(0.04)	[54002]
	8 - 7					$(0,1^{U1},0)$	25108.444	(0.04)	[54002]
$^{32}S^{12}C^{126}Te$	8 - 7					$(0,1^{L1},0)$	25193.132	(0.04)	[54002]
	8 - 7					$(0,1^{U1},0)$	25203.861	(0.04)	[54002]
$^{32}S^{12}C^{125}Te$	8 - 7					$(0,1^{L1},0)$	25241.844	(0.04)	[54002]
	8 - 7					$(0,1^{U1},0)$	25252.608	(0.04)	[54002]
$^{32}S^{12}C^{124}Te$	8 - 7					$(0,1^{L1},0)$	25291.465	(0.04)	[54002]
	8 - 7					$(0,1^{U1},0)$	25302.268	(0.04)	[54002]
$^{32}S^{12}C^{123}Te$	8 - 7					$(0,1^{L1},0)$	25341.714	(0.04)	[54002]
	8 - 7					$(0,1^{U1},0)$	25352.555	(0.04)	[54002]
$^{32}S^{12}C^{122}Te$	8 - 7					$(0,1^{L1},0)$	25392.929	(0.04)	[54002]
	8 - 7					$(0,1^{U1},0)$	25403.788	(0.04)	[54002]

Table 21. Molecular parameters for HCC.

Parameter	$H^{12}C\ ^{12}C$	$H^{13}C^{12}C$	$H^{12}C^{13}C$	$D^{12}C^{12}C$
B_0-2D_0	43 674.37(10)	...	...	
γ	-62.57(13)	...	...	
b	40.24(43)	139(1)	863(1)	6.177
c	12.23(35)	52(2)	117(2)	1.877
Reference	[74002]	[74042]	[74042]	[74046]

TABLE 21.1. The microwave spectrum of HCC

Isotopic species	$J' - J''$	F_1'	F_1''	(v_1,v_2,v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{12}C^{12}C$	3/2 - 1/2	2	1	(0,0,0)	87317.05	(0.10)	[74002]
	3/2 - 1/2	1	0	(0,0,0)	87328.70	(0.10)	[74002]
	1/2 - 1/2	1	1	(0,0,0)	87402.10	(0.10)	[74002]
	1/2 - 1/2	0	1	(0,0,0)	87407.23	(0.20)	[74002]

Table 21a. Molecular parameters for KrClF. [75034]

Parameter	$^{82}Kr^{35}Cl^{19}F$	$^{84}Kr^{35}Cl^{19}F$	$^{86}Kr^{35}Cl^{19}F$	$^{84}Kr^{37}Cl^{19}F$
B (MHz)	933.4239(50)	925.1859(50)	917.3176(50)	914.4371(50)
D_J (kHz)	a	1.86(20)	a	a
eqQ (MHz)	-141.521(20)	-141.519(20)	-141.517(20)	-111.544(20)
μ_a (D)		1.136(3)		

[a] The value of D_J determined for $^{84}Kr^{35}Cl^{19}F$ was used to determine B for the other isotopic species.

TABLE 21a.1. The microwave spectrum of KrClF

Isotopic species	$J',K' - J'',K''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{82}Kr^{35}Cl^{19}F$	3, 0 - 2, 0		3/2		5/2	$(0,0^0,0)$	5654.014	(0.01)	[75034]
	3, 0 - 2, 0		3/2		3/2	$(0,0^0,0)$	5628.472	(0.01)	[75034]
$^{84}Kr^{35}Cl^{19}F$	3, 0 - 2, 0		3/2		5/2	$(0,0^0,0)$	5604.586	(0.01)	[75034]
	3, 0 - 2, 0		3/2		3/2	$(0,0^0,0)$	5579.042	(0.01)	[75034]
	4, 0 - 3, 0		5/2		3/2	$(0,0^0,0)$	7397.978	(0.01)	[75034]
$^{86}Kr^{35}Cl^{19}F$	3, 0 - 2, 0		3/2		5/2	$(0,0^0,0)$	5557.376	(0.01)	[75034]
	3, 0 - 2, 0		3/2		3/2	$(0,0^0,0)$	5531.830	(0.01)	[75034]
$^{84}Kr^{37}Cl^{19}F$	3, 0 - 2, 0		3/2		5/2	$(0,0^0,0)$	5528.710	(0.01)	[75034]
	3, 0 - 2, 0		3/2		3/2	$(0,0^0,0)$	5508.620	(0.01)	[75034]

Table 22. Rotational, centrifugal distortion and hyperfine constants for $H^{16}O^{35}Cl$.

Watson's Determinable Parameters	Value[a] (MHz)
A''	613 375(600)[c]
B''	15 118.26(8)
C''	14 726.93(8)
τ_1	-5.335(21)
τ_2	-0.223(6)
τ_3[b]	196.(16)
τ_{aaaa}	0[c]
τ_{bbbb}	-0.119(6)
τ_{cccc}	-0.0950(68)
$\chi_{aa}(^{35}Cl)$	-121.942(23)
$\chi_{bb}(^{35}Cl)$	59.511(31)
Std. dev.	0.311
No. lines	20

[a] The uncertainties quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

[c] The A rotational constant was fixed at this value from infrared measurements [67026]. Since τ_{aaaa} was indeterminable it is fixed at zero.

Table 22.1. Molecular parameters for HOCl.

Parameter	$H^{16}O^{35}Cl$	$H^{16}O^{37}Cl$	$D^{16}O^{35}Cl$	$D^{16}O^{37}Cl$	$D^{18}O^{35}Cl$	Reference
A (GHz)	a	a	332.0(10)	a	...	[71023]
B (MHz)	15 117.50(15)	14 852.52(15)	14 299.00(15)	14 037.71(15)	13 407.70(15)	[71023]
C (MHz)	14 725.04(15)	14 473.54(15)	13 674.78(15)	13 435.51(15)	12 848.76(15)	[71023]
χ_{aa}(Cl) (MHz)	-121.93(3)[b]	-96.07(5)	-121.54(8)	-95.61(15)	-121.61(2)	[71023]
χ_{bb}(Cl) (MHz)	59.50(4)[b]	46.88(6)	59.09(9)	46.62(16)	59.23(3)	[71023]
μ_a (D)	0.367(8)	...	0.412(15)	...	...	[71024]
g_I(Cl) (μ_N)	0.5490(14)					[75012]
g_{aa} (μ_N)	0.6390(55)					[75012]
g_{bb} (μ_N)	-0.0752(9)					[75012]
g_{cc} (μ_N)	-0.0616(10)					[75012]

[a] From infrared measurements A(HOCl) = 613.38(60) GHz and A(DOCl) = 332.1(10). For $H^{16}O^{35}Cl$ the centrifugal distortion terms determined were D_J = 0.0267(2) MHz and D_{JK} = 1.251(9) MHz [71023].

[b] Reference [75012].

Additional reference: [69024].

TABLE 22.2. The microwave spectrum of HOCl

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{16}O^{35}Cl$	1(0, 1) - 0(0, 0)		3/2		3/2	(0,0,0)	29818.063	(0.01)	[75012]
	1(0, 1) - 0(0, 0)		5/2		3/2	(0,0,0)	29848.586	(0.01)	[75012]
	1(0, 1) - 0(0, 0)		1/2		3/2	(0,0,0)	29872.925	(0.01)	[75012]
	2(1, 2) - 1(1, 1)		5/2		3/2	(0,0,0)	59265.229	(0.01)	[75012]
	2(1, 2) - 1(1, 1)		3/2		3/2	(0,0,0)	59276.366	(0.01)	[75012]
	2(1, 2) - 1(1, 1)		5/2		5/2	(0,0,0)	59280.108	(0.01)	[75012]
	2(1, 2) - 1(1, 1)		7/2		5/2	(0,0,0)	59295.709	(0.01)	[75012]
	2(1, 2) - 1(1, 1)		3/2		1/2	(0,0,0)	59303.141	(0.01)	[75012]
	2(1, 2) - 1(1, 1)		1/2		1/2	(0,0,0)	59318.759	(0.01)	[75012]
	2(0, 2) - 1(0, 1)		5/2		5/2	(0,0,0)	59656.181	(0.01)	[75012]
	2(0, 2) - 1(0, 1)		3/2		3/2	(0,0,0)	59708.463	(0.01)	[75012]
	2(1, 1) - 1(1, 0)		5/2		3/2	(0,0,0)	60047.144	(0.01)	[75012]
	2(1, 1) - 1(1, 0)		3/2		3/2	(0,0,0)	60057.764	(0.01)	[75012]
	2(1, 1) - 1(1, 0)		5/2		5/2	(0,0,0)	60062.733	(0.01)	[75012]
	2(1, 1) - 1(1, 0)		7/2		5/2	(0,0,0)	60077.657	(0.01)	[75012]
	2(1, 1) - 1(1, 0)		3/2		1/2	(0,0,0)	60085.880	(0.01)	[75012]
	2(1, 1) - 1(1, 0)		1/2		1/2	(0,0,0)	60100.719	(0.01)	[75012]
	3(1, 3) - 2(1, 2)					(0,0,0)	88929.96	(0.10)	[71023]
	3(2, 2) - 2(2, 1)					(0,0,0)	89494.79	(0.10)	[71023]
	3(2, 1) - 2(2, 0)					(0,0,0)	89495.62	(0.10)	[71023]
	3(0, 3) - 2(0, 2)					(0,0,0)	89524.00	(0.10)	[71023]
	3(1, 2) - 2(1, 1)					(0,0,0)	90104.26	(0.10)	[71023]
	4(0, 4) - 3(0, 3)					(0,0,0)	119361.44	(0.15)	[71023]
	5(1, 5) - 4(1, 4)					(0,0,0)	148209.22	(0.20)	[71023]
	5(2, 4) - 4(2, 3)					(0,0,0)	149148.80	(0.20)	[71023]
	5(2, 3) - 4(2, 2)					(0,0,0)	149152.50	(0.20)	[71023]
	5(0, 5) - 4(0, 4)					(0,0,0)	149195.55	(0.20)	[71023]
	5(1, 4) - 4(1, 3)					(0,0,0)	150164.12	(0.20)	[71023]
	6(2, 5) - 5(2, 4)					(0,0,0)	178971.36	(0.40)	[71023]
	6(2, 4) - 5(2, 3)					(0,0,0)	178978.08	(0.40)	[71023]
	6(0, 6) - 5(0, 5)					(0,0,0)	179025.31	(0.40)	[71023]
	6(1, 5) - 5(1, 4)					(0,0,0)	180188.59	(0.40)	[71023]
$H^{16}O^{37}Cl$	1(0, 1) - 0(0, 0)		3/2		3/2	(0,0,0)	29303.86	(0.05)	[69024]
	1(0, 1) - 0(0, 0)		5/2		3/2	(0,0,0)	29328.01	(0.05)	[69024]
	1(0, 1) - 0(0, 0)		1/2		3/2	(0,0,0)	29347.80	(0.05)	[69024]
	2(1, 2) - 1(1, 1)		5/2		3/2	(0,0,0)	58245.28	(0.06)	[71023]
	2(1, 2) - 1(1, 1)		3/2		3/2	(0,0,0)	58254.07	(0.06)	[71023]

TABLE 22.2. The microwave spectrum of HOCl—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{16}O^{37}Cl$	2(1, 2) - 1(1, 1)		5/2		5/2	(0,0,0)	58256.99	(0.06)	[71023]
	2(1, 2) - 1(1, 1)		7/2		5/2	(0,0,0)	58269.30	(0.06)	[71023]
	2(1, 2) - 1(1, 1)		3/2		1/2	(0,0,0)	58275.15	(0.06)	[71023]
	2(1, 2) - 1(1, 1)		1/2		1/2	(0,0,0)	58287.44	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		5/2		3/2	(0,0,0)	59000.30	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		3/2		3/2	(0,0,0)	59008.66	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		5/2		5/2	(0,0,0)	59012.56	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		7/2		5/2	(0,0,0)	59024.38	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		3/2		1/2	(0,0,0)	59030.81	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		1/2		1/2	(0,0,0)	59042.51	(0.06)	[71023]
$D^{16}O^{35}Cl$	1(0, 1) - 0(0, 0)		3/2		3/2	(0,0,0)	27949.41	(0.05)	[69024]
	1(0, 1) - 0(0, 0)		5/2		3/2	(0,0,0)	27979.79	(0.05)	[69024]
	1(0, 1) - 0(0, 0)		1/2		3/2	(0,0,0)	28004.05	(0.05)	[69024]
	2(1, 2) - 1(1, 1)		5/2		3/2	(0,0,0)	55297.86	(0.06)	[71023]
	2(1, 2) - 1(1, 1)		3/2		3/2	(0,0,0)	55308.99	(0.06)	[71023]
	2(1, 2) - 1(1, 1)		5/2		5/2	(0,0,0)	55312.61	(0.06)	[71023]
	2(1, 2) - 1(1, 1)		7/2		5/2	(0,0,0)	55328.23	(0.06)	[71023]
	2(1, 2) - 1(1, 1)		3/2		1/2	(0,0,0)	55335.56	(0.06)	[71023]
	2(1, 2) - 1(1, 1)		1/2		1/2	(0,0,0)	55351.13	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		5/2		3/2	(0,0,0)	56543.99	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		3/2		3/2	(0,0,0)	56554.57	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		5/2		5/2	(0,0,0)	56559.57	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		7/2		5/2	(0,0,0)	56574.46	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		3/2		1/2	(0,0,0)	56582.72	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		1/2		1/2	(0,0,0)	56597.46	(0.06)	[71023]
	6(2, 5) - 5(2, 4)					(0,0,0)	167783.18	(0.40)	[71023]
	6(2, 4) - 5(2, 3)					(0,0,0)	167815.11	(0.40)	[71023]
$D^{16}O^{37}Cl$	1(0, 1) - 0(0, 0)		3/2		3/2	(0,0,0)	27453.87	(0.05)	[69024]
	1(0, 1) - 0(0, 0)		5/2		3/2	(0,0,0)	27477.98	(0.05)	[69024]
	1(0, 1) - 0(0, 0)		1/2		3/2	(0,0,0)	27497.21	(0.05)	[69024]
	2(1, 2) - 1(1, 1)		5/2		3/2	(0,0,0)	54323.80	(0.06)	[71023]
	2(1, 2) - 1(1, 1)		3/2		3/2	(0,0,0)	54332.69	(0.06)	[71023]
	2(1, 2) - 1(1, 1)		5/2		5/2	(0,0,0)	54335.57	(0.06)	[71023]
	2(1, 2) - 1(1, 1)		7/2		5/2	(0,0,0)	54347.80	(0.06)	[71023]
	2(1, 2) - 1(1, 1)		3/2		1/2	(0,0,0)	54353.67	(0.06)	[71023]
	2(1, 2) - 1(1, 1)		1/2		1/2	(0,0,0)	54365.95	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		5/2		3/2	(0,0,0)	55526.04	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		3/2		3/2	(0,0,0)	55534.40	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		5/2		5/2	(0,0,0)	55538.35	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		7/2		5/2	(0,0,0)	55550.04	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		3/2		1/2	(0,0,0)	55556.41	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		1/2		1/2	(0,0,0)	55567.94	(0.06)	[71023]
$D^{18}O^{35}Cl$	2(1, 2) - 1(1, 1)		5/2		3/2	(0,0,0)	51928.60	(0.06)	[71023]
	2(1, 2) - 1(1, 1)		3/2		3/2	(0,0,0)	51939.71	(0.06)	[71023]
	2(1, 2) - 1(1, 1)		5/2		5/2	(0,0,0)	51943.39	(0.06)	[71023]
	2(1, 2) - 1(1, 1)		7/2		5/2	(0,0,0)	51959.02	(0.06)	[71023]
	2(1, 2) - 1(1, 1)		3/2		1/2	(0,0,0)	51966.38	(0.06)	[71023]
	2(1, 2) - 1(1, 1)		1/2		1/2	(0,0,0)	51981.97	(0.06)	[71023]
	2(0, 2) - 1(0, 1)					(0,0,0)	52511.50	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		5/2		3/2	(0,0,0)	53044.23	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		3/2		3/2	(0,0,0)	53054.77	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		5/2		5/2	(0,0,0)	53059.81	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		7/2		5/2	(0,0,0)	53074.64	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		3/2		1/2	(0,0,0)	53082.86	(0.06)	[71023]
	2(1, 1) - 1(1, 0)		1/2		1/2	(0,0,0)	53097.67	(0.06)	[71023]

Table 23. Rotational, centrifugal distortion and hyperfine constants for $^{35}ClNO$ and $^{37}ClNO$.

Watson's Determinable Parameters	$^{35}Cl^{14}N^{16}O$ Value[a] (MHz)	$^{37}Cl^{14}N^{16}O$ Value[a] (MHz)	Derived Parameters (assuming planarity conditions)	$^{35}Cl^{14}N^{16}O$ Value[a] (MHz)	$^{37}Cl^{14}N^{16}O$ Value[a] (MHz)
A"	87 374.608(96)	87 207(66)[c]	A'	87 374.596(96)	87 207(66)
B"	5 737.6537(53)	5 601.217(33)	B'	5 737.757(11)	5 601.18(25)
C"	5 376.2712(55)	5 255.947(34)	C'	5 376.261(16)	5 256.08(26)
τ_1	0.1605(6)	0.1566(35)	τ'_{bbcc}	-0.02471(14)	-0.0246(11)
τ_2	-0.01106(24)	-0.0124(28)	τ'_{ccaa}	0.206(28)	
τ_3[b]	7.01(3)	6.59(88)	τ'_{aabb}	-0.021(28)	
τ_{aaaa}	-17.23(13)	0[c]	$\tau_{aabb}(1)$	0.310(32)	
τ_{bbbb}	-0.029426(40)	-0.02750(121)	$\tau_{aabb}(2)$	0.239(16)	
τ_{cccc}	-0.021446(107)	-0.02040(95)	$\tau_{aabb}(3)$	0.239(16)	
$\chi_{aa}(Cl)$	-49.69(33)	-39.02(37)	$\tau_{abab}(1)$	-0.166(30)	
$\chi_{bb}(Cl)$	29.96(53)	23.47(57)	$\tau_{abab}(2)$	-0.099(15)	
$\chi_{cc}(Cl)$	19.73(53)	15.55(57)	$\tau_{abab}(3)$	-0.094(18)	
Std. dev.	0.197	0.350	$\Delta\tau$	$-4.8(3.2)\times10^{-4}$	0.0016(36)
No. lines	44	34			

[a] The uncertainties quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

[c] Since A" and τ_{aaaa} are directly correlated, τ_{aaaa} had to be fixed at zero in this analysis.

Table 23.1. Rotational constants for the ground and vibrationally excited states of ClNO.

Isotopic Species	Vib. State v_1 v_2 v_3	A (MHz)	B (MHz)	C (MHz)	Reference[a]
$^{35}Cl^{14}N^{16}O$	0 0 0	87 374.43(3)	5 737.72(1)	5 376.27(1)	[75010]
	0 1 0	88 147(46)	5 715.70(2)	5 348.16(2)	[75010]
	0 0 1	87 879.64(30)	5 710.53(5)	5 349.19(3)	[75010]
$^{37}Cl^{14}N^{16}O$	0 0 0	---	5 601.25(4)	5 255.99(4)	[65007]
$^{35}Cl^{14}N^{18}O$	0 0 0	---	5 439.31(40)	5 103.17(40)	[61005]

[a] Additional references: [50015], [61004], and [75014].

Table 23.2. Hyperfine constants and dipole moment of ClNO [65007][a].

Isotopic Species	$\chi_{aa}(Cl)$ (MHz)	$\chi_{bb}(Cl)$ (MHz)	$\chi_{aa}(N)$ (MHz)	$\chi_{bb}(N)$ (MHz)	μ_a (D)
$^{35}Cl^{14}N^{16}O$	-49.18(35)	29.46(20)	1.0(4)	-4.8(2)	1.28(4)[b]
$^{37}Cl^{14}N^{16}O$	-38.89(40)	22.97(30)	1.0(4)	-4.8(2)	
$^{35}Cl^{14}N^{18}O$	-48.8[c]				

[a] The values in the table are taken from this reference unless otherwise indicated.

[b] Reference [51005].

[c] Reference [61005].

TABLE 23.3. The microwave spectrum of ClNO

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{35}Cl^{14}N^{16}O$	1(0, 1) - 0(0, 0)					(0,0,1)	11059.70	(0.05)	[75010]
	1(0, 1) - 0(0, 0)					(0,1,0)	11063.82	(0.05)	[75010]
	1(0, 1) - 0(0, 0)		3/2		3/2	(0,0,0)	11104.21	(0.03)	[65007]
	1(0, 1) - 0(0, 0)		5/2		3/2	(0,0,0)	11116.47	(0.03)	[65007]
	1(0, 1) - 0(0, 0)		1/2		3/2	(0,0,0)	11126.26	(0.03)	[65007]
	20(1,19) - 19(2,18)					(0,0,0)	13344.85	(0.05)	[75010]
	17(2,16) - 18(1,17)					(0,0,0)	15452.88	(0.05)	[75010]
	2(1, 2) - 1(1, 1)					(0,0,1)	21758.23	(0.05)	[75010]
	2(1, 2) - 1(1, 1)	5/2	5/2	3/2	3/2	(0,0,0)	21855.87	(0.03)	[65007]
	2(1, 2) - 1(1, 1)	7/2	5/2	5/2	3/2	(0,0,0)	21857.47	(0.03)	[65007]
	2(1, 2) - 1(1, 1)	3/2	5/2	1/2	3/2	(0,0,0)	21858.24	(0.03)	[65007]
	2(1, 2) - 1(1, 1)	3/2	3/2	3/2	3/2	(0,0,0)	21859.97	(0.03)	[65007]
	2(1, 2) - 1(1, 1)	5/2	3/2	5/2	3/2	(0,0,0)	21861.00	(0.03)	[65007]
	2(1, 2) - 1(1, 1)	7/2	5/2	7/2	5/2	(0,0,0)	21864.38	(0.03)	[65007]
	2(1, 2) - 1(1, 1)	5/2	5/2	5/2	5/2	(0,0,0)	21865.00	(0.03)	[65007]
	2(1, 2) - 1(1, 1)	9/2	7/2	7/2	5/2	(0,0,0)	21869.65	(0.03)	[65007]
	2(1, 2) - 1(1, 1)		3/2		1/2	(0,0,0)	21874.26	(0.03)	[65007]
	2(1, 2) - 1(1, 1)		1/2		1/2	(0,0,0)	21879.18	(0.03)	[65007]
	2(0, 2) - 1(0, 1)		3/2		1/2	(0,0,1)	22106.31	(0.20)	[51005]
	2(0, 2) - 1(0, 1)		5/2		5/2	(0,0,1)	22106.31	(0.20)	[51005]
	2(0, 2) - 1(0, 1)		5/2		3/2	(0,0,1)	22118.93	(0.10)	[51005]
	2(0, 2) - 1(0, 1)		7/2		5/2	(0,0,1)	22118.93	(0.10)	[51005]
	2(0, 2) - 1(0, 1)		3/2		3/2	(0,0,1)	22126.81	(0.20)	[51005]
	2(0, 2) - 1(0, 1)		5/2		5/2	(0,0,0)	22215.08	(0.10)	[51005]
	2(0, 2) - 1(0, 1)		3/2		1/2	(0,0,0)	22215.08	(0.10)	[51005]
	2(0, 2) - 1(0, 1)		5/2		3/2	(0,0,0)	22227.37	(0.10)	[51005]
	2(0, 2) - 1(0, 1)		7/2		5/2	(0,0,0)	22227.37	(0.10)	[51005]
	2(0, 2) - 1(0, 1)		3/2		3/2	(0,0,0)	22236.45	(0.10)	[51005]
	2(1, 1) - 1(1, 0)		5/2		3/2	(0,0,1)	22471.6	(0.30)	[51005]
	2(1, 1) - 1(1, 0)		3/2		3/2	(0,0,1)	22476.2	(0.30)	[51005]
	2(1, 1) - 1(1, 0)		5/2		5/2	(0,0,1)	22476.2	(0.30)	[51005]
	2(1, 1) - 1(1, 0)		7/2		5/2	(0,0,1)	22483.7	(0.30)	[51005]
	2(1, 1) - 1(1, 0)		3/2		1/2	(0,0,1)	22483.7	(0.30)	[51005]
	2(1, 1) - 1(1, 0)	3/2	5/2	1/2	3/2	(0,0,0)	22578.87	(0.03)	[65007]
	2(1, 1) - 1(1, 0)	7/2	5/2	5/2	3/2	(0,0,0)	22579.82	(0.03)	[65007]
	2(1, 1) - 1(1, 0)	5/2	5/2	3/2	3/2	(0,0,0)	22580.87	(0.03)	[65007]
	2(1, 1) - 1(1, 0)	9/2	7/2	7/2	5/2	(0,0,0)	22592.27	(0.03)	[65007]
	2(1, 1) - 1(1, 0)	7/2	7/2	5/2	5/2	(0,0,0)	22592.87	(0.03)	[65007]
	2(1, 1) - 1(1, 0)		3/2		1/2	(0,0,0)	22594.45	(0.03)	[65007]
	2(1, 1) - 1(1, 0)		1/2		1/2	(0,0,0)	22602.01	(0.03)	[65007]
	9(0, 9) - 8(1, 8)					(0,0,0)	24355.32	(0.05)	[75010]
	21(1,20) - 20(2,19)					(0,0,0)	27956.94	(0.05)	[75010]
	16(2,15) - 17(1,16)					(0,0,0)	29630.44	(0.05)	[75010]
	3(1, 3) - 2(1, 2)					(0,0,1)	32636.40	(0.05)	[75010]
	3(1, 3) - 2(1, 2)					(0,1,0)	32639.52	(0.05)	[75010]
	3(0, 3) - 2(0, 2)					(0,0,1)	33173.66	(0.05)	[75010]
	3(1, 2) - 2(1, 1)					(0,0,1)	33719.94	(0.05)	[75010]
	3(1, 2) - 2(1, 1)					(0,1,0)	33742.14	(0.05)	[75010]
	10(0,10) - 9(1, 9)					(0,0,1)	35842.66	(0.05)	[75010]
	3(1, 3) - 4(0, 4)					(0,0,0)	36292.56	(0.05)	[75010]
	10(0,10) - 9(1, 9)					(0,0,0)	36923.53	(0.05)	[75010]
	3(1, 3) - 4(0, 4)					(0,0,1)	37047.15	(0.05)	[75010]
	15(2,14) - 16(1,15)					(0,0,0)	43655.62	(0.05)	[75010]
	14(2,13) - 15(1,14)					(0,0,0)	57525.10	(0.05)	[75010]
	4(1, 3) - 4(0, 4)					(0,0,0)	83635.88	(0.05)	[75010]
	5(1, 4) - 5(0, 5)					(0,0,0)	84558.29	(0.05)	[75010]
	6(1, 5) - 6(0, 6)					(0,0,0)	85675.04	(0.05)	[75010]
	8(1, 8) - 7(1, 7)					(0,0,0)	87431.86	(0.20)	[62018]
	8(0, 8) - 7(0, 7)					(0,0,0)	88798.72	(0.20)	[62018]
	8(2, 7) - 7(2, 6)					(0,0,0)	88888.52	(0.20)	[62018]
	8(2, 6) - 7(2, 5)					(0,0,0)	88988.56	(0.20)	[62018]
	8(1, 7) - 7(1, 6)					(0,0,0)	90320.40	(0.20)	[62018]
	10(1, 9) - 10(0,10)					(0,0,0)	92200.78	(0.05)	[75010]
	1(1, 1) - 0(0, 0)					(0,0,0)	92746.50	(0.05)	[75010]
	9(1, 9) - 8(1, 8)					(0,0,0)	98350.06	(0.20)	[62018]

TABLE 23.3. The microwave spectrum of ClNO—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{35}Cl^{14}N^{16}O$	9(2, 8) - 8(2, 7)					(0,0,0)	99990.06	(0.20)	[62018]
	9(6, 4) - 8(6, 3)					(0,0,0)	100052.27	(0.20)	[62018]
	9(6, 3) - 8(6, 2)					(0,0,0)	100052.27	(0.20)	[62018]
	9(7, 3) - 8(7, 2)					(0,0,0)	100064.64	(0.20)	[62018]
	9(7, 2) - 8(7, 1)					(0,0,0)	100064.64	(0.20)	[62018]
	9(8, 2) - 8(8, 1)					(0,0,0)	100079.27	(0.20)	[62018]
	9(8, 1) - 8(8, 0)					(0,0,0)	100079.27	(0.20)	[62018]
	9(2, 7) - 8(2, 6)					(0,0,0)	100133.59	(0.20)	[62018]
	9(1, 8) - 8(1, 7)					(0,0,0)	101598.50	(0.20)	[62018]
	10(1,10) - 9(1, 9)					(0,0,0)	109264.40	(0.20)	[62018]
	10(0,10) - 9(0, 9)					(0,0,0)	110918.30	(0.20)	[62018]
	10(2, 9) - 9(2, 8)					(0,0,0)	111089.48	(0.20)	[62018]
	10(6, 5) - 9(6, 4)					(0,0,0)	111165.33	(0.20)	[62018]
	10(6, 4) - 9(6, 3)					(0,0,0)	111165.33	(0.20)	[62018]
	10(7, 4) - 9(7, 3)					(0,0,0)	111178.90	(0.20)	[62018]
	10(7, 3) - 9(7, 2)					(0,0,0)	111178.90	(0.20)	[62018]
	10(8, 3) - 9(8, 2)					(0,0,0)	111194.97	(0.20)	[62018]
	10(8, 2) - 9(8, 1)					(0,0,0)	111194.97	(0.20)	[62018]
	10(2, 8) - 9(2, 7)					(0,0,0)	111286.13	(0.20)	[62018]
	10(1, 9) - 9(1, 8)					(0,0,0)	112872.20	(0.20)	[62018]
	12(1,12) - 11(1,11)					(0,0,0)	131080.00	(0.25)	[66012]
	12(2,11) - 11(2,10)					(0,1,0)	132673.83	(0.05)	[75010]
	12(2,10) - 11(2, 9)					(0,1,0)	133021.15	(0.05)	[75010]
	12(2,11) - 11(2,10)					(0,0,0)	133276.96	(0.10)	[75010]
	12(3,10) - 11(3, 9)					(0,0,0)	133380.76	(0.10)	[75010]
	12(3, 9) - 11(3, 8)					(0,0,0)	133385.67	(0.10)	[75010]
	12(2,10) - 11(2, 9)					(0,0,0)	133616.32	(0.10)	[75010]
	12(1,11) - 11(1,10)					(0,0,0)	135404.88	(0.25)	[66012]
	13(2,12) - 12(2,11)					(0,0,0)	144364.43	(0.10)	[75010]
	13(9, 5) - 12(9, 4)					(0,0,0)	144556.90	(0.25)	[66012]
	13(9, 4) - 12(9, 3)					(0,0,0)	144556.90	(0.25)	[66012]
	13(10, 4) - 12(10, 3)					(0,0,0)	144582.74	(0.25)	[66012]
	13(10, 3) - 12(10, 2)					(0,0,0)	144582.74	(0.25)	[66012]
	13(2,11) - 12(2,10)					(0,0,0)	144795.31	(0.10)	[75010]
	13(1,12) - 12(1,11)					(0,0,0)	146662.61	(0.25)	[66012]
	18(1,18) - 17(1,17)					(0,0,0)	196399.58	(0.40)	[66012]
$^{37}Cl^{14}N^{16}O$	1(0, 1) - 0(0, 0)		3/2		3/2	(0,0,0)	10849.42	(0.03)	[65007]
	1(0, 1) - 0(0, 0)		5/2		3/2	(0,0,0)	10859.10	(0.03)	[65007]
	1(0, 1) - 0(0, 0)		1/2		3/2	(0,0,0)	10866.82	(0.03)	[65007]
	2(1, 2) - 1(1, 1)	5/2	5/2	3/2	3/2	(0,0,0)	21360.28	(0.03)	[65007]
	2(1, 2) - 1(1, 1)	7/2	5/2	5/2	3/2	(0,0,0)	21361.95	(0.03)	[65007]
	2(1, 2) - 1(1, 1)	9/2	7/2	7/2	5/2	(0,0,0)	21371.49	(0.03)	[65007]
	2(1, 2) - 1(1, 1)		3/2		1/2	(0,0,0)	21375.13	(0.03)	[65007]
	2(1, 2) - 1(1, 1)		1/2		1/2	(0,0,0)	21379.11	(0.03)	[65007]
	2(0, 2) - 1(0, 1)		5/2		5/2	(0,0,0)	21703.77	(0.10)	[51005]
	2(0, 2) - 1(0, 1)		3/2		1/2	(0,0,0)	21703.77	(0.10)	[51005]
	2(0, 2) - 1(0, 1)		5/2		3/2	(0,0,0)	21713.25	(0.10)	[51005]
	2(0, 2) - 1(0, 1)		7/2		5/2	(0,0,0)	21713.25	(0.10)	[51005]
	2(0, 2) - 1(0, 1)		3/2		3/2	(0,0,0)	21719.68	(0.20)	[51005]
	2(1, 1) - 1(1, 0)	7/2	5/2	5/2	3/2	(0,0,0)	22052.07	(0.03)	[65007]
	2(1, 1) - 1(1, 0)	5/2	5/2	3/2	3/2	(0,0,0)	22052.92	(0.03)	[65007]
	2(1, 1) - 1(1, 0)	9/2	7/2	7/2	5/2	(0,0,0)	22061.87	(0.03)	[65007]
	2(1, 1) - 1(1, 0)		3/2		1/2	(0,0,0)	22063.66	(0.03)	[65007]
	2(1, 1) - 1(1, 0)		1/2		1/2	(0,0,0)	22069.83	(0.03)	[65007]
	8(1, 7) - 7(1, 6)					(0,0,0)	88204.20	(0.20)	[62018]
	9(1, 9) - 8(1, 8)					(0,0,0)	96114.77	(0.20)	[62018]
	9(2, 8) - 8(2, 7)					(0,0,0)	97681.97	(0.20)	[62018]
	9(5, 5) - 8(5, 4)					(0,0,0)	97730.94	(0.20)	[62018]
	9(5, 4) - 8(5, 3)					(0,0,0)	97730.94	(0.20)	[62018]
	9(6, 4) - 8(6, 3)					(0,0,0)	97740.60	(0.20)	[62018]
	9(6, 3) - 8(6, 2)					(0,0,0)	97740.60	(0.20)	[62018]
	9(7, 3) - 8(7, 2)					(0,0,0)	97753.00	(0.20)	[62018]
	9(7, 2) - 8(7, 1)					(0,0,0)	97753.00	(0.20)	[62018]
	9(1, 8) - 8(1, 7)					(0,0,0)	99218.76	(0.20)	[62018]
	10(1,10) - 9(1, 9)					(0,0,0)	106781.56	(0.20)	[62018]

TABLE 23.3. The microwave spectrum of ClNO—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{37}Cl^{14}N^{16}O$	10(5, 6) - 9(5, 5)					(0,0,0)	108586.82	(0.20)	[62018]
	10(5, 5) - 9(5, 4)					(0,0,0)	108586.82	(0.20)	[62018]
	10(6, 5) - 9(6, 4)					(0,0,0)	108597.08	(0.20)	[62018]
	10(6, 4) - 9(6, 3)					(0,0,0)	108597.08	(0.20)	[62018]
	10(7, 4) - 9(7, 3)					(0,0,0)	108610.30	(0.20)	[62018]
	10(7, 3) - 9(7, 2)					(0,0,0)	108610.30	(0.20)	[62018]
	10(8, 3) - 9(8, 2)					(0,0,0)	108626.05	(0.20)	[62018]
	10(8, 2) - 9(8, 1)					(0,0,0)	108626.05	(0.20)	[62018]
	10(1, 9) - 9(1, 8)					(0,0,0)	110229.19	(0.20)	[62018]
	11(6, 6) - 10(6, 5)					(0,0,0)	119452.51	(0.25)	[62018]
	11(6, 5) - 10(6, 4)					(0,0,0)	119452.51	(0.25)	[62018]
	11(7, 5) - 10(7, 4)					(0,0,0)	119466.88	(0.25)	[62018]
	11(7, 4) - 10(7, 3)					(0,0,0)	119466.88	(0.25)	[62018]
	11(8, 4) - 10(8, 3)					(0,0,0)	119484.08	(0.25)	[62018]
	11(8, 3) - 10(8, 2)					(0,0,0)	119484.08	(0.25)	[62018]
	14(1,14) - 13(1,13)					(0,0,0)	149406.94	(0.30)	[66012]
	14(0,14) - 13(0,13)					(0,0,0)	151443.76	(0.30)	[66012]
	14(1,13) - 13(1,12)					(0,0,0)	154221.52	(0.30)	[66012]
	15(0,15) - 14(0,14)					(0,0,0)	162174.37	(0.30)	[66012]
	15(1,15) - 14(1,14)					(0,0,0)	160051.15	(0.30)	[66012]
$^{35}Cl^{14}N^{18}O$	1(0, 1) - 0(0, 0)		3/2		3/2	(0,0,0)	10532.72	(0.10)	[61005]
	1(0, 1) - 0(0, 0)		5/2		3/2	(0,0,0)	10544.88	(0.10)	[61005]
	3(1, 3) - 2(1, 2)		7/2		5/2	(0,0,0)	31121.14	(0.20)	[61005]
	3(1, 3) - 2(1, 2)		5/2		3/2	(0,0,0)	31121.14	(0.20)	[61005]
	3(1, 3) - 2(1, 2)		9/2		7/2	(0,0,0)	31123.80	(0.20)	[61005]
	3(1, 3) - 2(1, 2)		5/2		5/2	(0,0,0)	31123.80	(0.20)	[61005]
	3(1, 3) - 2(1, 2)		3/2		1/2	(0,0,0)	31123.80	(0.20)	[61005]
	3(0, 3) - 2(0, 2)		7/2		7/2	(0,0,0)	31611.34	(0.20)	[61005]
	3(0, 3) - 2(0, 2)		3/2		5/2	(0,0,0)	31620.48	(0.20)	[61005]
	3(0, 3) - 2(0, 2)		3/2		1/2	(0,0,0)	31620.48	(0.20)	[61005]
	3(0, 3) - 2(0, 2)		9/2		7/2	(0,0,0)	31623.50	(0.20)	[61005]
	3(0, 3) - 2(0, 2)		7/2		5/2	(0,0,0)	31623.50	(0.20)	[61005]
	3(0, 3) - 2(0, 2)		5/2		5/2	(0,0,0)	31628.97	(0.20)	[61005]
	3(0, 3) - 2(0, 2)		3/2		3/2	(0,0,0)	31632.28	(0.20)	[61005]
	3(1, 2) - 2(1, 1)		7/2		5/2	(0,0,0)	32129.17	(0.20)	[61005]
	3(1, 2) - 2(1, 1)		5/2		3/2	(0,0,0)	32129.17	(0.20)	[61005]
	3(1, 2) - 2(1, 1)		9/2		7/2	(0,0,0)	32132.36	(0.20)	[61005]
	3(2, 1) - 2(2, 0)		5/2		5/2	(0,0,0)	31623.50	(0.20)	[61005]
	3(2, 1) - 2(2, 0)		3/2		5/2	(0,0,0)	31623.50	(0.20)	[61005]
	3(2, 1) - 2(2, 0)		5/2		3/2	(0,0,0)	31632.28	(0.20)	[61005]
	3(2, 1) - 2(2, 0)		3/2		3/2	(0,0,0)	31632.28	(0.20)	[61005]
	3(2, 1) - 2(2, 0)		7/2		5/2	(0,0,0)	31632.28	(0.20)	[61005]

Table 24. Rotational and centrifugal distortion constants for $^{14}N^{32}S^{35}Cl$.

Watson's Determinable Parameters	Value[a] this work (MHz)	Value [72045]
A"	41 723.36(14)	41 723.34(16)
B"	4 114.1091(238)	4 114.154(26)
C"	3 738.5576(225)	3 738.605(21)
τ_1	0.1986(314)	....
τ_2	$0.9526(2940)\times10^{-2}$	....
τ_3[b]	0.9(2)	....
τ_{aaaa}	-7.071(284)	-6.99(30)
τ_{bbbb}	-0.01074(110)	-0.0110(13)
τ_{cccc}	$-5.358(1010)\times10^{-3}$	....
Std. dev.	0.364[c]	
No. lines	28	
Derived Parameters (assuming planarity conditions)		
A'	41 723.36(14)	
B'	4 114.140(34)	
C'	3 738.630(50)	
τ'_{bbcc}	-0.00772(92)	
τ'_{ccaa}	0.061(53)	
τ'_{aabb}	0.145(69)	
$\tau_{aabb}(1)$	0.144(62)	
$\tau_{aabb}(2)$	0.183(20)	0.176(14)
$\tau_{aabb}(3)$	0.183(20)	
$\tau_{abab}(1)$	0.0008(638)	
$\tau_{abab}(2)$	-0.0356(95)	-0.0334(68)
$\tau_{abab}(3)$	-0.0389(153)	
$\Delta\tau$	$0.54(105)\times10^{-3}$	

[a] The uncertainties quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations..

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

[c] Convergence was relatively slow and the $5_{1,4}$-$5_{0,5}$ deviates by -0.87 MHz as found in [72045].

Table 24.1. Rotational constants, hyperfine constants and electric dipole moment for NSCl [70021].

Isotopic Species	Vib. State v_1 v_2 v_3	A (MHz)	B (MHz)	C (MHz)	χ_{aa} (Cl) (MHz)	χ_{bb} (Cl) (MHz)	χ_{cc} (Cl) (MHz)
$^{14}N^{32}S^{35}Cl$	0 0 0	41 723.36[a]	4 114.109[a]	3 738.558[a]	-39.1	23.8	15.3
	0 1 0	41 835.87	4 097.62	3 722.47			
	0 0 1	42 436.12	4 104.81	3 726.52			
$^{14}N^{32}S^{37}Cl$	0 0 0	41 623.10	3 997.51	3 641.10			
$^{14}N^{34}S^{35}Cl$	0 0 0	40 583.07	4 079.15	3 700.26			
$^{15}N^{32}S^{35}Cl$	0 0 0	40 355.96	4 019.65	3 649.36	-38.51	23.51	15.00

Electric dipole moment for $^{15}N^{32}S^{35}Cl$ [72045]:

μ_a = 0.5645(85) D; μ_b = 1.747(35) D

[a] See Table 24 for centrifugal distortion analysis.

TABLE 24.2. The microwave spectrum of NSCl

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{14}N^{32}S^{35}Cl$	6(0, 6) - 5(1, 5)					(0,0,0)	11958.30	(0.20)	[72045]
	19(2,17) - 20(1,20)					(0,0,0)	12877.96	(0.20)	[72045]
	2(1, 2) - 3(0, 3)					(0,0,0)	13687.89	(0.20)	[72045]
	18(2,16) - 19(1,19)					(0,0,0)	13994.59	(0.20)	[72045]
	10(2, 9) - 11(1,10)					(0,0,0)	14923.31	(0.20)	[72045]
	14(1,13) - 13(2,12)					(0,0,0)	15490.03	(0.20)	[72045]
	17(2,15) - 18(1,18)					(0,0,0)	15665.16	(0.20)	[72045]
	16(2,14) - 17(1,17)					(0,0,0)	17872.57	(0.20)	[72045]
	15(2,13) - 16(1,16)					(0,0,0)	20594.13	(0.20)	[72045]
	7(0, 7) - 6(1, 6)					(0,0,0)	20801.36	(0.20)	[72045]
	1(1, 1) - 2(0, 2)					(0,0,0)	21904.86	(0.20)	[72045]
	14(2,12) - 15(1,15)					(0,0,0)	23807.70	(0.20)	[72045]
	9(2, 8) - 10(1, 9)					(0,0,0)	24744.92	(0.20)	[72045]
	15(1,14) - 14(2,13)					(0,0,0)	25920.70	(0.20)	[72045]
	13(2,11) - 14(1,14)					(0,0,0)	27486.13	(0.20)	[72045]
	8(0, 8) - 7(1, 7)					(0,0,0)	29768.26	(0.20)	[72045]
	12(2,10) - 13(1,13)					(0,0,0)	31601.97	(0.20)	[72045]
	1(1, 0) - 1(0, 1)					(0,0,0)	37983.1	(0.20)	[70021]
	3(1, 2) - 3(0, 3)					(0,1,0)	38063.51	(0.30)	[70021]
	1(1, 0) - 1(0, 1)					(0,1,0)	38113.5	(0.30)	[70021]
	2(1, 1) - 2(0, 2)					(0,0,0)	38361.72	(0.20)	[70021]
	2(1, 1) - 2(0, 2)					(0,1,0)	38491.68	(0.30)	[70021]
	1(1, 0) - 1(0, 1)					(0,0,1)	38710.1	(0.50)	[70021]
	3(1, 2) - 3(0, 3)					(0,0,0)	38934.40	(0.20)	[70021]
	3(1, 2) - 3(0, 3)					(0,0,1)	39667.20	(0.50)	[70021]
	4(1, 3) - 4(0, 4)					(0,0,0)	39708.73	(0.20)	[70021]
	4(1, 3) - 4(0, 4)					(0,1,0)	39836.42	(0.30)	[70021]
	2(1, 1) - 2(0, 2)					(0,0,2)	39851.5	(0.50)	[70021]
	3(1, 2) - 3(0, 3)					(0,0,2)	40432.7	(0.50)	[70021]
	4(1, 3) - 4(0, 4)					(0,0,1)	40446.28	(0.50)	[70021]
	5(1, 4) - 5(0, 5)					(0,0,0)	40690.41	(0.20)	[70021]
	5(1, 4) - 5(0, 5)					(0,1,0)	40817.81	(0.30)	[70021]
	5(1, 4) - 5(0, 5)					(0,2,0)	40945.2	(0.50)	[70021]
	5(1, 4) - 5(0, 5)					(0,0,1)	41434.95	(0.50)	[70021]
	6(1, 5) - 6(0, 6)					(0,0,0)	41893.52	(0.20)	[70021]
	6(1, 5) - 6(0, 6)					(0,1,0)	42017.41	(0.30)	[70021]
	6(1, 5) - 6(0, 6)					(0,2,0)	42144.6	(0.50)	[70021]
	6(1, 5) - 6(0, 6)					(0,0,1)	42643.33	(0.50)	[70021]
	7(1, 6) - 7(0, 7)					(0,0,0)	43327.0	(0.20)	[70021]
	8(1, 7) - 8(0, 8)					(0,0,0)	45005.0	(0.20)	[70021]

TABLE 24.2. The microwave spectrum of NSCl—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{14}N^{32}S^{35}Cl$	1(1, 1) - 0(0, 0)					(0,0,0)	45460.22	(0.20)	[70021]
	1(1, 1) - 0(0, 0)					(0,1,0)	45558.33	(0.30)	[70021]
	1(1, 1) - 0(0, 0)					(0,0,1)	46162.64	(0.50)	[70021]
	2(1, 2) - 1(0, 1)					(0,0,0)	52937.9	(0.20)	[70021]
	2(1, 2) - 1(0, 1)					(0,1,0)	53003.4	(0.30)	[70021]
	3(1, 3) - 2(0, 2)					(0,0,0)	60228.4	(0.20)	[70021]
$^{14}N^{32}S^{37}Cl$	1(1, 1) - 2(0, 2)					(0,0,0)	22349.7	(0.20)	[70021]
	2(1, 1) - 2(0, 2)					(0,0,0)	38340.96	(0.20)	[70021]
	3(1, 2) - 3(0, 3)					(0,0,0)	38883.77	(0.20)	[70021]
	4(1, 3) - 4(0, 4)					(0,0,0)	39617.16	(0.20)	[70021]
	5(1, 4) - 5(0, 5)					(0,0,0)	40546.83	(0.20)	[70021]
	6(1, 5) - 6(0, 6)					(0,0,0)	41683.50	(0.20)	[70021]
	7(1, 6) - 7(0, 7)					(0,0,0)	43037.7	(0.20)	[70021]
	8(1, 7) - 8(0, 8)					(0,0,0)	44620.9	(0.20)	[70021]
	1(1, 1) - 0(0, 0)					(0,0,0)	45264.20	(0.20)	[70021]
	2(1, 2) - 1(0, 1)					(0,0,0)	52546.4	(0.20)	[70021]
	3(1, 3) - 2(0, 2)					(0,0,0)	59651.8	(0.20)	[70021]
$^{14}N^{34}S^{35}Cl$	1(1, 0) - 1(0, 1)					(0,0,0)	36886.0	(0.30)	[70021]
	2(1, 1) - 2(0, 2)					(0,0,0)	37264.42	(0.30)	[70021]
	3(1, 2) - 3(0, 3)					(0,0,0)	37842.35	(0.30)	[70021]
	4(1, 3) - 4(0, 4)					(0,0,0)	38624.08	(0.30)	[70021]
	7(1, 6) - 7(0, 7)					(0,0,0)	42282.5	(0.30)	[70021]
	8(1, 7) - 8(0, 8)					(0,0,0)	43982.2	(0.30)	[70021]
	1(1, 1) - 0(0, 0)					(0,0,0)	44283.33	(0.30)	[70021]
$^{15}N^{32}S^{35}Cl$	1(1, 1) - 2(0, 2)					(0,0,0)	21001.94	(0.20)	[70021]
	1(1, 0) - 1(0, 1)		1/2		1/2	(0,0,0)	36693.34	(0.10)	[70021]
	1(1, 0) - 1(0, 1)		3/2		1/2	(0,0,0)	36699.75	(0.10)	[70021]
	1(1, 0) - 1(0, 1)		5/2		5/2	(0,0,0)	36704.00	(0.10)	[70021]
	1(1, 0) - 1(0, 1)		3/2		5/2	(0,0,0)	36707.80	(0.10)	[70021]
	1(1, 0) - 1(0, 1)		1/2		3/2	(0,0,0)	36710.90	(0.10)	[70021]
	1(1, 0) - 1(0, 1)		5/2		3/2	(0,0,0)	36713.60	(0.10)	[70021]
	1(1, 0) - 1(0, 1)		3/2		3/2	(0,0,0)	36717.49	(0.10)	[70021]
	2(1, 1) - 2(0, 2)		3/2		1/2	(0,0,0)	37070.32	(0.10)	[70021]
	2(1, 1) - 2(0, 2)		5/2		7/2	(0,0,0)	37072.92	(0.10)	[70021]
	2(1, 1) - 2(0, 2)		5/2		3/2	(0,0,0)	37075.83	(0.10)	[70021]
	2(1, 1) - 2(0, 2)		7/2		7/2	(0,0,0)	37078.83	(0.10)	[70021]
	2(1, 1) - 2(0, 2)		3/2		3/2	(0,0,0)	37079.90	(0.10)	[70021]
	2(1, 1) - 2(0, 2)		5/2		5/2	(0,0,0)	37082.59	(0.10)	[70021]
	2(1, 1) - 2(0, 2)		1/2		3/2	(0,0,0)	37085.77	(0.10)	[70021]
	2(1, 1) - 2(0, 2)		3/2		5/2	(0,0,0)	37086.85	(0.10)	[70021]
	2(1, 1) - 2(0, 2)		7/2		5/2	(0,0,0)	37088.55	(0.10)	[70021]
	3(1, 2) - 3(0, 3)		5/2		3/2	(0,0,0)	37635.40	(0.10)	[70021]
	3(1, 2) - 3(0, 3)		7/2		9/2	(0,0,0)	37636.03	(0.10)	[70021]
	3(1, 2) - 3(0, 3)		7/2		5/2	(0,0,0)	37641.09	(0.10)	[70021]
	3(1, 2) - 3(0, 3)		3/2		3/2	(0,0,0)	37643.66	(0.10)	[70021]
	3(1, 2) - 3(0, 3)		9/2		9/2	(0,0,0)	37644.24	(0.10)	[70021]
	3(1, 2) - 3(0, 3)		5/2		5/2	(0,0,0)	37645.01	(0.10)	[70021]
	3(1, 2) - 3(0, 3)		7/2		7/2	(0,0,0)	37645.61	(0.10)	[70021]
	3(1, 2) - 3(0, 3)		5/2		7/2	(0,0,0)	37649.44	(0.10)	[70021]
	3(1, 2) - 3(0, 3)		3/2		5/2	(0,0,0)	37653.29	(0.10)	[70021]
	3(1, 2) - 3(0, 3)		9/2		7/2	(0,0,0)	37653.90	(0.10)	[70021]
	5(1, 4) - 5(0, 5)					(0,0,0)	39377.21	(0.20)	[70021]
	6(1, 5) - 6(0, 6)					(0,0,0)	40563.54	(0.20)	[70021]
	7(1, 6) - 7(0, 7)					(0,0,0)	41987.25	(0.20)	[70021]
	1(1, 1) - 0(0, 0)		1/2		3/2	(0,0,0)	43999.36	(0.10)	[70021]
	1(1, 1) - 0(0, 0)		5/2		3/2	(0,0,0)	44004.15	(0.10)	[70021]
	1(1, 1) - 0(0, 0)		3/2		3/2	(0,0,0)	44010.10	(0.10)	[70021]
	2(1, 2) - 1(0, 1)		3/2		1/2	(0,0,0)	51294.70	(0.10)	[70021]
	2(1, 2) - 1(0, 1)		5/2		5/2	(0,0,0)	51299.40	(0.10)	[70021]
	2(1, 2) - 1(0, 1)		7/2		5/2	(0,0,0)	51303.20	(0.10)	[70021]
	2(1, 2) - 1(0, 1)		5/2		3/2	(0,0,0)	51309.10	(0.10)	[70021]
	2(1, 2) - 1(0, 1)		3/2		3/2	(0,0,0)	51311.84	(0.10)	[70021]
	3(1, 3) - 2(0, 2)		3/2		1/2	(0,0,0)	58414.00	(0.10)	[70021]
	3(1, 3) - 2(0, 2)		9/2		7/2	(0,0,0)	58417.70	(0.10)	[70021]
	3(1, 3) - 2(0, 2)		7/2		5/2	(0,0,0)	58421.40	(0.10)	[70021]
	3(1, 3) - 2(0, 2)		5/2		5/2	(0,0,0)	58424.08	(0.10)	[70021]

Table 25. Molecular parameters for ClO_2 (MHz).

Parameter	$^{16}O^{35}Cl^{16}O$ (0,0,0)	$^{16}O^{35}Cl^{16}O$ (0,1,0)	$^{16}O^{37}Cl^{16}O$	$^{16}O^{35}Cl^{18}O$
Rotation				
A	52 079.5	53 078.9(20)	50 736.37	50 580.9
B	9 952.23	9 943.58(6)	9 953.03	9 379.6
C	8 333.99	8 310.30(60)	8 299.07	7 891.7
[Ref.]	[62007][a]	[70022]	[62007][a]	[62005]
Spin-rotation				
A_s	-1 387.1(4)	-1 375.2(4)	-1 352.3	-1 341.8
B_s	-216.7(2)	-217.4(2)	-216.7	-202.4
C_s	4.4(2)	4.1(2)	4.6	4.3
[Ref.]	[70022]	[70022]	[62005]	[62005]
Hyperfine Structure				
O_s	-533.6		-521.4	-513.3
$(aa)_s$	-855.0		-830.9	-828.5
$(bb)_s$	316.9		304.7	310.9
$(cc)_s$	538.1		526.2	517.6
O_I	46.21		38.48	
$(aa)_I$	-77.87		-64.87	
$(bb)_I$	-83.09		-69.02	
$(cc)_I$	160.96		133.89	
$(aa)_Q$	-8.65		-6.82	
$(bb)_Q$	0.38		0.44	
$(cc)_Q$	8.27		6.38	
[Ref.]	[62005]		[62005]	[62005]
Electric dipole moment				
μ_b (D)	1.784(10)			
[Ref.]	[62008]			

[a] See Table 25.1 for centrifugal distortion analysis.

Additional references: [62003], [62004], [62006], [62009], [71025].

Table 25.1. Rotational and centrifugal distortion constants for ClO_2 (MHz).

Watson's Determinable Parameters	$^{35}ClO_2$ Present work[a]	$^{35}ClO_2$ Pillai and Curl [62007][c]	$^{37}ClO_2$ Pillai and Curl [62007]
A''	52 080.852(469)	52 079.5	50 736.37
B''	9 952.4807(1186)	9 952.23	9 953.03
C''	8 333.9733(936)	8 333.99	8 299.07
τ_1	0.37729(11044)		
τ_2	0.03098(1774)		
τ_3[b]	0.77(35)		
τ_{aaaa}	-7.7740(963)	-7.4308	-7.0525
τ_{bbbb}	-0.052405(7226)	-0.05151	-0.05151
τ_{cccc}	-0.01365(468)		
Std. dev.	0.825	2.5	0.4
No. lines fit	18		
Derived Parameters (assuming planarity conditions)			
A'	52 080.84(46)		
B'	9 952.53(11)		
C'	8 334.12(9)		
τ'_{bbcc}	-0.0258(63)		
τ'_{ccaa}	0.100(31)		
τ'_{aabb}	0.303(73)		
$\tau_{aabb}(1)$	0.429(48)		
$\tau_{aabb}(2)$	0.481(36)	0.3924	0.3824
$\tau_{aabb}(3)$	0.481(36)		
$\tau_{abab}(1)$	-0.063(13)		
$\tau_{abab}(2)$	-0.108(33)	-0.06051	-0.06001
$\tau_{abab}(3)$	-0.115(37)		
$\Delta\tau$	0.00190(96)		

[a] The uncertainties quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reporduce the calculated transition frequencies within their standard

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

[c] Combined infrared and microwave fit. See least-squares method of [62007] for comparison to present results.

TABLE 25.2. The microwave spectrum of ClO_2

Isotopic species	$N'(K'_-,K'_+) - N''(K''_-,K''_+)$	J'	F'	J''	F''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{35}Cl^{16}O$	11(2, 9) - 10(3, 8)	21/2	9	19/2	8	(0,0,0)	7438.2	(0.20)	[62007]
	11(3, 8) - 12(2,11)	23/2	13	25/2	14	(0,0,0)	7449.0	(0.20)	[62007]
	11(2, 9) - 10(3, 8)	21/2	10	19/2	9	(0,0,0)	7457.1	(0.20)	[62007]
	11(3, 8) - 12(2,11)	23/2	12	25/2	13	(0,0,0)	7469.2	(0.20)	[62007]
	11(2, 9) - 10(3, 8)	21/2	11	19/2	10	(0,0,0)	7476.2	(0.20)	[62007]
	11(3, 8) - 12(2,11)	23/2	11	25/2	12	(0,0,0)	7483.6	(0.20)	[62007]
	11(3, 8) - 12(2,11)	23/2	10	25/2	11	(0,0,0)	7493.8	(0.20)	[62007]
	11(2, 9) - 10(3, 8)	21/2	12	19/2	11	(0,0,0)	7494.9	(0.20)	[62007]
	11(2, 9) - 10(3, 8)	23/2	10	21/2	9	(0,0,0)	7672.3	(0.20)	[62007]
	11(3, 8) - 12(2,11)	21/2	9	23/2	10	(0,0,0)	8214.3	(0.20)	[62007]
	11(3, 8) - 12(2,11)	21/2	10	23/2	11	(0,0,0)	8235.3	(0.20)	[62007]
	11(3, 8) - 12(2,11)	21/2	11	23/2	12	(0,0,0)	8253.7	(0.20)	[62007]
	11(3, 8) - 12(2,11)	21/2	12	23/2	13	(0,0,0)	8268.6	(0.20)	[62007]
	14(4,11) - 15(3,12)	29/2	13	31/2	14	(0,0,0)	10558.4	(0.20)	[62007]
	14(4,11) - 15(3,12)	29/2	14	31/2	15	(0,0,0)	10565.2	(0.20)	[62007]
	14(4,11) - 15(3,12)	29/2	15	31/2	16	(0,0,0)	10572.8	(0.20)	[62007]
	14(4,11) - 15(3,12)	29/2	16	31/2	17	(0,0,0)	10581.5	(0.20)	[62007]
	28(7,22) - 29(6,23)	57/2	27	59/2	28	(0,0,0)	10767.2	(0.20)	[62007]
	28(7,22) - 29(6,23)	57/2	28	59/2	29	(0,0,0)	10768.9	(0.20)	[62007]
	28(7,22) - 29(6,23)	57/2	29	59/2	30	(0,0,0)	10770.7	(0.20)	[62007]
	28(7,22) - 29(6,23)	57/2	30	59/2	31	(0,0,0)	10771.9	(0.20)	[62007]
	14(4,11) - 15(3,12)	27/2	15	29/2	16	(0,0,0)	10868.7	(0.20)	[62007]
	14(4,11) - 15(3,12)	27/2	14	29/2	15	(0,0,0)	10877.8	(0.20)	[62007]
	14(4,11) - 15(3,12)	27/2	13	29/2	14	(0,0,0)	10887.1	(0.20)	[62007]
	14(4,11) - 15(3,12)	27/2	12	29/2	13	(0,0,0)	10896.2	(0.20)	[62007]
	28(7,22) - 29(6,23)	55/2	29	57/2	30	(0,0,0)	11179.3	(0.20)	[62007]
	28(7,22) - 29(6,23)	55/2	28	57/2	29	(0,0,0)	11181.2	(0.20)	[62007]
	28(7,22) - 29(6,23)	55/2	27	57/2	28	(0,0,0)	11183.0	(0.20)	[62007]
	28(7,22) - 29(6,23)	55/2	26	57/2	27	(0,0,0)	11184.5	(0.20)	[62007]
	13(2,11) - 14(1,14)	27/2	15	29/2	16	(0,0,0)	12742.7	(0.20)	[62007]
	3(0, 3) - 2(1, 2)	5/2	1	3/2	0	(0,1,0)	12765.25	(0.20)	[70022]
	3(0, 3) - 2(1, 2)	5/2	2	3/2	1	(0,1,0)	12771.25	(0.20)	[70022]
	3(0, 3) - 2(1, 2)	5/2	3	3/2	2	(0,1,0)	12807.72	(0.20)	[70022]
	13(2,11) - 14(1,14)	27/2	14	29/2	15	(0,0,0)	12822.4	(0.20)	[62007]
	11(3, 8) - 12(2,11)	23/2	13	25/2	14	(0,1,0)	12835.7	(0.20)	[70022]
	11(3, 8) - 12(2,11)	23/2	12	25/2	13	(0,1,0)	12855.3	(0.20)	[70022]
	3(0, 3) - 2(1, 2)	5/2	4	3/2	3	(0,1,0)	12866.92	(0.20)	[70022]
	11(3, 8) - 12(2,11)	23/2	11	25/2	12	(0,1,0)	12869.40	(0.20)	[70022]
	11(3, 8) - 12(2,11)	23/2	10	25/2	11	(0,1,0)	12880.0	(0.20)	[70022]
	13(2,11) - 14(1,14)	27/2	13	29/2	14	(0,0,0)	12883.5	(0.20)	[62007]
	13(2,11) - 14(1,14)	27/2	12	29/2	13	(0,0,0)	12929.4	(0.20)	[62007]
	3(0, 3) - 2(1, 2)	7/2	5	5/2	4	(0,1,0)	13138.45	(0.20)	[70022]
	3(0, 3) - 2(1, 2)	7/2	4	5/2	3	(0,1,0)	13153.6	(0.20)	[70022]
	3(0, 3) - 2(1, 2)	7/2	3	5/2	2	(0,1,0)	13163.4	(0.20)	[70022]
	3(0, 3) - 2(1, 2)	7/2	2	5/2	1	(0,1,0)	13169.5	(0.20)	[70022]
	11(3, 8) - 12(2,11)	21/2	9	23/2	10	(0,1,0)	13591.8	(0.20)	[70022]
	11(3, 8) - 12(2,11)	21/2	10	23/2	11	(0,1,0)	13612.5	(0.20)	[70022]
	11(3, 8) - 12(2,11)	21/2	11	23/2	12	(0,1,0)	13630.6	(0.20)	[70022]
	11(3, 8) - 12(2,11)	21/2	12	23/2	13	(0,1,0)	13645.3	(0.20)	[70022]
	3(0, 3) - 2(1, 2)	5/2	1	3/2	0	(0,0,0)	13852.05	(0.20)	[61006]
	3(0, 3) - 2(1, 2)	5/2	2	3/2	1	(0,0,0)	13858.45	(0.20)	[61006]
	3(0, 3) - 2(1, 2)	5/2	3	3/2	2	(0,0,0)	13894.5	(0.20)	[61006]
	3(0, 3) - 2(1, 2)	5/2	4	3/2	3	(0,0,0)	13953.6	(0.20)	[61006]
	3(0, 3) - 2(1, 2)	7/2	5	5/2	4	(0,0,0)	14231.6	(0.20)	[61006]
	3(0, 3) - 2(1, 2)	7/2	4	5/2	3	(0,0,0)	14246.7	(0.20)	[61006]
	3(0, 3) - 2(1, 2)	7/2	3	5/2	2	(0,0,0)	14256.4	(0.20)	[61006]
	3(0, 3) - 2(1, 2)	7/2	2	5/2	1	(0,0,0)	14262.5	(0.20)	[61006]
	13(2,11) - 14(1,14)	25/2	11	27/2	12	(0,0,0)	14549.5	(0.20)	[62007]
	13(2,11) - 14(1,14)	25/2	12	27/2	13	(0,0,0)	14630.9	(0.20)	[62007]
	13(2,11) - 14(1,14)	25/2	13	27/2	14	(0,0,0)	14706.4	(0.20)	[62007]
	13(2,11) - 14(1,14)	25/2	14	27/2	15	(0,0,0)	14770.3	(0.20)	[62007]
	14(2,13) - 13(3,10)	27/2	15	25/2	14	(0,0,0)	16522.4	(0.20)	[62007]
	14(2,13) - 13(3,10)	27/2	14	25/2	13	(0,0,0)	16542.1	(0.20)	[62007]
	14(2,13) - 13(3,10)	27/2	13	25/2	12	(0,0,0)	16566.7	(0.20)	[62007]
	14(2,13) - 13(3,10)	27/2	12	25/2	11	(0,0,0)	16592.7	(0.20)	[62007]

TABLE 25.2. The microwave spectrum of ClO_2—Continued

Isotopic species	$N'(K'_-,K'_+) - N''(K''_-,K''_+)$	J'	F'	J''	F''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{35}Cl^{16}O$	13(2,11) - 14(1,14)	27/2	15	29/2	16	(0,1,0)	17040.11	(0.20)	[70022]
	13(2,11) - 14(1,14)	27/2	14	29/2	15	(0,1,0)	17120.55	(0.20)	[70022]
	13(2,11) - 14(1,14)	27/2	13	29/2	14	(0,1,0)	17180.35	(0.20)	[70022]
	13(2,11) - 14(1,14)	27/2	12	29/2	13	(0,1,0)	17225.88	(0.20)	[70022]
	21(4,17) - 20(5,16)	41/2	19	39/2	18	(0,0,0)	17325.0	(0.20)	[62007]
	21(4,17) - 20(5,16)	41/2	20	39/2	19	(0,0,0)	17331.6	(0.20)	[62007]
	21(4,17) - 20(5,16)	41/2	21	39/2	20	(0,0,0)	17338.2	(0.20)	[62007]
	21(4,17) - 20(5,16)	41/2	22	39/2	21	(0,0,0)	17344.7	(0.20)	[62007]
	14(2,13) - 13(3,10)	29/2	13	27/2	12	(0,0,0)	17379.6	(0.20)	[62007]
	14(2,13) - 13(3,10)	29/2	14	27/2	13	(0,0,0)	17393.8	(0.20)	[62007]
	14(2,13) - 13(3,10)	29/2	15	27/2	14	(0,0,0)	17413.2	(0.20)	[62007]
	14(2,13) - 13(3,10)	29/2	16	27/2	15	(0,0,0)	17438.7	(0.20)	[62007]
	21(4,17) - 20(5,16)	43/2	23	41/2	22	(0,0,0)	17577.4	(0.20)	[62007]
	21(4,17) - 20(5,16)	43/2	22	41/2	21	(0,0,0)	17583.8	(0.20)	[62007]
	21(4,17) - 20(5,16)	43/2	21	41/2	20	(0,0,0)	17589.5	(0.20)	[62007]
	21(4,17) - 20(5,16)	43/2	20	41/2	19	(0,0,0)	17594.7	(0.20)	[62007]
	7(1, 6) - 6(2, 5)	13/2	5	11/2	4	(0,1,0)	17633.2	(0.20)	[70022]
	7(1, 6) - 6(2, 5)	13/2	6	11/2	5	(0,1,0)	17658.80	(0.20)	[70022]
	7(1, 6) - 6(2, 5)	13/2	7	11/2	6	(0,1,0)	17687.45	(0.20)	[70022]
	7(1, 6) - 6(2, 5)	13/2	8	11/2	7	(0,1,0)	17716.2	(0.20)	[70022]
	7(1, 6) - 6(2, 5)	15/2	9	13/2	8	(0,1,0)	17794.8	(0.20)	[70022]
	7(1, 6) - 6(2, 5)	15/2	8	13/2	7	(0,1,0)	17818.95	(0.20)	[70022]
	7(1, 6) - 6(2, 5)	15/2	7	13/2	6	(0,1,0)	17838.2	(0.20)	[70022]
	7(1, 6) - 6(2, 5)	15/2	6	13/2	5	(0,1,0)	17853.14	(0.20)	[70022]
	14(4,11) - 15(3,12)	29/2	13	31/2	14	(0,1,0)	18283.78	(0.20)	[70022]
	14(4,11) - 15(3,12)	29/2	14	31/2	15	(0,1,0)	18290.36	(0.20)	[70022]
	14(4,11) - 15(3,12)	29/2	15	31/2	16	(0,1,0)	18298.0	(0.20)	[70022]
	14(4,11) - 15(3,12)	29/2	16	31/2	17	(0,1,0)	18306.1	(0.20)	[70022]
	18(3,16) - 17(4,13)	35/2	19	33/2	18	(0,1,0)	18306.10	(0.20)	[70022]
	18(3,16) - 17(4,13)	35/2	18	33/2	17	(0,1,0)	18311.28	(0.20)	[70022]
	18(3,16) - 17(4,13)	35/2	17	33/2	16	(0,1,0)	18318.80	(0.20)	[70022]
	18(3,16) - 17(4,13)	35/2	16	33/2	15	(0,1,0)	18327.47	(0.20)	[70022]
	14(4,11) - 15(3,12)	27/2	15	29/2	16	(0,1,0)	18590.35	(0.20)	[70022]
	14(4,11) - 15(3,12)	27/2	14	29/2	15	(0,1,0)	18599.45	(0.20)	[70022]
	14(4,11) - 15(3,12)	27/2	13	29/2	14	(0,1,0)	18608.4	(0.20)	[70022]
	14(4,11) - 15(3,12)	27/2	12	29/2	13	(0,1,0)	18617.36	(0.20)	[70022]
	13(2,11) - 14(1,14)	25/2	11	27/2	12	(0,1,0)	18843.39	(0.20)	[70022]
	18(3,16) - 17(4,13)	37/2	17	35/2	16	(0,1,0)	18887.72	(0.20)	[70022]
	18(3,16) - 17(4,13)	37/2	18	35/2	17	(0,1,0)	18891.86	(0.20)	[70022]
	18(3,16) - 17(4,13)	37/2	19	35/2	18	(0,1,0)	18898.00	(0.20)	[70022]
	18(3,16) - 17(4,13)	37/2	20	35/2	19	(0,1,0)	18906.46	(0.20)	[70022]
	13(2,11) - 14(1,14)	25/2	12	27/2	13	(0,1,0)	18925.43	(0.20)	[70022]
	13(2,11) - 14(1,14)	25/2	13	27/2	14	(0,1,0)	18999.60	(0.20)	[70022]
	13(2,11) - 14(1,14)	25/2	14	27/2	15	(0,1,0)	19063.52	(0.20)	[70022]
	7(1, 6) - 6(2, 5)	13/2	5	11/2	4	(0,0,0)	20688.0	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	13/2	6	11/2	5	(0,0,0)	20713.3	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	13/2	7	11/2	6	(0,0,0)	20741.8	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	13/2	8	11/2	7	(0,0,0)	20770.6	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	15/2	9	13/2	8	(0,0,0)	20857.2	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	15/2	8	13/2	7	(0,0,0)	20881.2	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	15/2	7	13/2	6	(0,0,0)	20900.6	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	15/2	6	13/2	5	(0,0,0)	20915.9	(0.20)	[62005]
	4(2, 3) - 5(1, 4)	9/2	3	11/2	4	(0,0,0)	25261.0	(0.20)	[61006]
	4(2, 3) - 5(1, 4)	9/2	4	11/2	5	(0,0,0)	25274.6	(0.20)	[61006]
	4(2, 3) - 5(1, 4)	9/2	5	11/2	6	(0,0,0)	25290.1	(0.20)	[61006]
	4(2, 3) - 5(1, 4)	9/2	6	11/2	7	(0,0,0)	25306.7	(0.20)	[61006]
	18(3,16) - 17(4,13)	35/2	19	33/2	18	(0,0,0)	25745.7	(0.20)	[62007]
	18(3,16) - 17(4,13)	35/2	18	33/2	17	(0,0,0)	25751.1	(0.20)	[62007]
	18(3,16) - 17(4,13)	35/2	17	33/2	16	(0,0,0)	25758.5	(0.20)	[62007]
	18(3,16) - 17(4,13)	35/2	16	33/2	15	(0,0,0)	25767.4	(0.20)	[62007]
	4(2, 3) - 5(1, 4)	7/2	5	9/2	6	(0,0,0)	25798.5	(0.20)	[61006]
	4(2, 3) - 5(1, 4)	7/2	4	9/2	5	(0,0,0)	25828.1	(0.20)	[61006]
	4(2, 3) - 5(1, 4)	7/2	3	9/2	4	(0,0,0)	25852.7	(0.20)	[61006]
	4(2, 3) - 5(1, 4)	7/2	2	9/2	3	(0,0,0)	25870.1	(0.20)	[61006]
	18(5,14) - 19(4,15)	37/2	17	39/2	18	(0,0,0)	26239.4	(0.20)	[62007]

TABLE 25.2. The microwave spectrum of ClO_2—Continued

Isotopic species	$N'(K'_-,K'_+)$ - $N''(K''_-,K''_+)$	J'	F'	J''	F''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{35}Cl^{16}O$	18(5,14) - 19(4,15)	37/2	18	39/2	19	(0,0,0)	26242.6	(0.20)	[62007]
	18(5,14) - 19(4,15)	37/2	19	39/2	20	(0,0,0)	26246.1	(0.20)	[62007]
	18(5,14) - 19(4,15)	37/2	20	39/2	21	(0,0,0)	26249.4	(0.20)	[62007]
	18(3,16) - 17(4,13)	37/2	17	35/2	16	(0,0,0)	26337.6	(0.20)	[62007]
	18(3,16) - 17(4,13)	37/2	18	35/2	17	(0,0,0)	26341.9	(0.20)	[62007]
	18(3,16) - 17(4,13)	37/2	19	35/2	18	(0,0,0)	26348.2	(0.20)	[62007]
	18(3,16) - 17(4,13)	37/2	20	35/2	19	(0,0,0)	26356.8	(0.20)	[62007]
	18(5,14) - 19(4,15)	35/2	19	37/2	20	(0,0,0)	26657.1	(0.20)	[62007]
	18(5,14) - 19(4,15)	35/2	18	37/2	19	(0,0,0)	26661.3	(0.20)	[62007]
	18(5,14) - 19(4,15)	35/2	17	37/2	18	(0,0,0)	26665.1	(0.20)	[62007]
	18(5,14) - 19(4,15)	35/2	16	37/2	17	(0,0,0)	26668.4	(0.20)	[62007]
	4(2, 3) - 5(1, 4)	9/2	3	11/2	4	(0,1,0)	28359.4	(0.20)	[70022]
	4(2, 3) - 5(1, 4)	9/2	4	11/2	5	(0,1,0)	28373.1	(0.20)	[70022]
	4(2, 3) - 5(1, 4)	9/2	5	11/2	6	(0,1,0)	28388.5	(0.20)	[70022]
	4(2, 3) - 5(1, 4)	9/2	6	11/2	7	(0,1,0)	28405.2	(0.20)	[70022]
	4(2, 3) - 5(1, 4)	7/2	5	9/2	6	(0,1,0)	28886.1	(0.20)	[70022]
	4(2, 3) - 5(1, 4)	7/2	4	9/2	5	(0,1,0)	28915.9	(0.20)	[70022]
	4(2, 3) - 5(1, 4)	7/2	3	9/2	4	(0,1,0)	28940.2	(0.20)	[70022]
	4(2, 3) - 5(1, 4)	7/2	2	9/2	3	(0,1,0)	28957.9	(0.20)	[70022]
	16(2,15) - 15(3,12)	31/2	17	29/2	16	(0,0,0)	34372.7	(0.20)	[62007]
	16(2,15) - 15(3,12)	31/2	16	29/2	15	(0,0,0)	34398.6	(0.20)	[62007]
	16(2,15) - 15(3,12)	31/2	15	29/2	14	(0,0,0)	34429.2	(0.20)	[62007]
	16(2,15) - 15(3,12)	31/2	14	29/2	13	(0,0,0)	34463.4	(0.20)	[62007]
	16(2,15) - 15(3,12)	33/2	15	31/2	14	(0,0,0)	35399.6	(0.20)	[62007]
	16(2,15) - 15(3,12)	33/2	16	31/2	15	(0,0,0)	35418.8	(0.20)	[62007]
	16(2,15) - 15(3,12)	33/2	17	31/2	16	(0,0,0)	35444.0	(0.20)	[62007]
	16(2,15) - 15(3,12)	33/2	18	31/2	17	(0,0,0)	35477.4	(0.20)	[62007]
	17(3,14) - 16(4,13)	33/2	15	31/2	14	(0,0,0)	37167.6	(0.20)	[62007]
	17(3,14) - 16(4,13)	33/2	16	31/2	15	(0,0,0)	37182.2	(0.20)	[62007]
	17(3,14) - 16(4,13)	33/2	17	31/2	16	(0,0,0)	37196.1	(0.20)	[62007]
	17(3,14) - 16(4,13)	33/2	18	31/2	17	(0,0,0)	37208.8	(0.20)	[62007]
	17(3,14) - 16(4,13)	35/2	19	33/2	18	(0,0,0)	37253.6	(0.20)	[62007]
	17(3,14) - 16(4,13)	35/2	18	33/2	17	(0,0,0)	37268.0	(0.20)	[62007]
	17(3,14) - 16(4,13)	35/2	17	33/2	16	(0,0,0)	37279.3	(0.20)	[62007]
	17(3,14) - 16(4,13)	35/2	16	33/2	15	(0,0,0)	37289.2	(0.20)	[62007]
	1(1, 0) - 1(0, 1)	3/2	0	1/2	1	(0,0,0)	43112.78	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	1	1/2	1	(0,0,0)	43124.95	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	2	1/2	1	(0,0,0)	43140.30	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	2	1/2	2	(0,0,0)	43274.56	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	3	1/2	2	(0,0,0)	43285.5	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	2	3/2	3	(0,0,0)	43338.16	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	3	3/2	3	(0,0,0)	43348.60	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	1	3/2	2	(0,0,0)	43398.08	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	2	3/2	2	(0,0,0)	43413.60	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	0	3/2	1	(0,0,0)	43416.10	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	3	3/2	2	(0,0,0)	43423.60	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	1	3/2	1	(0,0,0)	43428.72	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	2	3/2	1	(0,0,0)	43444.10	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	2	1/2	1	(0,1,0)	44165.48	(0.20)	[70022]
	1(1, 0) - 1(0, 1)	1/2	1	1/2	1	(0,0,0)	44242.08	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	3	1/2	2	(0,1,0)	44310.20	(0.20)	[70022]
	1(1, 0) - 1(0, 1)	3/2	2	3/2	3	(0,1,0)	44363.31	(0.20)	[70022]
	1(1, 0) - 1(0, 1)	3/2	3	3/2	3	(0,1,0)	44373.93	(0.20)	[70022]
	1(1, 0) - 1(0, 1)	1/2	1	1/2	2	(0,0,0)	44376.00	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	1	3/2	2	(0,1,0)	44423.97	(0.20)	[70022]
	1(1, 0) - 1(0, 1)	1/2	2	1/2	1	(0,0,0)	44429.74	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	2	3/2	2	(0,1,0)	44439.28	(0.20)	[70022]
	1(1, 0) - 1(0, 1)	3/2	3	3/2	2	(0,1,0)	44449.50	(0.20)	[70022]
	1(1, 0) - 1(0, 1)	3/2	2	3/2	1	(0,1,0)	44469.50	(0.20)	[70022]
	1(1, 0) - 1(0, 1)	1/2	1	3/2	2	(0,0,0)	44515.28	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	1/2	1	3/2	1	(0,0,0)	44545.80	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	1/2	2	1/2	2	(0,0,0)	44564.10	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	1/2	2	3/2	3	(0,0,0)	44627.20	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	1/2	2	3/2	2	(0,0,0)	44703.00	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	1/2	1	1/2	1	(0,1,0)	45258.06	(0.20)	[70022]

TABLE 25.2. The microwave spectrum of ClO_2—Continued

Isotopic species	$N'(K'_-,K'_+) - N''(K''_-,K''_+)$	J'	F'	J''	F''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{35}Cl^{16}O$	1(1, 0) - 1(0, 1)	1/2	1	1/2	2	(0,1,0)	45392.14	(0.20)	[70022]
	1(1, 0) - 1(0, 1)	1/2	2	1/2	1	(0,1,0)	45445.76	(0.20)	[70022]
	1(1, 0) - 1(0, 1)	1/2	1	3/2	1	(0,1,0)	45563.86	(0.20)	[70022]
	1(1, 0) - 1(0, 1)	1/2	2	1/2	2	(0,1,0)	45579.80	(0.20)	[70022]
	1(1, 0) - 1(0, 1)	1/2	2	3/2	3	(0,1,0)	45644.10	(0.20)	[70022]
	3(1, 2) - 3(0, 3)	7/2	5	7/2	5	(0,0,0)	47697.2	(0.20)	[61006]
	3(1, 2) - 3(0, 3)	7/2	4	7/2	4	(0,0,0)	47739.8	(0.20)	[61006]
	3(1, 2) - 3(0, 3)	7/2	3	7/2	3	(0,0,0)	47764.6	(0.20)	[61006]
	3(1, 2) - 3(0, 3)	7/2	2	7/2	2	(0,0,0)	47778.2	(0.20)	[61006]
	3(1, 2) - 3(0, 3)	5/2	1	5/2	1	(0,0,0)	48232.10	(0.20)	[61006]
	3(1, 2) - 3(0, 3)	5/2	2	5/2	2	(0,0,0)	48276.60	(0.20)	[61006]
	3(1, 2) - 3(0, 3)	5/2	3	5/2	3	(0,0,0)	48336.0	(0.20)	[61006]
	3(1, 2) - 3(0, 3)	5/2	4	5/2	4	(0,0,0)	48398.20	(0.20)	[61006]
	5(0, 5) - 4(1, 4)	9/2	3	7/2	2	(0,0,0)	55055.8	(0.20)	[62007]
	5(0, 5) - 4(1, 4)	9/2	4	7/2	3	(0,0,0)	55075.2	(0.20)	[62007]
	5(0, 5) - 4(1, 4)	11/2	7	9/2	6	(0,0,0)	55090.6	(0.20)	[62007]
	5(0, 5) - 4(1, 4)	9/2	5	7/2	4	(0,0,0)	55104.6	(0.20)	[62007]
	5(0, 5) - 4(1, 4)	11/2	6	9/2	5	(0,0,0)	55113.0	(0.20)	[62007]
	5(0, 5) - 4(1, 4)	11/2	5	9/2	4	(0,0,0)	55126.8	(0.20)	[62007]
	5(0, 5) - 4(1, 4)	11/2	4	9/2	3	(0,0,0)	55135.8	(0.20)	[62007]
	5(0, 5) - 4(1, 4)	9/2	6	7/2	5	(0,0,0)	55138.8	(0.20)	[62007]
	5(1, 4) - 5(0, 5)	11/2	7	11/2	7	(0,0,0)	56011.6	(0.20)	[62007]
	5(1, 4) - 5(0, 5)	11/2	6	11/2	6	(0,0,0)	56053.8	(0.20)	[62007]
	5(1, 4) - 5(0, 5)	11/2	5	11/2	5	(0,0,0)	56085.4	(0.20)	[62007]
	5(1, 4) - 5(0, 5)	11/2	4	11/2	4	(0,0,0)	56103.6	(0.20)	[62007]
	5(1, 4) - 5(0, 5)	9/2	3	9/2	3	(0,0,0)	56576.9	(0.20)	[62007]
	5(1, 4) - 5(0, 5)	9/2	4	9/2	4	(0,0,0)	56623.6	(0.20)	[62007]
	5(1, 4) - 5(0, 5)	9/2	5	9/2	5	(0,0,0)	56674.6	(0.20)	[62007]
	5(1, 4) - 5(0, 5)	9/2	6	9/2	6	(0,0,0)	56723.0	(0.20)	[62007]
$^{16}O^{37}Cl^{16}O$	11(2, 9) - 10(3, 8)	21/2	9	19/2	8	(0,0,0)	15002.8	(0.20)	[62007]
	11(2, 9) - 10(3, 8)	21/2	10	19/2	9	(0,0,0)	15019.1	(0.20)	[62007]
	11(2, 9) - 10(3, 8)	21/2	11	19/2	10	(0,0,0)	15035.1	(0.20)	[62007]
	11(2, 9) - 10(3, 8)	21/2	12	19/2	11	(0,0,0)	15051.1	(0.20)	[62007]
	3(0, 3) - 2(1, 2)	5/2	1	3/2	0	(0,0,0)	15131.8	(0.20)	[61006]
	3(0, 3) - 2(1, 2)	5/2	2	3/2	1	(0,0,0)	15136.9	(0.20)	[61006]
	11(2, 9) - 10(3, 8)	23/2	13	21/2	12	(0,0,0)	15161.9	(0.20)	[62007]
	3(0, 3) - 2(1, 2)	5/2	3	3/2	2	(0,0,0)	15166.8	(0.20)	[61006]
	11(2, 9) - 10(3, 8)	23/2	12	21/2	11	(0,0,0)	15177.1	(0.20)	[62007]
	11(2, 9) - 10(3, 8)	23/2	11	21/2	10	(0,0,0)	15189.9	(0.20)	[62007]
	11(2, 9) - 10(3, 8)	23/2	10	21/2	9	(0,0,0)	15200.4	(0.20)	[62007]
	3(0, 3) - 2(1, 2)	5/2	4	3/2	3	(0,0,0)	15215.3	(0.20)	[61006]
	3(0, 3) - 2(1, 2)	7/2	5	5/2	4	(0,0,0)	15486.3	(0.20)	[61006]
	3(0, 3) - 2(1, 2)	7/2	4	5/2	3	(0,0,0)	15499.2	(0.20)	[61006]
	3(0, 3) - 2(1, 2)	7/2	3	5/2	2	(0,0,0)	15507.4	(0.20)	[61006]
	3(0, 3) - 2(1, 2)	7/2	2	5/2	1	(0,0,0)	15512.4	(0.20)	[61006]
	14(2,13) - 13(3,10)	27/2	15	25/2	14	(0,0,0)	20643.6	(0.20)	[62007]
	14(2,13) - 13(3,10)	27/2	14	25/2	13	(0,0,0)	20661.4	(0.20)	[62007]
	14(2,13) - 13(3,10)	27/2	13	25/2	12	(0,0,0)	20682.2	(0.20)	[62007]
	14(2,13) - 13(3,10)	27/2	12	25/2	11	(0,0,0)	20705.5	(0.20)	[62007]
	4(2, 3) - 5(1, 4)	9/2	3	11/2	4	(0,0,0)	21226.3	(0.20)	[61006]
	4(2, 3) - 5(1, 4)	9/2	4	11/2	5	(0,0,0)	21237.5	(0.20)	[61006]
	4(2, 3) - 5(1, 4)	9/2	5	11/2	6	(0,0,0)	21250.4	(0.20)	[61006]
	4(2, 3) - 5(1, 4)	9/2	6	11/2	7	(0,0,0)	21264.3	(0.20)	[61006]
	14(2,13) - 13(3,10)	29/2	13	27/2	12	(0,0,0)	21509.9	(0.20)	[62007]
	14(2,13) - 13(3,10)	29/2	14	27/2	13	(0,0,0)	21522.6	(0.20)	[62007]
	14(2,13) - 13(3,10)	29/2	15	27/2	14	(0,0,0)	21539.8	(0.20)	[62007]
	14(2,13) - 13(3,10)	29/2	16	27/2	15	(0,0,0)	21561.8	(0.20)	[62007]
	4(2, 3) - 5(1, 4)	7/2	5	9/2	6	(0,0,0)	21739.2	(0.20)	[61006]
	4(2, 3) - 5(1, 4)	7/2	4	9/2	5	(0,0,0)	21764.2	(0.20)	[61006]
	4(2, 3) - 5(1, 4)	7/2	3	9/2	4	(0,0,0)	21784.1	(0.20)	[61006]
	4(2, 3) - 5(1, 4)	7/2	2	9/2	3	(0,0,0)	21797.7	(0.20)	[61006]
	7(1, 6) - 6(2, 5)	13/2	5	11/2	4	(0,0,0)	24856.0	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	13/2	6	11/2	5	(0,0,0)	24876.8	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	13/2	7	11/2	6	(0,0,0)	24898.5	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	13/2	8	11/2	7	(0,0,0)	24924.6	(0.20)	[62005]

TABLE 25.2. The microwave spectrum of ClO_2—Continued

Isotopic species	$N'(K'_-,K'_+)$ - $N''(K''_-,K''_+)$	J'	F'	J''	F''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{37}Cl^{16}O$	7(1, 6) - 6(2, 5)	15/2	9	13/2	8	(0,0,0)	25006.3	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	15/2	8	13/2	7	(0,0,0)	25026.1	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	15/2	7	13/2	6	(0,0,0)	25041.0	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	15/2	6	13/2	5	(0,0,0)	25054.7	(0.20)	[62005]
	1(1, 0) - 1(0, 1)	3/2	2	1/2	1	(0,0,0)	41856.53	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	2	1/2	2	(0,0,0)	41968.48	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	3	1/2	2	(0,0,0)	41977.60	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	2	3/2	3	(0,0,0)	42047.54	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	3	3/2	3	(0,0,0)	42055.84	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	1	3/2	2	(0,0,0)	42096.40	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	2	3/2	2	(0,0,0)	42109.20	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	0	3/2	1	(0,0,0)	42112.40	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	3	3/2	2	(0,0,0)	42117.52	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	3/2	2	3/2	1	(0,0,0)	42135.12	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	1/2	1	1/2	1	(0,0,0)	42948.50	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	1/2	1	1/2	2	(0,0,0)	43060.24	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	1/2	2	1/2	1	(0,0,0)	43104.18	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	1/2	1	3/2	2	(0,0,0)	43201.54	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	1/2	2	1/2	2	(0,0,0)	43215.84	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	1/2	1	3/2	1	(0,0,0)	43227.26	(0.20)	[61006]
	1(1, 0) - 1(0, 1)	1/2	2	3/2	3	(0,0,0)	43294.8	(0.20)	[61006]
	3(1, 2) - 3(0, 3)	7/2	5	7/2	5	(0,0,0)	46503.6	(0.20)	[61006]
	3(1, 2) - 3(0, 3)	7/2	4	7/2	4	(0,0,0)	46539.0	(0.20)	[61006]
	3(1, 2) - 3(0, 3)	7/2	3	7/2	3	(0,0,0)	46560.0	(0.20)	[61006]
	3(1, 2) - 3(0, 3)	7/2	2	7/2	2	(0,0,0)	46571.0	(0.20)	[61006]
	3(1, 2) - 3(0, 3)	5/2	1	5/2	1	(0,0,0)	47037.0	(0.20)	[61006]
	3(1, 2) - 3(0, 3)	5/2	2	5/2	2	(0,0,0)	47074.4	(0.20)	[61006]
	3(1, 2) - 3(0, 3)	5/2	3	5/2	3	(0,0,0)	47122.6	(0.20)	[61006]
	3(1, 2) - 3(0, 3)	5/2	4	5/2	4	(0,0,0)	47175.7	(0.20)	[61006]
$^{16}O^{35}Cl^{18}O$	3(0, 3) - 2(1, 2)	5/2	1	3/2	0	(0,0,0)	11633.8	(0.20)	[62005]
	3(0, 3) - 2(1, 2)	5/2	2	3/2	1	(0,0,0)	11640.1	(0.20)	[62005]
	3(0, 3) - 2(1, 2)	5/2	3	3/2	2	(0,0,0)	11677.5	(0.20)	[62005]
	3(0, 3) - 2(1, 2)	5/2	4	3/2	3	(0,0,0)	11736.2	(0.20)	[62005]
	3(0, 3) - 2(1, 2)	7/2	5	5/2	4	(0,0,0)	12011.4	(0.20)	[62005]
	3(0, 3) - 2(1, 2)	7/2	4	5/2	3	(0,0,0)	12026.6	(0.20)	[62005]
	3(0, 3) - 2(1, 2)	7/2	2	5/2	1	(0,0,0)	12042.7	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	13/2	5	11/2	4	(0,0,0)	14855.6	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	13/2	6	11/2	5	(0,0,0)	14881.2	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	13/2	7	11/2	6	(0,0,0)	14910.0	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	13/2	8	11/2	7	(0,0,0)	14939.1	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	15/2	8	13/2	7	(0,0,0)	15059.2	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	15/2	7	13/2	6	(0,0,0)	15078.4	(0.20)	[62005]
	7(1, 6) - 6(2, 5)	15/2	6	13/2	5	(0,0,0)	15093.6	(0.20)	[62005]
	4(2, 3) - 5(1, 4)	9/2	3	11/2	4	(0,0,0)	28308.2	(0.20)	[62005]
	4(2, 3) - 5(1, 4)	9/2	4	11/2	5	(0,0,0)	28322.1	(0.20)	[62005]
	4(2, 3) - 5(1, 4)	9/2	5	11/2	6	(0,0,0)	28337.4	(0.20)	[62005]
	4(2, 3) - 5(1, 4)	9/2	6	11/2	7	(0,0,0)	28354.2	(0.20)	[62005]
	4(2, 3) - 5(1, 4)	7/2	5	9/2	6	(0,0,0)	28843.6	(0.20)	[62005]
	4(2, 3) - 5(1, 4)	7/2	4	9/2	5	(0,0,0)	28873.7	(0.20)	[62005]
	4(2, 3) - 5(1, 4)	7/2	3	9/2	4	(0,0,0)	28897.9	(0.20)	[62005]

Table 26. Rotational and centrifugal distortion constants for Cl_2O from reanalysis.[a]

Watson's Determinable Parameters	$^{35}Cl_2{}^{16}O$ (MHz)	$^{35}Cl_2{}^{16}O^{37}Cl$ (MHz)	$^{37}Cl_2{}^{16}O$ (MHz)
A''	42 046.328(61)	41 833.98(41)	41 620.40(80)
B''	3 683.03984(600)	3 583.0699(444)	3 484.164(93)
C''	3 381.85254(544)	3 296.0476(348)	3 210.952(77)
τ_1	0.143297(3273)	0.12743(5018)	0.1879(1033)
τ_2	0.0051229(3016)	0.003648(4590)	0.009535(9390)
τ_3[b]	1.05(2)	1.1(3)	0.79(54)
τ_{aaaa}	-5.4748(491)	-5.388(748)	-5.993(1420)
τ_{bbbb}	-0.00870721(9427)	-0.0087947(15065)	-0.006321(3012)
τ_{cccc}	-0.0051090(801)	-0.005297(1270)	-0.00446(261)
Std. dev.	0.178	0.756	1.393
No. lines fit	47	25	22
Derived Parameters (assuming planarity conditions)			
A'	42 046.325(61)	41 833.98(41)	
B'	3 683.074(6)	3 583.101(41)	
C'	3 381.894(5)	3 296.084(34)	
τ'_{bbcc}	-0.00655(9)	-0.0067(14)	
τ'_{ccaa}	0.06768(10)	0.062(14)	
τ'_{aabb}	0.0822(22)	0.072(35)	
$\tau_{aabb}(1)$	0.1227(15)	0.113(22)	
$\tau_{aabb}(2)$	0.1215(13)	0.117(20)	
$\tau_{aabb}(3)$	0.1215(13)	0.117(20)	
$\tau_{abab}(1)$	-0.0203(4)	-0.0204(70)	
$\tau_{abab}(2)$	-0.0191(6)	-0.0237(87)	
$\tau_{abab}(3)$	-0.0191(6)	-0.0239(90)	
$\Delta\tau$	$-0.134(31)\times10^{-4}$	$0.38(54)\times10^{-4}$	

[a] The uncertainites quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

Table 26.1. Molecular parameters for Cl_2O.

Parameter	$^{35}Cl^{16}O^{35}Cl$ (MHz)	$^{35}Cl^{16}O^{37}Cl$ (MHz)	$^{37}Cl^{16}O^{37}Cl$ (MHz)	Reference
A	42 046.398(86)	41 834.021(410)	41 620.951(300)	[66015]
B	3 683.0827(84)	3 583.1034(420)	3 484.2521(320)	[66015]
C	3 381.9006(77)	3 296.0896(340)	3 210.9984(270)	[66015]
τ_{aaaa}	-5.38885(6400)	-5.48314(72000)	-6.30056(57000)	[66015]
τ_{bbbb}	-0.0090962(1400)	-0.0085944(15000)	-0.0057625(12000)	[66015]
τ_{aabb}	0.114583(2200)	0.117148(21000)	0.157657(23000)	[66015]
τ_{abab}	-0.0188015(6200)	-0.0202994(69000)	-0.0191993(28000)	[66015]
χ_{aa} (Cl)	-71.45		-56.31[a]	[62010]
χ_{bb} (Cl)	6.86		5.41[a]	[62010]
χ_{cc} (Cl)	64.59		50.90[a]	[62010]

[a] Calculated from the ratio $^{35}Q/^{37}Q$ = 1.2688. See [66015].

Additional references: [59002] and [62003].

TABLE 26.2. The microwave spectrum of Cl_2O

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	ϵ'	F''	ϵ''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{35}Cl^{16}O^{35}Cl$	3(1, 3) - 4(0, 4)					(0,0,0)	9375.26	(*0.10)	[66015]
	12(2,11) - 13(1,12)					(0,0,0)	10358.50	(*0.10)	[66015]
	34(2,33) - 33(3,30)					(0,0,0)	13126.50	(*0.10)	[66015]
	23(2,21) - 24(1,24)					(0,0,0)	13212.50	(*0.10)	[66015]
	24(2,22) - 25(1,25)					(0,0,0)	13399.00	(*0.10)	[66015]
	22(2,20) - 23(1,23)					(0,0,0)	13496.80	(*0.10)	[66015]
	7(0, 7) - 6(1, 6)					(0,0,0)	13904.25	(*0.10)	[66015]
	25(2,23) - 26(1,26)					(0,0,0)	14051.83	(*0.10)	[66015]
	26(3,23) - 27(2,26)					(0,0,0)	14882.16	(*0.10)	[66015]
	20(2,18) - 21(1,21)					(0,0,0)	15428.55	(*0.10)	[66015]
	22(3,20) - 23(2,21)					(0,0,0)	15668.00	(*0.10)	[66015]
	33(4,30) - 34(3,31)					(0,0,0)	15699.10	(*0.10)	[66015]
	35(4,31) - 36(3,34)					(0,0,0)	16540.33	(*0.10)	[66015]
	27(2,25) - 28(1,28)					(0,0,0)	16767.40	(*0.10)	[66015]
	2(1, 2) - 3(0, 3)					(0,0,0)	16874.90	(*0.10)	[66015]
	19(2,17) - 20(1,20)					(0,0,0)	17058.95	(*0.10)	[66015]
	16(1,15) - 15(2,14)					(0,0,0)	17171.35	(*0.10)	[66015]
	36(2,35) - 35(3,32)					(0,0,0)	17906.50	(*0.10)	[66015]
	18(2,16) - 19(1,19)					(0,0,0)	19116.05	(*0.10)	[66015]
	11(2,10) - 12(1,11)					(0,0,0)	19282.68	(*0.10)	[66015]
	29(2,27) - 30(1,30)					(0,0,0)	21348.08	(*0.10)	[66015]
	17(2,15) - 18(1,18)					(0,0,0)	21583.45	(*0.10)	[66015]
	38(3,35) - 37(4,34)					(0,0,0)	21734.45	(*0.10)	[66015]
	8(0, 8) - 7(1, 7)					(0,0,0)	21896.25	(*0.10)	[66015]
	27(2,25) - 26(3,24)					(0,0,0)	22820.20	(*0.10)	[66015]
	34(4,30) - 35(3,33)					(0,0,0)	23048.28	(*0.10)	[66015]
	1(1, 1) - 2(0, 2)					(0,0,0)	24233.79	(*0.10)	[66015]
	30(2,28) - 31(1,31)					(0,0,0)	24324.66	(*0.10)	[66015]
	16(2,14) - 17(1,17)					(0,0,0)	24444.74	(*0.10)	[66015]
	32(4,29) - 33(3,30)					(0,0,0)	24543.60	(*0.10)	[66015]

TABLE 26.2. The microwave spectrum of Cl_2O—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	ϵ'	F''	ϵ''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{35}Cl^{16}O^{35}Cl$	21(3,19) - 22(2,20)					(0,0,0)	24796.70	(*0.10)	[66015]
	24(3,21) - 25(2,24)	24	2	25	2	(0,0,0)	25399.53	(0.10)	[62010]
	24(3,21) - 25(2,24)					(0,0,0)	25402.90	(*0.10)	[66015]
	24(3,21) - 25(2,24)	26	2	27	2	(0,0,0)	25402.94	(0.10)	[62010]
	24(3,21) - 25(2,24)	24	0	25	0	(0,0,0)	25406.35	(0.10)	[62010]
	17(1,16) - 16(2,15)	17	1	16	1	(0,0,0)	26575.2	(0.10)	[62010]
	17(1,16) - 16(2,15)	18	1	17	1	(0,0,0)	26580.9	(0.10)	[62010]
	17(1,16) - 16(2,15)	16	3	15	3	(0,0,0)	26580.9	(0.10)	[62010]
	17(1,16) - 16(2,15)					(0,0,0)	26581.00	(*0.10)	[66015]
	17(1,16) - 16(2,15)	17	3	16	3	(0,0,0)	26587.2	(0.10)	[62010]
	15(2,13) - 16(1,16)					(0,0,0)	27682.00	(*0.10)	[66015]
	31(2,29) - 32(1,32)					(0,0,0)	27748.30	(*0.10)	[66015]
	10(2, 9) - 11(1,10)	11	3	12	3	(0,0,0)	28072.16	(0.10)	[62010]
	10(2, 9) - 11(1,10)	10	3	11	3	(0,0,0)	28073.35	(0.10)	[62010]
	10(2, 9) - 11(1,10)	9	3	10	3	(0,0,0)	28073.35	(0.10)	[62010]
	10(2, 9) - 11(1,10)	12	3	13	3	(0,0,0)	28076.76	(0.10)	[62010]
	10(2, 9) - 11(1,10)					(0,0,0)	28078.35	(*0.10)	[66015]
	10(2, 9) - 11(1,10)	9	3	10	3	(0,0,0)	28078.56	(0.10)	[62010]
	10(2, 9) - 11(1,10)	11	1	12	1	(0,0,0)	28078.56	(0.10)	[62010]
	10(2, 9) - 11(1,10)	8	3	9	3	(0,0,0)	28080.28	(0.10)	[62010]
	10(2, 9) - 11(1,10)	10	1	11	1	(0,0,0)	28083.75	(0.10)	[62010]
	10(2, 9) - 11(1,10)	7	3	8	3	(0,0,0)	28084.74	(0.10)	[62010]
	33(4,29) - 34(3,32)					(0,0,0)	29658.99	(*0.10)	[66015]
	9(0, 9) - 8(1, 8)	6	3	5	3	(0,0,0)	29980.5	(0.10)	[62010]
	9(0, 9) - 8(1, 8)	9	1	8	1	(0,0,0)	29982.1	(0.10)	[62010]
	9(0, 9) - 8(1, 8)	12	3	11	3	(0,0,0)	29983.1	(0.10)	[62010]
	9(0, 9) - 8(1, 8)	10	1	9	1	(0,0,0)	29987.0	(0.10)	[62010]
	9(0, 9) - 8(1, 8)	8	3	7	3	(0,0,0)	29987.0	(0.10)	[62010]
	9(0, 9) - 8(1, 8)					(0,0,0)	29987.30	(*0.10)	[66015]
	9(0, 9) - 8(1, 8)	11	3	10	3	(0,0,0)	29989.4	(0.10)	[62010]
	9(0, 9) - 8(1, 8)	8	3	7	3	(0,0,0)	29991.6	(0.10)	[62010]
	9(0, 9) - 8(1, 8)	9	3	8	3	(0,0,0)	29992.7	(0.10)	[62010]
	9(0, 9) - 8(1, 8)	10	3	9	3	(0,0,0)	29994.1	(0.10)	[62010]
	23(3,20) - 24(2,23)					(0,0,0)	30980.95	(*0.10)	[66015]
	14(2,12) - 15(1,15)					(0,0,0)	31274.67	(*0.10)	[66015]
	13(2,11) - 14(1,14)	10	3	11	3	(0,0,0)	35190.95	(0.10)	[62010]
	13(2,11) - 14(1,14)	11	3	12	3	(0,0,0)	35200.66	(0.10)	[62010]
	13(2,11) - 14(1,14)	14	1	15	1	(0,0,0)	35202.77	(0.10)	[62010]
	13(2,11) - 14(1,14)	12	3	13	3	(0,0,0)	35202.77	(0.10)	[62010]
	13(2,11) - 14(1,14)					(0,0,0)	35202.90	(*0.10)	[66015]
	13(2,11) - 14(1,14)	15	3	16	3	(0,0,0)	35204.82	(0.10)	[62010]
	13(2,11) - 14(1,14)	12	3	13	3	(0,0,0)	35212.77	(0.10)	[62010]
	18(1,17) - 17(2,16)	18	2	17	2	(0,0,0)	36094.36	(0.10)	[62010]
	18(1,17) - 17(2,16)					(0,0,0)	36100.45	(*0.10)	[66015]
	18(1,17) - 17(2,16)	20	2	19	2	(0,0,0)	36100.46	(0.10)	[62010]
	18(1,17) - 17(2,16)	18	0	17	0	(0,0,0)	36106.56	(0.10)	[62010]
	32(4,28) - 33(3,31)					(0,0,0)	36359.50	(*0.10)	[66015]
	9(2, 8) - 10(1, 9)	9	2	10	2	(0,0,0)	36734.45	(0.10)	[62010]
	9(2, 8) - 10(1, 9)	11	2	12	2	(0,0,0)	36739.68	(0.10)	[62010]
	9(2, 8) - 10(1, 9)					(0,0,0)	36739.68	(*0.10)	[62010]
	22(3,19) - 23(2,22)	22	2	23	2	(0,0,0)	36743.00	(0.10)	[62010]
	9(2, 8) - 10(1, 9)	9	0	10	0	(0,0,0)	36744.91	(0.10)	[62010]
	22(3,19) - 23(2,22)					(0,0,0)	36745.02	(*0.10)	[66015]
	22(3,19) - 23(2,22)	24	2	25	2	(0,0,0)	36746.02	(0.10)	[62010]
	22(3,19) - 23(2,22)	22	0	23	0	(0,0,0)	36749.04	(0.10)	[62010]
	10(0,10) - 9(1, 9)	10	2	9	2	(0,0,0)	38159.95	(0.10)	[62010]
	10(0,10) - 9(1, 9)	12	2	11	2	(0,0,0)	38165.30	(0.10)	[62010]
	10(0,10) - 9(1, 9)					(0,0,0)	38165.30	(*0.10)	[62010]
	10(0,10) - 9(1, 9)	10	0	9	0	(0,0,0)	38170.65	(0.10)	[62010]
	1(1, 0) - 1(0, 1)	2	1	1	1	(0,0,0)	38635.78	(0.10)	[62010]
	1(1, 0) - 1(0, 1)	1	1	1	1	(0,0,0)	38635.78	(0.10)	[62010]
	1(1, 0) - 1(0, 1)	4	3	4	3	(0,0,0)	38649.45	(0.10)	[62010]
	1(1, 0) - 1(0, 1)	3	3	2	1	(0,0,0)	38656.30	(0.10)	[62010]
	1(1, 0) - 1(0, 1)	2	3	1	1	(0,0,0)	38659.44	(0.10)	[62010]

TABLE 26.2. The microwave spectrum of Cl_2O—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	ϵ'	F''	ϵ''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{35}Cl^{16}O^{35}Cl$	1(1, 0) - 1(0, 1)	2	1	3	3	(0,0,0)	38661.00	(0.10)	[62010]
	1(1, 0) - 1(0, 1)	1	1	2	3	(0,0,0)	38661.00	(0.10)	[62010]
	1(1, 0) - 1(0, 1)					(0,0,0)	38663.02	(*0.10)	[62010]
	1(1, 0) - 1(0, 1)	3	3	4	3	(0,0,0)	38675.09	(0.10)	[62010]
	1(1, 0) - 1(0, 1)	4	3	3	3	(0,0,0)	38678.09	(0.10)	[62010]
	1(1, 0) - 1(0, 1)	2	3	2	3	(0,0,0)	38686.52	(0.10)	[62010]
	1(1, 0) - 1(0, 1)	3	3	2	3	(0,0,0)	38694.43	(0.10)	[62010]
	1(1, 0) - 1(0, 1)	2	3	3	3	(0,0,0)	38694.43	(0.10)	[62010]
	2(1, 1) - 2(0, 2)	3	2	2	2	(0,0,0)	38947.12	(0.10)	[62010]
	2(1, 1) - 2(0, 2)	1	2	2	2	(0,0,0)	38947.12	(0.10)	[62010]
	2(1, 1) - 2(0, 2)	2	2	2	2	(0,0,0)	38948.98	(0.10)	[62010]
	2(1, 1) - 2(0, 2)	2	0	1	2	(0,0,0)	38964.53	(0.10)	[62010]
	2(1, 1) - 2(0, 2)	2	0	3	2	(0,0,0)	38964.53	(0.10)	[62010]
	2(1, 1) - 2(0, 2)					(0,0,0)	38966.26	(*0.10)	[66015]
	2(1, 1) - 2(0, 2)	4	2	4	2	(0,0,0)	38966.29	(0.10)	[62010]
	2(1, 1) - 2(0, 2)	3	2	3	2	(0,0,0)	38966.29	(0.10)	[62010]
	2(1, 1) - 2(0, 2)	2	0	2	0	(0,0,0)	38983.65	(0.10)	[62010]
	2(1, 1) - 2(0, 2)	1	2	2	0	(0,0,0)	38985.47	(0.10)	[62010]
	2(1, 1) - 2(0, 2)	3	2	2	0	(0,0,0)	38985.47	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	2	3	1	3	(0,0,0)	39406.50	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	4	1	3	1	(0,0,0)	39406.50	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	5	3	6	3	(0,0,0)	39408.03	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	2	3	3	1	(0,0,0)	39409.46	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	3	1	3	1	(0,0,0)	39412.14	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	0	3	1	3	(0,0,0)	39412.14	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	6	3	6	3	(0,0,0)	39416.36	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	5	3	4	1	(0,0,0)	39418.40	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	4	1	4	1	(0,0,0)	39422.61	(0.10)	[62010]
	3(1, 2) - 3(0, 3)					(0,0,0)	39424.30	(*0.10)	[66015]
	3(1, 2) - 3(0, 3)	1	3	2	3	(0,0,0)	39425.92	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	4	3	3	3	(0,0,0)	39425.92	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	3	1	4	1	(0,0,0)	39428.66	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	4	3	5	3	(0,0,0)	39428.66	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	3	3	3	3	(0,0,0)	39430.00	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	5	3	5	3	(0,0,0)	39432.14	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	2	1	2	1	(0,0,0)	39432.78	(0.10)	[62010]
	12(2,10) - 13(1,13)	12	2	13	2	(0,0,0)	39435.66	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	4	1	5	3	(0,0,0)	39437.30	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	2	3	3	3	(0,0,0)	39437.30	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	4	3	4	3	(0,0,0)	39438.70	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	5	3	4	3	(0,0,0)	39440.42	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	6	3	5	3	(0,0,0)	39440.42	(0.10)	[62010]
	3(1, 2) - 3(0, 3)	3	3	4	3	(0,0,0)	39443.04	(0.10)	[62010]
	12(2,10) - 13(1,13)					(0,0,0)	39446.28	(*0.10)	[62010]
	12(2,10) - 13(1,13)	14	2	15	2	(0,0,0)	39446.28	(0.10)	[62010]
	12(2,10) - 13(1,13)	12	0	13	0	(0,0,0)	39456.90	(0.10)	[62010]
	4(1, 3) - 4(0, 4)	5	2	4	2	(0,0,0)	40022.64	(0.10)	[62010]
	4(1, 3) - 4(0, 4)	3	2	4	2	(0,0,0)	40022.64	(0.10)	[62010]
	4(1, 3) - 4(0, 4)	4	2	4	2	(0,0,0)	40030.56	(0.10)	[62010]
	4(1, 3) - 4(0, 4)	4	0	3	2	(0,0,0)	40032.76	(0.10)	[62010]
	4(1, 3) - 4(0, 4)	4	0	5	2	(0,0,0)	40032.76	(0.10)	[62010]
	4(1, 3) - 4(0, 4)	6	2	6	2	(0,0,0)	40040.96	(0.10)	[62010]
	4(1, 3) - 4(0, 4)	5	2	5	2	(0,0,0)	40040.96	(0.10)	[62010]
	4(1, 3) - 4(0, 4)					(0,0,0)	40041.11	(*0.10)	[66015]
	4(1, 3) - 4(0, 4)	4	2	3	2	(0,0,0)	40049.20	(0.10)	[62010]
	4(1, 3) - 4(0, 4)	4	2	5	2	(0,0,0)	40049.20	(0.10)	[62010]
	4(1, 3) - 4(0, 4)	4	0	4	0	(0,0,0)	40051.18	(0.10)	[62010]
	4(1, 3) - 4(0, 4)	3	2	4	0	(0,0,0)	40059.51	(0.10)	[62010]
	4(1, 3) - 4(0, 4)	5	2	4	0	(0,0,0)	40059.51	(0.10)	[62010]
	12(1,11) - 12(0,12)					(0,0,0)	51567.60	(*0.10)	[66015]
$^{37}Cl^{16}O^{35}Cl$	3(1, 3) - 4(0, 4)					(0,0,0)	10039.36	(*0.10)	[66015]
	26(2,24) - 27(1,27)					(0,0,0)	14559.31	(*0.10)	[66015]
	21(2,19) - 22(1,22)					(0,0,0)	14850.40	(*0.10)	[66015]
	36(2,35) - 35(3,32)					(0,0,0)	15872.95	(*0.10)	[66015]

TABLE 26.2. The microwave spectrum of Cl_2O—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	F'	ϵ'	F''	ϵ''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{37}Cl^{16}O^{35}Cl$	2(1, 2) – 3(0, 3)					(0,0,0)	17333.48	(*0.10)	[66015]
	19(2,17) – 20(1,20)					(0,0,0)	17988.00	(*0.10)	[66015]
	8(0, 8) – 7(1, 7)					(0,0,0)	20360.40	(*0.10)	[66015]
	11(2,10) – 12(1,11)					(0,0,0)	21681.60	(*0.10)	[66015]
	17(2,15) – 18(1,18)					(0,0,0)	22720.70	(*0.10)	[66015]
	17(1,16) – 16(2,15)					(0,0,0)	22791.00	(*0.10)	[66015]
	1(1, 1) – 2(0, 2)					(0,0,0)	24492.76	(*0.10)	[66015]
	16(2,14) – 17(1,17)					(0,0,0)	25646.70	(*0.10)	[66015]
	9(0, 9) – 8(1, 8)					(0,0,0)	28223.40	(*0.10)	[66015]
	24(3,21) – 25(2,24)					(0,0,0)	28578.10	(*0.10)	[66015]
	15(2,13) – 16(1,16)					(0,0,0)	28925.20	(*0.10)	[66015]
	10(2, 9) – 11(1,10)					(0,0,0)	30211.60	(*0.10)	[66015]
	18(1,17) – 17(2,16)					(0,0,0)	32020.60	(*0.10)	[66015]
	23(3,20) – 24(2,23)					(0,0,0)	34109.00	(*0.10)	[66015]
	10(0,10) – 9(1, 9)					(0,0,0)	36173.00	(*0.10)	[66015]
	13(2,11) – 14(1,14)					(0,0,0)	36460.00	(*0.10)	[66015]
	1(1, 0) – 1(0, 1)					(0,0,0)	38536.80	(*0.10)	[66015]
	9(2, 8) – 10(1, 9)					(0,0,0)	38617.40	(*0.10)	[66015]
	2(1, 1) – 2(0, 2)					(0,0,0)	38825.50	(*0.10)	[66015]
	3(1, 2) – 3(0, 3)					(0,0,0)	39261.90	(*0.10)	[66015]
	4(1, 3) – 4(0, 4)					(0,0,0)	39849.10	(*0.10)	[66015]
$^{37}Cl^{16}O^{37}Cl$	27(3,24) – 28(2,27)					(0,0,0)	16414.65	(*0.10)	[66015]
	20(2,18) – 21(1,21)					(0,0,0)	17088.50	(*0.10)	[66015]
	2(1, 2) – 3(0, 3)					(0,0,0)	17782.50	(*0.10)	[66015]
	8(0, 8) – 7(1, 7)					(0,0,0)	18844.35	(*0.10)	[66015]
	17(1,16) – 16(2,15)					(0,0,0)	19063.40	(*0.10)	[66015]
	26(3,23) – 27(2,26)					(0,0,0)	21337.93	(*0.10)	[66015]
	1(1, 1) – 2(0, 2)					(0,0,0)	24746.16	(*0.10)	[66015]
	25(3,22) – 26(2,25)					(0,0,0)	26461.50	(*0.10)	[66015]
	9(0, 9) – 8(1, 8)					(0,0,0)	26483.00	(*0.10)	[66015]
	16(2,14) – 17(1,17)					(0,0,0)	26895.00	(*0.10)	[66015]
	18(1,17) – 17(2,16)					(0,0,0)	28007.65	(*0.10)	[66015]
	24(3,21) – 25(2,24)					(0,0,0)	31767.35	(*0.10)	[66015]
	10(2, 9) – 11(1,10)					(0,0,0)	32309.00	(*0.10)	[66015]
	21(3,19) – 22(2,20)					(0,0,0)	33679.40	(*0.10)	[66015]
	14(2,12) – 15(1,15)					(0,0,0)	33812.70	(*0.10)	[66015]
	10(0,10) – 9(1, 9)					(0,0,0)	34207.80	(*0.10)	[66015]
$^{37}Cl^{16}O^{37}Cl$	19(1,18) – 18(2,17)					(0,0,0)	37050.97	(*0.10)	[66015]
	23(3,20) – 24(2,23)					(0,0,0)	37241.25	(*0.10)	[66015]
	13(2,11) – 14(1,14)					(0,0,0)	37723.00	(*0.10)	[66015]
	2(1, 1) – 2(0, 2)					(0,0,0)	38683.76	(*0.10)	[66015]
	3(1, 2) – 3(0, 3)					(0,0,0)	39098.80	(*0.10)	[66015]
	4(1, 3) – 4(0, 4)					(0,0,0)	39657.28	(*0.10)	[66015]
	9(2, 8) – 10(1, 9)					(0,0,0)	40458.00	(*0.10)	[66015]

*Hypothetical unsplit rotational transition frequency.

Table 27. Molecular parameters for $^{35}Cl_2{}^{32}S$ [76030][a].

Parameter	Value (MHz)
A	14 613.36
B	2 920.93
C	2 430.74
χ_{aa} (Cl)	-38.98(10)
χ_{bb} (Cl)	- 8.87(10)
χ_{cc} (Cl)	47.95(10)
$\lvert\chi_{ab}\rvert$ (Cl)	64(10)
μ	0.36(1) D

[a] The actual transition frequencies were not reported in this work. The hypothetical center frequencies derived from the measurements are given in the following table. The hyperfine splittings for several transitions are given in [76030].

TABLE 27.1. The microwave spectrum of Cl_2S

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	ϵ'	F''	ϵ''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{35}Cl^{32}S^{35}Cl$	4(0, 4) - 3(1, 3)					(0,0,0)	10722.4	(*0.5)	[76030]
	3(2, 2) - 4(1, 3)					(0,0,0)	11995.8	(*0.5)	[76030]
	2(1, 1) - 2(0, 2)	2	2	2	2	(0,0,0)	12674.99	(0.05)	[76030]
	2(1, 1) - 2(0, 2)	1	2	2	2	(0,0,0)	12677.25	(0.05)	[76030]
	2(1, 1) - 2(0, 2)					(0,0,0)	12687.96	(*0.10)	[76030]
	2(1, 1) - 2(0, 2)	1	2	2	0	(0,0,0)	12698.68	(0.05)	[76030]
	2(1, 1) - 2(0, 2)	2	0	2	0	(0,0,0)	12701.23	(0.05)	[76030]
	4(1, 3) - 4(0, 4)					(0,0,0)	14573.26	(*0.10)	[76030]
	1(1, 1) - 0(0, 0)	1	0	0	0	(0,0,0)	17041.34	(0.05)	[76030]
	1(1, 1) - 0(0, 0)					(0,0,0)	17044.17	(*0.10)	[76030]
	1(1, 1) - 0(0, 0)	1	2	2	2	(0,0,0)	17046.96	(0.05)	[76030]
	3(1, 3) - 2(0, 2)	3	0	2	0	(0,0,0)	26523.56	(0.05)	[76030]
	3(1, 3) - 2(0, 2)					(0,0,0)	26527.85	(*0.10)	[76030]
	3(1, 3) - 2(0, 2)	3	2	2	2	(0,0,0)	26532.17	(0.05)	[76030]
	4(2, 2) - 4(1, 3)	4	2	4	2	(0,0,0)	33606.24	(0.05)	[76030]
	4(2, 2) - 4(1, 3)					(0,0,0)	33615.96	(*0.10)	[76030]
	4(2, 2) - 4(1, 3)	4	0	4	0	(0,0,0)	33625.81	(0.05)	[76030]

*Hypothetical unsplit rotational transition frequency.

Table 28. Rotational constants and electric dipole moment of CsOH [67011].

Vib. State v_1 v_2^ℓ v_3	$^{133}Cs^{16}OH$ B_v (MHz)	q_v (MHz)	$^{133}Cs^{16}OD$ B_v (MHz)	q_v (MHz)
0 0^0 0	5 501.08(10)		4 996.83(10)	
0 1^1 0	5 484.07(10)	7.90	4 994.81(10)	7.59
0 2^0 0	5 472.43(10)		4 995.64(10)	
0 2^2 0	5 465.97(10)		4 992.40(10)	
0 3^1 0	5 460.65(10)	8.19	4 996.32(10)	8.20
0 3^3 0	5 443.54(10)		...	
0 4^0 0	5 454.4(3)		5 000.06(10)	
0 4^2 0	5 447.95(10)		4 996.65(10)	
0 6^2 0	5 438.65(10)		5 005.78(10)	
0 0^0 1	5 467.90(10)		4 967.57(10)	
0 1^1 1	5 451.0(3)	8.82	4 965.29(10)	7.88
0 2^0 1	5 438.35(10)		...	
0 2^2 1	5 436.63(10)		4 962.73(10)	
0 3^1 1	5 427.0(3)	8.67	...	
0 4^2 1	5 417.0(3)		4 967.18(10)	
0 0^0 2	5 434.50(10)		...	
0 1^1 2	5 417.64(10)	9.49	...	
0 2^0 2	5 404.5(3)		...	
0 2^2 2	5 406.36(10)		...	
0 4^2 2	5 386.62(10)		...	
0 0^0 3	5 401.04(10)		...	
0 2^2 3	5 375.6(3)		...	

Electric dipole moment: μ = 7.1(5) D

Additional references: [66016] and [69025].

TABLE 28.1. The microwave spectrum of CsOH

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	(v_1,v_2^{ℓ},v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{133}Cs^{16}OH$	2 - 1					$(0,1^{L1},2)$	21652.	(1.0)	[67011]
	2 - 1					$(0,1^{U1},2)$	21689.6	(0.3)	[67011]
	2 - 1					$(0,3^{U1},1)$	21743.	(1.0)	[67011]
	2 - 1					$(0,1^{L1},1)$	21786.6	(0.3)	[67011]
	2 - 1					$(0,3^{L1},0)$	21809.7	(0.3)	[67011]
	2 - 1					$(0,1^{U1},1)$	21821.0	(0.3)	[67011]
	2 - 1					$(0,0^{0},1)$	21871.8	(0.3)	[67011]
	2 - 1					$(0,3^{U1},0)$	21875.3	(0.3)	[67011]
	2 - 1					$(0,2^{0},0)$	21889.7	(0.3)	[67011]
	2 - 1					$(0,1^{L1},0)$	21920.6	(0.3)	[67011]
	2 - 1					$(0,1^{U1},0)$	21952.1	(0.3)	[67011]
	2 - 1					$(0,0^{0},0)$	22004.4	(0.3)	[67011]
	3 - 2					$(0,2^{2},3)$	32253.8	(0.3)	[67011]
	3 - 2					$(0,4^{2},2)$	32320.1	(0.3)	[67011]
	3 - 2					$(0,0^{0},3)$	32406.2	(0.3)	[67011]
	3 - 2					$(0,2^{0},2)$	32427.	(1.0)	[67011]
	3 - 2					$(0,2^{2},2)$	32438.4	(0.3)	[67011]
	3 - 2					$(0,1^{L1},2)$	32477.2	(0.3)	[67011]
	3 - 2					$(0,4^{2},1)$	32504.	(1.0)	[67011]
	3 - 2					$(0,1^{U1},2)$	32534.7	(0.3)	[67011]
	3 - 2					$(0,0^{0},2)$	32607.5	(0.3)	[67011]
	3 - 2					$(0,3^{U1},1)$	32614.	(1.0)	[67011]
	3 - 2					$(0,2^{2},1)$	32619.8	(0.3)	[67011]
	3 - 2					$(0,2^{0},1)$	32630.1	(0.3)	[67011]
	3 - 2					$(0,6^{2},0)$	32631.8	(0.3)	[67011]
	3 - 2					$(0,1^{L1},1)$	32678.6	(0.3)	[67011]
	3 - 2					$(0,4^{2},0)$	32687.8	(0.3)	[67011]
	3 - 2					$(0,3^{L1},0)$	32715.5	(0.3)	[67011]
	3 - 2					$(0,4^{0},0)$	32726.5	(0.3)	[67011]
	3 - 2					$(0,1^{U1},1)$	32733.0	(0.3)	[67011]
	3 - 2					$(0,2^{2},0)$	32795.8	(0.3)	[67011]
	3 - 2					$(0,0^{0},1)$	32807.0	(0.3)	[67011]
	3 - 2					$(0,3^{U1},0)$	32813.	(1.0)	[67011]
	3 - 2					$(0,2^{0},0)$	32834.6	(0.3)	[67011]
	3 - 2					$(0,1^{L1},0)$	32880.7	(0.3)	[67011]
	3 - 2					$(0,1^{U1},0)$	32928.1	(0.3)	[67011]
	3 - 2					$(0,0^{0},0)$	33006.6	(0.3)	[67011]
	4 - 3					$(0,4^{2},2)$	43092.6	(0.3)	[67011]
	4 - 3					$(0,2^{2},2)$	43250.6	(0.3)	[67011]
	4 - 3					$(0,4^{2},1)$	43336.2	(0.3)	[67011]
	4 - 3					$(0,3^{L1},1)$	43346.4	(0.3)	[67011]
	4 - 3					$(0,1^{U1},2)$	43378.4	(0.3)	[67011]
	4 - 3					$(0,0^{0},2)$	43475.4	(0.3)	[67011]
	4 - 3					$(0,3^{U1},1)$	43483.6	(0.3)	[67011]
	4 - 3					$(0,2^{2},1)$	43492.7	(0.3)	[67011]
	4 - 3					$(0,6^{2},0)$	43509.3	(0.3)	[67011]
	4 - 3					$(0,3^{3},0)$	43548.3	(0.3)	[67011]
	4 - 3					$(0,4^{2},0)$	43583.	(1.0)	[67011]
	4 - 3					$(0,2^{2},0)$	43728.1	(0.3)	[67011]
	4 - 3					$(0,1^{L1},0)$	43840.3	(0.3)	[67011]
	4 - 3					$(0,1^{U1},0)$	43904.2	(0.3)	[67011]
	4 - 3					$(0,0^{0},0)$	44008.2	(0.3)	[67011]
$^{133}Cs^{16}OD$	3 - 2					$(0,1^{L1},1)$	29768.1	(0.3)	[67011]
	3 - 2					$(0,2^{2},1)$	29776.4	(0.3)	[67011]
	3 - 2					$(0,4^{2},1)$	29803.1	(0.3)	[67011]
	3 - 2					$(0,0^{0},1)$	29805.4	(0.3)	[67011]
	3 - 2					$(0,1^{U1},1)$	29815.4	(0.3)	[67011]
	3 - 2					$(0,3^{L1},0)$	29928.8	(0.3)	[67011]
	3 - 2					$(0,1^{L1},0)$	29946.1	(0.3)	[67011]
	3 - 2					$(0,2^{2},0)$	29954.4	(0.3)	[67011]
	3 - 2					$(0,2^{0},0)$	29973.8	(0.3)	[67011]
	3 - 2					$(0,4^{2},0)$	29979.9	(0.3)	[67011]
	3 - 2					$(0,0^{0},0)$	29981.0	(0.3)	[67011]
	3 - 2					$(0,1^{U1},0)$	29991.6	(0.3)	[67011]
	3 - 2					$(0,4^{0},0)$	30000.3	(0.3)	[67011]
	3 - 2					$(0,3^{U1},0)$	30027.2	(0.3)	[67011]
	3 - 2					$(0,6^{2},0)$	30034.7	(0.3)	[67011]

Table 29. Rotational and centrifugal distortion constants for HOF and DOF from the present analysis.

Watson's Determinable Parameters	$H^{16}O^{19}F$ Value[a] (MHz)	$D^{16}O^{19}F$ Value[a] (MHz)
A"	585 631.428(159)	316 096.061(45)
B"	26 760.6692(120)	25 593.2238(30)
C"	25 515.0321(95)	23 589.5489(27)
τ_1	-10.7853(20)	-7.884041(1459)
τ_2	-0.7634757(4589)	-0.7570956(1334)
τ_3[b]	202.79(20)	65.172(9)
τ_{aaaa}	-340.301(393)	-106.496(29)
τ_{bbbb}	-0.4112447(2611)	-0.3632766(463)
τ_{cccc}	-0.3422286(5482)	-0.2683925(417)
Std. dev.	0.150	0.074
No. lines fit	46	40
Derived Parameters (assuming planarity conditions)		
A'	585 631.24(16)	316 095.907(44)
B'	26 760.264(53)	25 593.117(3)
C'	25 510.233(50)	23 585.868(3)
τ'_{bbcc}	-0.37640(30)	-0.30817(5)
τ'_{ccaa}	-0.810(113)	-0.2135(26)
τ'_{aabb}	-9.599(112)	-7.3623(28)
$\tau_{aabb}(1)$	-0.1267(1236)	0.4806(32)
$\tau_{aabb}(2)$	0.864(99)	0.1504(15)
$\tau_{aabb}(3)$	0.864(99)	0.1504(15)
$\tau_{abab}(1)$	-4.74(12)	-3.921(3)
$\tau_{abab}(2)$	-5.67(10)	-3.6137(13)
$\tau_{abab}(3)$	-5.73(10)	-3.5897(15)
$\Delta\tau$	0.00369(80)	-0.003327(40)

[a] The uncertainties quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

Table 29.1. Molecular parameters for HOF including rotational analysis of Pearson and Kim [72030].

Parameter	$H^{16}O^{19}F$ Value	$D^{16}O^{19}F$ Value	Reference
$\tilde{A}$ (MHz)	585 631.20(14)	316 096.02(6)	[72030]
$\tilde{B}$ (MHz)	26 760.31(12)	25 593.91(1)	[72030]
$\tilde{C}$ (MHz)	25 510.19(12)	23 585.28(1)	[72030]
Δ_J (MHz)	0.09414(9)	0.07904(3)	[72030]
Δ_{JK} (MHz)	2.4146(6)	1.7349(9)	[72030]
Δ_K (MHz)	82.52(8)	24.82(1)	[72030]
δ_J (MHz)	0.00432(1)	0.00593(1)	[72030]
δ_K (MHz)	1.12(6)	1.183(2)	[72030]
g_{aa} (μ_N)	0.642(1)	...	[73034]
g_{bb} (μ_N)	-0.119(1)	...	[73034]
g_{cc} (μ_N)	-0.061(1)	...	[73034]
$2\chi_{aa}-\chi_{bb}-\chi_{cc}$ [a]	-19.6(6)	...	[73034]
$2\chi_{bb}-\chi_{aa}-\chi_{cc}$ [a]	12.8(12)	...	[73034]
μ_a (D)	0.37(10)	0.28(10)	[73034]
μ_b (D)	2.20(10)	2.22(10)	[73034]

[a] In units erg/G^2·mole.

TABLE 29.2. The microwave spectrum of HOF

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{16}O^{19}F$	1(0, 1) - 0(0, 0)	(0,0,0)	52269.90	(0.10)	[73034]
	29(1,28) - 28(2,27)	(0,0,0)	94950.89	(0.10)	[72030]
	2(1, 2) - 1(1, 1)	(0,0,0)	103282.89	(0.10)	[72029]
	2(0, 2) - 1(0, 1)	(0,0,0)	104536.04	(0.10)	[72029]
	2(1, 1) - 1(1, 0)	(0,0,0)	105773.90	(0.10)	[72029]
	12(0,12) - 11(1,11)	(0,0,0)	106813.55	(0.10)	[72030]
	25(2,24) - 26(1,25)	(0,0,0)	108883.87	(0.10)	[72030]
	7(1, 7) - 8(0, 8)	(0,0,0)	124258.04	(0.10)	[72030]
	3(1, 3) - 2(1, 2)	(0,0,0)	154917.58	(0.10)	[72029]
	3(2, 2) - 2(2, 1)	(0,0,0)	156743.33	(0.10)	[72029]
	3(2, 1) - 2(2, 0)	(0,0,0)	156751.52	(0.10)	[72029]
	3(0, 3) - 2(0, 2)	(0,0,0)	156793.28	(0.10)	[72029]
	3(1, 2) - 2(1, 1)	(0,0,0)	158653.68	(0.10)	[72029]
	30(1,29) - 29(2,28)	(0,0,0)	163736.51	(0.10)	[72030]
	13(0,13) - 12(1,12)	(0,0,0)	165802.04	(0.10)	[72030]
	24(2,23) - 25(1,24)	(0,0,0)	175942.38	(0.10)	[72030]
	6(1, 6) - 7(0, 7)	(0,0,0)	180705.86	(0.10)	[72030]
	4(1, 4) - 3(1, 3)	(0,0,0)	206544.46	(0.10)	[72029]
	4(3, 1) - 3(3, 0)	(0,0,0)	208887.97	(0.10)	[72029]
	4(3, 2) - 3(3, 1)	(0,0,0)	208887.97	(0.10)	[72029]
	4(2, 3) - 3(2, 2)	(0,0,0)	208978.97	(0.10)	[72029]
	4(2, 2) - 3(2, 1)	(0,0,0)	208999.69	(0.10)	[72029]
	4(0, 4) - 3(0, 3)	(0,0,0)	209037.37	(0.10)	[72029]
	4(1, 3) - 3(1, 2)	(0,0,0)	211524.86	(0.10)	[72029]
	14(0,14) - 13(1,13)	(0,0,0)	225233.63	(0.10)	[72030]

TABLE 29.2. The microwave spectrum of HOF—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{16}O^{19}F$	31(1,30) - 30(2,29)	(0,0,0)	232917.67	(0.10)	[72030]
	5(1, 5) - 6(0, 6)	(0,0,0)	236591.22	(0.10)	[72030]
	23(2,22) - 24(1,23)	(0,0,0)	242536.36	(0.10)	[72030]
	5(1, 5) - 4(1, 4)	(0,0,0)	258160.52	(0.10)	[72029]
	5(4, 1) - 4(4, 0)	(0,0,0)	260923.69	(0.10)	[72029]
	5(4, 2) - 4(4, 1)	(0,0,0)	260923.69	(0.10)	[72029]
	5(3, 2) - 4(3, 1)	(0,0,0)	261095.04	(0.10)	[72029]
	5(3, 3) - 4(3, 2)	(0,0,0)	261095.04	(0.10)	[72029]
	5(2, 4) - 4(2, 3)	(0,0,0)	261204.37	(0.10)	[72029]
	5(2, 3) - 4(2, 2)	(0,0,0)	261245.65	(0.10)	[72029]
	5(0, 5) - 4(0, 4)	(0,0,0)	261264.22	(0.10)	[72029]
	5(1, 4) - 4(1, 3)	(0,0,0)	264384.57	(0.10)	[72029]
	4(1, 4) - 5(0, 5)	(0,0,0)	291900.02	(0.10)	[72030]
	7(1, 7) - 6(1, 6)	(0,0,0)	361349.55	(0.10)	[72030]
	7(4, 3) - 6(4, 2)	(0,0,0)	365234.08	(0.10)	[72030]
	7(4, 4) - 6(4, 3)	(0,0,0)	365234.08	(0.10)	[72030]
	7(3, 4) - 6(3, 3)	(0,0,0)	365477.52	(0.10)	[72030]
	7(3, 5) - 6(3, 4)	(0,0,0)	365477.52	(0.10)	[72030]
	7(2, 6) - 6(2, 5)	(0,0,0)	365613.80	(0.10)	[72030]
	7(0, 7) - 6(0, 6)	(0,0,0)	365648.94	(0.10)	[72030]
	7(2, 5) - 6(2, 4)	(0,0,0)	365729.34	(0.10)	[72030]
	7(1, 6) - 6(1, 5)	(0,0,0)	370057.77	(0.10)	[72030]
$D^{16}O^{19}F$	13(2,12) - 14(1,13)	(0,0,0)	83295.86	(0.10)	[72030]
	3(1, 3) - 4(0, 4)	(0,0,0)	88902.62	(0.10)	[72030]
	2(1, 2) - 1(1, 1)	(0,0,0)	96345.03	(0.10)	[72029]
	2(0, 2) - 1(0, 1)	(0,0,0)	98345.17	(0.10)	[72029]
	2(1, 1) - 1(1, 0)	(0,0,0)	100352.02	(0.10)	[72029]
	17(1,16) - 16(2,15)	(0,0,0)	108937.41	(0.10)	[72030]
	24(3,22) - 25(2,23)	(0,0,0)	111131.50	(0.10)	[72030]
	8(0, 8) - 7(1, 7)	(0,0,0)	128047.08	(0.10)	[72030]
	21(2,19) - 22(1,22)	(0,0,0)	139673.64	(0.10)	[72030]
	2(1, 2) - 3(0, 3)	(0,0,0)	140988.80	(0.10)	[72030]
	3(1, 3) - 2(1, 2)	(0,0,0)	144506.79	(0.10)	[72029]
	12(2,11) - 13(1,12)	(0,0,0)	145762.26	(0.10)	[72030]
	3(2, 2) - 2(2, 1)	(0,0,0)	147486.81	(0.10)	[72029]
	3(0, 3) - 2(0, 2)	(0,0,0)	147487.39	(0.10)	[72029]
	3(2, 1) - 2(2, 0)	(0,0,0)	147527.87	(0.10)	[72029]
	3(1, 2) - 2(1, 1)	(0,0,0)	150516.64	(0.10)	[72029]
	18(1,17) - 17(2,16)	(0,0,0)	174522.93	(0.10)	[72030]
	23(3,21) - 24(2,22)	(0,0,0)	175337.20	(0.10)	[72030]
$D^{16}O^{19}F$	18(2,16) - 19(1,19)	(0,0,0)	183556.01	(0.10)	[72030]
	9(0, 9) - 8(1, 8)	(0,0,0)	184160.19	(0.10)	[72030]
	1(1, 1) - 2(0, 2)	(0,0,0)	192131.16	(0.10)	[72030]
	4(1, 4) - 3(1, 3)	(0,0,0)	192655.95	(0.10)	[72029]
	4(3, 1) - 3(3, 0)	(0,0,0)	196591.10	(0.10)	[72029]
	4(3, 2) - 3(3, 1)	(0,0,0)	196591.10	(0.10)	[72029]
	4(0, 4) - 3(0, 3)	(0,0,0)	196592.94	(0.10)	[72029]
	4(2, 3) - 3(2, 2)	(0,0,0)	196632.50	(0.10)	[72029]
	4(2, 2) - 3(2, 1)	(0,0,0)	196735.30	(0.10)	[72029]
	4(1, 3) - 3(1, 2)	(0,0,0)	200667.41	(0.10)	[72029]
	17(2,15) - 18(1,18)	(0,0,0)	203476.50	(0.10)	[72030]
	11(2,10) - 12(1,11)	(0,0,0)	207378.37	(0.10)	[72030]
	22(3,20) - 23(2,21)	(0,0,0)	238274.90	(0.10)	[72030]
	5(1, 5) - 4(1, 4)	(0,0,0)	240787.74	(0.10)	[72029]
	19(1,18) - 18(2,17)	(0,0,0)	240802.69	(0.10)	[72030]
	10(0,10) - 9(1, 9)	(0,0,0)	240887.33	(0.10)	[72030]
	5(4, 1) - 4(4, 0)	(0,0,0)	245600.09	(0.10)	[72029]
	5(4, 2) - 4(4, 1)	(0,0,0)	245600.09	(0.10)	[72029]
	5(0, 5) - 4(0, 4)	(0,0,0)	245650.09	(0.10)	[72029]
	5(3, 2) - 4(3, 1)	(0,0,0)	245734.60	(0.10)	[72029]
	5(3, 3) - 4(3, 2)	(0,0,0)	245734.60	(0.10)	[72029]
	5(2, 4) - 4(2, 3)	(0,0,0)	245764.01	(0.10)	[72029]
	5(2, 3) - 4(2, 2)	(0,0,0)	245969.50	(0.10)	[72029]
	5(1, 4) - 4(1, 3)	(0,0,0)	250799.63	(0.10)	[72029]

Table 30. Rotational and centrifugal distortion constants for $^{19}F^{14}N^{16}O$.

Watson's Determinable Parameters	Present Value[a] (MHz)	Cook [65010] (MHz)
A''	95 189.827(78)	
B''	11 844.074(9)	
C''	10 508.393(8)	
τ_1	-0.095170(2681)	
τ_2	-0.060646(411)	
τ_3[b]	6.93(2)	
τ_{aaaa}	-15.771(49)	-15.586926
τ_{bbbb}	-0.100443(258)	-0.099630
τ_{cccc}	-0.056918(201)	-0.056554
H_J	$0.3669(1494)\times10^{-6}$	
H_{JK}	$-0.8311(7102)\times10^{-5}$	2.339×10^{-6}
H_{KJ}	$-0.152(243)\times10^{-4}$	-4.946×10^{-5}
H_K	$0.158(40)\times10^{-2}$	
h_J[c]	$-0.128(88)\times10^{-6}$	
h_{JK}	$0.2545(1300)\times10^{-4}$	
h_K	$-0.1219(586)\times10^{-2}$	
Std. dev.	0.244	
No. lines fit	90	
Derived Parameters (assuming planarity conditions)		
A'	95 189.790(78)	95 189.77
B'	11 844.137(8)	11 844.12
C'	10 508.320(8)	10 508.31
τ'_{bbcc}	-0.07437(24)	-0.07367
τ'_{ccaa}	0.1266(33)	0.1402
τ'_{aabb}	-0.1474(33)	
$\tau_{aabb}(1)$	0.4087(40)	
$\tau_{aabb}(2)$	0.4258(69)	0.418629
$\tau_{aabb}(3)$	0.4258(69)	
$\tau_{abab}(1)$	-0.2780(34)	
$\tau_{abab}(2)$	-0.2935(61)	-0.289581
$\tau_{abab}(3)$	-0.2952(69)	
$\Delta\tau$	$0.34(16)\times10^{-3}$	

[a] The uncertainties quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

[c] Watson uses $2h_J$ for this parameter.

Table 30.1. Molecular parameters for FNO [69026][a].

Parameter	$^{19}F^{14}N^{16}O$	$^{19}F^{14}N^{18}O$	$^{19}F^{15}N^{16}O$
A	95 189.67(81)	92 667.47(170)	90 828.51(170)
B	11 844.065(74)	11 253.92(11)	11 825.33(11)
C	10 508.259(79)	10 012.07(15)	10 437.62(15)
χ_{aa}	1.69(5)		
χ_{bb}	-4.83(5)		
χ_{cc}	3.14(5)		
μ_a	1.70[b]		
μ_b	0.62[b]		

[a] The values in the table are taken from this reference unless otherwise indicated.

[b] Reference [51007].

TABLE 30.2. The microwave spectrum of FNO

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{19}F^{14}N^{16}O$	10(2, 8) - 10(2, 9)		9		9	(0,0,0)	7705.75	(0.10)	[69026]
	10(2, 8) - 10(2, 9)		11		11	(0,0,0)	7705.75	(0.10)	[69026]
	10(2, 8) - 10(2, 9)		10		10	(0,0,0)	7706.38	(0.10)	[69026]
	3(1, 2) - 3(1, 3)		2		2	(0,0,0)	8011.65	(0.10)	[69026]
	3(1, 2) - 3(1, 3)		4		4	(0,0,0)	8012.57	(0.10)	[69026]
	3(1, 2) - 3(1, 3)		3		3	(0,0,0)	8015.24	(0.10)	[69026]
	19(3,16) - 19(3,17)		20		20	(0,0,0)	8358.91	(0.10)	[69026]
	19(3,16) - 19(3,17)		18		18	(0,0,0)	8358.91	(0.10)	[69026]
	19(3,16) - 20(2,19)		20		21	(0,0,0)	8498.69	(0.10)	[69026]
	19(3,16) - 20(2,19)		18		19	(0,0,0)	8498.69	(0.10)	[69026]
	29(4,25) - 29(4,26)					(0,0,0)	9067.21	(0.20)	[65010]
	4(0, 3) - 3(1, 3)		5		4	(0,0,0)	9172.07	(0.10)	[69026]
	4(0, 3) - 3(1, 3)		4		3	(0,0,0)	9173.81	(0.10)	[69026]
	11(2, 9) - 11(2,10)		12		12	(0,0,0)	11030.97	(0.10)	[69026]
	11(2, 9) - 11(2,10)		10		10	(0,0,0)	11030.97	(0.10)	[69026]
	11(2, 9) - 11(2,10)		11		11	(0,0,0)	11031.53	(0.10)	[69026]
	20(3,17) - 20(3,18)		21		21	(0,0,0)	11176.12	(0.10)	[69026]
	20(3,17) - 20(3,18)		19		19	(0,0,0)	11176.12	(0.10)	[69026]
	22(3,19) - 22(3,20)					(0,0,0)	19037.01	(0.20)	[65010]
	23(4,20) - 24(3,21)					(0,0,0)	19254.47	(0.20)	[65010]
	5(1, 4) - 5(1, 5)		4		4	(0,0,0)	20026.02	(0.10)	[69026]
	5(1, 4) - 5(1, 5)		6		6	(0,0,0)	20026.36	(0.10)	[69026]
	5(1, 4) - 5(1, 5)		5		5	(0,0,0)	20029.48	(0.10)	[69026]
	13(2,11) - 13(2,12)		14		14	(0,0,0)	20537.84	(0.10)	[69026]
	13(2,11) - 13(2,12)		12		12	(0,0,0)	20537.84	(0.10)	[69026]
	13(2,11) - 13(2,12)		13		13	(0,0,0)	20539.80	(0.10)	[69026]
	1(0, 1) - 0(0, 0)		0		1	(0,0,0)	22351.58	(0.03)	[66017]
	1(0, 1) - 0(0, 0)		2		1	(0,0,0)	22352.321	(1E-3)	[74011]
	1(0, 1) - 0(0, 0)		1		1	(0,0,0)	22352.824	(1E-3)	[74011]
	18(3,15) - 19(2,18)		19		20	(0,0,0)	23936.75	(0.10)	[69026]
	18(3,15) - 19(2,18)		17		18	(0,0,0)	23936.75	(0.10)	[69026]
	23(3,20) - 23(3,21)					(0,0,0)	24303.85	(0.20)	[65010]
	14(2,12) - 14(2,13)		15		15	(0,0,0)	26937.74	(0.10)	[69026]
	14(2,12) - 14(2,13)		13		13	(0,0,0)	26937.74	(0.10)	[69026]
	14(2,12) - 14(2,13)		14		14	(0,0,0)	26938.34	(0.10)	[69026]
	14(2,12) - 15(1,15)		15		16	(0,0,0)	27633.86	(0.10)	[69026]
	14(2,12) - 15(1,15)		13		14	(0,0,0)	27633.86	(0.10)	[69026]

TABLE 30.2. The microwave spectrum of FNO—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{19}F^{14}N^{16}O$	14(2,12) - 15(1,15)		14		15	(0,0,0)	27636.83	(0.10)	[69026]
	6(1, 5) - 6(1, 6)		5		5	(0,0,0)	28028.96	(0.10)	[69026]
	6(1, 5) - 6(1, 6)		6		6	(0;0,0)	28032.23	(0.10)	[69026]
	28(3,26) - 27(4,23)					(0,0,0)	28782.53	(0.20)	[65010]
	31(5,26) - 32(4,29)					(0,0,0)	28861.04	(0.20)	[65010]
	18(2,16) - 17(3,15)		19		18	(0,0,0)	29327.18	(0.10)	[69026]
	18(2,16) - 17(3,15)		17		16	(0,0,0)	29327.18	(0.10)	[69026]
	24(4,20) - 25(3,23)					(0,0,0)	30530.62	(0.20)	[65010]
	15(3,13) - 16(2,14)		15		16	(0,0,0)	30637.22	(0.10)	[69026]
	15(3,13) - 16(2,14)		16		17	(0,0,0)	30638.22	(0.10)	[69026]
	15(3,13) - 16(2,14)		14		15	(0,0,0)	30638.22	(0.10)	[69026]
	13(2,11) - 14(1,14)					(0,0,0)	32849.70	(0.20)	[65010]
	5(0, 5) - 4(1, 4)		6		5	(0,0,0)	33903.92	(0.10)	[69026]
	5(0, 5) - 4(1, 4)		5		4	(0,0,0)	33905.05	(0.10)	[69026]
	15(2,13) - 15(2,14)		16		16	(0,0,0)	34558.47	(0.10)	[69026]
	15(2,13) - 15(2,14)		14		14	(0,0,0)	34558.47	(0.10)	[69026]
	15(2,13) - 15(2,14)		15		15	(0,0,0)	34560.37	(0.10)	[69026]
	30(5,26) - 31(4,27)					(0,0,0)	36014.79	(0.20)	[65010]
	11(1,10) - 10(2, 9)		12		11	(0,0,0)	36043.69	(0.10)	[69026]
	11(1,10) - 10(2, 9)		10		9	(0,0,0)	36043.69	(0.10)	[69026]
	11(1,10) - 10(2, 9)		11		10	(0,0,0)	36045.26	(0.10)	[69026]
	7(1, 6) - 7(1, 7)		6		6	(0,0,0)	37356.31	(0.10)	[69026]
	7(1, 6) - 7(1, 7)		7		7	(0,0,0)	37360.00	(0.10)	[69026]
	1(1, 1) - 2(0, 2)					(0,0,0)	38653.49	(0.20)	[65010]
	26(3,23) - 25(4,22)					(0,0,0)	39544.56	(0.20)	[65010]
	12(2,10) - 13(1,13)					(0,0,0)	39947.80	(0.20)	[65010]
	2(1, 2) - 1(1, 1)		2		2	(0,0,0)	43367.81	(0.03)	[66017]
	2(1, 2) - 1(1, 1)		3		2	(0,0,0)	43368.89	(0.03)	[66017]
	2(1, 2) - 1(1, 1)		2		1	(0,0,0)	43368.89	(0.40)	[66017]
	2(1, 2) - 1(1, 1)		1		1	(0,0,0)	43370.91	(0.03)	[66017]
	2(1, 1) - 1(1, 0)		1		1	(0,0,0)	46037.91	(0.03)	[66017]
	2(1, 1) - 1(1, 0)		3		2	(0,0,0)	46039.84	(0.03)	[66017]
	2(1, 1) - 1(1, 0)		1		0	(0,0,0)	46039.84	(0.40)	[66017]
	2(1, 1) - 1(1, 0)		2		1	(0,0,0)	46040.45	(0.03)	[66017]
	2(1, 1) - 1(1, 0)		2		2	(0,0,0)	46041.41	(0.03)	[66017]
	29(5,25) - 30(4,26)					(0,0,0)	62306.76	(0.20)	[65010]
	12(1,11) - 11(2,10)					(0,0,0)	65669.32	(0.20)	[65010]
	27(3,24) - 26(4,23)					(0,0,0)	70398.42	(0.20)	[65010]
	9(2, 7) - 10(1,10)					(0,0,0)	71453.11	(0.20)	[65010]
	22(4,18) - 23(3,21)					(0,0,0)	72693.63	(0.20)	[65010]
	8(0, 8) - 7(1, 7)					(0,0,0)	110583.17	(0.20)	[65010]
	6(1, 6) - 5(1, 5)					(0,0,0)	129969.59	(0.20)	[65010]
	6(0, 6) - 5(0, 5)					(0,0,0)	133543.69	(0.20)	[65010]
	6(2, 5) - 5(2, 4)					(0,0,0)	134028.58	(0.20)	[65010]
	6(5, 2) - 5(5, 1)					(0,0,0)	134147.45	(0.20)	[65010]
	6(4, 3) - 5(4, 2)					(0,0,0)	134158.45	(0.20)	[65010]
	6(3, 4) - 5(3, 3)					(0,0,0)	134185.96	(0.20)	[65010]
	6(3, 3) - 5(3, 2)					(0,0,0)	134192.16	(0.20)	[65010]
	6(2, 4) - 5(2, 3)					(0,0,0)	134582.32	(0.20)	[65010]
	9(0, 9) - 8(1, 8)					(0,0,0)	136693.56	(0.20)	[65010]
	6(1, 5) - 5(1, 4)					(0,0,0)	137972.83	(0.20)	[65010]
	7(1, 7) - 6(1, 6)					(0,0,0)	151568.60	(0.20)	[65010]
	7(0, 7) - 6(0, 6)					(0,0,0)	155556.86	(0.20)	[65010]
	7(2, 6) - 6(2, 5)					(0,0,0)	156319.48	(0.20)	[65010]
	7(5, 3) - 6(5, 2)					(0,0,0)	156507.98	(0.20)	[65010]
	7(4, 4) - 6(4, 3)					(0,0,0)	156526.85	(0.20)	[65010]
	7(3, 5) - 6(3, 4)					(0,0,0)	156570.47	(0.20)	[65010]
	7(2, 5) - 6(2, 4)					(0,0,0)	157201.94	(0.20)	[65010]
	7(1, 6) - 6(1, 5)					(0,0,0)	160896.53	(0.20)	[65010]
	8(1, 8) - 7(1, 7)					(0,0,0)	173140.14	(0.20)	[65010]
	8(0, 8) - 7(0, 7)					(0,0,0)	177463.08	(0.20)	[65010]
	8(2, 7) - 7(2, 6)					(0,0,0)	178588.40	(0.20)	[65010]
	8(7, 2) - 7(7, 1)					(0,0,0)	178853.65	(0.20)	[65010]
	8(6, 3) - 7(6, 2)					(0,0,0)	178858.28	(0.20)	[65010]
	8(5, 4) - 7(5, 3)					(0,0,0)	178871.46	(0.20)	[65010]

TABLE 30.2. The microwave spectrum of FNO—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{19}F^{14}N^{16}O$	8(3, 6) - 7(3, 5)					(0,0,0)	178960.88	(0.20)	[65010]
	8(3, 5) - 7(3, 4)					(0,0,0)	178990.69	(0.20)	[65010]
	8(2, 6) - 7(2, 5)					(0,0,0)	179904.25	(0.20)	[65010]
	8(1, 7) - 7(1, 6)					(0,0,0)	183785.06	(0.20)	[65010]
	11(0,11) - 10(1,10)					(0,0,0)	189179.10	(0.20)	[65010]
	9(1, 9) - 8(1, 8)					(0,0,0)	194681.56	(0.20)	[65010]
	9(2, 8) - 8(2, 7)					(0,0,0)	200832.97	(0.20)	[65010]
	9(7, 3) - 8(7, 2)					(0,0,0)	201207.38	(0.20)	[65010]
	9(6, 4) - 8(6, 3)					(0,0,0)	201215.62	(0.20)	[65010]
	9(5, 5) - 8(5, 4)					(0,0,0)	201234.71	(0.20)	[65010]
	9(4, 6) - 8(4, 5)					(0,0,0)	201278.06	(0.20)	[65010]
	9(3, 7) - 8(3, 6)					(0,0,0)	201360.00	(0.20)	[65010]
	9(3, 6) - 8(3, 5)					(0,0,0)	201414.28	(0.20)	[65010]
	9(2, 7) - 8(2, 6)					(0,0,0)	202696.92	(0.20)	[65010]
	9(1, 8) - 8(1, 7)					(0,0,0)	206632.35	(0.20)	[65010]
	10(1,10) - 9(1, 9)					(0,0,0)	216190.60	(0.20)	[65010]
	10(0,10) - 9(0, 9)					(0,0,0)	220912.37	(0.20)	[65010]
	10(2, 9) - 9(2, 8)					(0,0,0)	223049.95	(0.20)	[65010]
	10(8, 3) - 9(8, 2)					(0,0,0)	223554.74	(0.20)	[65010]
	10(7, 4) - 9(7, 3)					(0,0,0)	223559.69	(0.20)	[65010]
	10(6, 5) - 9(6, 4)					(0,0,0)	223572.63	(0.20)	[65010]
	10(5, 6) - 9(5, 5)					(0,0,0)	223600.65	(0.20)	[65010]
	10(4, 7) - 9(4, 6)					(0,0,0)	223660.71	(0.20)	[65010]
	10(4, 6) - 9(4, 5)					(0,0,0)	223661.70	(0.20)	[65010]
	10(3, 8) - 9(3, 7)					(0,0,0)	223765.54	(0.20)	[65010]
	10(3, 7) - 9(3, 6)					(0,0,0)	223858.44	(0.20)	[65010]
	10(2, 8) - 9(2, 7)					(0,0,0)	225582.27	(0.20)	[65010]
$^{19}F^{15}N^{16}O$	18(3,15) - 18(3,16)					(0,0,0)	7593.49	(0.10)	[69026]
	3(1, 2) - 3(1, 3)					(0,0,0)	8324.45	(0.10)	[69026]
	5(1, 4) - 5(1, 5)					(0,0,0)	20804.51	(0.10)	[69026]
	1(0, 1) - 0(0, 0)					(0,0,0)	22262.96	(0.10)	[69026]
	6(1, 5) - 6(1, 6)					(0,0,0)	29116.59	(0.10)	[69026]
	5(0, 5) - 4(1, 4)					(0,0,0)	37962.10	(0.10)	[69026]
$^{19}F^{14}N^{18}O$	19(3,16) - 19(3,17)					(0,0,0)	7081.50	(0.10)	[69026]
	3(1, 2) - 3(1, 3)					(0,0,0)	7448.85	(0.10)	[69026]
	20(3,17) - 20(3,18)					(0,0,0)	9478.50	(0.10)	[69026]
	11(2, 9) - 11(2,10)					(0,0,0)	9791.53	(0.10)	[69026]
	13(2,11) - 13(2,12)					(0,0,0)	18268.05	(0.10)	[69026]
	5(1, 4) - 5(1, 5)					(0,0,0)	18619.10	(0.10)	[69026]
	1(0, 1) - 0(0, 0)					(0,0,0)	21265.91	(0.10)	[69026]
	14(2,12) - 14(2,13)					(0,0,0)	23992.10	(0.10)	[69026]
	6(1, 5) - 6(1, 6)					(0,0,0)	26060.63	(0.10)	[69026]
	11(1,10) - 10(2, 9)					(0,0,0)	27159.68	(0.10)	[69026]
	8(2, 7) - 9(1, 8)					(0,0,0)	27529.31	(0.10)	[69026]
	5(0, 5) - 4(1, 4)					(0,0,0)	30042.33	(0.10)	[69026]
	15(2,13) - 15(2,14)					(0,0,0)	30823.74	(0.10)	[69026]
	7(1, 6) - 7(1, 7)					(0,0,0)	34733.60	(0.10)	[69026]

Table 31. Rotational and centrifugal distortion constants for NSF.

Watson's Determinable Parameters	$^{14}N^{32}S^{19}F$ Value[a] (MHz) [72031]	$^{14}N^{34}S^{19}F$ Value (MHz) [67013]
A"	49 719.6068(172)	48 298.98
B"	8 712.25890(316)	8 701.26
C"	7 392.99808(269)	7 352.78
τ_1	0.3771750(27383)	
τ_2	0.0254081(4089)	
τ_3[b]	1.276(9)	
τ_{aaaa}	-8.896917(3700)	-8.46707
τ_{bbbb}	-0.05625526(15169)	-0.05713
τ_{cccc}	-0.0194343(1098)	
H_J	$0.4061(2701)\times10^{-7}$	
H_{JK}	$0.3390(3104)\times10^{-6}$	
H_{KJ}	$-0.30861(3795)\times10^{-4}$	
H_K	$0.42285(4015)\times10^{-3}$	
h_J[c]	$0.9933(3768)\times10^{-8}$	
h_{JK}	$0.1770(986)\times10^{-5}$	
h_K	$-0.1116(2976)\times10^{-4}$	
Std. dev.	0.047	
No. lines fit	76	
Derived Parameters (assuming planarity conditions)		
A'	49 719.592(17)	
B'	8 712.324(3)	
C'	7 393.137(3)	
τ'_{bbcc}	-0.03043(13)	
τ'_{ccaa}	0.1303(7)	
τ'_{aabb}	0.2773(19)	
$\tau_{aabb}(1)$	0.4572(11)	
$\tau_{aabb}(2)$	0.4469(10)	0.42993
$\tau_{aabb}(3)$	0.4469(10)	
$\tau_{abab}(1)$	-0.08996(40)	
$\tau_{abab}(2)$	-0.08100(53)	-0.08346
$\tau_{abab}(3)$	-0.07967(56)	
$\Delta\tau$	-0.335(9)	

[a] The uncertainties quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

[c] Watson uses $2h_J$ for this parameter.

Table 31.1. Hyperfine constants and electric dipole moment of $^{14}N^{32}S^{19}F$.

Parameter	Value	Reference
χ_{aa} (^{14}N) (MHz)	-1.720(41)	this work
χ_{bb} (^{14}N) (MHz)	-3.990(36)	this work
χ_{cc} (^{14}N) (MHz)	5.710(46)	this work
μ_a (D)	0.242(12)	[67013]
μ_b (D)	1.886(11)	[67013]

TABLE 31.2. The microwave spectrum of NSF

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{14}N^{32}S^{19}F$	33(6,27) - 32(7,26)					(0,0,0)	8092.73	(0.10)	[67013]
	10(2, 8) - 11(1,11)		9		10	(0,0,0)	8220.82	(0.20)	[63006]
	10(2, 8) - 11(1,11)		11		12	(0,0,0)	8221.14	(0.20)	[63006]
	10(2, 8) - 11(1,11)		10		11	(0,0,0)	8224.42	(0.20)	[63006]
	26(6,21) - 27(5,22)					(0,0,0)	8265.34	(0.10)	[67013]
	3(0, 3) - 2(1, 2)		2		1	(0,0,0)	8471.52	(0.20)	[63006]
	3(0, 3) - 2(1, 2)		4		3	(0,0,0)	8472.23	(0.20)	[63006]
	3(0, 3) - 2(1, 2)		3		2	(0,0,0)	8473.42	(0.20)	[63006]
	1(1, 1) - 2(0, 2)		1		1	(0,0,0)	8824.46	(0.20)	[63006]
	1(1, 1) - 2(0, 2)		1		2	(0,0,0)	8825.31	(0.20)	[63006]
	1(1, 1) - 2(0, 2)		2		3	(0,0,0)	8825.96	(0.20)	[63006]
	1(1, 1) - 2(0, 2)		2		2	(0,0,0)	8826.50	(0.20)	[63006]
	1(1, 1) - 2(0, 2)		0		1	(0,0,0)	8827.46	(0.20)	[63006]
	13(2,11) - 14(1,14)		12		13	(0,0,0)	9366.14	(0.20)	[63006]
	13(2,11) - 14(1,14)		14		15	(0,0,0)	9366.39	(0.20)	[63006]
	13(2,11) - 14(1,14)		13		14	(0,0,0)	9370.22	(0.20)	[63006]
	31(7,25) - 32(6,26)					(0,0,0)	10061.91	(0.10)	[67013]
	28(5,23) - 27(6,22)					(0,0,0)	10460.47	(0.10)	[67013]
	12(3, 9) - 13(2,12)		13		14	(0,0,0)	10906.67	(0.20)	[63006]
	12(3, 9) - 13(2,12)		11		12	(0,0,0)	10906.67	(0.20)	[63006]
	12(3, 9) - 13(2,12)		12		13	(0,0,0)	10907.57	(0.20)	[63006]
	36(8,29) - 37(7,30)					(0,0,0)	11245.53	(0.10)	[67013]
	15(2,14) - 14(3,11)		15		14	(0,0,0)	11267.12	(0.20)	[63006]
	15(2,14) - 14(3,11)		14		13	(0,0,0)	11268.22	(0.20)	[63006]
	15(2,14) - 14(3,11)		16		15	(0,0,0)	11268.22	(0.20)	[63006]
	31(7,24) - 32(6,27)					(0,0,0)	11637.07	(0.10)	[67013]
	9(2, 7) - 10(1,10)		8		9	(0,0,0)	11888.95	(0.20)	[63006]
	9(2, 7) - 10(1,10)		10		11	(0,0,0)	11889.28	(0.20)	[63006]
	36(8,28) - 37(7,31)					(0,0,0)	11890.79	(0.10)	[67013]
	9(2, 7) - 10(1,10)		9		10	(0,0,0)	11892.31	(0.20)	[63006]
	26(6,20) - 27(5,23)					(0,0,0)	11953.85	(0.10)	[67013]
	19(3,17) - 18(4,14)		19		18	(0,0,0)	12810.00	(0.10)	[67013]
	19(3,17) - 18(4,14)		18		17	(0,0,0)	12810.00	(0.10)	[67013]
	19(3,17) - 18(4,14)		20		19	(0,0,0)	12810.00	(0.10)	[67013]
	21(5,16) - 22(4,19)					(0,0,0)	13404.79	(0.10)	[67013]
	37(3,35) - 36(4,32)					(0,0,0)	13644.47	(0.10)	[67013]
	14(2,12) - 15(1,15)		15		16	(0,0,0)	13904.62	(0.20)	[67013]
	23(4,19) - 22(5,18)					(0,0,0)	14464.73	(0.10)	[67013]
	5(2, 4) - 6(1, 5)		5		6	(0,0,0)	14896.43	(0.20)	[63006]
	5(2, 4) - 6(1, 5)		6		7	(0,0,0)	14897.89	(0.20)	[63006]
	5(2, 4) - 6(1, 5)		4		5	(0,0,0)	14897.89	(0.20)	[63006]
	10(3, 8) - 11(2, 9)		10		11	(0,0,0)	16079.34	(0.20)	[63006]
	10(3, 8) - 11(2, 9)		11		12	(0,0,0)	16080.37	(0.20)	[63006]
	1(0, 1) - 0(0, 0)		2		1	(0,0,0)	16105.50	(0.20)	[63006]
	25(2,24) - 24(3,21)					(0,0,0)	16312.53	(0.10)	[67013]

TABLE 31.2. The microwave spectrum of NSF—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{14}N^{32}S^{19}F$	16(4,12) - 17(3,15)		15		16	(0,0,0)	16909.88	(0.10)	[67013]
	16(4,12) - 17(3,15)		16		17	(0,0,0)	16909.88	(0.10)	[67013]
	16(4,12) - 17(3,15)		17		18	(0,0,0)	16909.88	(0.10)	[67013]
	8(2, 6) - 9(1, 9)		9		10	(0,0,0)	17424.86	(0.20)	[63006]
	8(2, 6) - 9(1, 9)		7		8	(0,0,0)	17424.86	(0.20)	[63006]
	8(2, 6) - 9(1, 9)		8		9	(0,0,0)	17427.95	(0.20)	[63006]
	24(4,21) - 23(5,18)					(0,0,0)	19436.66	(0.10)	[67013]
	16(2,15) - 15(3,12)		16		15	(0,0,0)	20421.55	(0.20)	[63006]
	16(2,15) - 15(3,12)		17		16	(0,0,0)	20422.82	(0.20)	[63006]
	16(2,15) - 15(3,12)		15		14	(0,0,0)	20422.82	(0.20)	[63006]
	15(2,13) - 16(1,16)		16		17	(0,0,0)	20473.40	(0.20)	[63006]
	15(2,13) - 16(1,16)		14		15	(0,0,0)	20473.40	(0.20)	[63006]
	15(2,13) - 16(1,16)		15		16	(0,0,0)	20477.47	(0.20)	[63006]
	15(4,12) - 16(3,13)		15		16	(0,0,0)	20649.27	(0.20)	[63006]
	15(4,12) - 16(3,13)		16		17	(0,0,0)	20649.84	(0.20)	[63006]
	15(4,12) - 16(3,13)		14		15	(0,0,0)	20649.84	(0.20)	[63006]
	18(3,15) - 17(4,14)		18		17	(0,0,0)	20661.14	(0.20)	[63006]
	18(3,15) - 17(4,14)		19		18	(0,0,0)	20661.37	(0.20)	[63006]
	18(3,15) - 17(4,14)		17		16	(0,0,0)	20661.37	(0.20)	[63006]
	29(5,25) - 28(6,22)					(0,0,0)	22452.46	(0.10)	[67013]
	27(3,24) - 28(2,27)					(0,0,0)	22805.78	(0.10)	[67013]
	39(7,33) - 38(8,30)					(0,0,0)	23309.40	(0.10)	[67013]
	34(6,29) - 33(7,26)					(0,0,0)	23410.52	(0.10)	[67013]
	11(3, 8) - 12(2,11)					(0,0,0)	23555.89	(0.10)	[67013]
	20(5,16) - 21(4,17)					(0,0,0)	24315.90	(0.10)	[67013]
	39(7,32) - 38(8,31)					(0,0,0)	24610.57	(0.10)	[67013]
	7(2, 5) - 8(1, 8)		8		9	(0,0,0)	24678.78	(0.20)	[63006]
	7(2, 5) - 8(1, 8)		6		7	(0,0,0)	24678.78	(0.20)	[63006]
	7(2, 5) - 8(1, 8)		7		8	(0,0,0)	24681.70	(0.20)	[63006]
	24(2,23) - 23(3,20)					(0,0,0)	25404.05	(0.10)	[67013]
	38(4,34) - 39(3,37)					(0,0,0)	25947.61	(0.10)	[67013]
	4(0, 4) - 3(1, 3)		5		4	(0,0,0)	26261.53	(0.20)	[63006]
	4(0, 4) - 3(1, 3)		4		3	(0,0,0)	26262.69	(0.20)	[63006]
	8(1, 7) - 7(2, 6)		9		8	(0,0,0)	26437.85	(0.20)	[63006]
	8(1, 7) - 7(2, 6)		7		6	(0,0,0)	26437.85	(0.20)	[63006]
	8(1, 7) - 7(2, 6)		8		7	(0,0,0)	26439.41	(0.20)	[63006]
	34(6,28) - 33(7,27)					(0,0,0)	26550.93	(0.10)	[67013]
	25(6,20) - 26(5,21)					(0,0,0)	26579.12	(0.10)	[67013]
	20(3,18) - 19(4,15)					(0,0,0)	26764.20	(0.10)	[67013]
	13(2,11) - 12(3,10)					(0,0,0)	27102.47	(0.10)	[67013]
	30(7,24) - 31(6,25)					(0,0,0)	27957.29	(0.10)	[67013]
	17(2,16) - 16(3,13)		17		16	(0,0,0)	28029.27	(0.20)	[63006]
	17(2,16) - 16(3,13)		18		17	(0,0,0)	28030.78	(0.20)	[63006]
	17(2,16) - 16(3,13)		16		15	(0,0,0)	28030.78	(0.20)	[63006]
	35(8,28) - 36(7,29)					(0,0,0)	28899.70	(0.10)	[67013]
	16(2,14) - 17(1,17)		15		16	(0,0,0)	29003.06	(0.20)	[63006]
	16(2,14) - 17(1,17)		17		18	(0,0,0)	29003.32	(0.20)	[63006]
	16(2,14) - 17(1,17)		16		17	(0,0,0)	29007.37	(0.20)	[63006]
	30(7,23) - 31(6,26)					(0,0,0)	29051.23	(0.10)	[67013]
	25(6,19) - 26(5,22)					(0,0,0)	29154.09	(0.10)	[67013]
	35(8,27) - 36(7,30)					(0,0,0)	29346.37	(0.10)	[67013]
	30(5,26) - 29(6,23)					(0,0,0)	29581.33	(0.10)	[67013]
	29(5,24) - 28(6,23)					(0,0,0)	29676.26	(0.10)	[67013]
	20(5,15) - 21(4,18)					(0,0,0)	30057.24	(0.10)	[67013]
	2(1, 2) - 1(1, 1)		2		1	(0,0,0)	30891.49	(0.20)	[63006]
	2(1, 2) - 1(1, 1)		1		0	(0,0,0)	30891.49	(0.20)	[63006]
	2(1, 2) - 1(1, 1)		3		2	(0,0,0)	30892.13	(0.20)	[63006]
	36(3,34) - 35(4,31)					(0,0,0)	31091.45	(0.10)	[67013]
	2(0, 2) - 1(0, 1)		3		2	(0,0,0)	32179.27	(0.20)	[63006]
	2(0, 2) - 1(0, 1)		2		1	(0,0,0)	32179.27	(0.20)	[63006]
	23(2,22) - 22(3,19)					(0,0,0)	32339.22	(0.10)	[67013]
	15(4,11) - 16(3,14)		16		17	(0,0,0)	32425.85	(0.20)	[63006]
	15(4,11) - 16(3,14)		15		16	(0,0,0)	32425.85	(0.20)	[63006]
	15(4,11) - 16(3,14)		14		15	(0,0,0)	32425.85	(0.20)	[63006]
	6(2, 4) - 7(1, 7)		7		8	(0,0,0)	33478.91	(0.20)	[63006]
	6(2, 4) - 7(1, 7)		5		6	(0,0,0)	33478.56	(0.20)	[63006]

TABLE 31.2. The microwave spectrum of NSF—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{14}N^{32}S^{19}F$	6(2, 4) - 7(1, 7)		6		7	(0,0,0)	33481.42	(0.20)	[63006]
	2(1, 1) - 1(1, 0)		3		2	(0,0,0)	33530.31	(0.20)	[63006]
	18(2,17) - 17(3,14)		18		17	(0,0,0)	33901.19	(0.20)	[63006]
	18(2,17) - 17(3,14)		19		18	(0,0,0)	33902.92	(0.20)	[63006]
	18(2,17) - 17(3,14)		17		16	(0,0,0)	33902.92	(0.20)	[63006]
	4(2, 3) - 5(1, 4)		4		5	(0,0,0)	34757.01	(0.20)	[63006]
	4(2, 3) - 5(1, 4)		5		6	(0,0,0)	34758.35	(0.20)	[63006]
	4(2, 3) - 5(1, 4)		3		4	(0,0,0)	34758.61	(0.20)	[63006]
	24(4,20) - 23(5,19)					(0,0,0)	34948.10	(0.10)	[67013]
	25(4,22) - 24(5,19)					(0,0,0)	35473.92	(0.10)	[67013]
	9(3, 7) - 10(2, 8)		10		11	(0,0,0)	36366.81	(0.20)	[63006]
	9(3, 7) - 10(2, 8)		8		9	(0,0,0)	36366.81	(0.20)	[63006]
	10(3, 7) - 11(2,10)		11		12	(0,0,0)	37020.30	(0.20)	[63006]
	10(3, 7) - 11(2,10)		10		11	(0,0,0)	37020.30	(0.20)	[63006]
	10(3, 7) - 11(2,10)		9		10	(0,0,0)	37020.30	(0.20)	[63006]
	22(2,21) - 21(3,18)					(0,0,0)	37055.44	(0.10)	[67013]
	19(2,18) - 18(3,15)					(0,0,0)	37866.22	(0.10)	[67013]
	28(3,25) - 29(2,28)					(0,0,0)	39307.27	(0.10)	[67013]
	17(2,15) - 18(1,18)					(0,0,0)	39394.95	(0.10)	[67013]
	21(2,20) - 20(3,17)					(0,0,0)	39528.46	(0.10)	[67013]
	20(2,19) - 19(3,16)					(0,0,0)	39777.45	(0.10)	[67013]
	21(3,19) - 20(4,16)					(0,0,0)	39919.73	(0.10)	[67013]
	1(1, 0) - 1(0, 1)		0		1	(0,0,0)	42322.34	(0.20)	[63006]
	1(1, 0) - 1(0, 1)		2		2	(0,0,0)	42324.46	(0.20)	[63006]
	1(1, 0) - 1(0, 1)		2		1	(0,0,0)	42324.94	(0.20)	[63006]
	1(1, 0) - 1(0, 1)		1		0	(0,0,0)	42325.38	(0.20)	[63006]
	1(1, 0) - 1(0, 1)		1		2	(0,0,0)	42326.11	(0.20)	[63006]
	1(1, 0) - 1(0, 1)		1		1	(0,0,0)	42326.63	(0.20)	[63006]
	3(2, 2) - 4(1, 3)		4		5	(0,0,0)	54038.	(2.0)	[63006]
	3(2, 2) - 4(1, 3)		2		3	(0,0,0)	54038.	(2.0)	[63006]
	2(1, 2) - 1(0, 1)		2		2	(0,0,0)	71895.62	(0.20)	[63006]
	2(1, 2) - 1(0, 1)		2		1	(0,0,0)	71896.10	(0.20)	[63006]
	2(1, 2) - 1(0, 1)		3		2	(0,0,0)	71897.53	(0.20)	[63006]
	2(1, 2) - 1(0, 1)		1		0	(0,0,0)	71897.53	(0.20)	[63006]
	2(1, 2) - 1(0, 1)		1		1	(0,0,0)	71898.93	(0.20)	[63006]
	2(2, 1) - 3(1, 2)		3		4	(0,0,0)	72713.61	(0.20)	[63006]
	2(2, 1) - 3(1, 2)		2		3	(0,0,0)	72713.61	(0.20)	[63006]
	2(2, 1) - 3(1, 2)		1		2	(0,0,0)	72713.61	(0.20)	[63006]
$^{14}N^{34}S^{19}F$	7(1, 6) - 6(2, 5)		6		5	(0,0,0)	9687.58	(0.20)	[63006]
	7(1, 6) - 6(2, 5)		8		7	(0,0,0)	9687.58	(0.20)	[63006]
	7(1, 6) - 6(2, 5)		7		6	(0,0,0)	9689.05	(0.20)	[63006]
	3(0, 3) - 2(1, 2)		2		1	(0,0,0)	9743.35	(0.20)	[63006]
	3(0, 3) - 2(1, 2)		4		3	(0,0,0)	9744.08	(0.20)	[63006]
	3(0, 3) - 2(1, 2)		3		2	(0,0,0)	9745.12	(0.20)	[63006]
	5(2, 4) - 6(1, 5)		5		6	(0,0,0)	10747.13	(0.20)	[63006]
	5(2, 4) - 6(1, 5)		4		5	(0,0,0)	10748.64	(0.20)	[63006]
	5(2, 4) - 6(1, 5)		6		7	(0,0,0)	10748.64	(0.20)	[63006]
	8(2, 6) - 9(1, 9)		9		10	(0,0,0)	14947.94	(0.20)	[63006]
	8(2, 6) - 9(1, 9)		11		12	(0,0,0)	14947.94	(0.20)	[63006]
	8(2, 6) - 9(1, 9)		8		9	(0,0,0)	14951.28	(0.20)	[63006]
	7(2, 5) - 8(1, 8)		6		7	(0,0,0)	21805.07	(0.20)	[63006]
	7(2, 5) - 8(1, 8)		8		9	(0,0,0)	21805.46	(0.20)	[63006]
	7(2, 5) - 8(1, 8)		7		8	(0,0,0)	21808.20	(0.20)	[63006]
	9(3, 7) - 10(2, 8)		9		10	(0,0,0)	29140.12	(0.20)	[63006]
	9(3, 7) - 10(2, 8)		10		11	(0,0,0)	29141.04	(0.20)	[63006]
	9(3, 7) - 10(2, 8)		11		12	(0,0,0)	29141.04	(0.20)	[63006]
	6(2, 4) - 7(1, 7)		5		6	(0,0,0)	30282.65	(0.20)	[63006]
	6(2, 4) - 7(1, 7)		7		8	(0,0,0)	30283.01	(0.20)	[63006]
	6(2, 4) - 7(1, 7)		6		7	(0,0,0)	30285.51	(0.20)	[63006]
	4(2, 3) - 5(1, 4)		4		5	(0,0,0)	30627.67	(0.20)	[63006]
	4(2, 3) - 5(1, 4)		3		4	(0,0,0)	30629.01	(0.20)	[63006]
	4(2, 3) - 5(1, 4)		5		6	(0,0,0)	30629.01	(0.20)	[63006]
	8(1, 7) - 7(2, 6)		9		8	(0,0,0)	30638.50	(0.20)	[63006]
	8(1, 7) - 7(2, 6)		7		6	(0,0,0)	30638.50	(0.20)	[63006]
	8(1, 7) - 7(2, 6)		8		7	(0,0,0)	30640.01	(0.20)	[63006]
	10(3, 7) - 11(2,10)		11		12	(0,0,0)	31117.39	(0.20)	[63006]

TABLE 31.2. The microwave spectrum of NSF—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{14}N^{34}S^{19}F$	10(3, 7) - 11(2,10)		9		10	(0,0,0)	31117.39	(0.20)	[63006]
	10(3, 7) - 11(2,10)		10		11	(0,0,0)	31118.05	(0.20)	[63006]
	1(1, 0) - 1(0, 1)		1		0	(0,0,0)	40944.07	(0.20)	[63006]
	1(1, 0) - 1(0, 1)		2		1	(0,0,0)	40944.07	(0.20)	[63006]
	1(1, 0) - 1(0, 1)		1		2	(0,0,0)	40945.44	(0.20)	[63006]
	1(1, 0) - 1(0, 1)		1		1	(0,0,0)	40945.44	(0.20)	[63006]

Table 32. Rotational constants for GeF_2.

Isotopic Species	Vib. State v_1 v_2 v_3	A (MHz)	B (MHz)	C (MHz)	Reference
$^{76}Ge^{19}F_2$	0 0 0	15 243.86	7 848.91	5 166.48	[71004]
$^{74}Ge^{19}F_2$	0 0 0	15 381.29	7 848.95	5 182.30	[72032]
	1 0 0	15 371.27	7 808.14	5 169.82	[72032]
	0 1 0	15 571.60	7 834.47	5 166.78	[72032]
	0 2 0	15 767.28	7 819.57	5 151.27	[72032]
	0 0 1	15 300.31	7 831.90	5 159.72	[72032]
$^{73}Ge^{19}F_2$	0 0 0	15 452.75	...	5 190.30	[72032]
$^{72}Ge^{19}F_2$	0 0 0	15 526.34	7 848.84	5 198.66	[72032]
	1 0 0	15 516.77	7 807.63	5 186.26	[72032]
	0 1 0	15 718.64	7 834.31	5 183.04	[72032]
	0 2 0	15 916.46	7 819.69	5 167.47	[72032]
	0 0 1	15 443.53	7 831.55	5 175.60	[72032]
$^{70}Ge^{19}F_2$	0 0 0	15 679.82	7 848.82	5 215.79	[72032]
	1 0 0	15 670.71	7 807.33	5 203.64	[72032]
	0 1 0	15 873.96	7 834.28	5 200.02	[72032]
	0 2 0	16 074.23	7 819.92	5 184.47	[72032]
	0 0 1	15 595.12	7 831.42	5 192.16	[72032]

Electric dipole moment: μ_b = 2.61(2) D [71004]

Hyperfine constants for $^{73}Ge^{19}F_2$: $\chi_{aa}(^{73}Ge)$ = 17.2(10) MHz [72032]
$\chi_{bb}(^{73}Ge)$ = 121.7(10) MHz [72032]
$\chi_{cc}(^{73}Ge)$ =-138.9(10) MHz [72032]

Table 32.1. Rotational and centrifugal distortion constants for GeF_2.

Watson's Determinable Parameters	$^{74}Ge^{19}F_2$ Value[a] (MHz)	$^{72}Ge^{19}F_2$ Value[a] (MHz)	$^{70}Ge^{19}F_2$ Value[a] (MHz)
A"	15 381.247(44)	15 526.470(45)	15 679.895(54)
B"	7 848.8993(197)	7 848.8891(205)	7 848.8346(258)
C"	5 182.1477(156)	5 198.5465(184)	5 215.6731(196)
τ_1	0.1156(49)	0.08543(638)	0.08433(578)
τ_2	0.01706(115)	0.01034(191)	0.008345(1316)
τ_3[b]	-0.25(2)	-0.11(1)	-0.15(2)
τ_{aaaa}	-0.45135(499)	-0.49498(522)	-0.50121(601)
τ_{bbbb}	-0.072301(994)	-0.079803(891)	-0.077517(1275)
τ_{cccc}	-0.003941(682)	-0.009497(699)	-0.006282(893)
Std. dev.	0.205	0.179	0.263
No. lines fit	42	37	40
Derived Parameters (assuming planarity conditions)			
A'	15 381.239(44)	15 526.462(44)	15 679.885(54)
B'	7 848.906(19)	7 848.895(20)	7 848.836(26)
C'	5 182.206(14)	5 198.592(18)	5 215.724(19)
τ'_{bbcc}	-0.01469(51)	-0.0176(11)	-0.01973(59)
τ'_{ccaa}	0.01340(95)	0.0126(41)	0.0025(14)
τ'_{aabb}	0.1169(37)	0.0904(30)	0.1016(48)
$\tau_{aabb}(1)$	0.1485(12)	0.1556(83)	0.1317(30)
$\tau_{aabb}(2)$	0.1582(43)	0.1242(64)	0.1540(58)
$\tau_{aabb}(3)$	0.1582(43)	0.1242(64)	0.1540(58)
$\tau_{abab}(1)$	-0.0158(18)	-0.0326(44)	-0.0151(32)
$\tau_{abab}(2)$	-0.0233(17)	-0.0082(67)	-0.0324(29)
$\tau_{abab}(3)$	-0.0255(27)	-0.0011(99)	-0.0374(46)
$\Delta\tau$	$0.97(43)\times10^{-3}$	$-0.31(14)\times10^{-2}$	$0.22(7)\times10^{-2}$

[a] The uncertainties quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

TABLE 32.2. The microwave spectrum of GeF_2

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{76}Ge^{19}F_2$	1(1, 0) - 1(0, 1)	(0,0,0)	10077.37	(0.30)	[71004]
	1(1, 0) - 1(0, 1)	(0,1,0)	10281.16	(0.30)	[71004]
	2(1, 1) - 2(0, 2)	(0,0,0)	13366.80	(0.30)	[71004]
	2(0, 2) - 1(1, 1)	(0,0,0)	18028.64	(0.30)	[71004]
	3(1, 2) - 3(0, 3)	(0,0,0)	19205.50	(0.30)	[71004]
	3(1, 2) - 3(0, 3)	(0,1,0)	19367.74	(0.30)	[71004]
	3(1, 2) - 3(0, 3)	(0,2,0)	19534.99	(0.30)	[71004]
	1(1, 0) - 0(0, 0)	(0,0,0)	20410.33	(0.30)	[71004]
	1(1, 1) - 0(0, 0)	(0,1,0)	20582.90	(0.30)	[71004]
	3(2, 1) - 3(1, 2)	(0,0,0)	21449.95	(0.30)	[71004]
	3(2, 1) - 3(1, 2)	(0,1,0)	21991.62	(0.30)	[71004]
	4(2, 2) - 4(1, 3)	(0,1,0)	22356.42	(0.30)	[71004]
	2(2, 0) - 2(1, 1)	(0,0,0)	22790.72	(0.30)	[71004]
	5(2, 3) - 5(1, 4)	(0,0,0)	25074.28	(0.30)	[71004]
	5(2, 3) - 5(1, 4)	(0,1,0)	25390.50	(0.30)	[71004]
	5(2, 3) - 5(1, 4)	(0,2,0)	25715.30	(0.30)	[71004]
	2(2, 1) - 2(1, 2)	(0,0,0)	30230.40	(0.30)	[71004]
	2(1, 2) - 1(0, 1)	(0,0,0)	30743.00	(0.30)	[71004]
	2(2, 1) - 2(1, 2)	(0,1,0)	30840.81	(0.30)	[71004]
	2(1, 2) - 1(0, 1)	(0,1,0)	30880.36	(0.30)	[71004]
$^{74}Ge^{19}F_2$	1(1, 0) - 1(0, 1)	(0,0,1)	10140.43	(0.30)	[71004]
	1(1, 0) - 1(0, 1)	(0,0,0)	10199.19	(0.30)	[71004]
	1(1, 0) - 1(0, 1)	(0,1,0)	10405.05	(0.30)	[71004]
	1(1, 0) - 1(0, 1)	(0,2,0)	10616.18	(0.30)	[71004]
	2(1, 1) - 2(0, 2)	(0,0,1)	13410.75	(0.30)	[71004]
	2(1, 1) - 2(0, 2)	(0,0,0)	13457.51	(0.30)	[71004]
	2(1, 1) - 2(0, 2)	(0,1,0)	13651.77	(0.30)	[71004]
	7(4, 4) - 6(5, 1)	(0,0,0)	15620.90	(0.30)	[72032]
	11(3, 8) - 12(2,11)	(0,0,0)	15995.00	(0.30)	[72032]
	11(7, 5) - 10(8, 2)	(0,0,0)	17111.65	(0.30)	[72032]
	11(7, 4) - 10(8, 3)	(0,0,0)	17140.76	(0.30)	[72032]
	5(2, 4) - 4(3, 1)	(0,0,0)	17172.17	(0.30)	[72032]
	2(0, 2) - 1(1, 1)	(0,0,0)	17398.08	(0.30)	[71004]
	2(0, 2) - 1(1, 1)	(0,0,1)	17915.83	(0.30)	[71004]
	6(3, 4) - 5(4, 1)	(0,0,0)	18359.88	(0.30)	[72032]
	15(4,11) - 16(3,14)	(0,0,0)	19012.04	(0.30)	[72032]
	3(1, 2) - 3(0, 3)	(1,0,0)	19115.86	(0.30)	[71004]
	3(1, 2) - 3(0, 3)	(0,0,0)	19233.41	(0.30)	[71004]
	3(1, 2) - 3(0, 3)	(0,1,0)	19399.12	(0.30)	[71004]
	3(1, 2) - 3(0, 3)	(0,2,0)	19569.12	(0.30)	[71004]
	3(1, 2) - 2(2, 1)	(0,0,0)	20076.06	(0.30)	[72032]
	1(1, 1) - 0(0, 0)	(0,0,1)	20459.82	(0.30)	[71004]
	1(1, 1) - 0(0, 0)	(1,0,0)	20541.12	(0.30)	[71004]
	1(1, 1) - 0(0, 0)	(0,0,0)	20563.31	(0.30)	[71004]
	1(1, 1) - 0(0, 0)	(0,1,0)	20738.56	(0.30)	[71004]
	1(1, 1) - 0(0, 0)	(0,2,0)	20918.92	(0.30)	[71004]
	10(6, 5) - 9(7, 2)	(0,0,0)	21595.49	(0.30)	[72032]
	10(6, 4) - 9(7, 3)	(0,0,0)	21770.69	(0.30)	[72032]
	3(2, 1) - 3(1, 2)	(0,0,0)	21806.35	(0.30)	[71004]
	3(2, 1) - 3(1, 2)	(1,0,0)	21871.45	(0.30)	[71004]
	4(2, 2) - 4(1, 3)	(0,0,1)	22046.46	(0.30)	[71004]
	4(2, 2) - 4(1, 3)	(0,0,0)	22177.27	(0.30)	[72032]
	3(2, 1) - 3(1, 2)	(0,1,0)	22356.40	(0.30)	[71004]
	4(2, 2) - 4(1, 3)	(0,1,0)	22633.52	(0.30)	[71004]
	14(9, 6) - 13(10, 3)	(0,0,0)	22688.83	(0.30)	[72032]
	14(9, 5) - 13(10, 4)	(0,0,0)	22691.61	(0.30)	[72032]
	3(2, 1) - 3(1, 2)	(0,2,0)	22923.43	(0.30)	[71004]
	2(2, 0) - 2(1, 1)	(0,0,1)	23002.20	(0.30)	[71004]
	2(2, 0) - 2(1, 1)	(0,1,0)	23789.57	(0.30)	[71004]
	6(3, 3) - 5(4, 2)	(0,0,0)	24253.44	(0.30)	[72032]
	6(2, 5) - 5(3, 2)	(0,0,0)	24729.89	(0.30)	[72032]
	5(2, 3) - 5(1, 4)	(1,0,0)	25110.73	(0.30)	[71004]
	5(2, 3) - 5(1, 4)	(0,0,0)	25204.68	(0.30)	[71004]
	5(2, 3) - 5(1, 4)	(0,1,0)	25534.30	(0.30)	[71004]
	5(2, 3) - 5(1, 4)	(0,2,0)	25876.68	(0.30)	[71004]

TABLE 32.2. The microwave spectrum of GeF_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{74}Ge^{19}F_2$	9(5, 5) - 8(6, 2)	(0,0,0)	25993.38	(0.30)	[72032]
	9(5, 4) - 8(6, 3)	(0,0,0)	26929.51	(0.30)	[72032]
	13(8, 6) - 12(9, 3)	(0,0,0)	27154.76	(0.30)	[72032]
	13(8, 5) - 12(9, 4)	(0,0,0)	27171.78	(0.30)	[72032]
	4(1, 3) - 4(0, 4)	(0,0,0)	27820.51	(0.30)	[71004]
	13(3,11) - 12(4, 8)	(0,0,0)	28146.55	(0.30)	[72032]
	7(2, 6) - 6(3, 3)	(0,0,0)	28387.08	(0.30)	[72032]
	8(4, 5) - 7(5, 2)	(0,0,0)	29604.43	(0.30)	[72032]
	2(2, 1) - 2(1, 2)	(0,0,1)	30418.75	(0.30)	[71004]
	7(3, 5) - 6(4, 2)	(0,0,0)	30435.06	(0.30)	[72032]
	2(2, 1) - 2(1, 2)	(0,0,0)	30595.77	(0.30)	[71004]
	2(1, 2) - 1(0, 1)	(1,0,0)	30880.36	(0.30)	[71004]
	2(1, 2) - 1(0, 1)	(0,0,0)	30927.65	(0.30)	[72032]
	2(1, 2) - 1(0, 1)	(0,1,0)	31073.14	(0.30)	[71004]
	3(0, 3) - 2(1, 2)	(0,1,0)	31197.22	(0.30)	[71004]
	2(2, 1) - 2(1, 2)	(0,1,0)	31213.31	(0.30)	[71004]
	2(1, 2) - 1(0, 1)	(0,2,0)	31221.09	(0.30)	[71004]
	3(0, 3) - 2(1, 2)	(0,0,0)	31437.91	(0.30)	[72032]
	6(2, 4) - 6(1, 5)	(0,0,0)	31441.26	(0.30)	[72032]
	12(7, 6) - 11(8, 3)	(0,0,0)	31728.44	(0.30)	[72032]
	12(7, 5) - 11(8, 4)	(0,0,0)	31832.86	(0.30)	[72032]
	16(10, 7) - 15(11, 4)	(0,0,0)	32753.57	(0.30)	[72032]
	16(10, 6) - 15(11, 5)	(0,0,0)	32755.07	(0.30)	[72032]
	5(2, 3) - 4(3, 2)	(0,0,0)	32778.92	(0.30)	[72032]
	6(3, 3) - 6(2, 4)	(0,0,0)	33357.80	(0.30)	[72032]
	6(3, 3) - 6(2, 4)	(1,0,0)	33496.92	(0.30)	[71004]
	8(4, 4) - 7(5, 3)	(0,0,0)	33674.03	(0.30)	[72032]

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{73}Ge^{19}F_2$	1(1, 0) - 1(0, 1)		9/2		11/2	(0,0,0)	10245.08	(0.30)	[72032]
	1(1, 0) - 1(0, 1)		9/2		7/2	(0,0,0)	10245.08	(0.30)	[72032]
	1(1, 0) - 1(0, 1)		11/2		9/2	(0,0,0)	10267.09	(0.30)	[72032]
	1(1, 0) - 1(0, 1)		11/2		11/2	(0,0,0)	10270.45	(0.30)	[72032]
	1(1, 0) - 1(0, 1)		7/2		9/2	(0,0,0)	10272.94	(0.30)	[72032]
	1(1, 1) - 0(0, 0)		7/2		9/2	(0,0,0)	20631.96	(0.30)	[72032]
	1(1, 1) - 0(0, 0)		11/2		9/2	(0,0,0)	20637.01	(0.30)	[72032]
	1(1, 1) - 0(0, 0)		9/2		9/2	(0,0,0)	20659.55	(0.30)	[72032]
	2(1, 2) - 1(0, 1)		5/2		7/2	(0,0,0)	31007.25	(0.30)	[72032]
	2(1, 2) - 1(0, 1)		13/2		11/2	(0,0,0)	31014.38	(0.30)	[72032]
	2(1, 2) - 1(0, 1)		7/2		7/2	(0,0,0)	31023.90	(0.30)	[72032]
	2(1, 2) - 1(0, 1)		11/2		9/2	(0,0,0)	31032.86	(0.30)	[72032]
	2(1, 2) - 1(0, 1)		11/2		11/2	(0,0,0)	31036.36	(0.30)	[72032]

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{72}Ge^{19}F_2$	1(1, 0) - 1(0, 1)	(0,0,0)	10328.06	(0.30)	[71004]
	1(1, 0) - 1(0, 1)	(0,1,0)	10536.08	(0.30)	[71004]
	1(1, 0) - 1(0, 1)	(0,2,0)	10749.43	(0.30)	[71004]
	2(1, 1) - 2(0, 2)	(0,0,0)	13354.12	(0.30)	[71004]
	2(1, 1) - 2(0, 2)	(0,0,1)	13506.73	(0.30)	[71004]
	2(1, 1) - 2(0, 2)	(0,1,0)	13750.95	(0.30)	[71004]
	11(7, 4) - 10(8, 3)	(0,0,0)	15084.61	(0.30)	[72032]
	5(2, 4) - 4(3, 1)	(0,0,0)	16673.63	(0.30)	[72032]
	15(4,11) - 16(3,14)	(0,0,0)	17329.78	(0.30)	[72032]
	2(0, 2) - 1(1, 1)	(0,0,1)	17819.80	(0.30)	[71004]
	2(0, 2) - 1(1, 1)	(0,0,0)	17840.78	(0.30)	[71004]
	3(1, 2) - 3(0, 3)	(1,0,0)	19146.73	(0.30)	[71004]
	3(1, 2) - 3(0, 3)	(0,0,0)	19265.19	(0.30)	[71004]
	3(1, 2) - 3(0, 3)	(0,1,0)	19434.38	(0.30)	[71004]
	3(1, 2) - 3(0, 3)	(0,2,0)	19608.51	(0.30)	[71004]
	3(1, 2) - 2(2, 1)	(0,0,0)	19677.14	(0.30)	[72032]
	10(6, 5) - 9(7, 2)	(0,0,0)	19806.80	(0.30)	[72032]

TABLE 32.2. The microwave spectrum of GeF_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{72}Ge^{19}F_2$	10(6, 4) - 9(7, 3)	(0,0,0)	19963.60	(0.30)	[72032]
	14(9, 6) - 13(10, 3)	(0,0,0)	20092.06	(0.30)	[72032]
	14(9, 5) - 13(10, 4)	(0,0,0)	20094.22	(0.30)	[72032]
	1(1, 1) - 0(0, 0)	(0,0,1)	20619.00	(0.30)	[71004]
	1(1, 1) - 0(0, 0)	(1,0,0)	20703.34	(0.30)	[71004]
	1(1, 1) - 0(0, 0)	(0,0,0)	20724.78	(0.30)	[71004]
	1(1, 1) - 0(0, 0)	(0,1,0)	20901.53	(0.30)	[71004]
	1(1, 1) - 0(0, 0)	(0,2,0)	21083.94	(0.30)	[71004]
	3(2, 1) - 3(1, 2)	(0,0,0)	22185.68	(0.30)	[71004]
	4(2, 2) - 4(1, 3)	(0,0,1)	22332.97	(0.30)	[71004]
	4(2, 2) - 4(1, 3)	(0,0,0)	22465.39	(0.30)	[72032]
	3(2, 1) - 3(1, 2)	(0,1,0)	22743.20	(0.30)	[71004]
	4(2, 2) - 4(1, 3)	(0,1,0)	22931.50	(0.30)	[71004]
	6(3, 3) - 5(4, 2)	(0,0,0)	23142.92	(0.30)	[72032]
	2(2, 0) - 2(1, 1)	(0,0,0)	23607.19	(0.30)	[71004]
	6(2, 5) - 5(3, 2)	(0,0,0)	24404.45	(0.30)	[72032]
	9(5, 5) - 8(6, 2)	(0,0,0)	24484.50	(0.30)	[72032]
	13(8, 6) - 12(9, 3)	(0,0,0)	24815.79	(0.30)	[72032]
	13(8, 5) - 12(9, 4)	(0,0,0)	24830.56	(0.30)	[72032]
	9(5, 4) - 8(6, 3)	(0,0,0)	25342.73	(0.30)	[72032]
	5(2, 3) - 5(1, 4)	(0,0,0)	25351.13	(0.30)	[71004]
	5(2, 3) - 5(1, 4)	(0,1,0)	25690.61	(0.30)	[71004]
	5(2, 3) - 5(1, 4)	(0,2,0)	26047.24	(0.30)	[71004]
	4(1, 3) - 4(0, 4)	(0,0,0)	27772.26	(0.30)	[71004]
	7(2, 6) - 6(3, 3)	(0,0,0)	28327.92	(0.30)	[72032]
	8(4, 5) - 7(5, 2)	(0,0,0)	28422.30	(0.30)	[72032]
	12(7, 6) - 11(8, 3)	(0,0,0)	29648.12	(0.30)	[72032]
	7(3, 5) - 6(4, 2)	(0,0,0)	29657.06	(0.30)	[72032]
	12(7, 5) - 11(8, 4)	(0,0,0)	29739.52	(0.30)	[72032]
	16(10, 7) - 15(11, 4)	(0,0,0)	29871.79	(0.30)	[72032]
	16(10, 6) - 15(11, 5)	(0,0,0)	29873.30	(0.30)	[72032]
	2(2, 1) - 2(1, 2)	(0,0,0)	30982.09	(0.30)	[71004]
	2(1, 2) - 1(0, 1)	(0,0,0)	31122.08	(0.30)	[72032]
	2(1, 2) - 1(0, 1)	(0,1,0)	31267.90	(0.30)	[71004]
	3(0, 3) - 2(1, 2)	(0,0,0)	31393.09	(0.30)	[71004]
	6(2, 4) - 6(1, 5)	(0,0,0)	31405.02	(0.30)	[72032]
	2(1, 2) - 1(0, 1)	(0,2,0)	31418.51	(0.30)	[71004]
	2(2, 1) - 2(1, 2)	(0,1,0)	31605.59	(0.30)	[71004]
	8(4, 4) - 7(5, 3)	(0,0,0)	32248.42	(0.30)	[72032]
	7(3, 4) - 7(2, 5)	(0,0,0)	33593.92	(0.30)	[72032]
	6(3, 3) - 6(2, 4)	(0,0,0)	34009.08	(0.30)	[72032]
$^{70}Ge^{19}F_2$	1(1, 0) - 1(0, 1)	(0,0,0)	10464.40	(0.30)	[72032]
	1(1, 0) - 1(0, 1)	(0,1,0)	10673.14	(0.30)	[71004]
	1(1, 0) - 1(0, 1)	(0,2,0)	10889.95	(0.30)	[71004]
	11(7, 4) - 10(8, 3)	(0,0,0)	12915.75	(0.30)	[72032]
	2(1, 1) - 2(0, 2)	(0,0,1)	13609.15	(0.30)	[71004]
	2(1, 1) - 2(0, 2)	(0,0,0)	13657.38	(0.30)	[71004]
	2(1, 1) - 2(0, 2)	(0,1,0)	13856.96	(0.30)	[71004]
	7(4, 3) - 6(5, 2)	(0,0,0)	14426.04	(0.30)	[72032]
	15(4,11) - 16(3,14)	(0,0,0)	15506.28	(0.30)	[72032]
	5(2, 4) - 4(3, 1)	(0,0,0)	16140.36	(0.30)	[72032]
	6(3, 4) - 5(4, 1)	(0,0,0)	16558.96	(0.30)	[72032]
	14(9, 6) - 13(10, 3)	(0,0,0)	17352.83	(0.30)	[72032]
	14(9, 5) - 13(10, 4)	(0,0,0)	17354.84	(0.30)	[72032]
	2(0, 2) - 1(1, 1)	(0,0,1)	17716.80	(0.30)	[71004]
	2(0, 2) - 1(1, 1)	(0,0,0)	17738.11	(0.30)	[71004]
	10(6, 5) - 9(7, 2)	(0,0,0)	17920.20	(0.30)	[72032]
	10(6, 4) - 9(7, 3)	(0,0,0)	18059.99	(0.30)	[72032]
	3(1, 2) - 3(0, 3)	(1,0,0)	19181.57	(0.30)	[71004]
	3(1, 2) - 2(2, 1)	(0,0,0)	19254.66	(0.30)	[72032]
	3(1, 2) - 3(0, 3)	(0,0,0)	19301.10	(0.30)	[71004]
	3(1, 2) - 3(0, 3)	(0,1,0)	19473.95	(0.30)	[71004]
	3(1, 2) - 3(0, 3)	(0,2,0)	19652.10	(0.30)	[71004]
	1(1, 1) - 0(0, 0)	(0,0,1)	20787.23	(0.30)	[71004]
	1(1, 1) - 0(0, 0)	(0,0,0)	20895.36	(0.30)	[71004]

TABLE 32.2. The microwave spectrum of GeF_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{70}Ge^{19}F_2$	1(1, 1) - 0(0, 0)	(0,1,0)	21073.75	(0.30)	[71004]
	1(1, 1) - 0(0, 0)	(0,2,0)	21258.94	(0.30)	[71004]
	6(3, 3) - 5(4, 2)	(0,0,0)	21977.56	(0.30)	[72032]
	13(8, 6) - 12(9, 3)	(0,0,0)	22349.51	(0.30)	[72032]
	13(8, 5) - 12(9, 4)	(0,0,0)	22361.90	(0.30)	[72032]
	3(2, 1) - 3(1, 2)	(0,0,0)	22588.90	(0.30)	[71004]
	3(2, 1) - 3(1, 2)	(1,0,0)	22660.74	(0.30)	[71004]
	4(2, 2) - 4(1, 3)	(0,0,0)	22775.76	(0.30)	[72032]
	9(5, 5) - 8(6, 2)	(0,0,0)	22891.93	(0.30)	[72032]
	9(5, 4) - 8(6, 3)	(0,0,0)	23675.33	(0.30)	[72032]
	6(2, 6) - 5(3, 2)	(0,0,0)	24048.24	(0.30)	[72032]
	2(2, 0) - 2(1, 1)	(0,0,0)	24051.60	(0.30)	[71004]
	5(2, 3) - 5(1, 4)	(1,0,0)	25428.35	(0.30)	[71004]
	5(2, 3) - 5(1, 4)	(0,0,0)	25515.23	(0.30)	[71004]
	5(2, 3) - 5(1, 4)	(0,1,0)	25867.25	(0.30)	[71004]
	5(2, 3) - 5(1, 4)	(0,2,0)	26237.14	(0.30)	[71004]
	16(10, 7) - 15(11, 4)	(0,0,0)	26833.77	(0.30)	[72032]
	16(10, 6) - 15(11, 5)	(0,0,0)	26834.80	(0.30)	[72032]
	8(4, 5) - 7(5, 2)	(0,0,0)	27170.40	(0.30)	[72032]
	12(7, 6) - 11(8, 3)	(0,0,0)	27455.40	(0.30)	[72032]
	12(7, 5) - 11(8, 4)	(0,0,0)	27535.40	(0.30)	[72032]
	4(1, 3) - 4(0, 4)	(0,0,0)	27724.27	(0.30)	[71004]
	7(2, 6) - 6(3, 3)	(0,0,0)	28244.44	(0.30)	[72032]
	7(3, 5) - 6(4, 2)	(0,0,0)	28825.95	(0.30)	[72032]
	8(4, 4) - 7(5, 3)	(0,0,0)	30755.93	(0.30)	[72032]
	13(3,11) - 12(4, 8)	(0,0,0)	31311.35	(0.30)	[72032]
	2(1, 2) - 1(0, 1)	(0,0,0)	31326.88	(0.30)	[71004]
	3(0, 3) - 2(1, 2)	(0,0,0)	31343.98	(0.30)	[71004]
	6(2, 4) - 6(1, 5)	(0,0,0)	31379.89	(0.30)	[72032]
	2(2, 1) - 2(1, 2)	(0,0,0)	31390.86	(0.30)	[71004]
	2(1, 2) - 1(0, 1)	(0,1,0)	31474.05	(0.30)	[71004]
	2(1, 2) - 1(0, 1)	(0,2,0)	31627.16	(0.30)	[71004]
	7(3, 4) - 7(2, 5)	(0,0,0)	34087.70	(0.30)	[72032]

Table 33. Rotational and centrifugal distortion constants for $^{14}N^{19}F_2$.

Watson's Determinable Parameters	Present Value[a] (MHz)	Brown et al. [74003] (MHz)
A"	70 496.191(916)	
B"	11 872.057(191)	
C"	10 136.23(17)	
τ_1	0. 24259(22158)	
τ_2	0.00265(3299)	
τ_3[b]	2.2(7)	
τ_{aaaa}	-7.7880(3163)	-7.75(20)
τ_{bbbb}	-0.069050(12726)	-0.081(20)
τ_{cccc}	-0.02859(1016)	
Std. dev.	1.465	
No. lines fit	20	10
Derived Parameters (assuming planarity conditions)		
A'	70 496.17(92)	70 496(2)
B'	11 872.14(17)	11 872.24(20)
C'	10 136.29(16)	10 136.46(20)
τ'_{bbcc}	-0.041(11)	
τ'_{ccaa}	0.160(67)	
τ'_{aabb}	0.12(14)	
$\tau_{aabb}(1)$	0.44(10)	
$\tau_{aabb}(2)$	0.39(12)	0.297(30)
$\tau_{aabb}(3)$	0.39(12)	
$\tau_{abab}(1)$	-0.159(23)	
$\tau_{abab}(2)$	-0.111(56)	-0.126(60)
$\tau_{abab}(3)$	-0.104(64)	
$\Delta\tau$	$-0.17(21)\times10^{-2}$	

[a] The uncertainties quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

Table 33.1. Spin-rotation and spin-spin interaction constants and electric dipole moment of $^{14}N^{19}F_2$ [74003].

Parameter	Value (MHz)	Parameter	Value (MHz)
A_s	-951.79(10)	χ_{aa}	5.59(10)
B_s	-92.86(10)	χ_{bb}	-0.73(10)
C_s	4.49(10)	χ_{cc}	-4.86(10)
A_F	164.39(40)	A_N	46.57(10)
T_{aa} (F)	-241.75(40)	T_{aa} (N)	-47.72(10)
T_{bb} (F)	-226.48(40)	T_{bb} (N)	-50.47(10)
T_{cc} (F)	468.22(40)	T_{cc} (N)	98.19(10)

Electric dipole moment: μ_b = 0.136(10) D

TABLE 33.2. The microwave spectrum of NF_2

Isotopic species	$N'(K'_-,K'_+) - N''(K''_-,K''_+)$	F'	ϵ'	F''	ϵ''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{14}N^{19}F_2$	10(2, 8) - 11(1,11)	25/2	1	27/2	1	(0,0,0)	13845.52	(0.05)	[74003]
	10(2, 8) - 11(1,11)	23/2	1	25/2	1	(0,0,0)	13978.85	(0.05)	[74003]
	10(2, 8) - 11(1,11)	21/2	2	23/2	2	(0,0,0)	14010.95	(0.05)	[74003]
	10(2, 8) - 11(1,11)	19/2	2	21/2	2	(0,0,0)	14043.65	(0.05)	[74003]
	10(2, 8) - 11(1,11)	21/2	1	23/2	1	(0,0,0)	14122.11	(0.05)	[74003]
	10(2, 8) - 11(1,11)	19/2	1	21/2	1	(0,0,0)	14153.25	(0.05)	[74003]
	10(2, 8) - 11(1,11)	17/2	1	19/2	1	(0,0,0)	14185.87	(0.05)	[74003]
	1(1, 1) - 2(0, 2)	5/2	2	7/2	3	(0,0,0)	14425.6	(0.2)	[74003]
	1(1, 1) - 2(0, 2)	3/2	3	5/2	4	(0,0,0)	14428.75	(0.05)	[74003]
	1(1, 1) - 2(0, 2)	7/2	1	9/2	1	(0,0,0)	14431.	(1.0)	[74003]
	1(1, 1) - 2(0, 2)	3/2	1	5/2	1	(0,0,0)	14438.6	(0.2)	[74003]
	1(1, 1) - 2(0, 2)	1/2	2	3/2	2	(0,0,0)	14455.6	(0.2)	[74003]
	1(1, 1) - 2(0, 2)	3/2	2	5/2	2	(0,0,0)	14469.08	(0.05)	[74003]
	10(2, 8) - 11(1,11)	15/2	1	17/2	1	(0,0,0)	14469.08	(0.05)	[74003]
	10(2, 8) - 11(1,11)	17/2	3	19/2	3	(0,0,0)	14514.75	(0.05)	[74003]
	10(2, 8) - 11(1,11)	19/2	5	21/2	5	(0,0,0)	14553.2	(0.2)	[74003]
	10(2, 8) - 11(1,11)	17/2	2	19/2	2	(0,0,0)	14654.83	(0.05)	[74003]
	10(2, 8) - 11(1,11)	19/2	4	21/2	4	(0,0,0)	14690.61	(0.05)	[74003]
	10(2, 8) - 11(1,11)	21/2	5	23/2	5	(0,0,0)	14732.73	(0.05)	[74003]
	10(2, 8) - 11(1,11)	19/2	3	21/2	3	(0,0,0)	14840.03	(0.05)	[74003]
	10(2, 8) - 11(1,11)	21/2	4	23/2	4	(0,0,0)	14877.1	(0.2)	[74003]
	10(2, 8) - 11(1,11)	23/2	3	25/2	3	(0,0,0)	14915.13	(0.05)	[74003]
	12(3, 9) - 13(2,12)	29/2	1	31/2	1	(0,0,0)	25495.3	(0.2)	[74003]
	12(3, 9) - 13(2,12)	27/2	2	29/2	2	(0,0,0)	25503.4	(0.2)	[74003]
	25(4,22) - 24(5,19)	53/2	3	51/2	3	(0,0,0)	25506.6	(0.2)	[74003]
	25(4,22) - 24(5,19)	51/2	4	49/2	4	(0,0,0)	25507.2	(0.2)	[74003]
	25(4,22) - 24(5,19)	49/2	3	47/2	3	(0,0,0)	25507.5	(0.2)	[74003]
	25(4,22) - 24(5,19)	51/2	5	49/2	5	(0,0,0)	25509.2	(0.2)	[74003]
	25(4,22) - 24(5,19)	49/2	4	47/2	4	(0,0,0)	25509.8	(0.2)	[74003]
	25(4,22) - 24(5,19)	47/2	2	45/2	2	(0,0,0)	25510.2	(0.2)	[74003]
	25(4,22) - 24(5,19)	49/2	5	47/2	5	(0,0,0)	25511.8	(0.2)	[74003]
	12(3, 9) - 13(2,12)	25/2	3	27/2	3	(0,0,0)	25511.8	(0.2)	[74003]
	25(4,22) - 24(5,19)	47/2	3	45/2	3	(0,0,0)	25512.6	(0.2)	[74003]
	25(4,22) - 24(5,19)	45/2	1	43/2	1	(0,0,0)	25513.0	(0.2)	[74003]
	12(3, 9) - 13(2,12)	27/2	1	29/2	1	(0,0,0)	25534.5	(0.2)	[74003]
	12(3, 9) - 13(2,12)	25/2	2	27/2	2	(0,0,0)	25542.3	(0.2)	[74003]
	12(3, 9) - 13(2,12)	23/2	2	25/2	2	(0,0,0)	25550.9	(0.2)	[74003]
	12(3, 9) - 13(2,12)	25/2	1	27/2	1	(0,0,0)	25572.7	(0.2)	[74003]

TABLE 33.2. The microwave spectrum of NF_2—Continued

Isotopic species	$N'(K'_-,K'_+) - N''(K''_-,K''_+)$	F'	ϵ'	F''	ϵ''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{14}N^{19}F_2$	12(3, 9) - 13(2,12)	23/2	1	25/2	1	(0,0,0)	25580.9	(0.2)	[74003]
	12(3, 9) - 13(2,12)	21/2	1	23/2	1	(0,0,0)	25589.9	(0.2)	[74003]
	32(7,26) - 33(6,27)	63/2	1	65/2	1	(0,0,0)	25604.6	(0.2)	[74003]
	32(7,26) - 33(6,27)	65/2	1	67/2	1	(0,0,0)	25606.0	(0.2)	[74003]
	32(7,26) - 33(6,27)	67/2	1	69/2	1	(0,0,0)	25607.1	(0.2)	[74003]
	25(4,22) - 24(5,19)	47/2	1	45/2	1	(0,0,0)	25809.8	(0.2)	[74003]
	25(4,22) - 24(5,19)	49/2	1	47/2	1	(0,0,0)	25810.6	(0.2)	[74003]
	25(4,22) - 24(5,19)	51/2	1	49/2	1	(0,0,0)	25811.2	(0.2)	[74003]
	25(4,22) - 24(5,19)	49/2	2	47/2	2	(0,0,0)	25813.4	(0.2)	[74003]
	25(4,22) - 24(5,19)	51/2	2	49/2	2	(0,0,0)	25814.2	(0.2)	[74003]
	25(4,22) - 24(5,19)	53/2	1	51/2	1	(0,0,0)	25814.8	(0.2)	[74003]
	25(4,22) - 24(5,19)	51/2	3	49/2	3	(0,0,0)	25817.4	(0.2)	[74003]
	25(4,22) - 24(5,19)	53/2	2	51/2	2	(0,0,0)	25818.2	(0.2)	[74003]
	25(4,22) - 24(5,19)	55/2	1	53/2	1	(0,0,0)	25818.8	(0.2)	[74003]
	32(7,26) - 33(6,27)	65/2	2	67/2	2	(0,0,0)	25893.6	(0.2)	[74003]
	32(7,26) - 33(6,27)	63/2	2	65/2	2	(0,0,0)	25894.8	(0.2)	[74003]
	32(7,26) - 33(6,27)	61/2	1	63/2	1	(0,0,0)	25896.0	(0.2)	[74003]
	12(3, 9) - 13(2,12)	19/2	1	21/2	1	(0,0,0)	25942.4	(0.2)	[74003]
	12(3, 9) - 13(2,12)	21/2	3	23/2	3	(0,0,0)	25951.4	(0.2)	[74003]
	12(3, 9) - 13(2,12)	23/2	5	25/2	5	(0,0,0)	25961.9	(0.2)	[74003]
	12(3, 9) - 13(2,12)	21/2	2	23/2	2	(0,0,0)	25988.9	(0.2)	[74003]
	12(3, 9) - 13(2,12)	23/2	4	25/2	4	(0,0,0)	25997.8	(0.2)	[74003]
	12(3, 9) - 13(2,12)	25/2	5	27/2	5	(0,0,0)	26088.5	(0.2)	[74003]
	12(3, 9) - 13(2,12)	23/2	3	25/2	3	(0,0,0)	26036.5	(0.2)	[74003]
	12(3, 9) - 13(2,12)	25/2	4	27/2	4	(0,0,0)	26045.1	(0.2)	[74003]
	12(3, 9) - 13(2,12)	27/2	3	29/2	3	(0,0,0)	26054.2	(0.2)	[74003]
	8(1, 7) - 7(2, 6)	11/2	1	9/2	1	(0,0,0)	27263.08	(0.05)	[74003]
	8(1, 7) - 7(2, 6)	13/2	3	11/2	3	(0,0,0)	27280.23	(0.05)	[74003]
	8(1, 7) - 7(2, 6)	15/2	5	13/2	5	(0,0,0)	27300.56	(0.05)	[74003]
	8(1, 7) - 7(2, 6)	13/2	2	11/2	2	(0,0,0)	27347.12	(0.05)	[74003]
	8(1, 7) - 7(2, 6)	15/2	4	13/2	4	(0,0,0)	27363.57	(0.05)	[74003]
	8(1, 7) - 7(2, 6)	17/2	5	15/2	5	(0,0,0)	27386.84	(0.05)	[74003]
	8(1, 7) - 7(2, 6)	15/2	3	13/2	3	(0,0,0)	27435.45	(0.05)	[74003]
	8(1, 7) - 7(2, 6)	21/2	1	19/2	1	(0,0,0)	27447.04	(0.05)	[74003]
	8(1, 7) - 7(2, 6)	17/2	4	15/2	4	(0,0,0)	27452.51	(0.05)	[74003]
	8(1, 7) - 7(2, 6)	19/2	2	17/2	2	(0,0,0)	27460.41	(0.05)	[74003]
	8(1, 7) - 7(2, 6)	17/2	3	15/2	3	(0,0,0)	27473.08	(0.05)	[74003]
	8(1, 7) - 7(2, 6)	19/2	3	17/2	3	(0,0,0)	27473.90	(0.05)	[74003]
	8(1, 7) - 7(2, 6)	19/2	1	17/2	1	(0,0,0)	27493.13	(0.05)	[74003]
	8(1, 7) - 7(2, 6)	17/2	2	15/2	2	(0,0,0)	27508.60	(0.05)	[74003]
	8(1, 7) - 7(2, 6)	15/2	2	13/2	2	(0,0,0)	27522.77	(0.05)	[74003]
	8(1, 7) - 7(2, 6)	17/2	1	15/2	1	(0,0,0)	27552.69	(0.05)	[74003]
	8(1, 7) - 7(2, 6)	15/2	1	13/2	1	(0,0,0)	27567.27	(0.05)	[74003]
	8(1, 7) - 7(2, 6)	13/2	1	11/2	1	(0,0,0)	27581.79	(0.05)	[74003]
	32(7,25) - 33(6,28)	61/2	1	63/2	1	(0,0,0)	27600.49	(0.05)	[74003]
	32(7,25) - 33(6,28)	63/2	1	65/2	1	(0,0,0)	27601.12	(0.05)	[74003]
	32(7,25) - 33(6,28)	65/2	1	67/2	1	(0,0,0)	27601.88	(0.05)	[74003]
	32(7,25) - 33(6,28)	63/2	2	65/2	2	(0,0,0)	27603.56	(0.05)	[74003]
	32(7,25) - 33(6,28)	65/2	2	67/2	2	(0,0,0)	27604.25	(0.05)	[74003]
	32(7,25) - 33(6,28)	67/2	1	69/2	1	(0,0,0)	27604.98	(0.05)	[74003]
	32(7,25) - 33(6,28)	65/2	3	67/2	3	(0,0,0)	27606.27	(0.05)	[74003]
	32(7,25) - 33(6,28)	67/2	2	69/2	2	(0,0,0)	27606.95	(0.05)	[74003]
	32(7,25) - 33(6,28)	69/2	1	71/2	1	(0,0,0)	27607.68	(0.05)	[74003]
	32(7,25) - 33(6,28)	67/2	3	69/2	3	(0,0,0)	27903.13	(0.05)	[74003]
	32(7,25) - 33(6,28)	65/2	4	67/2	4	(0,0,0)	27903.90	(0.05)	[74003]
	32(7,25) - 33(6,28)	63/2	3	65/2	3	(0,0,0)	27904.67	(0.05)	[74003]
	32(7,25) - 33(6,28)	65/2	5	67/2	5	(0,0,0)	27906.50	(0.05)	[74003]
	32(7,25) - 33(6,28)	63/2	4	65/2	4	(0,0,0)	27907.27	(0.05)	[74003]
	32(7,25) - 33(6,28)	61/2	2	63/2	2	(0,0,0)	27908.08	(0.05)	[74003]
	32(7,25) - 33(6,28)	63/2	5	65/2	5	(0,0,0)	27910.10	(0.05)	[74003]
	32(7,25) - 33(6,28)	61/2	3	63/2	3	(0,0,0)	27910.76	(0.05)	[74003]
	32(7,25) - 33(6,28)	59/2	1	61/2	1	(0,0,0)	27911.55	(0.05)	[74003]
	8(2, 6) - 9(1, 9)	21/2	1	23/2	1	(0,0,0)	28404.8	(0.2)	[74003]
	8(2, 6) - 9(1, 9)	19/2	2	21/2	2	(0,0,0)	28430.1	(0.2)	[74003]
	8(2, 6) - 9(1, 9)	17/2	3	19/2	3	(0,0,0)	28457.3	(0.2)	[74003]
	5(2, 4) - 6(1, 5)	7/2	1	9/2	1	(0,0,0)	28461.8	(0.2)	[74003]

TABLE 33.2. The microwave spectrum of NF_2—Continued

Isotopic species	$N'(K'_-,K'_+) - N''(K''_-,K''_+)$	F'	ϵ'	F''	ϵ''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{14}N^{19}F_2$	5(2, 4) - 6(1, 5)	9/2	1	11/2	1	(0,0,0)	28475.2	(0.2)	[74003]
	5(2, 4) - 6(1, 5)	11/2	1	13/2	1	(0,0,0)	28489.7	(0.2)	[74003]
	5(2, 4) - 6(1, 5)	9/2	2	11/2	2	(0,0,0)	28513.8	(0.2)	[74003]
	8(2, 6) - 9(1, 9)	19/2	1	21/2	1	(0,0,0)	28520.7	(0.2)	[74003]
	5(2, 4) - 6(1, 5)	11/2	2	13/2	2	(0,0,0)	28526.6	(0.2)	[74003]
	5(2, 4) - 6(1, 5)	13/2	1	15/2	1	(0,0,0)	28542.6	(0.2)	[74003]
	8(2, 6) - 9(1, 9)	17/2	2	19/2	2	(0,0,0)	28550.6	(0.2)	[74003]
	5(2, 4) - 6(1, 5)	11/2	3	13/2	3	(0,0,0)	28552.9	(0.2)	[74003]
	5(2, 4) - 6(1, 5)	13/2	2	15/2	2	(0,0,0)	28563.6	(0.2)	[74003]
	5(2, 4) - 6(1, 5)	15/2	1	17/2	1	(0,0,0)	28575.6	(0.2)	[74003]
	8(2, 6) - 9(1, 9)	15/2	2	17/2	2	(0,0,0)	28579.2	(0.2)	[74003]
	8(2, 6) - 9(1, 9)	17/2	1	19/2	1	(0,0,0)	28647.8	(0.2)	[74003]
	8(2, 6) - 9(1, 9)	15/2	1	17/2	1	(0,0,0)	28675.5	(0.2)	[74003]
	8(2, 6) - 9(1, 9)	13/2	1	15/2	1	(0,0,0)	28704.2	(0.2)	[74003]
	5(2, 4) - 6(1, 5)	13/2	3	15/2	3	(0,0,0)	28749.2	(0.2)	[74003]
	5(2, 4) - 6(1, 5)	11/2	4	13/2	4	(0,0,0)	28772.1	(0.2)	[74003]
	5(2, 4) - 6(1, 5)	9/2	4	11/2	3	(0,0,0)	28788.7	(0.2)	[74003]
	5(2, 4) - 6(1, 5)	11/2	5	13/2	5	(0,0,0)	28836.	(1.0)	[74003]
	5(2, 4) - 6(1, 5)	9/2	4	11/2	5	(0,0,0)	28848.	(1.0)	[74003]
	5(2, 4) - 6(1, 5)	9/2	4	11/2	4	(0,0,0)	28864.6	(0.2)	[74003]
	5(2, 4) - 6(1, 5)	7/2	2	9/2	2	(0,0,0)	28876.5	(0.2)	[74003]
	37(8,30) - 38(7,31)	71/2	1	73/2	1	(0,0,0)	32946.6	(0.2)	[74003]
	37(8,30) - 38(7,31)	73/2	1	75/2	1	(0,0,0)	32947.5	(0.2)	[74003]
	37(8,30) - 38(7,31)	75/2	1	77/2	1	(0,0,0)	32948.3	(0.2)	[74003]
	37(8,30) - 38(7,31)	73/2	2	75/2	2	(0,0,0)	32950.2	(0.2)	[74003]
	37(8,30) - 38(7,31)	75/2	2	77/2	2	(0,0,0)	32951.1	(0.2)	[74003]
	37(8,30) - 38(7,31)	77/2	1	79/2	1	(0,0,0)	32951.9	(0.2)	[74003]
	37(8,30) - 38(7,31)	75/2	3	77/2	3	(0,0,0)	33953.7	(0.2)	[74003]
	37(8,30) - 38(7,31)	77/2	2	79/2	2	(0,0,0)	32954.5	(0.2)	[74003]
	37(8,30) - 38(7,31)	79/2	1	81/2	1	(0,0,0)	32955.3	(0.2)	[74003]
	4(0, 4) - 3(1, 3)	3/2	1	1/2	1	(0,0,0)	32978.86	(0.05)	[74003]
	4(0, 4) - 3(1, 3)	5/2	3	3/2	3	(0,0,0)	32988.15	(0.05)	[74003]
	4(0, 4) - 3(1, 3)	7/2	5	5/2	5	(0,0,0)	33011.36	(0.05)	[74003]
	4(0, 4) - 3(1, 3)	5/2	2	3/2	2	(0,0,0)	33057.56	(0.05)	[74003]
	4(0, 4) - 3(1, 3)	7/2	4	5/2	4	(0,0,0)	33072.19	(0.05)	[74003]
	4(0, 4) - 3(1, 3)	9/2	5	7/2	5	(0,0,0)	33094.08	(0.05)	[74003]
	4(0, 4) - 3(1, 3)	11/2	1	9/2	2	(0,0,0)	33110.15	(0.05)	[74003]
	4(0, 4) - 3(1, 3)	7/2	3	5/2	3	(0,0,0)	33180.95	(0.05)	[74003]
	4(0, 4) - 3(1, 3)	9/2	3	7/2	4	(0,0,0)	33192.3	(0.2)	[74003]
	4(0, 4) - 3(1, 3)	11/2	1	9/2	1	(0,0,0)	33214.1	(0.2)	[74003]
	4(0, 4) - 3(1, 3)	13/2	1	11/2	1	(0,0,0)	33221.92	(0.05)	[74003]
	4(0, 4) - 3(1, 3)	9/2	3	7/2	3	(0,0,0)	33223.9	(0.2)	[74003]
	4(0, 4) - 3(1, 3)	9/2	4	7/2	4	(0,0,0)	33224.9	(0.2)	[74003]
	4(0, 4) - 3(1, 3)	11/2	3	9/2	3	(0,0,0)	33235.07	(0.05)	[74003]
	37(8,30) - 38(7,31)	77/2	3	79/2	3	(0,0,0)	33241.0	(0.2)	[74003]
	37(8,30) - 38(7,31)	75/2	4	77/2	4	(0,0,0)	33241.9	(0.2)	[74003]
	37(8,30) - 38(7,31)	73/2	3	75/2	3	(0,0,0)	33242.8	(0.2)	[74003]
	37(8,30) - 38(7,31)	75/2	5	77/2	5	(0,0,0)	33245.0	(0.2)	[74003]
	37(8,30) - 38(7,31)	73/2	4	75/2	4	(0,0,0)	33245.9	(0.2)	[74003]
	37(8,30) - 38(7,31)	71/2	2	73/2	2	(0,0,0)	33246.7	(0.2)	[74003]
	37(8,30) - 38(7,31)	73/2	5	75/2	5	(0,0,0)	33249.0	(0.2)	[74003]
	37(8,30) - 38(7,31)	71/2	3	73/2	3	(0,0,0)	33249.9	(0.2)	[74003]
	37(8,30) - 38(7,31)	69/2	1	71/2	1	(0,0,0)	33250.8	(0.2)	[74003]
	4(0, 4) - 3(1, 3)	9/2	2	7/2	2	(0,0,0)	33252.50	(0.05)	[74003]
	4(0, 4) - 3(1, 3)	9/2	4	7/2	3	(0,0,0)	33255.45	(0.05)	[74003]
	4(0, 4) - 3(1, 3)	11/2	2	9/2	2	(0,0,0)	33256.25	(0.05)	[74003]
	21(5,17) - 22(4,18)	39/2	1	41/2	1	(0,0,0)	33266.4	(0.2)	[74003]
	21(5,17) - 22(4,18)	41/2	1	43/2	1	(0,0,0)	33269.0	(0.2)	[74003]
	21(5,17) - 22(4,18)	43/2	1	45/2	1	(0,0,0)	33271.7	(0.2)	[74003]
	4(0, 4) - 3(1, 3)	7/2	2	5/2	2	(0,0,0)	33272.50	(0.05)	[74003]
	21(5,17) - 22(4,18)	41/2	2	43/2	2	(0,0,0)	33277.9	(0.2)	[74003]
	21(5,17) - 22(4,18)	43/2	2	45/2	2	(0,0,0)	33280.5	(0.2)	[74003]
	21(5,17) - 22(4,18)	45/2	1	47/2	1	(0,0,0)	33283.2	(0.2)	[74003]
	21(5,17) - 22(4,18)	43/2	3	45/2	3	(0,0,0)	33288.4	(0.2)	[74003]
	21(5,17) - 22(4,18)	45/2	2	47/2	2	(0,0,0)	33290.9	(0.2)	[74003]
	21(5,17) - 22(4,18)	47/2	1	49/2	1	(0,0,0)	33293.4	(0.2)	[74003]

TABLE 33.2. The microwave spectrum of NF_2—Continued

Isotopic species	$N'(K'_-,K'_+) - N''(K''_-,K''_+)$	F'	ϵ'	F''	ϵ''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{14}N^{19}F_2$	4(0, 4) - 3(1, 3)	9/2	1	7/2	1	(0,0,0)	33301.50	(0.05)	[74003]
	4(0, 4) - 3(1, 3)	7/2	1	5/2	1	(0,0,0)	33316.98	(0.05)	[74003]
	4(0, 4) - 3(1, 3)	5/2	1	3/2	1	(0,0,0)	33325.35	(0.05)	[74003]
	21(5,17) - 22(4,18)	45/2	3	47/2	3	(0,0,0)	33545.3	(0.2)	[74003]
	21(5,17) - 22(4,18)	43/2	4	45/2	4	(0,0,0)	33548.4	(0.2)	[74003]
	21(5,17) - 22(4,18)	41/2	3	43/2	3	(0,0,0)	33551.2	(0.2)	[74003]
	21(5,17) - 22(4,18)	43/2	5	45/2	5	(0,0,0)	33558.9	(0.2)	[74003]
	21(5,17) - 22(4,18)	41/2	4	43/2	4	(0,0,0)	33562.0	(0.2)	[74003]
	21(5,17) - 22(4,18)	39/2	2	41/2	2	(0,0,0)	33564.9	(0.2)	[74003]
	21(5,17) - 22(4,18)	41/2	5	43/2	5	(0,0,0)	33572.7	(0.2)	[74003]
	21(5,17) - 22(4,18)	39/2	3	41/2	3	(0,0,0)	33575.6	(0.2)	[74003]
	21(5,17) - 22(4,18)	37/2	1	39/2	1	(0,0,0)	33578.3	(0.2)	[74003]
	30(5,25) - 29(6,24)	55/2	1	53/2	1	(0,0,0)	34069.5	(0.2)	[74003]
	30(5,25) - 29(6,24)	57/2	3	55/2	3	(0,0,0)	34072.3	(0.2)	[74003]
	30(5,25) - 29(6,24)	59/2	5	57/2	5	(0,0,0)	34075.1	(0.2)	[74003]
	30(5,25) - 29(6,24)	57/2	2	55/2	2	(0,0,0)	34082.65	(0.05)	[74003]
	30(5,25) - 29(6,24)	59/2	4	57/2	4	(0,0,0)	34085.39	(0.05)	[74003]
	30(5,25) - 29(6,24)	61/2	5	59/2	5	(0,0,0)	34088.28	(0.05)	[74003]
	30(5,25) - 29(6,24)	59/2	3	57/2	3	(0,0,0)	34095.56	(0.05)	[74003]
	30(5,25) - 29(6,24)	61/2	4	59/2	4	(0,0,0)	34098.31	(0.05)	[74003]
	30(5,25) - 29(6,24)	63/2	3	61/2	3	(0,0,0)	34101.22	(0.05)	[74003]
	30(5,25) - 29(6,24)	65/2	1	63/2	1	(0,0,0)	34286.52	(0.05)	[74003]
	30(5,25) - 29(6,24)	63/2	2	61/2	2	(0,0,0)	34289.02	(0.05)	[74003]
	30(5,25) - 29(6,24)	61/2	3	59/2	3	(0,0,0)	34291.57	(0.05)	[74003]
	30(5,25) - 29(6,24)	63/2	1	61/2	1	(0,0,0)	34297.42	(0.05)	[74003]
	30(5,25) - 29(6,24)	61/2	2	59/2	2	(0,0,0)	34299.95	(0.05)	[74003]
	30(5,25) - 29(6,24)	59/2	2	57/2	2	(0,0,0)	34302.56	(0.05)	[74003]
	30(5,25) - 29(6,24)	61/2	1	59/2	1	(0,0,0)	34309.00	(0.05)	[74003]
	30(5,25) - 29(6,24)	59/2	1	57/2	1	(0,0,0)	34311.54	(0.05)	[74003]
	30(5,25) - 29(6,24)	57/2	1	55/2	1	(0,0,0)	34314.12	(0.05)	[74003]
	1(1, 0) - 1(0, 1)	3/2	1	5/2	1	(0,0,0)	60074.66	(0.05)	[74003]
	1(1, 0) - 1(0, 1)	5/2	1	3/2	2	(0,0,0)	60076.69	(0.05)	[74003]
	1(1, 0) - 1(0, 1)	5/2	1	5/2	1	(0,0,0)	60101.68	(0.05)	[74003]
	1(1, 0) - 1(0, 1)	1/2	1	3/2	1	(0,0,0)	60120.44	(0.05)	[74003]
	1(1, 0) - 1(0, 1)	3/2	1	3/2	1	(0,0,0)	60129.98	(0.05)	[74003]
	1(1, 0) - 1(0, 1)	1/2	1	1/2	1	(0,0,0)	60142.30	(0.05)	[74003]
	1(1, 0) - 1(0, 1)	3/2	1	1/2	1	(0,0,0)	60151.83	(0.05)	[74003]
	1(1, 0) - 1(0, 1)	1/2	2	3/2	2	(0,0,0)	60801.71	(0.05)	[74003]
	1(1, 0) - 1(0, 1)	3/2	2	1/2	2	(0,0,0)	60816.01	(0.05)	[74003]
	1(1, 0) - 1(0, 1)	3/2	2	3/2	2	(0,0,0)	60878.32	(0.05)	[74003]
	1(1, 0) - 1(0, 1)	3/2	2	5/2	2	(0,0,0)	60903.14	(0.05)	[74003]
	1(1, 0) - 1(0, 1)	3/2	2	3/2	1	(0,0,0)	60958.5	(0.2)	[74003]
	15(4,11) - 16(3,14)	33/2	1	35/2	1	(0,0,0)	61820.6	(0.2)	[74003]
	15(4,11) - 16(3,14)	31/2	1	33/2	1	(0,0,0)	61821.9	(0.2)	[74003]
	15(4,11) - 16(3,14)	29/2	1	31/2	1	(0,0,0)	61823.5	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	7/2	1	7/2	2	(0,0,0)	61843.9	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	9/2	1	9/2	1	(0,0,0)	61871.49	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	7/2	2	7/2	3	(0,0,0)	61884.87	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	5/2	3	5/2	4	(0,0,0)	61899.57	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	9/2	1	7/2	3	(0,0,0)	61905.0	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	7/2	2	5/2	4	(0,0,0)	61916.0	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	5/2	3	3/2	3	(0,0,0)	61929.5	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	5/2	3	5/2	3	(0,0,0)	61942.0	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	7/2	2	7/2	2	(0,0,0)	61948.9	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	3/2	1	5/2	2	(0,0,0)	61951.5	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	7/2	2	5/2	3	(0,0,0)	61958.5	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	9/2	1	7/2	2	(0,0,0)	61969.3	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	5/2	1	7/2	1	(0,0,0)	61975.0	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	3/2	2	3/2	2	(0,0,0)	61996.75	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	5/2	2	5/2	2	(0,0,0)	61998.42	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	7/2	1	5/2	2	(0,0,0)	62001.6	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	3/2	1	5/2	1	(0,0,0)	62002.9	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	5/2	1	5/2	1	(0,0,0)	62013.43	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	7/2	1	7/2	1	(0,0,0)	62014.3	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	1/2	1	3/2	1	(0,0,0)	62033.2	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	3/2	1	3/2	1	(0,0,0)	62036.6	(0.2)	[74003]

TABLE 33.2. The microwave spectrum of NF_2—Continued

Isotopic species	$N'(K'_-K'_+) - N''(K''_-,K''_+)$	F'	ϵ'	F''	ϵ''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{14}N^{19}F_2$	2(1, 1) - 2(0, 2)	5/2	1	3/2	1	(0,0,0)	62047.15	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	5/2	2	5/2	1	(0,0,0)	62049.60	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	7/2	1	5/2	1	(0,0,0)	62052.89	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	1/2	1	1/2	1	(0,0,0)	62055.7	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	3/2	1	1/2	1	(0,0,0)	62058.95	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	3/2	3	1/2	3	(0,0,0)	62127.0	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	1/2	2	3/2	5	(0,0,0)	62165.5	(0.2)	[74003]
	10(3, 7) - 11(2,10)	25/2	1	27/2	1	(0,0,0)	62182.0	(0.2)	[74003]
	10(3, 7) - 11(2,10)	23/2	2	25/2	2	(0,0,0)	62188.2	(0.2)	[74003]
	10(3, 7) - 11(2,10)	21/2	3	23/2	3	(0,0,0)	62194.2	(0.2)	[74003]
	10(3, 7) - 11(2,10)	23/2	1	25/2	1	(0,0,0)	62214.4	(0.2)	[74003]
	10(3, 7) - 11(2,10)	21/2	2	23/2	2	(0,0,0)	62219.1	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	5/2	4	3/2	5	(0,0,0)	62223.2	(0.2)	[74003]
	10(3, 7) - 11(2,10)	19/2	2	21/2	2	(0,0,0)	62229.7	(0.2)	[74003]
	15(4,11) - 16(3,14)	27/2	1	29/2	1	(0,0,0)	62230.5	(0.2)	[74003]
	15(4,11) - 16(3,14)	29/2	2	31/2	2	(0,0,0)	62232.0	(0.2)	[74003]
	15(4,11) - 16(3,14)	31/2	2	33/2	2	(0,0,0)	62234.0	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	3/2	3	3/2	4	(0,0,0)	62268.76	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	3/2	3	5/2	5	(0,0,0)	62287.7	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	1/2	3	3/2	4	(0,0,0)	62303.4	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	3/2	4	3/2	4	(0,0,0)	62311.48	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	3/2	4	5/2	5	(0,0,0)	62330.5	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	3/2	5	1/2	2	(0,0,0)	62331.5	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	5/2	4	5/2	5	(0,0,0)	62341.82	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	5/2	5	3/2	4	(0,0,0)	62363.90	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	7/2	3	5/2	5	(0,0,0)	62394.2	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	7/2	3	9/2	1	(0,0,0)	62437.2	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	5/2	5	7/2	3	(0,0,0)	62459.3	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	3/2	4	3/2	3	(0,0,0)	62468.32	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	3/2	4	5/2	3	(0,0,0)	62480.53	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	5/2	4	7/2	2	(0,0,0)	62482.4	(0.2)	[74003]
	2(1, 1) - 2(0, 2)	5/2	4	5/2	3	(0,0,0)	62492.02	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	3/2	5	3/2	3	(0,0,0)	62509.59	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	5/2	5	5/2	3	(0,0,0)	62532.95	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	7/2	3	7/2	2	(0,0,0)	62534.71	(0.05)	[74003]
	10(3, 7) - 11(2,10)	15/2	1	17/2	1	(0,0,0)	62664.58	(0.05)	[74003]
	10(3, 7) - 11(2,10)	17/2	3	19/2	3	(0,0,0)	62671.52	(0.05)	[74003]
	10(3, 7) - 11(2,10)	19/2	5	21/2	5	(0,0,0)	62680.03	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	5/2	5	5/2	2	(0,0,0)	62681.28	(0.05)	[74003]
	10(3, 7) - 11(2,10)	17/2	2	19/2	2	(0,0,0)	62699.65	(0.05)	[74003]
	2(1, 1) - 2(0, 2)	7/2	3	7/2	1	(0,0,0)	62705.29	(0.05)	[74003]
	10(3, 7) - 11(2,10)	19/2	4	21/2	4	(0,0,0)	62706.47	(0.05)	[74003]
	10(3, 7) - 11(2,10)	21/2	5	23/2	5	(0,0,0)	62714.79	(0.05)	[74003]
	10(3, 7) - 11(2,10)	19/2	3	21/2	3	(0,0,0)	62737.32	(0.05)	[74003]
	10(3, 7) - 11(2,10)	21/2	4	23/2	4	(0,0,0)	62743.73	(0.05)	[74003]
	10(3, 7) - 11(2,10)	23/2	3	25/2	3	(0,0,0)	62751.4	(0.2)	[74003]
	20(5,15) - 21(4,18)	45/2	1	47/2	1	(0,0,0)	64633.10	(0.05)	[74003]
	20(5,15) - 21(4,18)	43/2	1	45/2	1	(0,0,0)	64634.2	(0.2)	[74003]
	20(5,15) - 21(4,18)	41/2	1	43/2	1	(0,0,0)	64634.38	(0.05)	[74003]
	3(1, 2) - 3(0, 3)	9/2	1	9/2	1	(0,0,0)	64695.19	(0.05)	[74003]
	3(1, 2) - 3(0, 3)	7/2	1	7/2	1	(0,0,0)	64714.84	(0.05)	[74003]
	3(1, 2) - 3(0, 3)	5/2	1	5/2	1	(0,0,0)	64729.65	(0.05)	[74003]
	20(5,15) - 21(4,18)	43/2	3	45/2	3	(0,0,0)	65002.02	(0.05)	[74003]
	3(1, 2) - 3(0, 3)	3/2	1	3/2	1	(0,0,0)	65033.38	(0.05)	[74003]
	3(1, 2) - 3(0, 3)	5/2	2	5/2	2	(0,0,0)	65058.46	(0.05)	[74003]
	3(1, 2) - 3(0, 3)	7/2	2	7/2	2	(0,0,0)	65094.62	(0.05)	[74003]

Table 34. Rotational and centrifugal distortion constants for $^{19}F_2{}^{16}O$. [a]

Watson's Determinable Parameters	Present Analysis[b] (MHz)	Derived Parameters (assuming planarity conditions)	
A''	58 782.6832(151)	A'	58 782.655(15)
B''	10 896.3521(30)	B'	10 896.418(3)
C''	9 167.37374(255)	C'	9 167.422(3)
τ_1	0.174809(1681)	τ'_{bbcc}	-0.05568(9)
τ_2	-0.0117994(2618)	τ'_{ccaa}	0.1329(5)
τ_3[c]	2.590(5)	τ'_{aabb}	0.0976(12)
τ_{aaaa}	-6.651478(1426)	$\tau_{aabb}(1)$	0.4165(7)
τ_{bbbb}	-0.09278132(10292)	$\tau_{aabb}(2)$	0.4044(6)
τ_{cccc}	-0.0367054(701)	$\tau_{aabb}(3)$	0.4044(6)
H_J	$(0.59137\pm0.22)\times10^{-7}$	$\tau_{abab}(1)$	-0.15895(27)
H_{JK}	$(0.4706\pm0.38)\times10^{-6}$	$\tau_{abab}(2)$	-0.14845(41)
H_{KJ}	$-0.22290(836)\times10^{-4}$	$\tau_{abab}(3)$	-0.14683(44)
H_K	$0.17668(978)\times10^{-3}$	$\Delta\tau$	$-0.355(11)\times10^{-3}$
h_J[d]	$0.2282(461)\times10^{-7}$		
h_{JK}	$0.1664(665)\times10^{-5}$		
h_K	$(0.565\pm17.2)\times10^{-6}$		
Std. dev.	0.066		
No. lines fit	108		

[a] Reanalysis was carried out with new unpublished millimeter measurements by F.J. Lovas and R.D. Suenram. The analysis is discussed in Appendix 2 and the new measurements are listed in Table A.2.1.

[b] The uncertainties quoted are one standard deviation as estimated by the least-squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviation.

[c] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

[d] Watson uses $2h_J$ for this parameter.

Table 34.1. Rotational constants for the excited vibrational states of F_2O [66019].

Vib. State v_1 v_2 v_3	A (MHz)	B (MHz)	C (MHz)
1 0 0	59 213.58(100)	10 824.35(50)	9 128.09(50)
1 0 0[a]	58 744.08(100)	10 830.66(50)	9 160.23(50)
0 1 0	59 481.65(100)	10 854.07(50)	9 114.13(50)
0 2 0	59 711.17(100)	10 818.01(50)	9 092.99(50)
0 0 1	58 197.62(100)	10 826.87(50)	9 052.16(50)

[a] Corrected for the effect of ν_1-$2\nu_2$ Fermi resonance.

Table 34.2. Zeeman constants, spin-rotation constants and electric dipole moment of F_2O.

Parameter	Value	Reference
Zeeman constants:		
g_{aa} (μ_N)	-0.213(5)	[69027]
g_{bb} (μ_N)	-0.058(2)	[69027]
g_{cc} (μ_N)	-0.068(2)	[69027]
$2\chi_{aa}-\chi_{bb}-\chi_{cc}$[a]	-8.8(14)	[69027]
$2\chi_{bb}-\chi_{aa}-\chi_{cc}$[a]	-4.4(7)	[69027]
Spin-rotation constants:		
M_{aa} (kHz)	-42(1)	[65011]
M_{bb} (kHz)	-22(1)	[65011]
M_{cc} (kHz)	-49(1)	[65011]
Electric dipole moment		
μ_b (D)	0.297(5)	[61008]

TABLE 34.3. The microwave spectrum of F_2O

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{19}F_2{}^{16}O$	5(2, 4) - 6(1, 5)					(0,0,0)	8299.51	(0.10)	[63007]
	12(2,10) - 13(1,13)					(0,0,0)	8610.91	(0.10)	[63007]
	34(8,27) - 35(7,28)					(0,0,0)	8769.86	(0.10)	[63007]
	31(6,25) - 30(7,24)					(0,0,0)	8779.55	(0.10)	[63007]
	20(5,15) - 21(4,18)					(0,0,0)	8782.91	(0.10)	[63007]
	34(8,26) - 35(7,29)					(0,0,0)	9533.43	(0.10)	[63007]
	9(2, 7) - 10(1,10)	10		11		(0,0,0)	10057.571	(0.01)	[65011]
	9(2, 7) - 10(1,10)	9		10		(0,0,0)	10057.730	(0.01)	[65011]
	9(2, 7) - 10(1,10)	8		9		(0,0,0)	10057.877	(0.01)	[65011]
	22(4,19) - 21(5,16)					(0,0,0)	11778.86	(0.10)	[63007]
	3(0, 3) - 2(1, 2)					(0,2,0)	12340.23	(0.10)	[66019]
	36(7,30) - 35(8,27)					(0,0,0)	12387.79	(0.10)	[63007]
	9(2, 7) - 10(1,10)					(0,0,1)	12679.59	(0.10)	[66019]
	14(2,13) - 13(3,10)	13		12		(0,0,0)	12782.514	(0.01)	[65011]
	14(2,13) - 13(3,10)	14		13		(0,0,0)	12782.600	(0.01)	[65011]
	14(2,13) - 13(3,10)	15		14		(0,0,0)	12782.690	(0.01)	[65011]
	3(0, 3) - 2(1, 2)					(0,1,0)	12787.24	(0.10)	[66019]
	3(0, 3) - 2(1, 2)					(1,0,0)	12944.84	(0.10)	[66019]
	7(1, 6) - 6(2, 6)					(0,2,0)	13230.72	(0.10)	[66019]
	36(7,29) - 35(8,28)					(0,0,0)	13500.68	(0.10)	[63007]
	9(2, 7) - 10(1,10)					(0,1,0)	13514.77	(0.10)	[66019]
	13(2,11) - 14(1,14)	14		15		(0,0,0)	13575.01	(0.01)	[63008]
	13(2,11) - 14(1,14)	13		14		(0,0,0)	13575.28	(0.01)	[63008]
	13(2,11) - 14(1,14)	12		13		(0,0,0)	13575.51	(0.01)	[63008]
	3(0, 3) - 2(1, 2)					(0,0,1)	13796.2	(0.50)	[66019]
	29(7,23) - 30(6,24)					(0,0,0)	13797.53	(0.10)	[63007]
	3(0, 3) - 2(1, 2)					(0,0,0)	13804.03	(0.10)	[63007]
	12(2,10) - 13(1,13)					(0,0,1)	13967.86	(0.10)	[66019]
	7(1, 6) - 6(2, 5)					(0,1,0)	14600.04	(0.10)	[66019]
	7(1, 6) - 6(2, 5)					(1,0,0)	14714.27	(0.10)	[66019]
	25(3,22) - 26(2,25)	26		27		(0,0,0)	14720.26	(0.01)	[63008]
	25(3,22) - 26(2,25)	25		26		(0,0,0)	14720.63	(0.01)	[63008]
	25(3,22) - 26(2,25)	24		25		(0,0,0)	14720.93	(0.01)	[63008]
	29(7,22) - 30(6,25)					(0,0,0)	15480.54	(0.10)	[63007]
	11(3, 8) - 12(2,11)	12		13		(0,0,0)	15624.761	(0.01)	[65011]
	11(3, 8) - 12(2,11)	11		12		(0,0,0)	15624.830	(0.01)	[65011]
	11(3, 8) - 12(2,11)	10		11		(0,0,0)	15624.896	(0.01)	[65011]
	8(2, 6) - 9(1, 9)					(0,0,0)	15771.44	(0.10)	[61008]
	8(2, 6) - 9(1, 9)					(1,0,0)	17022.18	(0.10)	[66019]
	24(2,23) - 23(3,20)	23		22		(0,0,0)	17257.70	(0.01)	[63008]
	24(2,23) - 23(3,20)	24		23		(0,0,0)	17257.96	(0.01)	[63008]
	24(2,23) - 23(3,20)	25		24		(0,0,0)	17258.26	(0.01)	[63008]
	7(1, 6) - 6(2, 5)					(0,0,0)	17354.71	(0.10)	[63007]
	8(2, 6) - 9(1, 9)					(0,0,1)	17661.49	(0.10)	[66019]
	18(3,16) - 17(4,13)					(0,0,0)	18095.67	(0.10)	[63007]
	7(1, 6) - 6(2, 5)					(0,0,1)	18108.02	(0.10)	[66019]
	24(6,19) - 25(5,20)					(0,0,0)	18474.80	(0.10)	[63007]
	11(3, 8) - 12(2,11)					(1,0,0)	18798.62	(0.10)	[66019]
	15(4,11) - 16(3,14)					(0,0,0)	19009.18	(0.10)	[63007]
	8(2, 6) - 9(1, 9)					(0,1,0)	19085.94	(0.10)	[66019]
	8(2, 6) - 9(1, 9)					(0,2,0)	19774.59	(0.10)	[66019]
	11(3, 8) - 12(2,11)					(0,1,0)	20450.52	(0.10)	[66019]
	12(2,10) - 11(3, 9)					(0,1,0)	20653.94	(0.10)	[66019]
	27(5,23) - 26(6,20)					(0,0,0)	20910.24	(0.10)	[63007]
	14(2,12) - 15(1,15)					(0,0,0)	21224.06	(0.10)	[63007]
	24(6,18) - 25(5,21)					(0,0,0)	22039.31	(0.10)	[63007]
	19(5,15) - 20(4,16)					(0,0,0)	22378.53	(0.10)	[63007]
	7(2, 5) - 8(1, 8)					(0,0,0)	23842.38	(0.10)	[61008]
	15(2,14) - 14(3,11)					(0,0,0)	24533.39	(0.10)	[63007]
	7(2, 5) - 8(1, 8)					(0,0,1)	25096.68	(0.10)	[66019]
	14(4,11) - 15(3,12)					(0,0,0)	25155.14	(0.10)	[63007]
	7(2, 5) - 8(1, 8)					(1,0,0)	25309.92	(0.10)	[66019]
	12(2,10) - 11(3, 9)					(0,0,0)	25527.21	(0.10)	[63007]
	38(9,30) - 39(8,31)					(0,0,0)	25569.29	(0.10)	[63007]
	38(9,29) - 39(8,32)					(0,0,0)	25796.85	(0.10)	[63007]

TABLE 34.3. The microwave spectrum of F_2O—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{19}F_2{}^{16}O$	9(3, 7) - 10(2, 8)					(0,0,1)	25998.68	(0.10)	[66019]
	17(3,14) - 16(4,13)					(0,0,0)	26192.22	(0.10)	[63007]
	22(4,18) - 21(5,17)					(0,0,0)	26359.08	(0.10)	[63007]
	7(2, 5) - 8(1, 8)					(0,1,0)	27020.76	(0.10)	[66019]
	12(2,10) - 11(3, 9)					(0,0,1)	27242.74	(0.10)	[66019]
	9(3, 7) - 10(2, 8)					(0,0,0)	27495.80	(0.10)	[63007]
	7(2, 5) - 8(1, 8)					(0,2,0)	27806.62	(0.10)	[66019]
	32(6,27) - 31(7,24)					(0,0,0)	28231.06	(0.10)	[63007]
	27(5,22) - 26(6,21)					(0,0,0)	28286.80	(0.10)	[63007]
	23(2,22) - 22(3,19)					(0,0,0)	29365.40	(0.10)	[63007]
	19(5,14) - 20(4,17)					(0,0,0)	29533.85	(0.10)	[63007]
	33(8,26) - 34(7,27)					(0,0,0)	30808.75	(0.10)	[63007]
	33(8,25) - 34(7,28)					(0,0,0)	31325.95	(0.10)	[63007]
	15(2,13) - 16(1,16)					(0,0,0)	31461.07	(0.10)	[63007]
	32(6,26) - 31(7,25)					(0,0,0)	31744.90	(0.10)	[63007]
	10(3, 7) - 11(2,10)					(0,0,0)	31774.50	(0.10)	[63007]
	10(3, 7) - 11(2,10)					(0,0,1)	31931.17	(0.10)	[66019]
	23(4,20) - 22(5,17)					(0,0,0)	32050.75	(0.10)	[63007]
	9(3, 7) - 10(3, 8)					(0,1,0)	32198.60	(0.10)	[66019]
	4(2, 3) - 5(1, 4)					(0,0,1)	32374.98	(0.10)	[66019]
	4(2, 3) - 5(1, 4)					(0,0,0)	33251.89	(0.05)	[69027]
	6(2, 4) - 7(1, 7)					(0,0,0)	34044.45	(0.10)	[63007]
	16(2,15) - 15(3,12)					(0,0,0)	34291.10	(0.10)	[63007]
	4(0, 4) - 3(1, 3)					(0,2,0)	34416.68	(0.10)	[66019]
	37(7,31) - 36(8,28)					(0,0,0)	34434.95	(0.10)	[63007]
	6(2, 4) - 7(1, 7)					(0,0,1)	34753.12	(0.10)	[66019]
	4(0, 4) - 3(1, 3)					(0,1,0)	34933.82	(0.10)	[66019]
	4(0, 4) - 3(1, 3)					(1,0,0)	35029.15	(0.10)	[66019]
	19(3,17) - 18(4,14)					(0,0,0)	35455.35	(0.10)	[63007]
	4(2, 3) - 5(1, 4)					(1,0,0)	35500.21	(0.10)	[66019]
	6(2, 4) - 7(1, 8)					(1,0,0)	35660.54	(0.10)	[66019]
	4(0, 4) - 3(1, 3)					(0,0,1)	35876.98	(0.10)	[66019]
	4(2, 3) - 5(1, 4)					(0,1,0)	35887.83	(0.10)	[66019]
	4(0, 4) - 3(1, 3)					(0,0,0)	36028.82	(0.05)	[69027]
	37(7,30) - 36(8,29)					(0,0,0)	36036.82	(0.10)	[63007]
	28(7,22) - 29(6,23)					(0,0,0)	36045.54	(0.10)	[63007]
	10(3, 7) - 11(2,10)					(0,1,0)	36520.35	(0.10)	[66019]
	4(2, 3) - 5(1, 4)					(0,2,0)	37053.30	(0.10)	[66019]
	6(2, 4) - 7(1, 7)					(0,1,0)	37091.44	(0.10)	[66019]
	28(7,21) - 29(6,24)					(0,0,0)	37184.65	(0.10)	[63007]
	14(4,10) - 15(3,13)					(0,0,0)	38408.88	(0.10)	[63007]
	23(6,18) - 24(5,19)					(0,0,0)	41064.05	(0.04)	[72031]
	34(3,32) - 33(4,29)	33		32		(0,0,0)	41297.60	(0.10)	[72031]
	34(3,32) - 33(4,29)	34		33		(0,0,0)	41298.01	(0.10)	[72031]
	34(3,32) - 33(4,29)	35		34		(0,0,0)	41298.33	(0.10)	[72031]
	21(2,20) - 20(3,17)					(0,0,0)	45089.32	(0.20)	[63007]
	18(2,17) - 17(3,14)					(0,0,0)	46795.92	(0.20)	[63007]
	9(3, 6) - 10(2, 9)					(0,0,0)	48919.17	(0.10)	[63007]
	13(4,10) - 14(3,11)					(0,0,0)	49186.21	(0.10)	[63007]
	1(1, 0) - 1(0, 1)					(0,0,0)	49613.55	(0.10)	[61008]
	33(6,28) - 32(7,25)					(0,0,0)	50198.50	(0.10)	[63007]
	18(5,13) - 19(4,16)					(0,0,0)	50393.23	(0.10)	[63007]
	2(1, 1) - 2(0, 2)					(0,0,0)	51388.95	(0.10)	[61008]
	20(3,18) - 19(4,15)					(0,0,0)	51747.90	(0.10)	[63007]
	24(4,21) - 23(5,18)					(0,0,0)	51911.88	(0.10)	[63007]
	23(4,19) - 22(5,18)					(0,0,0)	52223.40	(0.10)	[63007]
	8(3, 6) - 9(2, 7)					(0,0,0)	52302.40	(0.10)	[61008]
	32(8,25) - 33(7,26)					(0,0,0)	52643.25	(0.10)	[63007]
	28(5,23) - 27(6,22)					(0,0,0)	52676.00	(0.10)	[63007]
	32(8,24) - 33(7,27)					(0,0,0)	52988.75	(0.10)	[63007]
	13(2,11) - 12(3,10)					(0,0,0)	53708.85	(0.10)	[63007]
	18(3,15) - 17(4,14)					(0,0,0)	53739.10	(0.10)	[63007]
	3(1, 2) - 3(0, 3)					(0,0,0)	54137.05	(0.10)	[61008]
	33(6,27) - 32(7,26)					(0,0,0)	55170.63	(0.10)	[63007]
	38(7,32) - 37(8,29)					(0,0,0)	56600.15	(0.10)	[63007]

TABLE 34.3. The microwave spectrum of F_2O—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{19}F_2{}^{16}O$	3(2, 2) - 4(1, 3)					(0,0,0)	57457.10	(0.10)	[61008]
	4(1, 3) - 4(0, 4)					(0,0,0)	57958.30	(0.10)	[63007]
	27(7,21) - 28(6,22)					(0,0,0)	58013.45	(0.10)	[63007]
	13(4, 9) - 14(3,12)					(0,0,0)	58183.80	(0.10)	[63007]
	5(0, 5) - 4(1, 4)					(0,0,0)	58725.50	(0.10)	[61008]
	27(7,20) - 28(6,23)					(0,0,0)	58772.25	(0.10)	[63007]
	38(7,31) - 37(8,30)					(0,0,0)	58879.50	(0.10)	[63007]
	17(2,15) - 18(1,18)					(0,0,0)	59137.55	(0.10)	[63007]
	4(2, 2) - 5(1, 5)					(0,0,0)	59846.20	(0.10)	[61008]

Table 35. Rotational and centrifugal distortion constants for $^{32}S^{19}F_2$ [73035].

Watson's Determinable Parameters	Value[a] (MHz)	Derived Parameters (assuming planarity conditions)	Value (MHz)
A"	26 930.5017(45)	A'	26 930.486(4)
B"	9 212.04734(229)	B'	9 212.068(2)
C"	6 845.87452(120)	C'	6 845.934(1)
τ_1	0.128603(615)	τ'_{bbcc}	-0.03146(8)
τ_2	0.0080540(1504)	τ'_{ccaa}	0.04133(47)
τ_3[b]	0.3720(17)	τ'_{aabb}	0.11874(49)
τ_{aaaa}	-1.221848(481)	$\tau_{aabb}(1)$	0.2179(8)
τ_{bbbb}	-0.0823413(730)	$\tau_{aabb}(2)$	0.2117(10)
τ_{cccc}	-0.015201(78)	$\tau_{aabb}(3)$	
H_J	$(0.36044\pm0.14)\times10^{-6}$	$\tau_{abab}(1)$	-0.0495(6)
H_{JK}	$(0.6525\pm1.4)\times10^{-6}$	$\tau_{abab}(2)$	-0.0445(10)
H_{KJ}	$(0.1908\pm0.25)\times10^{-5}$	$\tau_{abab}(3)$	-0.0433(14)
H_K	$(0.15453\pm0.017)\times10^{-4}$		
h_J[c]	$-(0.3162\pm0.21)\times10^{-7}$	$\Delta\tau$	$-0.42(14)\times10^{-3}$
h_{JK}	$(0.53051\pm0.18)\times10^{-5}$		
h_K	$-(0.8503\pm0.74)\times10^{-5}$		
rms. dev.	0.078		
No. lines fit	75		

[a] The uncertainties quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

[c] Watson uses $2h_J$ for this parameter.

Table 35.1. Rotational constants and electric dipole moment for SF_2.

Parameter	(0,0,0)[a]	$^{32}S^{19}F_2$ (1,0,0)[b]	(0,1,0)[b]	(0,0,1)[b]	$^{34}S^{19}F_2$ (0,0,0)[c]
A (MHz)		26 967.13(25)	27 264.59(43)	26 780.09(43)	26 071.56(61)
B (MHz)		9 167.06(6)	9 188.94(13)	9 157.35(8)	9 211.42(53)
C (MHz)		6 830.64(6)	6 819.06(11)	6 801.95(8)	6 789.00(49)
τ_{aaaa}		-1.68(17)	-0.945(68)	-1.26(27)	
τ_{bbbb}		-0.0850[d]	-0.064(7)	-0.0850[d]	
τ_{aabb}		0.2055[d]	0.229(31)	0.2055[d]	
τ_{abab}		-0.0498[d]	-0.062(16)	-0.0498[d]	
μ_b (D)	1.05[c]				

[a] See Table 35 for the ground state values.

[b] Reference [74010].

[c] Reference [69028].

[d] Fixed at the value determined for the ground state.

TABLE 35.2. The microwave spectrum of SF_2

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{32}S^{19}F_2$	16(6,11) - 15(7, 8)	(0,0,0)	20591.22	(0.15)	[73035]
	16(6,10) - 15(7, 9)	(0,0,0)	21258.97	(0.15)	[73035]
	24(12,13) - 25(11,14)	(0,0,0)	21522.68	(0.15)	[73035]
	24(12,12) - 25(11,15)	(0,0,0)	21522.98	(0.15)	[73035]
	8(2, 7) - 7(3, 4)	(0,0,0)	22211.41	(0.05)	[73035]
	8(5, 3) - 9(4, 6)	(0,0,0)	22273.96	(0.10)	[73035]
	2(1, 1) - 2(0, 2)	(0,0,1)	22553.2	(0.50)	[74010]
	2(1, 1) - 2(0, 2)	(0,0,0)	22672.14	(0.04)	[73035]
	2(1, 1) - 2(0, 2)	(1,0,0)	22688.5	(0.50)	[74010]
	2(1, 1) - 2(0, 2)	(0,1,0)	23033.0	(0.50)	[74010]
	33(16,17) - 34(15,20)	(0,0,0)	23068.04	(0.10)	[73035]
	23(9,15) - 22(10,12)	(0,0,0)	23289.53	(0.10)	[73035]
	23(9,14) - 22(10,13)	(0,0,0)	23316.19	(0.10)	[73035]
	39(16,23) - 38(17,22)	(0,0,0)	23993.48	(0.15)	[73035]
	9(3, 6) - 8(4, 5)	(0,0,0)	24228.48	(0.10)	[73035]
	17(9, 9) - 18(8,10)	(0,0,0)	24336.89	(0.15)	[73035]
	17(9, 8) - 18(8,11)	(0,0,0)	24345.49	(0.15)	[73035]
	14(5,10) - 13(6, 7)	(0,0,0)	25190.53	(0.15)	[73035]
	13(2,12) - 12(3, 9)	(0,0,0)	25287.22	(0.50)	[73035]
	30(12,19) - 29(13,16)	(0,0,0)	25939.68	(0.15)	[73035]
	30(12,18) - 29(13,17)	(0,0,0)	25940.55	(0.15)	[73035]
	35(17,18) - 36(16,21)	(0,0,0)	27633.05	(0.15)	[73035]
	37(15,22) - 36(16,21)	(0,0,0)	28784.50	(0.15)	[73035]
	19(10,10) - 20(9,11)	(0,0,0)	29183.02	(0.16)	[73035]
	19(10, 9) - 20(9,12)	(0,0,0)	29185.13	(0.16)	[73035]
	9(2, 8) - 8(3, 5)	(0,0,0)	30324.25	(0.20)	[73035]
	3(3, 0) - 4(2, 3)	(0,0,0)	30574.90	(0.10)	[73035]
	28(11,18) - 27(12,15)	(0,0,0)	30934.31	(0.15)	[73035]
	28(11,17) - 27(12,16)	(0,0,0)	30937.96	(0.15)	[73035]
	3(0, 3) - 2(1, 2)	(0,1,0)	31236.6	(0.50)	[74010]
	3(0, 3) - 2(1, 2)	(0,0,0)	31725.57	(0.10)	[73035]
	12(7, 6) - 13(6, 7)	(0,0,0)	31774.72	(0.15)	[73035]
	12(7, 5) - 13(6, 8)	(0,0,0)	31830.16	(0.15)	[73035]
	37(18,19) - 38(17,22)	(0,0,0)	32131.31	(0.15)	[73035]
	4(1, 3) - 4(0, 4)	(0,1,0)	33646.5	(0.50)	[74010]
	1(1, 0) - 0(0, 0)	(1,0,0)	33797.5	(0.50)	[74010]

TABLE 35.2. The microwave spectrum of SF_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{32}S^{19}F_2$	1(1, 0) - 0(0, 0)	(0,1,0)	34086.2	(0.50)	[74010]
	5(1, 4) - 4(2, 3)	(0,1,0)	38487.0	(0.50)	[74010]
	11(3, 9) - 10(4, 6)	(0,1,0)	39340.1	(0.50)	[74010]
	13(4,10) - 12(5, 7)	(0,1,0)	41105.3	(0.50)	[74010]
	5(1, 4) - 5(0, 5)	(0,0,1)	41845.7	(0.50)	[74010]
	5(1, 4) - 5(0, 5)	(0,1,0)	42372.7	(0.50)	[74010]
	27(5,22) - 28(4,25)	(0,0,0)	42519.45	(0.10)	[73035]
	7(5, 3) - 8(4, 4)	(0,1,0)	42546.9	(0.50)	[74010]
	10(3, 7) - 9(4, 6)	(0,1,0)	43339.0	(0.50)	[74010]
	30(5,26) - 29(6,23)	(0,0,0)	43967.09	(0.15)	[73035]
	11(2, 9) - 12(1,12)	(0,0,0)	44515.86	(0.20)	[73035]
	34(17,18) - 35(16,19)	(0,0,0)	44673.70	(0.20)	[73035]
	13(4,10) - 12(5, 7)	(0,0,0)	44925.53	(0.20)	[73035]
	22(8,14) - 21(9,13)	(0,0,0)	46628.74	(0.10)	[73035]
	10(3, 7) - 9(4, 6)	(0,0,0)	46681.81	(0.15)	[73035]
	5(2, 3) - 5(1, 4)	(0,0,1)	46920.5	(0.50)	[74010]
	15(5,10) - 14(6, 9)	(0,0,0)	47150.74	(0.20)	[73035]
	5(2, 3) - 5(1, 4)	(0,0,0)	47175.57	(0.01)	[69028]
	2(1, 2) - 1(0, 1)	(0,0,1)	47186.0	(0.50)	[74010]
	6(2, 4) - 6(1, 5)	(0,0,1)	47201.0	(0.50)	[74010]
	5(2, 3) - 5(1, 4)	(1,0,0)	47377.0	(0.50)	[74010]
	6(2, 4) - 6(1, 5)	(0,0,0)	47452.06	(0.01)	[69028]
	2(1, 2) - 1(0, 1)	(1,0,0)	47458.3	(0.50)	[74010]
	2(1, 2) - 1(0, 1)	(0,0,0)	47468.04	(0.01)	[69028]
	6(2, 4) - 6(1, 5)	(1,0,0)	47562.5	(0.50)	[74010]
	2(1, 2) - 1(0, 1)	(0,1,0)	47722.4	(0.50)	[74010]
	5(2, 3) - 5(1, 4)	(0,1,0)	48112.4	(0.50)	[74010]
	18(3,16) - 17(4,13)	(0,0,0)	48293.34	(0.20)	[73035]
	6(2, 4) - 6(1, 5)	(0,1,0)	48294.6	(0.50)	[74010]
	4(2, 2) - 4(1, 3)	(0,0,0)	48531.28	(0.02)	[73035]
	4(2, 2) - 4(1, 3)	(1,0,0)	48777.8	(0.50)	[74010]
	4(0, 4) - 3(1, 3)	(0,1,0)	48853.1	(0.50)	[74010]
	11(7, 5) - 12(6, 6)	(0,0,0)	48858.43	(0.35)	[73035]
	11(7, 4) - 12(6, 7)	(0,0,0)	48879.05	(0.25)	[73035]
	4(0, 4) - 3(1, 3)	(0,0,1)	49041.7	(0.50)	[74010]
	4(0, 4) - 3(1, 3)	(1,0,0)	49042.7	(0.50)	[74010]
	4(0, 4) - 3(1, 3)	(0,0,0)	49356.29	(0.01)	[69028]
	4(2, 2) - 4(1, 3)	(0,1,0)	49535.9	(0.50)	[74010]
	22(4,18) - 23(3,21)	(0,0,0)	49768.04	(0.15)	[73035]
	7(2, 5) - 7(1, 6)	(0,0,0)	49896.43	(0.01)	[69028]
	4(4, 1) - 5(3, 2)	(0,0,0)	50607.46	(0.35)	[73035]
	7(2, 5) - 7(1, 6)	(0,1,0)	50623.1	(0.50)	[74010]
	3(2, 1) - 3(1, 2)	(0,0,0)	50843.68	(0.02)	[69028]
	4(4, 0) - 5(3, 3)	(0,0,0)	50967.20	(0.20)	[73035]
	3(2, 1) - 3(1, 2)	(1,0,0)	51096.4	(0.50)	[74010]
	24(4,21) - 23(5,18)	(0,0,0)	51429.83	(0.15)	[73035]
	20(7,14) - 19(8,11)	(0,0,0)	51642.91	(0.10)	[73035]
	20(7,13) - 19(8,12)	(0,0,0)	52415.70	(0.20)	[73035]
	6(1, 5) - 6(0, 6)	(0,0,0)	53243.12	(0.10)	[73035]
	2(2, 0) - 2(1, 1)	(0,0,0)	53372.52	(0.03)	[69028]
	13(8, 6) - 14(7, 7)	(0,0,0)	53736.24	(0.20)	[73035]
	13(8, 5) - 14(7, 8)	(0,0,0)	53741.29	(0.20)	[73035]
	12(3,10) - 11(4, 7)	(0,0,0)	53754.47	(0.20)	[73035]
	43(17,26) - 42(18,25)	(0,0,0)	53973.05	(0.30)	[73035]
	8(2, 6) - 8(1, 7)	(0,0,0)	54911.76	(0.02)	[69028]
	6(5, 2) - 7(4, 3)	(0,0,0)	55779.28	(0.10)	[73035]
	22(12,11) - 23(11,12)	(0,0,0)	55809.15	(0.20)	[73035]
	6(5, 1) - 7(4, 4)	(0,0,0)	55882.37	(0.10)	[73035]
	13(4, 9) - 12(5, 8)	(0,0,0)	57394.37	(0.20)	[73035]
	8(2, 6) - 7(3, 5)	(0,0,0)	58024.02	(0.20)	[73035]
	2(2, 1) - 2(1, 2)	(0,0,1)	59931.0	(0.50)	[74010]
	2(2, 1) - 2(1, 2)	(1,0,0)	60402.8	(0.50)	[74010]
	14(4,11) - 13(5, 8)	(0,0,0)	60520.62	(0.20)	[73035]
	32(12,21) - 31(13,18)	(0,0,0)	61470.80	(0.10)	[73035]
	32(12,20) - 31(13,19)	(0,0,0)	61474.80	(0.10)	[73035]
	33(17,16) - 34(16,19)	(0,0,0)	61638.47	(0.10)	[73035]

TABLE 35.2. The microwave spectrum of SF_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{32}S^{19}F_2$	9(2, 7) - 9(1, 8)	(0,0,0)	62764.65	(0.10)	[73035]
	3(2, 2) - 3(1, 3)	(0,0,0)	63931.79	(0.20)	[73035]
	3(2, 2) - 3(1, 3)	(1,0,0)	64037.7	(0.50)	[74010]
	26(14,13) - 27(13,14)	(0,0,0)	65075.18	(0.10)	[73035]
	35(18,17) - 36(17,20)	(0,0,0)	66033.10	(0.20)	[73035]
	6(2, 5) - 6(1, 6)	(0,0,0)	82714.08	(0.20)	[73035]
$^{34}S^{19}F_2$	5(2, 3) - 5(1, 4)	(0,0,0)	44982.21	(0.05)	[69028]
	6(2, 4) - 6(1, 5)	(0,0,0)	45658.72	(0.05)	[69028]
	2(1, 2) - 1(0, 1)	(0,0,0)	46438.56	(0.05)	[69028]
	7(2, 5) - 7(1, 6)	(0,0,0)	48659.53	(0.05)	[69028]
	4(0, 4) - 3(1, 3)	(0,0,0)	49853.29	(0.05)	[69028]
	8(2, 6) - 8(1, 7)	(0,0,0)	54380.70	(0.05)	[69028]

Table 36. Rotational and centrifugal distortion constants for $^{28}Si^{19}F_2$ [72031].

Watson's Determinable Parameters	Value[a] (MHz)	Derived Parameters (assuming planarity conditions)	Value[a] (MHz)
A''	30 602.2556(507)	A'	30 602.241(51)
B''	8 823.4827(146)	B'	8 823.517(14)
C''	6 830.2589(158)	C'	6 830.356(17)
τ_1	0.234713(12794)	τ'_{bbcc}	-0.0285(10)
τ_2	0.023005(2522)	τ'_{ccaa}	0.0692(31)
τ_3[b]	0.383(39)	τ'_{aabb}	0.1940(94)
τ_{aaaa}	-1.99213(655)	$\tau_{aabb}(1)$	0.2813(47)
τ_{bbbb}	-0.0708473(13806)	$\tau_{aabb}(2)$	0.2612(67)
τ_{cccc}	-0.014864(732)	$\tau_{aabb}(3)$	0.2612(67)
H_J	$-0.352510\pm0.164\times10^{-5}$	$\tau_{abab}(1)$	-0.0436(36)
H_{JK}	$-0.598708\pm0.268\times10^{-4}$	$\tau_{abab}(2)$	-0.0269(66)
H_{KJ}	$-0.40691\pm0.162\times10^{-4}$	$\tau_{abab}(3)$	-0.0234(75)
H_K	$-0.3145\pm0.320\times10^{-4}$	$\Delta\tau$	$-0.119(37)\times10^{-2}$
h_J[c]	$-0.14707\pm0.057\times10^{-5}$		
h_{JK}	$-0.20654\pm0.116\times10^{-4}$		
h_K	$0.8732\pm0.392\times10^{-4}$		
Std. dev.	0.151		
No. lines fit	73		

[a] The uncertainties quoted are one standard deviation as estimated by the least squres fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

[c] Watson uses $2h_J$ for this parameter.

Table 36.1. Rotational constants and electric dipole moment for SiF_2.

Isotopic Species	Vib. State v_1 v_2 v_3	A (MHz)	B (MHz)	C (MHz)	Reference
$^{28}Si^{19}F_2$	0 0 0	a	a	a	
	1 0 0[b]	30 651.64(17)	8 768.17(6)	6 797.70(90)	[73036]
	0 1 0	31 054.31(4)	8 807.71(3)	6 808.23(1)	[66021]
	0 0 1[b]	30 300.85(13)	8 809.96(5)	6 806.57(90)	[73036]
$^{29}Si^{19}F_2$	0 0 0	29 994.39(37)	8 823.77(5)	6 799.63(14)	[66021]
$^{30}Si^{19}F_2$	0 0 0	29 428.3	8 824.0	6 770.2	[66021]
Electric dipole moment of $^{28}SiF_2$: μ_b = 1.230(15) D					[65012]

[a] See Table 36 for the ground state constants.

[b] The intervibration-state transition, v_1=1, 8_{54} ← v_3=1, 8_{17}, has been measured at 54351.8(1) MHz [73036]. Due to format difficulties, this is not shown in Table 36.2.

Additional reference: [66020].

TABLE 36.2. The microwave spectrum of SiF_2

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{28}Si^{19}F_2$	16(5,12) - 15(6, 9)	(0,0,0)	7712.90	(0.20)	[66021]
	13(4, 9) - 12(5, 8)	(0,0,0)	7793.01	(0.20)	[66021]
	31(12,20) - 32(11,21)	(0,0,0)	7953.49	(0.20)	[66021]
	31(12,19) - 32(11,22)	(0,0,0)	7955.29	(0.20)	[66021]
	6(3, 3) - 7(2, 6)	(0,0,0)	8015.17	(0.20)	[66021]
	14(6, 9) - 15(5,10)	(0,0,0)	8262.04	(0.20)	[66021]
	2(0, 2) - 1(1, 1)	(0,1,0)	8856.70	(0.20)	[66021]
	33(11,23) - 32(12,20)	(0,0,0)	9036.07	(0.20)	[66021]
	33(11,22) - 32(12,21)	(0,0,0)	9039.56	(0.20)	[66021]
	14(6, 8) - 15(5,11)	(0,0,0)	9225.15	(0.20)	[66021]
	2(0, 2) - 1(1, 1)	(0,0,0)	9398.62	(0.20)	[66021]
	16(5,11) - 15(6,10)	(0,0,0)	9509.97	(0.20)	[66021]
	11(5, 7) - 12(4, 8)	(0,0,0)	10521.31	(0.20)	[66021]
	28(11,18) - 29(10,19)	(0,0,0)	10968.48	(0.20)	[66021]
	28(11,17) - 29(10,20)	(0,0,0)	10973.32	(0.20)	[66021]
	19(6,14) - 18(7,11)	(0,0,0)	11118.30	(0.20)	[66021]
	5(3, 3) - 6(2, 4)	(0,0,1)	11648.4	(0.20)	[73036]
	19(6,13) - 18(7,12)	(0,0,0)	11874.20	(0.20)	[66021]
	36(12,25) - 35(13,22)	(0,0,0)	12019.71	(0.20)	[66021]
	8(4, 5) - 9(3, 6)	(0,0,0)	12141.80	(0.20)	[66021]
	11(5, 6) - 12(4, 9)	(0,0,0)	12722.13	(0.20)	[66021]
	25(10,16) - 26(9,17)	(0,0,0)	13971.60	(0.20)	[66021]
	25(10,15) - 26(9,18)	(0,0,0)	13984.09	(0.20)	[66021]
	22(7,16) - 21(8,13)	(0,0,0)	14258.92	(0.20)	[66021]
	22(7,15) - 21(8,14)	(0,0,0)	14565.60	(0.20)	[66021]
	2(2, 1) - 3(1, 2)	(0,0,0)	15463.3	(0.50)	[66021]
	9(2, 8) - 8(3, 5)	(0,0,0)	15748.19	(0.20)	[66021]
	16(2,15) - 15(3,12)	(0,0,0)	16325.00	(0.20)	[66021]
	3(2, 1) - 4(1, 4)	(0,0,0)	16646.10	(0.20)	[66021]
	8(4, 4) - 9(3, 7)	(0,0,0)	16796.65	(0.20)	[66021]
	22(9,14) - 23(8,15)	(0,0,0)	16954.90	(0.20)	[66021]
	22(9,13) - 23(8,16)	(0,0,0)	16987.43	(0.20)	[66021]
	25(8,17) - 24(9,16)	(0,0,0)	17404.69	(0.20)	[66021]
	3(2, 1) - 4(1, 4)	(0,1,0)	18229.44	(0.20)	[66021]
	36(14,23) - 37(13,24)	(0,0,0)	18715.86	(0.20)	[66021]
	36(14,22) - 37(13,25)	(0,0,0)	18715.86	(0.20)	[66021]
	19(8,12) - 20(7,13)	(0,0,0)	19903.46	(0.20)	[66021]
	19(8,11) - 20(7,14)	(0,0,0)	19985.78	(0.20)	[66021]

TABLE 36.2. The microwave spectrum of SiF_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{28}Si^{19}F_2$	14(4,11) - 13(5, 8)	(0,0,0)	20078.86	(0.20)	[66021]
	28(9,20) - 27(10,17)	(0,0,0)	20259.47	(0.20)	[66021]
	33(13,20) - 34(12,23)	(0,0,0)	21777.53	(0.20)	[66021]
	5(3, 2) - 6(2, 5)	(0,0,0)	21780.24	(0.20)	[66021]
	31(10,22) - 30(11,19)	(0,0,0)	23212.86	(0.20)	[66021]
	31(10,21) - 30(11,20)	(0,0,0)	23230.46	(0.20)	[66021]
	5(1, 4) - 4(2, 3)	(1,0,0)	23236.10	(0.20)	[73036]
	1(1, 0) - 1(0, 1)	(0,0,1)	23416.64	(0.20)	[73036]
	1(1, 0) - 1(0, 1)	(0,0,0)	23771.54	(0.20)	[66021]
	1(1, 0) - 1(0, 1)	(1,0,0)	23921.30	(0.20)	[73036]
	5(1, 4) - 4(2, 3)	(0,0,0)	23998.41	(0.20)	[66021]
	1(1, 0) - 1(0, 1)	(0,1,0)	24245.59	(0.20)	[66021]
	11(2, 9) - 12(1,12)	(0,0,0)	24664.24	(0.20)	[66021]
	17(5,13) - 16(6,10)	(0,0,0)	24720.93	(0.20)	[66021]
	5(1, 4) - 4(2, 3)	(0,0,1)	24763.48	(0.20)	[73036]
	30(12,19) - 31(11,20)	(0,0,0)	24827.58	(0.20)	[66021]
	10(2, 9) - 9(3, 6)	(0,0,0)	24874.15	(0.20)	[66021]
	2(1, 1) - 2(0, 2)	(0,0,1)	25480.58	(0.20)	[73036]
	13(6, 8) - 14(5, 9)	(0,0,0)	25550.75	(0.20)	[66021]
	2(1, 1) - 2(0, 2)	(0,0,0)	25895.54	(0.20)	[66021]
	3(0, 3) - 2(1, 2)	(0,1,0)	25959.07	(0.20)	[66021]
	3(0, 3) - 2(1, 2)	(1,0,0)	25989.48	(0.20)	[73036]
	13(6, 7) - 14(5,10)	(0,0,0)	26041.39	(0.20)	[66021]
	2(1, 1) - 2(0, 2)	(1,0,0)	26104.46	(0.20)	[73036]
	34(11,24) - 33(12,21)	(0,0,0)	26153.73	(0.20)	[66021]
	34(11,23) - 33(12,22)	(0,0,0)	26160.67	(0.20)	[66021]
	2(0, 2) - 3(1, 3)	(0,0,1)	26263.26	(0.20)	[73036]
	2(1, 1) - 2(0, 2)	(0,1,0)	26374.28	(0.20)	[66021]
	3(0, 3) - 2(1, 2)	(0,0,0)	26525.33	(0.20)	[66021]
	3(0, 3) - 2(1, 2)	(0,0,1)	26909.96	(0.20)	[73036]
	14(4,10) - 13(5, 9)	(0,0,0)	27109.43	(0.20)	[66021]
	27(11,17) - 28(10,18)	(0,0,0)	27862.08	(0.20)	[66021]
	27(11,16) - 28(10,19)	(0,0,0)	27864.33	(0.20)	[66021]
	12(3,10) - 11(4, 7)	(0,0,0)	27891.98	(0.20)	[66021]
	17(5,12) - 16(6,11)	(0,0,0)	27922.68	(0.20)	[66021]
	10(5, 6) - 11(4, 7)	(0,0,0)	28081.64	(0.20)	[66021]
	8(2, 6) - 7(3, 5)	(0,0,0)	28141.36	(0.20)	[66021]
	3(1, 2) - 3(0, 3)	(0,0,1)	28805.10	(0.20)	[73036]
	37(12,25) - 36(13,24)	(0,0,0)	29087.50	(0.20)	[66021]
	3(1, 2) - 3(0, 3)	(0,0,0)	29319.55	(0.20)	[66021]
	8(2, 6) - 7(3, 5)	(0,0,1)	29458.4	(0.20)	[73036]
	3(1, 2) - 3(0, 3)	(1,0,0)	29629.14	(0.20)	[73036]
	20(6,14) - 19(7,13)	(0,0,0)	29787.53	(0.20)	[66021]
	3(1, 2) - 3(0, 3)	(0,1,0)	29802.20	(0.20)	[66021]
	4(3, 2) - 5(2, 3)	(0,0,1)	30239.04	(0.20)	[73036]
	24(10,15) - 25(9,16)	(0,0,0)	30876.10	(0.20)	[66021]
	24(10,14) - 25(9,17)	(0,0,0)	30882.30	(0.20)	[66021]
	11(2,10) - 10(3, 7)	(0,0,0)	31515.19	(0.20)	[66021]
	23(7,17) - 22(8,14)	(0,0,0)	31656.39	(0.20)	[66021]
	4(3, 2) - 5(2, 3)	(0,0,0)	31918.22	(0.20)	[66021]
	23(7,16) - 22(8,15)	(0,0,0)	32217.43	(0.20)	[66021]
	14(2,13) - 13(3,10)	(0,0,0)	32582.35	(0.20)	[66021]
	7(4, 3) - 8(3, 6)	(0,0,0)	32604.3	(0.50)	[66021]
	4(3, 2) - 5(2, 3)	(1,0,0)	33126.55	(0.20)	[73036]
	4(3, 1) - 5(2, 4)	(0,0,1)	34470.92	(0.20)	[73036]
	4(1, 3) - 4(0, 4)	(1,0,0)	34763.85	(0.20)	[73036]
	4(1, 3) - 4(0, 4)	(0,1,0)	34784.40	(0.20)	[66021]
	12(2,11) - 11(3, 8)	(0,0,0)	35215.04	(0.20)	[66021]
	13(2,12) - 12(3, 9)	(0,0,0)	35628.88	(0.20)	[66021]
	1(1, 1) - 0(0, 0)	(0,0,1)	37174.45	(0.20)	[73036]
	1(1, 1) - 0(0, 0)	(1,0,0)	37371.70	(0.20)	[73036]
	1(1, 1) - 0(0, 0)	(0,0,0)	37432.24	(0.20)	[66021]
	4(3, 1) - 5(2, 4)	(1,0,0)	37750.95	(0.20)	[73036]
	1(1, 1) - 0(0, 0)	(0,1,0)	37862.21	(0.20)	[66021]
	5(1, 4) - 5(0, 5)	(0,0,1)	40235.53	(0.20)	[73036]
	5(1, 4) - 5(0, 5)	(1,0,0)	41788.12	(0.20)	[73036]

TABLE 36.2. The microwave spectrum of SiF_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{28}Si^{19}F_2$	4(0, 4) - 3(1, 3)	(1,0,0)	43308.63	(0.20)	[73036]
	6(1, 5) - 5(2, 4)	(1,0,0)	43924.56	(0.20)	[73036]
	4(0, 4) - 3(1, 3)	(0,0,1)	44357.24	(0.20)	[73036]
	6(1, 5) - 5(2, 4)	(0,0,1)	45370.18	(0.20)	[73036]
	3(3, 1) - 4(2, 3)	(0,0,1)	47739.57	(0.20)	[73036]
	2(1, 2) - 1(0, 1)	(1,0,0)	50820.60	(0.20)	[73036]
	2(1, 2) - 1(0, 1)	(0,0,1)	50934.66	(0.20)	[73036]
	7(2, 5) - 7(1, 6)	(0,0,1)	56260.8	(0.20)	[73036]
	6(2, 4) - 6(1, 5)	(0,0,1)	56327.4	(0.20)	[73036]
	5(2, 3) - 5(1, 4)	(0,0,1)	57643.0	(0.20)	[73036]
	8(2, 6) - 8(1, 7)	(0,0,1)	58094.7	(0.20)	[73036]
	4(2, 2) - 4(1, 3)	(0,0,1)	59782.6	(0.20)	[73036]
	2(2, 0) - 2(1, 1)	(0,0,1)	64559.91	(0.20)	[73036]
	7(1, 6) - 6(2, 5)	(1,0,0)	65041.43	(0.20)	[73036]
	2(2, 0) - 2(1, 1)	(1,0,0)	65750.01	(0.20)	[73036]
	9(2, 7) - 9(1, 8)	(0,0,1)	69654.0	(0.20)	[73036]
	2(2, 1) - 2(1, 2)	(0,0,1)	70243.31	(0.20)	[73036]
	2(2, 1) - 2(1, 2)	(1,0,0)	71756.34	(0.20)	[73036]
	3(2, 2) - 3(1, 3)	(0,0,1)	73236.60	(0.20)	[73036]
$^{29}Si^{19}F_2$	2(0, 2) - 1(1, 1)	(0,0,0)	9938.32	(0.20)	[66021]
	1(1, 0) - 1(0, 1)	(0,0,0)	23194.5	(0.50)	[66021]
	2(1, 1) - 2(0, 2)	(0,0,0)	25357.12	(0.20)	[66021]
	3(0, 3) - 2(1, 2)	(0,0,0)	27035.20	(0.20)	[66021]
	3(1, 2) - 3(0, 3)	(0,0,0)	28853.00	(0.20)	[66021]
$^{30}Si^{19}F_2$	1(1, 0) - 1(0, 1)	(0,0,0)	22651.50	(0.20)	[66021]
	2(1, 1) - 2(0, 2)	(0,0,0)	24858.30	(0.20)	[66021]
	3(1, 2) - 3(0, 3)	(0,0,0)	28423.20	(0.20)	[66021]

Table 37. Rotational constants for $^{39}K^{16}OH$ [76036].[a]

Vib. State v_1 v_2 v_3	B_v(MHz)	D_v(kHz)	$\gamma_{\ell\ell}$(MHz)	q_0(MHz)	q_1(Hz)	$\chi_{\ell\ell}$(cm^{-1})
0 0 0	8 208.679(10)[b]	12.19(6)[b]				
0 1 0	8 169.03(2)	12.456(18)	-2.95(2)	-16.042(20)	-56(73)	
0 2 0	8 135.190(28)	12.599(21)	-3.146(10)	-16.47(10)[c]	-50[b]	8.1(5)
0 3 0	8 108.038(21)	12.811(51)	-3.337(2)	-16.900(9)	-48(36)	8.0(15)
0 4 0	8 087.009(78)	12.964(10)	-3.457(2)[d]	-17.29(10)[c]		8.2(4)[e]
			-3.281(30)[e]			
0 5 0	8 072.041(91)	13.082(223)	-3.317(7)	-17.665(8)	-96(37)	8.5(5)
0 1 1	8 102.47(2)	12.483(27)	-3.00(2)[c]	-17.376(6)	-44(24)	
0 2 1	8 096.264(28)	12.666(51)	-3.088(10)	-17.58(10)[c]	-40[c]	8.0(6)
0 3 1	8 043.179(78)	12.788(200)	-3.172(6)	-17.793(34)	-49(140)	7.2(15)
0 4 1	8 023.111(21)	13.007(42)	-3.173(7)[e]	-18.0(1)[c]		7.6(5)[e]
0 1 2	8 036.10(2)	12.528(111)	-3.05(2)[c]	-18.778(25)		

[a] The constants were obtained from fitting the data of references [76036] and [75011].

[b] Reference [73037].

[c] Extrapolated value.

[d] From ℓ=0 and 4 difference.

[e] From ℓ=0 and 2 difference.

Table 37.1. Rotational constants for $^{41}K^{16}OH$ and $^{39}K^{16}OD$ [76036].

Vib. State v_1 v_2 v_3	B_v(MHz)	D_v(kHz)	$\gamma_{\ell\ell}$(MHz)	q_0(MHz)	q_1(Hz)	$\chi_{\ell\ell}$(cm^{-1})
$^{41}K^{16}OH$						
0 0 0	8 088.910(2)	11.852(57)				
$^{39}K^{16}OD$						
0 0 0	7 494.825(20)	9.455(57)				
0 1 0[b]	7 483.458(24)	9.652(36)	-1.74(2)[a]	-16.775(29)	-31(63)	
0 2 0	7 474.872(9)	9.822(21)	-1.770(2)	-17.0(2)[b]		4.25(25)
0 3 0	7 468.878(28)	9.910(33)	-1.793(3)	-17.251(8)	-80(20)	4.40(15)
0 4 0	7 464.889(20)	10.00(5)[a]	-1.771(75)[c]	-17.5(2)[a]		4.27(20)[c]
0 0 1	7 438.072(12)	9.510(28)				
0 1 1[b]	7 429.461(36)	9.788(40)	-1.90(2)[a]	-18.008(17)	-71(40)	
0 2 1	7 420.653(17)	9.959(16)	-1.921(6)	-18.0(2)[a]		3.73(20)

[a] Extrapolated value.

[b] The B_v value for the v_2=1 states were corrected for $\gamma_{\ell\ell}$. See [76036].

[c] Determined for the ℓ=2 state only.

Table 37.2. Rotation-vibration interaction constants for KOH [76036].

Parameter	$^{39}K^{16}OH$ (MHz)	$^{41}K^{16}OH$ (MHz)	$^{39}K^{16}OD$ (MHz)
α_1	65.68(90)	64.21(90)	57.19(100)
α_2	48.94(96)	48.39(96)	14.88(100)
α_3	19.7[a]	19.3[a]	24.4[a]
γ_{11}	0.040(30)	0.040[b]	0.216(100)
γ_{22}	3.119(63)	3.12[b]	1.239(141)
γ_{12}	-0.44(90)	-0.44[b]	0[c]

[a] Calculated value.

[b] Assumed value from ^{39}KOH.

[c] Not determinable.

TABLE 37.3. The microwave spectrum of KOH

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{39}K^{16}OH$	6 - 5					$(0,0^0,4)$	95329.79	(0.10)	[75011]
	6 - 5					$(0,3^3,2)$	95412.32	(0.15)	[75011]
	6 - 5					$(0,1^{L1},3)$	95470.19	(0.10)	[75011]
	6 - 5					$(0,3^{L1},2)$	95474.58	(0.10)	[75011]
	6 - 5					$(0,1^{U1},3)$	95713.10	(0.15)	[75011]
	6 - 5					$(0,5^{L1},1)$	95725.06	(0.15)	[75011]
	6 - 5					$(0,5^3,1)$	95750.80	(0.20)	[75011]
	6 - 5					$(0,2^2,2)$	95889.18	(0.15)	[75011]
	6 - 5					$(0,3^{U1},2)$	95922.18	(0.20)	[75011]
	6 - 5					$(0,2^0,2)$	96034.50	(0.20)	[75011]
	6 - 5					$(0,6^4,0)$	96102.00	(1.00)	[75011]
	6 - 5					$(0,4^{L2},1)$	96115.00	(0.20)	[75011]
	6 - 5					$(0,4^{U2},1)$	96115.90	(0.20)	[75011]
	6 - 5					$(0,0^0,3)$	96119.20	(0.10)	[75011]
	6 - 5					$(0,3^3,1)$	96167.42	(0.20)	[75011]
	6 - 5					$(0,3^{L1},1)$	96255.75	(0.40)	[75011]
	6 - 5					$(0,4^0,1)$	96265.27	(0.30)	[75011]
	6 - 5					$(0,1^{L1},2)$	96273.16	(0.10)	[75011]
	6 - 5					$(0,7^3,0)$	96325.30	(0.30)	[75011]
	6 - 5					$(0,5^{U1},1)$	96373.50	(0.15)	[75011]
	6 - 5					$(0,4^4,0)$	96374.40	(0.15)	[75011]
	6 - 5					$(0,5^{L1},0)$	96495.60	(0.20)	[75011]
	6 - 5					$(0,5^3,0)$	96498.00	(0.50)	[75011]
	6 - 5					$(0,1^{U1},2)$	96498.50	(0.20)	[75011]
	6 - 5					$(0,6^{L2},0)$	96579.96	(0.10)	[75011]
	6 - 5					$(0,6^{U2},0)$	96581.62	(0.10)	[75011]
	6 - 5					$(0,2^2,1)$	96673.45	(0.10)	[75011]
	6 - 5					$(0,3^{U1},1)$	96682.70	(0.40)	[75011]
	6 - 5					$(0,6^0,0)$	96727.70	(0.20)	[75011]
	6 - 5					$(0,2^0,1)$	96819.92	(0.10)	[75011]
	6 - 5					$(0,4^{L2},0)$	96876.70	(0.20)	[75011]
	6 - 5					$(0,4^{U2},0)$	96877.30	(0.20)	[75011]
	6 - 5					$(0,0^0,2)$	96909.76	(0.50)	[75011]
	6 - 5					$(0,3^3,0)$	96928.20	(0.50)	[75011]
	6 - 5					$(0,4^0,0)$	97032.24	(0.20)	[75011]
	6 - 5					$(0,3^{L1},0)$	97042.70	(0.20)	[75011]
	6 - 5					$(0,1^{L1},1)$	97078.63	(0.10)	[75011]
	6 - 5					$(0,5^{U1},0)$	97131.28	(0.10)	[75011]
	6 - 5					$(0,1^{U1},1)$	97287.13	(0.10)	[75011]
	6 - 5					$(0,3^{U1},0)$	97448.29	(0.10)	[75011]
	6 - 5					$(0,2^2,0)$	97461.80	(0.10)	[75011]
	6 - 5					$(0,2^0,0)$	97610.98	(0.10)	[75011]
	6 - 5					$(0,0^0,1)$	97701.30	(0.05)	[75011]
	6 - 5					$(0,1^{L1},0)$	97886.05	(0.05)	[75011]
	6 - 5					$(0,1^{U1},0)$	98078.44	(0.05)	[75011]
	6 - 5					$(0,0^0,0)$	98493.78	(0.05)	[75011]
	9 - 8					$(0,4^4,0)$	144540.16	(0.10)	[76036]
	9 - 8					$(0,2^{+2},1)$	144989.75	(0.10)	[76036]
	9 - 8					$(0,2^{-2},1)$	144989.75	(0.10)	[76036]
	9 - 8					$(0,3^{-1},1)$	145003.16	(0.10)	[76036]
	9 - 8					$(0,2^0,1)$	145208.76	(0.10)	[76036]
	9 - 8					$(0,4^{-2},0)$	145293.75	(0.10)	[76036]
	9 - 8					$(0,4^{+2},0)$	145296.54	(0.10)	[76036]
	9 - 8					$(0,0^0,2)$	145344.52	(0.10)	[76036]
	9 - 8					$(0,3^3,0)$	145371.28	(0.10)	[76036]
	9 - 8					$(0,4^0,0)$	145525.98	(0.10)	[76036]
	9 - 8					$(0,3^{+1},0)$	145543.34	(0.10)	[76036]
	9 - 8					$(0,1^{+1},1)$	145597.73	(0.10)	[76036]
	9 - 8					$(0,1^{-1},1)$	145910.34	(0.10)	[76036]
	9 - 8					$(0,3^{-1},0)$	146151.36	(0.10)	[76036]
	9 - 8					$(0,2^{+2},0)$	146172.44	(0.10)	[76036]
	9 - 8					$(0,2^{-2},0)$	146172.44	(0.10)	[76036]
	9 - 8					$(0,2^0,0)$	146395.84	(0.10)	[76036]
	9 - 8					$(0,0^0,1)$	146532.02	(0.10)	[76036]
	9 - 8					$(0,1^{+1},0)$	146808.85	(0.10)	[76036]

TABLE 37.3. The microwave spectrum of KOH—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{39}K^{16}OH$	9 - 8					$(0,1^{-1},0)$	147097.44	(0.10)	[76036]
	9 - 8					$(0,0^{0},0)$	147720.71	(0.10)	[76036]
	11 - 10					$(0,4^{-2},1)$	176162.02	(0.10)	[76036]
	11 - 10					$(0,4^{+2},1)$	176167.82	(0.10)	[76036]
	11 - 10					$(0,0^{0},3)$	176172.32	(0.10)	[76036]
	11 - 10					$(0,3^{3},1)$	176259.63	(0.10)	[76036]
	11 - 10					$(0,3^{+1},1)$	176420.72	(0.10)	[76036]
	11 - 10					$(0,4^{0},1)$	176433.87	(0.10)	[76036]
	11 - 10					$(0,1^{+1},2)$	176453.94	(0.10)	[76036]
	11 - 10					$(0,4^{4},0)$	176637.68	(0.10)	[76036]
	11 - 10					$(0,5^{+1},0)$	176859.08	(0.10)	[76036]
	11 - 10					$(0,5^{3},0)$	176865.20	(0.10)	[76036]
	11 - 10					$(0,1^{-1},2)$	176867.06	(0.10)	[76036]
	11 - 10					$(0,2^{+2},1)$	177188.76	(0.10)	[76036]
	11 - 10					$(0,2^{-2},1)$	177186.87	(0.10)	[76036]
	11 - 10					$(0,3^{-1},1)$	177203.08	(0.10)	[76036]
	11 - 10					$(0,2^{0},1)$	177454.55	(0.10)	[76036]
	11 - 10					$(0,4^{-2},0)$	177558.50	(0.10)	[76036]
	11 - 10					$(0,4^{+2},0)$	177563.50	(0.10)	[76036]
	11 - 10					$(0,0^{0},2)$	177621.82	(0.10)	[76036]
	11 - 10					$(0,3^{3},0)$	177653.72	(0.10)	[76036]
	11 - 10					$(0,4^{0},0)$	177840.51	(0.10)	[76036]
	11 - 10					$(0,3^{+1},0)$	177863.67	(0.10)	[76036]
	11 - 10					$(0,1^{+1},1)$	177930.84	(0.10)	[76036]
	11 - 10					$(0,5^{-1},0)$	178023.42	(0.10)	[76036]
	11 - 10					$(0,1^{-1},1)$	178312.86	(0.10)	[76036]
	11 - 10					$(0,3^{-1},0)$	178606.73	(0.10)	[76036]
	11 - 10					$(0,2^{-2},0)$	178632.47	(0.10)	[76036]
	11 - 10					$(0,2^{+2},0)$	178634.00	(0.10)	[76036]
	11 - 10					$(0,2^{0},0)$	178905.51	(0.10)	[76036]
	11 - 10					$(0,0^{0},1)$	179073.17	(0.10)	[76036]
	11 - 10					$(0,1^{+1},0)$	179411.12	(0.10)	[76036]
	11 - 10					$(0,1^{-1},0)$	179763.83	(0.10)	[76036]
	11 - 10					$(0,0^{0},0)$	180526.07	(0.10)	[76036]
	12 - 11					$(0,0^{0},0)$	196923.81	(0.60)	[73037]
	13 - 12					$(0,4^{4},0)$	208721.57	(0.10)	[76036]
	13 - 12					$(0,5^{+1},0)$	208982.27	(0.10)	[76036]
	13 - 12					$(0,5^{3},0)$	208990.71	(0.10)	[76036]
	13 - 12					$(0,1^{-1},2)$	208993.41	(0.10)	[76036]
	13 - 12					$(0,2^{-2},1)$	209371.08	(0.10)	[76036]
	13 - 12					$(0,2^{+2},1)$	209373.99	(0.10)	[76036]
	13 - 12					$(0,3^{-1},1)$	209389.54	(0.10)	[76036]
	13 - 12					$(0,2^{0},1)$	209686.60	(0.10)	[76036]
	13 - 12					$(0,0^{0},2)$	209885.84	(0.10)	[76036]
	13 - 12					$(0,3^{3},0)$	209922.69	(0.10)	[76036]
	13 - 12					$(0,3^{+1},0)$	210170.26	(0.10)	[76036]
	13 - 12					$(0,1^{+1},1)$	210250.83	(0.10)	[76036]
	13 - 12					$(0,1^{-1},1)$	210702.22	(0.10)	[76036]
	13 - 12					$(0,3^{-1},0)$	211048.21	(0.10)	[76036]
	13 - 12					$(0,2^{-2},0)$	211079.65	(0.10)	[76036]
	13 - 12					$(0,2^{+2},0)$	211082.19	(0.10)	[76036]
	13 - 12					$(0,2^{0},0)$	211401.73	(0.10)	[76036]
	13 - 12					$(0,0^{0},1)$	211601.37	(0.10)	[76036]
	13 - 12					$(0,1^{+1},0)$	212000.41	(0.10)	[76036]
	13 - 12					$(0,1^{-1},0)$	212416.95	(0.10)	[76036]
	13 - 12					$(0,0^{0},0)$	213318.61	(0.10)	[76036]
$^{39}K^{16}OD$	9 - 8					$(0,2^{-2},0)$	134393.06	(0.10)	[76036]
	9 - 8					$(0,2^{+2},0)$	134394.79	(0.10)	[76036]
	9 - 8					$(0,1^{+1},0)$	134491.78	(0.10)	[76036]
	9 - 8					$(0,2^{0},0)$	134517.31	(0.10)	[76036]
	9 - 8					$(0,3^{-1},0)$	134688.82	(0.10)	[76036]
	9 - 8					$(0,1^{-1},0)$	134793.55	(0.10)	[76036]
	9 - 8					$(0,0^{0},0)$	134879.23	(0.10)	[76036]
	12 - 11					$(0,0^{0},2)$	177095.95	(0.10)	[76036]
	12 - 11					$(0,2^{-2},1)$	177844.33	(0.10)	[76036]

TABLE 37.3. The microwave spectrum of KOH—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{39}K^{16}OD$	12 - 11					$(0,2^{+2},1)$	177849.52	(0.10)	[76036]
	12 - 11					$(0,1^{+1},1)$	177977.47	(0.10)	[76036]
	12 - 11					$(0,2^{0},1)$	178021.67	(0.10)	[76036]
	12 - 11					$(0,1^{-1},1)$	178410.16	(0.10)	[76036]
	12 - 11					$(0,0^{0},1)$	178448.00	(0.10)	[76036]
	12 - 11					$(0,3^{+1},0)$	178727.06	(0.10)	[76036]
	12 - 11					$(0,3^{3},0)$	178803.13	(0.10)	[76036]
	12 - 11					$(0,4^{-2},0)$	178920.08	(0.10)	[76036]
	12 - 11					$(0,4^{+2},0)$	178933.16	(0.10)	[76036]
	12 - 11					$(0,4^{0},0)$	179075.16	(0.10)	[76036]
	12 - 11					$(0,2^{-2},0)$	179160.94	(0.10)	[76036]
	12 - 11					$(0,2^{+2},0)$	179165.01	(0.10)	[76036]
	12 - 11					$(0,1^{+1},0)$	179293.25	(0.10)	[76036]
	12 - 11					$(0,2^{0},0)$	179324.95	(0.10)	[76036]
	12 - 11					$(0,3^{-1},0)$	179553.98	(0.10)	[76036]
	12 - 11					$(0,1^{-1},0)$	179695.72	(0.10)	[76036]
	12 - 11					$(0,0^{0},0)$	179810.53	(0.10)	[76036]
	16 - 15					$(0,2^{-2},1)$	237054.41	(0.10)	[76036]
	16 - 15					$(0,2^{+2},1)$	237067.19	(0.10)	[76036]
	16 - 15					$(0,1^{+1},1)$	237232.88	(0.10)	[76036]
	16 - 15					$(0,2^{0},1)$	237284.94	(0.10)	[76036]
	16 - 15					$(0,1^{-1},1)$	237810.31	(0.10)	[76036]
	16 - 15					$(0,0^{0},1)$	237862.50	(0.10)	[76036]
	16 - 15					$(0,3^{+1},0)$	238230.72	(0.10)	[76036]
	16 - 15					$(0,3^{3},0)$	238334.71	(0.10)	[76036]
	16 - 15					$(0,2^{-2},0)$	238810.86	(0.10)	[76036]
	16 - 15					$(0,2^{+2},0)$	238820.73	(0.10)	[76036]
	16 - 15					$(0,1^{+1},0)$	238988.58	(0.10)	[76036]
	16 - 15					$(0,2^{0},0)$	239025.23	(0.10)	[76036]
	16 - 15					$(0,3^{-1},0)$	239332.13	(0.10)	[76036]
	16 - 15					$(0,1^{-1},0)$	239524.83	(0.10)	[76036]
	16 - 15					$(0,0^{0},0)$	239679.43	(0.10)	[76036]
$^{41}K^{16}OH$	6 - 5					$(0,1^{L1},1)$	95668.66	(0.20)	[75011]
	6 - 5					$(0,1^{U1},1)$	95871.30	(0.40)	[75011]
	6 - 5					$(0,2^{2},0)$	96038.16	(0.10)	[75011]
	6 - 5					$(0,0^{0},1)$	96281.80	(0.20)	[75011]
	6 - 5					$(0,1^{L1},0)$	96458.20	(0.10)	[75011]
	6 - 5					$(0,1^{U1},0)$	96645.26	(0.20)	[75011]
	6 - 5					$(0,0^{0},0)$	97056.68	(0.10)	[75011]
	11 - 10					$(0,0^{0},0)$	177892.92	(0.10)	[76036]

Table 38. Rotational and hyperfine constants and electric dipole moments for $^{7}Li^{16}OH$ and $^{7}Li^{16}OD$. [76007]

Isotopic Species	Vib. State v_1 v_2^{ℓ} v_3	B_v (MHz)	eqQ (^{7}Li) (kHz)	c_{Li} (kHz)	μ (D)
$^{7}Li^{16}OH$	0 0^0 0	35 342.44(5)	295.8(15)	1.70(29)	4.755(2)
	1 0^0 0	35 240.8(5)			
	0 1^1 0	...			4.899(5)
	0 2^0 0	35 165.88(5)	346.9(21)	1.18(40)	5.031(2)
	0 3^1 0	...			5.133(5)
	0 0^0 1	34 887.76(5)	299.7(31)	1.17(58)	4.851(2)
	0 2^0 1	34 723.44(10)			
	1 0^0 1	34 836(1)			
$^{7}Li^{16}OD$	0 0^0 0	31 477.39(5)			4.711(1)
	0 1^1 0	...			4.815(5)
	0 2^0 0	...			4.89(1)
	0 3^1 0	...			5.002(5)
	0 0^0 1	...			4.80(1)

TABLE 38.1. The microwave spectrum of LiOH

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	(v_1,v_2^{ℓ},v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{7}Li^{16}OH$	6 - 6					$(0,3^3,0)$	1.040	(5E-3)	[76007]
	2 - 2					$(0,2^2,0)$	2.555	(5E-3)	[76007]
	7 - 7					$(0,3^3,0)$	2.555	(5E-3)	[76007]
	8 - 8					$(0,3^3,0)$	5.635	(5E-3)	[76007]
	9 - 9					$(0,3^3,0)$	11.323	(5E-3)	[76007]
	3 - 3					$(0,2^2,0)$	12.690	(5E-3)	[76007]
	10 - 10					$(0,3^3,0)$	21.155	(5E-3)	[76007]
	11 - 11					$(0,3^3,0)$	37.260	(5E-3)	[76007]
	4 - 4					$(0,2^2,0)$	38.065	(5E-3)	[76007]
	12 - 12					$(0,3^3,0)$	62.555	(5E-3)	[76007]
	5 - 5					$(0,2^2,0)$	88.920	(5E-3)	[76007]
	6 - 6					$(0,2^2,0)$	178.082	(5E-3)	[76007]
	7 - 7					$(0,2^2,0)$	321.068	(5E-3)	[76007]
	8 - 8					$(0,2^2,0)$	536.060	(5E-3)	[76007]
	1 - 1					$(0,1^1,0)$	591.60	(0.02)	[76007]
	1 - 1					$(0,3^1,0)$	1221.06	(0.01)	[76007]
	2 - 2					$(0,1^1,0)$	1774.55	(0.01)	[76007]
	1 - 0					$(0,2^0,1)$	69446.88	(0.20)	[70056]
	1 - 0					$(1,0^0,1)$	69672.	(2.)	[70056]
	1 - 0					$(0,0^0,1)$	69775.52	(0.10)	[70056]
	1 - 0					$(0,2^0,0)$	70331.76	(0.10)	[70056]
	1 - 0					$(1,0^0,0)$	70481.6	(1.0)	[70056]
	1 - 0					$(0,0^0,0)$	70684.88	(0.10)	[70056]
$^{7}Li^{16}OD$	1 - 1					$(0,1^1,0)$	597.44	(0.02)	[76007]
	1 - 1					$(0,3^1,0)$	1260.47	(0.01)	[76007]
	2 - 2					$(0,1^1,0)$	1792.11	(0.01)	[76007]
	1 - 0					$(0,0^0,0)$	62954.78	(0.10)	[70056]

Table 39. Molecular parameters for $H^{14}N^{16}O$ and $D^{14}N^{16}O$.

Parameter	$H^{14}N^{16}O$ Value	$D^{14}N^{16}O$ Value	Reference
A (MHz)	553 903.0(27)	315 496.5(23)	[73038]
B (MHz)	42 308.52(10)	38 732.16(10)	[73038]
C (MHz)	39 169.46(10)	34 353.68(10)	[73038]
D_J (MHz)	0.1216(3)	0.094(9)	[73038][a]
D_{JK} (MHz)	2.94(6)	1.75(3)	[73038][a]
D_K (MHz)	134.5(6)	43.6(6)	[73038][a]
d_{EJ}	$1.170(4)\times10^{-5}$	$1.115(4)\times10^{-5}$	[73038]
χ_{aa} (^{14}N) (MHz)	0.36(56)	1.03(40)	[73038,72034]
χ_{bb} (^{14}N) (MHz)	-5.46(30)	-6.13(26)	[73038,72034]
χ_{cc} (^{14}N) (MHz)	5.10(26)[b]	5.10(26)	[73038,72034]
μ_a (D)	1.03(1)	1.18(4)	[73038,72034]
μ_b (D)	1.31(2)	1.22(4)	[73038,72034]

[a] Distortion constants taken from F. W. Dalby, Can. J. Phys. 36, 1336 (1958).

[b] Assumed.

TABLE 39.1. The microwave spectrum of HNO

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{14}N^{16}O$	5(1, 4) - 5(1, 5)		4		4	(0,0,0)	47066.67	(0.10)	[72033]
	5(1, 4) - 5(1, 5)		6		6	(0,0,0)	47067.32	(0.10)	[72033]
	5(1, 4) - 5(1, 5)		5		5	(0,0,0)	47070.96	(0.10)	[72033]
	6(1, 5) - 6(1, 6)		5		5	(0,0,0)	65882.88	(0.10)	[72033]
	6(1, 5) - 6(1, 6)		7		7	(0,0,0)	65883.56	(0.10)	[72033]
	6(1, 5) - 6(1, 6)		6		6	(0,0,0)	65887.27	(0.10)	[72033]
	1(0, 1) - 0(0, 0)					(0,0,0)	81477.49	(0.10)	[72033]
	7(1, 6) - 7(1, 7)		8		8	(0,0,0)	87826.59	(0.10)	[72033]
	7(1, 6) - 7(1, 7)		7		7	(0,0,0)	87830.32	(0.10)	[72033]
	7(0, 7) - 6(1, 6)		8		7	(0,0,0)	88622.55	(0.10)	[72033]
	7(0, 7) - 6(1, 6)		7		6	(0,0,0)	88624.40	(0.10)	[72033]
	4(1, 4) - 5(0, 5)		4		5	(0,0,0)	90415.07	(0.10)	[72033]
	4(1, 4) - 5(0, 5)		5		6	(0,0,0)	90417.01	(0.10)	[72033]
$D^{14}N^{16}O$	4(0, 4) - 3(1, 3)		5		4	(0,0,0)	25823.36	(0.10)	[72034]
	4(0, 4) - 3(1, 3)		4		3	(0,0,0)	25825.23	(0.10)	[72034]
	4(1, 3) - 4(1, 4)		3		3	(0,0,0)	43770.30	(0.10)	[72034]
	4(1, 3) - 4(1, 4)		5		5	(0,0,0)	43771.28	(0.10)	[72034]
	4(1, 3) - 4(1, 4)		4		4	(0,0,0)	43775.11	(0.10)	[72034]
	2(1, 2) - 3(0, 3)		2		3	(0,0,0)	53341.02	(0.10)	[72034]
	2(1, 2) - 3(0, 3)		3		4	(0,0,0)	53342.95	(0.10)	[72034]
	2(1, 2) - 3(0, 3)		1		2	(0,0,0)	53343.91	(0.10)	[72034]
	5(1, 4) - 5(1, 5)		4		4	(0,0,0)	65642.64	(0.10)	[72034]
	5(1, 4) - 5(1, 5)		6		6	(0,0,0)	65643.48	(0.10)	[72034]
	5(1, 4) - 5(1, 5)		5		5	(0,0,0)	65647.25	(0.10)	[72034]
	1(0, 1) - 0(0, 0)					(0,0,0)	73085.46	(0.10)	[72034]

Table 40. Molecular constants for HN_2^+

Parameters	$H^{14}N^{14}N^+$ Value (MHz)	$H^{15}N^{15}N^+$ Value (MHz)
B_0-2D_0	46 586.696(16)	44 132.06(3)
eqQ (^{14}N inner)	-5.666(12)	
eqQ (^{14}N outer)	-1.426(21)	
c (^{14}N outer)	0.0147(23)	
Reference	[75017]	[76014]

TABLE 40.1. The microwave spectrum of HN_2^+

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	(v_1,v_2^{ℓ},v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{14}N^{14}N^+$	1 - 0		1		1	$(0,0^0,0)$	93171.88	(0.08)	[76005]
	1 - 0		2		1	$(0,0^0,0)$	93173.70	(0.08)	[76005]
	1 - 0		0		1	$(0,0^0,0)$	93176.13	(0.36)	[76005]
$H^{15}N^{15}N^+$	1 - 0					$(0,0^0,0)$	88264.11	(0.06)	[76014]

Table 41. Rotational constants of $^{23}Na^{16}OH$

Parameter	Value (MHz)	Reference
$B_{0,0,0}$	12 567.054(10)	[73039]
D_0	0.02872(5)	[73039]
$B_{0,0,1}-B_{0,0,0}$	116.3(15)	[76032]
α_2	97(20)	[76032]
γ_{22}	9(2)	[76032]
$\gamma_{\ell\ell}$	-10(2)	[76032]
$q_v(0,1^1,0)$	51.66(3)	[76032]

TABLE 41.1. The microwave spectrum of NaOH

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	(v_1,v_2^{ℓ},v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{23}Na^{16}OH$	4 - 3					$(0,2^2,1)$	98490.75	(0.20)	[76032]
	4 - 3					$(0,1^{U1},1)$	99224.57	(0.15)	[76032]
	4 - 3					$(0,2^2,0)$	99255.04	(0.15)	[76032]
	4 - 3					$(0,3^{U1},0)$	99637.08	(0.08)	[76032]
	4 - 3					$(0,1^{L1},0)$	99665.56	(0.08)	[76032]
	4 - 3					$(0,1^{U1},0)$	100078.82	(0.15)	[76032]
	4 - 3					$(0,0^0,0)$	100529.11	(0.06)	[76032]
	7 - 6					$(0,0^0,0)$	175899.37	(0.55)	[73039]
	8 - 7					$(0,0^0,0)$	201014.01	(0.60)	[73039]
	9 - 8					$(0,0^0,0)$	226123.23	(0.70)	[73039]

Table 42. Rotational and hyperfine constants for ^{85}RbOH. [69029]

Vib. State v_1 v_2^ℓ v_3	B_v ($^{85}Rb^{16}OH$)[a] (MHz)	B_v (^{85}RbOD)[a] (MHz)	eqQ (^{85}Rb) (MHz)
0 0^0 0	6 290.15	5 720.77	-67.9
0 1^1 0	6 260.55	5 711.69	-67.6
0 2^0 0	6 238.37	5 707.08	-67.9[b]
0 2^2 0	6 230.13	5 702.57	-67.4
0 3^1 0	6 216.43	5 702.34	-67.6[b]
0 4^2 0	6 194.38	5 697.42	-67
0 0^0 1	6 246.45	5 682.50	-65.9
0 1^1 1	6 216.70	5 673.24	-67
0 2^0 1	6 194.03	5 668.37	-66[b]
0 2^2 1	6 187.95	5 663.75	-66.3
0 0^0 2	6 202.75	5 644.40	-64.2

[a] A value of D_0 = 0.0067 MHz was used in calculating the rotational constants. The uncertainty in the rotational constants is expected to be ∿0.10 MHz.

[b] Assumed value.

Table 42.1 Rotational and hyperfine constants for ^{87}RbOH. [69029]

Vib. State v_1 v_2^ℓ v_3	B_v ($^{87}Rb^{16}OH$)[a] (MHz)	B_v ($^{87}Rb^{16}OD$)[a] (MHz)	eqQ (^{87}Rb) (MHz)
0 0^0 0	6 266.35	5 698.13	-35
0 1^1 0	6 236.84	5 689.32	-33
0 2^0 0	6 214.63	5 684.53	-31
0 2^2 0	6 206.48	5 680.02	-32
0 0^0 1	6 222.90	5 660.18	-33[b]

[a] A value of D_0 = 0.0067 MHz was used in calculating the rotational constants. The uncertainty in the rotational constants is expected to be ∿0.10 MHz.

[b] Assumed value.

Table 42.2. The ℓ-doubling constants for RbOH [69029].

Vib. State v_1 v_2^ℓ v_3	q_v (^{85}RbOH) (MHz)	q_v (^{85}RbOD) (MHz)	q_v (^{87}RbOH) (MHz)	q_v (^{87}RbOD) (MHz)
0 1^1 0	9.87	9.82	9.85	9.70
0 3^1 0	10.33	10.51		
0 1^1 0	10.73	10.12		

TABLE 42.3. The microwave spectrum of RbOH

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	(v_1,v_2^{ℓ},v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{85}Rb^{16}OH$	3 - 2		9/2		7/2	$(0,2^2,1)$	37119.2	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,2^2,1)$	37122.3	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,2^2,1)$	37132.0	(0.2)	[69029]
	3 - 2		3/2		1/2	$(0,2^2,1)$	37140.7	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,4^2,0)$	37157.8	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,4^2,0)$	37160.9	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,2^0,1)$	37164.5	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,4^2,0)$	37170.7	(0.2)	[69029]
	3 - 2		3/2		1/2	$(0,4^2,0)$	37179.4	(0.2)	[69029]
	3 - 2		7/2		9/2	$(0,0^0,2)$	37204.8	(0.2)	[69029]
	3 - 2		5/2		3/2	$(0,0^0,2)$	37210.8	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,0^0,2)$	37213.9	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,0^0,2)$	37216.9	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,3^{L1},0)$	37233.0	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,3^{L1},0)$	37235.0	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,3^{L1},0)$	37238.1	(0.2)	[69029]
	3 - 2		7/2		9/2	$(0,1^{L1},1)$	37260.0	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,1^{L1},1)$	37264.9	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,1^{L1},1)$	37266.4	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,1^{L1},1)$	37269.2	(0.2)	[69029]
	3 - 2		7/2		9/2	$(0,1^{U1},1)$	37324.1	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,1^{U1},1)$	37329.0	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,1^{U1},1)$	37330.8	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,1^{U1},1)$	37333.6	(0.2)	[69029]
	3 - 2		7/2		9/2	$(0,3^{U1},0)$	37352.5	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,3^{U1},0)$	37357.2	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,3^{U1},0)$	37358.9	(0.2)	[69029]
	3 - 2		11/2		5/2	$(0,3^{U1},0)$	37362.2	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,2^2,0)$	37372.2	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,2^2,0)$	37375.6	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,2^2,0)$	37385.2	(0.2)	[69029]
	3 - 2		3/2		1/2	$(0,2^2,0)$	37394.0	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,2^0,0)$	37417.1	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,2^0,0)$	37430.5	(0.2)	[69029]
	3 - 2		7/2		9/2	$(0,0^0,1)$	37466.7	(0.2)	[69029]
	3 - 2		5/2		3/2	$(0,0^0,1)$	37472.7	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,0^0,1)$	37479.1	(0.2)	[69029]
	3 - 2		7/2		9/2	$(0,1^{L1},0)$	37525.5	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,1^{L1},0)$	37530.6	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,1^{L1},0)$	37532.0	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,1^{L1},0)$	37534.9	(0.2)	[69029]
	3 - 2		3/2		5/2	$(0,1^{L1},0)$	37541.0	(0.2)	[69029]
	3 - 2		7/2		9/2	$(0,1^{U1},0)$	37584.7	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,1^{U1},0)$	37589.4	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,1^{U1},0)$	37591.3	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,1^{U1},0)$	37594.3	(0.2)	[69029]
	3 - 2		3/2		5/2	$(0,1^{U1},0)$	37600.7	(0.2)	[69029]
	3 - 2		7/2		9/2	$(0,0^0,0)$	37728.6	(0.2)	[69029]
	3 - 2		5/2		3/2	$(0,0^0,0)$	37734.9	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,0^0,0)$	37738.3	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,0^0,0)$	37741.2	(0.2)	[69029]
	3 - 2		5/2		5/2	$(0,0^0,0)$	37744.8	(0.2)	[69029]
$^{87}Rb^{16}OH$	3 - 2		7/2		5/2	$(0,2^2,0)$	37232.8	(0.2)	[69029]
	3 - 2		5/2		3/2	$(0,2^2,0)$	37238.3	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,2^2,0)$	37241.1	(0.2)	[69029]
	3 - 2		3/2		1/2	$(0,2^2,0)$	37246.8	(0.2)	[69029]
	3 - 2		5/2		3/2	$(0,2^0,0)$	37285.6	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,2^0,0)$	37287.5	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,0^0,1)$	37337.1	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,1^{L1},0)$	37389.7	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,1^{L1},0)$	37391.7	(0.2)	[69029]
	3 - 2		7/2		7/2	$(0,1^{U1},0)$	37444.0	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,1^{U1},0)$	37448.7	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,1^{U1},0)$	37450.8	(0.2)	[69029]
	3 - 2		3/2		3/2	$(0,1^{U1},0)$	37455.1	(0.2)	[69029]

TABLE 42.3. The microwave spectrum of RbOH—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{87}Rb^{16}OH$	3 - 2		5/2		3/2	$(0,0^0,0)$	37595.6	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,0^0,0)$	37597.8	(0.2)	[69029]
$^{85}Rb^{16}OD$	3 - 2		5/2		3/2	$(0,2^2,2)$	33860.7	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,2^2,2)$	33863.9	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,2^2,2)$	33866.8	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,2^2,1)$	33974.1	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,2^2,1)$	33977.3	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,2^2,1)$	33986.8	(0.2)	[69029]
	3 - 2		3/2		1/2	$(0,2^2,1)$	33995.2	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,1^{L1},1)$	34006.1	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,1^{L1},1)$	34007.5	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,2^0,1)$	34007.6	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,1^{L1},1)$	34010.2	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,2^0,1)$	34010.5	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,1^{U1},1)$	34066.4	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,1^{U1},1)$	34068.2	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,1^{U1},1)$	34071.0	(0.2)	[69029]
	3 - 2		7/2		9/2	$(0,0^0,1)$	34082.9	(0.2)	[69029]
	3 - 2		5/2		3/2	$(0,0^0,1)$	34089.0	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,0^0,1)$	34095.4	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,3^{L1},0)$	34147.8	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,3^{L1},0)$	34149.3	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,3^{L1},0)$	34152.2	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,4^2,0)$	34174.8	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,4^2,0)$	34179.2	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,4^2,0)$	34189.2	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,2^2,0)$	34207.1	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,2^2,0)$	34210.4	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,2^2,0)$	34220.1	(0.2)	[69029]
	3 - 2		3/2		1/2	$(0,2^2,0)$	34228.8	(0.2)	[69029]
	3 - 2		7/2		9/2	$(0,1^{L1},0)$	34233.5	(0.2)	[69029]
	3 - 2		5/2		3/2	$(0,2^0,0)$	34236.0	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,1^{L1},0)$	34238.5	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,2^0,0)$	34240.0	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,1^{L1},0)$	34240.1	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,2^0,0)$	34242.8	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,1^{L1},0)$	34242.9	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,3^{U1},0)$	34273.5	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,3^{U1},0)$	34275.4	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,3^{U1},0)$	34278.3	(0.2)	[69029]
	3 - 2		7/2		9/2	$(0,1^{U1},0)$	34292.3	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,1^{U1},0)$	34297.3	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,1^{U1},0)$	34299.0	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,1^{U1},0)$	34301.9	(0.2)	[69029]
	3 - 2		7/2		9/2	$(0,0^0,0)$	34311.9	(0.2)	[69029]
	3 - 2		5/2		3/2	$(0,0^0,0)$	34317.9	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,0^0,0)$	34321.6	(0.2)	[69029]
	3 - 2		11/2		9/2	$(0,0^0,0)$	34324.6	(0.2)	[69029]
$^{87}Rb^{16}OD$	3 - 2		7/2		5/2	$(0,0^0,1)$	33959.0	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,0^0,1)$	33960.8	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,2^2,0)$	34074.2	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,2^2,0)$	34082.5	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,1^{L1},0)$	34105.1	(0.2)	[69029]
	3 - 2		5/2		3/2	$(0,2^0,0)$	34105.2	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,1^{L1},0)$	34106.9	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,2^0,0)$	34106.9	(0.2)	[69029]
	3 - 2		7/2		5/2	$(0,1^{U1},0)$	34163.4	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,1^{U1},0)$	34165.1	(0.2)	[69029]
	3 - 2		5/2		3/2	$(0,0^0,0)$	34186.6	(0.2)	[69029]
	3 - 2		9/2		7/2	$(0,0^0,0)$	34188.4	(0.2)	[69029]

Table 43. Molecular parameters for HO_2.

Parameter	$H^{16}O_2$ Value (MHz) [76031]	$D^{16}O_2$ Value (MHz) [76008]
A	610 257(35)	
B	33 511.95(60)	
C	31 673.46(60)	
B+C		60 467.7(30)
D_N	0.112(68)	
D_K	123(9)[a]	
D_{NK}	3.47(48)	
ε_{aa}	-49 546.1(58)	
ε_{bb}	-431.9(33)	
ε_{cc}	17.6(33)	
$\lvert\varepsilon_{ab}+\varepsilon_{ba}\rvert/2$	189(30)	
$\varepsilon_{bb}+\varepsilon_{cc}$		-382(6)
a_F	-27.6(14)	
T_{aa}	-8.1(11)	
T_{bb}	19.5(11)	
T_{cc}	-11.4(11)	

[a] From the laser magnetic resonance study by J.T. Hougen, H.E. Radford, K.M. Evenson and C.J. Howard, J. Mol. Spectrosc. 56, 210 (1975).

Additional references: [75019], [74004].

TABLE 43.1. The microwave spectrum of HO_2

Isotopic species	$N'(K'_-,K'_+)$ - $N''(K''_-,K''_+)$	J'	F'	J''	F''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{16}O^{16}O$	7(1, 7) - 8(0, 8)	15/2	8	17/2	9	(0,0,0)	27474.24	(0.06)	[76031]
	7(1, 7) - 8(0, 8)	15/2	7	17/2	8	(0,0,0)	27477.69	(0.04)	[76031]
	7(1, 7) - 8(0, 8)	13/2	6	15/2	7	(0,0,0)	35530.88	(0.03)	[76031]
	7(1, 7) - 8(0, 8)	13/2	7	15/2	8	(0,0,0)	35535.41	(0.04)	[76031]
	9(0, 9) - 8(1, 8)	17/2	9	15/2	8	(0,0,0)	37138.59	(0.07)	[76031]
	9(0, 9) - 8(1, 8)	17/2	8	15/2	7	(0,0,0)	37142.60	(0.06)	[76031]
	9(0, 9) - 8(1, 8)	19/2	9	17/2	8	(0,0,0)	44069.56	(0.04)	[76031]
	9(0, 9) - 8(1, 8)	19/2	10	17/2	9	(0,0,0)	44073.10	(0.10)	[76031]
	1(0, 1) - 0(0, 0)	3/2	1	1/2	0	(0,0,0)	65070.85	(0.08)	[76031]
	1(0, 1) - 0(0, 0)	3/2	2	1/2	1	(0,0,0)	65081.82	(0.04)	[76031]
	1(0, 1) - 0(0, 0)	3/2	1	1/2	1	(0,0,0)	65098.44	(0.09)	[76031]
	1(0, 1) - 0(0, 0)	1/2	1	1/2	0	(0,0,0)	65373.01	(0.10)	[76031]
	1(0, 1) - 0(0, 0)	1/2	0	1/2	1	(0,0,0)	65396.15	(0.10)	[76031]
	1(0, 1) - 0(0, 0)	1/2	1	1/2	1	(0,0,0)	65400.63	(0.10)	[76031]
	6(1, 6) - 7(0, 7)	13/2	7	15/2	8	(0,0,0)	98117.82	(0.05)	[76031]
	6(1, 6) - 7(0, 7)	13/2	6	15/2	7	(0,0,0)	98121.15	(0.05)	[76031]
	6(1, 6) - 7(0, 7)	11/2	5	13/2	6	(0,0,0)	107635.51	(0.10)	[76031]
	6(1, 6) - 7(0, 7)	11/2	6	13/2	7	(0,0,0)	107640.22	(0.10)	[76031]
	10(0,10) - 9(1, 9)	19/2	10	17/2	9	(0,0,0)	110472.20	(0.04)	[76031]
	10(0,10) - 9(1, 9)	19/2	9	17/2	8	(0,0,0)	110476.90	(0.07)	[76031]
	10(0,10) - 9(1, 9)	21/2	10	19/2	9	(0,0,0)	116448.40	(0.10)	[76031]
	10(0,10) - 9(1, 9)	21/2	11	19/2	10	(0,0,0)	116451.73	(0.10)	[76031]
	2(1, 2) - 1(1, 1)	3/2	1	1/2	1	(0,0,0)	119137.04	(0.07)	[76031]
	2(1, 2) - 1(1, 1)	3/2	2	1/2	1	(0,0,0)	119153.74	(0.04)	[76031]
	2(1, 2) - 1(1, 1)	3/2	1	1/2	0	(0,0,0)	119159.19	(0.11)	[76031]
	2(1, 1) - 1(1, 0)	3/2	1	1/2	1	(0,0,0)	122856.61	(0.09)	[76031]
	2(1, 1) - 1(1, 0)	3/2	1	1/2	0	(0,0,0)	122858.26	(0.07)	[76031]
	2(1, 1) - 1(1, 0)	3/2	2	1/2	1	(0,0,0)	122858.92	(0.05)	[76031]
	2(0, 2) - 1(0, 1)	5/2	2	3/2	1	(0,0,0)	130258.13	(0.20)	[76031]
	2(0, 2) - 1(0, 1)	5/2	3	3/2	2	(0,0,0)	130260.07	(0.20)	[76031]
	2(0, 2) - 1(0, 1)	3/2	1	1/2	0	(0,0,0)	130463.68	(0.20)	[76031]
	2(0, 2) - 1(0, 1)	3/2	2	1/2	1	(0,0,0)	130467.41	(0.20)	[76031]
	2(1, 2) - 1(1, 1)	5/2	2	3/2	1	(0,0,0)	132959.56	(0.08)	[76031]
	2(1, 2) - 1(1, 1)	5/2	3	3/2	2	(0,0,0)	132961.99	(0.08)	[76031]
	2(1, 1) - 1(1, 0)	5/2	2	3/2	1	(0,0,0)	136492.09	(0.12)	[76031]
	2(1, 1) - 1(1, 0)	5/2	3	3/2	2	(0,0,0)	136495.97	(0.09)	[76031]
$D^{16}O^{16}O$	1(0, 1) - 0(0, 0)	3/2	3/2	1/2	1/2	(0,0,0)	60368.17	(1.5)	[76008]
	1(0, 1) - 0(0, 0)	3/2	5/2	1/2	3/2	(0,0,0)	60371.75	(0.8)	[76008]
	1(0, 1) - 0(0, 0)	3/2	1/2	1/2	1/2	(0,0,0)	60371.75	(0.8)	[76008]
	1(0, 1) - 0(0, 0)	1/2	3/2	1/2	1/2	(0,0,0)	60655.4	(3.)	[76008]
	1(0, 1) - 0(0, 0)	1/2	1/2	1/2	3/2	(0,0,0)	60660.84	(0.6)	[76008]
	1(0, 1) - 0(0, 0)	1/2	3/2	1/2	3/2	(0,0,0)	60660.84	(0.6)	[76008]

Table 44. Molecular parameters for NH_2. [76022]

Parameter	NH_2 ground state Value (MHz)	NH_2 $\Pi(0,10,0)\tilde{A}\ ^2A_1$ Value (MHz)
Fermi contact		
$(0)_I$	39.6	162.5
Dipole-dipole		
$(aa)_I$	-31.1	-16.6
$(bb)_I$	-31.1	+33.2
$(cc)_I$	+62.2	-16.6
Spin-rotation[a]		
$(0)_S$	-3467.63	-10874.5
$(aa)_S$	-5286.4	-19857.1
$(cc)_S$	3437.63	6940.7

[a] The ground state spin-rotation constants are from G. Duxbury, J. Mol. Spectrosc. 25, 1 (1968) and the excited state values from K. Dressler and D.A. Ramsey, Phil. Trans. Roy. Soc. A251, 553 (1959).

TABLE 44.1. *The microwave spectrum of* NH_2

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{14}NH_2$	1(1, 1) - 1(1, 1)	1/2		3/2		(0,0,0)	6933.25	(0.50)	[76024]
	1(1, 1) - 1(1, 1)	1/2		3/2		(0,0,0)	6961.59	(0.50)	[76024]
	1(1, 1) - 1(1, 1)	1/2		3/2		(0,0,0)	6974.08	(0.50)	[76024]
	1(1, 1) - 1(1, 1)	1/2		3/2		(0,0,0)	7012.66	(0.50)	[76024]
	1(1, 1) - 1(1, 1)	1/2		3/2		(0,0,0)	7029.51	(0.50)	[76024]
	1(1, 1) - 1(1, 1)	1/2		3/2		(0,0,0)	7035.24	(0.50)	[76024]
	1(1, 0) - 1(1, 0)	1/2	1/2	3/2	3/2	(0,0,0)	7910.53	(0.50)	[76024]
	1(1, 0) - 1(1, 0)	1/2	1/2	3/2	1/2	(0,0,0)	7916.63	(0.50)	[76024]
	1(1, 0) - 1(1, 0)	1/2	3/2	3/2	5/2	(0,0,0)	7975.56	(0.50)	[76024]
	1(1, 0) - 1(1, 0)	1/2	3/2	3/2	3/2	(0,0,0)	7983.72	(0.50)	[76024]
	5(2, 3) - 6(1, 6)	11/2	13/2	13/2	15/2	(0,0,0)	8749.68	(0.50)	[76023]
	5(2, 3) - 6(1, 6)	11/2	11/2	13/2	13/2	(0,0,0)	8790.30	(0.50)	[76023]
	5(2, 3) - 6(1, 6)	11/2	13/2	13/2	13/2	(0,0,0)	8797.71	(0.50)	[76023]
	5(2, 3) - 6(1, 6)	11/2	9/2	13/2	11/2	(0,0,0)	8819.81	(0.50)	[76023]
	5(2, 3) - 6(1, 6)	11/2	11/2	13/2	11/2	(0,0,0)	8828.89	(0.50)	[76023]
	5(2, 3) - 6(1, 6)	9/2	9/2	11/2	11/2	(0,0,0)	15991.22	(0.50)	[76024]
	5(2, 3) - 6(1, 6)	9/2	7/2	11/2	9/2	(0,0,0)	15942.63	(0.50)	[76024]
	5(2, 3) - 6(1, 6)	9/2	11/2	11/2	13/2	(0,0,0)	16043.84	(0.50)	[76024]

Table 45. Rotational and centrifugal distortion constants for $H_2{}^{16}O$, $H_2{}^{17}O$ and $H_2{}^{18}O$.

Parameter	$H_2{}^{16}O$ Value (MHz) [74005][a]	$H_2{}^{17}O$ Value (MHz) [75009]	$H_2{}^{18}O$ Value (MHz) [74005][b]
$\mathcal{A}$	835 840.288(1000)	830 282.838±8.7	825 366.08±8.7
$\mathcal{B}$	435 351.717(900)	435 341.662±8.0	435 331.59±8.0
$\mathcal{C}$	278 138.700(900)	277 510.396±8.0	276 950.46±8.0
Δ_J	37.59422±0.049	37.44401[c]	37.2938±0.30
Δ_{JK}	-172.9128±0.34	-171.5584	-170.204±1.3
Δ_K	973.29052±0.19	965.7665±2.3	959.6441±2.3
δ_J	15.21040±0.020	15.22675	15.2431±0.21
δ_K	41.0502±0.30	36.2566	31.463±1.2
H_J	$(1.56556\pm0.039)\times10^{-2}$	1.48878×10^{-2}	$(1.412\pm0.34)\times10^{-2}$
H_{JK}	$(-4.2081\pm1.1)\times10^{-2}$	-2.10405×10^{-2}	
H_{KJ}	$(-5.09508\pm0.21)\times10^{-1}$	-4.81054×10^{-1}	$(-4.5260\pm0.71)\times10^{-1}$
H_K	3.733028±0.015	4.409069	5.08511±0.24
h_J	$(7.79579\pm0.18)\times10^{-3}$	7.844745×10^{-3}	$(7.8937\pm1.1)\times10^{-3}$
h_{JK}	$(-2.5165\pm0.22)\times10^{-2}$	-2.11625×10^{-2}	$(-1.716\pm2.8)\times10^{-2}$
h_K	1.0971±0.052	5.4855×10^{-1}	
L_{JK}	$(-3.0647\pm0.93)\times10^{-3}$	1.53235×10^{-3}	
L_{KKJ}	$(1.02952\pm0.24)\times10^{-2}$	5.1476×10^{-3}	
L_K	$(-2.340138\pm0.15)\times10^{-2}$	-5.966754×10^{-2}	$(-9.59337\pm0.83)\times10^{-2}$
ℓ_K	$(-1.3546\pm0.20)\times10^{-2}$	4.982×10^{-3}	$(2.351\pm0.24)\times10^{-2}$
P_K	$(5.19841\pm0.15)\times10^{-5}$	7.50542×10^{-4}	$(1.449\pm0.13)\times10^{-3}$
p_K	$(3.7603\pm2.1)\times10^{-5}$	1.88015×10^{-5}	

[a] See reference [72049].

[b] See reference [72050].

[c] All distortion constants except Δ_K were calculated from $H_2{}^{16}O$ and $H_2{}^{18}O$ constants.

Table 45.1. Rotational and centrifugal distortion constants for HDO and HTO.

Parameter	HDO Value (MHz) [74005][a]	HTO Value (MHz) [74037]
$\mathfrak{A}$	701 931.502±0.22	677 849.040±0.17
$\mathfrak{B}$	272 912.599±0.11	198 197.489±0.128
$\mathfrak{C}$	192 055.245±0.10	150 462.412±0.128
Δ_J	10.83749±0.0058	5.212023±0.003
Δ_{JK}	34.20729±0.037	48.52276±0.02
Δ_K	377.07828±0.026	271.27533±0.06
δ_J	3.647126±0.0014	1.414126±0.0005
δ_K	63.08750±0.035	51.32833±0.07
H_J	$(1.1275\pm0.099)\times10^{-3}$	$(5.19072\pm0.4)\times10^{-4}$
H_{JK}	$(7.3435\pm0.091)\times10^{-2}$	$(3.94327\pm0.06)\times10^{-2}$
H_{KJ}	$(-2.740667\pm0.022)\times10^{-1}$	$(-6.34743\pm0.18)\times10^{-2}$
H_K	1.465159±0.0027	0.8963777±0.011
h_J	$(6.5461\pm0.15)\times10^{-4}$	$(1.7818\pm0.08)\times10^{-4}$
h_{JK}	$(3.0963\pm0.037)\times10^{-2}$	$(1.7126\pm0.02)\times10^{-2}$
h_K	$(5.54951\pm0.055)\times10^{-1}$	$(5.38348\pm0.13)\times10^{-1}$
L_J	$(2.1939\pm0.40)\times10^{-6}$	
L_{JK}	$(-7.45685\pm0.45)\times10^{-4}$	$(-5.42921\pm0.3)\times10^{-4}$
L_{KKJ}	$(2.86575\pm0.091)\times10^{-3}$	$(1.98579\pm0.08)\times10^{-3}$
L_K	$(-7.557072\pm0.10)\times10^{-3}$	$(-8.34015\pm0.7)\times10^{-3}$
ℓ_{KJ}		$(-9.1126\pm2.0)\times10^{-5}$
ℓ_K	$(-5.69461\pm0.24)\times10^{-3}$	$(-8.1573\pm0.7)\times10^{-3}$
P_K	$(1.90459\pm0.10)\times10^{-5}$	$(1.10422\pm0.17)\times10^{-4}$
p_K	$(1.4074\pm0.39)\times10^{-5}$	$(5.95655\pm1.1)\times10^{-5}$

[a] *See also reference [71037].*

Table 45.2. Rotational and centrifugal distortion constants for DTO and T_2O.

Parameters	DTO Value (MHz) [74037]	T_2O Value (MHz) [73058]
A	410 174.145±0.078	338 810.923±0.076
B	172 101.952±0.045	145 665.417±0.044
C	119 127.850±0.045	100 259.415±0.044
Δ_J	5.199034±0.003	4.145597±0.0014
Δ_{JK}	-15.50411±0.015	-22.03898±0.008
Δ_K	180.31052±0.010	144.13766±0.006
δ_J	1.941256±0.0010	1.609823±0.0008
δ_K	12.8893±0.012	5.44092±0.01
H_J	$(5.9488\pm0.7)\times10^{-4}$	$(5.5745\pm0.18)\times10^{-4}$
H_{JK}	$(4.1358\pm0.8)\times10^{-3}$	$(-2.4519\pm0.18)\times10^{-3}$
H_{KJ}	$(-6.44426\pm0.10)\times10^{-2}$	$(-2.73425\pm0.034)\times10^{-2}$
H_K	$(3.466981\pm0.009)\times10^{-1}$	$(2.036106\pm0.003)\times10^{-1}$
h_J	$(2.9687\pm0.16)\times10^{-4}$	$(2.6829\pm0.10)\times10^{-4}$
h_{JK}	$(2.962\pm0.42)\times10^{-3}$	$(2.774\pm2.4)\times10^{-4}$
h_K	$(8.08715\pm0.16)\times10^{-2}$	$(3.63685\pm0.04)\times10^{-2}$
L_{JJK}	$(1.3294\pm0.4)\times10^{-5}$	
L_{KKJ}	$(1.7846\pm0.2)\times10^{-4}$	
L_{JK}		$(1.9022\pm0.24)\times10^{-5}$
L_K	$(-8.21427\pm0.2)\times10^{-4}$	$(-3.77789\pm0.04)\times10^{-4}$
ℓ_J		$(7.001\pm5.0)\times10^{-8}$
ℓ_K	$(-6.7028\pm0.7)\times10^{-4}$	
ℓ_{JK}		$(-3.143\pm1.4)\times10^{-6}$
P_{JJK}	$(-6.0406\pm1.3)\times10^{-8}$	
P_{KJ}		$(1.6559\pm0.6)\times10^{-7}$
P_K		$(5.5117\pm0.32)\times10^{-7}$
p_K	$(6.1777\pm0.8)\times10^{-6}$	
P_{KKJ}		$(-3.4123\pm1.0)\times10^{-7}$

Table 45.3. Rotational and centrifugal distortion constants for $D_2{}^{16}O$ [73057].

Parameter	$D_2{}^{16}O$ (0,0,0) State (MHz)	$D_2{}^{16}O$ (0,1,0) State (MHz)
G	462 278.854(52)	498 730(24)
B	218 038.233(33)	220 039(14)
C	145 258.022(21)	143 611(6)
τ'_{xxxx}	-66.654(11)	-74.1(7)
τ'_{yyyy}	-7.650(4)	-7.67(24)
τ'_{zzzz}	-963.936(68)	-1491.2(37)
τ'_1	71.429(76)	101.0(32)
τ'_2	-51.107(79)	-17.5(56)
H_J	$0.174(2)\times10^{-2}$	
H_{JK}	$-0.776(41)\times10^{-2}$	
H_{KJ}	$-7.862(57)\times10^{-2}$	
H_K	$55.527(42)\times10^{-2}$	1.05(3)
$2h_J$	$0.181(1)\times10^{-2}$	
h_{JK}	$-0.266(17)\times10^{-2}$	
h_K	$11.824(134)\times10^{-2}$	
G_{KJK}	$-0.154(16)\times10^{-3}$	
G_{KJ}	$0.612(42)\times10^{-3}$	
G_K	$-1.923(29)\times10^{-3}$	
g_K	$-0.660(42)\times10^{-3}$	
F_2	$-0.133(27)\times10^{-6}$	
F_3	$4.991(64)\times10^{-6}$	
F_5	$-0.098(2)\times10^{-7}$	
Kivelson-Wilson Rotational Constants:		
A	462 291.698	498 746
B	217 982.286	219 960
C	145 301.126	143 672

Table 45.4. Rotational and centrifugal distion constants for $D_2{}^{17}O$ and $D_2{}^{18}O$ [73056].

Parameter	$D_2{}^{17}O$ Value[a] (MHz)	$D_2{}^{18}O$ Value[a] (MHz)
G	456 766.850(250)	451 891.921(530)
B	218 041.011(160)	218 045.181(280)
C	144 701.487(58)	144 201.681(140)
τ'_{xxxx}	-66.219(44)	-66.653(83)
τ'_{yyyy}	-7.405(18)	-7.537(45)
τ'_{zzzz}	-938.124(240)	-920.459(50)
τ'_1	72.050(270)	67.238(550)
τ'_2	-47.660(280)	-49.030(570)
H_J	0.174×10^{-2}	0.174×10^{-2}
H_{JK}	-0.776×10^{-2}	-0.776×10^{-2}
H_{KJ}	$-7.723(46)\times10^{-2}$	$-7.049(120)\times10^{-2}$
H_K	0.53655(35)	0.51773(77)
$2h_J$	0.181×10^{-2}	$0.177(1)\times10^{-2}$
h_{JK}	-0.266×10^{-2}	-0.266×10^{-2}
h_K	0.11636(63)	0.10905(150)
G_{KJK}	-0.154×10^{-3}	-0.154×10^{-3}
G_{KJ}	0.612×10^{-3}	0.612×10^{-3}
G_K	$-1.862(4)\times10^{-3}$	$-1.834(1)\times10^{-3}$
g_K	-0.660×10^{-3}	-0.660×10^{-3}
F_2	-0.133×10^{-6}	-0.133×10^{-6}
F_3	$4.867(2)\times10^{-6}$	4.991×10^{-6}
F_5	-0.098×10^{-7}	-0.098×10^{-7}
Kivelson-Wilson Rotational Constants:		
A	456 779.808	451 905.017
B	217 985.875	217 990.613
C	144 743.666	144 243.154

[a] In cases where no uncertainties are indicated the values were fixed at those obtained for $D_2{}^{16}O$.

Table 45.5. Rotational and centrifugal distortion constants for $HD^{18}O$ and the (0,1,0) state of $HD^{16}O$.

Parameter	$HD^{18}O$ Value (MHz) [70059]	$HD^{16}O$ (0,1,0) State (MHz) [71035]
G	692 872.91(879)	764 781(48)
a	271 598.61(201)	276 856(16)
c	190 714.17(280)	189 567(14)
τ'_{xxxx}	-70.04(24)	-81.66(50)
τ'_{yyyy}	-13.043(220)	-12.85(40)
τ'_{zzzz}	-1599.58(275)	-2953.0(93)
τ'_1	-268.61(265)	-265.5(35)
τ'_2	-115.86(357)	-49.2(37)
H_J	0.00161(49)	
H_{JK}	0.0516(42)	
H_K	0.582(72)	3.22(11)
$2h_J$	0.00088(20)	
h_{JK}	0.0666(66)	
h_K	0.225(30)	
G_K	0.0103(13)	-0.0156(15)
Kivelson-Wilson Rotational Constants:		
A	692 883.9	764 798
B	271 530.5	276 745
C	190 771.3	189 662

Table 45.6. Hyperfine constants for various isotopic species of H_2O in in individual rotational states.

Isotopic Species	Rotational State	eqQ (D) (kHz)	c (D) (kHz)	c (H) (kHz)	Reference
$H_2{}^{16}O$	6_{16}			-32.70[a]	[67014]
	5_{23}			-31.75[a]	[67014]
$HD^{16}O$	2_{20}	80.10(3)	-2.07(1)	-42.38(2)	[67023]
	2_{21}	79.16(3)	-2.04(1)	-43.23(3)	[67023]
	7_{43}	-15.65(20)	-3.16(3)	-26.15(5)	[68014]
	7_{44}	-15.65(20)	-3.16(3)	-26.15(5)	[68014]
D_2O	3_{13}	-72.92(2)	-2.62(1)		[67023]
	2_{20}	49.57(2)	-2.80(1)		[67023]
	4_{41}	78.5(1)	-2.86(3)		[68014]
	5_{32}	8.3(1)	-2.60(2)		[68014]

[a] Kukolich [69033] obtained the following values c (6_{16}) = -32.78(30) kHz, c (5_{23}) = -31.84(30) kHz, D (6_{16}) = 14.63(30) kHz, and D (5_{23}) = 10.89(30) kHz, where D is the spin-spin interaction.

Table 45.7. Diagonal components of the hyperfine tensors for H_2O.

Isotopic Species	Atom	χ_{aa} (kHz)	χ_{bb} (kHz)	χ_{cc} (kHz)	M_{aa} (kHz)	M_{bb} (kHz)	M_{cc} (kHz)	Reference
$H_2{}^{16}O$	H				-35.14(15)	-30.68(30)	-32.68(16)	[67024]
$HD^{16}O$	H				-56.81(30)	-8.80(8)	-23.28(10)	[67024]
	D				-1.07(1)	-4.32(4)	-3.57(2)	[67024]
$D_2{}^{16}O$	D	307.91(14)	-133.13(14)	-174.78(20)	-2.99(1)	-2.36(2)	-2.64(1)	[67024,67023]
$H_2{}^{17}O$	^{17}O	-8899.	-1269.	10 169.				[75009]
$HD^{17}O$	^{17}O	-7877.8	-2229.	10 106.8				[73056,69031]
$D_2{}^{17}O$ [a]	^{17}O	-8896.4	-1210.4	10 106.8				[73056]

[a] Calculated from the $HD^{17}O$ values.

Table 45.8. Zeeman constants and electric dipole moment for H_2O.

Parameters	$H_2{}^{16}O$ Value	$HD^{16}O$ Value	$D_2{}^{16}O$ Value	Reference
μ_a (D)		0.6567(4)		[73059]
μ_b (D)	1.8546(4)	1.7318(9)	1.8545(4)	[73059,73060]
g_{aa} (μ_N)	0.6650(20)	0.623[a]	0.3233(10)	[69033]
g_{bb} (μ_N)	0.7145(20)	0.408[a]	0.3580(10)	[69033]
g_{cc} (μ_N)	0.6465(20)	0.438[a]	0.3226(10)	[69033]
$2\chi_{aa}-\chi_{bb}-\chi_{cc}$ [b]			$-2.3(10)\times10^{-6}$	[69033]
$2\chi_{bb}-\chi_{cc}-\chi_{aa}$ [b]			$-1.1(6)\times10^{-6}$	[69033]

[a] See reference [53015].

[b] Units are erg/G^2·mole.

Table 45.9 Additional references for H_2O.

Microwave Spectrum	Microwave Spectrum	Stark Effect	Zeeman Effect	Hyperfine Structure	Pressure Broadening Line Width	Other
[46001]	[54006]	[48010]	[49011]	[59014]	[65022]	[54011]
[46002]	[54012]	[49012]	[51008]	[60006]	[69030]	[62003]
[46003]	[55011]	[72051]	[51009]	[64020]	[69032]	[67025]
[47006]	[66030]	[72052]	[63020]		[69034]	[69052]
[49010]	[66031]	[75008]	[65021]		[69051]	[69053]
[53013]	[70053]		[69035]		[71027]	[70054]
[53014]	[71005]					
[53016]	[74043]					
[53018]						

TABLE 45.10. The microwave spectrum of H_2O

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H_2{}^{16}O$	6(1, 6) - 5(2, 3)	7		6		(0,0,0)	22235.044	(1E-3)	[69033]
	6(1, 6) - 5(2, 3)	6		5		(0,0,0)	22235.077	(1E-3)	[69033]
	6(1, 6) - 5(2, 3)					(0,0,0)	22235.080	(*1E-4)	[69033]
	6(1, 6) - 5(2, 3)	5		4		(0,0,0)	22235.120	(1E-3)	[69033]
	6(1, 6) - 5(2, 3)	6		6		(0,0,0)	22235.253	(1E-3)	[69033]
	6(1, 6) - 5(2, 3)	5		5		(0,0,0)	22235.298	(1E-3)	[69033]
	3(2, 1) - 4(1, 4)					(0,1,0)	67803.62	(0.10)	[71036]
	3(1, 3) - 2(2, 0)					(0,0,0)	183310.091	(2E-3)	[71032]
	10(2, 9) - 9(3, 6)					(0,0,0)	321225.644	(0.24)	[72049]
	5(1, 5) - 4(2, 2)					(0,0,0)	325152.919	(0.03)	[72049]
	4(1, 4) - 3(2, 1)					(0,0,0)	380197.372	(0.03)	[72049]
	7(5, 3) - 6(6, 0)					(0,0,0)	437346.667	(0.20)	[72049]
	6(4, 3) - 5(5, 0)					(0,0,0)	439150.812	(0.05)	[72049]
	7(5, 2) - 6(6, 1)					(0,0,0)	443018.295	(0.21)	[72049]
	4(2, 3) - 3(3, 0)					(0,0,0)	448001.075	(0.02)	[72049]
	6(4, 2) - 5(5, 1)					(0,0,0)	470888.947	(0.19)	[72049]
	5(3, 3) - 4(4, 0)					(0,0,0)	474689.127	(0.07)	[72049]
	6(2, 4) - 7(1, 7)					(0,0,0)	488491.133	(0.38)	[72049]
	1(1, 0) - 1(0, 1)					(0,0,0)	556936.002	(0.09)	[72049]
	5(3, 2) - 4(4, 1)					(0,0,0)	620700.807	(0.39)	[72049]
	2(1, 1) - 2(0, 2)					(0,0,0)	752033.227	(0.49)	[72049]
$H_2{}^{17}O$	6(1, 6) - 5(2, 3)		13/2		11/2	(0,0,0)	13533.79	(0.10)	[71036]
	6(1, 6) - 5(2, 3)		15/2		13/2	(0,0,0)	13534.41	(0.10)	[71036]
	6(1, 6) - 5(2, 3)		11/2		9/2	(0,0,0)	13534.41	(0.10)	[71036]
	6(1, 6) - 5(2, 3)		9/2		7/2	(0,0,0)	13536.02	(0.10)	[71036]
	6(1, 6) - 5(2, 3)		17/2		15/2	(0,0,0)	13537.06	(0.10)	[71036]
	6(1, 6) - 5(2, 3)		7/2		5/2	(0,0,0)	13537.97	(0.10)	[71036]
	3(1, 3) - 2(2, 0)		9/2		7/2	(0,0,0)	193999.796	(0.01)	[75009]
	3(1, 3) - 2(2, 0)		7/2		7/2	(0,0,0)	193999.796	(0.01)	[75009]
	3(1, 3) - 2(2, 0)		7/2		5/2	(0,0,0)	194000.310	(0.01)	[75009]
	3(1, 3) - 2(2, 0)		5/2		5/2	(0,0,0)	194001.675	(0.01)	[75009]
	3(1, 3) - 2(2, 0)		9/2		9/2	(0,0,0)	194001.675	(0.01)	[75009]
	3(1, 3) - 2(2, 0)		5/2		3/2	(0,0,0)	194002.998	(0.01)	[75009]
	3(1, 3) - 2(2, 0)		11/2		9/2	(0,0,0)	194004.172	(0.01)	[75009]
	3(1, 3) - 2(2, 0)		3/2		3/2	(0,0,0)	194004.172	(0.01)	[75009]
	3(1, 3) - 2(2, 0)		3/2		1/2	(0,0,0)	194005.835	(0.01)	[75009]
	3(1, 3) - 2(2, 0)		1/2		1/2	(0,0,0)	194007.002	(0.01)	[75009]
	5(1, 5) - 4(2, 2)		13/2		11/2	(0,0,0)	323825.089	(0.01)	[75009]
	5(1, 5) - 4(2, 2)		15/2		13/2	(0,0,0)	323827.873	(0.01)	[75009]
	4(1, 4) - 3(2, 1)		11/2		9/2	(0,0,0)	385784.860	(0.01)	[75009]
	4(1, 4) - 3(2, 1)		13/2		11/2	(0,0,0)	385788.189	(0.01)	[75009]
	4(2, 3) - 3(3, 0)		11/2		9/2	(0,0,0)	469808.134	(0.01)	[75009]
	4(2, 3) - 3(3, 0)		13/2		11/2	(0,0,0)	469811.064	(0.01)	[75009]
	1(1, 0) - 1(0, 1)					(0,0,0)	552020.960	(0.01)	[75009]
	2(1, 1) - 2(0, 2)					(0,0,0)	748458.254	(0.01)	[75009]
$H_2{}^{18}O$	6(1, 6) - 5(2, 3)					(0,0,0)	5625.147	(0.02)	[70025]
	3(1, 3) - 2(2, 0)					(0,0,0)	203407.52	(0.02)	[72050]
	5(1, 5) - 4(2, 2)					(0,0,0)	322465.17	(0.05)	[72050]
	4(1, 4) - 3(2, 1)					(0,0,0)	390607.76	(0.04)	[72050]
	4(2, 3) - 3(3, 0)					(0,0,0)	489054.26	(0.08)	[72050]
	6(2, 4) - 7(1, 7)					(0,0,0)	517181.96	(0.21)	[72050]
	6(4, 3) - 5(5, 0)					(0,0,0)	520137.32	(0.47)	[72050]
	5(3, 3) - 4(4, 0)					(0,0,0)	537337.57	(0.47)	[72050]
	1(1, 0) - 1(0, 1)					(0,0,0)	547676.44	(0.06)	[72050]
	6(4, 2) - 5(5, 1)					(0,0,0)	554859.87	(0.49)	[72050]
	5(3, 2) - 4(4, 1)					(0,0,0)	692079.14	(0.60)	[72050]
	2(1, 1) - 2(0, 2)					(0,0,0)	745320.20	(0.48)	[72050]
$H^{16}OD$	7(6, 1) - 7(6, 2)					(0,0,0)	2.340	(*1E-3)	[74005]
	5(5, 0) - 5(5, 1)					(0,0,0)	3.259	(*1E-3)	[74005]
	6(5, 1) - 6(5, 2)					(0,0,0)	35.484	(*1E-3)	[74005]
	4(4, 0) - 4(4, 1)					(0,0,0)	54.618	(*1E-3)	[74005]
	7(5, 2) - 7(5, 3)					(0,0,0)	209.887	(*5E-3)	[74005]
	5(4, 1) - 5(4, 2)	9/2	5	11/2	5	(0,0,0)	486.266	(2E-3)	[62019]
	5(4, 1) - 5(4, 2)	9/2	4	11/2	5	(0,0,0)	486.450	(2E-3)	[62019]
	5(4, 1) - 5(4, 2)	13/2	6	11/2	5	(0,0,0)	486.487	(2E-3)	[62019]

TABLE 45.10. The microwave spectrum of H_2O—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{16}OD$	5(4, 1) - 5(4, 2)					(0,0,0)	486.528	(*2E-3)	[62019]
	5(4, 1) - 5(4, 2)	11/2	5	9/2	4	(0,0,0)	486.569	(2E-3)	[62019]
	5(4, 1) - 5(4, 2)	11/2	5	13/2	6	(0,0,0)	486.607	(2E-3)	[62019]
	3(3, 0) - 3(3, 1)	3/2	2	5/2	3	(0,0,0)	824.478	(2E-3)	[62019]
	3(3, 0) - 3(3, 1)	7/2	4	9/2	4	(0,0,0)	824.507	(2E-3)	[62019]
	3(3, 0) - 3(3, 1)	7/2	4	5/2	3	(0,0,0)	824.525	(2E-3)	[62019]
	3(3, 0) - 3(3, 1)	5/2	3	7/2	3	(0,0,0)	824.549	(2E-3)	[62019]
	3(3, 0) - 3(3, 1)	9/2	4	7/2	3	(0,0,0)	824.569	(2E-3)	[62019]
	3(3, 0) - 3(3, 1)	7/2	4	5/2	2	(0,0,0)	824.604	(2E-3)	[62019]
	3(3, 0) - 3(3, 1)	9/2	4	9/2	4	(0,0,0)	824.671	(2E-3)	[62019]
	3(3, 0) - 3(3, 1)	7/2	4	7/2	4	(0,0,0)	824.671	(2E-3)	[62019]
	3(3, 0) - 3(3, 1)	7/2	3	7/2	3	(0,0,0)	824.671	(2E-3)	[62019]
	3(3, 0) - 3(3, 1)	5/2	3	5/2	3	(0,0,0)	824.671	(2E-3)	[62019]
	3(3, 0) - 3(3, 1)	5/2	2	5/2	2	(0,0,0)	824.671	(2E-3)	[62019]
	3(3, 0) - 3(3, 1)	3/2	2	3/2	2	(0,0,0)	824.671	(2E-3)	[62019]
	3(3, 0) - 3(3, 1)	5/2	2	7/2	4	(0,0,0)	824.742	(2E-3)	[62019]
	3(3, 0) - 3(3, 1)	7/2	3	9/2	4	(0,0,0)	824.773	(2E-3)	[62019]
	3(3, 0) - 3(3, 1)	7/2	3	5/2	3	(0,0,0)	824.790	(2E-3)	[62019]
	3(3, 0) - 3(3, 1)	5/2	3	7/2	4	(0,0,0)	824.814	(2E-3)	[62019]
	3(3, 0) - 3(3, 1)	9/2	4	7/2	4	(0,0,0)	824.834	(2E-3)	[62019]
	3(3, 0) - 3(3, 1)	5/2	3	3/2	2	(0,0,0)	824.864	(2E-3)	[62019]
	8(5, 3) - 8(5, 4)					(0,0,0)	892.229	(*0.02)	[74005]
	6(4, 2) - 6(4, 3)					(0,0,0)	2394.56	(0.05)	[55010]
	9(5, 4) - 9(5, 5)					(0,0,0)	3044.71	(0.10)	[55010]
	5(0, 5) - 4(2, 2)					(0,0,0)	3296.488	(*0.24)	[74005]
	4(3, 1) - 4(3, 2)					(0,0,0)	5702.78	(0.06)	[53017]
	7(4, 3) - 7(4, 4)					(0,0,0)	8577.812	(0.04)	[68014]
	10(5, 5) - 10(5, 6)					(0,0,0)	8837.21	(0.10)	[71035]
	2(2, 0) - 2(2, 1)	5/2	2	3/2	1	(0,0,0)	10278.080	(1E-3)	[64020]
	2(2, 0) - 2(2, 1)	3/2	2	1/2	1	(0,0,0)	10278.080	(1E-3)	[64020]
	2(2, 0) - 2(2, 1)	7/2	3	5/2	3	(0,0,0)	10278.137	(1E-3)	[64020]
	2(2, 0) - 2(2, 1)	3/2	2	5/2	3	(0,0,0)	10278.137	(1E-3)	[64020]
	2(2, 0) - 2(2, 1)	3/2	1	1/2	1	(0,0,0)	10278.168	(1E-3)	[64020]
	2(2, 0) - 2(2, 1)	5/2	2	7/2	3	(0,0,0)	10278.168	(1E-3)	[64020]
	2(2, 0) - 2(2, 1)	3/2	1	5/2	3	(0,0,0)	10278.226	(1E-3)	[64020]
	2(2, 0) - 2(2, 1)	3/2	2	3/2	2	(0,0,0)	10278.246	(1E-3)	[64020]
	2(2, 0) - 2(2, 1)	5/2	2	5/2	2	(0,0,0)	10278.246	(1E-3)	[64020]
	2(2, 0) - 2(2, 1)	5/2	3	5/2	3	(0,0,0)	10278.246	(1E-3)	[64020]
	2(2, 0) - 2(2, 1)	7/2	3	7/2	3	(0,0,0)	10278.246	(1E-3)	[64020]
	2(2, 0) - 2(2, 1)	5/2	3	3/2	1	(0,0,0)	10278.264	(1E-3)	[64020]
	2(2, 0) - 2(2, 1)	1/2	1	3/2	1	(0,0,0)	10278.323	(1E-3)	[64020]
	2(2, 0) - 2(2, 1)	7/2	3	5/2	2	(0,0,0)	10278.323	(1E-3)	[64020]
	2(2, 0) - 2(2, 1)	5/2	3	7/2	3	(0,0,0)	10278.355	(1E-3)	[64020]
	2(2, 0) - 2(2, 1)	5/2	3	3/2	2	(0,0,0)	10278.355	(1E-3)	[64020]
	2(2, 0) - 2(2, 1)	3/2	1	5/2	2	(0,0,0)	10278.413	(1E-3)	[64020]
	2(2, 0) - 2(2, 1)	1/2	1	3/2	2	(0,0,0)	10278.413	(1E-3)	[64020]
	2(2, 0) - 2(2, 1)					(0,1,0)	10557.45	(0.05)	[71035]
	6(2, 4) - 7(0, 7)					(0,0,0)	11618.2	(0.1)	[73062]
	3(2, 1) - 4(1, 4)					(0,0,0)	20460.01	(0.05)	[70023]
	5(3, 2) - 5(3, 3)					(0,1,0)	21820.34	(0.10)	[71035]
	5(3, 2) - 5(3, 3)					(0,0,0)	22307.67	(0.05)	[48011]
	11(5, 6) - 11(5, 7)					(0,0,0)	22581.57	(0.10)	[71035]
	8(4, 4) - 8(4, 5)					(0,0,0)	24884.77	(0.05)	[53017]
	7(1, 7) - 6(2, 4)					(0,0,0)	26880.38	(0.05)	[53017]
	6(2, 5) - 5(3, 2)					(0,1,0)	27892.29	(0.10)	[71035]
	11(7, 5) - 12(6, 6)					(0,0,0)	28668.34	(0.10)	[71035]
	11(7, 4) - 12(6, 7)					(0,0,0)	31670.43	(0.10)	[71035]
	13(2,12) - 12(3, 9)					(0,0,0)	45902.54	(0.10)	[71035]
	3(2, 1) - 3(2, 2)					(0,0,0)	50236.30	(0.10)	[56016]
	3(2, 1) - 3(2, 2)					(0,1,0)	51675.47	(0.10)	[71035]
	12(5, 7) - 12(5, 8)					(0,0,0)	51917.87	(0.10)	[71035]
	4(3, 1) - 5(2, 4)					(0,0,0)	61185.95	(0.10)	[70028]
	9(4, 5) - 9(4, 6)					(0,0,0)	61704.59	(0.20)	[70028]
	6(3, 3) - 6(3, 4)					(0,1,0)	63155.55	(0.10)	[71035]
	6(3, 3) - 6(3, 4)					(0,0,0)	64427.34	(0.10)	[70028]

TABLE 45.10. The microwave spectrum of H_2O—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{16}OD$	3(1, 2) - 2(2, 1)					(0,1,0)	67153.04	(0.10)	[71035]
	6(0, 6) - 5(2, 3)					(0,0,0)	69550.58	(0.10)	[70023]
	1(1, 0) - 1(1, 1)					(0,0,0)	80578.15	(0.15)	[56016]
	7(3, 5) - 6(4, 2)					(0,0,0)	87962.81	(0.02)	[71037]
	5(1, 5) - 4(2, 2)					(0,0,0)	120778.19	(0.01)	[71037]
	7(1, 6) - 6(3, 3)					(0,0,0)	127527.533	(*3.00)	[74005]
	10(4, 6) - 10(4, 7)					(0,0,0)	134770.22	(0.04)	[71037]
	6(1, 6) - 5(2, 3)					(0,0,0)	138530.57	(0.06)	[71037]
	4(2, 2) - 4(2, 3)					(0,0,0)	143727.21	(0.04)	[71037]
	7(3, 4) - 7(3, 5)					(0,0,0)	151616.19	(0.03)	[71037]
	9(6, 4) - 10(5, 5)					(0,0,0)	160329.47	(0.10)	[70023]
	9(6, 3) - 10(5, 6)					(0,0,0)	169246.05	(0.10)	[71037]
	3(2, 1) - 4(0, 4)					(0,0,0)	207110.65	(0.10)	[73061]
	7(2, 5) - 8(1, 8)					(0,0,0)	207345.71	(0.07)	[71037]
	9(4, 6) - 8(5, 3)					(0,0,0)	210310.65	(0.02)	[71037]
	3(1, 2) - 2(2, 1)					(0,0,0)	225896.72	(0.04)	[71037]
	7(2, 5) - 8(0, 8)					(0,0,0)	228072.253	(*0.51)	[74005]
	2(1, 1) - 2(1, 2)					(0,0,0)	241561.55	(0.04)	[71037]
	7(3, 4) - 6(4, 3)					(0,0,0)	241973.57	(0.04)	[71037]
	5(2, 3) - 4(3, 2)					(0,0,0)	255050.26	(0.06)	[71037]
	7(5, 3) - 8(4, 4)					(0,0,0)	258223.76	(0.10)	[71037]
	2(2, 0) - 3(1, 3)					(0,0,0)	266161.07	(0.03)	[71037]
	9(4, 5) - 8(5, 4)					(0,0,0)	272907.54	(0.03)	[71037]
	7(5, 2) - 8(4, 5)					(0,0,0)	283318.59	(0.02)	[71037]
	8(3, 5) - 8(3, 6)					(0,0,0)	305038.55	(0.11)	[71037]
	5(2, 3) - 5(2, 4)					(0,0,0)	310533.29	(0.05)	[71037]
	6(2, 5) - 5(3, 2)					(0,0,0)	313750.62	(0.03)	[71037]
	5(4, 2) - 6(3, 3)					(0,0,0)	317151.25	(0.05)	[71037]
	3(3, 1) - 4(2, 2)					(0,0,0)	335395.50	(0.03)	[71037]
	5(3, 2) - 6(1, 5)					(0,0,0)	356839.62	(*1.79)	[74005]
	5(4, 1) - 6(3, 4)					(0,0,0)	382065.10	(0.09)	[71037]
	1(0, 1) - 0(0, 0)					(0,0,0)	464924.52	(0.03)	[71037]
	3(3, 0) - 4(2, 3)					(0,0,0)	479947.37	(0.10)	[71037]
	3(1, 2) - 3(1, 3)					(0,0,0)	481779.50	(0.28)	[71037]
	2(0, 2) - 1(1, 1)					(0,0,0)	490596.64	(0.06)	[71037]
	8(1, 7) - 7(3, 4)					(0,0,0)	497675.668	(*4.53)	[74005]
	1(1, 0) - 1(0, 1)					(0,0,0)	509292.42	(0.05)	[71037]
	2(2, 0) - 3(0, 3)					(0,0,0)	537792.770	(*0.24)	[74005]
	8(3, 6) - 7(4, 3)					(0,0,0)	539935.90	(0.34)	[71037]
	9(3, 6) - 9(3, 7)					(0,0,0)	540375.466	(*0.94)	[74005]
	8(2, 6) - 9(1, 9)					(0,0,0)	548552.311	(*1.77)	[74005]
	8(2, 6) - 9(0, 9)					(0,0,0)	559427.696	(*1.96)	[74005]
	6(2, 4) - 6(2, 5)					(0,0,0)	559816.74	(0.29)	[71037]
	2(1, 1) - 2(0, 2)					(0,0,0)	599926.71	(0.12)	[71037]
	7(2, 6) - 6(3, 3)					(0,0,0)	622483.456	(*0.61)	[74005]
	3(1, 2) - 3(0, 3)					(0,0,0)	753411.15	(0.38)	[71037]
	6(5, 2) - 7(4, 3)					(0,0,0)	766163.057	(*2.14)	[74005]
	6(5, 1) - 7(4, 4)					(0,0,0)	774776.302	(*2.12)	[74005]
	4(1, 3) - 4(1, 4)					(0,0,0)	797486.719	(*0.25)	[74005]
$D_2{}^{16}O$	3(1, 3) - 2(2, 0)	3	0	2	0	(0,0,0)	10919.301	(1E-3)	[57009]
	3(1, 3) - 2(2, 0)	5	2	4	2	(0,0,0)	10919.357	(1E-3)	[57009]
	3(1, 3) - 2(2, 0)					(0,0,0)	10919.420	(*1E-4)	[70024]
	3(1, 3) - 2(2, 0)	4	2	3	2	(0,0,0)	10919.521	(1E-3)	[57009]
	3(1, 3) - 2(2, 0)	3	2	2	2	(0,0,0)	10919.603	(1E-3)	[57009]
	4(4, 1) - 5(3, 2)					(0,0,0)	10947.113	(1E-4)	[70024]
	4(1, 4) - 3(2, 1)					(0,1,0)	29695.58	(0.10)	[71038]
	8(7, 2) - 9(6, 3)					(0,0,0)	30182.49	(0.03)	[73056]
	8(7, 1) - 9(6, 4)					(0,0,0)	30778.50	(0.03)	[73056]
	4(2, 3) - 3(3, 0)					(0,0,0)	43414.57	(0.03)	[56016]
	5(2, 3) - 6(1, 6)					(0,1,0)	50538.74	(0.10)	[71038]
	5(1, 5) - 4(2, 2)					(0,1,0)	51436.58	(0.10)	[71038]
	4(2, 2) - 3(3, 1)					(0,1,0)	54216.60	(0.10)	[71038]
	4(4, 0) - 5(3, 3)					(0,0,0)	55482.32	(0.03)	[56016]
	8(5, 4) - 7(6, 1)					(0,0,0)	70240.63	(0.03)	[70028]
	8(5, 3) - 7(6, 2)					(0,0,0)	74471.69	(0.03)	[70028]

TABLE 45.10. The microwave spectrum of H_2O—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$D_2{}^{16}O$	6(1, 6) - 5(2, 3)					(0,0,0)	93350.06	(0.03)	[70028]
	9(8, 2) - 10(7, 3)					(0,0,0)	103076.40	(0.06)	[70028]
	9(8, 1) - 10(7, 4)					(0,0,0)	103152.89	(0.06)	[70028]
	6(2, 4) - 7(1, 7)					(0,0,0)	104875.71	(0.06)	[70028]
	11(2,10) - 10(3, 7)					(0,0,0)	120183.28	(0.06)	[70026]
	10(9, 2) - 11(8, 3)					(0,0,0)	145134.80	(0.06)	[70023]
	10(9, 1) - 11(8, 4)					(0,0,0)	145143.82	(0.06)	[70023]
	4(1, 4) - 3(2, 1)					(0,0,0)	151710.40	(0.06)	[70028]
	5(5, 1) - 6(4, 2)					(0,0,0)	180171.22	(0.09)	[70028]
	5(1, 5) - 4(2, 2)					(0,0,0)	181883.02	(0.09)	[70028]
	5(5, 0) - 6(4, 3)					(0,0,0)	187633.10	(0.09)	[70028]
	7(4, 4) - 6(5, 1)					(0,0,0)	192519.44	(0.09)	[70028]
	12(8, 5) - 11(9, 2)					(0,0,0)	215689.00	(0.09)	[70023]
	12(8, 4) - 11(9, 3)					(0,0,0)	215731.72	(0.09)	[70023]
	7(4, 3) - 6(5, 2)					(0,0,0)	218442.50	(0.09)	[70028]
	4(2, 2) - 3(3, 1)					(0,0,0)	227010.50	(0.09)	[70028]
	11(3, 8) - 12(2,11)					(0,0,0)	254484.27	(0.12)	[70026]
	11(7, 5) - 10(8, 2)					(0,0,0)	265060.07	(0.12)	[73057]
	11(7, 4) - 10(8, 3)					(0,0,0)	265381.30	(0.12)	[73057]
	6(6, 1) - 7(5, 2)					(0,0,0)	307107.53	(0.12)	[70028]
	6(3, 4) - 5(4, 1)					(0,0,0)	307743.14	(0.12)	[70028]
	6(6, 0) - 7(5, 3)					(0,0,0)	308133.65	(0.12)	[70028]
	1(1, 0) - 1(0, 1)					(0,0,0)	316799.81	(0.12)	[70028]
	5(2, 4) - 4(3, 1)					(0,0,0)	339035.26	(0.15)	[70028]
	2(1, 1) - 2(0, 2)					(0,0,0)	403561.82	(0.15)	[73057]
	3(1, 2) - 2(2, 1)					(0,0,0)	458531.45	(0.15)	[73057]
	2(0, 2) - 1(1, 1)					(0,0,0)	468246.57	(0.15)	[73057]
	1(1, 1) - 0(0, 0)					(0,0,0)	607349.6	(0.2)	[70027]
	6(2, 4) - 6(1, 5)					(0,0,0)	890395.0	(3.0)	[72051]
$D_2{}^{17}O$	4(4, 0) - 5(3, 3)		3/2		5/2	(0,0,0)	21311.05	(0.03)	[73056]
	4(4, 0) - 5(3, 3)		13/2		15/2	(0,0,0)	21312.20	(0.03)	[73056]
	4(4, 0) - 5(3, 3)		7/2		9/2	(0,0,0)	21313.80	(0.03)	[73056]
	4(4, 0) - 5(3, 3)		11/2		13/2	(0,0,0)	21314.50	(0.03)	[73056]
	4(4, 0) - 5(3, 3)		9/2		11/2	(0,0,0)	21314.80	(0.03)	[73056]
	3(1, 3) - 2(2, 0)		9/2		7/2	(0,0,0)	22454.04	(0.03)	[73056]
	3(1, 3) - 2(2, 0)		7/2		7/2	(0,0,0)	22454.04	(0.03)	[73056]
	3(1, 3) - 2(2, 0)		7/2		5/2	(0,0,0)	22454.60	(0.03)	[73056]
	3(1, 3) - 2(2, 0)		5/2		7/2	(0,0,0)	22455.3	(0.1)	[73056]
	3(1, 3) - 2(2, 0)		5/2		5/2	(0,0,0)	22455.64	(0.03)	[73056]
	3(1, 3) - 2(2, 0)		5/2		3/2	(0,0,0)	22457.09	(0.03)	[73056]
	3(1, 3) - 2(2, 0)		3/2		5/2	(0,0,0)	22457.09	(0.03)	[73056]
	3(1, 3) - 2(2, 0)		11/2		9/2	(0,0,0)	22458.24	(0.03)	[73056]
	3(1, 3) - 2(2, 0)		3/2		1/2	(0,0,0)	22460.03	(0.03)	[73056]
	3(1, 3) - 2(2, 0)		1/2		1/2	(0,0,0)	22461.10	(0.03)	[73056]
	5(3, 2) - 4(4, 1)		13/2		11/2	(0,0,0)	25835.35	(0.03)	[73056]
	5(3, 2) - 4(4, 1)		9/2		7/2	(0,0,0)	25836.10	(0.03)	[73056]
	5(3, 2) - 4(4, 1)		15/2		13/2	(0,0,0)	25837.40	(0.03)	[73056]
	5(3, 2) - 4(4, 1)		5/2		3/2	(0,0,0)	25838.55	(0.03)	[73056]
	9(6, 4) - 8(7, 1)		21/2		19/2	(0,0,0)	30414.69	(0.03)	[73056]
	9(6, 4) - 8(7, 1)		15/2		13/2	(0,0,0)	30415.38	(0.03)	[73056]
	9(6, 4) - 8(7, 1)		23/2		21/2	(0,0,0)	30415.90	(0.03)	[73056]
	9(6, 3) - 8(7, 2)		21/2		19/2	(0,0,0)	31099.88	(0.03)	[73056]
	9(6, 3) - 8(7, 2)		15/2		13/2	(0,0,0)	31100.57	(0.03)	[73056]
	9(6, 3) - 8(7, 2)		23/2		21/2	(0,0,0)	31101.09	(0.03)	[73056]
	9(8, 2) - 10(7, 3)		13/2		15/2	(0,0,0)	34453.65	(0.03)	[73056]
	9(8, 2) - 10(7, 3)		23/2		25/2	(0,0,0)	34453.89	(0.03)	[73056]
	9(8, 2) - 10(7, 3)		15/2		17/2	(0,0,0)	34454.47	(0.03)	[73056]
	9(8, 2) - 10(7, 3)		21/2		23/2	(0,0,0)	34455.07	(0.03)	[73056]
	9(8, 2) - 10(7, 3)		19/2		21/2	(0,0,0)	34455.25	(0.03)	[73056]
	9(8, 1) - 10(7, 4)		13/2		15/2	(0,0,0)	34544.00	(0.03)	[73056]
	9(8, 1) - 10(7, 4)		23/2		25/2	(0,0,0)	34544.30	(0.03)	[73056]
	9(8, 1) - 10(7, 4)		15/2		17/2	(0,0,0)	34544.86	(0.03)	[73056]
	9(8, 1) - 10(7, 4)		21/2		23/2	(0,0,0)	34545.42	(0.03)	[73056]
	9(8, 1) - 10(7, 4)		19/2		21/2	(0,0,0)	34545.66	(0.03)	[73056]
	4(2, 3) - 3(3, 0)		11/2		9/2	(0,0,0)	66237.71	(0.03)	[73056]

TABLE 45.10. The microwave spectrum of H_2O—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$D_2{}^{17}O$	4(2, 3) - 3(3, 0)		7/2		5/2	(0,0,0)	66239.06	(0.03)	[73056]
	4(2, 3) - 3(3, 0)		13/2		11/2	(0,0,0)	66240.57	(0.03)	[73056]
	4(2, 3) - 3(3, 0)		3/2		1/2	(0,0,0)	66242.26	(0.03)	[73056]
	8(5, 4) - 7(6, 1)		19/2		17/2	(0,0,0)	123366.05	(0.06)	[73056]
	8(5, 4) - 7(6, 1)		21/2		19/2	(0,0,0)	123367.39	(0.06)	[73056]
	8(5, 3) - 7(6, 2)		19/2		17/2	(0,0,0)	128097.22	(0.06)	[73056]
	8(5, 3) - 7(6, 2)		21/2		19/2	(0,0,0)	128098.61	(0.06)	[73056]
	5(5, 1) - 6(4, 2)		5/2		7/2	(0,0,0)	135432.50	(0.06)	[73056]
	5(5, 1) - 6(4, 2)		15/2		17/2	(0,0,0)	135433.57	(0.06)	[73056]
	5(5, 1) - 6(4, 2)		13/2		15/2	(0,0,0)	135435.29	(0.06)	[73056]
	5(5, 0) - 6(4, 3)		5/2		7/2	(0,0,0)	143561.15	(0.06)	[73056]
	5(5, 0) - 6(4, 3)		15/2		17/2	(0,0,0)	143562.09	(0.06)	[73056]
	5(5, 0) - 6(4, 3)		13/2		15/2	(0,0,0)	143564.01	(0.06)	[73056]
	4(1, 4) - 3(2, 1)		11/2		9/2	(0,0,0)	159238.51	(0.06)	[73056]
	4(1, 4) - 3(2, 1)		7/2		5/2	(0,0,0)	159239.56	(0.06)	[73056]
	4(1, 4) - 3(2, 1)		13/2		11/2	(0,0,0)	159241.68	(0.06)	[73056]
	4(1, 4) - 3(2, 1)		3/2		1/2	(0,0,0)	159243.21	(0.06)	[73056]
	5(1, 5) - 4(2, 2)		13/2		11/2	(0,0,0)	183551.83	(0.09)	[73056]
	5(1, 5) - 4(2, 2)		15/2		13/2	(0,0,0)	183554.34	(0.09)	[73056]
	7(4, 4) - 6(5, 1)		17/2		15/2	(0,0,0)	236524.84	(0.09)	[73056]
	4(2, 2) - 3(3, 1)		11/2		9/2	(0,0,0)	255077.37	(0.12)	[73056]
	4(2, 2) - 3(3, 1)		13/2		11/2	(0,0,0)	255079.26	(0.12)	[73056]
	7(4, 3) - 6(5, 2)		17/2		15/2	(0,0,0)	264698.58	(0.12)	[73056]
	1(1, 0) - 1(0, 1)		7/2		7/2	(0,0,0)	311850.63	(0.12)	[73056]
	1(1, 0) - 1(0, 1)		7/2		5/2	(0,0,0)	311852.38	(0.12)	[73056]
	2(1, 1) - 2(0, 2)		9/2		9/2	(0,0,0)	399650.88	(0.15)	[73056]
	2(1, 1) - 2(0, 2)		7/2		9/2	(0,0,0)	399650.88	(0.15)	[73056]
$D_2{}^{18}O$	5(3, 3) - 4(4, 0)					(0,0,0)	8898.45	(0.03)	[73056]
	10(7, 4) - 9(8, 1)					(0,0,0)	26281.93	(0.03)	[73056]
	10(7, 3) - 9(8, 2)					(0,0,0)	26386.88	(0.03)	[73056]
	3(1, 3) - 2(2, 0)					(0,0,0)	32581.33	(0.03)	[73056]
	11(2,10) - 10(3, 7)					(0,0,0)	50052.17	(0.03)	[73056]
	5(3, 2) - 4(4, 1)					(0,0,0)	58514.58	(0.03)	[73056]
	5(5, 1) - 6(4, 2)					(0,0,0)	95762.68	(0.06)	[73056]
	5(5, 0) - 6(4, 3)					(0,0,0)	104538.60	(0.06)	[73056]
	6(2, 4) - 7(1, 7)					(0,0,0)	127557.38	(0.06)	[73056]
	4(1, 4) - 3(2, 1)					(0,0,0)	165718.23	(0.06)	[73056]
	8(5, 3) - 7(6, 2)					(0,0,0)	175676.75	(0.09)	[73056]
	5(1, 5) - 4(2, 2)					(0,0,0)	184774.74	(0.09)	[73056]
	6(6, 1) - 7(5, 2)					(0,0,0)	207185.02	(0.09)	[73056]
	6(6, 0) - 7(5, 3)					(0,0,0)	208456.35	(0.09)	[73056]
	7(4, 4) - 6(5, 1)					(0,0,0)	275475.39	(0.12)	[73056]
	4(2, 2) - 3(3, 1)					(0,0,0)	279987.59	(0.12)	[73056]
	7(7, 1) - 8(6, 2)					(0,0,0)	288294.20	(0.12)	[73056]
	7(7, 0) - 8(6, 3)					(0,0,0)	288458.26	(0.12)	[73056]
	7(4, 3) - 6(5, 2)					(0,0,0)	305827.11	(0.12)	[73056]
	1(1, 0) - 1(0, 1)					(0,0,0)	307480.60	(0.12)	[73056]
	5(2, 4) - 4(3, 1)					(0,0,0)	376411.11	(0.15)	[73056]
$H^{16}OT$	6(3, 3) - 6(3, 4)					(0,0,0)	11953.20	(0.10)	[72048]
	3(2, 1) - 3(2, 2)					(0,0,0)	16562.53	(0.10)	[72048]
	7(3, 4) - 7(3, 5)					(0,0,0)	29356.41	(0.10)	[72048]
	11(4, 7) - 11(4, 8)					(0,0,0)	30786.40	(0.10)	[72048]
	1(1, 0) - 1(1, 1)					(0,0,0)	47520.71	(0.10)	[72048]
	10(3, 8) - 9(4, 5)					(0,0,0)	48598.40	(0.10)	[72048]
	4(2, 2) - 4(2, 3)					(0,0,0)	48889.95	(0.10)	[72048]
	5(2, 3) - 6(1, 6)					(0,0,0)	56425.59	(0.10)	[72048]
	12(4, 8) - 12(4, 9)					(0,0,0)	59615.35	(0.10)	[72048]
	8(3, 5) - 8(3, 6)					(0,0,0)	62890.66	(0.10)	[72048]
	11(5, 7) - 12(4, 8)					(0,0,0)	77009.15	(0.10)	[72048]
	7(2, 5) - 8(0, 8)					(0,0,0)	88680.414	(0.06)	[74037]
	13(4, 9) - 13(4,10)					(0,0,0)	107979.061	(0.06)	[74037]
	5(2, 3) - 5(2, 4)					(0,0,0)	110811.643	(0.06)	[74037]
	4(1, 3) - 3(2, 2)					(0,0,0)	116130.270	(0.06)	[72048]
	6(2, 4) - 7(0, 7)					(0,0,0)	116405.330	(0.06)	[74037]
	9(3, 6) - 9(3, 7)					(0,0,0)	121066.84	(0.06)	[72048]

TABLE 45.10. The microwave spectrum of H_2O—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{16}OT$	8(2, 7) - 7(3, 4)					(0,0,0)	121264.40	(0.06)	[72048]
	11(5, 6) - 12(4, 9)					(0,0,0)	137892.64	(0.06)	[72048]
	2(1, 1) - 2(1, 2)					(0,0,0)	142495.10	(0.06)	[72048]
	6(3, 3) - 7(2, 6)					(0,0,0)	151984.194	(0.06)	[74037]
	8(4, 5) - 9(3, 6)					(0,0,0)	172464.74	(0.09)	[72048]
	4(2, 2) - 5(1, 5)					(0,0,0)	185982.72	(0.09)	[72048]
	6(2, 4) - 6(2, 5)					(0,0,0)	211927.55	(0.09)	[72048]
	10(3, 7) - 10(3, 8)					(0,0,0)	213290.392	(0.09)	[74037]
	2(0, 2) - 1(1, 1)					(0,0,0)	214424.62	(0.09)	[72048]
	7(2, 5) - 6(3, 4)					(0,0,0)	218846.85	(0.09)	[72048]
	5(2, 3) - 6(0, 6)					(0,0,0)	230097.908	(0.09)	[74037]
	5(3, 3) - 6(2, 4)					(0,0,0)	237740.32	(0.09)	[72048]
	9(2, 7) - 10(1,10)					(0,0,0)	252373.246	(0.12)	[74037]
	10(3, 7) - 9(4, 6)					(0,0,0)	268317.973	(0.12)	[74037]
	3(1, 2) - 3(1, 3)					(0,0,0)	284644.07	(0.12)	[72048]
	8(4, 4) - 9(3, 7)					(0,0,0)	296038.757	(0.12)	[74037]
	2(2, 1) - 3(1, 2)					(0,0,0)	320262.772	(0.15)	[74037]
	11(3, 8) - 11(3, 9)					(0,0,0)	348183.910	(0.15)	[74037]
	1(0, 1) - 0(0, 0)					(0,0,0)	348639.061	(0.15)	[74037]
	9(2, 8) - 8(3, 5)					(0,0,0)	355877.351	(0.15)	[74037]
	7(2, 5) - 7(2, 6)					(0,0,0)	358877.810	(0.15)	[74037]
	3(2, 1) - 4(1, 4)					(0,0,0)	373621.836	(0.15)	[74037]
	11(3, 9) - 10(4, 6)					(0,0,0)	379032.308	(0.15)	[74037]
	5(3, 2) - 6(2, 5)					(0,0,0)	453697.802	(0.18)	[74037]
	4(1, 3) - 4(1, 4)					(0,0,0)	473189.609	(0.18)	[74037]
	1(1, 0) - 1(0, 1)					(0,0,0)	526911.988	(0.21)	[74037]
	5(1, 4) - 4(2, 3)					(0,0,0)	569350.080	(0.21)	[74037]
	2(1, 1) - 2(0, 2)					(0,0,0)	577543.126	(0.21)	[74037]
	3(0, 3) - 2(1, 2)					(0,0,0)	597144.023	(0.30)	[74037]
	2(1, 2) - 1(1, 1)					(0,0,0)	649472.828	(0.30)	[74037]
	2(0, 2) - 1(0, 1)					(0,0,0)	693816.158	(0.30)	[74037]
$D^{16}OT$	6(3, 3) - 5(4, 2)					(0,0,0)	16797.78	(0.10)	[74037]
	3(2, 1) - 3(2, 2)					(0,0,0)	38186.45	(0.10)	[74037]
	5(4, 1) - 6(3, 4)					(0,0,0)	40136.05	(0.10)	[74037]
	3(3, 1) - 4(2, 2)					(0,0,0)	51025.424	(0.03)	[74037]
	4(1, 4) - 3(2, 1)					(0,0,0)	51905.572	(0.03)	[74037]
	2(2, 0) - 3(1, 3)					(0,0,0)	88991.395	(0.06)	[74037]
	5(2, 4) - 4(3, 1)					(0,0,0)	94713.289	(0.06)	[74037]
	8(4, 4) - 7(5, 3)					(0,0,0)	101466.243	(0.06)	[74037]
	6(1, 6) - 5(2, 3)					(0,0,0)	102708.147	(0.06)	[74037]
	4(2, 2) - 4(2, 3)					(0,0,0)	107763.229	(0.06)	[74037]
	8(6, 3) - 9(5, 4)					(0,0,0)	110556.548	(0.06)	[74037]
	8(6, 2) - 9(5, 5)					(0,0,0)	114308.159	(0.06)	[74037]
	5(1, 5) - 4(2, 2)					(0,0,0)	119425.985	(0.06)	[74037]
	7(3, 4) - 7(3, 5)					(0,0,0)	129854.072	(0.06)	[74037]
	2(1, 1) - 2(1, 2)					(0,0,0)	158629.161	(0.06)	[74037]
	3(3, 0) - 4(2, 3)					(0,0,0)	159531.785	(0.06)	[74037]
	7(2, 5) - 8(1, 8)					(0,0,0)	177050.655	(0.09)	[74037]
	10(5, 6) - 9(6, 3)					(0,0,0)	194595.352	(0.09)	[74037]
	10(5, 5) - 9(6, 4)					(0,0,0)	205353.409	(0.09)	[74037]
	6(5, 2) - 7(4, 3)					(0,0,0)	221366.024	(0.09)	[74037]
	5(2, 3) - 5(2, 4)					(0,0,0)	228651.098	(0.09)	[74037]
	6(5, 1) - 7(4, 4)					(0,0,0)	230350.066	(0.09)	[74037]
	3(1, 2) - 2(2, 1)					(0,0,0)	235116.740	(0.09)	[74037]
	7(3, 5) - 6(4, 2)					(0,0,0)	248085.412	(0.12)	[74037]
	8(3, 5) - 8(3, 6)					(0,0,0)	253758.145	(0.12)	[74037]
	1(1, 0) - 1(0, 1)					(0,0,0)	290863.828	(0.12)	[74037]
	1(0, 1) - 0(0, 0)					(0,0,0)	291209.062	(0.12)	[74037]
	6(2, 5) - 5(3, 2)					(0,0,0)	314556.550	(0.12)	[74037]
	3(1, 2) - 3(1, 3)					(0,0,0)	316236.877	(0.12)	[74037]
	4(4, 1) - 5(3, 2)					(0,0,0)	316612.544	(0.12)	[74037]
	5(2, 3) - 4(3, 2)					(0,0,0)	328477.447	(0.15)	[74037]
	2(0, 2) - 1(1, 1)					(0,0,0)	336465.493	(0.15)	[74037]
	4(4, 0) - 5(3, 3)					(0,0,0)	336494.646	(0.15)	[74037]
	2(1, 1) - 2(0, 2)					(0,0,0)	351658.116	(0.15)	[74037]

TABLE 45.10. The microwave spectrum of H_2O—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$D^{16}OT$	7(3, 4) - 6(4, 3)					(0,0,0)	380461.686	(0.15)	[74037]
	9(4, 6) - 8(5, 3)					(0,0,0)	380780.494	(0.15)	[74037]
	9(4, 5) - 8(5, 4)					(0,0,0)	443970.391	(0.18)	[74037]
	3(1, 2) - 3(0, 3)					(0,0,0)	455915.048	(0.18)	[74037]
	7(2, 6) - 6(3, 3)					(0,0,0)	482874.751	(0.18)	[74037]
	8(3, 6) - 7(4, 3)					(0,0,0)	518999.582	(0.21)	[74037]
	1(1, 1) - 0(0, 0)					(0,0,0)	529165.461	(0.21)	[74037]
	4(1, 3) - 3(2, 2)					(0,0,0)	612661.581	(0.30)	[74037]
	4(1, 3) - 4(0, 4)					(0,0,0)	612999.562	(0.30)	[74037]
	3(2, 1) - 3(1, 2)					(0,0,0)	676566.044	(0.30)	[74037]
$T_2{}^{16}O$	2(2, 0) - 3(1, 3)					(0,0,0)	55476.17	(0.03)	[72048]
	4(1, 4) - 3(2, 1)					(0,0,0)	59651.20	(0.03)	[72048]
	6(3, 3) - 5(4, 2)					(0,0,0)	71474.10	(0.03)	[72048]
	6(1, 6) - 5(2, 3)					(0,0,0)	88572.829	(0.06)	[73058]
	3(3, 0) - 4(2, 3)					(0,0,0)	98341.697	(0.06)	[73058]
	11(6, 6) - 10(7, 3)					(0,0,0)	104033.722	(0.06)	[73058]
	11(6, 5) - 10(7, 4)					(0,0,0)	105665.015	(0.06)	[73058]
	5(1, 5) - 4(2, 2)					(0,0,0)	110559.438	(0.06)	[73058]
	5(2, 4) - 4(3, 1)					(0,0,0)	113867.814	(0.06)	[73058]
	6(5, 2) - 7(4, 3)					(0,0,0)	118267.919	(0.06)	[73058]
	6(5, 1) - 7(4, 4)					(0,0,0)	127190.298	(0.06)	[73058]
	9(7, 3) - 10(6, 4)					(0,0,0)	151748.917	(0.06)	[73058]
	9(7, 2) - 10(6, 5)					(0,0,0)	152252.873	(0.06)	[73058]
	8(4, 4) - 7(5, 3)					(0,0,0)	156035.976	(0.06)	[73058]
	7(2, 5) - 8(1, 8)					(0,0,0)	164473.211	(0.09)	[73058]
	4(4, 1) - 5(3, 2)					(0,0,0)	212606.619	(0.09)	[73058]
	3(1, 2) - 2(2, 1)					(0,0,0)	222756.07	(0.09)	[72048]
	4(4, 0) - 5(3, 3)					(0,0,0)	231386.797	(0.09)	[73058]
	1(1, 0) - 1(0, 1)					(0,0,0)	238434.50	(0.09)	[72048]
	10(5, 6) - 9(6, 3)					(0,0,0)	244191.923	(0.12)	[73058]
	10(5, 5) - 9(6, 4)					(0,0,0)	255351.462	(0.12)	[73058]
	7(3, 5) - 6(4, 2)					(0,0,0)	259297.645	(0.12)	[73058]
	11(2,10) - 10(3, 7)					(0,0,0)	265426.974	(0.12)	[73058]
	10(8, 3) - 11(7, 4)					(0,0,0)	271832.579	(0.12)	[73058]
	10(8, 2) - 11(7, 5)					(0,0,0)	271890.246	(0.12)	[73058]
	7(6, 2) - 8(5, 3)					(0,0,0)	272210.475	(0.12)	[73058]
	7(6, 1) - 8(5, 4)					(0,0,0)	273375.898	(0.12)	[73058]
	2(1, 1) - 2(0, 2)					(0,0,0)	290949.739	(0.12)	[73058]
	2(0, 2) - 1(1, 1)					(0,0,0)	291559.959	(0.12)	[73058]
	6(2, 5) - 5(3, 2)					(0,0,0)	294861.853	(0.12)	[73058]
	5(2, 3) - 4(3, 2)					(0,0,0)	321804.342	(0.15)	[73058]
	12(6, 7) - 11(7, 4)					(0,0,0)	362915.855	(0.15)	[73058]
	5(5, 1) - 6(4, 2)					(0,0,0)	381138.787	(0.15)	[73058]
	3(1, 2) - 3(0, 3)					(0,0,0)	381371.073	(0.15)	[73058]
	7(3, 4) - 6(4, 3)					(0,0,0)	382676.413	(0.15)	[73058]
	5(5, 0) - 6(4, 3)					(0,0,0)	383658.221	(0.15)	[73058]
	9(4, 6) - 8(5, 3)					(0,0,0)	386705.220	(0.15)	[73058]
	8(7, 2) - 9(6, 3)					(0,0,0)	406009.486	(0.18)	[73058]
	10(2, 9) - 9(3, 6)					(0,0,0)	417701.411	(0.18)	[73058]
	7(2, 6) - 6(3, 3)					(0,0,0)	429290.199	(0.18)	[73058]
	1(1, 1) - 0(0, 0)					(0,0,0)	438971.144	(0.18)	[73058]
	9(4, 5) - 8(5, 4)					(0,0,0)	448637.909	(0.18)	[73058]
	8(3, 6) - 7(4, 3)					(0,0,0)	484020.760	(0.21)	[73058]
	4(2, 2) - 4(1, 3)					(0,0,0)	532458.020	(0.24)	[73058]
	4(1, 3) - 3(2, 2)					(0,0,0)	541681.258	(0.24)	[73058]
	3(2, 1) - 3(1, 2)					(0,0,0)	549412.662	(0.24)	[73058]
	5(2, 3) - 5(1, 4)					(0,0,0)	549846.414	(0.24)	[73058]
	3(0, 3) - 2(1, 2)					(0,0,0)	555193.929	(0.24)	[73058]
	2(2, 0) - 2(1, 1)					(0,0,0)	584865.821	(0.30)	[73058]
	6(2, 4) - 6(1, 5)					(0,0,0)	612876.470	(0.30)	[73058]
	2(1, 2) - 1(0, 1)					(0,0,0)	639534.877	(0.30)	[73058]
$H^{17}OD$	7(4, 3) - 7(4, 4)					(0,0,0)	8817.35	(0.10)	[71038]
	10(5, 5) - 10(5, 6)					(0,0,0)	9172.80	(0.10)	[71038]
	2(2, 0) - 2(2, 1)		9/2		9/2	(0,0,0)	10374.31	(0.10)	[57010]
	2(2, 0) - 2(2, 1)					(0,0,0)	10374.56	(*0.10)	[57010]

TABLE 45.10. The microwave spectrum of H_2O—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{17}OD$	3(2, 1) - 4(1, 4)					(0,0,0)	14597.65	(0.10)	[71038]
	3(2, 1) - 4(1, 4)					(0,0,0)	14599.17	(0.10)	[71038]
	3(2, 1) - 4(1, 4)					(0,0,0)	14599.43	(0.10)	[71038]
	3(2, 1) - 4(1, 4)					(0,0,0)	14599.64	(0.10)	[71038]
	3(2, 1) - 4(1, 4)					(0,0,0)	14601.10	(0.10)	[71038]
	3(2, 1) - 4(1, 4)					(0,0,0)	14602.04	(0.10)	[71038]
	3(2, 1) - 4(1, 4)					(0,0,0)	14602.37	(0.10)	[71038]
	5(3, 2) - 5(3, 3)					(0,0,0)	22716.80	(0.10)	[71038]
	11(5, 6) - 11(5, 7)					(0,0,0)	23440.046	(0.10)	[71038]
	7(1, 7) - 6(2, 4)					(0,0,0)	24698.586	(0.10)	[71038]
	7(1, 7) - 6(2, 4)					(0,0,0)	24699.322	(0.10)	[71038]
	7(1, 7) - 6(2, 4)					(0,0,0)	24700.718	(0.10)	[71038]
	7(1, 7) - 6(2, 4)					(0,0,0)	24701.892	(0.10)	[71038]
	7(1, 7) - 6(2, 4)					(0,0,0)	24702.675	(0.10)	[71038]
	8(4, 4) - 8(4, 5)					(0,0,0)	25576.42	(0.10)	[71038]
	4(3, 1) - 5(2, 4)					(0,0,0)	48713.700	(0.10)	[71038]
	4(3, 1) - 5(2, 4)					(0,0,0)	48714.437	(0.10)	[71038]
	4(3, 1) - 5(2, 4)					(0,0,0)	48714.774	(0.10)	[71038]
	4(3, 1) - 5(2, 4)					(0,0,0)	48715.175	(0.10)	[71038]
	4(3, 1) - 5(2, 4)					(0,0,0)	48715.700	(0.10)	[71038]
	4(3, 1) - 5(2, 4)					(0,0,0)	48716.016	(0.10)	[71038]
	4(3, 1) - 5(2, 4)					(0,0,0)	48716.301	(0.10)	[71038]
	3(2, 1) - 3(2, 2)					(0,0,0)	50690.104	(0.10)	[71038]
	3(2, 1) - 3(2, 2)					(0,0,0)	50690.561	(0.10)	[71038]
	9(4, 5) - 9(4, 6)					(0,0,0)	63394.332	(0.10)	[71038]
	6(3, 3) - 6(3, 4)					(0,0,0)	65579.878	(0.10)	[71038]
	6(0, 6) - 5(2, 3)					(0,0,0)	72070.32	(0.10)	[71038]
	6(0, 6) - 5(2, 3)					(0,0,0)	72070.94	(0.10)	[71038]
	6(0, 6) - 5(2, 3)					(0,0,0)	72072.55	(0.10)	[71038]
	6(0, 6) - 5(2, 3)					(0,0,0)	72073.50	(0.10)	[71038]
	6(0, 6) - 5(2, 3)					(0,0,0)	72074.30	(0.10)	[71038]
	1(1, 0) - 1(1, 1)					(0,0,0)	80600.230	(0.10)	[71038]
	1(1, 0) - 1(1, 1)					(0,0,0)	80600.926	(0.10)	[71038]
	1(1, 0) - 1(1, 1)					(0,0,0)	80601.318	(0.10)	[71038]
	1(1, 0) - 1(1, 1)					(0,0,0)	80601.775	(0.10)	[71038]
	1(1, 0) - 1(1, 1)					(0,0,0)	80603.217	(0.10)	[71038]
	1(1, 0) - 1(1, 1)					(0,0,0)	80603.547	(0.10)	[71038]
	5(1, 5) - 4(2, 2)					(0,0,0)	124250.848	(0.10)	[71038]
	5(1, 5) - 4(2, 2)					(0,0,0)	124251.634	(0.10)	[71038]
	5(1, 5) - 4(2, 2)					(0,0,0)	124253.258	(0.10)	[71038]
	5(1, 5) - 4(2, 2)					(0,0,0)	124254.075	(0.10)	[71038]
	5(1, 5) - 4(2, 2)					(0,0,0)	124255.200	(0.10)	[71038]
	10(4, 6) - 10(4, 7)					(0,0,0)	138348.654	(0.10)	[71038]
	6(1, 6) - 5(2, 3)					(0,0,0)	139237.861	(0.10)	[71038]
	6(1, 6) - 5(2, 3)					(0,0,0)	139238.584	(0.10)	[71038]
	6(1, 6) - 5(2, 3)					(0,0,0)	139240.132	(0.10)	[71038]
	6(1, 6) - 5(2, 3)					(0,0,0)	139241.103	(0.10)	[71038]
	6(1, 6) - 5(2, 3)					(0,0,0)	139242.010	(0.10)	[71038]
	4(2, 2) - 4(2, 3)					(0,0,0)	144932.098	(0.10)	[71038]
	4(2, 2) - 4(2, 3)					(0,0,0)	144932.852	(0.10)	[71038]
	7(3, 4) - 7(3, 5)					(0,0,0)	145195.756	(0.10)	[71038]
	3(1, 2) - 2(2, 1)					(0,0,0)	233919.888	(0.10)	[71038]
	3(1, 2) - 2(2, 1)					(0,0,0)	233921.286	(0.10)	[71038]
	2(1, 1) - 2(1, 2)					(0,0,0)	241632.672	(0.10)	[71038]
	2(1, 1) - 2(1, 2)					(0,0,0)	241634.238	(0.10)	[71038]
	2(1, 1) - 2(1, 2)					(0,0,0)	241635.771	(0.10)	[71038]
	2(1, 1) - 2(1, 2)					(0,0,0)	241636.455	(0.10)	[71038]
$H^{18}OD$	4(4, 1) - 4(3, 2)					(0,0,0)	5902.38	(0.10)	[71038]
	7(4, 3) - 7(4, 4)					(0,0,0)	9032.2	(0.2)	[71038]
	10(5, 5) - 10(5, 6)					(0,0,0)	9477.1	(0.2)	[71038]
	3(2, 1) - 4(1, 4)					(0,0,0)	9526.6	(0.2)	[71038]
	2(2, 0) - 2(2, 1)					(0,0,0)	10458.6	(0.2)	[71038]
	7(1, 7) - 6(2, 4)					(0,0,0)	22733.2	(0.2)	[71038]
	5(3, 2) - 5(3, 3)					(0,0,0)	23080.25	(0.10)	[71038]
	11(5, 6) - 11(5, 7)					(0,0,0)	24218.4	(0.2)	[71038]

TABLE 45.10. The microwave spectrum of H_2O—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{18}OD$	8(4, 4) - 8(4, 5)					(0,0,0)	26196.85	(0.10)	[71038]
	4(3, 1) - 5(2, 4)					(0,0,0)	37889.87	(0.10)	[71038]
	3(2, 1) - 3(2, 2)					(0,0,0)	51087.68	(0.10)	[71038]
	12(5, 7) - 12(5, 8)					(0,0,0)	55658.94	(0.10)	[71038]
	9(4, 5) - 9(4, 6)					(0,0,0)	64908.69	(0.10)	[71038]
	6(3, 3) - 6(3, 4)					(0,0,0)	66601.94	(0.10)	[71038]
	6(0, 6) - 5(2, 3)					(0,0,0)	74187.30	(0.10)	[71038]
	1(1, 0) - 1(1, 1)					(0,0,0)	80616.30	(0.10)	[71038]
	7(3, 5) - 6(4, 2)					(0,0,0)	121185.97	(0.15)	[71038]
	5(1, 5) - 4(2, 2)					(0,0,0)	127224.80	(0.15)	[71038]
	6(1, 6) - 5(2, 3)					(0,0,0)	139788.66	(0.15)	[71038]
	10(4, 6) - 10(4, 7)					(0,0,0)	141550.34	(0.15)	[71038]
	4(2, 2) - 4(2, 3)					(0,0,0)	145984.85	(0.15)	[71038]
	7(3, 4) - 7(3, 5)					(0,0,0)	156478.35	(0.15)	[71038]
	7(5, 3) - 8(4, 4)					(0,0,0)	212375.51	(0.20)	[71038]
	7(2, 5) - 8(1, 8)					(0,0,0)	216553.11	(0.20)	[71038]
	7(5, 2) - 8(4, 5)					(0,0,0)	238797.23	(0.20)	[71038]
	3(1, 2) - 2(2, 1)					(0,0,0)	240872.00	(0.20)	[71038]
	2(1, 1) - 2(1, 2)					(0,0,0)	241680.38	(0.20)	[71038]

*Calculated transition frequency.

Table 46. Rotational and centrifugal distortion constants for $H_2{}^{32}S$, $HD^{32}S$ and $D_2{}^{32}S$.

Parameters	$H_2{}^{32}S$ Value (MHz)[a] [73040][b]	$HD^{32}S$ Value (MHz)[a] [73040][c]	$D_2{}^{32}S$ Value (MHz) [72047]
A	310 180.24(60)	292 351.302(135)	164 571.118(45)
B	270 884.05(51)	147 861.801(54)	135 380.313(45)
C	141 705.88(51)	96 704.120(54)	73 244.068(71)
Δ_J	49.85131(3800)	2.61341(150)	13.0763(26)
Δ_{JK}	-159.69566(6900)	28.6933(97)	-41.7800(66)
Δ_K	111.8505(680)	-11.2972(190)	29.2170(113)
δ_J	-6.01908(500)	0.855403(770)	-1.95725(68)
δ_K	262.1654±0.21	19.4078(85)	47.2516(37)
H_J	$(2.81317\pm0.105)\times10^{-2}$		$3.783(41)\times10^{-3}$
H_{JK}	$(-2.282819\pm0.027)\times10^{-1}$	$(1.3266\pm0.044)\times10^{-2}$	$-3.206(20)\times10^{-2}$
H_{KJ}	$(4.594148\pm0.16)\times10^{-1}$	$(-2.028\pm0.096)\times10^{-2}$	$6.373(44)\times10^{-2}$
H_K	$(-2.76462\pm0.141)\times10^{-1}$	$(1.304\pm0.104)\times10^{-2}$	$-3.620(75)\times10^{-2}$
h_J	$(-5.8411\pm0.081)\times10^{-3}$	$(1.069\pm0.22)\times10^{-4}$	$-9.84(16)\times10^{-4}$
h_{JK}	$(2.42811\pm0.052)\times10^{-1}$	$(5.3237\pm0.41)\times10^{-3}$	$2.443(19)\times10^{-2}$
h_K	2.870195±0.039	$(2.8365\pm0.134)\times10^{-2}$	$8.804(65)\times10^{-2}$
L_{KKJ}	$(2.19929\pm1.19)\times10^{-3}$		$7.8(21)\times10^{-5}$
L_K	$(-2.34287\pm1.26)\times10^{-3}$		$-5.76(25)\times10^{-4}$
ℓ_{KJ}	$(-5.32671\pm0.99)\times10^{-3}$		
ℓ_K	$(-4.164750\pm0.19)\times10^{-2}$		
P_{KJ}	$(-3.040037\pm0.70)\times10^{-4}$		
P_{KKJ}	$(8.034210\pm1.8)\times10^{-4}$		
P_K	$(-5.152582\pm1.14)\times10^{-4}$		
p_{JK}	$(-1.2260\pm0.52)\times10^{-5}$		
p_{KKJ}	$(1.29628\pm0.133)\times10^{-4}$		
L_{JK}			$-8.85(107)\times10^{-5}$
L_{JJK}			$2.747(101)\times10^{-5}$
ℓ_J			$7.72(102)\times10^{-7}$
ℓ_{JK}			$-1.750(131)\times10^{-5}$
p_K			$1.95(32)\times10^{-6}$

[a] The number of significant figures quoted are needed to calculate the transition frequencies within their standard deviations.

[b] See also reference [72046].

[c] See also reference [71034].

Table 46.1. Hyperfine constants and electric dipole moment for H_2S.

Isotopic Species	Rotational level $J_{K,K}$	eqQ (D) (kHz)	c (H)[a] (kHz)	c (D)[a] (kHz)	$eqQ_{aa}(^{33}S)$ (kHz)	$eqQ_{bb}(^{33}S)$ (kHz)	$eqQ_{cc}(^{33}S)$ (kHz)	Reference
$H_2{}^{32}S$	$1_{1,0}$		-16.239(10)[b]					[68039]
	$1_{0,1}$		-15.885(10)					[68039]
$H_2{}^{34}S$	$1_{1,0}$		-15.97(15)					[71032]
	$1_{0,1}$		-15.66(25)					[71032]
$H_2{}^{33}S$	$1_{1,0} \leftarrow 1_{0,1}$				-32.	-8.	40.	[53012]
$HD^{33}S$	$1_{1,0} \leftarrow 1_{0,1}$				-31.0	-10.0	41.0	[54008]
$HD^{32}S$	$2_{2,0}$	42.9(4)	-25.03(13)	-0.47(2)				[64020]
	$2_{2,1}$	43.3(4)	-25.45(13)	-0.22(2)				[64020]
$D_2{}^{32}S$	$1_{1,0}$	17.83(15)		-1.24				[71033]
	$1_{0,1}$	-10.82(28)		-1.21				[71033]
Electric dipole moments:								
	μ_b (H_2S) = 0.974(5) D [65020]							
	μ_a (HDS) = 1.02(2) D [51017]							

[a] Spin-rotation constants.

[b] The spin-spin constant was determined: c_{SS} = 16.726 (30) kHz [68039].

Table 46.2. The molecular g-factors[a] for H_2S [59005].

Isotopic Species	Rotational level $J_{K,K}$	$g_J(\mu_N)$	$g_{aa}(\mu_N)$	$g_{bb}(\mu_N)$	$g_{cc}(\mu_N)$
H_2S	$1_{0,1}$	0.202(7)	0.355(8)	0.195(8)	0.209
	$1_{1,0}$	0.275(7)			
	$2_{1,1}$	0.224(10)			
	$2_{2,0}$	0.296(10)			
HDS	$1_{0,1}$	0.141(10)	0.261(10)	0.155(10)	0.127(10)
	$1_{1,0}$	0.208(10)			
	$2_{1,1}$	0.168(10)			
D_2S	$1_{0,1}$	0.105(10)	0.194(10)	0.086(10)	0.124(10)
	$1_{1,1}$	0.159(10)			
	$1_{1,0}$	0.140(10)			

[a] The sign of the g-factors has not been determined.

TABLE 46.3. The microwave spectrum of H_2S

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H_2{}^{32}S$	3(3, 1) - 4(0, 4)					(0,0,0)	35028.15	(0.10)	[72046]
	7(1, 6) - 6(4, 3)					(0,0,0)	89497.99	(0.03)	[72046]
	4(2, 2) - 5(1, 5)					(0,0,0)	119664.42	(0.02)	[72046]
	7(3, 4) - 8(2, 7)					(0,0,0)	161438.45	(0.03)	[72046]
	1(1, 0) - 1(0, 1)	0		1		(0,0,0)	168762.734	(1E-3)	[68039]
	1(1, 0) - 1(0, 1)	1		2		(0,0,0)	168762.738	(1E-3)	[68039]
	1(1, 0) - 1(0, 1)	2		2		(0,0,0)	168762.760	(1E-3)	[68039]
	1(1, 0) - 1(0, 1)					(0,0,0)	168762.762	(*2E-5)	[68039]
	1(1, 0) - 1(0, 1)	1		1		(0,0,0)	168762.775	(1E-3)	[68039]
	1(1, 0) - 1(0, 1)	1		0		(0,0,0)	168762.779	(1E-3)	[68039]
	1(1, 0) - 1(0, 1)	2		1		(0,0,0)	168762.797	(1E-3)	[68039]
	7(2, 6) - 6(3, 3)					(0,0,0)	175009.58	(0.02)	[72046]
	7(4, 4) - 8(1, 7)					(0,0,0)	185099.88	(0.02)	[72046]
	4(1, 4) - 3(2, 1)					(0,0,0)	204140.17	(0.02)	[72046]
	2(2, 0) - 2(1, 1)					(0,0,0)	216710.437	(2E-3)	[71032]
	4(3, 2) - 5(0, 5)					(0,0,0)	228556.27	(0.03)	[72046]
	3(3, 0) - 3(2, 1)					(0,0,0)	300505.56	(0.10)	[68039]
	6(1, 5) - 5(4, 2)					(0,0,0)	314437.79	(0.18)	[72046]
	3(2, 1) - 3(1, 2)					(0,0,0)	369101.45	(0.01)	[72046]
	4(3, 1) - 4(2, 2)					(0,0,0)	369126.91	(0.10)	[68039]
	3(1, 3) - 2(2, 0)					(0,0,0)	392617.84	(0.07)	[72046]
	2(1, 1) - 2(0, 2)					(0,0,0)	393450.49	(0.02)	[72046]
	5(4, 1) - 5(3, 2)					(0,0,0)	407676.73	(0.03)	[72046]
	4(4, 0) - 4(3, 1)					(0,0,0)	424314.82	(0.04)	[72046]
	5(1, 4) - 4(4, 1)					(0,0,0)	436373.36	(0.28)	[72046]
	1(1, 1) - 0(0, 0)					(0,0,0)	452390.33	(0.04)	[72046]
	6(5, 1) - 6(4, 2)					(0,0,0)	493362.16	(0.07)	[72046]
	2(2, 1) - 2(1, 2)					(0,0,0)	505565.23	(0.06)	[72046]
	6(2, 5) - 5(3, 2)					(0,0,0)	535531.83	(*1.55)	[73040]
	7(5, 2) - 7(4, 3)					(0,0,0)	555254.03	(0.06)	[72046]
	6(4, 2) - 6(3, 3)					(0,0,0)	567079.48	(0.03)	[72046]
	3(3, 1) - 3(2, 2)					(0,0,0)	568050.55	(0:05)	[72046]
	5(5, 0) - 5(4, 1)					(0,0,0)	579799.00	(0.13)	[72046]
	8(6, 2) - 8(5, 3)					(0,0,0)	593170.23	(0.13)	[72046]
	5(3, 2) - 5(2, 3)					(0,0,0)	611441.63	(0.08)	[72046]
	7(6, 1) - 7(5, 2)					(0,0,0)	626474.55	(0.19)	[72046]
	4(4, 1) - 4(3, 2)					(0,0,0)	650374.47	(0.40)	[72046]
	4(2, 2) - 4(1, 3)					(0,0,0)	665393.70	(0.25)	[72046]
	2(0, 2) - 1(1, 1)					(0,0,0)	687303.48	(0.38)	[72046]
	9(7, 2) - 9(6, 3)					(0,0,0)	689120.17	(0.33)	[72046]
	3(1, 2) - 3(0, 3)					(0,0,0)	708470.43	(0.41)	[72046]
	2(1, 2) - 1(0, 1)					(0,0,0)	736033.65	(0.89)	[72046]
	3(2, 2) - 3(1, 3)					(0,0,0)	747301.89	(0.45)	[72046]
	6(6, 0) - 6(5, 1)					(0,0,0)	748241.49	(0.38)	[72046]
	5(5, 1) - 5(4, 2)					(0,0,0)	749432.28	(0.45)	[72046]
	4(3, 2) - 4(2, 3)					(0,0,0)	765937.91	(0.65)	[72046]
	5(4, 2) - 5(3, 3)					(0,0,0)	800855.96	(*1.63)	[73040]
	5(2, 4) - 4(3, 1)					(0,0,0)	827915.49	(*0.98)	[73040]
	6(5, 2) - 6(4, 3)					(0,0,0)	854974.90	(*3.80)	[73040]
	6(6, 1) - 6(5, 2)					(0,0,0)	860129.55	(*2.30)	[73040]
	7(6, 2) - 7(5, 3)					(0,0,0)	928657.77	(*4.65)	[73040]
	4(2, 3) - 3(3, 0)					(0,0,0)	930145.62	(*1.17)	[73040]
	5(2, 3) - 5(1, 4)					(0,0,0)	993100.36	(*4.71)	[73040]
	3(0, 3) - 2(1, 2)					(0,0,0)	993108.47	(*0.96)	[73040]
$H_2{}^{33}S$	1(1, 0) - 1(0, 1)		5/2		5/2	(0,0,0)	168318.93	(0.10)	[53012]
	1(1, 0) - 1(0, 1)		3/2		1/2	(0,0,0)	168318.93	(0.10)	[53012]
	1(1, 0) - 1(0, 1)		1/2		3/2	(0,0,0)	168322.63	(0.10)	[53012]
	1(1, 0) - 1(0, 1)		5/2		3/2	(0,0,0)	168326.90	(0.10)	[53012]
	1(1, 0) - 1(0, 1)		3/2		5/2	(0,0,0)	168329.03	(0.10)	[53012]
	2(2, 0) - 2(1, 1)		1/2		3/2	(0,0,0)	215494.428	(0.10)	[63019]
	2(2, 0) - 2(1, 1)		1/2		1/2	(0,0,0)	215496.600	(0.10)	[63019]
	2(2, 0) - 2(1, 1)		7/2		5/2	(0,0,0)	215500.728	(0.10)	[63019]
	2(2, 0) - 2(1, 1)		7/2		7/2	(0,0,0)	215502.768	(0.10)	[63019]
	2(2, 0) - 2(1, 1)		3/2		3/2	(0,0,0)	215505.300	(0.10)	[63019]
	2(2, 0) - 2(1, 1)		3/2		1/2	(0,0,0)	215507.508	(0.10)	[63019]

TABLE 46.3. The microwave spectrum of H_2S—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H_2{}^{33}S$	2(2, 0) - 2(1, 1)		5/2		5/2	(0,0,0)	215511.444	(0.10)	[63019]
	2(2, 0) - 2(1, 1)		5/2		7/2	(0,0,0)	215513.316	(0.10)	[63019]
$H_2{}^{34}S$	1(1, 0) - 1(0, 1)	0		1		(0,0,0)	167910.491	(1E-3)	[71032]
	1(1, 0) - 1(0, 1)	1		2		(0,0,0)	167910.491	(1E-3)	[71032]
	1(1, 0) - 1(0, 1)	2		2		(0,0,0)	167910.514	(1E-3)	[71032]
	1(1, 0) - 1(0, 1)					(0,0,0)	167910.516	(2E-3)	[71032]
	1(1, 0) - 1(0, 1)	1		1		(0,0,0)	167910.530	(1E-3)	[71032]
	1(1, 0) - 1(0, 1)	1		0		(0,0,0)	167910.530	(1E-3)	[71032]
	1(1, 0) - 1(0, 1)	2		1		(0,0,0)	167910.550	(1E-3)	[71032]
	2(2, 0) - 2(1, 1)					(0,0,0)	213376.924	(2E-3)	[71032]
$H^{32}SD$	6(6, 0) - 6(6, 1)					(0,0,0)	1.827	(*0.00)	[73040]
	5(5, 0) - 5(5, 1)					(0,0,0)	19.100	(*1E-3)	[73040]
	7(6, 1) - 7(6, 2)					(0,0,0)	23.666	(*2E-3)	[73040]
	8(6, 2) - 8(6, 3)					(0,0,0)	164.153	(*0.01)	[73040]
	4(4, 0) - 4(4, 1)					(0,0,0)	184.781	(*4E-3)	[73040]
	6(5, 1) - 6(5, 2)					(0,0,0)	208.200	(*0.01)	[73040]
	5(5, 1) - 6(4, 2)					(0,0,0)	435.42	(*3.51)	[73040]
	7(5, 2) - 7(5, 3)					(0,0,0)	1227.41	(*0.03)	[73040]
	3(3, 0) - 3(3, 1)					(0,0,0)	1596.061	(*0.01)	[73040]
	5(4, 1) - 5(4, 2)					(0,0,0)	1636.82	(*0.02)	[73040]
	8(5, 3) - 8(5, 4)					(0,0,0)	5161.09	(*0.08)	[73040]
	6(4, 2) - 6(4, 3)					(0,0,0)	7936.74	(0.05)	[51017]
	5(5, 0) - 6(4, 3)					(0,0,0)	8390.39	(0.05)	[73062]
	11(6, 5) - 11(6, 6)					(0,0,0)	10235.81	(0.05)	[51017]
	2(2, 0) - 3(0, 3)					(0,0,0)	10835.62	(0.05)	[73062]
	4(3, 1) - 4(3, 2)					(0,0,0)	10861.07	(0.05)	[51017]
	2(2, 0) - 2(2, 1)	5/2	2	3/2	1	(0,0,0)	11283.741	(0.05)	[64020]
	2(2, 0) - 2(2, 1)	3/2	2	1/2	1	(0,0,0)	11283.741	(0.05)	[64020]
	2(2, 0) - 2(2, 1)	7/2	3	5/2	3	(0,0,0)	11283.768	(0.05)	[64020]
	2(2, 0) - 2(2, 1)	3/2	2	5/2	3	(0,0,0)	11283.768	(0.05)	[64020]
	2(2, 0) - 2(2, 1)	3/2	1	1/2	1	(0,0,0)	11283.784	(0.05)	[64020]
	2(2, 0) - 2(2, 1)	5/2	2	7/2	3	(0,0,0)	11283.784	(0.05)	[64020]
	2(2, 0) - 2(2, 1)	3/2	1	5/2	3	(0,0,0)	11283.813	(0.05)	[64020]
	2(2, 0) - 2(2, 1)	7/2	3	7/2	3	(0,0,0)	11283.83	(0.05)	[51017]
	2(2, 0) - 2(2, 1)	5/2	3	5/2	3	(0,0,0)	11283.83	(0.05)	[51017]
	2(2, 0) - 2(2, 1)	5/2	2	5/2	2	(0,0,0)	11283.83	(0.05)	[51017]
	2(2, 0) - 2(2, 1)	3/2	2	3/2	2	(0,0,0)	11283.83	(0.05)	[51017]
	2(2, 0) - 2(2, 1)	3/2	1	3/2	1	(0,0,0)	11283.83	(0.05)	[51017]
	2(2, 0) - 2(2, 1)	1/2	1	1/2	1	(0,0,0)	11283.83	(0.05)	[51017]
	2(2, 0) - 2(2, 1)	5/2	3	3/2	1	(0,0,0)	11283.846	(0.05)	[64020]
	2(2, 0) - 2(2, 1)	1/2	1	3/2	1	(0,0,0)	11283.876	(0.05)	[64020]
	2(2, 0) - 2(2, 1)	7/2	3	5/2	2	(0,0,0)	11283.876	(0.05)	[64020]
	2(2, 0) - 2(2, 1)	5/2	3	7/2	3	(0,0,0)	11283.892	(0.05)	[64020]
	2(2, 0) - 2(2, 1)	5/2	3	3/2	2	(0,0,0)	11283.892	(0.05)	[64020]
	2(2, 0) - 2(2, 1)	3/2	1	5/2	2	(0,0,0)	11283.922	(0.05)	[64020]
	2(2, 0) - 2(2, 1)	1/2	1	3/2	2	(0,0,0)	11283.922	(0.05)	[64020]
	9(5, 4) - 9(5, 5)					(0,0,0)	17212.61	(0.05)	[51017]
	10(7, 3) - 9(8, 2)					(0,0,0)	25764.05	(0.10)	[73062]
	10(7, 4) - 9(8, 1)					(0,0,0)	25875.15	(0.10)	[73062]
	7(4, 3) - 7(4, 4)					(0,0,0)	27566.31	(0.05)	[51017]
	12(6, 6) - 12(6, 7)					(0,0,0)	28842.84	(0.05)	[51017]
	5(3, 2) - 5(3, 3)					(0,0,0)	40929.20	(0.05)	[51017]
	15(7, 8) - 15(7, 9)					(0,0,0)	42763.25	(0.10)	[73062]
	6(0, 6) - 5(2, 3)					(0,0,0)	45306.34	(*1.12)	[73040]
	10(5, 5) - 10(5, 6)					(0,0,0)	47905.36	(0.05)	[51017]
	1(1, 0) - 1(1, 1)					(0,0,0)	51073.27	(0.05)	[51017]
	6(1, 6) - 5(2, 3)					(0,0,0)	51823.14	(*1.14)	[73040]
	3(1, 3) - 2(2, 0)					(0,0,0)	52626.04	(*0.24)	[73040]
	3(2, 1) - 3(2, 2)					(0,0,0)	53200.93	(0.05)	[51017]
	5(3, 3) - 4(4, 0)					(0,0,0)	71571.44	(*0.41)	[73040]
	8(4, 4) - 8(4, 5)					(0,0,0)	75551.73	(0.05)	[51017]
	4(0, 4) - 3(2, 1)					(0,0,0)	102092.61	(*0.22)	[73040]
	6(2, 4) - 7(1, 7)					(0,0,0)	106836.71	(*3.17)	[73040]
	6(2, 4) - 7(0, 7)					(0,0,0)	109478.01	(*3.15)	[73040]
	5(1, 4) - 4(3, 1)					(0,0,0)	109928.54	(*0.38)	[73040]

TABLE 46.3. The microwave spectrum of H_2S—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{32}SD$	6(3, 3) - 6(3, 4)					(0,0,0)	110281.15	(0.02)	[71034]
	4(2, 3) - 3(3, 0)					(0,0,0)	110706.22	(0.02)	[71034]
	5(3, 2) - 4(4, 1)					(0,0,0)	112685.45	(0.04)	[71034]
	5(0, 5) - 4(2, 2)					(0,0,0)	120426.46	(*0.37)	[73040]
	4(1, 4) - 3(2, 1)					(0,0,0)	135017.27	(0.06)	[71034]
	5(1, 5) - 4(2, 2)					(0,0,0)	135654.99	(0.03)	[71034]
	4(2, 2) - 4(2, 3)					(0,0,0)	143034.72	(0.02)	[71034]
	2(1, 1) - 2(1, 2)					(0,0,0)	153179.16	(0.10)	[73040]
	7(2, 5) - 6(4, 2)					(0,0,0)	154523.40	(*1.14)	[73040]
	3(3, 0) - 4(1, 3)					(0,0,0)	169830.38	(*0.37)	[73040]
	9(4, 5) - 9(4, 6)					(0,0,0)	170641.23	(*0.30)	[73040]
	1(1, 0) - 1(0, 1)					(0,0,0)	195558.92	(0.10)	[73040]
	5(4, 1) - 6(2, 4)					(0,0,0)	204250.62	(*0.74)	[73040]
	7(3, 4) - 7(3, 5)					(0,0,0)	234044.87	(*0.24)	[73040]
	1(0, 1) - 0(0, 0)					(0,0,0)	244555.58	(0.10)	[73040]
	4(2, 2) - 3(3, 1)					(0,0,0)	255337.19	(*0.32)	[73040]
	2(1, 1) - 2(0, 2)					(0,0,0)	257781.41	(0.10)	[73040]
	7(4, 4) - 6(5, 1)					(0,0,0)	258733.87	(*3.17)	[73040]
	7(4, 3) - 6(5, 2)					(0,0,0)	286508.01	(*3.12)	[73040]
	5(2, 3) - 5(2, 4)					(0,0,0)	286920.91	(*0.18)	[73040]
	5(2, 4) - 4(3, 1)					(0,0,0)	303516.54	(0.03)	[71034]
	3(1, 2) - 3(1, 3)					(0,0,0)	304640.54	(0.10)	[73040]
	6(3, 4) - 5(4, 1)					(0,0,0)	319556.89	(*0.42)	[73040]
	10(4, 6) - 10(4, 7)					(0,0,0)	326381.48	(0.02)	[71034]
	6(1, 5) - 5(3, 2)					(0,0,0)	327272.77	(*0.51)	[73040]
	2(0, 2) - 1(1, 1)					(0,0,0)	333278.71	(0.10)	[73040]
	3(1, 2) - 3(0, 3)					(0,0,0)	368102.22	(0.02)	[71034]
	3(1, 2) - 2(2, 1)					(0,0,0)	368550.52	(0.03)	[71034]
	1(1, 1) - 0(0, 0)					(0,0,0)	389041.08	(0.04)	[71034]
	8(3, 5) - 8(3, 6)					(0,0,0)	415880.03	(0.03)	[71034]
	3(2, 1) - 3(1, 2)					(0,0,0)	417381.10	(0.02)	[71034]
	4(2, 2) - 4(1, 3)					(0,0,0)	423571.36	(0.03)	[71034]
	6(3, 3) - 5(4, 2)					(0,0,0)	431474.46	(0.07)	[71034]
	2(1, 2) - 1(1, 1)					(0,0,0)	437880.83	(0.04)	[71034]
	2(2, 0) - 2(1, 1)					(0,0,0)	444552.85	(0.02)	[71034]
	6(2, 5) - 5(3, 2)					(0,0,0)	445094.65	(0.05)	[71034]
	7(1, 6) - 6(3, 3)					(0,0,0)	448753.04	(*1.61)	[73040]
	8(1, 7) - 7(3, 4)					(0,0,0)	458109.94	(*3.55)	[73040]
	8(2, 6) - 7(4, 3)					(0,0,0)	471760.97	(*3.90)	[73040]
	7(4, 4) - 8(2, 7)					(0,0,0)	471864.23	(*2.82)	[73040]
	2(0, 2) - 1(0, 1)					(0,0,0)	477764.27	(0.05)	[71034]
	5(2, 3) - 5(1, 4)					(0,0,0)	480508.88	(0.06)	[71034]
	6(2, 4) - 6(2, 5)					(0,0,0)	480983.25	(0.08)	[71034]
	8(2, 7) - 7(3, 4)					(0,0,0)	489174.38	(*3.19)	[73040]
	4(1, 3) - 4(1, 4)					(0,0,0)	499262.13	(*0.25)	[73040]
	7(4, 4) - 8(1, 7)					(0,0,0)	502928.67	(*3.04)	[73040]
	7(2, 6) - 6(3, 3)					(0,0,0)	512298.41	(*1.37)	[73040]
	8(4, 5) - 7(5, 2)					(0,0,0)	525087.80	(*4.19)	[73040]
	4(1, 3) - 4(0, 4)					(0,0,0)	532187.04	(0.07)	[71034]
	2(1, 1) - 1(1, 0)					(0,0,0)	539986.65	(0.04)	[71034]
	7(3, 5) - 6(4, 2)					(0,0,0)	548497.04	(*1.11)	[73040]
	6(4, 3) - 7(2, 6)					(0,0,0)	552192.75	(*1.12)	[73040]
	4(4, 0) - 5(2, 3)					(0,0,0)	571260.98	(*0.63)	[73040]
	2(1, 2) - 1(0, 1)					(0,0,0)	582366.42	(0.05)	[71034]
	2(2, 1) - 2(1, 2)					(0,0,0)	586448.10	(*0.23)	[73040]
	3(0, 3) - 2(1, 2)					(0,0,0)	586896.20	(0.14)	[71034]
	5(3, 3) - 6(1, 6)					(0,0,0)	591009.27	(*1.39)	[73040]
	5(3, 3) - 6(0, 6)					(0,0,0)	597526.07	(*1.36)	[73040]
	6(2, 4) - 6(1, 5)					(0,0,0)	598805.17	(0.08)	[71034]
	5(2, 3) - 4(3, 2)					(0,0,0)	601298.59	(*0.29)	[73040]
	8(4, 4) - 7(5, 3)					(0,0,0)	601867.47	(*4.13)	[73040]
	4(3, 2) - 5(1, 5)					(0,0,0)	602940.09	(*0.62)	[73040]
	6(4, 3) - 7(1, 6)					(0,0,0)	615738.12	(*1.10)	[73040]
	4(3, 2) - 5(0, 5)					(0,0,0)	618168.56	(*0.60)	[73040]
	7(3, 4) - 7(2, 5)					(0,0,0)	628018.53	(0.05)	[71034]

TABLE 46.3. The microwave spectrum of H_2S—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H^{32}SD$	6(3, 4) - 7(1, 7)					(0,0,0)	630644.22	(*3.43)	[73040]
	6(3, 4) - 7(0, 7)					(0,0,0)	633285.52	(*3.39)	[73040]
	6(3, 3) - 6(2, 4)					(0,0,0)	634088.27	(*0.51)	[73040]
	9(3, 6) - 9(3, 7)					(0,0,0)	648612.59	(*0.95)	[73040]
	3(1, 3) - 2(1, 2)					(0,0,0)	650358.15	(*0.17)	[73040]
	3(3, 1) - 4(1, 4)					(0,0,0)	667496.45	(*0.42)	[73040]
	3(2, 2) - 3(1, 3)					(0,0,0)	668820.61	(*0.23)	[73040]
	5(4, 2) - 6(2, 5)					(0,0,0)	683597.02	(*0.80)	[73040]
	5(3, 2) - 5(2, 3)					(0,0,0)	683761.62	(*0.60)	[73040]
	8(3, 5) - 8(2, 6)					(0,0,0)	684675.82	(*0.95)	[73040]
	4(1, 3) - 3(2, 2)					(0,0,0)	687480.43	(*0.25)	[73040]
	2(2, 1) - 2(0, 2)					(0,0,0)	691050.29	(*0.30)	[73040]
	3(0, 3) - 2(0, 2)					(0,0,0)	691498.51	(*0.18)	[73040]
$H^{33}SD$	4(3, 1) - 4(3, 2)		5/2		5/2	(0,0,0)	10830.54	(0.10)	[68038]
	4(3, 1) - 4(3, 2)		11/2		11/2	(0,0,0)	10830.83	(0.10)	[68038]
	4(3, 1) - 4(3, 2)		7/2		7/2	(0,0,0)	10831.37	(0.10)	[68038]
	4(3, 1) - 4(3, 2)		9/2		9/2	(0,0,0)	10831.63	(0.10)	[68038]
	2(2, 0) - 2(2, 1)		3/2		1/2	(0,0,0)	11251.28	(0.10)	[68038]
	2(2, 0) - 2(2, 1)		5/2		7/2	(0,0,0)	11252.85	(0.10)	[68038]
	2(2, 0) - 2(2, 1)		5/2		3/2	(0,0,0)	11254.82	(0.10)	[68038]
	2(2, 0) - 2(2, 1)		1/2		1/2	(0,0,0)	11257.16	(0.10)	[68038]
	2(2, 0) - 2(2, 1)		7/2		7/2	(0,0,0)	11258.55	(0.10)	[68038]
	2(2, 0) - 2(2, 1)		3/2		3/2	(0,0,0)	11259.09	(0.10)	[68038]
	2(2, 0) - 2(2, 1)		5/2		5/2	(0,0,0)	11260.52	(0.10)	[68038]
	2(2, 0) - 2(2, 1)		1/2		3/2	(0,0,0)	11264.78	(0.10)	[68038]
	2(2, 0) - 2(2, 1)		3/2		5/2	(0,0,0)	11264.78	(0.10)	[68038]
	2(2, 0) - 2(2, 1)		7/2		5/2	(0,0,0)	11266.35	(0.10)	[68038]
$H^{34}SD$	4(3, 1) - 4(3, 2)					(0,0,0)	10802.36	(0.10)	[51017]
	2(2, 0) - 2(2, 1)					(0,0,0)	11235.45	(0.10)	[51017]
	7(4, 3) - 7(4, 4)					(0,0,0)	27392.00	(0.10)	[51017]
	5(3, 2) - 5(3, 3)					(0,0,0)	40715.45	(0.10)	[73062]
	1(1, 0) - 1(1, 1)					(0,0,0)	50912.27	(0.10)	[51017]
	3(2, 1) - 3(2, 2)					(0,0,0)	52979.67	(0.10)	[51017]
$D_2{}^{32}S$	1(1, 0) - 1(0, 1)	0		1		(0,0,0)	91359.091	(1E-3)	[71033]
	1(1, 0) - 1(0, 1)	2		2		(0,0,0)	91359.114	(1E-3)	[71033]
	1(1, 0) - 1(0, 1)	2		1		(0,0,0)	91359.128	(1E-3)	[71033]
	1(1, 0) - 1(0, 1)	1		2		(0,0,0)	91359.143	(1E-3)	[71033]
	1(1, 0) - 1(0, 1)	1		1		(0,0,0)	91359.158	(1E-3)	[71033]
	2(2, 0) - 2(1, 1)					(0,0,0)	128815.31	(0.10)	[72047]
	3(2, 1) - 3(1, 2)					(0,0,0)	185591.87	(0.10)	[72047]
	2(1, 1) - 2(0, 2)					(0,0,0)	194189.30	(0.10)	[72047]
	3(3, 0) - 3(2, 1)					(0,0,0)	195692.13	(0.10)	[72047]
	3(1, 3) - 2(2, 0)					(0,0,0)	196900.84	(0.10)	[72047]
	4(3, 1) - 4(2, 2)					(0,0,0)	201306.58	(0.10)	[72047]
	1(1, 1) - 0(0, 0)					(0,0,0)	237903.80	(0.10)	[72047]
	5(4, 1) - 5(3, 2)					(0,0,0)	250390.95	(0.10)	[72047]
	2(2, 1) - 2(1, 2)					(0,0,0)	273879.18	(0.10)	[72047]
	6(4, 2) - 6(3, 3)					(0,0,0)	281788.08	(0.10)	[72047]
	5(3, 2) - 5(2, 3)					(0,0,0)	290043.86	(0.10)	[72047]
	4(4, 0) - 4(3, 1)					(0,0,0)	291340.25	(0.10)	[72047]
	7(5, 2) - 7(4, 3)					(0,0,0)	308863.56	(0.20)	[72047]
	4(2, 2) - 4(1, 3)					(0,0,0)	319555.99	(0.20)	[72047]
	3(3, 1) - 3(2, 2)					(0,0,0)	321784.13	(0.20)	[72047]
	6(2, 5) - 5(3, 2)					(0,0,0)	324356.04	(0.20)	[72047]
	6(5, 1) - 6(4, 2)					(0,0,0)	335350.27	(0.20)	[72047]
	2(0, 2) - 1(1, 1)					(0,0,0)	346782.36	(0.20)	[72047]
	3(1, 2) - 3(0, 3)					(0,0,0)	351473.87	(0.20)	[72047]
	8(5, 3) - 8(4, 4)					(0,0,0)	374158.37	(0.20)	[72047]
	9(6, 3) - 9(5, 4)					(0,0,0)	376492.75	(0.20)	[72047]
	8(6, 2) - 8(5, 3)					(0,0,0)	377560.13	(0.20)	[72047]
	2(1, 2) - 1(0, 1)					(0,0,0)	384452.14	(0.20)	[72047]
	4(4, 1) - 4(3, 2)					(0,0,0)	385315.93	(0.20)	[72047]
	3(2, 2) - 3(1, 3)					(0,0,0)	387843.70	(0.20)	[72047]
	5(5, 0) - 5(4, 1)					(0,0,0)	403291.63	(0.30)	[72047]
	7(4, 3) - 7(3, 4)					(0,0,0)	405800.95	(0.30)	[72047]

TABLE 46.3. The microwave spectrum of H_2S—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$D_2{}^{32}S$	4(3, 2) - 4(2, 3)					(0,0,0)	406857.82	(0.30)	[72047]
	10(7, 3) - 10(6, 4)					(0,0,0)	424386.25	(0.30)	[72047]
	5(4, 2) - 5(3, 3)					(0,0,0)	440500.74	(0.30)	[72047]
	5(2, 4) - 4(3, 1)					(0,0,0)	444159.43	(0.30)	[72047]
	7(6, 1) - 7(5, 2)					(0,0,0)	447210.35	(0.30)	[72047]
	6(3, 3) - 6(2, 4)					(0,0,0)	451575.89	(0.30)	[72047]
	4(2, 3) - 3(3, 0)					(0,0,0)	454804.75	(0.30)	[72047]
	11(7, 4) - 11(6, 5)					(0,0,0)	455365.73	(0.30)	[72047]
	5(5, 1) - 5(4, 2)					(0,0,0)	461763.49	(0.30)	[72047]
	10(6, 4) - 10(5, 5)					(0,0,0)	478255.25	(0.30)	[72047]
	12(8, 4) - 12(7, 5)					(0,0,0)	479524.47	(0.30)	[72047]
	9(7, 2) - 9(6, 3)					(0,0,0)	483402.85	(0.30)	[72047]
	6(5, 2) - 6(4, 3)					(0,0,0)	490325.67	(0.30)	[72047]
	5(2, 3) - 5(1, 4)					(0,0,0)	491247.75	(0.30)	[72047]
	3(0, 3) - 2(1, 2)					(0,0,0)	510025.44	(0.40)	[72047]
	4(1, 3) - 4(0, 4)					(0,0,0)	515114.05	(0.40)	[72047]
	6(6, 0) - 6(5, 1)					(0,0,0)	516361.89	(0.40)	[72047]
	11(8, 3) - 11(7, 4)					(0,0,0)	518317.29	(0.40)	[72047]
	3(1, 3) - 2(0, 2)					(0,0,0)	519905.23	(0.40)	[72047]
	4(2, 3) - 4(1, 4)					(0,0,0)	525317.63	(0.40)	[72047]
	5(3, 3) - 5(2, 4)					(0,0,0)	526701.22	(0.40)	[72047]
	9(5, 4) - 9(4, 5)					(0,0,0)	530145.51	(0.40)	[72047]
	6(4, 3) - 6(3, 4)					(0,0,0)	536003.85	(0.40)	[72047]
	6(6, 1) - 6(5, 2)					(0,0,0)	546989.47	(0.40)	[72047]
	7(6, 2) - 7(5, 3)					(0,0,0)	555378.25	(0.40)	[72047]
	7(5, 3) - 7(4, 4)					(0,0,0)	557878.11	(0.40)	[72047]
	2(2, 1) - 1(1, 0)					(0,0,0)	566972.29	(0.40)	[72047]
	8(7, 1) - 8(6, 2)					(0,0,0)	568408.12	(0.40)	[72047]
	8(4, 4) - 8(3, 5)					(0,0,0)	586926.59	(0.40)	[72047]
	3(1, 2) - 2(2, 1)					(0,0,0)	587620.04	(0.40)	[72047]
	8(6, 3) - 8(5, 4)					(0,0,0)	595505.25	(0.40)	[72047]
	10(8, 2) - 10(7, 3)					(0,0,0)	609672.97	(0.50)	[72047]
	7(3, 4) - 7(2, 5)					(0,0,0)	630485.63	(0.50)	[72047]
	8(7, 2) - 8(6, 3)					(0,0,0)	632477.80	(0.50)	[72047]
	4(0, 4) - 3(1, 3)					(0,0,0)	660418.18	(0.50)	[72047]
	4(1, 4) - 3(0, 3)					(0,0,0)	662245.07	(0.50)	[72047]
	2(2, 0) - 1(1, 1)					(0,0,0)	669787.00	(0.50)	[72047]
	5(2, 4) - 5(1, 5)					(0,0,0)	672337.45	(0.50)	[72047]

*Calculated transition frequency.

Table 47. Rotational and centrifugal distortion constants for $H_2{}^{78}Se$ and $H_2{}^{80}Se$ [75026].

Parameter	$H_2{}^{78}Se$ Value (MHz)	$H_2{}^{80}Se$ Value (MHz)
G	244 259.14(119)	244 099.89(29)
B	232 558.27(119)	232 561.95(29)
C	116 910.11(514)	116 874.93(176)
A	245 122.14	244 967.32
B	231 593.37	231 593.31
C	117 012.00	116 976.14
Δ_J	35.042(100)	34.950(30)
Δ_{JK}	-118.184(150)	-118.189(70)
Δ_K	87.908(300)	88.1873(1300)
δ_J	-2.11491(1800)	-2.12091(1200)
δ_K	458.9872±3.	461.0394±1.
H_J	0.0198(40)	0.0217(14)
H_{JK}	-1.13758±0.03	-1.20193±0.013
H_{KJ}	2.4996±0.2	2.7535±0.06
H_K	-0.8681±0.2	-1.1067±0.06
h_J	$(-0.59680\pm0.02)\times10^{-2}$	$(-0.626116\pm0.012)\times10^{-2}$
h_{JK}	0.20764±0.01	0.20217±0.007
h_K	8.45190±0.4	8.27658±0.12
L_{JJK}	$(0.18122\pm0.017)\times10^{-2}$	$(0.17430\pm0.004)\times10^{-2}$
L_{JK}	0.135773±0.008	0.135488±0.002
L_{KKJ}	-0.365455±0.017	-0.366685±0.005
L_K	0.218064±0.009	0.221558±0.002
ℓ_{JK}	$(0.98799\pm0.2)\times10^{-3}$	$(0.89245\pm0.06)\times10^{-3}$
ℓ_K	$(0.8493\pm0.17)\times10^{-2}$	$(0.6860\pm0.12)\times10^{-2}$
P_{JK}	$(-0.2258\pm0.27)\times10^{-4}$	$(-0.43699\pm0.07)\times10^{-4}$
P_{KJ}	$(-0.248166\pm0.02)\times10^{-2}$	$(-0.226800\pm0.01)\times10^{-2}$
P_{KKJ}	$(0.647661\pm0.06)\times10^{-2}$	$(0.604766\pm0.02)\times10^{-2}$
P_K	$(-0.396067\pm0.04)\times10^{-2}$	$(-0.373530\pm0.013)\times10^{-2}$
Std. dev. MW	0.07	0.14
Std. dev. IR	387.59	354.76

Table 47.1. Rotational and centrifugal distortion constants for $H_2{}^{76}Se$, $H_2{}^{77}Se$ and $H_2{}^{82}Se$ [75026].[a]

Parameters	$H_2{}^{76}Se$ Value (MHz)	$H_2{}^{77}Se$ Value (MHz)	$H_2{}^{82}Se$ Value (MHz)
$\mathcal{A}$	244 434.91	244 348.74	243 945.78
$\mathcal{B}$	232 546.40	232 549.75	232 568.92
$\mathcal{C}$	116 945.72	116 927.29	116 841.45
Δ_J	35.146	35.122	34.906
Δ_{JK}	-118.341	-118.408	-118.264
Δ_K	86.5614	87.0799	88.9171
δ_J	-2.15431	-2.14838	-2.10903
δ_K	452.4169	454.1929	464.5726
H_{JK}	-1.14809	-1.16993	-1.23863
H_{KJ}	2.5035	2.5778	2.88624
h_J	-0.00610582	-0.00617029	-0.00636121
h_{JK}	0.20083	0.19872	0.19916
h_K	8.14709	8.12889	8.27415
Std. dev. MW	0.390	0.438	0.141

[a] The distortion constants not shown in this table were fixed at their $H_2{}^{80}Se$ values in Table 46.

Table 47.2. Rotational and centrifugal distortion constants for D_2Se [62011].

Parameters	$D_2{}^{76}Se$	$D_2{}^{77}Se$	$D_2{}^{78}Se$	$D_2{}^{80}Se$	$D_2{}^{82}Se$
A (MHz)	125 946.6(5)	125 864.1(5)	125 784.0(5)	125 629.5(5)	125 482.7(5)
B (MHz)	115 906.4(30)	115 906.2(30)	115 906.4(30)	115 906.1(30)	115 906.5(30)
C (MHz)	59 614.5(5)	59 596.0(5)	59 577.9(5)	59 542.9(5)	59 509.7(5)
τ_{aaaa} (MHz)[a]	-38.515	-38.465	-38.415	-38.321	-38.231
τ_{bbbb} (MHz)[a]	-32.759	-32.759	-32.759	-32.759	-32.759
τ_{aabb} (MHz)[a]	23.982	23.966	23.951	23.921	23.893
τ_{abab} (MHz)[a]	-5.694	-5.690	-5.687	-5.679	-5.673

[a] The τ's were derived from the vibrational frequencies.

Table 47.3. Rotational and centrifugal distortion constants for HDSe [59006].

Parameter	$HD^{76}Se$	$HD^{77}Se$	$HD^{78}Se$	$HD^{80}Se$	$HD^{82}Se$
(A-C)/2 (MHz)	79830	79812	79808	79785	79772
δ_J (Hz)	3.56	4.10	3.64	3.85	3.10
D_{JK} (kHz)	0.229	0.224	0.212	0.217	0.215
R_6 (Hz)	0.308	0.275	0.288	0.272	0.299
D_K (kHz)	-0.371	-0.357	-0.358	-0.338	-0.372
R_5 (kHz)	-0.0571	-0.0587	-0.0575	-0.0600	-0.0543

Table 47.4. Hyperfine constants and electric dipole moment for $HD^{80}Se$.

Parameters	Molecular Value	4_{32} level [72035]	4_{31} level [72035]	2_{21} level [67014]	2_{20} level [67014]	Reference
eq_JQ (D) (kHz)		15.69(26)	14.23(21)	35.04(12)	34.69(13)	
c_J (H) (kHz)[a]		-18.53(27)	-17.97(27)	-26.94(6)	-25.74(6)	
c_J (D) (kHz)[a]		- 1.05(2)	- 1.13(3)	- 0.43	- 0.48	
χ_{aa} (D) (kHz)	123.3(6)					[72035]
χ_{bb} (D) (kHz)	-56.5(60)					[72035]
χ_{cc} (D) (kHz)	-66.8(71)					[72035]
μ_b HDSe (Debye)	0.62					[59006]
μ_b D_2Se (Debye)	0.627(2)					[69037]

[a] The spin-rotation tensor elements derived in [72035] are:
for the proton $M_{aa}(H) = -38.77(10)$ kHz, $M_{bb}(H) = 2.37(49)$ kHz and $M_{cc}(H) = -8.95(95)$ kHz;
for the deuteron $M_{aa}(D) = 0.51$ kHz, $M_{bb}(D) = -2.46(1)$ kHz and $M_{cc}(D) = -2.13(2)$ kHz.

TABLE 47.5. The microwave spectrum of H_2Se

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H_2{}^{82}Se$	1(1, 0) - 1(0, 1)					(0,0,0)	127860.35	(0.20)	[56011]
	2(2, 0) - 2(1, 1)					(0,0,0)	141889.02	(0.20)	[56011]
	3(3, 0) - 3(2, 1)					(0,0,0)	164663.10	(0.20)	[56011]
	4(4, 0) - 4(3, 1)					(0,0,0)	197748.81	(0.20)	[75026]
	5(5, 0) - 5(4, 1)					(0,0,0)	242112.28	(0.20)	[75026]
	6(6, 0) - 6(5, 1)					(0,0,0)	297106.08	(0.20)	[75026]
	5(4, 1) - 5(3, 2)					(0,0,0)	308016.04	(0.20)	[75026]
	6(5, 1) - 6(4, 2)					(0,0,0)	309251.68	(0.20)	[75026]
	4(3, 1) - 4(2, 2)					(0,0,0)	316392.66	(0.20)	[75026]
	7(6, 1) - 7(5, 2)					(0,0,0)	323624.01	(0.20)	[75026]
	3(2, 1) - 3(1, 2)					(0,0,0)	330181.47	(0.20)	[75026]
	2(1, 1) - 2(0, 2)					(0,0,0)	345030.44	(0.20)	[75026]
	8(7, 1) - 8(6, 2)					(0,0,0)	353768.27	(0.20)	[75026]
	7(7, 0) - 7(6, 1)					(0,0,0)	359829.07	(0.20)	[75026]
	1(1, 1) - 0(0, 0)					(0,0,0)	361698.54	(0.20)	[75026]
	2(2, 1) - 2(1, 2)					(0,0,0)	383125.26	(0.20)	[75026]
	9(8, 1) - 9(7, 2)					(0,0,0)	401087.63	(0.20)	[75026]
	3(3, 1) - 3(2, 2)					(0,0,0)	401983.80	(0.20)	[75026]
	4(4, 1) - 4(3, 2)					(0,0,0)	426414.26	(0.20)	[75026]
	5(5, 1) - 5(4, 2)					(0,0,0)	455560.94	(0.20)	[75026]
	2(1, 2) - 1(0, 1)					(0,0,0)	595552.80	(0.20)	[75026]
$H_2{}^{80}Se$	1(1, 0) - 1(0, 1)					(0,0,0)	127973.40	(0.20)	[56011]
	2(2, 0) - 2(1, 1)					(0,0,0)	142171.86	(0.20)	[56011]
	3(3, 0) - 3(2, 1)					(0,0,0)	165240.46	(0.20)	[56011]
	4(4, 0) - 4(3, 1)					(0,0,0)	198776.38	(0.20)	[75026]
	5(5, 0) - 5(4, 1)					(0,0,0)	243754.69	(0.20)	[75026]
	6(6, 0) - 6(5, 1)					(0,0,0)	299490.16	(0.20)	[75026]
	5(4, 1) - 5(3, 2)					(0,0,0)	307884.72	(0.20)	[75026]
	6(5, 1) - 6(4, 2)					(0,0,0)	309399.66	(0.20)	[75026]
	4(3, 1) - 4(2, 2)					(0,0,0)	316164.20	(0.20)	[75026]
	7(6, 1) - 7(5, 2)					(0,0,0)	324255.52	(0.20)	[75026]
	3(2, 1) - 3(1, 2)					(0,0,0)	329992.71	(0.20)	[75026]
	2(1, 1) - 2(0, 2)					(0,0,0)	344953.15	(0.20)	[75026]
	8(7, 1) - 8(6, 2)					(0,0,0)	355087.30	(0.20)	[75026]
	1(1, 1) - 0(0, 0)					(0,0,0)	361879.28	(0.20)	[75026]
	7(7, 0) - 7(6, 1)					(0,0,0)	362998.90	(0.20)	[75026]
	2(2, 1) - 2(1, 2)					(0,0,0)	383463.65	(0.20)	[75026]
	3(3, 1) - 3(2, 2)					(0,0,0)	402553.93	(0.20)	[75026]
	9(8, 1) - 9(7, 2)					(0,0,0)	403259.55	(0.20)	[75026]
	4(4, 1) - 4(3, 2)					(0,0,0)	427295.16	(0.20)	[75026]
	8(8, 0) - 8(7, 1)					(0,0,0)	429235.84	(0.20)	[75026]
	5(5, 1) - 5(4, 2)					(0,0,0)	456827.96	(0.20)	[75026]
	6(6, 1) - 6(5, 2)					(0,0,0)	489861.69	(0.20)	[75026]
	9(9, 0) - 9(8, 1)					(0,0,0)	492152.55	(0.20)	[75026]
	2(0, 2) - 1(1, 1)					(0,0,0)	581098.89	(0.20)	[75026]
	2(1, 2) - 1(0, 1)					(0,0,0)	595800.97	(0.20)	[75026]
$H_2{}^{78}Se$	2(2, 0) - 2(1, 1)					(0,0,0)	142469.58	(0.20)	[56011]
	3(3, 0) - 3(2, 1)					(0,0,0)	165847.57	(0.20)	[56011]
	4(4, 0) - 4(3, 1)					(0,0,0)	199858.66	(0.20)	[75026]
	5(5, 0) - 5(4, 1)					(0,0,0)	245484.52	(0.20)	[75026]
	6(6, 0) - 6(5, 1)					(0,0,0)	301999.28	(0.20)	[75026]
	5(4, 1) - 5(3, 2)					(0,0,0)	307754.78	(0.20)	[75026]
	6(5, 1) - 6(4, 2)					(0,0,0)	309568.45	(0.20)	[75026]
	4(3, 1) - 4(2, 2)					(0,0,0)	315928.10	(0.20)	[75026]
	7(6, 1) - 7(5, 2)					(0,0,0)	324938.27	(0.20)	[75026]
	3(2, 1) - 3(1, 2)					(0,0,0)	329795.90	(0.20)	[75026]
	2(1, 1) - 2(0, 2)					(0,0,0)	344872.29	(0.20)	[75026]
	8(7, 1) - 8(6, 2)					(0,0,0)	356498.41	(0.20)	[75026]
	1(1, 1) - 0(0, 0)					(0,0,0)	362069.14	(0.20)	[75026]
	7(7, 0) - 7(6, 1)					(0,0,0)	366331.05	(0.20)	[75026]
	2(2, 1) - 2(1, 2)					(0,0,0)	383819.46	(0.20)	[75026]
	3(3, 1) - 3(2, 2)					(0,0,0)	403153.22	(0.20)	[75026]
	9(8, 1) - 9(7, 2)					(0,0,0)	405571.85	(0.20)	[75026]
	4(4, 1) - 4(3, 2)					(0,0,0)	428221.28	(0.20)	[75026]
	5(5, 1) - 5(4, 2)					(0,0,0)	458160.01	(0.20)	[75026]

TABLE 47.5. The microwave spectrum of H_2Se—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$H_2{}^{78}Se$	2(0, 2) - 1(1, 1)					(0,0,0)	581180.62	(0.20)	[75026]
	2(1, 2) - 1(0, 1)					(0,0,0)	596061.86	(0.20)	[75026]
$H_2{}^{77}Se$	1(1, 0) - 1(0, 1)					(0,0,0)	128155.40	(0.20)	[56011]
	2(2, 0) - 2(1, 1)					(0,0,0)	142623.48	(0.20)	[56011]
	3(3, 0) - 3(2, 1)					(0,0,0)	166163.20	(0.20)	[56011]
	4(4, 0) - 4(3, 1)					(0,0,0)	200420.65	(0.20)	[75026]
	5(5, 0) - 5(4, 1)					(0,0,0)	246382.75	(0.20)	[75026]
	6(6, 0) - 6(5, 1)					(0,0,0)	303301.44	(0.20)	[75026]
	5(4, 1) - 5(3, 2)					(0,0,0)	307690.68	(0.20)	[75026]
	6(5, 1) - 6(4, 2)					(0,0,0)	309661.16	(0.20)	[75026]
	4(3, 1) - 4(2, 2)					(0,0,0)	315807.45	(0.20)	[75026]
	7(6, 1) - 7(5, 2)					(0,0,0)	325299.72	(0.20)	[75026]
	3(2, 1) - 3(1, 2)					(0,0,0)	329694.48	(0.20)	[75026]
	2(1, 1) - 2(0, 2)					(0,0,0)	344830.49	(0.20)	[75026]
	8(7, 1) - 8(6, 2)					(0,0,0)	357239.79	(0.20)	[75026]
	1(1, 1) - 0(0, 0)					(0,0,0)	362167.63	(0.20)	[75026]
	7(7, 0) - 7(6, 1)					(0,0,0)	368058.70	(0.20)	[75026]
	2(2, 1) - 2(1, 2)					(0,0,0)	384003.88	(0.20)	[75026]
	3(3, 1) - 3(2, 2)					(0,0,0)	403463.92	(0.20)	[75026]
	9(8, 1) - 9(7, 2)					(0,0,0)	406781.99	(0.20)	[75026]
	4(4, 1) - 4(3, 2)					(0,0,0)	428701.45	(0.20)	[75026]
	5(5, 1) - 5(4, 2)					(0,0,0)	458850.63	(0.20)	[75026]
	2(1, 2) - 1(0, 1)					(0,0,0)	596197.06	(0.20)	[75026]
$H_2{}^{76}Se$	1(1, 0) - 1(0, 1)					(0,0,0)	128219.10	(0.20)	[56011]
	2(2, 0) - 2(1, 1)					(0,0,0)	142783.02	(0.20)	[56011]
	3(3, 0) - 3(2, 1)					(0,0,0)	166488.14	(0.20)	[56011]
	4(4, 0) - 4(3, 1)					(0,0,0)	201000.01	(0.20)	[75026]
	5(5, 0) - 5(4, 1)					(0,0,0)	247308.71	(0.20)	[75026]
	6(6, 0) - 6(5, 1)					(0,0,0)	304643.20	(0.20)	[75026]
	5(4, 1) - 5(3, 2)					(0,0,0)	307626.96	(0.20)	[75026]
	6(5, 1) - 6(4, 2)					(0,0,0)	309760.43	(0.20)	[75026]
	4(3, 1) - 4(2, 2)					(0,0,0)	315684.32	(0.20)	[75026]
	7(6, 1) - 7(5, 2)					(0,0,0)	325677.38	(0.20)	[75026]
	3(2, 1) - 3(1, 2)					(0,0,0)	329590.51	(0.20)	[75026]
	2(1, 1) - 2(0, 2)					(0,0,0)	344787.62	(0.20)	[75026]
	8(7, 1) - 8(6, 2)					(0,0,0)	358010.12	(0.20)	[75026]
	1(1, 1) - 0(0, 0)					(0,0,0)	362268.84	(0.20)	[75026]
	7(7, 0) - 7(6, 1)					(0,0,0)	369837.86	(0.20)	[75026]
	2(2, 1) - 2(1, 2)					(0,0,0)	384193.75	(0.20)	[75026]
	3(3, 1) - 3(2, 2)					(0,0,0)	403783.97	(0.20)	[75026]
	9(8, 1) - 9(7, 2)					(0,0,0)	408036.27	(0.20)	[75026]
	4(4, 1) - 4(3, 2)					(0,0,0)	429195.99	(0.20)	[75026]
	5(5, 1) - 5(4, 2)					(0,0,0)	459562.13	(0.20)	[75026]
	2(1, 2) - 1(0, 1)					(0,0,0)	596336.52	(0.20)	[75026]
$HD^{82}Se$	11(6, 6) - 11(6, 5)					(0,0,0)	8215.8	(0.10)	[59006]
	4(3, 2) - 4(3, 1)					(0,0,0)	8756.7	(0.10)	[57006]
	2(2, 1) - 2(2, 0)					(0,0,0)	9127.75	(0.10)	[57006]
	9(5, 5) - 9(5, 4)					(0,0,0)	13827.7	(0.10)	[57006]
	7(4, 4) - 7(4, 3)					(0,0,0)	22184.4	(0.10)	[59006]
	5(3, 3) - 5(3, 2)					(0,0,0)	33023.0	(0.10)	[59006]
	1(1, 1) - 1(1, 0)					(0,0,0)	41476.1	(0.10)	[59006]
	3(2, 2) - 3(2, 1)					(0,0,0)	43058.4	(0.10)	[59006]
$HD^{80}Se$	11(6, 6) - 11(6, 5)					(0,0,0)	8240.6	(0.1)	[59006]
	4(3, 2) - 4(3, 1)	9/2	4	11/2	5	(0,0,0)	8770.928	(1E-3)	[72035]
	4(3, 2) - 4(3, 1)	5/2	3	7/2	4	(0,0,0)	8770.928	(1E-3)	[72035]
	4(3, 2) - 4(3, 1)	7/2	3	9/2	5	(0,0,0)	8770.928	(1E-3)	[72035]
	4(3, 2) - 4(3, 1)	5/2	3	7/2	3	(0,0,0)	8770.988	(1E-4)	[72035]
	4(3, 2) - 4(3, 1)	7/2	4	9/2	5	(0,0,0)	8770.990	(2E-4)	[72035]
	4(3, 2) - 4(3, 1)	9/2	4	7/2	3	(0,0,0)	8771.001	(3E-4)	[72035]
	4(3, 2) - 4(3, 1)	11/2	5	9/2	5	(0,0,0)	8771.003	(2E-4)	[72035]
	4(3, 2) - 4(3, 1)	9/2	4	9/2	4	(0,0,0)	8771.008	(1E-4)	[72035]
	4(3, 2) - 4(3, 1)	5/2	3	5/2	3	(0,0,0)	8771.008	(1E-4)	[72035]
	4(3, 2) - 4(3, 1)	7/2	3	7/2	3	(0,0,0)	8771.008	(1E-4)	[72035]
	4(3, 2) - 4(3, 1)	11/2	5	11/2	5	(0,0,0)	8771.011	(2E-4)	[72035]
	4(3, 2) - 4(3, 1)	7/2	4	7/2	4	(0,0,0)	8771.011	(2E-4)	[72035]

TABLE 47.5. The microwave spectrum of H_2Se—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$HD^{80}Se$	4(3, 2) - 4(3, 1)	9/2	5	9/2	5	(0,0,0)	8771.011	(2E-4)	[72035]
	4(3, 2) - 4(3, 1)	7/2	3	9/2	4	(0,0,0)	8771.016	(4E-4)	[72035]
	4(3, 2) - 4(3, 1)	9/2	5	11/2	5	(0,0,0)	8771.019	(2E-4)	[72035]
	4(3, 2) - 4(3, 1)	7/2	3	5/2	3	(0,0,0)	8771.030	(4E-4)	[72035]
	4(3, 2) - 4(3, 1)	9/2	5	7/2	4	(0,0,0)	8771.032	(3E-4)	[72035]
	4(3, 2) - 4(3, 1)	11/2	5	9/2	4	(0,0,0)	8771.093	(1E-3)	[72035]
	4(3, 2) - 4(3, 1)	7/2	4	5/2	3	(0,0,0)	8771.093	(1E-3)	[72035]
	4(3, 2) - 4(3, 1)	9/2	5	7/2	3	(0,0,0)	8771.093	(1E-3)	[72035]
	2(2, 1) - 2(2, 0)	3/2	1	5/2	2	(0,0,0)	9138.425	(1E-4)	[67014]
	2(2, 1) - 2(2, 0)	5/2	3	3/2	2	(0,0,0)	9138.447	(2E-4)	[67014]
	2(2, 1) - 2(2, 0)	5/2	3	7/2	3	(0,0,0)	9138.441	(3E-4)	[67014]
	2(2, 1) - 2(2, 0)	7/2	3	5/2	2	(0,0,0)	9138.472	(1E-4)	[67014]
	2(2, 1) - 2(2, 0)	1/2	3	3/2	1	(0,0,0)	9138.463	(1E-4)	[67014]
	2(2, 1) - 2(2, 0)	5/2	3	3/2	1	(0,0,0)	9138.487	(2E-4)	[67014]
	2(2, 1) - 2(2, 0)	3/2	1	5/2	3	(0,0,0)	9138.524	(2E-4)	[67014]
	2(2, 1) - 2(2, 0)	3/2	1	1/2	1	(0,0,0)	9138.548	(2E-4)	[67014]
	2(2, 1) - 2(2, 0)	5/2	2	7/2	3	(0,0,0)	9138.544	(2E-4)	[67014]
	2(2, 1) - 2(2, 0)	7/2	3	5/2	3	(0,0,0)	9138.571	(3E-4)	[67014]
	2(2, 1) - 2(2, 0)	3/2	2	5/2	3	(0,0,0)	9138.565	(2E-4)	[67014]
	2(2, 1) - 2(2, 0)	5/2	2	3/2	1	(0,0,0)	9138.590	(2E-4)	[67014]
	2(2, 1) - 2(2, 0)	5/2	2	5/2	3	(0,0,0)	9138.608	(3E-4)	[67014]
	9(5, 5) - 9(5, 4)					(0,0,0)	13862.65	(0.10)	[57006]
	7(4, 4) - 7(4, 3)					(0,0,0)	22230.0	(0.10)	[59006]
	12(6, 7) - 12(6, 6)					(0,0,0)	23249.8	(0.10)	[59006]
	5(3, 3) - 5(3, 2)					(0,0,0)	33075.4	(0.10)	[59006]
	10(5, 6) - 10(5, 5)					(0,0,0)	38629.0	(0.10)	[59006]
	1(1, 1) - 1(1, 0)					(0,0,0)	41504.5	(0.10)	[59006]
	3(2, 2) - 3(2, 1)					(0,0,0)	43106.6	(0.10)	[59006]
$HD^{78}Se$	11(6, 6) - 11(6, 5)					(0,0,0)	8266.6	(0.10)	[59006]
	4(3, 2) - 4(3, 1)					(0,0,0)	8786.05	(0.10)	[57006]
	2(2, 1) - 2(2, 0)					(0,0,0)	9149.65	(0.10)	[57006]
	9(5, 5) - 9(5, 4)					(0,0,0)	13899.3	(0.10)	[57006]
	7(4, 4) - 7(4, 3)					(0,0,0)	22277.6	(0.10)	[59006]
	5(3, 3) - 5(3, 2)					(0,0,0)	33129.7	(0.10)	[59006]
	10(5, 6) - 10(5, 5)					(0,0,0)	38724.0	(0.10)	[59006]
	1(1, 1) - 1(1, 0)					(0,0,0)	41534.1	(0.10)	[59006]
	3(2, 2) - 3(2, 1)					(0,0,0)	43156.8	(0.10)	[59006]
$HD^{77}Se$	11(6, 6) - 11(6, 5)					(0,0,0)	8280.0	(0.10)	[59006]
	4(3, 2) - 4(3, 1)					(0,0,0)	8793.95	(0.10)	[57006]
	2(2, 1) - 2(2, 0)					(0,0,0)	9155.85	(0.10)	[57006]
	9(5, 5) - 9(5, 4)					(0,0,0)	13918.3	(0.10)	[57006]
	7(4, 4) - 7(4, 3)					(0,0,0)	22302.3	(0.10)	[59006]
	5(3, 3) - 5(3, 2)					(0,0,0)	33157.4	(0.10)	[59006]
	1(1, 1) - 1(1, 0)					(0,0,0)	41549.0	(0.10)	[59006]
	3(2, 2) - 3(2, 1)					(0,0,0)	43183.1	(0.10)	[59006]
$HD^{76}Se$	11(6, 6) - 11(6, 5)					(0,0,0)	8293.60	(0.10)	[59006]
	4(3, 2) - 4(3, 1)					(0,0,0)	8801.85	(0.10)	[57006]
	2(2, 1) - 2(2, 0)					(0,0,0)	9161.50	(0.10)	[57006]
	9(5, 5) - 9(5, 4)					(0,0,0)	13937.80	(0.10)	[57006]
	7(4, 4) - 7(4, 3)					(0,0,0)	22327.70	(0.10)	[59006]
	5(3, 3) - 5(3, 2)					(0,0,0)	33188.20	(0.10)	[59006]
	1(1, 1) - 1(1, 0)					(0,0,0)	41565.40	(0.10)	[59006]
	3(2, 2) - 3(2, 1)					(0,0,0)	43209.80	(0.10)	[59006]
$D_2{}^{82}Se$	1(1, 0) - 1(0, 1)					(0,0,0)	65971.71	(0.10)	[56011]
	2(2, 0) - 2(1, 1)					(0,0,0)	76612.14	(0.10)	[56011]
	3(3, 0) - 3(2, 1)					(0,0,0)	94462.12	(0.10)	[56011]
	2(1, 1) - 2(0, 2)					(0,0,0)	170277.03	(0.20)	[56011]
	1(1, 1) - 0(0, 0)					(0,0,0)	184981.28	(0.20)	[56011]
$D_2{}^{80}Se$	1(1, 0) - 1(0, 1)					(0,0,0)	66085.41	(0.10)	[56011]
	2(2, 0) - 2(1, 1)					(0,0,0)	76907.04	(0.10)	[56011]
	3(3, 0) - 3(2, 1)					(0,0,0)	95082.56	(0.10)	[56011]
	6(5, 1) - 6(4, 2)					(0,0,0)	160591.79	(0.20)	[69037]
	2(1, 1) - 2(0, 2)					(0,0,0)	170211.30	(0.20)	[56011]
	1(1, 1) - 0(0, 0)					(0,0,0)	185161.28	(0.20)	[56011]
$D_2{}^{78}Se$	1(1, 0) - 1(0, 1)					(0,0,0)	66204.87	(0.10)	[56011]

TABLE 47.5. The microwave spectrum of H_2Se—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$D_2{}^{78}Se$	2(2, 0) - 2(1, 1)					(0,0,0)	77216.40	(0.10)	[56011]
	3(3, 0) - 3(2, 1)					(0,0,0)	95733.92	(0.10)	[56011]
	2(1, 1) - 2(0, 2)					(0,0,0)	170142.70	(0.20)	[56011]
	1(1, 1) - 0(0, 0)					(0,0,0)	185350.80	(0.20)	[56011]
$D_2{}^{77}Se$	1(1, 0) - 1(0, 1)					(0,0,0)	66266.82	(0.10)	[56011]
	2(2, 0) - 2(1, 1)					(0,0,0)	77377.10	(0.10)	[56011]
	3(3, 0) - 3(2, 1)					(0,0,0)	96073.00	(0.10)	[56011]
	2(1, 1) - 2(0, 2)					(0,0,0)	170107.35	(0.20)	[56011]
	1(1, 1) - 0(0, 0)					(0,0,0)	185448.96	(0.20)	[56011]
$D_2{}^{76}Se$	1(1, 0) - 1(0, 1)					(0,0,0)	66330.78	(0.10)	[56011]
	2(2, 0) - 2(1, 1)					(0,0,0)	77542.71	(0.10)	[56011]
	3(3, 0) - 3(2, 1)					(0,0,0)	96423.40	(0.10)	[56011]
	2(1, 1) - 2(0, 2)					(0,0,0)	170071.51	(0.20)	[56011]
	1(1, 1) - 0(0, 0)					(0,0,0)	185549.92	(0.20)	[56011]

Table 48. Rotational and centrifugal distortion constants for NO_2.

Parameter	$^{14}N^{16}O_2$ Value (MHz)[a] [64008]	$^{15}N^{16}O_2$ Value (MHz) [64008]	$^{14}N^{16}O^{18}O$ Value (MHz) [64008]
A	239 868.7(110)	228 756.1(40)	235 802.5(150)
B	13 000.12(60)	13 003.06(20)	12 264.92(80)
C	12 303.45(60)	12 274.73(20)	11 632.71(80)
τ_{aaaa}	-299.4(4)	-273.4(40)	-284.4(40)
τ_{bbbb}	-0.04144(15)	-0.04144(15)	-0.03721(15)
τ_{aabb}	1.843(20)	1.761(20)	1.705(20)
τ_{abab}	-0.2453(10)	-0.2445(10)	-0.2188(10)
μ_b (D)	0.316(10)[b]	0.294(15)[c]	

[a] See Table 47.2 for constants derived from infrared and microwave spectra.

[b] Reference [63009].

[c] Reference [64009].

Table 48.1. Spin-rotation and hyperfine constants for NO_2.

Parameters	$^{14}N^{16}O_2$ Value (MHz) [66026]	$^{14}N^{16}O_2$ v_2=1 Value (MHz) [76019]	$^{15}N^{16}O_2$ Value (MHz) [66026]	$^{14}N^{16}O^{18}O$ Value (MHz) [64008]	$^{14}N^{16}O^{17}O$ Value (MHz) [66025]
A_s	5 401.76(7)	5 920.4(13)	5 149.07(10)	5 326.08(460)	5 369.58(250)
B_s	7.65(2)	6.4(3)	7.70(3)	7.72(5)	8.05(260)
C_s	-95.24(2)	-97.1(3)	-94.99(10)	-90.58(6)	-92.92(90)
$(0)_I$ (^{14}N or ^{15}N)	147.23(3)	147.0(2)	-206.46(6)	146.62(60)	147.28(5)
$(aa)_I$ (^{14}N or ^{15}N)	-22.16(7)	-22.2(4)	30.89(20)	-19.92(220)	-21.93(14)
$(cc)_I$ (^{14}N or ^{15}N)	-17.69(8)	-18.1(4)	25.11(20)	-18.85(130)	-17.00(24)
$(aa)_Q$ (^{14}N)	0.45(6)	0.45[a]		1.69(120)	0.41(8)
$(cc)_Q$ (^{14}N)	1.26(5)	1.26[a]		0.92(60)	1.33(15)
$(0)_I$ (^{17}O)					-63.76(3)
$(aa)_I$ (^{17}O)					50.48(8)
$(cc)_I$ (^{17}O)					55.85(10)
$(aa)_Q$ (^{17}O)					-0.202(14)
$(cc)_Q$ (^{17}O)					-0.009(16)

[a] Assumed value.

Additional references: [50018], [51014], [58004], [59010], [62003], [62004], [72042], [72043], [73049], [73065], [74008], [74016], [74017], [74018], [74019], [74020], [74023], [75015], [75016], [75027], [75028], [75029].

Table 48.2. Rotational constants for $^{14}NO_2$ ground state and (0,1,0) state from combined infrared and microwave spectra.

Parameters	Ground State Value (MHz) [76020][a]	(0,1,0) State Value (MHz) [75036][b]
$\mathcal{A}$	239 905.41(63)	251 027.(23)
$\mathcal{B}$	13 002.262(123)	13 000.13(234)
$\mathcal{C}$	12 304.888(66)	12 278.87(192)
Δ_K	80.94(39)	101.45(183)
Δ_{NK}	-0.5903(90)	-0.668(35)
Δ_N	9.033(90) 10^{-3}	9.033(90) 10^{-3}
δ_K	0.12(5)	0.12(5)
δ_N	9.303(288)×10^{-4}	9.303(288)×10^{-4}
H_K	0.0977(138)	0.0977(138)
H_{KN}	-7.26(165)×10^{-4}	-7.26(165)×10^{-4}
H_N	1.6(18)×10^{-8}	1.6(18)×10^{-8}
L_K	1.7(12)×10^{-4}	1.7(12)×10^{-4}

[a] See this reference for molecular constants for v_3=1 also.

[b] The change in parameters between the ground state and v_2=1 are reported. These changes are significant only for the values of $\mathcal{A}$, $\mathcal{B}$, $\mathcal{C}$, Δ_K and Δ_{NK} when compared to the uncertainty in the ground state constants.

TABLE 48.3. The microwave spectrum of NO_2

Isotopic species	$N'(K'_-,K'_+)$ - $N''(K''_-,K''_+)$	J'	F'	J''	F''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{14}N^{16}O$	7(1, 7) - 8(0, 8)	13/2	13/2	15/2	15/2	(0,0,0)	14929.90	(0.20)	[56015]
	7(1, 7) - 8(0, 8)	13/2	15/2	15/2	17/2	(0,0,0)	14961.00	(0.20)	[56015]
	7(1, 7) - 8(0, 8)	13/2	11/2	15/2	13/2	(0,0,0)	15025.37	(0.20)	[56015]
	7(1, 7) - 8(0, 8)	15/2	13/2	15/2	15/2	(0,0,0)	15136.42	(0.20)	[56015]
	7(1, 7) - 8(0, 8)	15/2	15/2	15/2	17/2	(0,0,0)	15242.90	(0.20)	[56015]
	7(1, 7) - 8(0, 8)	13/2	15/2	17/2	17/2	(0,0,0)	15342.75	(0.20)	[56015]
	7(1, 7) - 8(0, 8)	13/2	13/2	17/2	15/2	(0,0,0)	15447.25	(0.20)	[56015]
	7(1, 7) - 8(0, 8)	15/2	17/2	17/2	19/2	(0,0,0)	15539.32	(0.20)	[56015]
	7(1, 7) - 8(0, 8)	15/2	15/2	17/2	17/2	(0,0,0)	15624.90	(0.20)	[56015]
	7(1, 7) - 8(0, 8)	15/2	13/2	17/2	15/2	(0,0,0)	15653.98	(0.20)	[56015]
	39(3,37) - 40(2,38)	77/2	75/2	79/2	77/2	(0,0,0)	16008.35	(0.50)	[56015]
	39(3,37) - 40(2,38)	77/2	77/2	79/2	79/2	(0,0,0)	16014.05	(0.50)	[56015]
	39(3,37) - 40(2,38)	77/2	79/2	79/2	81/2	(0,0,0)	16019.90	(0.50)	[56015]
	39(3,37) - 40(2,38)	79/2	81/2	81/2	83/2	(0,0,0)	16023.65	(0.50)	[56015]
	39(3,37) - 40(2,38)	79/2	79/2	81/2	81/2	(0,0,0)	16025.95	(0.50)	[56015]
	39(3,37) - 40(2,38)	79/2	77/2	81/2	79/2	(0,0,0)	16031.85	(0.50)	[56015]
	24(1,23) - 23(2,22)	49/2	47/2	47/2	45/2	(0,0,0)	26563.25	(0.50)	[64008]
	24(1,23) - 23(2,22)	49/2	51/2	47/2	49/2	(0,0,0)	26569.21	(0.50)	[64008]
	7(1, 7) - 8(0, 8)	13/2	13/2	15/2	15/2	(0,1,0)	25955.17	(0.50)	[76019]
	7(1, 7) - 8(0, 8)	13/2	15/2	15/2	17/2	(0,1,0)	25978.63	(0.50)	[76019]
	7(1, 7) - 8(0, 8)	13/2	11/2	15/2	13/2	(0,1,0)	26034.95	(0.50)	[76019]
	7(1, 7) - 8(0, 8)	15/2	13/2	15/2	15/2	(0,1,0)	26173.67	(0.50)	[76019]
	7(1, 7) - 8(0, 8)	15/2	15/2	15/2	17/2	(0,1,0)	26288.52	(0.50)	[76019]
	7(1, 7) - 8(0, 8)	13/2	15/2	17/2	17/2	(0,1,0)	26371.83	(0.50)	[76019]
	7(1, 7) - 8(0, 8)	13/2	13/2	17/2	15/2	(0,1,0)	26484.73	(0.50)	[76019]
	24(1,23) - 23(2,22)	49/2	49/2	47/2	47/2	(0,0,0)	26577.02	(0.50)	[64008]
	7(1, 7) - 8(0, 8)	15/2	17/2	17/2	19/2	(0,1,0)	26603.65	(0.50)	[76019]
	24(1,23) - 23(2,22)	47/2	49/2	45/2	47/2	(0,0,0)	26619.38	(0.50)	[64008]
	24(1,23) - 23(2,22)	47/2	47/2	45/2	45/2	(0,0,0)	26633.83	(0.50)	[64008]
	24(1,23) - 23(2,22)	47/2	45/2	45/2	43/2	(0,0,0)	26647.17	(0.50)	[64008]
	7(1, 7) - 8(0, 8)	15/2	15/2	17/2	17/2	(0,1,0)	26681.41	(0.50)	[76019]
	7(1, 7) - 8(0, 8)	15/2	13/2	17/2	15/2	(0,1,0)	26702.85	(0.50)	[76019]
	10(0,10) - 9(1, 9)	21/2	19/2	17/2	17/2	(0,1,0)	29460.85	(0.50)	[76019]
	10(0,10) - 9(1, 9)	21/2	21/2	17/2	19/2	(0,1,0)	29564.82	(0.50)	[76019]
	10(0,10) - 9(1, 9)	21/2	23/2	19/2	21/2	(0,1,0)	29740.56	(0.50)	[76019]
	10(0,10) - 9(1, 9)	21/2	19/2	19/2	17/2	(0,1,0)	29753.64	(0.50)	[76019]
	10(0,10) - 9(1, 9)	21/2	21/2	19/2	19/2	(0,1,0)	29791.65	(0.50)	[76019]
	10(0,10) - 9(1, 9)	19/2	21/2	17/2	19/2	(0,1,0)	30042.52	(0.50)	[76019]
	10(0,10) - 9(1, 9)	19/2	19/2	17/2	17/2	(0,1,0)	30081.49	(0.50)	[76019]
	10(0,10) - 9(1, 9)	19/2	17/2	17/2	15/2	(0,1,0)	30113.90	(0.50)	[76019]
	10(0,10) - 9(1, 9)	19/2	21/2	19/2	19/2	(0,1,0)	30268.69	(0.50)	[76019]
	10(0,10) - 9(1, 9)	19/2	19/2	19/2	17/2	(0,1,0)	30374.98	(0.50)	[76019]
	21(2,20) - 22(1,21)	41/2	39/2	43/2	41/2	(0,0,0)	39066.7	(0.50)	[64008]
	21(2,20) - 22(1,21)	41/2	41/2	43/2	43/2	(0,0,0)	39097.8	(0.50)	[64008]
	21(2,20) - 22(1,21)	43/2	43/2	43/2	45/2	(0,0,0)	39142.46	(0.50)	[64008]
	21(2,20) - 22(1,21)	41/2	43/2	45/2	45/2	(0,0,0)	39192.94	(0.50)	[64008]
	21(2,20) - 22(1,21)	43/2	41/2	45/2	43/2	(0,0,0)	39235.98	(0.50)	[64008]
	21(2,20) - 22(1,21)	43/2	45/2	45/2	47/2	(0,0,0)	39247.28	(0.50)	[64008]
	10(0,10) - 9(1, 9)	19/2	19/2	19/2	17/2	(0,0,0)	40357.96	(0.50)	[64008]
	10(0,10) - 9(1, 9)	19/2	21/2	19/2	19/2	(0,0,0)	40467.44	(0.50)	[64008]
	10(0,10) - 9(1, 9)	21/2	23/2	19/2	21/2	(0,0,0)	40661.38	(0.50)	[64008]
	10(0,10) - 9(1, 9)	21/2	23/2	19/2	19/2	(0,0,0)	40661.38	(0.50)	[64008]
	10(0,10) - 9(1, 9)	21/2	19/2	19/2	17/2	(0,0,0)	40671.06	(0.50)	[64008]
	10(0,10) - 9(1, 9)	21/2	21/2	19/2	19/2	(0,0,0)	40703.20	(0.50)	[64008]
	10(0,10) - 9(1, 9)	19/2	21/2	17/2	19/2	(0,0,0)	40931.18	(0.50)	[64008]
	10(0,10) - 9(1, 9)	19/2	19/2	17/2	17/2	(0,0,0)	40964.38	(0.50)	[64008]
	10(0,10) - 9(1, 9)	19/2	17/2	17/2	15/2	(0,0,0)	40993.38	(0.50)	[64008]
	10(0,10) - 9(1, 9)	21/2	21/2	17/2	19/2	(0,0,0)	41167.52	(0.50)	[64008]
	10(0,10) - 9(1, 9)	21/2	19/2	17/2	17/2	(0,0,0)	41277.92	(0.50)	[64008]
	5(1, 5) - 6(0, 6)	9/2	11/2	11/2	11/2	(0,0,0)	69682.08	(0.05)	[74034]
	5(1, 5) - 6(0, 6)	11/2	9/2	9/2	9/2	(0,0,0)	69704.8	(0.05)	[74034]
	5(1, 5) - 6(0, 6)	9/2	11/2	11/2	13/2	(0,0,0)	69745.49	(0.05)	[74034]
	5(1, 5) - 6(0, 6)	9/2	9/2	11/2	11/2	(0,0,0)	69750.37	(0.05)	[74034]
	5(1, 5) - 6(0, 6)	9/2	7/2	11/2	9/2	(0,0,0)	69786.60	(0.05)	[74034]
	5(1, 5) - 6(0, 6)	9/2	11/2	13/2	13/2	(0,0,0)	70057.28	(0.05)	[74034]

TABLE 48.3. The microwave spectrum of NO_2—Continued

Isotopic species	$N'(K'_-,K'_+) - N''(K''_-,K''_+)$	J'	F'	J''	F''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{14}N^{16}O$	5(1, 5) - 6(0, 6)	9/2	9/2	13/2	11/2	(0,0,0)	70186.46	(0.05)	[74034]
	5(1, 5) - 6(0, 6)	11/2	9/2	11/2	11/2	(0,0,0)	70209.97	(0.05)	[74034]
	5(1, 5) - 6(0, 6)	11/2	11/2	11/2	11/2	(0,0,0)	70278.84	(0.05)	[74034]
	5(1, 5) - 6(0, 6)	11/2	11/2	11/2	13/2	(0,0,0)	70342.18	(0.05)	[74034]
	5(1, 5) - 6(0, 6)	11/2	13/2	11/2	13/2	(0,0,0)	70406.86	(0.05)	[74034]
	5(1, 5) - 6(0, 6)	11/2	13/2	13/2	15/2	(0,0,0)	70589.69	(0.05)	[74034]
	5(1, 5) - 6(0, 6)	11/2	9/2	13/2	11/2	(0,0,0)	70646.19	(0.05)	[74034]
	5(1, 5) - 6(0, 6)	11/2	11/2	13/2	13/2	(0,0,0)	70654.05	(0.05)	[74034]
	5(1, 5) - 6(0, 6)	11/2	11/2	13/2	11/2	(0,0,0)	70714.90	(0.05)	[74034]
	5(1, 5) - 6(0, 6)	11/2	13/2	13/2	13/2	(0,0,0)	70718.67	(0.05)	[74034]
	3(1, 3) - 4(0, 4)	5/2	7/2	7/2	9/2	(0,0,0)	123046.11	(0.05)	[66026]
	3(1, 3) - 4(0, 4)	5/2	5/2	7/2	7/2	(0,0,0)	123062.38	(0.05)	[66026]
	3(1, 3) - 4(0, 4)	5/2	3/2	7/2	5/2	(0,0,0)	123084.32	(0.05)	[66026]
	3(1, 3) - 4(0, 4)	7/2	7/2	7/2	9/2	(0,0,0)	123304.79	(0.10)	[66026]
	3(1, 3) - 4(0, 4)	5/2	7/2	9/2	9/2	(0,0,0)	124281.40	(0.10)	[66026]
	3(1, 3) - 4(0, 4)	7/2	9/2	9/2	11/2	(0,0,0)	124474.64	(0.05)	[66026]
	3(1, 3) - 4(0, 4)	7/2	5/2	9/2	7/2	(0,0,0)	124518.41	(0.05)	[66026]
	3(1, 3) - 4(0, 4)	7/2	7/2	9/2	9/2	(0,0,0)	124539.97	(0.05)	[66026]
	1(1, 1) - 2(0, 2)	1/2	3/2	3/2	3/2	(0,0,0)	173417.55	(0.10)	[66026]
	1(1, 1) - 2(0, 2)	1/2	1/2	3/2	1/2	(0,0,0)	173428.90	(0.10)	[66026]
	1(1, 1) - 2(0, 2)	1/2	1/2	3/2	3/2	(0,0,0)	173453.25	(0.10)	[66026]
	1(1, 1) - 2(0, 2)	1/2	3/2	3/2	5/2	(0,0,0)	173457.91	(0.10)	[66026]
	1(1, 1) - 2(0, 2)	1/2	3/2	5/2	5/2	(0,0,0)	173688.09	(0.25)	[66026]
	1(1, 1) - 2(0, 2)	3/2	3/2	3/2	3/2	(0,0,0)	177253.88	(0.20)	[66026]
	1(1, 1) - 2(0, 2)	3/2	3/2	3/2	5/2	(0,0,0)	177294.33	(0.15)	[66026]
	1(1, 1) - 2(0, 2)	3/2	5/2	3/2	5/2	(0,0,0)	177407.38	(0.10)	[66026]
	1(1, 1) - 2(0, 2)	3/2	5/2	5/2	7/2	(0,0,0)	177459.99	(0.05)	[66026]
	1(1, 1) - 2(0, 2)	3/2	1/2	5/2	3/2	(0,0,0)	177487.33	(0.10)	[66026]
	1(1, 1) - 2(0, 2)	3/2	3/2	5/2	5/2	(0,0,0)	177524.62	(0.05)	[66026]
	1(1, 1) - 2(0, 2)	3/2	3/2	5/2	3/2	(0,0,0)	177557.33	(0.15)	[66026]
	1(1, 1) - 2(0, 2)	3/2	5/2	5/2	5/2	(0,0,0)	177637.76	(0.25)	[66026]
$^{16}O^{15}N^{16}O$	21(2,20) - 22(1,21)	41/2	20	43/2	21	(0,0,0)	2746.51	(0.30)	[63018]
	21(2,20) - 22(1,21)	41/2	21	43/2	22	(0,0,0)	2767.35	(0.30)	[63018]
	21(2,20) - 22(1,21)	43/2	21	45/2	22	(0,0,0)	2861.82	(0.20)	[63018]
	21(2,20) - 22(1,21)	43/2	22	45/2	23	(0,0,0)	2902.11	(0.30)	[63018]
	7(1, 7) - 8(0, 8)	13/2	7	15/2	8	(0,0,0)	3660.75	(0.24)	[63018]
	7(1, 7) - 8(0, 8)	13/2	6	15/2	7	(0,0,0)	3759.69	(0.05)	[63018]
	7(1, 7) - 8(0, 8)	15/2	7	15/2	8	(0,0,0)	3900.57	(0.10)	[63018]
	7(1, 7) - 8(0, 8)	15/2	6	15/2	7	(0,0,0)	4082.16	(0.15)	[63018]
	7(1, 7) - 8(0, 8)	15/2	8	17/2	9	(0,0,0)	4243.94	(0.05)	[63018]
	7(1, 7) - 8(0, 8)	15/2	7	17/2	8	(0,0,0)	4321.59	(0.06)	[63018]
	10(0,10) - 9(1, 9)	21/2	11	19/2	10	(0,0,0)	52109.4	(0.5)	[64008]
	10(0,10) - 9(1, 9)	21/2	10	19/2	9	(0,0,0)	52149.8	(0.5)	[64008]
	10(0,10) - 9(1, 9)	19/2	10	17/2	9	(0,0,0)	52398.4	(0.5)	[64008]
	10(0,10) - 9(1, 9)	19/2	9	17/2	8	(0,0,0)	52419.2	(0.5)	[64008]
	5(1, 5) - 6(0, 6)	9/2	5	11/2	6	(0,0,0)	58583.23	(0.10)	[64008]
	5(1, 5) - 6(0, 6)	9/2	4	11/2	5	(0,0,0)	58650.08	(0.10)	[64008]
	5(1, 5) - 6(0, 6)	11/2	6	13/2	7	(0,0,0)	59411.47	(0.10)	[64008]
	5(1, 5) - 6(0, 6)	11/2	5	13/2	6	(0,0,0)	59457.01	(0.10)	[64008]
	12(0,12) - 11(1,11)	25/2	13	23/2	12	(0,0,0)	109559.23	(0.20)	[64008]
	12(0,12) - 11(1,11)	25/2	12	23/2	11	(0,0,0)	109576.98	(0.20)	[64008]
	12(0,12) - 11(1,11)	23/2	11	21/2	10	(0,0,0)	109743.01	(0.20)	[64008]
	12(0,12) - 11(1,11)	23/2	12	21/2	11	(0,0,0)	109743.83	(0.20)	[64008]
	3(1, 3) - 4(0, 4)	5/2	3	7/2	4	(0,0,0)	111969.09	(0.20)	[64008]
	3(1, 3) - 4(0, 4)	5/2	2	7/2	3	(0,0,0)	112040.39	(0.20)	[64008]
	3(1, 3) - 4(0, 4)	7/2	4	9/2	5	(0,0,0)	113362.39	(0.20)	[64008]
	3(1, 3) - 4(0, 4)	7/2	3	9/2	4	(0,0,0)	113409.41	(0.20)	[64008]
$^{16}O^{14}N^{18}O$	7(1, 7) - 8(0, 8)	13/2	13/2	15/2	15/2	(0,0,0)	23674.33	(0.20)	[64008]
	7(1, 7) - 8(0, 8)	13/2	15/2	15/2	17/2	(0,0,0)	23701.45	(0.20)	[64008]
	7(1, 7) - 8(0, 8)	13/2	11/2	15/2	13/2	(0,0,0)	23765.13	(0.20)	[64008]
	7(1, 7) - 8(0, 8)	13/2	15/2	17/2	17/2	(0,0,0)	23883.98	(0.20)	[64008]
	7(1, 7) - 8(0, 8)	15/2	15/2	15/2	17/2	(0,0,0)	23992.66	(0.20)	[64008]
	7(1, 7) - 8(0, 8)	15/2	13/2	15/2	15/2	(0,0,0)	24065.1	(0.20)	[64008]
	7(1, 7) - 8(0, 8)	13/2	13/2	17/2	15/2	(0,0,0)	24171.7	(0.20)	[64008]
	7(1, 7) - 8(0, 8)	15/2	17/2	17/2	19/2	(0,0,0)	24271.2	(0.20)	[64008]

TABLE 48.3. The microwave spectrum of NO_2—Continued

Isotopic species	$N'(K'_-,K'_+) - N''(K''_-,K''_+)$	J'	F'	J''	F''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{14}N^{18}O$	7(1, 7) - 8(0, 8)	15/2	15/2	17/2	17/2	(0,0,0)	24356.14	(0.20)	[64008]
	7(1, 7) - 8(0, 8)	15/2	13/2	17/2	15/2	(0,0,0)	24381.5	(0.20)	[64008]
	25(1,24) - 24(2,23)	51/2	49/2	49/2	47/2	(0,0,0)	25025.0	(0.20)	[64008]
	25(1,24) - 24(2,23)	51/2	53/2	49/2	51/2	(0,0,0)	25033.4	(0.20)	[64008]
	25(1,24) - 24(2,23)	51/2	51/2	49/2	49/2	(0,0,0)	25035.8	(0.20)	[64008]
	25(1,24) - 24(2,23)	49/2	51/2	47/2	49/2	(0,0,0)	25056.8	(0.20)	[64008]
	25(1,24) - 24(2,23)	49/2	49/2	47/2	47/2	(0,0,0)	25068.18	(0.20)	[64008]
	25(1,24) - 24(2,23)	49/2	47/2	47/2	45/2	(0,0,0)	25079.3	(0.20)	[64008]
	10(0,10) - 9(1, 9)	19/2	21/2	19/2	19/2	(0,0,0)	28446.98	(0.20)	[64008]
	10(0,10) - 9(1, 9)	21/2	23/2	19/2	21/2	(0,0,0)	28626.13	(0.20)	[64008]
	10(0,10) - 9(1, 9)	21/2	19/2	19/2	17/2	(0,0,0)	28638.28	(0.20)	[64008]
	10(0,10) - 9(1, 9)	21/2	21/2	19/2	19/2	(0,0,0)	28674.0	(0.20)	[64008]
	10(0,10) - 9(1, 9)	19/2	21/2	17/2	19/2	(0,0,0)	28886.61	(0.20)	[64008]
	10(0,10) - 9(1, 9)	19/2	19/2	17/2	17/2	(0,0,0)	28923.86	(0.20)	[64008]
	10(0,10) - 9(1, 9)	19/2	17/2	17/2	15/2	(0,0,0)	28954.85	(0.20)	[64008]
	10(0,10) - 9(1, 9)	19/2	19/2	19/2	17/2	(0,0,0)	29114.35	(0.20)	[64008]
	10(0,10) - 9(1, 9)	21/2	19/2	17/2	17/2	(0,0,0)	29218.7	(0.20)	[64008]
	22(2,21) - 23(1,22)	43/2		45/2		(0,0,0)	37021.45	(0.50)	[65019]
	22(2,21) - 23(1,22)	43/2		45/2		(0,0,0)	37024.46	(0.50)	[65019]
	22(2,21) - 23(1,22)	43/2		45/2		(0,0,0)	37055.26	(0.50)	[65019]
	22(2,21) - 23(1,22)	45/2		47/2		(0,0,0)	37116.43	(0.50)	[65019]
	22(2,21) - 23(1,22)	45/2		47/2		(0,0,0)	37147.47	(0.50)	[65019]
	22(2,21) - 23(1,22)	45/2		47/2		(0,0,0)	37151.20	(0.50)	[65019]
$^{16}O^{14}N^{17}O$	7(1, 7) - 8(0, 8)	9	2	10	5	(0,0,0)	19408.3	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	8	2	9	5	(0,0,0)	19433.0	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	10	1	11	3	(0,0,0)	19455.8	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	8	3	9	6	(0,0,0)	19458.2	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	9	1	10	4	(0,0,0)	19463.2	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	8	1	9	4	(0,0,0)	19481.8	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	7	3	8	6	(0,0,0)	19492.5	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	7	1	8	4	(0,0,0)	19504.5	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	8	2	9	4	(0,0,0)	19542.4	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	9	3	10	5	(0,0,0)	19549.0	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	8	3	9	5	(0,0,0)	19561.7	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	7	2	8	4	(0,0,0)	19563.8	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	5	3	6	5	(0,0,0)	19573.3	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	6	2	7	4	(0,0,0)	19586.0	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	7	3	8	5	(0,0,0)	19589.1	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	8	4	9	6	(0,0,0)	19596.3	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	5	2	6	3	(0,0,0)	19612.7	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	4	2	5	3	(0,0,0)	19615.0	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	6	3	7	5	(0,0,0)	19621.2	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	8	5	9	6	(0,0,0)	19649.0	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	5	3	6	4	(0,0,0)	19655.3	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	9	3	10	4	(0,0,0)	19666.2	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	8	3	9	4	(0,0,0)	19671.2	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	9	4	10	5	(0,0,0)	19672.0	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	7	3	8	4	(0,0,0)	19689.8	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	4	2	5	2	(0,0,0)	19693.0	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	8	4	9	5	(0,0,0)	19699.4	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	6	3	7	4	(0,0,0)	19711.7	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	6	4	7	6	(0,0,0)	19713.6	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	7	5	8	6	(0,0,0)	19715.2	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	5	3	6	3	(0,0,0)	19739.2	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	8	5	9	5	(0,0,0)	19752.7	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	7	4	8	5	(0,0,0)	19755.7	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	10	3	11	3	(0,0,0)	19772.7	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	9	1	10	3	(0,0,0)	19786.5	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	5	1	6	2	(0,0,0)	19788.6	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	4	3	5	3	(0,0,0)	19807.5	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	6	1	7	2	(0,0,0)	19808.3	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	7	5	8	5	(0,0,0)	19811.5	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	5	5	6	5	(0,0,0)	19818.9	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	7	1	8	2	(0,0,0)	19839.5	(0.5)	[66025]
	7(1, 7) - 8(0, 8)	5	2	6	2	(0,0,0)	19842.9	(0.5)	[66025]

TABLE 48.3. The microwave spectrum of NO_2—Continued

Isotopic species	$N'(K'_-,K'_+)$ – $N''(K''_-,K''_+)$	J'	F'	J''	F''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{14}N^{17}O$	7(1, 7) – 8(0, 8)	9	2	10	3	(0,0,0)	19848.7	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	9	5	10	4	(0,0,0)	19853.4	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	6	5	7	5	(0,0,0)	19859.4	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	8	1	9	2	(0,0,0)	19881.6	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	4	1	5	1	(0,0,0)	19885.5	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	6	4	7	4	(0,0,0)	19893.1	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	8	6	9	4	(0,0,0)	19913.0	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	8	3	9	3	(0,0,0)	19916.1	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	5	2	6	1	(0,0,0)	19918.4	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	5	4	6	3	(0,0,0)	19928.9	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	9	1	10	2	(0,0,0)	19937.9	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	8	2	9	2	(0,0,0)	19942.4	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	6	2	7	1	(0,0,0)	19954.9	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	7	6	8	4	(0,0,0)	19957.8	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	5	5	6	3	(0,0,0)	19985.6	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	6	6	7	4	(0,0,0)	19990.6	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	7	2	8	1	(0,0,0)	19997.3	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	6	4	7	3	(0,0,0)	20000.2	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	10	1	11	1	(0,0,0)	20014.4	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	7	3	8	2	(0,0,0)	20024.7	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	8	2	9	1	(0,0,0)	20048.8	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	9	1	10	1	(0,0,0)	20051.3	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	8	4	9	3	(0,0,0)	20054.0	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	6	5	7	3	(0,0,0)	20057.6	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	10	2	11	2	(0,0,0)	20069.9	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	6	3	7	1	(0,0,0)	20080.4	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	7	5	8	3	(0,0,0)	20086.0	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	6	6	7	3	(0,0,0)	20097.3	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	8	5	9	3	(0,0,0)	20107.3	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	9	2	10	1	(0,0,0)	20112.9	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	9	4	10	3	(0,0,0)	20112.9	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	7	3	8	1	(0,0,0)	20123.6	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	7	6	8	3	(0,0,0)	20131.5	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	9	3	10	2	(0,0,0)	20140.8	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	11	1	12	1	(0,0,0)	20153.6	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	8	6	9	3	(0,0,0)	20158.2	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	6	4	7	2	(0,0,0)	20173.4	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	9	5	10	3	(0,0,0)	20176.5	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	10	3	11	2	(0,0,0)	20181.9	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	7	4	8	2	(0,0,0)	20191.0	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	4	3	5	1	(0,0,0)	20205.8	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	8	4	9	2	(0,0,0)	20208.8	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	5	5	6	2	(0,0,0)	20215.6	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	10	2	11	1	(0,0,0)	20219.1	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	6	5	7	2	(0,0,0)	20230.4	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	5	4	6	1	(0,0,0)	20233.9	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	9	3	10	1	(0,0,0)	20253.8	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	6	4	7	1	(0,0,0)	20261.8	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	8	6	9	2	(0,0,0)	20312.8	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	8	4	9	1	(0,0,0)	20315.9	(0.5)	[66025]
	7(1, 7) – 8(0, 8)	6	5	7	1	(0,0,0)	20318.9	(0.5)	[66025]
	10(0,10) – 9(1, 9)	11	3	10	4	(0,0,0)	34198.6	(0.5)	[66025]
	10(0,10) – 9(1, 9)	12	1	11	2	(0,0,0)	34201.6	(0.5)	[66025]
	10(0,10) – 9(1, 9)	11	2	10	3	(0,0,0)	34207.7	(0.5)	[66025]
	10(0,10) – 9(1, 9)	10	2	9	3	(0,0,0)	34225.0	(0.5)	[66025]
	10(0,10) – 9(1, 9)	11	1	10	2	(0,0,0)	34238.4	(0.5)	[66025]
	10(0,10) – 9(1, 9)	14	1	13	1	(0,0,0)	34248.9	(0.5)	[66025]
	10(0,10) – 9(1, 9)	12	1	11	1	(0,0,0)	34256.9	(0.5)	[66025]
	10(0,10) – 9(1, 9)	10	1	9	2	(0,0,0)	34269.6	(0.5)	[66025]
	10(0,10) – 9(1, 9)	13	1	12	1	(0,0,0)	34277.2	(0.5)	[66025]
	10(0,10) – 9(1, 9)	13	2	12	2	(0,0,0)	34292.1	(0.5)	[66025]
	10(0,10) – 9(1, 9)	9	1	8	2	(0,0,0)	34297.3	(0.5)	[66025]
	10(0,10) – 9(1, 9)	11	1	10	1	(0,0,0)	34298.3	(0.5)	[66025]
	10(0,10) – 9(1, 9)	9	3	8	4	(0,0,0)	34300.7	(0.5)	[66025]
	10(0,10) – 9(1, 9)	12	2	11	2	(0,0,0)	34316.2	(0.5)	[66025]

TABLE 48.3. The microwave spectrum of NO_2—Continued

Isotopic species	$N'(K'_-,K'_+)$ - $N''(K''_-,K''_+)$	J'	F'	J''	F''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{14}N^{17}O$	10(0,10) - 9(1, 9)	8	1	7	2	(0,0,0)	34322.6	(0.5)	[66025]
	10(0,10) - 9(1, 9)	12	3	11	3	(0,0,0)	34327.7	(0.5)	[66025]
	10(0,10) - 9(1, 9)	10	1	9	1	(0,0,0)	34330.9	(0.5)	[66025]
	10(0,10) - 9(1, 9)	11	2	10	2	(0,0,0)	34348.9	(0.5)	[66025]
	10(0,10) - 9(1, 9)	11	3	10	3	(0,0,0)	34356.0	(0.5)	[66025]
	10(0,10) - 9(1, 9)	9	1	8	1	(0,0,0)	34356.0	(0.5)	[66025]
	10(0,10) - 9(1, 9)	12	2	11	1	(0,0,0)	34371.5	(0.5)	[66025]
	10(0,10) - 9(1, 9)	8	1	7	1	(0,0,0)	34372.7	(0.5)	[66025]
	10(0,10) - 9(1, 9)	10	2	9	2	(0,0,0)	34375.5	(0.5)	[66025]
	10(0,10) - 9(1, 9)	10	3	9	3	(0,0,0)	34377.9	(0.5)	[66025]
	10(0,10) - 9(1, 9)	7	1	6	1	(0,0,0)	34377.9	(0.5)	[66025]
	10(0,10) - 9(1, 9)	9	3	8	3	(0,0,0)	34393.4	(0.5)	[66025]
	10(0,10) - 9(1, 9)	9	2	8	2	(0,0,0)	34397.2	(0.5)	[66025]
	10(0,10) - 9(1, 9)	11	2	10	1	(0,0,0)	34408.8	(0.5)	[66025]
	10(0,10) - 9(1, 9)	8	2	7	2	(0,0,0)	34414.6	(0.5)	[66025]
	10(0,10) - 9(1, 9)	8	3	7	4	(0,0,0)	34423.3	(0.5)	[66025]
	10(0,10) - 9(1, 9)	9	4	8	5	(0,0,0)	34428.2	(0.5)	[66025]
	10(0,10) - 9(1, 9)	10	2	9	1	(0,0,0)	34436.6	(0.5)	[66025]
	10(0,10) - 9(1, 9)	10	4	9	5	(0,0,0)	34444.7	(0.5)	[66025]
	10(0,10) - 9(1, 9)	9	2	8	1	(0,0,0)	34455.8	(0.5)	[66025]
	10(0,10) - 9(1, 9)	7	2	6	3	(0,0,0)	34461.2	(0.5)	[66025]
	10(0,10) - 9(1, 9)	8	4	7	5	(0,0,0)	34465.2	(0.5)	[66025]
	10(0,10) - 9(1, 9)	11	4	10	5	(0,0,0)	34469.9	(0.5)	[66025]
	10(0,10) - 9(1, 9)	9	5	8	6	(0,0,0)	34480.6	(0.5)	[66025]
	10(0,10) - 9(1, 9)	9	4	8	4	(0,0,0)	34483.4	(0.5)	[66025]
	10(0,10) - 9(1, 9)	8	3	7	3	(0,0,0)	34509.0	(0.5)	[66025]
	10(0,10) - 9(1, 9)	8	4	7	4	(0,0,0)	34520.9	(0.5)	[66025]
	10(0,10) - 9(1, 9)	9	5	8	5	(0,0,0)	34530.5	(0.5)	[66025]
	10(0,10) - 9(1, 9)	11	4	10	4	(0,0,0)	34531.5	(0.5)	[66025]
	10(0,10) - 9(1, 9)	11	5	10	6	(0,0,0)	34541.2	(0.5)	[66025]
	10(0,10) - 9(1, 9)	7	2	6	2	(0,0,0)	34542.8	(0.5)	[66025]
	10(0,10) - 9(1, 9)	7	3	6	3	(0,0,0)	34547.5	(0.5)	[66025]
	10(0,10) - 9(1, 9)	10	5	9	5	(0,0,0)	34552.8	(0.5)	[66025]
	10(0,10) - 9(1, 9)	8	5	7	5	(0,0,0)	34554.8	(0.5)	[66025]
	10(0,10) - 9(1, 9)	12	4	11	4	(0,0,0)	34562.7	(0.5)	[66025]
	10(0,10) - 9(1, 9)	6	1	5	1	(0,0,0)	34566.3	(0.5)	[66025]
	10(0,10) - 9(1, 9)	9	6	8	6	(0,0,0)	34575.2	(0.5)	[66025]
	10(0,10) - 9(1, 9)	9	4	8	3	(0,0,0)	34576.2	(0.5)	[66025]
	10(0,10) - 9(1, 9)	11	5	10	5	(0,0,0)	34583.2	(0.5)	[66025]
	10(0,10) - 9(1, 9)	9	5	8	4	(0,0,0)	34585.5	(0.5)	[66025]
	10(0,10) - 9(1, 9)	13	3	12	3	(0,0,0)	34599.2	(0.5)	[66025]
	10(0,10) - 9(1, 9)	8	4	7	3	(0,0,0)	34606.9	(0.5)	[66025]
	10(0,10) - 9(1, 9)	10	6	9	6	(0,0,0)	34605.8	(0.5)	[66025]
$^{16}O^{14}N^{16}O$ $^2B_2$	9(0, 9) - 8(1, 8)	19/2	19/2	17/2	19/2	(0,0,0)	24360.9	(0.5)	[74019]
	9(0, 9) - 8(1, 8)	19/2	17/2	17/2	17/2	(0,0,0)	24368.1	(0.5)	[74019]
	9(0, 9) - 8(1, 8)	19/2	21/2	17/2	19/2	(0,0,0)	24399.0	(0.5)	[74019]
	9(0, 9) - 8(1, 8)	19/2	19/2	17/2	17/2	(0,0,0)	24402.0	(0.5)	[74019]
	9(0, 9) - 8(1, 8)	19/2	17/2	17/2	15/2	(0,0,0)	24403.5	(0.5)	[74019]
	6(1, 6) - 7(0, 7)	11/2	13/2	13/2	13/2	(0,0,0)	25291.4	(0.5)	[76018]
	6(1, 6) - 7(0, 7)	11/2	11/2	13/2	11/2	(0,0,0)	25294.4	(0.5)	[76018]
	6(1, 6) - 7(0, 7)	11/2	9/2	13/2	11/2	(0,0,0)	25327.2	(0.5)	[76018]
	6(1, 6) - 7(0, 7)	11/2	11/2	13/2	13/2	(0,0,0)	25328.4	(0.5)	[76018]
	6(1, 6) - 7(0, 7)	11/2	13/2	13/2	15/2	(0,0,0)	25330.8	(0.5)	[76018]
	6(1, 6) - 7(0, 7)	13/2	11/2	13/2	11/2	(0,0,0)	31508.7	(0.5)	[76018]
	6(1, 6) - 7(0, 7)	13/2	13/2	13/2	13/2	(0,0,0)	31553.0	(0.5)	[76018]
	6(1, 6) - 7(0, 7)	13/2	15/2	13/2	15/2	(0,0,0)	31604.6	(0.5)	[76018]
	9(0, 9) - 8(1, 8)	17/2	19/2	15/2	17/2	(0,0,0)	33085.3	(0.5)	[74019]
	9(0, 9) - 8(1, 8)	17/2	17/2	15/2	15/2	(0,0,0)	33090.0	(0.5)	[74019]
	9(0, 9) - 8(1, 8)	17/2	15/2	15/2	13/2	(0,0,0)	33093.7	(0.5)	[74019]
	9(0, 9) - 8(1, 8)	17/2	17/2	15/2	17/2	(0,0,0)	33125.0	(0.5)	[74019]
	9(0, 9) - 8(1, 8)	17/2	15/2	15/2	15/2	(0,0,0)	33125.0	(0.5)	[74019]
	9(0, 9) - 8(1, 8)	17/2	19/2	17/2	19/2	(0,0,0)	38119.6	(0.5)	[74019]
	9(0, 9) - 8(1, 8)	17/2	17/2	17/2	17/2	(0,0,0)	38200.4	(0.5)	[74019]
	9(0, 9) - 8(1, 8)	17/2	15/2	17/2	15/2	(0,0,0)	38270.8	(0.5)	[74019]
	6(1, 6) - 7(0, 7)	13/2	15/2	15/2	17/2	(0,0,0)	42371.6	(0.5)	[76018]

TABLE 48.3. The microwave spectrum of NO_2—Continued

Isotopic species	$N'(K'_-,K'_+)$ - $N''(K''_-,K''_+)$	J'	F'	J''	F''	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{14}N^{16}O$ $^2B_2$	6(1, 6) - 7(0, 7)	13/2	13/2	15/2	15/2	(0,0,0)	42400.2	(0.5)	[76018]
	6(1, 6) - 7(0, 7)	13/2	15/2	15/2	15/2	(0,0,0)	42412.4	(0.5)	[76018]
	6(1, 6) - 7(0, 7)	13/2	11/2	15/2	13/2	(0,0,0)	42425.8	(0.5)	[76018]
	6(1, 6) - 7(0, 7)	13/2	13/2	15/2	13/2	(0,0,0)	42436.0	(0.5)	[76018]

Table 49. Rotational and centrifugal distortion constants for N_2O[a].

Isotopic Species	Vib. State[b] v_1 v_2^ℓ v_3	B_v (MHz)	D_v (kHz)	H_v (Hz)	Reference
$^{14}N^{14}N^{16}O$	0 0^0 0	12 561.6348(21)	5.2808(61)	+0.0008(57)	[76028]
	1 0^0 0	12 458.1706	5.17		[75018]
	0 1^{1c}0	12 566.6411(21)	5.3539(61)	+0.0057(57)	[76028]
	0 1^{1d}0	12 590.3906(21)	5.4002(61)	+0.0197(57)	[76028]
	0 2^0 0	12 588.8913(21)	7.4403(61)	+0.0825(57)	[76028]
	0 2^{2c}0	12 595.0614(21)	3.6281(61)	-0.0702(57)	[76028]
	0 2^{2d}0	12 595.0692(21)	5.4482(61)	+0.0029(57)	[76028]
	0 3^{1c}0	12 578.8241(68)	6.340(19)	+0.039(18)	[76028]
	0 3^{1d}0	12 623.6200(68)	6.494(19)	-0.035(18)	[76028]
	0 3^3 0	12 611.2577(72)	4.742(20)	-0.102(18)	[76028]
	0 0^0 1	12 508.9923(31)	5.1726(86)	+0.0018(77)	[76028]
	0 1^{1c}1	12 515.270(15)	5.233(38)	-0.001(33)	[76028]
	0 1^{1d}1	12 542.493(15)	5.120(38)	-0.023(33)	[76028]
$^{14}N^{15}N^{16}O$	0 0^0 0	12 560.7310(21)	5.2682(61)	-0.0081(57)	[76028]
	0 1^{1c}0	12 564.5298(99)	5.319(27)	-0.021(24)	[76028]
	0 1^{1d}0	12 588.8168(68)	5.368(19)	-0.003(18)	[76028]
$^{15}N^{14}N^{16}O$	0 0^0 0	12 137.3103(22)	4.8896(57)	-0.0113(49)	[76028]
	0 1^{1c}0	12 142.711(10)	4.960(25)	-0.004(20)	[76028]
	0 1^{1d}0	12 164.996(10)	4.972(25)	-0.016(20)	[76028]
$^{15}N^{15}N^{16}O$	0 0^0 0	12 137.40(3)	5.2[c]		[49009]
$^{14}N^{14}N^{17}O$	0 0^0 0	12 191.719(10)	4.987(25)	-0.004(20)	[76028]
$^{14}N^{14}N^{18}O$	0 0^0 0	11 859.1097(22)	4.7274(57)	-0.0119(49)	[76028]
	0 1^{1c}0	11 864.545(10)	4.772(25)	-0.020(20)	[76028]
	0 1^{1d}0	11 885.913(15)	4.857(36)	+0.023(28)	[76028]

[a] For a detailed analysis of the ℓ-doubling and Fermi resonances in N_2O see Andreev et al. [76028] and the results in Tables 49.1 and 49.2.

[b] With the exception of the $(0,2^2,0)$ state, the c and d labels associated with the ℓ quantum number correlate with the L (lower) and U (upper) labels, respectively, in Table 49.4, while the reverse correlation holds for the $(0,2^2,0)$ c and d states.

[c] Assumed value.

Table 49.1. Molecular constants for $^{14}N_2{}^{16}O$ [76028][a].

Parameter	Value	Parameter	Value
B_0 (MHz)	12561.6369(9)	$q_{(010)}$ (MHz)	11.87212(27)
α_1^* (MHz)[c]	58.78678(86)	q_1 (MHz)	0.253(23)
α_2^* (MHz)[c]	-17.03655(35)	q_2 (MHz)	0.0379(56)
γ_{12} (MHz)	-0.41472(42)	q_J (Hz)	-15.68(38)
γ_{22} (MHz)	-0.17087(14)	q_{JJ} (Hz)	0[b]
$\gamma_{\ell\ell}$ (MHz)	0[b]	ρ (Hz)	-0.86(15)
D_0 (kHz)	5.2869(24)	$g_{\ell\ell}$ (GHz)	16.79(83)
β_1 (kHz)	-0.05153(92)	Δ_1 (THz)	2.9604
β_2 (kHz)	-0.08303(35)	Δ_2 (THz)	2.9360
H_0 (Hz)	0.0061(22)	$K^{122}_{(100)}$ (THz)	1.3221(87)
		λ_2 (THz)	-0.0123(24)
		λ_J (MHz)	-2.58(18)

[a] All experimental measurements from [76028], except for the $(0,3^3,0)$ state, were included in the analysis. The values of Δ_1 and Δ_2 were determined from infrared data.

[b] The condition $\gamma_{\ell\ell} = q_{JJ} = 0$ was employed.

[c] Here $\alpha_1^* = \alpha_1 - 2\gamma_{11} - 2\gamma_{12} - \gamma_{13}$ and $\alpha_2^* = \alpha_2 - \gamma_{12} - 2\gamma_{22} - \gamma_{23}$.

Table 49.2. Molecular constants for $^{14}N^{15}N^{16}O$, $^{15}N^{14}N^{16}O$ and $^{14}N_2{}^{18}O$ [76028].

Parameter	$^{14}N^{15}N^{16}O$ Value	$^{15}N^{14}N^{16}O$ Value	$^{14}N_2{}^{18}O$ Value
B_0 (MHz)	12560.7310(19)	12137.3104(20)	11859.1100(21)
α_2^{**} (MHz)[a]	-15.9332(14)	-16.5321(14)	-16.1024(17)
D_0 (kHz)	5.2680(57)	4.8898(54)	4.7280(55)
β_2 (kHz)	-0.0802(18)	-0.0748(16)	-0.0698(19)
H_0 (Hz)	-0.0083(53)	-0.0112(45)	-0.0114(47)
$q_{(010)}$ (MHz)	12.1398(13)	11.1457(13)	10.6723(15)
q_J (kHz)	-0.0142(17)	-0.0140(15)	-0.0145(17)

[a] This parameter is defined as $\alpha_2^{**} = \alpha_2 - \gamma_{12} - 2\gamma_{22} - \gamma_{23} - \gamma_{\ell\ell}$.

Table 49.3. Hyperfine and Zeeman constants and electric dipole moment for N_2O.

Parameters	$^{14}N^{14}N^{16}O$	Reference	$^{15}N^{14}N^{16}O$	Reference	$^{15}N^{15}N^{16}O$	Reference
eqQ (outer ^{14}N) (MHz)	-0.7767(10)	[75000]				
eqQ (inner ^{14}N) (MHz)	-0.2694(18)	[75000]	-0.27	[47008]		
M (outer) (kHz)	-2.35(20)	[75000]				
M (inner) (kHz)	-2.90(26)	[75000]				
$g_\perp$ (μ_N)					0.07606(10)	[69038]
$\chi_\perp - \chi_\parallel$ (erg/G^2)					$1.68(2)\times10^{-29}$	[69038]
μ (D)	0.160830(16)	[70029]	0.166(2)	[50006]		
α ($Å^3$)	3.222(46)	[70029]				

Additional references: [48005], [49008], [51008], [51009], [51013], [55009], [59011], [59007], [61010], [64006], [66027], [68009], [68015], [68016], [68035], [71027], and [74015].

TABLE 49.4. The microwave spectrum of N_2O

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	(v_1,v_2^{ℓ},v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{14}N^{14}N^{16}O$	1 - 1	2		1		$(0,1^1,0)$	47.280	(2E-4)	[76035]
	1 - 1	1		1		$(0,1^1,0)$	47.294	(2E-4)	[76035]
	1 - 1	2		3		$(0,1^1,0)$	47.315	(2E-4)	[76035]
	1 - 1	2		2		$(0,1^1,0)$	47.341	(2E-4)	[76035]
	1 - 1	1		2		$(0,1^1,0)$	47.355	(2E-4)	[76035]
	1 - 1	0		1		$(0,1^1,0)$	47.386	(2E-4)	[76035]
	1 - 1	2		1		$(0,1^1,0)$	47.402	(2E-4)	[76035]
	1 - 1	2		2		$(0,1^1,0)$	47.414	(2E-4)	[76035]
	1 - 1	1		1		$(0,1^1,0)$	47.416	(2E-4)	[76035]
	1 - 1	1		2		$(0,1^1,0)$	47.428	(2E-4)	[76035]
	1 - 1	2		1		$(0,1^1,0)$	47.448	(2E-4)	[76035]
	1 - 1	1		0		$(0,1^1,0)$	47.453	(2E-4)	[76035]
	1 - 1	2		3		$(0,1^1,0)$	47.483	(2E-4)	[76035]
	1 - 1	1		1		$(0,1^1,0)$	47.488	(2E-4)	[76035]
	1 - 1	3		3		$(0,1^1,0)$	47.500	(2E-4)	[76035]
	1 - 1	2		2		$(0,1^1,0)$	47.510	(2E-4)	[76035]
	1 - 1	3		2		$(0,1^1,0)$	47.526	(2E-4)	[76035]
	1 - 1	1		2		$(0,1^1,0)$	47.550	(2E-4)	[76035]
	1 - 1	2		1		$(0,1^1,0)$	47.571	(2E-4)	[76035]
	1 - 1	2		2		$(0,1^1,0)$	47.582	(2E-4)	[76035]
	1 - 1	3		2		$(0,1^1,0)$	47.599	(2E-4)	[76035]
	1 - 1	1		1		$(0,1^1,0)$	47.611	(2E-4)	[76035]
	1 - 1	1		0		$(0,1^1,0)$	47.648	(2E-4)	[76035]
	1 - 1	1		1		$(0,1^1,0)$	47.740	(2E-4)	[76035]
	1 - 1	1		2		$(0,1^1,0)$	47.801	(2E-4)	[76035]
	1 - 1	1		1		$(0,1^1,0)$	47.862	(2E-4)	[76035]
	1 - 1	1		2		$(0,1^1,0)$	47.873	(2E-4)	[76035]
	1 - 1	1		0		$(0,1^1,0)$	47.899	(2E-4)	[76035]
	2 - 2	2		2		$(0,1^1,0)$	142.215	(1E-3)	[76035]
	2 - 2	2		3		$(0,1^1,0)$	142.238	(2E-4)	[76035]
	2 - 2	2		1		$(0,1^1,0)$	142.267	(2E-4)	[76035]
	2 - 2	4		3		$(0,1^1,0)$	142.275	(2E-4)	[76035]
	2 - 2	3		2		$(0,1^1,0)$	142.299	(2E-4)	[76035]
	2 - 2	3		3		$(0,1^1,0)$	142.322	(2E-4)	[76035]
	2 - 2	3		2		$(0,1^1,0)$	142.362	(1E-3)	[76035]
	2 - 2	1		1		$(0,1^1,0)$	142.382	(2E-4)	[76035]
	2 - 2	3		3		$(0,1^1,0)$	142.385	(2E-4)	[76035]
	2 - 2	2		2		$(0,1^1,0)$	142.394	(2E-4)	[76035]
	2 - 2	2		3		$(0,1^1,0)$	142.417	(2E-4)	[76035]
	2 - 2	2		3		$(0,1^1,0)$	142.440	(1E-3)	[76035]
	2 - 2	4		3		$(0,1^1,0)$	142.445	(2E-4)	[76035]
	2 - 2	2		2		$(0,1^1,0)$	142.472	(2E-4)	[76035]
	2 - 2	4		4		$(0,1^1,0)$	142.480	(2E-4)	[76035]
	2 - 2	3		3		$(0,1^1,0)$	142.492	(2E-4)	[76035]
	2 - 2	2		1		$(0,1^1,0)$	142.514	(2E-4)	[76035]
	2 - 2	3		2		$(0,1^1,0)$	142.524	(2E-4)	[76035]
	2 - 2	3		4		$(0,1^1,0)$	142.527	(1E-3)	[76035]
	2 - 2	2		2		$(0,1^1,0)$	142.536	(2E-4)	[76035]
	2 - 2	1		1		$(0,1^1,0)$	142.541	(2E-4)	[76035]
	2 - 2	3		3		$(0,1^1,0)$	142.554	(2E-4)	[76035]
	2 - 2	1		2		$(0,1^1,0)$	142.563	(2E-4)	[76035]
	2 - 2	1		0		$(0,1^1,0)$	142.572	(2E-4)	[76035]
	2 - 2	3		2		$(0,1^1,0)$	142.586	(1E-3)	[76035]
	2 - 2	3		4		$(0,1^1,0)$	142.589	(1E-3)	[76035]
	2 - 2	3		2		$(0,1^1,0)$	142.620	(1E-3)	[76035]
	2 - 2	1		1		$(0,1^1,0)$	142.661	(2E-4)	[76035]
	2 - 2	3		2		$(0,1^1,0)$	142.683	(1E-3)	[76035]
	2 - 2	2		1		$(0,1^1,0)$	142.693	(2E-4)	[76035]
	2 - 2	2		2		$(0,1^1,0)$	142.716	(2E-4)	[76035]
	3 - 3	3		3		$(0,1^1,0)$	284.562	(2E-4)	[76035]
	3 - 3	1		2		$(0,1^1,0)$	284.598	(2E-4)	[76035]
	3 - 3	3		4		$(0,1^1,0)$	284.613	(2E-4)	[76035]
	3 - 3	2		3		$(0,1^1,0)$	284.627	(2E-4)	[76035]
	3 - 3	3		2		$(0,1^1,0)$	284.651	(2E-4)	[76035]
	3 - 3	5		4		$(0,1^1,0)$	284.655	(2E-3)	[76035]

TABLE 49.4. The microwave spectrum of N_2O—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{14}N^{14}N^{16}O$	3 - 3	4		3		$(0,1^1,0)$	284.680	(2E-4)	[76035]
	3 - 3	4		4		$(0,1^1,0)$	284.731	(2E-4)	[76035]
	3 - 3	4		3		$(0,1^1,0)$	284.789	(2E-3)	[76035]
	3 - 3	2		2		$(0,1^1,0)$	284.836	(2E-4)	[76035]
	3 - 3	4		4		$(0,1^1,0)$	284.840	(1E-3)	[76035]
	3 - 3	3		3		$(0,1^1,0)$	284.855	(2E-4)	[76035]
	3 - 3	5		4		$(0,1^1,0)$	284.881	(1E-3)	[76035]
	3 - 3	3		2		$(0,1^1,0)$	284.903	(1E-3)	[76035]
	3 - 3	3		4		$(0,1^1,0)$	284.905	(1E-3)	[76035]
	3 - 3	1		2		$(0,1^1,0)$	284.915	(2E-4)	[76035]
	3 - 3	3		2		$(0,1^1,0)$	284.927	(2E-4)	[76035]
	3 - 3	3		3		$(0,1^1,0)$	284.936	(2E-4)	[76035]
	3 - 3	5		5		$(0,1^1,0)$	284.942	(2E-4)	[76035]
	3 - 3	4		4		$(0,1^1,0)$	284.958	(2E-3)	[76035]
	3 - 3	1		1		$(0,1^1,0)$	284.972	(2E-4)	[76035]
	3 - 3	3		3		$(0,1^1,0)$	284.979	(2E-4)	[76035]
	3 - 3	2		2		$(0,1^1,0)$	284.992	(2E-4)	[76035]
	3 - 3	4		3		$(0,1^1,0)$	285.013	(2E-4)	[76035]
	3 - 3	4		5		$(0,1^1,0)$	285.018	(2E-3)	[76035]
	3 - 3	2		3		$(0,1^1,0)$	285.044	(2E-4)	[76035]
	3 - 3	4		3		$(0,1^1,0)$	285.121	(1E-3)	[76035]
	3 - 3	4		5		$(0,1^1,0)$	285.127	(2E-4)	[76035]
	3 - 3	3		4		$(0,1^1,0)$	285.133	(2E-4)	[76035]
	3 - 3	2		2		$(0,1^1,0)$	285.153	(2E-4)	[76035]
	3 - 3	3		3		$(0,1^1,0)$	285.188	(2E-4)	[76035]
	3 - 3	4		3		$(0,1^1,0)$	285.206	(2E-3)	[76035]
	3 - 3	2		1		$(0,1^1,0)$	285.210	(2E-4)	[76035]
	3 - 3	3		2		$(0,1^1,0)$	285.220	(2E-4)	[76035]
	3 - 3	3		3		$(0,1^1,0)$	285.272	(2E-4)	[76035]
	1 - 0					$(0,0^0,1)$	25017.99	(0.06)	[64010]
	1 - 0	0	1	1	1	$(0,0^0,0)$	25122.980	(1E-3)	[75000]
	1 - 0	2	1	2	1	$(0,0^0,0)$	25123.037	(1E-3)	[75000]
	1 - 0	2	1	1	1	$(0,0^0,0)$	25123.037	(1E-3)	[75000]
	1 - 0	1	1	2	1	$(0,0^0,0)$	25123.060	(1E-3)	[75000]
	1 - 0	1	1	1	1	$(0,0^0,0)$	25123.060	(1E-3)	[75000]
	1 - 0	1	1	0	1	$(0,0^0,0)$	25123.060	(1E-3)	[75000]
	1 - 0	2	2	2	1	$(0,0^0,0)$	25123.246	(1E-3)	[75000]
	1 - 0	2	2	1	1	$(0,0^0,0)$	25123.246	(1E-3)	[75000]
	1 - 0	3	2	2	1	$(0,0^0,0)$	25123.303	(1E-3)	[75000]
	1 - 0	1	2	2	1	$(0,0^0,0)$	25123.340	(1E-3)	[75000]
	1 - 0	1	2	1	1	$(0,0^0,0)$	25123.340	(1E-3)	[75000]
	1 - 0	1	2	0	1	$(0,0^0,0)$	25123.340	(1E-3)	[75000]
	1 - 0	1	0	2	1	$(0,0^0,0)$	25123.642	(1E-3)	[75000]
	1 - 0	1	0	1	1	$(0,0^0,0)$	25123.642	(1E-3)	[75000]
	1 - 0	1	0	0	1	$(0,0^0,0)$	25123.642	(1E-3)	[75000]
	1 - 0					$(0,2^0,0)$	25177.65	(0.06)	[64010]
	2 - 1					$(1,0^0,0)$	49832.523	(0.03)	[75018]
	2 - 1		2		2	$(0,0^0,0)$	50245.63	(0.15)	[52017]
	2 - 1		1		0	$(0,0^0,0)$	50245.63	(0.15)	[52017]
	2 - 1		3		2	$(0,0^0,0)$	50246.03	(0.10)	[52017]
	2 - 1		2		1	$(0,0^0,0)$	50246.03	(0.10)	[52017]
	2 - 1		1		2	$(0,0^0,0)$	50246.03	(0.10)	[52017]
	2 - 1		1		1	$(0,0^0,0)$	50246.53	(0.15)	[52017]
	3 - 2					$(1,0^0,0)$	74748.471	(0.03)	[75018]
	3 - 2					$(0,0^0,1)$	75053.40	(0.10)	[71030]
	3 - 2					$(0,0^0,0)$	75369.224	(0.01)	[70029]
	3 - 2					$(0,1^{L1},0)$	75399.26	(0.10)	[71030]
	3 - 2					$(0,2^0,0)$	75532.47	(0.10)	[71030]
	3 - 2					$(0,1^{U1},0)$	75541.70	(0.10)	[71030]
	3 - 2					$(0,2^2,0)$	75569.94	(0.10)	[64010]
	4 - 3					$(1,0^0,0)$	99664.025	(0.06)	[75018]
	4 - 3					$(0,0^0,0)$	100491.74	(0.20)	[56005]
	4 - 3					$(0,1^{L1},0)$	100531.65	(0.20)	[56005]
	4 - 3					$(0,1^{U1},0)$	100721.58	(0.20)	[56005]
	5 - 4					$(1,0^0,0)$	124579.124	(0.06)	[75018]

TABLE 49.4. The microwave spectrum of N_2O—Continued

Isotopic species	$J' - J''$	F'	F'_1	F''	F''_1	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{14}N^{14}N^{16}O$	5 - 4					$(0,0^0,1)$	125087.400	(0.05)	[70030]
	5 - 4					$(0,0^0,0)$	125613.696	(0.03)	[70030]
	5 - 4					$(0,1^{L1},0)$	125663.687	(0.03)	[70030]
	5 - 4					$(0,2^0,0)$	125884.94	(0.10)	[70030]
	5 - 4					$(0,1^{U1},0)$	125901.113	(0.03)	[70030]
	5 - 4					$(0,2^{L2},0)$	125948.06	(0.10)	[70030]
	5 - 4					$(0,2^{U2},0)$	125948.74	(0.10)	[70030]
	6 - 5					$(0,0^0,1)$	150103.500	(0.06)	[70030]
	6 - 5					$(0,0^0,0)$	150735.046	(0.03)	[70030]
	6 - 5					$(0,1^{L1},0)$	150795.008	(0.03)	[70030]
	6 - 5					$(0,2^0,0)$	151060.28	(0.10)	[70030]
	6 - 5					$(0,1^{U1},0)$	151079.922	(0.03)	[70030]
	6 - 5					$(0,2^{L2},0)$	151136.06	(0.10)	[70030]
	6 - 5					$(0,2^{U2},0)$	151137.62	(0.10)	[70030]
	7 - 6					$(0,0^0,1)$	175119.012	(0.07)	[70030]
	7 - 6					$(0,0^0,0)$	175855.623	(0.04)	[70030]
	7 - 6					$(0,1^{L1},0)$	175925.593	(0.04)	[70030]
	7 - 6					$(0,2^0,0)$	176234.17	(0.10)	[70030]
	7 - 6					$(0,1^{U1},0)$	176257.962	(0.04)	[70030]
	7 - 6					$(0,2^{L2},0)$	176323.46	(0.10)	[70030]
	7 - 6					$(0,2^{U2},0)$	176325.83	(0.10)	[70030]
	8 - 7					$(0,0^0,0)$	200975.26	(0.10)	[56005]
	10 - 9					$(0,0^0,1)$	250159.637	(0.10)	[70030]
	10 - 9					$(0,0^0,0)$	251211.557	(0.08)	[70030]
	10 - 9					$(0,1^{L1},0)$	251311.342	(0.08)	[70030]
	10 - 9					$(0,2^0,0)$	251748.12	(0.12)	[70030]
	10 - 9					$(0,1^{U1},0)$	251786.078	(0.08)	[70030]
	10 - 9					$(0,2^{L2},0)$	251879.52	(0.12)	[70030]
	10 - 9					$(0,2^{U2},0)$	251886.75	(0.12)	[70030]
	12 - 11					$(0,0^0,0)$	301442.711	(0.05)	[74044]
	12 - 11					$(0,1^{L1},0)$	301562.280	(0.09)	[70030]
	12 - 11					$(0,2^0,0)$	302082.07	(0.15)	[70030]
	12 - 11					$(0,1^{U1},0)$	302132.009	(0.09)	[70030]
	12 - 11					$(0,2^{L2},0)$	302224.33	(0.15)	[70030]
	12 - 11					$(0,2^{U1},0)$	302256.25	(0.15)	[70030]
	13 - 12					$(0,0^0,0)$	326556.071	(0.05)	[74044]
	15 - 14					$(0,0^0,0)$	376777.753	(0.01)	[76028]
	15 - 14					$(0,1^{L1},0)$	376926.982	(0.01)	[76028]
	15 - 14					$(0,3^{L1},0)$	377279.303	(0.04)	[76028]
	15 - 14					$(0,2^0,0)$	377566.687	(0.01)	[76028]
	15 - 14					$(0,1^{U1},0)$	377638.917	(0.01)	[76028]
	15 - 14					$(0,2^{L2},0)$	377778.541	(0.01)	[76028]
	15 - 14					$(0,2^{U2},0)$	377802.535	(0.01)	[76028]
	15 - 14					$(0,3^3,0)$	378273.226	(0.04)	[76028]
	15 - 14					$(0,3^{U1},0)$	378620.731	(0.04)	[76028]
	16 - 15					$(0,0^0,1)$	400203.009	(0.01)	[76028]
	16 - 15					$(0,0^0,0)$	401885.802	(0.01)	[76028]
	16 - 15					$(0,1^{L1},0)$	402044.836	(0.01)	[76028]
	16 - 15					$(0,3^{L1},0)$	402418.747	(0.04)	[76028]
	16 - 15					$(0,2^0,0)$	402723.120	(0.01)	[76028]
	16 - 15					$(0,1^{U1},0)$	402804.126	(0.01)	[76028]
	16 - 15					$(0,2^{L2},0)$	402952.967	(0.01)	[76028]
	16 - 15					$(0,2^{U2},0)$	402982.088	(0.01)	[76028]
	16 - 15					$(0,3^{U1},0)$	403849.263	(0.04)	[76028]
	17 - 16					$(0,0^0,1)$	425204.112	(0.01)	[76028]
	17 - 16					$(0,1^{L1},1)$	425416.331	(0.04)	[76028]
	17 - 16					$(0,1^{U1},1)$	426343.955	(0.04)	[76028]
	17 - 16					$(0,0^0,0)$	426991.808	(0.01)	[76028]
	17 - 16					$(0,1^{L1},0)$	427160.632	(0.01)	[76028]
	17 - 16					$(0,3^{L1},0)$	427555.755	(0.04)	[76028]
	17 - 16					$(0,2^0,0)$	427876.776	(0.01)	[76028]
	17 - 16					$(0,1^{U1},0)$	427967.310	(0.01)	[76028]
	17 - 16					$(0,2^{L2},0)$	428125.318	(0.01)	[76028]
	17 - 16					$(0,2^{U2},0)$	428160.195	(0.01)	[76028]
	17 - 16					$(0,3^3,0)$	428688.725	(0.04)	[76028]

TABLE 49.4. The microwave spectrum of N_2O—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	(v_1,v_2^{ℓ},v_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{14}N^{14}N^{16}O$	17 - 16					$(0,3^{U1},0)$	429075.216	(0.04)	[76028]
	18 - 17					$(0,0^{0},1)$	450203.085	(0.01)	[76028]
	18 - 17					$(0,1^{L1},1)$	450427.642	(0.04)	[76028]
	18 - 17					$(0,1^{U1},1)$	451410.056	(0.04)	[76028]
	18 - 17					$(0,0^{0},0)$	452095.670	(0.01)	[76028]
	18 - 17					$(0,1^{L1},0)$	452274.249	(0.01)	[76028]
	18 - 17					$(0,3^{L1},0)$	452690.192	(0.04)	[76028]
	18 - 17					$(0,2^{0},0)$	453027.454	(0.01)	[76028]
	18 - 17					$(0,1^{U1},0)$	453128.301	(0.01)	[76028]
	18 - 17					$(0,2^{L2},0)$	453295.428	(0.01)	[76028]
	18 - 17					$(0,2^{U2},0)$	453336.775	(0.01)	[76028]
	18 - 17					$(0,3^{3},0)$	453893.533	(0.04)	[76028]
	18 - 17					$(0,3^{U1},0)$	454298.429	(0.04)	[76028]
	19 - 18					$(0,0^{0},1)$	475199.801	(0.01)	[76028]
	19 - 18					$(0,1^{L1},1)$	475436.623	(0.04)	[76028]
	19 - 18					$(0,1^{U1},1)$	476473.886	(0.04)	[76028]
	19 - 18					$(0,0^{0},0)$	477197.247	(0.01)	[76028]
	19 - 18					$(0,1^{L1},0)$	477385.556	(0.01)	[76028]
	19 - 18					$(0,3^{L1},0)$	477821.945	(0.04)	[76028]
	19 - 18					$(0,2^{0},0)$	478174.970	(0.01)	[76028]
	19 - 18					$(0,1^{U1},0)$	478286.972	(0.01)	[76028]
	19 - 18					$(0,2^{L2},0)$	478463.193	(0.01)	[76028]
	19 - 18					$(0,2^{U2},0)$	478511.737	(0.01)	[76028]
	19 - 18					$(0,3^{3},0)$	479096.157	(0.04)	[76028]
	19 - 18					$(0,3^{U1},0)$	479518.847	(0.04)	[76028]
	20 - 19					$(0,0^{0},1)$	500194.206	(0.01)	[76028]
	20 - 19					$(0,1^{L1},1)$	500443.339	(0.04)	[76028]
	20 - 19					$(0,1^{U1},1)$	501535.464	(0.04)	[76028]
	20 - 19					$(0,0^{0},0)$	502296.423	(0.01)	[76028]
	20 - 19					$(0,1^{L1},0)$	502494.433	(0.01)	[76028]
	20 - 19					$(0,3^{L1},0)$	502950.827	(0.04)	[76028]
	20 - 19					$(0,2^{0},0)$	503319.159	(0.01)	[76028]
	20 - 19					$(0,1^{U1},0)$	503443.198	(0.01)	[76028]
	20 - 19					$(0,2^{L2},0)$	503628.487	(0.01)	[76028]
	20 - 19					$(0,2^{U2},0)$	503685.005	(0.01)	[76028]
	20 - 19					$(0,3^{3},0)$	504296.581	(0.04)	[76028]
	20 - 19					$(0,3^{U1},0)$	504736.326	(0.04)	[76028]
	21 - 20					$(0,0^{0},1)$	525186.106	(0.01)	[76028]
	21 - 20					$(0,1^{L1},1)$	525447.475	(0.04)	[76028]
	21 - 20					$(0,1^{U1},1)$	526594.468	(0.04)	[76028]
	21 - 20					$(0,0^{0},0)$	527393.051	(0.01)	[76028]
	21 - 20					$(0,1^{L1},0)$	527600.741	(0.01)	[76028]
	21 - 20					$(0,3^{L1},0)$	528076.706	(0.04)	[76028]
	21 - 20					$(0,2^{0},0)$	528459.840	(0.01)	[76028]
	21 - 20					$(0,1^{U1},0)$	528596.839	(0.01)	[76028]
	21 - 20					$(0,2^{L2},0)$	528791.162	(0.01)	[76028]
	21 - 20					$(0,2^{U2},0)$	528856.462	(0.01)	[76028]
	21 - 20					$(0,3^{3},0)$	529494.653	(0.04)	[76028]
	21 - 20					$(0,3^{U1},0)$	529950.638	(0.04)	[76028]
	22 - 21					$(0,0^{0},1)$	550175.406	(0.01)	[76028]
	22 - 21					$(0,1^{L1},1)$	550448.950	(0.04)	[76028]
	22 - 21					$(0,1^{U1},1)$	551650.897	(0.04)	[76028]
	22 - 21					$(0,0^{0},0)$	552487.036	(0.01)	[76028]
	22 - 21					$(0,1^{L1},0)$	552704.352	(0.01)	[76028]
	22 - 21					$(0,3^{L1},0)$	553199.419	(0.04)	[76028]
	22 - 21					$(0,2^{0},0)$	553596.860	(0.01)	[76028]
	22 - 21					$(0,1^{U1},0)$	553747.764	(0.01)	[76028]
	22 - 21					$(0,2^{L2},0)$	553951.086	(0.01)	[76028]
	22 - 21					$(0,2^{U2},0)$	554025.998	(0.01)	[76028]
	22 - 21					$(0,3^{3},0)$	554690.231	(0.04)	[76028]
	22 - 21					$(0,3^{U1},0)$	555161.627	(0.04)	[76028]
$^{14}N^{15}N^{16}O$	1 - 0					$(0,0^{0},0)$	25121.55	(0.05)	[49009]
	15 - 14					$(0,0^{0},0)$	376750.762	(0.01)	[76028]
	15 - 14					$(0,1^{U1},0)$	377592.022	(0.04)	[76028]
	16 - 15					$(0,0^{0},0)$	401857.048	(0.01)	[76028]

TABLE 49.4. The microwave spectrum of N_2O—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{14}N^{15}N^{16}O$	16 - 15					$(0,1^{L1},0)$	401977.590	(0.04)	[76028]
	16 - 15					$(0,1^{U1},0)$	402754.200	(0.04)	[76028]
	17 - 16					$(0,0^{0},0)$	426961.257	(0.01)	[76028]
	17 - 16					$(0,1^{U1},0)$	427914.282	(0.04)	[76028]
	18 - 17					$(0,0^{0},0)$	452063.322	(0.01)	[76028]
	18 - 17					$(0,1^{L1},0)$	452198.710	(0.04)	[76028]
	18 - 17					$(0,1^{U1},0)$	453072.147	(0.04)	[76028]
	19 - 18					$(0,0^{0},0)$	477163.120	(0.01)	[76028]
	19 - 18					$(0,1^{L1},0)$	477305.799	(0.04)	[76028]
	19 - 18					$(0,1^{U1},0)$	478227.737	(0.04)	[76028]
	20 - 19					$(0,0^{0},0)$	502260.498	(0.01)	[76028]
	20 - 19					$(0,1^{L1},0)$	502410.529	(0.04)	[76028]
	20 - 19					$(0,1^{U1},0)$	503380.850	(0.04)	[76028]
	21 - 20					$(0,0^{0},0)$	527355.356	(0.01)	[76028]
	21 - 20					$(0,1^{L1},0)$	527512.660	(0.04)	[76028]
	21 - 20					$(0,1^{U1},0)$	528531.346	(0.04)	[76028]
	22 - 21					$(0,0^{0},0)$	552447.533	(0.01)	[76028]
	22 - 21					$(0,1^{L1},0)$	552612.059	(0.04)	[76028]
	22 - 21					$(0,1^{U1},0)$	553679.232	(0.04)	[76028]
$^{15}N^{14}N^{16}O$	1 - 0		1		1	$(0,0^{0},0)$	24274.53	(0.05)	[47008]
	1 - 0		2		1	$(0,0^{0},0)$	24274.61	(0.05)	[47008]
	1 - 0		0		1	$(0,0^{0},0)$	24274.73	(0.05)	[47008]
	16 - 15					$(0,0^{0},0)$	388313.736	(0.01)	[76028]
	17 - 16					$(0,0^{0},0)$	412572.385	(0.01)	[76028]
	17 - 16					$(0,1^{L1},0)$	412754.664	(0.04)	[76028]
	17 - 16					$(0,1^{U1},0)$	413512.003	(0.04)	[76028]
	18 - 17					$(0,0^{0},0)$	436828.978	(0.01)	[76028]
	18 - 17					$(0,1^{L1},0)$	437021.775	(0.04)	[76028]
	18 - 17					$(0,1^{U1},0)$	437823.654	(0.04)	[76028]
	19 - 18					$(0,0^{0},0)$	461083.472	(0.01)	[76028]
	19 - 18					$(0,1^{L1},0)$	461286.927	(0.04)	[76028]
	19 - 18					$(0,1^{U1},0)$	462133.172	(0.04)	[76028]
	20 - 19					$(0,0^{0},0)$	485335.729	(0.01)	[76028]
	20 - 19					$(0,1^{L1},0)$	485549.636	(0.04)	[76028]
	20 - 19					$(0,1^{U1},0)$	486440.411	(0.04)	[76028]
	21 - 20					$(0,0^{0},0)$	509585.619	(0.01)	[76028]
	21 - 20					$(0,1^{L1},0)$	509809.983	(0.04)	[76028]
	21 - 20					$(0,1^{U1},0)$	510745.225	(0.04)	[76028]
	22 - 21					$(0,0^{0},0)$	533833.046	(0.01)	[76028]
	22 - 21					$(0,1^{L1},0)$	534067.894	(0.04)	[76028]
	22 - 21					$(0,1^{U1},0)$	535047.522	(0.04)	[76028]
	23 - 22					$(0,0^{0},0)$	558077.877	(0.01)	[76028]
	23 - 22					$(0,1^{L1},0)$	558323.158	(0.04)	[76028]
	23 - 22					$(0,1^{U1},0)$	559347.184	(0.04)	[76028]
$^{15}N^{15}N^{16}O$	1 - 0					$(0,0^{0},0)$	24274.78	(0.05)	[49009]
$^{14}N^{14}N^{18}O$	16 - 15					$(0,0^{0},0)$	379413.968	(0.01)	[76028]
	17 - 16					$(0,0^{0},0)$	403116.747	(0.01)	[76028]
	17 - 16					$(0,1^{L1},0)$	403300.584	(0.04)	[76028]
	18 - 17					$(0,0^{0},0)$	426817.545	(0.01)	[76028]
	18 - 17					$(0,1^{U1},0)$	427779.831	(0.04)	[76028]
	19 - 18					$(0,0^{0},0)$	450516.295	(0.01)	[76028]
	19 - 18					$(0,1^{L1},0)$	450721.500	(0.04)	[76028]
	19 - 18					$(0,1^{U1},0)$	451531.806	(0.04)	[76028]
	20 - 19					$(0,0^{0},0)$	474212.870	(0.01)	[76028]
	20 - 19					$(0,1^{L1},0)$	474428.692	(0.04)	[76028]
	20 - 19					$(0,1^{U1},0)$	475281.483	(0.04)	[76028]
	21 - 20					$(0,0^{0},0)$	497907.195	(0.01)	[76028]
	21 - 20					$(0,1^{L1},0)$	498133.635	(0.04)	[76028]
	21 - 20					$(0,1^{U1},0)$	499029.049	(0.04)	[76028]
	22 - 21					$(0,0^{0},0)$	521599.106	(0.01)	[76028]
	22 - 21					$(0,1^{L1},0)$	521836.114	(0.04)	[76028]
	22 - 21					$(0,1^{U1},0)$	522774.011	(0.04)	[76028]
	23 - 22					$(0,0^{0},0)$	545288.526	(0.01)	[76028]
	23 - 22					$(0,1^{L1},0)$	545536.046	(0.04)	[76028]
	23 - 22					$(0,1^{U1},0)$	546516.516	(0.04)	[76028]

TABLE 49.4. The microwave spectrum of N_2O—Continued

Isotopic species	$J' - J''$	F'	F_1'	F''	F_1''	$(\nu_1,\nu_2^{\ell},\nu_3)$	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{14}N^{14}N^{17}O$	17 - 16					$(0,0^0,0)$	414420.396	(0.04)	[76028]
	18 - 17					$(0,0^0,0)$	438785.508	(0.04)	[76028]
	19 - 18					$(0,0^0,0)$	463148.448	(0.04)	[76028]
	20 - 19					$(0,0^0,0)$	487509.107	(0.04)	[76028]
	21 - 20					$(0,0^0,0)$	511867.356	(0.04)	[76028]
	22 - 21					$(0,0^0,0)$	536223.104	(0.04)	[76028]
	23 - 22					$(0,0^0,0)$	560576.228	(0.04)	[76028]

Table 50. Rotational and centrifugal distortion constants for $^{32}S_2{}^{16}O$.

Watson's Determinable Parameters	$^{32}S_2{}^{16}O$ (0,0,0)[a,d] (MHz)	$^{32}S_2{}^{16}O$ (0,1,0)[a] (MHz)	Derived Parameters (assuming planarity conditions)	$^{32}S_2{}^{16}O$ (0,0,0)[d] (MHz)	$^{32}S_2{}^{16}O$ (0,1,0) (MHz)
A''	41 915.4395(100)	42 479.687(24)	A'	41 915.436(10)	42 479.683(24)
B''	5 059.04706(131)	5 059.73551(471)	B'	5 059.0714(13)	5 059.7598(43)
C''	4 507.15763(131)	4 500.8588(42)	C'	4 507.1896(12)	4 500.8870(36)
τ_1	0.105983(308)	0.097785(3959)	τ'_{bbcc}	-0.006688(13)	-0.00717(15)
τ_2	0.00494026(3709)	0.003748(464)	τ'_{ccaa}	0.04865(11)	0.0486(12)
τ_3[b]	0.601(1)	0.66(2)	τ'_{aabb}	0.06402(23)	0.0564(31)
τ_{aaaa}	-4.67933(269)	-5.0330(170)	$\tau_{aabb}(1)$	0.13013(16)	0.1349(17)
τ_{bbbb}	-0.0103185(152)	-0.010957(175)	$\tau_{aabb}(2)$	0.12906(50)	0.1171(52)
τ_{cccc}	-0.0047746(166)	-0.005489(187)	$\tau_{aabb}(3)$	0.12906(50)	0.1171(52)
H_J	$-0.7367(4840)\times10^{-8}$		$\tau_{abab}(1)$	-0.03306(11)	-0.0393(13)
H_{JK}	$0.2400(1321)\times10^{-6}$		$\tau_{abab}(2)$	-0.03209(39)	-0.0232(39)
H_{KJ}	$-0.6155(1234)\times10^{-5}$		$\tau_{abab}(3)$	-0.03199(43)	-0.0214(44)
H_K	$0.1349(258)\times10^{-3}$				
h_J[c]	$0.418(157)\times10^{-8}$		$\Delta\tau$	$-0.199(83)\times10^{-4}$	$-0.33(10)\times10^{-3}$
h_{JK}	$-0.546(292)\times10^{-6}$				
h_K	$0.3578(1459)\times10^{-4}$				
Std. dev.	0.074	0.069			
No. lines fit	113	22			
μ_a (D)	0.875(10)[e]				
μ_b (D)	1.18(2)[e]				

[a] The uncertainties quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

[c] Watson uses $2h_J$ for this parameter.

[d] Data from [73041] and [74006] shown in Table 50.2 was refit to obtain these values.

[e] Reference [59003].

Table 50.1. Rotational constants for $^{34}S^{32}S^{16}O$ and $^{32}S^{34}S^{16}O$ [74006].

Rotational Constant	$^{34}S^{32}S^{16}O$ Value (MHz)	$^{32}S^{34}S^{16}O$ Value (MHz)
A''	41 737.142(60)	40 637.232(75)
B''	4 901.545(10)	5 034.435(10)
C''	4 379.740(10)	4 472.449(10)

TABLE 50.2. The microwave spectrum of S_2O

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{32}S^{32}S^{16}O$	12(2,10) - 13(1,13)	(0,0,0)	19028.615	(0.10)	[74006]
	2(0, 2) - 1(0, 1)	(0,0,0)	19126.4	(0.50)	[59003]
	27(3,24) - 26(4,23)	(0,0,0)	19675.430	(0.10)	[74006]
	2(1, 1) - 1(1, 0)	(0,0,0)	19684.3	(0.50)	[59003]
	15(3,13) - 16(2,14)	(0,0,0)	20058.095	(0.10)	[74006]
	35(4,31) - 34(5,30)	(0,0,0)	20068.505	(0.10)	[74006]
	24(4,20) - 25(3,23)	(0,0,0)	20631.530	(0.10)	[74006]
	30(3,28) - 29(4,25)	(0,0,0)	21532.783	(0.10)	[74006]
	26(2,25) - 25(3,22)	(0,0,0)	21869.23	(0.10)	[73041]
	17(3,14) - 18(2,17)	(0,0,0)	22155.03	(0.10)	[73041]
	11(2, 9) - 12(1,12)	(0,0,0)	23137.86	(0.10)	[73041]
	12(1,11) - 11(2,10)	(0,0,0)	23963.56	(0.10)	[73041]
	6(0, 6) - 5(1, 5)	(0,0,0)	24015.760	(0.10)	[74006]
	27(2,26) - 26(3,23)	(0,0,0)	24364.33	(0.10)	[73041]
	7(2, 6) - 8(1, 7)	(0,0,0)	25137.230	(0.10)	[74006]
	37(4,34) - 36(5,31)	(0,0,0)	25415.880	(0.10)	[74006]
	31(2,30) - 30(3,27)	(0,0,0)	25672.801	(0.10)	[74006]
	28(2,27) - 27(3,24)	(0,0,0)	26025.07	(0.10)	[73041]
	18(2,16) - 18(2,17)	(0,1,0)	26038.352	(0.10)	[74006]
	38(6,32) - 39(5,35)	(0,0,0)	26597.898	(0.10)	[74006]
	30(2,29) - 29(3,26)	(0,0,0)	26703.728	(0.10)	[74006]
	29(2,28) - 28(3,25)	(0,0,0)	26814.38	(0.10)	[73041]
	30(5,26) - 31(4,27)	(0,0,0)	26969.803	(0.10)	[74006]
	23(2,21) - 24(1,24)	(0,0,0)	27169.25	(0.10)	[73041]
	3(1, 3) - 2(1, 2)	(0,0,0)	27867.0	(0.50)	[59003]
	10(2, 8) - 11(1,11)	(0,0,0)	27916.31	(0.10)	[73041]
	3(0, 3) - 2(0, 2)	(0,0,0)	28673.990	(0.10)	[74006]
	3(2, 2) - 2(2, 1)	(0,0,0)	28699.3	(0.50)	[59003]
	3(2, 1) - 2(2, 0)	(0,0,0)	28723.949	(0.10)	[74006]
	31(3,29) - 30(4,26)	(0,0,0)	29010.736	(0.10)	[74006]
	28(3,25) - 27(4,24)	(0,1,0)	29116.733	(0.10)	[74006]
	3(1, 2) - 2(1, 1)	(0,0,0)	29522.8	(0.50)	[59003]
	22(4,19) - 23(3,20)	(0,0,0)	29626.54	(0.10)	[73041]
	23(4,19) - 24(3,22)	(0,0,0)	29735.40	(0.10)	[73041]
	16(3,13) - 17(2,16)	(0,0,0)	29859.90	(0.10)	[73041]
	19(2,17) - 19(2,18)	(0,0,0)	30982.100	(0.10)	[74006]
	45(7,38) - 46(6,41)	(0,0,0)	31686.950	(0.10)	[74006]
	20(2,18) - 19(3,17)	(0,0,0)	31944.58	(0.10)	[73041]
	14(3,12) - 15(2,13)	(0,0,0)	32150.12	(0.10)	[73041]
	30(5,25) - 31(4,28)	(0,0,0)	32422.827	(0.10)	[74006]
	36(4,32) - 35(5,31)	(0,0,0)	32650.964	(0.10)	[74006]
	24(2,22) - 25(1,25)	(0,0,0)	32924.710	(0.10)	[74006]
	28(3,25) - 27(4,24)	(0,0,0)	32998.37	(0.10)	[73041]
	9(2, 7) - 10(1,10)	(0,0,0)	33312.766	(0.10)	[74006]
	44(5,39) - 43(6,38)	(0,0,0)	33400.775	(0.10)	[74006]
	37(6,32) - 38(5,33)	(0,0,0)	34495.794	(0.10)	[74006]
	7(0, 7) - 6(1, 6)	(0,0,0)	34942.247	(0.10)	[74006]
	13(1,12) - 12(2,11)	(0,1,0)	35301.584	(0.10)	[74006]
	32(3,30) - 31(4,27)	(0,0,0)	36060.422	(0.10)	[74006]
	11(1,10) - 11(1,11)	(0,0,0)	36284.840	(0.10)	[74006]
	13(1,12) - 12(2,11)	(0,0,0)	36769.650	(0.10)	[74006]
	37(6,31) - 38(5,34)	(0,0,0)	36789.380	(0.10)	[74006]
	6(2, 5) - 7(1, 6)	(0,0,0)	36827.258	(0.10)	[74006]
	4(1, 4) - 3(1, 3)	(0,1,0)	37112.3	(0.50)	[59003]
	4(1, 4) - 3(1, 3)	(0,0,0)	37149.040	(0.10)	[74006]
	1(1, 0) - 1(0, 1)	(0,0,0)	37407.2	(0.50)	[59003]
	15(3,12) - 16(2,15)	(0,0,0)	37886.598	(0.10)	[74006]
	2(1, 1) - 2(0, 2)	(0,0,0)	37965.395	(0.10)	[74006]
	29(5,25) - 30(4,26)	(0,0,0)	38062.145	(0.10)	[74006]
	4(0, 4) - 3(0, 3)	(0,1,0)	38180.0	(0.50)	[59003]
	4(0, 4) - 3(0, 3)	(0,0,0)	38203.0	(0.50)	[59003]
	4(2, 3) - 3(2, 2)	(0,0,0)	38260.9	(0.50)	[59003]
	4(3, 1) - 3(3, 0)	(0,0,0)	38279.1	(0.50)	[59003]
	4(3, 2) - 3(3, 1)	(0,0,0)	38279.1	(0.50)	[59003]
	4(2, 2) - 3(2, 1)	(0,0,0)	38322.3	(0.50)	[59003]

TABLE 50.2. The microwave spectrum of S_2O—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{32}S^{32}S^{16}O$	6(2, 5) - 7(1, 6)	(0,1,0)	38469.950	(0.10)	[74006]
	2(1, 1) - 2(0, 2)	(0,1,0)	38542.744	(0.10)	[74006]
	3(1, 2) - 3(0, 3)	(0,0,0)	38814.0	(0.50)	[59003]
	22(4,18) - 23(3,21)	(0,0,0)	38984.32	(0.10)	[73041]
	8(2, 6) - 9(1, 9)	(0,0,0)	39275.365	(0.10)	[74006]
	4(1, 3) - 3(1, 2)	(0,1,0)	39347.226	(0.10)	[74006]
	4(1, 3) - 3(1, 2)	(0,0,0)	39356.2	(0.50)	[59003]
	3(1, 2) - 3(0, 3)	(0,1,0)	39402.196	(0.10)	[74006]
	25(2,23) - 26(1,26)	(0,0,0)	39441.778	(0.10)	[74006]
	4(1, 3) - 4(0, 4)	(0,0,0)	39966.8	(0.50)	[59003]
	4(1, 3) - 4(0, 4)	(0,1,0)	40569.593	(0.10)	[74006]
	5(1, 4) - 5(0, 5)	(0,0,0)	41442.2	(0.50)	[59003]
	44(7,37) - 45(6,40)	(0,0,0)	42006.400	(0.10)	[74006]
	5(1, 4) - 5(0, 5)	(0,1,0)	42063.360	(0.10)	[74006]
	8(0, 8) - 7(1, 7)	(0,1,0)	45480.308	(0.10)	[74006]
	7(1, 6) - 7(0, 7)	(0,1,0)	46122.824	(0.10)	[74006]
	14(3,11) - 15(2,14)	(0,0,0)	46193.200	(0.10)	[74006]
	5(1, 5) - 4(1, 4)	(0,1,0)	46378.808	(0.10)	[74006]
	1(1, 1) - 0(0, 0)	(0,0,0)	46421.6	(0.50)	[59003]
	5(1, 5) - 4(1, 4)	(0,0,0)	46424.740	(0.10)	[74006]
	13(3,11) - 14(2,12)	(0,1,0)	46713.212	(0.10)	[74006]
	1(1, 1) - 0(0, 0)	(0,1,0)	46979.456	(0.10)	[74006]
	7(2, 5) - 8(1, 8)	(0,1,0)	47633.514	(0.10)	[74006]
	5(0, 5) - 4(0, 4)	(0,0,0)	47707.620	(0.10)	[74006]
	5(2, 4) - 4(2, 3)	(0,0,0)	47818.040	(0.10)	[74006]
	5(4, 1) - 4(4, 0)	(0,0,0)	47849.270	(0.10)	[74006]
	5(3, 3) - 4(3, 2)	(0,0,0)	47854.040	(0.10)	[74006]
	5(2, 3) - 4(2, 2)	(0,0,0)	47940.840	(0.10)	[74006]
	14(1,13) - 13(2,12)	(0,1,0)	48330.480	(0.10)	[74006]
	14(3,11) - 15(2,14)	(0,1,0)	49147.280	(0.10)	[74006]
	5(1, 4) - 4(1, 3)	(0,1,0)	49171.940	(0.10)	[74006]
	14(1,13) - 13(2,12)	(0,0,0)	49759.490	(0.10)	[74006]
	13(1,12) - 13(1,13)	(0,0,0)	49859.480	(0.10)	[74006]
	9(1, 8) - 9(0, 9)	(0,0,0)	51060.220	(0.10)	[74006]
	43(7,37) - 44(6,38)	(0,0,0)	51587.100	(0.10)	[74006]
	9(1, 8) - 9(0, 9)	(0,1,0)	51799.685	(0.10)	[74006]
	35(3,33) - 34(4,30)	(0,0,0)	54095.650	(0.10)	[74006]
	47(5,43) - 46(6,40)	(0,0,0)	54205.480	(0.10)	[74006]
	10(1, 9) - 10(0,10)	(0,0,0)	54540.680	(0.10)	[74006]
	10(1, 9) - 10(0,10)	(0,1,0)	55322.560	(0.10)	[74006]
	2(1, 2) - 1(0, 1)	(0,0,0)	55435.980	(0.10)	[74006]
	6(1, 6) - 5(1, 5)	(0,0,0)	55692.960	(0.10)	[74006]
	35(6,30) - 36(5,31)	(0,0,0)	55760.460	(0.10)	[74006]
	27(5,22) - 28(4,25)	(0,0,0)	62148.170	(0.10)	[74006]
	10(6, 5) - 9(6, 4)	(0,0,0)	95717.67	(0.10)	[73041]
	10(6, 4) - 9(6, 3)	(0,0,0)	95717.67	(0.10)	[73041]
	10(7, 4) - 9(7, 3)	(0,0,0)	95717.67	(0.10)	[73041]
	10(7, 3) - 9(7, 2)	(0,0,0)	95717.67	(0.10)	[73041]
	10(8, 2) - 9(8, 1)	(0,0,0)	95722.17	(0.10)	[73041]
	10(8, 3) - 9(8, 2)	(0,0,0)	95722.17	(0.10)	[73041]
	10(5, 6) - 9(5, 5)	(0,0,0)	95724.00	(0.10)	[73041]
	10(5, 5) - 9(5, 4)	(0,0,0)	95724.00	(0.10)	[73041]
	10(4, 7) - 9(4, 6)	(0,0,0)	95743.95	(0.10)	[73041]
	10(4, 6) - 9(4, 5)	(0,0,0)	95743.95	(0.10)	[73041]
	10(3, 8) - 9(3, 7)	(0,0,0)	95782.68	(0.10)	[73041]
	10(3, 7) - 9(3, 6)	(0,0,0)	95816.46	(0.10)	[73041]
	20(2,18) - 20(1,19)	(0,0,0)	96404.01	(0.10)	[73041]
	12(2,10) - 12(1,11)	(0,0,0)	96484.74	(0.10)	[73041]
	10(2, 8) - 9(2, 7)	(0,0,0)	96486.87	(0.10)	[73041]
	7(1, 7) - 6(0, 6)	(0,0,0)	96629.70	(0.10)	[73041]
	11(2, 9) - 11(1,10)	(0,0,0)	97938.33	(0.10)	[73041]
	21(2,19) - 21(1,20)	(0,0,0)	98528.76	(0.10)	[73041]
	10(2, 8) - 10(1, 9)	(0,0,0)	99527.22	(0.10)	[73041]
	22(2,20) - 22(1,21)	(0,0,0)	101246.22	(0.10)	[73041]
	11(1,11) - 10(1,10)	(0,0,0)	101883.26	(0.10)	[73041]

TABLE 50.2. The microwave spectrum of S_2O—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{32}S^{32}S^{16}O$	13(0,13) - 12(1,12)	(0,0,0)	102091.14	(0.10)	[73041]
	8(2, 6) - 8(1, 7)	(0,0,0)	102871.77	(0.10)	[73041]
	11(0,11) - 10(0,10)	(0,0,0)	103922.97	(0.10)	[73041]
	11(2,10) - 10(2, 9)	(0,0,0)	105011.71	(0.10)	[73041]
	11(7, 4) - 10(7, 3)	(0,0,0)	105292.83	(0.10)	[73041]
	11(7, 5) - 10(7, 4)	(0,0,0)	105292.83	(0.10)	[73041]
	11(6, 5) - 10(6, 4)	(0,0,0)	105294.36	(0.10)	[73041]
	11(6, 6) - 10(6, 5)	(0,0,0)	105294.36	(0.10)	[73041]
	11(8, 4) - 10(8, 3)	(0,0,0)	105296.46	(0.10)	[73041]
	11(8, 3) - 10(8, 2)	(0,0,0)	105296.46	(0.10)	[73041]
	11(5, 7) - 10(5, 6)	(0,0,0)	105304.53	(0.10)	[73041]
	11(5, 6) - 10(5, 5)	(0,0,0)	105304.53	(0.10)	[73041]
	11(3, 9) - 10(3, 8)	(0,0,0)	105380.13	(0.10)	[73041]
	11(3, 8) - 10(3, 7)	(0,0,0)	105434.94	(0.10)	[73041]
	11(2, 9) - 10(2, 8)	(0,0,0)	106306.77	(0.10)	[73041]
	11(1,10) - 10(1, 9)	(0,0,0)	107895.51	(0.10)	[73041]
	15(0,15) - 14(0,14)	(0,0,0)	140456.20	(0.10)	[73041]
	13(1,13) - 12(0,12)	(0,0,0)	140462.40	(0.10)	[73041]
$^{34}S^{32}S^{16}O$	3(1, 2) - 3(0, 3)	(0,0,0)	38685.010	(0.10)	[74006]
	4(1, 3) - 4(0, 4)	(0,0,0)	39772.750	(0.10)	[74006]
	5(1, 4) - 5(0, 5)	(0,0,0)	41162.713	(0.10)	[74006]
	7(1, 6) - 7(0, 7)	(0,0,0)	44933.084	(0.10)	[74006]
	1(1, 1) - 0(0, 0)	(0,0,0)	46115.814	(0.10)	[74006]
	5(0, 5) - 4(0, 4)	(0,0,0)	46295.792	(0.10)	[74006]
	5(2, 4) - 4(2, 3)	(0,0,0)	46394.804	(0.10)	[74006]
	5(2, 3) - 4(2, 2)	(0,0,0)	46504.760	(0.10)	[74006]
	10(1, 9) - 10(0,10)	(0,0,0)	53449.268	(0.10)	[74006]
	2(1, 2) - 1(0, 1)	(0,0,0)	54875.550	(0.10)	[74006]
$^{32}S^{34}S^{16}O$	1(1, 1) - 0(0, 0)	(0,0,0)	45108.466	(0.10)	[74006]
	5(1, 5) - 4(1, 4)	(0,0,0)	46101.040	(0.10)	[74006]
	8(1, 7) - 8(0, 8)	(0,0,0)	47043.918	(0.10)	[74006]
	5(0, 5) - 4(0, 4)	(0,0,0)	47402.150	(0.10)	[74006]
	5(2, 4) - 4(2, 3)	(0,0,0)	47520.422	(0.10)	[74006]
	5(3, 3) - 4(3, 2)	(0,0,0)	47558.774	(0.10)	[74006]
	5(3, 2) - 4(3, 1)	(0,0,0)	47559.782	(0.10)	[74006]
	5(2, 3) - 4(2, 2)	(0,0,0)	47652.016	(0.10)	[74006]
	2(1, 2) - 1(0, 1)	(0,0,0)	54053.680	(0.10)	[74006]

Table 51. Rotational and centrifugal distortion constants for the ground vibrational state of $^{32}S^{16}O_2$ and $^{33}S^{16}O_2$ [76000]

Watson's Determinable Parameters	$^{32}S^{16}O_2$ Value[a] (MHz)	$^{33}S^{16}O_2$ Value[a] (MHz)
A''	60 778.5553(56)	59 856.4540(681)
B''	10 317.91220(106)	10 318.1328(121)
C''	8 799.651056(927)	8 780.08934(116)
τ_1	0.3883076(1118)	0.381875±0.0092
τ_2	0.03157071(1652)	0.0316319±0.0014
τ_3[b]	0.72784(44)	0.670±0.032
τ_{aaaa}	-9.917148(221)	-9.62800±0.014
τ_{bbbb}	-0.04004591(753)	-0.0396980±0.00056
τ_{cccc}	-0.01282924(624)	-0.012705±0.00035
H_J	$0.13729(1361)\times10^{-7}$	$(-0.63683\pm0.36)\times10^{-6}$
H_{JK}	$0.1129(291)\times10^{-6}$	$(-0.17436\pm0.089)\times10^{-4}$
H_{KJ}	$-0.184810(797)\times10^{-4}$	$(0.50098\pm0.34)\times10^{-4}$
H_K	$0.354211(587)\times10^{-3}$	$(-0.1257\pm0.25)\times10^{-3}$
h_J[c]	$0.10146(241)\times10^{-7}$	$(-0.1553\pm0.078)\times10^{-6}$
h_{JK}	$0.49316(4775)\times10^{-6}$	$(-0.5277\pm0.46)\times10^{-5}$
h_K	0.12411(1467)	$(0.1324\pm0.11)\times10^{-3}$
Std. dev.	0.086	0.111
No. lines fit	198	40
Derived Parameters (assuming planarity conditions)		
A'	60 778.5452(56)	59 856.444(68)
B'	10 317.9625(10)	10 318.1809(117)
C'	8 799.8050(9)	8 780.2420(121)
τ'_{bbcc}	-0.0201513(60)	-0.01964(48)
τ'_{ccaa}	0.100672(34)	0.0962(23)
τ'_{aabb}	0.307787(94)	0.3053(65)
$\tau_{aabb}(1)$	0.42737(5)	0.4221(36)
$\tau_{aabb}(2)$	0.41948(9)	0.4059(34)
$\tau_{aabb}(3)$	0.41948(9)	0.4059(34)
$\tau_{abab}(1)$	-0.05980(5)	-0.0584(15)
$\tau_{abab}(2)$	-0.05289(5)	-0.0442(41)
$\tau_{abab}(3)$	-0.05189(7)	-0.0422(45)
$\Delta\tau$	$-0.246(3)\times10^{-3}$	$-0.516(104)\times10^{-3}$

[a] The uncertainties quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

[c] Watson uses $2h_J$ for this parameter.

Table 51.1. Rotational and centrifugal distortion constants for the (1,0,0) and (0,0,1) vibrational states of $^{32}S^{16}O_2$ [76000].

Watson's Determinable Parameters	$^{32}S^{16}O_2$ ν_1=1 Value[a] (MHz)	$^{32}S^{16}O_2$ ν_3=1 Value[a] (MHz)
A"	60 810.908(87)	60 158.405(86)
B"	10 268.097(15)	10 283.0482(192)
C"	8 757.3121(17)	8 766.86835(1655)
τ_1	0.354762±0.0136	0.481166±0.023
τ_2	0.027035±0.0020	0.0447019±0.0034
τ_3[b]	0.821±0.048	0.450±0.080
τ_{aaaa}	-10.0546±0.024	-9.87982±0.034
τ_{bbbb}	-0.0410525±0.00084	-0.0362180±0.0014
τ_{cccc}	-0.013630±0.00055	-0.011006±0.0008
H_J	$(0.66187\pm0.59)\times10^{-6}$	$(-0.220903\pm0.079)\times10^{-5}$
H_{JK}	$(0.12798\pm0.17)\times10^{-4}$	$(-0.766512\pm0.23)\times10^{-4}$
H_{KJ}	$(-0.51919\pm0.76)\times10^{-4}$	$(0.24558\pm0.081)\times10^{-3}$
H_K	$(0.6008\pm0.52)\times10^{-3}$	$(-0.10760\pm0.052)\times10^{-2}$
h_J[c]	$(0.4347\pm1.66)\times10^{-7}$	$(-0.76972\pm0.23)\times10^{-6}$
h_{JK}	$(0.1132\pm0.064)\times10^{-4}$	$(-0.4544\pm0.73)\times10^{-5}$
h_K	$(-0.1522\pm0.13)\times10^{-3}$	$(-0.6118\pm1.31)\times10^{-4}$
Std. dev.	0.190	0.151
No. lines fit	41	33
Derived Parameters (assuming planarity conditions)		
A'	60 810.898(87)	60 158.397(86)
B'	10 268.146(15)	10 283.107(17)
C'	8 757.451(17)	8 767.058(17)
τ'_{bbcc}	-0.02104(72)	-0.0167(12)
τ'_{ccaa}	0.0972(34)	0.1180(60)
τ'_{aabb}	0.2786(97)	0.380(16)
$\tau_{aabb}(1)$	0.4245(52)	0.4533(92)
$\tau_{aabb}(2)$	0.4153(83)	0.4091(89)
$\tau_{aabb}(3)$	0.4153(83)	0.4091(89)
$\tau_{abab}(1)$	-0.0730(25)	-0.0368(35)
$\tau_{abab}(2)$	-0.0649(86)	0.002(13)
$\tau_{abab}(3)$	-0.0637(96)	0.007(14)
$\Delta\tau$	$-0.287(242)\times10^{-3}$	$-0.139(36)\times10^{-2}$

[a] The uncertainites quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

[c] Watson uses $2h_J$ for this parameter.

Table 51.2. Rotational and centrifugal distortion constants for the (0,1,0) and (0,2,0) vibrational states of $^{32}S^{16}O_2$ [76000].[a]

Watson's Determinable Parameters	$^{32}S^{16}O_2$ ν_2=1 Value (MHz)	$^{32}S^{16}O_2$ ν_2=2 Value (MHz)
A"	61 954.7930(177)	63 185.5876(656)
B"	10 320.2147(32)	10 322.1482(114)
C"	8 783.80517(276)	8 767.77679(1004)
τ_1	0.4094489(5437)	0.441451±0.0070
τ_2	0.03361685(7973)	0.0372037±0.0010
τ_3[b]	0.6996(21)	0.6355±0.024
τ_{aaaa}	-11.02698(118)	-12.2839±0.014
τ_{bbbb}	-0.04013276(3566)	-0.0396164±0.00040
τ_{cccc}	-0.0127477(275)	-0.012326±0.00026
H_J	$(0.2793\pm0.78)\times10^{-8}$	$(-0.31551\pm0.16)\times10^{-6}$
H_{JK}	$(-0.3777\pm1.64)\times10^{-7}$	$(-0.78331\pm0.42)\times10^{-5}$
H_{KJ}	$(-0.21090\pm0.011)\times10^{-4}$	$(0.1111\pm0.19)\times10^{-4}$
H_K	$(0.43841\pm0.010)\times10^{-3}$	$(0.26342\pm0.14)\times10^{-3}$
h_J[c]	$(0.11290\pm0.0080)\times10^{-7}$	$(-0.4662\pm0.29)\times10^{-7}$
h_{JK}	$(0.1301\pm0.20)\times10^{-6}$	$(-0.3455\pm0.19)\times10^{-5}$
h_K	$(0.1509\pm0.048)\times10^{-4}$	$(0.10331\pm0.038)\times10^{-3}$
Std. dev.	0.114	0.143
No. lines fit	90	52
Derived Parameters (assuming planarity conditions)		
A'	61 954.783(18)	63 185.578(66)
B'	10 320.2697(32)	10 322.210(11)
C'	8 783.9647(27)	8 767.945(10)
τ'_{bbcc}	-0.019572(29)	-0.01839(36)
τ'_{ccaa}	0.11004(17)	0.1231(17)
τ'_{aabb}	0.31898(45)	0.3368(49)
$\tau_{aabb}(1)$	0.46821(24)	0.5171(27)
$\tau_{aabb}(2)$	0.44620(31)	0.4752(18)
$\tau_{aabb}(3)$	0.44620(31)	0.4752(18)
$\tau_{abab}(1)$	-0.07462(22)	-0.0920(12)
$\tau_{abab}(2)$	-0.05529(18)	-0.0533(24)
$\tau_{abab}(3)$	-0.05245(22)	-0.0478(26)
$\Delta\tau$	$-0.689(12)\times10^{-3}$	$-0.1312(54)\times10^{-2}$

[a] The uncertainties quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

[c] Watson uses $2h_J$ for this parameter.

Table 51.3. Rotational and centrifugal distortion constants for the ground and (0,1,0) vibrational states of $^{34}S^{16}O_2$ [76000].[a]

Watson's Determinable Parameters	$^{34}S^{16}O_2$ (0,0,0) Value (MHz)	$^{34}S^{16}O_2$ (0,1,0) Value (MHz)
A"	58 991.1970(150)	60 129.228(339)
B"	10 318.3582(28)	10 320.298(63)
C"	8 761.25810(246)	8 745.0711(513)
τ_1	0.367168(717)	0.37964±0.029
τ_2	0.0303047(1098)	0.031482±0.0043
τ_3[b]	0.6542(24)	0.64±0.09
τ_{aaaa}	-9.338295(1597)	-10.2580±0.043
τ_{bbbb}	-0.0400718(447)	-0.040042±0.0017
τ_{cccc}	-0.012533(35)	-0.012357±0.0012
H_J	$(0.2242\pm0.099)\times10^{-7}$	
H_{JK}	$(0.3456\pm0.63)\times10^{-6}$	
H_{KJ}	$(-0.21318\pm0.037)\times10^{-4}$	
H_K	$(0.36197\pm0.026)\times10^{-3}$	
h_J[c]	$(0.672\pm0.82)\times10^{-8}$	
h_{JK}	$(0.6369\pm0.59)\times10^{-6}$	
h_K	$(0.7388\pm1.74)\times10^{-5}$	
Std. Dev.	0.083	0.401
No. lines fit	59	24
Derived Parameters (assuming planarity conditions)		
A'	58 991.187(15)	60 129.218(338)
B'	10 318.4033(27)	10 320.347(61)
C'	8 761.4064(24)	8 745.221(49)
τ'_{bbcc}	-0.019739(40)	-0.0191(15)
τ'_{ccaa}	0.09027(31)	0.0992(83)
τ'_{aabb}	0.29664(49)	0.300(19)
$\tau_{aabb}(1)$	0.41404(44)	0.451(13)
$\tau_{aabb}(2)$	0.40618(80)	0.431(9)
$\tau_{aabb}(3)$	0.40618(80)	0.431(9)
$\tau_{abab}(1)$	-0.05871(25)	-0.0755(33)
$\tau_{abab}(2)$	-0.05184(78)	-0.0588(66)
$\tau_{abab}(3)$	-0.05083(88)	-0.0563(71)
$\Delta\tau$	$-0.256(29)\times10^{-3}$	$-0.62(14)\times10^{-3}$

[a] The uncertainties quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

[c] Watson uses $2h_J$ for this parameter.

Table 51.4. Rotational and quartic distortion constants for all isotopic species and vibrational states analyzed for SO_2 by the Kivelson and Wilson method.[a]

Isotopic Species	Vib. State	A'	B'	C'	τ'_{aaaa}	τ'_{bbbb}	τ'_{aabb}	τ'_{abab}	Reference
$^{32}S^{16}O_2$	(0,0,0)	60 778.514	10 317.965	8 799.804	- 9.87411	-0.040090	0.42171	-0.05617	[68036]
	(1,0,0)	60 811.038	10 268.174	8 757.465	-10.02397	-0.041791	0.41672	-0.07140	[68036]
	(0,1,0)	61 954.687	10 320.256	8 783.941	-10.96607	-0.040361	0.45757	-0.06649	[68036]
	(0,0,1)	60 158.431	10 283.159	8 767.041	- 9.71437	-0.040616	0.41771	-0.04510	[68036]
	(0,2,0)	63 185.787	10 322.313	8 767.940	-11.92063	-0.048489	0.44319	-0.09991	[68036]
	(0,3,0)	64 474.75	10 323.98	8 751.89					[69039]
	(1,1,0)	61 993.90	10 270.61	8 742.11					[69039]
	(0,1,1)	61 315.42	10 285.17	8 750.50					[69039]
	(1,0,1)	60 183.04	10 233.31	8 723.59					[69039]
	(2,0,0)	60 842.29	10 218.40	8 715.38					[69039]
	(0,0,2)	59 544.76	10 247.91	8 734.14					[69039]
$^{34}S^{16}O_2$	(0,0,0)	58 991.174	10 318.399	8 761.394	- 9.31885	-0.040074	0.40944	-0.05585	[65015]
	(0,1,0)	60 130.514	10 320.598	8 745.3716	-10.06005	-0.049991	0.36370	-0.08613	[63016]
$^{33}S^{16}O_2$	(0,0,0)	59 856.387	10 318.283	8 780.124	- 9.54037	-0.040133	0.41053	-0.05566	[68017]
	(0,1,0)	61 013.738	10 320.489	8 764.2976	-10.32546	-0.049430	0.36925	-0.08474	[64015]
$^{32}S^{16}O^{18}O$	(0,0,0)	59 101.191	9 724.523	8 331.647	- 9.34427	-0.035482	0.38333	-0.05035	[65016]
	(0,1,0)	60 212.028	9 726.741	8 317.2379	-10.21285	-0.037730	0.39444	-0.06710	[64012]
$^{32}S^{18}O_2$	(0,0,0)	57 384.526	9 170.351	7 889.6007	- 8.73736	-0.032574	0.33891	-0.04538	[63010]
	(0,1,0)	58 432.942	9 172.691	7 876.7265	- 9.63121	-0.034810	0.35594	-0.06241	[64012]
$^{34}S^{16}O^{18}O$	(0,0,0)	57 314.690	9 724.228	8 294.697	- 8.75329	-0.035421	0.37185	-0.05107	[65016]
	(0,1,0)	58 390.506	9 726.328	8 280.1595	- 9.60174	-0.038290	0.38053	-0.06821	[64015]
$^{34}S^{18}O_2$	(0,0,0)	55 597.855	9 170.815	7 854.9773	- 8.24354	-0.031857	0.33922	-0.04580	[63017]
	(0,1,0)	56 611.880	9 172.937	7 841.8818	- 9.01647	-0.033977	0.34620	-0.05832	[64015]
$^{33}S^{16}O^{18}O$	(0,0,0)	58 179.596	9 724.495	8 312.748	- 8.98394	-0.036655	0.36724	-0.05199	[68017]
$^{33}S^{18}O_2$	(0,0,0)	56 463.093	9 170.713	7 871.928	- 8.51291	-0.031434	0.34678	-0.04355	[68017]
$^{32}S^{16}O^{17}O$	(0,0,0)	59 883.544	10 008.076	8 555.1956	- 9.53188	-0.037835	0.39729	-0.05552	[65017]
	(0,1,0)	61 024.922	10 010.312	8 540.0787	-10.46194	-0.041371	0.40171	-0.07346	[65017]
$^{32}S^{17}O_2$	(0,0,0)	58 977.398	9 709.1769	8 317.7300	- 9.23091	-0.036151	0.37450	-0.05103	[68037]
	(0,1,0)	60 085.210	9 711.4564	8 303.4243	-10.22963	-0.036417	0.40693	-0.06079	[68037]
$^{34}S^{16}O^{17}O$	(0,0,0)	58 096.578	10 008.3346	8 517.6794	- 9.85911	-0.039230	0.37508	-0.05612	[65017]
	(0,1,0)	59200.674	10 010.1790	8 502.2035	- 9.94347	-0.037375	0.42598	-0.06948	[65017]
$^{34}S^{17}O_2$	(0,0,0)	57 190.236	9 709.6284	8 281.2770	- 8.59731	-0.039159	0.34067	-0.05660	[68037]
$^{33}S^{16}O^{17}O$	(0,0,0)	58 961.521	10 008.284	8 535.969	- 9.23227	-0.038835	0.38387	-0.05465	[68017]
	(0,1,0)	60 085.026	10 010.5588	8 520.9077	-10.19203	-0.043129	0.36780	-0.05501	[68037]
$^{33}S^{17}O_2$	(0,0,0)	58 055.949	9 709.489	8 299.264	- 8.95079	-0.036378	0.36448	-0.04853	[68017]
$^{32}S^{17}O^{18}O$	(0,0,0)	58 184.900	9 435.2693	8 100.7437	- 9.07095	-0.030668	0.38563	-0.04298	[65017]
	(0,1,0)	59 263.039	9 437.7055	8 087.1002	- 9.87586	-0.035927	0.37394	-0.05895	[68037]
$^{33}S^{17}O^{18}O$	(0,0,0)	57 263.881	9 435.627	8 082.606	- 8.72074	-0.033828	0.35598	-0.04705	[68017]
$^{34}S^{17}O^{18}O$	(0,0,0)	56 398.745	9 435.6558	8 065.1794	- 8.44291	-0.034950	0.34410	-0.05096	[65017]
$^{36}S^{16}O_2$	(0,0,0)	57 399.507	10 318.7849	8 725.4710	- 8.75476	-0.041953	0.38162	-0.05924	[64014]
	(0,1,0)	58 507.	10 320.8	8 709.3					[64014]

[a] No uncertainties are given in the refernces cited. See the previous SO_2 tables for the constants and uncertainties determined in the present work.

Table 51.5. Hyperfine coupling constants, Zeeman constants and electric dipole moment for SO_2.

Parameter	Isotopic Species	Value	Reference
Hyperfine constants			
χ_{aa} (^{33}S) (MHz)	$^{33}S^{16}O_2$	- 1.91(13)	[76000]
χ_{bb} (^{33}S) (MHz)	$^{33}S^{16}O_2$	25.86(8)	[76000]
χ_{cc} (^{33}S) (MHz)	$^{33}S^{16}O_2$	-23.95(8)	[76000]
χ_{aa} (^{17}O) (MHz)	a	- 1.0(1)	[65017]
χ_{bb} (^{17}O) (MHz)	a	5.8(2)	[65017]
χ_{cc} (^{17}O) (MHz)	a	- 4.8(1)	[65017]
Zeeman constants			
g_{aa} (μ_N)	$^{32}S^{16}O_2$	- 0.6037(5)	[69027]
g_{bb} (μ_N)	$^{32}S^{16}O_2$	- 0.1161(2)	[69027]
g_{cc} (μ_N)	$^{32}S^{16}O_2$	- 0.0882(4)	[69027]
χ_{aa} (erg/G^2·mole)	$^{32}S^{16}O_2$	-16.07(18)	[69027]
χ_{bb} (erg/G^2·mole)	$^{32}S^{16}O_2$	-17.18(12)	[69027]
χ_{cc} (erg/G^2·mole)	$^{32}S^{16}O_2$	-21.35(30)	[69027]
Electric dipole moment			
μ (D)	$^{32}S^{16}O_2$	1.634(1)	[69042]

[a] Identical values were obtained from $^{32}S^{16}O^{17}O$, $^{34}S^{16}O^{17}O$, $^{32}S^{17}O^{18}O$ and $^{34}S^{17}O^{18}O$.

Table 51.6. Additional references for SO_2 divided into general categories.

Microwave Spectrum	Stark and Zeeman Effect	Line Width and Pressure Broadening	Other
[47009] [66029]	[48009]	[63012] [72042]	[61010]
[51015] [67001]	[51008]	[63013] [73051]	[62003]
[54010] [67017]	[51009]	[63014]	[76026]
[57008] [69040]	[59005]	[69032]	
[59012] [70031]	[65013]	[69041]	
[62017] [72031]	[69043]	[70032]	
[64017] [73050]		[70033]	
[66028] [76027]		[70034]	

TABLE 51.7. The microwave spectrum of SO_2

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	39(7,33) - 38(8,30)	(0,0,0)	521.431	(*0.01)	[76000]
	18(3,15) - 17(4,14)	(0,1,0)	851.336	(*0.03)	[76000]
	15(2,14) - 14(3,11)	(0,1,0)	1069.337	(*0.03)	[76000]
	19(3,17) - 18(4,14)	(1,0,0)	1832.116	(*0.10)	[76000]
	45(9,37) - 46(8,38)	(0,2,0)	1906.511	(*0.10)	[76000]
	7(1, 6) - 6(2, 5)	(0,0,1)	1935.561	(*0.07)	[76000]
	34(6,28) - 33(7,27)	(1,0,0)	2496.283	(*0.11)	[76000]
	44(9,35) - 45(8,38)	(0,1,0)	2613.415	(*0.04)	[76000]
	23(4,19) - 22(5,18)	(0,0,1)	2794.648	(*0.10)	[76000]
	27(2,26) - 26(3,23)	(0,0,0)	2838.925	(*0.03)	[76000]
	43(9,35) - 44(8,36)	(0,0,0)	3045.788	(*0.02)	[76000]
	29(5,25) - 28(6,22)	(1,0,0)	3228.873	(*0.09)	[76000]
	19(3,17) - 18(4,14)	(0,0,0)	4027.080	(*0.01)	[76000]
	13(3,10) - 14(2,13)	(0,0,1)	4155.011	(*0.09)	[76000]
	38(4,34) - 39(3,37)	(0,0,0)	4195.716	(*0.03)	[76000]
	26(3,23) - 27(2,26)	(0,1,0)	4275.675	(*0.05)	[76000]
	18(4,14) - 19(3,17)	(0,1,0)	4332.963	(*0.03)	[76000]
	38(8,30) - 39(7,33)	(1,0,0)	4350.057	(*0.17)	[76000]
	11(3, 9) - 12(2,10)	(0,0,0)	4546.018	(0.02)	[73051]
	11(3, 9) - 12(2,10)	(0,0,0)	4546.071	(*0.01)	[76000]
	25(4,22) - 24(5,19)	(0,2,0)	4822.815	(*0.06)	[76000]
	40(7,33) - 39(8,32)	(0,1,0)	5086.187	(*0.04)	[76000]
	60(11,49) - 59(12,48)	(0,0,0)	5189.596	(*0.04)	[76000]
	14(3,11) - 15(2,14)	(0,2,0)	5285.493	(*0.06)	[76000]
	56(10,46) - 55(11,45)	(0,1,0)	5636.682	(*0.05)	[76000]
	15(2,14) - 14(3,11)	(1,0,0)	5682.599	(*0.09)	[76000]
	41(7,35) - 40(8,32)	(0,2,0)	6089.706	(*0.08)	[76000]
	11(3, 9) - 12(2,10)	(1,0,0)	6254.875	(*0.09)	[76000]
	28(6,22) - 29(5,25)	(0,1,0)	6326.651	(*0.02)	[76000]
	34(7,27) - 35(6,30)	(0,2,0)	6750.990	(*0.06)	[76000]
	29(5,25) - 28(6,22)	(0,0,0)	6837.402	(*0.01)	[76000]
	34(6,28) - 33(7,27)	(0,0,0)	6848.427	(*0.01)	[76000]
	18(3,15) - 17(4,14)	(1,0,0)	6888.714	(*0.10)	[76000]
	15(2,14) - 14(3,11)	(0,0,0)	7169.45	(0.10)	[70055]
	15(2,14) - 14(3,11)	(0,0,0)	7169.597	(*0.01)	[76000]
	48(10,38) - 49(9,41)	(0,0,0)	7503.519	(*0.02)	[76000]
	39(7,32) - 38(8,31)	(0,0,1)	7800.663	(*0.39)	[76000]
	11(2, 9) - 12(1,12)	(0,0,1)	8087.07	(0.10)	[64016]
	17(4,14) - 18(3,15)	(0,2,0)	8120.1	(0.2)	[68036]
	12(2,10) - 13(1,13)	(0,0,0)	8420.3	(0.2)	[68036]
	43(9,35) - 44(8,36)	(1,0,0)	8521.615	(*0.23)	[76000]
	3(0, 3) - 2(1, 2)	(0,0,1)	8622.74	(0.10)	[64016]
	49(10,40) - 50(9,41)	(0,1,0)	8793.8	(0.2)	[68036]
	33(7,27) - 34(6,28)	(0,1,0)	8797.40	(0.10)	[68036]
	30(5,25) - 29(6,24)	(0,2,0)	8885.6	(0.2)	[68036]
	27(6,22) - 28(5,23)	(0,0,0)	8911.0	(0.2)	[68036]
	27(6,22) - 28(5,23)	(0,0,0)	8911.144	(*0.01)	[76000]
	27(6,21) - 28(5,24)	(0,0,1)	9080.7	(0.2)	[68036]
	12(2,10) - 13(1,13)	(1,0,0)	9172.5	(0.2)	[68036]
	55(10,46) - 54(11,43)	(0,0,0)	9240.7	(0.1)	[68036]
	32(7,26) - 33(6,27)	(0,0,1)	9264.176	(*0.16)	[76000]
	18(3,15) - 17(4,14)	(0,0,0)	9403.2	(0.2)	[68036]
	34(6,29) - 33(7,26)	(0,0,1)	9482.026	(*0.21)	[76000]
	35(6,30) - 34(7,27)	(0,1,0)	9509.70	(0.10)	[68036]
	13(2,11) - 14(1,14)	(0,0,1)	9653.603	(*0.25)	[76000]
	52(9,43) - 51(10,42)	(0,2,0)	10025.972	(*0.14)	[76000]
	11(3, 9) - 12(2,10)	(0,1,0)	10527.60	(0.10)	[68036]
	17(4,13) - 18(3,16)	(0,0,1)	10915.0	(0.2)	[68036]
	24(4,21) - 23(5,18)	(0,0,1)	11024.921	(*0.09)	[76000]
	50(10,40) - 51(9,43)	(0,2,0)	11409.629	(*0.14)	[76000]
	26(3,23) - 27(2,26)	(0,2,0)	11434.180	(*0.14)	[76000]
	24(4,20) - 23(5,19)	(0,1,0)	11456.95	(0.10)	[68036]
	53(11,43) - 54(10,44)	(0,0,0)	11472.3	(0.1)	[68036]
	10(2, 8) - 11(1,11)	(0,0,0)	11788.841	(0.02)	[73051]
	16(4,13) - 17(3,14)	(0,0,1)	11884.180	(*0.08)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	45(8,38) - 44(9,35)	(1,0,0)	11973.676	(*0.29)	[76000]
	51(9,43) - 50(10,40)	(0,1,0)	11994.3	(0.2)	[68036]
	22(5,17) - 23(4,20)	(0,0,0)	12132.4	(0.2)	[68036]
	2(0, 2) - 1(1, 1)	(0,0,0)	12256.583	(0.02)	[73051]
	1(1, 1) - 2(0, 2)	(1,0,0)	12522.89	(0.10)	[64016]
	27(6,22) - 28(5,23)	(1,0,0)	12563.0	(0.2)	[68036]
	10(2, 8) - 11(1,11)	(1,0,0)	12597.69	(0.10)	[64016]
	38(4,34) - 39(3,37)	(0,1,0)	12756.20	(0.10)	[68036]
	1(1, 1) - 2(0, 2)	(2,0,0)	12787.19	(0.10)	[69039]
	18(4,14) - 19(3,17)	(0,2,0)	13072.5	(0.2)	[65015]
	12(2,10) - 13(1,13)	(0,1,0)	13084.10	(0.10)	[68036]
	1(1, 1) - 2(0, 2)	(0,1,0)	13457.50	(0.10)	[68036]
	50(9,41) - 49(10,40)	(0,0,0)	13599.5	(0.1)	[62014]
	39(8,32) - 40(7,33)	(0,2,0)	13685.8	(0.2)	[68036]
	1(1, 1) - 2(0, 2)	(1,1,0)	13729.07	(0.20)	[69039]
	37(8,29) - 38(7,32)	(0,0,1)	14169.218	(*0.30)	[76000]
	25(2,24) - 24(3,21)	(0,2,0)	14506.8	(0.2)	[68036]
	14(2,12) - 15(1,15)	(0,0,0)	14587.697	(0.02)	[73051]
	1(1, 1) - 2(0, 2)	(0,2,0)	14714.15	(0.20)	[68036]
	8(1, 7) - 7(2, 6)	(0,3,0)	14880.46	(0.20)	[69039]
	22(5,17) - 23(4,20)	(1,0,0)	14974.3	(0.2)	[68036]
	14(2,12) - 15(1,15)	(1,0,0)	15230.5	(0.2)	[68036]
	54(11,43) - 55(10,46)	(0,1,0)	15309.2	(0.2)	[68036]
	58(12,46) - 59(11,49)	(0,0,0)	15470.4	(0.1)	[68036]
	9(2, 7) - 10(1,10)	(0,0,1)	15847.9	(0.2)	[68036]
	1(1, 1) - 2(0, 2)	(0,3,0)	16030.59	(0.20)	[69039]
	25(4,22) - 24(5,19)	(0,1,0)	16048.54	(0.10)	[64019]
	49(4,46) - 48(5,43)	(0,1,0)	16069.0	(0.2)	[68036]
	10(2, 8) - 11(1,11)	(0,1,0)	16126.89	(0.10)	[64019]
	17(2,16) - 16(3,13)	(0,2,0)	16372.7	(0.2)	[68036]
	32(7,25) - 33(6,28)	(0,0,0)	16681.03	(0.10)	[64019]
	11(3, 9) - 12(2,10)	(0,2,0)	16807.3	(0.2)	[68036]
	38(8,30) - 39(7,33)	(0,1,0)	17341.9	(0.3)	[62014]
	45(8,38) - 44(9,35)	(0,0,0)	17539.94	(0.10)	[64019]
	71(13,59) - 70(14,56)	(0,0,0)	17719.15	(0.10)	[68036]
	12(2,10) - 13(1,13)	(0,2,0)	17880.1	(0.2)	[68036]
	40(7,33) - 39(8,32)	(1,0,0)	17994.7	(0.2)	[68036]
	29(5,24) - 28(6,23)	(0,0,1)	18145.0	(0.2)	[68036]
	8(1, 7) - 7(2, 6)	(0,2,0)	18568.3	(0.2)	[64016]
	47(8,40) - 46(9,37)	(0,2,0)	18592.15	(0.20)	[68036]
	36(6,30) - 35(7,29)	(0,2,0)	18976.5	(0.2)	[68036]
	24(4,20) - 23(5,19)	(1,0,0)	19226.75	(0.10)	[68036]
	46(8,38) - 45(9,37)	(0,1,0)	19229.6	(0.3)	[62014]
	63(13,51) - 64(12,52)	(0,0,0)	19306.2	(0.2)	[68036]
	37(8,30) - 38(7,31)	(0,0,0)	19637.10	(0.10)	[64019]
	14(2,12) - 15(1,15)	(0,1,0)	19681.13	(0.10)	[64019]
	62(11,51) - 61(12,50)	(0,1,0)	20031.0	(0.2)	[68036]
	28(6,22) - 29(5,25)	(0,2,0)	20103.1	(0.2)	[65015]
	12(3, 9) - 13(2,12)	(0,0,0)	20335.396	(0.02)	[73051]
	21(3,19) - 20(4,16)	(0,2,0)	20383.75	(0.20)	[68036]
	16(2,15) - 15(3,12)	(0,0,1)	20383.86	(0.10)	[64016]
	10(2, 8) - 11(1,11)	(0,2,0)	20611.6	(0.2)	[68036]
	35(6,30) - 34(7,27)	(1,0,0)	20689.8	(0.2)	[65015]
	15(2,13) - 16(1,16)	(0,0,1)	20777.282	(*0.32)	[76000]
	31(5,27) - 30(6,24)	(0,2,0)	20785.7	(0.2)	[65015]
	32(7,25) - 33(6,28)	(1,0,0)	20835.1	(0.2)	[65015]
	8(1, 7) - 7(2, 6)	(1,1,0)	20953.36	(0.20)	[69039]
	25(2,24) - 24(3,21)	(0,1,0)	21264.29	(0.10)	[64019]
	59(12,48) - 60(11,49)	(0,1,0)	21479.5	(0.2)	[68036]
	66(12,54) - 65(13,53)	(0,0,0)	21761.4	(0.2)	[68036]
	12(3, 9) - 13(2,12)	(1,0,0)	21768.64	(0.10)	[64016]
	8(2, 6) - 9(1, 9)	(0,0,2)	21843.68	(0.20)	[69039]
	8(1, 7) - 7(2, 6)	(0,1,0)	22065.73	(0.10)	[64019]
	27(6,22) - 28(5,23)	(0,1,0)	22220.36	(0.10)	[64019]
	24(4,20) - 23(5,19)	(0,0,0)	22482.548	(0.02)	[73051]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	17(2,16) - 16(3,13)	(0,1,0)	22733.99	(0.10)	[64019]
	22(5,17) - 23(4,20)	(0,1,0)	22904.86	(0.10)	[64019]
	30(5,25) - 29(6,24)	(0,1,0)	22928.52	(0.10)	[64019]
	40(7,33) - 39(8,32)	(0,0,0)	23034.821	(0.02)	[73051]
	68(14,54) - 69(13,57)	(0,0,0)	23041.1	(0.2)	[68036]
	43(9,35) - 44(8,36)	(0,1,0)	23206.35	(0.30)	[62014]
	13(2,11) - 12(3,10)	(0,0,1)	23402.2	(0.2)	[68036]
	5(2, 4) - 6(1, 5)	(0,0,0)	23414.253	(0.02)	[73051]
	20(3,18) - 19(4,15)	(0,0,1)	23629.6	(0.2)	[68036]
	44(9,35) - 45(8,38)	(0,2,0)	23681.2	(0.2)	[68036]
	25(4,22) - 24(5,19)	(1,0,0)	23788.	(1.)	[65015]
	21(5,17) - 22(4,18)	(0,0,0)	24039.641	(0.02)	[73051]
	8(2, 6) - 9(1, 9)	(0,0,0)	24083.455	(0.02)	[73051]
	5(2, 4) - 6(1, 5)	(1,0,0)	24275.46	(0.10)	[64016]
	8(1, 7) - 7(2, 6)	(1,0,0)	24301.59	(0.10)	[64016]
	42(9,33) - 43(8,36)	(0,0,0)	24319.556	(0.02)	[73051]
	37(8,30) - 38(7,31)	(1,0,0)	24431.8	(0.2)	[68036]
	41(7,35) - 40(8,32)	(0,1,0)	24796.9	(0.3)	[62014]
	8(2, 6) - 9(1, 9)	(1,0,0)	24888.0	(0.2)	[68036]
	14(2,12) - 15(1,15)	(0,2,0)	24889.75	(0.20)	[68036]
	49(4,46) - 48(5,43)	(0,0,0)	24915.60	(0.10)	[68036]
	35(6,30) - 34(7,27)	(0,0,0)	25049.43	(0.02)	[73051]
	5(2, 4) - 6(1, 5)	(2,0,0)	25132.06	(0.20)	[69039]
	33(7,27) - 34(6,28)	(0,2,0)	25167.2	(0.2)	[68036]
	10(2, 8) - 11(1,11)	(0,3,0)	25254.4	(0.2)	[68036]
	8(1, 7) - 7(2, 6)	(0,0,0)	25392.776	(0.02)	[51016]
	4(0, 4) - 3(1, 3)	(0,3,0)	25597.70	(0.20)	[69039]
	8(2, 6) - 9(1, 9)	(2,0,0)	25683.50	(0.20)	[69039]
	61(11,51) - 60(12,48)	(0,0,0)	25883.6	(0.2)	[65015]
	26(6,21) - 27(5,22)	(0,0,1)	25999.8	(0.2)	[68036]
	12(3, 9) - 13(2,12)	(0,1,0)	26411.75	(0.10)	[64016]
	57(10,48) - 56(11,45)	(0,1,0)	26489.4	(0.2)	[68036]
	73(15,59) - 74(14,60)	(0,0,0)	26644.5	(0.2)	[68036]
	25(4,22) - 24(5,19)	(0,0,0)	26776.574	(0.02)	[73051]
	5(2, 4) - 6(1, 5)	(0,1,0)	26850.3	(0.2)	[62016]
	4(0, 4) - 3(1, 3)	(0,2,0)	26898.5	(0.2)	[68036]
	21(5,17) - 22(4,18)	(1,0,0)	26977.8	(0.2)	[65015]
	10(3, 8) - 11(2, 9)	(0,0,1)	26984.8	(0.2)	[68036]
	17(2,16) - 16(3,13)	(1,0,0)	27386.15	(0.10)	[68036]
	64(13,51) - 65(12,54)	(0,1,0)	27546.3	(0.2)	[68036]
	40(7,34) - 39(8,31)	(0,0,1)	27638.748	(*0.59)	[76000]
	4(0, 4) - 3(1, 3)	(1,1,0)	27669.12	(0.20)	[69039]
	8(1, 7) - 7(2, 6)	(0,0,2)	27700.88	(0.20)	[69039]
	5(2, 4) - 6(1, 5)	(1,1,0)	27730.40	(0.20)	[69039]
	12(3, 9) - 13(2,12)	(1,1,0)	27865.5	(0.5)	[68036]
	25(2,24) - 24(3,21)	(0,0,0)	27932.2	(0.2)	[68036]
	25(2,24) - 24(3,21)	(0,0,0)	27932.454	(*0.03)	[76000]
	21(5,16) - 22(4,19)	(0,0,1)	28121.3	(0.2)	[68036]
	4(0, 4) - 3(1, 3)	(0,1,0)	28138.3	(0.2)	[62016]
	8(2, 6) - 9(1, 9)	(0,1,0)	28173.4	(0.2)	[62016]
	47(10,38) - 48(9,39)	(0,0,0)	28179.20	(0.05)	[62016]
	4(0, 4) - 3(1, 3)	(2,0,0)	28395.22	(0.20)	[69039]
	4(0, 4) - 3(1, 3)	(1,0,0)	28857.310	(*0.05)	[76000]
	17(2,16) - 16(3,13)	(0,0,0)	28858.037	(0.02)	[73051]
	8(2, 6) - 9(1, 9)	(1,1,0)	28983.2	(0.5)	[69039]
	21(3,19) - 20(4,16)	(0,1,0)	29052.63	(0.10)	[64019]
	4(0, 4) - 3(1, 3)	(0,0,0)	29321.333	(0.02)	[73051]
	19(3,16) - 18(4,15)	(0,1,1)	29658.4	(0.5)	[68036]
	42(9,33) - 43(8,36)	(1,0,0)	29668.0	(0.2)	[68036]
	48(10,38) - 49(9,41)	(0,1,0)	29861.2	(0.2)	[68036]
	42(7,35) - 41(8,34)	(0,2,0)	29871.8	(0.2)	[68036]
	4(0, 4) - 3(1, 3)	(0,0,2)	29922.82	(0.20)	[69039]
	16(2,14) - 17(1,17)	(0,0,0)	30205.52	(0.10)	[64019]
	56(10,46) - 55(11,45)	(0,0,0)	30218.84	(0.10)	[65015]
	23(2,22) - 22(3,19)	(0,2,0)	30268.7	(0.2)	[68036]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	5(2, 4) - 6(1, 5)	(0,2,0)	30455.1	(0.2)	[68036]
	19(2,18) - 18(3,15)	(0,2,0)	30486.1	(0.2)	[68036]
	16(2,14) - 17(1,17)	(1,0,0)	30700.5	(0.2)	[68036]
	53(9,45) - 52(10,42)	(0,2,0)	30869.3	(0.2)	[68036]
	37(3,35) - 36(4,32)	(0,1,0)	30948.20	(0.10)	[68036]
	28(3,25) - 29(2,28)	(0,0,0)	31089.903	(*0.03)	[76000]
	28(3,25) - 29(2,28)	(0,0,0)	31089.92	(0.10)	[64019]
	30(5,26) - 29(6,23)	(0,0,1)	31678.1	(0.2)	[68036]
	16(4,12) - 17(3,15)	(0,0,0)	31922.21	(0.03)	[63011]
	31(7,24) - 32(6,27)	(0,0,1)	31943.6	(0.2)	[68036]
	7(2, 5) - 8(1, 8)	(0,0,1)	31993.92	(0.10)	[64016]
	49(10,40) - 50(9,41)	(0,2,0)	32188.0	(0.2)	[68036]
	52(11,41) - 53(10,44)	(0,0,0)	32195.45	(0.10)	[64019]
	32(7,25) - 33(6,28)	(0,1,0)	32214.62	(0.10)	[64019]
	30(5,25) - 29(6,24)	(1,0,0)	32381.8	(0.2)	[68036]
	8(2, 6) - 9(1, 9)	(0,2,0)	32420.05	(0.20)	[68036]
	12(3, 9) - 13(2,12)	(0,2,0)	32753.0	(0.5)	[65015]
	7(2, 5) - 8(1, 8)	(1,0,1)	32786.60	(0.20)	[69039]
	50(5,45) - 51(4,48)	(0,0,0)	32829.93	(0.10)	[65015]
	50(5,45) - 51(4,48)	(0,0,0)	32830.067	(*0.07)	[76000]
	52(9,43) - 51(10,42)	(0,1,0)	33483.3	(0.2)	[68036]
	11(3, 8) - 12(2,11)	(0,0,1)	33730.90	(0.10)	[64016]
	46(8,38) - 45(9,37)	(1,0,0)	33733.4	(0.2)	[68036]
	16(4,12) - 17(3,15)	(1,0,0)	33996.1	(0.2)	[68036]
	26(6,20) - 27(5,23)	(0,0,0)	34097.72	(0.03)	[63011]
	22(5,17) - 23(4,20)	(0,2,0)	34176.75	(0.20)	[68036]
	35(6,29) - 34(7,28)	(0,0,1)	34253.4	(0.2)	[68036]
	36(8,29) - 37(7,30)	(0,0,1)	34345.8	(0.2)	[68036]
	51(9,43) - 50(10,40)	(0,0,0)	34393.55	(0.10)	[64019]
	31(5,27) - 30(6,24)	(0,1,0)	34530.22	(0.10)	[64019]
	21(5,17) - 22(4,18)	(0,1,0)	34971.60	(0.10)	[64019]
	21(3,19) - 20(4,16)	(1,0,0)	35084.3	(0.2)	[68036]
	37(6,32) - 36(7,29)	(0,2,0)	35233.3	(0.2)	[68036]
	36(6,30) - 35(7,29)	(0,1,0)	35448.00	(0.10)	[64019]
	21(2,20) - 20(3,17)	(0,2,0)	35477.486	(*0.08)	[76000]
	14(2,12) - 13(3,11)	(0,2,0)	35788.9	(0.2)	[68036]
	16(2,14) - 17(1,17)	(0,1,0)	35855.86	(0.10)	[64019]
	7(2, 5) - 8(1, 8)	(0,1,1)	35941.26	(0.20)	[69039]
	57(12,46) - 58(11,47)	(0,0,0)	36003.54	(0.10)	[64019]
	53(11,43) - 54(10,44)	(0,1,0)	36003.6	(0.2)	[68036]
	38(8,30) - 39(7,33)	(0,2,0)	36022.8	(0.2)	[68036]
	31(7,25) - 32(6,26)	(0,0,0)	36065.23	(0.03)	[63011]
	27(6,22) - 28(5,23)	(0,2,0)	36150.5	(0.2)	[68036]
	30(5,25) - 29(6,24)	(0,0,0)	36338.05	(0.03)	[63011]
	23(2,22) - 22(3,19)	(0,1,0)	36791.07	(0.10)	[64019]
	19(2,18) - 18(3,15)	(0,1,0)	36857.00	(0.10)	[64019]
	21(3,19) - 20(4,16)	(0,0,0)	37351.80	(0.10)	[64019]
	26(6,20) - 27(5,23)	(1,0,0)	37515.6	(0.2)	[68036]
	37(8,30) - 38(7,31)	(0,1,0)	37525.20	(0.10)	[64019]
	41(7,35) - 40(8,32)	(1,0,0)	37593.4	(0.2)	[68036]
	21(5,17) - 22(4,18)	(1,1,0)	37961.0	(0.5)	[68036]
	41(9,32) - 42(8,35)	(0,0,1)	38015.3	(0.2)	[68036]
	19(3,16) - 18(4,15)	(0,0,1)	38101.4	(0.2)	[68036]
	18(2,17) - 17(3,14)	(0,0,1)	38186.9	(0.2)	[68036]
	72(13,59) - 71(14,58)	(0,0,0)	38209.5	(0.2)	[68036]
	15(4,12) - 16(3,13)	(0,0,0)	38518.225	(0.02)	[73051]
	28(3,25) - 29(2,28)	(0,1,0)	38843.50	(0.10)	[68036]
	37(3,35) - 36(4,32)	(0,0,0)	38909.683	(*0.03)	[76000]
	37(3,35) - 36(4,32)	(0,0,0)	38909.70	(0.10)	[64019]
	46(8,38) - 45(9,37)	(0,0,0)	39446.99	(0.10)	[64019]
	47(8,40) - 46(9,37)	(0,1,0)	39698.7	(0.2)	[68036]
	62(13,49) - 63(12,52)	(0,0,0)	39730.0	(0.2)	[68036]
	14(2,12) - 13(3,11)	(1,1,0)	39965.3	(0.5)	[68036]
	31(7,25) - 32(6,26)	(1,0,0)	40163.0	(0.2)	[68036]
	16(4,12) - 17(3,15)	(0,1,0)	40313.08	(0.10)	[64019]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	15(4,12) - 16(3,13)	(1,0,0)	40720.8	(0.2)	[68036]
	63(11,53) - 62(12,50)	(0,1,0)	40867.4	(0.2)	[68036]
	17(2,15) - 18(1,18)	(0,0,1)	41050.7	(0.2)	[68036]
	36(8,28) - 37(7,31)	(0,0,0)	41177.50	(0.10)	[68036]
	48(8,40) - 47(9,39)	(0,2,0)	41249.4	(0.2)	[68036]
	6(2, 4) - 7(1, 7)	(0,0,2)	41495.15	(0.20)	[69039]
	16(2,14) - 17(1,17)	(0,2,0)	41603.6	(0.2)	[68036]
	19(2,18) - 18(3,15)	(1,0,0)	41642.4	(0.2)	[68036]
	21(2,20) - 20(3,17)	(0,1,0)	41887.49	(0.10)	[64019]
	14(2,12) - 13(3,11)	(0,1,0)	42005.35	(0.10)	[64019]
	58(12,46) - 59(11,49)	(0,1,0)	42111.9	(0.2)	[68036]
	20(5,16) - 21(4,17)	(0,0,1)	42231.3	(0.2)	[68036]
	23(2,22) - 22(3,19)	(1,0,0)	42243.044	(*0.71)	[76000]
	67(12,56) - 66(13,53)	(0,0,0)	42397.7	(0.2)	[68036]
	16(4,12) - 17(3,15)	(1,1,0)	42423.0	(0.5)	[68036]
	27(4,24) - 26(5,21)	(0,2,0)	42498.8	(0.2)	[68036]
	50(5,45) - 51(4,48)	(0,1,0)	42615.9	(0.2)	[68036]
	41(7,35) - 40(8,32)	(0,0,0)	42680.09	(0.10)	[64019]
	19(2,18) - 18(3,15)	(0,0,0)	43016.28	(0.10)	[64019]
	23(2,22) - 22(3,19)	(0,0,0)	43178.14	(0.10)	[64019]
	67(14,54) - 68(13,55)	(0,0,0)	43321.7	(0.2)	[68036]
	31(5,27) - 30(6,24)	(1,0,0)	43878.4	(0.2)	[68036]
	20(3,17) - 19(4,16)	(0,2,0)	44023.5	(0.2)	[68036]
	6(2, 4) - 7(1, 7)	(0,0,0)	44052.860	(0.02)	[73051]
	43(9,35) - 44(8,36)	(0,2,0)	44278.2	(0.2)	[68036]
	42(9,33) - 43(8,36)	(0,1,0)	44438.05	(0.10)	[68036]
	6(2, 4) - 7(1, 7)	(1,0,0)	44794.5	(0.2)	[68036]
	41(9,33) - 42(8,34)	(0,0,0)	44875.86	(0.03)	[64011]
	4(2, 3) - 5(1, 4)	(0,0,1)	45468.4	(0.2)	[68036]
	6(2, 4) - 7(1, 7)	(2,0,0)	45528.88	(0.20)	[69039]
	36(8,28) - 37(7,31)	(1,0,0)	45834.0	(0.2)	[68036]
	14(2,12) - 13(3,11)	(1,0,0)	45911.1	(0.2)	[68036]
	4(2, 3) - 5(1, 4)	(1,0,1)	46194.30	(0.20)	[69039]
	21(5,17) - 22(4,18)	(0,2,0)	46418.9	(0.2)	[68036]
	36(6,30) - 35(7,29)	(1,0,0)	46547.236	(*0.30)	[76000]
	28(3,25) - 29(2,28)	(0,2,0)	46599.5	(0.2)	[68036]
	62(11,51) - 61(12,50)	(0,0,0)	46752.9	(0.2)	[68036]
	72(15,57) - 73(14,60)	(0,0,0)	46786.9	(0.2)	[68036]
	21(2,20) - 20(3,17)	(1,0,0)	46929.5	(0.2)	[68036]
	15(4,12) - 16(3,13)	(0,1,0)	47017.60	(0.06)	[64011]
	26(6,20) - 27(5,23)	(0,1,0)	47269.31	(0.06)	[64011]
	22(2,21) - 21(3,18)	(0,0,1)	47331.623	(*0.94)	[76000]
	15(4,11) - 16(3,14)	(0,0,1)	47575.6	(0.2)	[68036]
	20(2,19) - 19(3,16)	(0,0,1)	47594.544	(*0.31)	[76000]
	31(5,27) - 30(6,24)	(0,0,0)	47660.60	(0.05)	[68036]
	58(10,48) - 57(11,47)	(0,1,0)	47745.8	(0.2)	[68036]
	14(2,12) - 13(3,11)	(0,0,0)	47913.420	(0.02)	[73051]
	59(5,55) - 58(6,52)	(0,1,0)	47916.069	(*0.93)	[76000]
	6(2, 4) - 7(1, 7)	(0,1,0)	47950.79	(0.06)	[64011]
	63(13,51) - 64(12,52)	(0,1,0)	48005.5	(0.2)	[68036]
	21(2,20) - 20(3,17)	(0,0,0)	48120.44	(0.03)	[64011]
	32(7,25) - 33(6,28)	(0,2,0)	48464.05	(0.20)	[68036]
	9(1, 8) - 8(2, 7)	(0,1,1)	48531.97	(0.20)	[69039]
	43(7,37) - 42(8,34)	(0,2,0)	48635.75	(0.20)	[68036]
	6(2, 4) - 7(1, 7)	(1,1,0)	48703.36	(0.20)	[69039]
	42(7,35) - 41(8,34)	(0,1,0)	48732.7	(0.2)	[68036]
	4(2, 3) - 5(1, 4)	(0,1,1)	48893.15	(0.20)	[69039]
	46(10,36) - 47(9,39)	(0,0,0)	48958.18	(0.03)	[64011]
	16(4,12) - 17(3,15)	(0,2,0)	49088.2	(0.2)	[68036]
	26(4,23) - 25(5,20)	(0,0,1)	49108.0	(0.2)	[68036]
	25(6,19) - 26(5,22)	(0,0,1)	49814.1	(0.2)	[68036]
	26(4,22) - 25(5,21)	(0,2,0)	49833.5	(0.2)	[68036]
	5(0, 5) - 4(1, 4)	(0,1,1)	49951.69	(0.20)	[69039]
	23(3,21) - 22(4,18)	(0,2,0)	49971.0	(0.2)	[68036]
	41(9,33) - 42(8,34)	(1,0,0)	50125.995	(*0.35)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	47(10,38) - 48(9,39)	(0,1,0)	50523.7	(0.2)	[68036]
	5(0, 5) - 4(1, 4)	(1,0,1)	50538.70	(0.20)	[69039]
	9(1, 8) - 8(2, 7)	(1,0,1)	50561.22	(0.20)	[69039]
	41(7,34) - 40(8,33)	(0,0,1)	50893.349	(*0.96)	[76000]
	25(4,21) - 24(5,20)	(0,0,1)	51052.3	(0.2)	[68036]
	57(10,48) - 56(11,45)	(0,0,0)	51086.1	(0.1)	[68036]
	5(0, 5) - 4(1, 4)	(0,0,1)	51097.25	(0.10)	[68036]
	36(6,30) - 35(7,29)	(0,0,0)	51185.22	(0.06)	[64011]
	36(6,31) - 35(7,28)	(0,0,1)	51205.385	(*0.65)	[76000]
	1(1, 0) - 1(0, 1)	(0,0,1)	51389.15	(0.10)	[68036]
	1(1, 0) - 1(0, 1)	(1,0,1)	51457.16	(0.20)	[69039]
	37(6,32) - 36(7,29)	(0,1,0)	51485.10	(0.10)	[68036]
	30(7,24) - 31(6,25)	(0,0,1)	51531.103	(*0.22)	[76000]
	31(7,25) - 32(6,26)	(0,1,0)	51645.00	(0.10)	[68036]
	20(5,15) - 21(4,18)	(0,0,0)	51736.59	(0.03)	[64011]
	9(1, 8) - 8(2, 7)	(0,0,1)	51738.145	(*0.09)	[76000]
	6(2, 4) - 7(1, 7)	(0,2,0)	52010.9	(0.2)	[68036]
	10(3, 7) - 11(2,10)	(0,0,0)	52051.71	(0.03)	[64011]
	25(6,20) - 26(5,21)	(0,0,0)	52188.48	(0.06)	[64011]
	2(1, 1) - 2(0, 2)	(0,0,2)	52356.93	(0.20)	[69039]
	1(1, 0) - 1(0, 1)	(0,1,1)	52562.63	(0.20)	[69039]
	51(11,41) - 52(10,42)	(0,0,0)	52744.0	(0.1)	[68036]
	9(3, 7) - 10(2, 8)	(0,0,0)	53015.296	(*0.01)	[76000]
	9(3, 7) - 10(2, 8)	(0,0,0)	53015.4	(0.2)	[68036]
	20(3,17) - 19(4,16)	(0,1,0)	53048.80	(0.10)	[68036]
	48(10,38) - 49(9,41)	(0,2,0)	53216.327	(*0.22)	[76000]
	10(3, 7) - 11(2,10)	(1,0,0)	53378.9	(0.2)	[68036]
	2(1, 1) - 2(0, 2)	(0,0,0)	53528.80	(0.05)	[70055]
	2(1, 1) - 2(0, 2)	(1,0,0)	53595.8	(0.2)	[68036]
	27(4,24) - 26(5,21)	(0,1,0)	53633.80	(0.10)	[68036]
	2(1, 1) - 2(0, 2)	(2,0,0)	53661.16	(0.20)	[69039]
	40(4,36) - 41(3,39)	(0,0,0)	54138.8	(0.3)	[68036]
	40(4,36) - 41(3,39)	(0,0,0)	54139.127	(*0.04)	[76000]
	53(9,45) - 52(10,42)	(0,1,0)	54322.300	(*0.08)	[76000]
	20(5,15) - 21(4,18)	(1,0,0)	54406.496	(*0.14)	[76000]
	9(3, 7) - 10(2, 8)	(1,0,0)	54448.594	(*0.12)	[76000]
	18(2,16) - 19(1,19)	(0,0,0)	54633.4	(0.2)	[68036]
	2(1, 1) - 2(0, 2)	(0,1,0)	54738.80	(0.10)	[68036]
	2(1, 1) - 2(0, 2)	(1,1,0)	54811.92	(0.20)	[69039]
	22(3,20) - 21(4,17)	(0,0,1)	54859.6	(0.2)	[68036]
	18(2,16) - 19(1,19)	(1,0,0)	54958.364	(*0.86)	[76000]
	5(2, 3) - 6(1, 6)	(0,0,1)	55066.475	(*0.13)	[76000]
	3(1, 2) - 3(0, 3)	(0,0,1)	55329.3	(0.2)	[63015]
	3(1, 2) - 3(0, 3)	(1,0,1)	55379.81	(0.20)	[69039]
	35(8,27) - 36(7,30)	(0,0,1)	55512.229	(*0.43)	[76000]
	25(6,20) - 26(5,21)	(1,0,0)	55576.215	(*0.19)	[76000]
	5(2, 3) - 6(1, 6)	(1,0,1)	55756.48	(0.20)	[69039]
	15(4,12) - 16(3,13)	(0,2,0)	55922.2	(0.2)	[68036]
	52(9,43) - 51(10,42)	(0,0,0)	55932.0	(0.1)	[68036]
	2(1, 1) - 2(0, 2)	(0,2,0)	56003.6	(0.2)	[68036]
	37(8,30) - 38(7,31)	(0,2,0)	56229.3	(0.2)	[68036]
	56(12,44) - 57(11,47)	(0,0,0)	56481.05	(0.05)	[70055]
	3(1, 2) - 3(0, 3)	(0,1,1)	56549.34	(0.20)	[69039]
	32(5,27) - 31(6,26)	(0,2,0)	56569.6	(0.2)	[68036]
	59(5,55) - 58(6,52)	(0,0,0)	56572.00	(0.05)	[70055]
	52(11,41) - 53(10,44)	(0,1,0)	56699.5	(0.2)	[68036]
	2(1, 1) - 2(0, 2)	(0,3,0)	57326.93	(0.20)	[69039]
	14(4,11) - 15(3,12)	(0,0,1)	57902.252	(*0.17)	[76000]
	30(7,23) - 31(6,26)	(0,0,0)	58042.41	(0.2)	[65015]
	30(7,23) - 31(6,26)	(0,0,0)	58042.664	(*0.01)	[76000]
	10(3, 7) - 11(2,10)	(0,1,0)	58101.04	(0.10)	[65015]
	40(9,32) - 41(8,33)	(0,0,1)	58450.850	(*0.72)	[76000]
	23(3,21) - 22(4,18)	(0,1,0)	58524.32	(0.10)	[65015]
	20(3,17) - 19(4,16)	(1,0,0)	58769.217	(*0.20)	[76000]
	5(2, 3) - 6(1, 6)	(0,1,1)	58839.53	(0.20)	[69039]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	36(8,28) - 37(7,31)	(0,1,0)	59013.40	(0.10)	[68036]
	9(3, 7) - 10(2, 8)	(0,1,0)	59019.93	(0.10)	[64019]
	4(1, 3) - 4(0, 4)	(0,0,0)	59224.84	(0.10)	[65015]
	4(1, 3) - 4(0, 4)	(1,0,0)	59260.96	(0.10)	[63015]
	4(1, 3) - 4(0, 4)	(2,0,0)	59295.57	(0.20)	[69039]
	47(8,40) - 46(9,37)	(0,0,0)	59883.50	(0.05)	[70055]
	61(13,49) - 62(12,50)	(0,0,0)	60072.58	(0.05)	[70055]
	4(1, 3) - 4(0, 4)	(0,1,0)	60498.73	(0.08)	[63011]
	4(1, 3) - 4(0, 4)	(1,1,0)	60540.09	(0.20)	[69039]
	18(2,16) - 19(1,19)	(0,1,0)	60983.936	(*0.08)	[76000]
	26(6,20) - 27(5,23)	(0,2,0)	61050.033	(*0.09)	[76000]
	27(4,24) - 26(5,21)	(1,0,0)	61182.337	(*0.15)	[76000]
	33(5,29) - 32(6,26)	(0,2,0)	61197.187	(*0.11)	[76000]
	49(8,42) - 48(9,39)	(0,2,0)	61358.367	(*0.26)	[76000]
	42(7,35) - 41(8,34)	(1,0,0)	61452.283	(*0.61)	[76000]
	35(8,28) - 36(7,29)	(0,0,0)	61489.85	(0.05)	[70055]
	26(4,22) - 25(5,21)	(0,1,0)	61526.04	(0.10)	[64019]
	20(3,17) - 19(4,16)	(0,0,0)	61636.16	(0.05)	[70055]
	4(1, 3) - 4(0, 4)	(0,2,0)	61826.6	(0.2)	[68036]
	30(7,23) - 31(6,26)	(1,0,0)	61988.164	(*0.27)	[76000]
	37(6,32) - 36(7,29)	(1,0,0)	62455.923	(*0.38)	[76000]
	48(8,40) - 47(9,39)	(0,1,0)	62464.558	(*0.08)	[76000]
	20(5,15) - 21(4,18)	(0,1,0)	62524.798	(*0.03)	[76000]
	57(12,46) - 58(11,47)	(0,1,0)	62622.020	(*0.13)	[76000]
	5(1, 4) - 5(0, 5)	(0,0,1)	62944.88	(0.10)	[63015]
	5(1, 4) - 5(0, 5)	(1,0,1)	62959.11	(0.20)	[69039]
	4(1, 3) - 4(0, 4)	(0,3,0)	63211.76	(0.20)	[69039]
	40(4,36) - 41(3,39)	(0,1,0)	63578.142	(*0.16)	[76000]
	5(1, 4) - 5(0, 5)	(0,1,1)	64248.60	(0.20)	[69039]
	27(4,24) - 26(5,21)	(0,0,0)	64277.10	(0.04)	[63011]
	10(3, 7) - 11(2,10)	(0,2,0)	64421.890	(*0.07)	[76000]
	23(3,21) - 22(4,18)	(1,0,0)	64453.886	(*0.14)	[76000]
	31(5,26) - 30(6,25)	(0,0,1)	64671.435	(*0.38)	[76000]
	38(6,32) - 37(7,31)	(0,2,0)	64982.973	(*0.15)	[76000]
	41(9,33) - 42(8,34)	(0,1,0)	64988.183	(*0.05)	[76000]
	9(3, 7) - 10(2, 8)	(0,2,0)	65313.416	(*0.09)	[76000]
	25(6,20) - 26(5,21)	(0,1,0)	65426.89	(0.10)	[64019]
	42(9,33) - 43(8,36)	(0,2,0)	65463.990	(*0.20)	[76000]
	40(9,31) - 41(8,34)	(0,0,0)	65714.09	(0.04)	[63011]
	35(3,33) - 34(4,30)	(0,1,0)	65811.662	(*0.09)	[76000]
	35(8,28) - 36(7,29)	(1,0,0)	66054.980	(*0.42)	[76000]
	23(3,21) - 22(4,18)	(0,0,0)	66724.87	(0.04)	[63011]
	42(7,35) - 41(8,34)	(0,0,0)	66761.15	(0.05)	[70055]
	9(3, 6) - 10(2, 9)	(0,0,1)	66846.480	(*0.17)	[76000]
	37(6,32) - 36(7,29)	(0,0,0)	67011.29	(0.04)	[63011]
	4(2, 2) - 5(1, 5)	(0,0,2)	67295.4	(0.5)	[69039]
	43(7,37) - 42(8,34)	(0,1,0)	67356.765	(*0.08)	[76000]
	18(2,16) - 19(1,19)	(0,2,0)	67415.212	(*0.26)	[76000]
	19(5,14) - 20(4,17)	(0,0,1)	67719.999	(*0.20)	[76000]
	6(1, 5) - 6(0, 6)	(0,0,2)	67790.28	(0.20)	[69039]
	19(5,15) - 20(4,16)	(0,0,0)	67848.65	(0.05)	[70055]
	31(7,25) - 32(6,26)	(0,2,0)	67941.138	(*0.12)	[76000]
	47(4,44) - 46(5,41)	(0,1,0)	68275.956	(*0.17)	[76000]
	1(1, 1) - 0(0, 0)	(0,0,2)	68276.3	(0.5)	[69039]
	24(6,19) - 25(5,20)	(0,0,1)	68442.831	(*0.26)	[76000]
	59(10,50) - 58(11,47)	(0,1,0)	68728.171	(*0.15)	[76000]
	6(1, 5) - 6(0, 6)	(2,0,0)	68929.72	(0.20)	[69039]
	6(1, 5) - 6(0, 6)	(1,0,0)	68951.16	(0.10)	[69039]
	6(1, 5) - 6(0, 6)	(0,0,0)	68972.17	(0.05)	[70055]
	26(4,22) - 25(5,21)	(1,0,0)	69038.487	(*0.27)	[76000]
	6(0, 6) - 5(1, 5)	(0,3,0)	69192.59	(0.20)	[69039]
	14(4,10) - 15(3,13)	(0,0,0)	69464.09	(0.05)	[70055]
	14(4,10) - 15(3,13)	(0,0,0)	69464.143	(*0.01)	[76000]
	45(10,36) - 46(9,37)	(0,0,0)	69480.43	(0.05)	[70055]
	1(1, 1) - 0(0, 0)	(1,0,0)	69566.06	(0.10)	[69039]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	1(1, 1) - 0(0, 0)	(0,0,0)	69575.91	(0.02)	[73051]
	19(2,17) - 20(1,20)	(0,0,1)	69595.838	(*1.37)	[76000]
	3(2, 2) - 4(1, 3)	(0,0,0)	69653.57	(0.05)	[70055]
	10(1, 9) - 9(2, 8)	(0,2,0)	69879.627	(*0.08)	[76000]
	4(2, 2) - 5(1, 5)	(0,0,0)	70134.368	(0.02)	[73051]
	3(2, 2) - 4(1, 3)	(1,0,0)	70293.43	(0.10)	[69039]
	6(1, 5) - 6(0, 6)	(0,1,0)	70347.95	(0.10)	[63011]
	6(0, 6) - 5(1, 5)	(0,2,0)	70440.170	(*0.08)	[76000]
	19(5,15) - 20(4,16)	(1,0,0)	70515.410	(*0.30)	[76000]
	1(1, 1) - 0(0, 0)	(0,1,0)	70735.92	(0.10)	[63015]
	4(2, 2) - 5(1, 5)	(1,0,0)	70765.92	(0.10)	[69039]
	32(5,27) - 31(6,26)	(0,1,0)	70770.64	(0.10)	[64019]
	40(9,31) - 41(8,34)	(1,0,0)	70848.359	(*0.79)	[76000]
	46(10,36) - 47(9,39)	(0,1,0)	71274.502	(*0.08)	[76000]
	14(4,10) - 15(3,13)	(1,0,0)	71384.609	(*0.18)	[76000]
	6(0, 6) - 5(1, 5)	(0,1,0)	71627.84	(0.08)	[63011]
	6(1, 5) - 6(0, 6)	(0,2,0)	71774.9	(0.2)	[65015]
	1(1, 1) - 0(0, 0)	(0,2,0)	71950.511	(*0.07)	[76000]
	32(5,28) - 31(6,25)	(0,0,1)	72090.423	(*0.82)	[76000]
	6(0, 6) - 5(1, 5)	(1,0,0)	72094.411	(*0.11)	[76000]
	58(10,48) - 57(11,47)	(0,0,0)	72383.71	(0.05)	[70055]
	30(3,27) - 31(2,30)	(0,0,0)	72437.26	(0.04)	[63011]
	30(3,27) - 31(2,30)	(0,0,0)	72437.263	(*0.03)	[76000]
	26(4,22) - 25(5,21)	(0,0,0)	72668.03	(0.05)	[70055]
	6(0, 6) - 5(1, 5)	(0,0,0)	72758.24	(0.05)	[70055]
	29(7,22) - 30(6,25)	(0,0,1)	72967.863	(*0.50)	[76000]
	3(2, 2) - 4(1, 3)	(0,1,0)	73161.979	(*0.02)	[76000]
	10(1, 9) - 9(2, 8)	(0,1,0)	73231.58	(0.10)	[63011]
	50(11,39) - 51(10,42)	(0,0,0)	73255.22	(0.05)	[70055]
	8(3, 6) - 9(2, 7)	(0,0,1)	73412.025	(*0.23)	[76000]
	35(3,33) - 34(4,30)	(0,0,0)	73430.42	(0.05)	[70055]
	35(3,33) - 34(4,30)	(0,0,0)	73430.453	(*0.03)	[76000]
	30(7,23) - 31(6,26)	(0,1,0)	73558.128	(*0.04)	[76000]
	20(5,15) - 21(4,18)	(0,2,0)	73811.644	(*0.11)	[76000]
	47(10,38) - 48(9,39)	(0,2,0)	73862.171	(*0.42)	[76000]
	4(2, 2) - 5(1, 5)	(0,1,0)	73883.939	(*0.02)	[76000]
	25(3,23) - 24(4,20)	(0,2,0)	74101.876	(*0.12)	[76000]
	44(7,37) - 43(8,36)	(0,2,0)	74753.883	(*0.26)	[76000]
	24(6,18) - 25(5,21)	(0,0,0)	74866.51	(0.05)	[70055]
	33(5,29) - 32(6,26)	(0,1,0)	74868.565	(*0.06)	[76000]
	7(1, 6) - 7(0, 7)	(0,0,1)	75060.599	(*0.17)	[76000]
	10(1, 9) - 9(2, 8)	(1,0,0)	75085.674	(*0.14)	[76000]
	45(10,36) - 46(9,37)	(1,0,0)	75181.050	(*1.53)	[76000]
	34(8,27) - 35(7,28)	(0,0,1)	75748.693	(*0.91)	[76000]
	54(9,45) - 53(10,44)	(0,1,0)	76403.664	(*0.14)	[76000]
	10(1, 9) - 9(2, 8)	(0,0,0)	76412.162	(0.02)	[73051]
	47(4,44) - 46(5,41)	(0,0,0)	76540.02	(0.05)	[70055]
	53(9,45) - 52(10,42)	(0,0,0)	76762.28	(0.05)	[70055]
	3(2, 2) - 4(1, 3)	(0,2,0)	76837.304	(*0.09)	[76000]
	55(12,44) - 56(11,45)	(0,0,0)	76860.55	(0.05)	[70055]
	51(11,41) - 52(10,42)	(0,1,0)	77227.939	(*0.13)	[76000]
	39(6,34) - 38(7,31)	(0,2,0)	77262.947	(*0.23)	[76000]
	15(2,13) - 14(3,12)	(0,0,1)	77655.028	(*0.21)	[76000]
	36(8,28) - 37(7,31)	(0,2,0)	77661.401	(*0.20)	[76000]
	4(2, 2) - 5(1, 5)	(0,2,0)	77798.064	(*0.08)	[76000]
	14(4,10) - 15(3,13)	(0,1,0)	77863.427	(*0.03)	[76000]
	29(4,26) - 28(5,23)	(0,2,0)	77904.364	(*0.13)	[76000]
	29(7,23) - 30(6,24)	(0,0,0)	77926.72	(0.05)	[70055]
	24(6,18) - 25(5,21)	(1,0,0)	78085.940	(*0.41)	[76000]
	19(5,15) - 20(4,16)	(0,1,0)	78711.356	(*0.03)	[76000]
	39(9,30) - 40(8,33)	(0,0,1)	79067.013	(*1.58)	[76000]
	25(6,20) - 26(5,21)	(0,2,0)	79277.574	(*0.17)	[76000]
	35(8,28) - 36(7,29)	(0,1,0)	79329.242	(*0.05)	[76000]
	37(6,31) - 36(7,30)	(0,0,1)	79475.646	(*1.27)	[76000]
	43(7,37) - 42(8,34)	(1,0,0)	79948.864	(*1.22)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	32(5,27) - 31(6,26)	(1,0,0)	80004.911	(*0.56)	[76000]
	30(3,27) - 31(2,30)	(0,1,0)	81040.557	(*0.14)	[76000]
	24(3,22) - 23(4,19)	(0,0,1)	81285.238	(*0.58)	[76000]
	38(6,32) - 37(7,31)	(0,1,0)	81598.508	(*0.08)	[76000]
	29(7,23) - 30(6,24)	(1,0,0)	81790.965	(*0.57)	[76000]
	52(11,41) - 53(10,44)	(0,2,0)	82277.396	(*0.94)	[76000]
	34(8,26) - 35(7,29)	(0,0,0)	82409.534	(*0.01)	[76000]
	25(3,23) - 24(4,20)	(0,1,0)	82488.380	(*0.05)	[76000]
	49(8,42) - 48(9,39)	(0,1,0)	82497.782	(*0.13)	[76000]
	48(8,40) - 47(9,39)	(0,0,0)	82752.788	(*0.02)	[76000]
	13(4,10) - 14(3,11)	(0,0,0)	82952.019	(*0.01)	[76000]
	56(12,44) - 57(11,47)	(0,1,0)	83074.685	(*0.22)	[76000]
	3(2, 1) - 4(1, 4)	(0,0,1)	83503.670	(*0.20)	[76000]
	8(1, 7) - 8(0, 8)	(1,0,0)	83576.340	(*0.17)	[76000]
	8(1, 7) - 8(0, 8)	(0,0,0)	83688.071	(*0.01)	[76000]
	33(5,29) - 32(6,26)	(1,0,0)	84000.695	(*0.62)	[76000]
	32(5,27) - 31(6,26)	(0,0,0)	84320.922	(*0.02)	[76000]
	13(4,10) - 14(3,11)	(1,0,0)	84885.242	(*0.34)	[76000]
	18(5,14) - 19(4,15)	(0,0,1)	84931.632	(*0.40)	[76000]
	8(1, 7) - 8(0, 8)	(0,1,0)	85208.061	(*0.02)	[76000]
	43(7,37) - 42(8,34)	(0,0,0)	85246.955	(*0.02)	[76000]
	28(4,25) - 27(5,22)	(0,0,1)	85265.114	(*0.79)	[76000]
	50(8,42) - 49(9,41)	(0,2,0)	85382.521	(*0.52)	[76000]
	13(4, 9) - 14(3,12)	(0,0,1)	85447.225	(*0.35)	[76000]
	40(9,31) - 41(8,34)	(0,1,0)	85796.088	(*0.08)	[76000]
	41(9,33) - 42(8,34)	(0,2,0)	86005.082	(*0.37)	[76000]
	39(9,31) - 40(8,32)	(0,0,0)	86153.727	(*0.02)	[76000]
	2(1, 2) - 1(0, 1)	(0,0,1)	86457.459	(*0.13)	[76000]
	8(3, 5) - 9(2, 8)	(0,0,0)	86639.138	(*0.01)	[76000]
	14(4,10) - 15(3,13)	(0,2,0)	86648.812	(*0.13)	[76000]
	8(1, 7) - 8(0, 8)	(0,2,0)	86774.654	(*0.10)	[76000]
	20(2,18) - 21(1,21)	(0,0,0)	86828.917	(*0.04)	[76000]
	34(8,26) - 35(7,29)	(1,0,0)	86854.130	(*0.89)	[76000]
	8(3, 5) - 9(2, 8)	(1,0,0)	87825.868	(*0.20)	[76000]
	33(5,29) - 32(6,26)	(0,0,0)	87926.348	(*0.02)	[76000]
	24(6,18) - 25(5,21)	(0,1,0)	88028.914	(*0.04)	[76000]
	25(3,23) - 24(4,20)	(1,0,0)	88364.350	(*0.49)	[76000]
	29(4,26) - 28(5,23)	(0,1,0)	88888.846	(*0.06)	[76000]
	30(3,27) - 31(2,30)	(0,2,0)	89610.792	(*0.65)	[76000]
	30(7,23) - 31(6,26)	(0,2,0)	89784.389	(*0.25)	[76000]
	44(10,34) - 45(9,37)	(0,0,0)	90005.081	(*0.02)	[76000]
	19(5,15) - 20(4,16)	(0,2,0)	90079.556	(*0.21)	[76000]
	2(2, 1) - 3(1, 2)	(0,0,1)	90185.829	(*0.19)	[76000]
	23(6,17) - 24(5,20)	(0,0,1)	90301.216	(*0.54)	[76000]
	60(10,50) - 59(11,49)	(0,1,0)	90390.193	(*0.27)	[76000]
	33(3,31) - 32(4,28)	(0,1,0)	90496.938	(*0.10)	[76000]
	25(3,23) - 24(4,20)	(0,0,0)	90548.220	(*0.02)	[76000]
	27(3,25) - 26(4,22)	(0,2,0)	91005.593	(*0.30)	[76000]
	39(9,31) - 40(8,32)	(1,0,0)	91187.078	(*1.44)	[76000]
	13(4,10) - 14(3,11)	(0,1,0)	91400.926	(*0.03)	[76000]
	45(7,39) - 44(8,36)	(0,2,0)	91513.219	(*0.51)	[76000]
	18(5,13) - 19(4,16)	(0,0,0)	91550.521	(*0.01)	[76000]
	45(10,36) - 46(9,37)	(0,1,0)	91779.852	(*0.13)	[76000]
	16(2,14) - 15(3,13)	(0,2,0)	92177.821	(*0.12)	[76000]
	38(6,32) - 37(7,31)	(1,0,0)	92497.497	(*1.17)	[76000]
	9(1, 8) - 9(0, 9)	(0,0,1)	92619.941	(*0.30)	[76000]
	8(3, 5) - 9(2, 8)	(0,1,0)	92660.350	(*0.03)	[76000]
	21(3,18) - 20(4,17)	(0,0,1)	92676.776	(*0.35)	[76000]
	28(7,22) - 29(6,23)	(0,0,1)	92866.157	(*0.85)	[76000]
	59(10,50) - 58(11,47)	(0,0,0)	93373.061	(*0.03)	[76000]
	29(7,23) - 30(6,24)	(0,1,0)	93456.384	(*0.05)	[76000]
	39(6,34) - 38(7,31)	(0,1,0)	93474.308	(*0.11)	[76000]
	49(11,39) - 50(10,40)	(0,0,0)	93641.776	(*0.02)	[76000]
	44(7,37) - 43(8,36)	(0,1,0)	93736.357	(*0.13)	[76000]
	20(2,18) - 21(1,21)	(0,1,0)	94032.814	(*0.12)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	18(5,13) - 19(4,16)	(1,0,0)	94034.561	(*0.52)	[76000]
	23(6,18) - 24(5,19)	(0,0,0)	94064.767	(*0.01)	[76000]
	52(5,47) - 53(4,50)	(0,0,0)	94478.694	(*0.14)	[76000]
	46(10,36) - 47(9,39)	(0,2,0)	94581.665	(*0.71)	[76000]
	7(0, 7) - 6(1, 6)	(0,0,1)	94905.666	(*0.16)	[76000]
	29(4,26) - 28(5,23)	(1,0,0)	96252.088	(*0.70)	[76000]
	33(8,25) - 34(7,28)	(0,0,1)	96393.557	(*1.53)	[76000]
	31(3,29) - 30(4,26)	(0,2,0)	96491.728	(*1.63)	[76000]
	55(9,47) - 54(10,44)	(0,1,0)	97144.063	(*0.22)	[76000]
	54(12,42) - 55(11,45)	(0,0,0)	97177.284	(*0.03)	[76000]
	23(6,18) - 24(5,19)	(1,0,0)	97215.741	(*0.75)	[76000]
	38(6,32) - 37(7,31)	(0,0,0)	97466.399	(*0.02)	[76000]
	7(3, 5) - 8(2, 6)	(0,0,0)	97702.389	(*0.01)	[76000]
	50(11,39) - 51(10,42)	(0,1,0)	97714.805	(*0.21)	[76000]
	35(8,28) - 36(7,29)	(0,2,0)	97978.035	(*0.36)	[76000]
	33(3,31) - 32(4,28)	(0,0,0)	97994.156	(*0.03)	[76000]
	16(2,14) - 15(3,13)	(0,1,0)	98264.674	(*0.04)	[76000]
	7(3, 5) - 8(2, 6)	(1,0,0)	98887.146	(*0.28)	[76000]
	54(9,45) - 53(10,44)	(0,0,0)	98917.685	(*0.02)	[76000]
	29(3,27) - 28(4,24)	(0,2,0)	98937.806	(*0.77)	[76000]
	8(3, 5) - 9(2, 8)	(0,2,0)	98955.514	(*0.14)	[76000]
	28(7,21) - 29(6,24)	(0,0,0)	98976.323	(*0.01)	[76000]
	27(3,25) - 26(4,22)	(0,1,0)	99177.414	(*0.07)	[76000]
	29(4,26) - 28(5,23)	(0,0,0)	99392.605	(*0.02)	[76000]
	34(8,26) - 35(7,29)	(0,1,0)	100214.875	(*0.07)	[76000]
	13(4,10) - 14(3,11)	(0,2,0)	100245.233	(*0.21)	[76000]
	35(5,31) - 34(6,28)	(0,2,0)	100511.131	(*0.36)	[76000]
	59(13,47) - 60(12,48)	(0,0,0)	100563.034	(*0.07)	[76000]
	2(2, 0) - 3(1, 3)	(0,0,0)	100878.09	(0.08)	[70055]
	12(4, 9) - 13(3,10)	(0,0,1)	100881.184	(*0.56)	[76000]
	22(3,19) - 21(4,18)	(0,2,0)	100968.889	(*0.18)	[76000]
	20(2,18) - 21(1,21)	(0,2,0)	101304.598	(*0.47)	[76000]
	2(2, 0) - 3(1, 3)	(1,0,0)	101366.437	(*0.15)	[76000]
	16(2,14) - 15(3,13)	(1,0,0)	101732.812	(*0.34)	[76000]
	24(6,18) - 25(5,21)	(0,2,0)	101796.723	(*0.29)	[76000]
	7(3, 4) - 8(2, 7)	(0,0,1)	102299.509	(*0.41)	[76000]
	18(5,13) - 19(4,16)	(0,1,0)	102335.148	(*0.04)	[76000]
	33(8,26) - 34(7,27)	(0,0,0)	102690.05	(0.08)	[70055]
	49(8,42) - 48(9,39)	(0,0,0)	102707.24	(0.08)	[70055]
	28(7,21) - 29(6,24)	(1,0,0)	102714.307	(*1.07)	[76000]
	51(11,41) - 52(10,42)	(0,2,0)	102781.975	(*1.34)	[76000]
	55(12,44) - 56(11,45)	(0,1,0)	103431.050	(*0.34)	[76000]
	11(1,10) - 10(2, 9)	(0,0,1)	103493.669	(*0.25)	[76000]
	27(4,23) - 26(5,22)	(0,0,1)	103500.638	(*0.64)	[76000]
	7(3, 5) - 8(2, 6)	(0,1,0)	103699.713	(*0.03)	[76000]
	3(1, 3) - 2(0, 2)	(1,0,0)	103853.468	(*0.18)	[76000]
	10(1, 9) - 10(0,10)	(1,0,0)	103998.060	(*0.28)	[76000]
	3(1, 3) - 2(0, 2)	(0,0,0)	104029.42	(0.08)	[70055]
	16(2,14) - 15(3,13)	(0,0,0)	104033.56	(0.08)	[70055]
	31(3,29) - 30(4,26)	(0,1,0)	104210.693	(*0.10)	[76000]
	39(6,34) - 38(7,31)	(1,0,0)	104224.395	(*1.86)	[76000]
	10(1, 9) - 10(0,10)	(0,0,0)	104239.28	(0.08)	[70055]
	28(4,24) - 27(5,23)	(0,2,0)	104319.909	(*0.18)	[76000]
	2(2, 0) - 3(1, 3)	(0,1,0)	104518.053	(*0.03)	[76000]
	51(8,44) - 50(9,41)	(0,2,0)	104587.568	(*1.09)	[76000]
	27(3,25) - 26(4,22)	(1,0,0)	105072.098	(*1.55)	[76000]
	3(1, 3) - 2(0, 2)	(0,1,0)	105117.151	(*0.03)	[76000]
	52(5,47) - 53(4,50)	(0,1,0)	105567.099	(*0.37)	[76000]
	10(1, 9) - 10(0,10)	(0,1,0)	105956.722	(*0.03)	[76000]
	39(9,31) - 40(8,32)	(0,1,0)	106223.129	(*0.11)	[76000]
	3(1, 3) - 2(0, 2)	(0,2,0)	106258.639	(*0.12)	[76000]
	38(9,29) - 39(8,32)	(0,0,0)	106674.82	(0.08)	[70055]
	50(8,42) - 49(9,41)	(0,1,0)	106700.769	(*0.21)	[76000]
	40(9,31) - 41(8,34)	(0,2,0)	106779.355	(*0.61)	[76000]
	29(3,27) - 28(4,24)	(0,1,0)	106870.669	(*0.09)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	33(8,26) - 34(7,27)	(1,0,0)	107037.128	(*1.54)	[76000]
	27(3,25) - 26(4,22)	(0,0,0)	107060.19	(0.08)	[70055]
	23(6,18) - 24(5,19)	(0,1,0)	107251.176	(*0.04)	[76000]
	17(5,12) - 18(4,15)	(0,0,1)	107372.348	(*0.72)	[76000]
	10(1, 9) - 10(0,10)	(0,2,0)	107713.820	(*0.15)	[76000]
	34(5,29) - 33(6,28)	(0,2,0)	107814.243	(*0.24)	[76000]
	57(5,53) - 56(6,50)	(0,1,0)	107836.436	(*0.98)	[76000]
	12(4, 8) - 13(3,11)	(0,0,0)	107843.46	(0.08)	[70055]
	2(2, 0) - 3(1, 3)	(0,2,0)	108322.917	(*0.12)	[76000]
	42(4,38) - 43(3,41)	(0,0,0)	108915.46	(0.08)	[70055]
	39(6,34) - 38(7,31)	(0,0,0)	108955.91	(0.08)	[70055]
	12(4, 8) - 13(3,11)	(1,0,0)	109591.725	(*0.51)	[76000]
	22(6,17) - 23(5,18)	(0,0,1)	109679.006	(*0.92)	[76000]
	29(7,23) - 30(6,24)	(0,2,0)	109695.541	(*0.40)	[76000]
	17(5,13) - 18(4,14)	(0,0,0)	109757.60	(0.08)	[70055]
	31(4,28) - 30(5,25)	(0,2,0)	109807.388	(*0.41)	[76000]
	7(3, 5) - 8(2, 6)	(0,2,0)	109978.529	(*0.18)	[76000]
	22(3,19) - 21(4,18)	(0,1,0)	110003.708	(*0.05)	[76000]
	45(7,39) - 44(8,36)	(0,1,0)	110227.805	(*0.18)	[76000]
	43(10,34) - 44(9,35)	(0,0,0)	110363.80	(0.08)	[70055]
	31(3,29) - 30(4,26)	(0,0,0)	111755.03	(0.08)	[70055]
	44(7,37) - 43(8,36)	(0,0,0)	111875.54	(0.08)	[70055]
	45(4,42) - 44(5,39)	(0,1,0)	112010.469	(*0.22)	[76000]
	17(5,13) - 18(4,14)	(1,0,0)	112186.000	(*0.83)	[76000]
	44(10,34) - 45(9,37)	(0,1,0)	112280.761	(*0.19)	[76000]
	40(6,34) - 39(7,33)	(0,2,0)	113521.720	(*0.43)	[76000]
	27(7,20) - 28(6,23)	(0,0,1)	113554.811	(*1.39)	[76000]
	18(5,13) - 19(4,16)	(0,2,0)	113616.457	(*0.31)	[76000]
	48(11,37) - 49(10,40)	(0,0,0)	113970.87	(0.08)	[70055]
	35(5,31) - 34(6,28)	(0,1,0)	114050.785	(*0.11)	[76000]
	33(5,28) - 32(6,27)	(0,0,1)	114445.255	(*1.78)	[76000]
	28(7,21) - 29(6,24)	(0,1,0)	114467.055	(*0.06)	[76000]
	29(3,27) - 28(4,24)	(0,0,0)	114565.35	(0.08)	[70055]
	8(0, 8) - 7(1, 7)	(0,2,0)	114831.687	(*0.13)	[76000]
	45(10,36) - 46(9,37)	(0,2,0)	115066.810	(*1.06)	[76000]
	60(10,50) - 59(11,49)	(0,0,0)	115090.63	(0.08)	[70055]
	22(6,16) - 23(5,19)	(0,0,0)	115317.58	(0.08)	[70055]
	22(3,19) - 21(4,18)	(1,0,0)	115331.073	(*0.65)	[76000]
	57(5,53) - 56(6,50)	(0,0,0)	115904.836	(*0.07)	[76000]
	8(0, 8) - 7(1, 7)	(0,1,0)	115933.887	(*0.03)	[76000]
	8(0, 8) - 7(1, 7)	(1,0,0)	116125.602	(*0.21)	[76000]
	28(4,24) - 27(5,23)	(0,1,0)	116163.327	(*0.07)	[76000]
	12(4, 8) - 13(3,11)	(0,1,0)	116235.806	(*0.04)	[76000]
	11(1,10) - 11(0,11)	(0,0,1)	116295.807	(*0.52)	[76000]
	6(3, 4) - 7(2, 5)	(0,0,1)	116360.903	(*0.53)	[76000]
	8(0, 8) - 7(1, 7)	(0,0,0)	116980.44	(0.08)	[70055]
	53(12,42) - 54(11,43)	(0,0,0)	117412.57	(0.08)	[70055]
	49(11,39) - 50(10,40)	(0,1,0)	118080.628	(*0.31)	[76000]
	22(6,16) - 23(5,19)	(1,0,0)	118336.376	(*1.22)	[76000]
	22(3,19) - 21(4,18)	(0,0,0)	118577.42	(0.08)	[70055]
	34(8,26) - 35(7,29)	(0,2,0)	118826.104	(*0.60)	[76000]
	41(6,36) - 40(7,33)	(0,2,0)	118972.537	(*0.80)	[76000]
	27(7,21) - 28(6,22)	(0,0,0)	118994.21	(0.08)	[70055]
	4(1, 4) - 3(0, 3)	(0,0,1)	119334.696	(*0.24)	[76000]
	32(3,29) - 33(2,32)	(0,0,0)	119483.08	(0.08)	[70055]
	42(4,38) - 43(3,41)	(0,1,0)	119523.363	(*0.30)	[76000]
	55(9,47) - 54(10,44)	(0,0,0)	119621.790	(*0.02)	[76000]
	45(4,42) - 44(5,39)	(0,0,0)	120023.40	(0.08)	[70055]
	56(9,47) - 55(10,46)	(0,1,0)	120095.464	(*0.35)	[76000]
	33(8,26) - 34(7,27)	(0,1,0)	120487.829	(*0.10)	[76000]
	31(4,28) - 30(5,25)	(0,1,0)	120564.283	(*0.10)	[76000]
	17(5,13) - 18(4,14)	(0,1,0)	120569.461	(*0.04)	[76000]
	58(13,45) - 59(12,48)	(0,0,0)	120713.137	(*0.07)	[76000]
	23(6,18) - 24(5,19)	(0,2,0)	121043.326	(*0.45)	[76000]
	46(7,39) - 45(8,38)	(0,2,0)	121395.560	(*0.74)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	34(5,29) - 33(6,28)	(0,1,0)	122226.512	(*0.11)	[76000]
	27(7,21) - 28(6,22)	(1,0,0)	122639.824	(*1.72)	[76000]
	12(1,11) - 11(2,10)	(0,2,0)	122946.544	(*0.16)	[76000]
	6(3, 3) - 7(2, 6)	(0,0,0)	123057.69	(0.08)	[70055]
	32(8,24) - 33(7,27)	(0,0,0)	123194.70	(0.08)	[70055]
	50(11,39) - 51(10,42)	(0,2,0)	123241.151	(*1.86)	[76000]
	28(4,24) - 27(5,23)	(1,0,0)	123367.864	(*0.96)	[76000]
	54(12,42) - 55(11,45)	(0,1,0)	123724.050	(*0.48)	[76000]
	11(4, 7) - 12(3,10)	(0,0,1)	123889.979	(*0.84)	[76000]
	6(3, 3) - 7(2, 6)	(1,0,0)	124081.848	(*0.39)	[76000]
	11(4, 8) - 12(3, 9)	(0,0,0)	124864.74	(0.08)	[70055]
	12(4, 8) - 13(3,11)	(0,2,0)	125013.834	(*0.29)	[76000]
	22(2,20) - 23(1,23)	(0,0,0)	125427.13	(0.08)	[70055]
	51(8,44) - 50(9,41)	(0,1,0)	125748.951	(*0.28)	[76000]
	16(5,12) - 17(4,13)	(0,0,1)	126034.830	(*1.12)	[76000]
	12(1,11) - 11(2,10)	(0,1,0)	126111.620	(*0.04)	[76000]
	11(4, 8) - 12(3, 9)	(1,0,0)	126563.253	(*0.74)	[76000]
	38(9,29) - 39(8,32)	(0,1,0)	126720.236	(*0.16)	[76000]
	37(9,29) - 38(8,30)	(0,0,0)	126962.46	(0.08)	[70055]
	35(5,31) - 34(6,28)	(0,0,0)	126980.70	(0.08)	[70055]
	11(2, 9) - 11(1,10)	(0,0,1)	127016.032	(*0.94)	[76000]
	50(8,42) - 49(9,41)	(0,0,0)	127081.96	(0.08)	[70055]
	39(9,31) - 40(8,32)	(0,2,0)	127190.681	(*0.92)	[76000]
	28(4,24) - 27(5,23)	(0,0,0)	127428.23	(0.08)	[70055]
	12(1,11) - 11(2,10)	(1,0,0)	127547.729	(*0.31)	[76000]
	45(7,39) - 44(8,36)	(0,0,0)	128103.81	(0.08)	[70055]
	22(6,16) - 23(5,19)	(0,1,0)	128460.976	(*0.05)	[76000]
	12(2,10) - 12(1,11)	(0,0,0)	128605.13	(0.08)	[70055]
	13(2,11) - 13(1,12)	(0,0,1)	128620.710	(*1.33)	[76000]
	12(2,10) - 12(1,11)	(1,0,0)	128773.970	(*0.86)	[76000]
	6(3, 3) - 7(2, 6)	(0,1,0)	129050.545	(*0.04)	[76000]
	12(1,11) - 11(2,10)	(0,0,0)	129105.83	(0.08)	[70055]
	32(3,29) - 33(2,32)	(0,1,0)	129157.351	(*0.24)	[76000]
	59(13,47) - 60(12,48)	(0,1,0)	129162.246	(*0.71)	[76000]
	10(2, 8) - 10(1, 9)	(0,0,0)	129514.81	(0.08)	[70055]
	10(2, 8) - 10(1, 9)	(1,0,0)	129763.115	(*0.58)	[76000]
	9(2, 7) - 9(1, 8)	(0,0,1)	129806.895	(*0.71)	[76000]
	40(6,34) - 39(7,33)	(0,1,0)	130341.053	(*0.18)	[76000]
	21(6,15) - 22(5,18)	(0,0,1)	130433.478	(*1.47)	[76000]
	12(1,11) - 12(0,12)	(1,0,0)	130613.204	(*0.46)	[76000]
	28(7,21) - 29(6,24)	(0,2,0)	130663.442	(*0.62)	[76000]
	42(10,32) - 43(9,35)	(0,0,0)	130680.01	(0.08)	[70055]
	52(8,44) - 51(9,43)	(0,2,0)	130762.993	(*1.46)	[76000]
	31(4,28) - 30(5,25)	(0,0,0)	130859.40	(0.08)	[70055]
	12(1,11) - 12(0,12)	(0,0,0)	131014.86	(0.08)	[70055]
	34(5,29) - 33(6,28)	(1,0,0)	131218.192	(*1.74)	[76000]
	16(5,11) - 17(4,14)	(0,0,0)	131274.93	(0.08)	[70055]
	12(2,10) - 12(1,11)	(0,1,0)	131530.51	(0.10)	[64011]
	17(5,13) - 18(4,14)	(0,2,0)	131879.994	(*0.45)	[76000]
	10(2, 8) - 10(1, 9)	(0,1,0)	132594.39	(0.10)	[64011]
	43(10,34) - 44(9,35)	(0,1,0)	132621.129	(*0.27)	[76000]
	14(2,12) - 14(1,13)	(0,0,0)	132744.86	(0.08)	[70055]
	14(2,12) - 14(1,13)	(1,0,0)	132783.793	(*1.40)	[76000]
	12(1,11) - 12(0,12)	(0,1,0)	133003.55	(0.10)	[64011]
	11(4, 8) - 12(3, 9)	(0,1,0)	133271.68	(0.10)	[64011]
	16(5,11) - 17(4,14)	(1,0,0)	133567.285	(*1.21)	[76000]
	22(2,20) - 23(1,23)	(0,1,0)	133645.623	(*0.17)	[76000]
	8(2, 6) - 8(1, 7)	(0,0,0)	134004.86	(0.08)	[70055]
	47(11,37) - 48(10,38)	(0,0,0)	134203.82	(0.08)	[70055]
	8(2, 6) - 8(1, 7)	(1,0,0)	134287.514	(*0.42)	[76000]
	27(7,21) - 28(6,22)	(0,1,0)	134482.98	(0.10)	[64011]
	47(7,41) - 46(8,38)	(0,2,0)	134533.145	(*1.56)	[76000]
	12(2,10) - 12(1,11)	(0,2,0)	134595.183	(*0.41)	[76000]
	21(6,16) - 22(5,17)	(0,0,0)	134943.30	(0.08)	[70055]
	12(1,11) - 12(0,12)	(0,2,0)	135023.451	(*0.23)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	41(6,36) - 40(7,33)	(0,1,0)	135096.083	(*0.20)	[76000]
	17(2,15) - 16(3,14)	(0,0,1)	135221.364	(*0.65)	[76000]
	6(3, 3) - 7(2, 6)	(0,2,0)	135317.939	(*0.23)	[76000]
	7(2, 5) - 7(1, 6)	(0,0,1)	135358.108	(*0.50)	[76000]
	5(1, 5) - 4(0, 4)	(1,0,0)	135366.164	(*0.28)	[76000]
	14(2,12) - 14(1,13)	(0,1,0)	135531.58	(0.10)	[64011]
	44(10,34) - 45(9,37)	(0,2,0)	135540.559	(*1.51)	[76000]
	5(1, 5) - 4(0, 4)	(0,0,0)	135696.02	(0.08)	[70055]
	10(2, 8) - 10(1, 9)	(0,2,0)	135826.454	(*0.33)	[76000]
	34(5,29) - 33(6,28)	(0,0,0)	135963.00	(0.08)	[70055]
	5(1, 5) - 4(0, 4)	(0,1,0)	136675.34	(0.10)	[64011]
	33(4,30) - 32(5,27)	(0,2,0)	136692.368	(*1.15)	[76000]
	8(2, 6) - 8(1, 7)	(0,1,0)	137234.31	(0.10)	[64011]
	52(12,40) - 53(11,43)	(0,0,0)	137585.05	(0.08)	[70055]
	5(1, 5) - 4(0, 4)	(0,2,0)	137707.928	(*0.17)	[76000]
	37(5,33) - 36(6,30)	(0,2,0)	137868.325	(*1.08)	[76000]
	21(6,16) - 22(5,17)	(1,0,0)	137875.920	(*1.81)	[76000]
	48(11,37) - 49(10,40)	(0,1,0)	138387.238	(*0.42)	[76000]
	14(2,12) - 14(1,13)	(0,2,0)	138439.784	(*0.50)	[76000]
	9(0, 9) - 8(1, 8)	(0,0,1)	138886.439	(*0.37)	[76000]
	33(8,26) - 34(7,27)	(0,2,0)	139088.828	(*0.88)	[76000]
	5(3, 2) - 6(2, 5)	(0,0,1)	139183.562	(*0.70)	[76000]
	5(3, 3) - 6(2, 4)	(0,0,0)	139355.06	(0.08)	[70055]
	26(7,19) - 27(6,22)	(0,0,0)	139474.54	(0.08)	[70055]
	6(2, 4) - 6(1, 5)	(0,0,0)	140306.17	(0.08)	[70055]
	5(3, 3) - 6(2, 4)	(1,0,0)	140319.154	(*0.48)	[76000]
	57(9,49) - 56(10,46)	(0,1,0)	140463.781	(*0.47)	[76000]
	46(7,39) - 45(8,38)	(0,1,0)	140549.261	(*0.28)	[76000]
	6(2, 4) - 6(1, 5)	(1,0,0)	140589.229	(*0.30)	[76000]
	8(2, 6) - 8(1, 7)	(0,2,0)	140623.595	(*0.26)	[76000]
	57(13,45) - 58(12,46)	(0,0,0)	140800.16	(0.08)	[70055]
	57(13,45) - 58(12,46)	(0,0,0)	140800.562	(*0.07)	[76000]
	32(8,24) - 33(7,27)	(0,1,0)	140967.656	(*0.13)	[76000]
	10(4, 7) - 11(3, 8)	(0,0,1)	141767.609	(*1.15)	[76000]
	5(2, 3) - 5(1, 4)	(0,0,1)	141831.070	(*0.28)	[76000]
	22(2,20) - 23(1,23)	(0,2,0)	141924.400	(*0.78)	[76000]
	16(5,11) - 17(4,14)	(0,1,0)	142044.09	(0.10)	[64011]
	11(4, 8) - 12(3, 9)	(0,2,0)	142067.529	(*0.39)	[76000]
	22(6,16) - 23(5,19)	(0,2,0)	142205.693	(*0.64)	[76000]
	56(9,47) - 55(10,46)	(0,0,0)	142690.18	(0.08)	[70055]
	16(2,14) - 16(1,15)	(0,0,0)	143057.11	(0.08)	[70055]
	31(8,24) - 32(7,25)	(0,0,0)	143357.80	(0.08)	[70055]
	6(2, 4) - 6(1, 5)	(0,1,0)	143663.781	(*0.04)	[76000]
	53(12,42) - 54(11,43)	(0,1,0)	143936.875	(*0.64)	[76000]
	5(3, 3) - 6(2, 4)	(0,1,0)	145331.275	(*0.05)	[76000]
	43(4,40) - 42(5,37)	(0,1,0)	145625.408	(*0.24)	[76000]
	16(2,14) - 16(1,15)	(0,1,0)	145740.026	(*0.04)	[76000]
	51(8,44) - 50(9,41)	(0,0,0)	145970.29	(0.08)	[70055]
	13(1,12) - 13(0,13)	(0,0,1)	146078.271	(*0.87)	[76000]
	40(6,34) - 39(7,33)	(0,0,0)	146393.72	(0.08)	[70055]
	10(4, 6) - 11(3, 9)	(0,0,0)	146550.08	(0.08)	[70055]
	4(2, 2) - 4(1, 3)	(0,0,0)	146605.52	(0.08)	[70055]
	15(5,10) - 16(4,13)	(0,0,1)	146848.648	(*1.62)	[76000]
	4(2, 2) - 4(1, 3)	(1,0,0)	146870.912	(*0.21)	[76000]
	37(9,29) - 38(8,30)	(0,1,0)	146992.295	(*0.22)	[76000]
	33(4,30) - 32(5,27)	(0,1,0)	147129.954	(*0.14)	[76000]
	6(2, 4) - 6(1, 5)	(0,2,0)	147184.818	(*0.19)	[76000]
	36(9,27) - 37(8,30)	(0,0,0)	147239.28	(0.08)	[70055]
	3(2, 1) - 3(1, 2)	(0,0,1)	147509.101	(*0.19)	[76000]
	38(9,29) - 39(8,32)	(0,2,0)	147660.541	(*1.32)	[76000]
	21(6,16) - 22(5,17)	(0,1,0)	148089.107	(*0.07)	[76000]
	10(4, 6) - 11(3, 9)	(1,0,0)	148116.145	(*0.98)	[76000]
	16(2,14) - 16(1,15)	(0,2,0)	148521.645	(*0.65)	[76000]
	58(13,45) - 59(12,48)	(0,1,0)	149288.012	(*0.93)	[76000]
	6(1, 6) - 5(0, 5)	(0,0,1)	149709.312	(*0.44)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	4(2, 2) - 4(1, 3)	(0,1,0)	150060.401	(*0.04)	[76000]
	15(5,11) - 16(4,12)	(0,0,0)	150381.10	(0.08)	[70055]
	41(6,36) - 40(7,33)	(0,0,0)	150486.92	(0.08)	[70055]
	27(7,21) - 28(6,22)	(0,2,0)	150675.168	(*0.89)	[76000]
	41(10,32) - 42(9,33)	(0,0,0)	150878.81	(0.08)	[70055]
	37(5,33) - 36(6,30)	(0,1,0)	151196.911	(*0.18)	[76000]
	2(2, 0) - 2(1, 1)	(0,0,0)	151378.63	(0.08)	[70055]
	5(3, 3) - 6(2, 4)	(0,2,0)	151584.312	(*0.28)	[76000]
	2(2, 0) - 2(1, 1)	(1,0,0)	151624.281	(*0.20)	[76000]
	18(2,16) - 17(3,15)	(0,2,0)	151680.868	(*0.29)	[76000]
	23(3,20) - 22(4,19)	(0,0,1)	151921.725	(*1.45)	[76000]
	52(8,44) - 51(9,43)	(0,1,0)	152220.681	(*0.43)	[76000]
	15(5,11) - 16(4,12)	(1,0,0)	152592.998	(*1.66)	[76000]
	42(10,32) - 43(9,35)	(0,1,0)	152915.867	(*0.35)	[76000]
	47(7,41) - 46(8,38)	(0,1,0)	153208.401	(*0.32)	[76000]
	16(5,11) - 17(4,14)	(0,2,0)	153307.461	(*0.60)	[76000]
	43(4,40) - 42(5,37)	(0,0,0)	153677.14	(0.08)	[70055]
	4(2, 2) - 4(1, 3)	(0,2,0)	153679.656	(*0.16)	[76000]
	2(2, 1) - 2(1, 2)	(0,0,1)	154137.548	(*0.25)	[76000]
	46(11,35) - 47(10,38)	(0,0,0)	154373.34	(0.08)	[70055]
	2(2, 0) - 2(1, 1)	(0,1,0)	154896.339	(*0.04)	[76000]
	10(4, 6) - 11(3, 9)	(0,1,0)	154925.338	(*0.05)	[76000]
	26(7,19) - 27(6,22)	(0,1,0)	154937.104	(*0.10)	[76000]
	20(6,14) - 21(5,17)	(0,0,0)	155389.62	(0.08)	[70055]
	13(1,12) - 12(2,11)	(0,0,1)	156544.379	(*0.59)	[76000]
	4(3, 2) - 5(2, 3)	(0,0,1)	156762.250	(*0.83)	[76000]
	33(4,30) - 32(5,27)	(0,0,0)	157135.415	(*0.03)	[76000]
	18(2,16) - 17(3,15)	(0,1,0)	157562.676	(*0.05)	[76000]
	51(12,40) - 52(11,41)	(0,0,0)	157687.346	(*0.03)	[76000]
	54(5,49) - 55(4,52)	(0,0,0)	157769.895	(*0.25)	[76000]
	3(2, 2) - 3(1, 3)	(0,0,0)	158199.74	(0.08)	[70055]
	3(2, 2) - 3(1, 3)	(1,0,0)	158411.759	(*0.19)	[76000]
	2(2, 0) - 2(1, 1)	(0,2,0)	158578.194	(*0.16)	[76000]
	47(11,37) - 48(10,38)	(0,1,0)	158599.496	(*0.55)	[76000]
	46(7,39) - 45(8,38)	(0,0,0)	158845.08	(0.08)	[70055]
	10(0,10) - 9(1, 9)	(0,2,0)	158895.147	(*0.23)	[76000]
	25(7,19) - 26(6,20)	(0,0,0)	159447.96	(0.08)	[70055]
	4(2, 3) - 4(1, 4)	(0,0,1)	159510.614	(*0.19)	[76000]
	32(8,24) - 33(7,27)	(0,2,0)	159540.648	(*1.25)	[76000]
	55(5,51) - 54(6,48)	(0,1,0)	159760.885	(*0.93)	[76000]
	10(0,10) - 9(1, 9)	(1,0,0)	159799.148	(*0.38)	[76000]
	10(0,10) - 9(1, 9)	(0,1,0)	159887.217	(*0.04)	[76000]
	18(2,16) - 18(1,17)	(0,0,0)	160342.99	(0.08)	[70055]
	18(2,16) - 17(3,15)	(1,0,0)	160527.636	(*0.95)	[76000]
	4(3, 1) - 5(2, 4)	(0,0,0)	160543.06	(0.08)	[70055]
	10(0,10) - 9(1, 9)	(0,0,0)	160827.88	(0.08)	[70055]
	56(13,43) - 57(12,46)	(0,0,0)	160831.418	(*0.07)	[76000]
	31(8,24) - 32(7,25)	(0,1,0)	161118.096	(*0.17)	[76000]
	15(5,11) - 16(4,12)	(0,1,0)	161153.650	(*0.06)	[76000]
	4(3, 1) - 5(2, 4)	(1,0,0)	161391.932	(*0.58)	[76000]
	3(2, 2) - 3(1, 3)	(0,1,0)	161799.203	(*0.04)	[76000]
	21(6,16) - 22(5,17)	(0,2,0)	161835.117	(*0.87)	[76000]
	9(4, 5) - 10(3, 8)	(0,0,1)	162493.031	(*1.50)	[76000]
	24(3,21) - 23(4,20)	(0,2,0)	162604.091	(*0.47)	[76000]
	57(9,49) - 56(10,46)	(0,0,0)	162973.170	(*0.03)	[76000]
	18(2,16) - 18(1,17)	(0,1,0)	162976.647	(*0.04)	[76000]
	14(1,13) - 14(0,14)	(1,0,0)	163031.582	(*0.83)	[76000]
	18(2,16) - 17(3,15)	(0,0,0)	163119.360	(*0.02)	[76000]
	30(8,22) - 31(7,25)	(0,0,0)	163567.623	(*0.02)	[76000]
	14(1,13) - 14(0,14)	(0,0,0)	163605.504	(*0.02)	[76000]
	36(5,31) - 35(6,30)	(0,2,0)	163607.250	(*0.52)	[76000]
	10(4, 6) - 11(3, 9)	(0,2,0)	163684.936	(*0.49)	[76000]
	37(5,33) - 36(6,30)	(0,0,0)	163924.886	(*0.02)	[76000]
	30(4,26) - 29(5,25)	(0,2,0)	164041.024	(*0.48)	[76000]
	52(12,40) - 53(11,43)	(0,1,0)	164086.484	(*0.82)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	58(9,49) - 57(10,48)	(0,1,0)	164734.322	(*0.69)	[76000]
	7(1, 7) - 6(0, 6)	(1,0,0)	164746.421	(*0.42)	[76000]
	9(4, 6) - 10(3, 7)	(0,0,0)	165123.721	(*0.02)	[76000]
	5(2, 4) - 5(1, 5)	(0,0,0)	165144.638	(*0.01)	[76000]
	7(1, 7) - 6(0, 6)	(0,0,0)	165225.412	(*0.02)	[76000]
	5(2, 4) - 5(1, 5)	(1,0,0)	165321.408	(*0.22)	[76000]
	42(6,36) - 41(7,35)	(0,2,0)	165445.279	(*0.95)	[76000]
	3(2, 2) - 3(1, 3)	(0,2,0)	165562.030	(*0.16)	[76000]
	18(2,16) - 18(1,17)	(0,2,0)	165681.672	(*0.93)	[76000]
	14(1,13) - 14(0,14)	(0,1,0)	165963.756	(*0.04)	[76000]
	7(1, 7) - 6(0, 6)	(0,1,0)	166061.033	(*0.04)	[76000]
	44(4,40) - 45(3,43)	(0,0,0)	166387.008	(*0.12)	[76000]
	4(3, 1) - 5(2, 4)	(0,1,0)	166507.883	(*0.05)	[76000]
	9(4, 6) - 10(3, 7)	(1,0,0)	166611.070	(*1.25)	[76000]
	35(4,32) - 34(5,29)	(0,1,0)	166835.105	(*0.19)	[76000]
	7(1, 7) - 6(0, 6)	(0,2,0)	166948.943	(*0.25)	[76000]
	36(9,27) - 37(8,30)	(0,1,0)	167248.437	(*0.28)	[76000]
	35(9,27) - 36(8,28)	(0,0,0)	167367.207	(*0.02)	[76000]
	55(5,51) - 54(6,48)	(0,0,0)	167655.930	(*0.08)	[76000]
	37(9,29) - 38(8,30)	(0,2,0)	167913.738	(*1.81)	[76000]
	41(4,38) - 40(5,35)	(0,1,0)	167978.718	(*0.26)	[76000]
	6(2, 5) - 6(1, 6)	(0,0,1)	168030.705	(*0.33)	[76000]
	14(1,13) - 14(0,14)	(0,2,0)	168345.363	(*0.37)	[76000]
	20(6,14) - 21(5,17)	(0,1,0)	168508.639	(*0.08)	[76000]
	24(2,22) - 25(1,25)	(0,0,0)	168789.992	(*0.05)	[76000]
	5(2, 4) - 5(1, 5)	(0,1,0)	168826.182	(*0.04)	[76000]
	57(13,45) - 58(12,46)	(0,1,0)	169351.664	(*1.18)	[76000]
	53(8,46) - 52(9,43)	(0,1,0)	169363.766	(*0.52)	[76000]
	34(3,31) - 35(2,34)	(0,0,0)	170293.687	(*0.06)	[76000]
	48(7,41) - 47(8,40)	(0,2,0)	170390.213	(*1.63)	[76000]
	54(5,49) - 55(4,52)	(0,1,0)	170506.434	(*0.85)	[76000]
	14(5, 9) - 15(4,12)	(0,0,0)	170754.654	(*0.02)	[76000]
	40(10,30) - 41(9,33)	(0,0,0)	171017.867	(*0.02)	[76000]
	47(7,41) - 46(8,38)	(0,0,0)	171036.665	(*0.03)	[76000]
	26(7,19) - 27(6,22)	(0,2,0)	171100.201	(*1.22)	[76000]
	24(3,21) - 23(4,20)	(0,1,0)	171566.852	(*0.07)	[76000]
	15(5,11) - 16(4,12)	(0,2,0)	172419.914	(*0.78)	[76000]
	5(2, 4) - 5(1, 5)	(0,2,0)	172670.304	(*0.17)	[76000]
	52(8,44) - 51(9,43)	(0,0,0)	172728.421	(*0.03)	[76000]
	4(3, 1) - 5(2, 4)	(0,2,0)	172746.791	(*0.33)	[76000]
	41(10,32) - 42(9,33)	(0,1,0)	173095.908	(*0.44)	[76000]
	9(4, 6) - 10(3, 7)	(0,1,0)	173495.850	(*0.06)	[76000]
	45(11,35) - 46(10,36)	(0,0,0)	174463.721	(*0.02)	[76000]
	25(7,19) - 26(6,20)	(0,1,0)	174900.713	(*0.13)	[76000]
	19(6,14) - 20(5,15)	(0,0,0)	175101.414	(*0.02)	[76000]
	7(2, 6) - 7(1, 7)	(0,0,0)	175275.702	(*0.01)	[76000]
	7(2, 6) - 7(1, 7)	(1,0,0)	175400.729	(*0.35)	[76000]
	43(6,38) - 42(7,35)	(0,1,0)	175786.381	(*0.32)	[76000]
	30(4,26) - 29(5,25)	(0,1,0)	176012.824	(*0.12)	[76000]
	41(4,38) - 40(5,35)	(0,0,0)	176295.980	(*0.04)	[76000]
	35(4,32) - 34(5,29)	(0,0,0)	176466.427	(*0.03)	[76000]
	3(3, 0) - 4(2, 3)	(0,0,1)	176849.586	(*0.97)	[76000]
	14(1,13) - 13(2,12)	(0,2,0)	177008.067	(*0.30)	[76000]
	50(12,38) - 51(11,41)	(0,0,0)	177729.391	(*0.04)	[76000]
	37(4,34) - 36(5,31)	(0,1,0)	177865.978	(*0.23)	[76000]
	24(2,22) - 25(1,25)	(0,1,0)	178188.158	(*0.27)	[76000]
	36(5,31) - 35(6,30)	(0,1,0)	178277.240	(*0.20)	[76000]
	8(1, 8) - 7(0, 7)	(0,0,1)	178424.878	(*0.70)	[76000]
	44(4,40) - 45(3,43)	(0,1,0)	178449.080	(*0.53)	[76000]
	39(4,36) - 38(5,33)	(0,1,0)	178611.623	(*0.25)	[76000]
	46(11,35) - 47(10,38)	(0,1,0)	178747.658	(*0.68)	[76000]
	3(3, 1) - 4(2, 2)	(0,0,0)	179006.143	(*0.02)	[76000]
	7(2, 6) - 7(1, 7)	(0,1,0)	179076.293	(*0.04)	[76000]
	24(7,17) - 25(6,20)	(0,0,0)	179560.984	(*0.02)	[76000]
	31(8,24) - 32(7,25)	(0,2,0)	179675.541	(*1.69)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ – $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	8(2, 7) – 8(1, 8)	(0,0,1)	179768.235	(*0.62)	[76000]
	3(3, 1) – 4(2, 2)	(1,0,0)	179770.447	(*0.66)	[76000]
	14(1,13) – 13(2,12)	(0,1,0)	179941.142	(*0.04)	[76000]
	24(3,21) – 23(4,20)	(0,0,0)	180045.344	(*0.02)	[76000]
	55(13,43) – 56(12,44)	(0,0,0)	180805.760	(*0.07)	[76000]
	14(1,13) – 13(2,12)	(1,0,0)	180930.597	(*0.67)	[76000]
	15(1,14) – 15(0,15)	(0,0,1)	181109.566	(*1.43)	[76000]
	34(3,31) – 35(2,34)	(0,1,0)	181262.783	(*0.40)	[76000]
	30(8,22) – 31(7,25)	(0,1,0)	181307.770	(*0.21)	[76000]
	8(4, 5) – 9(3, 6)	(0,0,1)	181338.510	(*1.85)	[76000]
	14(5, 9) – 15(4,12)	(0,1,0)	181501.824	(*0.07)	[76000]
	11(0,11) – 10(1,10)	(0,0,1)	181964.621	(*0.72)	[76000]
	20(6,14) – 21(5,17)	(0,2,0)	182224.795	(*1.14)	[76000]
	9(4, 6) – 10(3, 7)	(0,2,0)	182252.820	(*0.60)	[76000]
	42(6,36) – 41(7,35)	(0,1,0)	182543.474	(*0.33)	[76000]
	14(1,13) – 13(2,12)	(0,0,0)	182705.89	(0.10)	[74038]
	7(2, 6) – 7(1, 7)	(0,2,0)	183038.175	(*0.22)	[76000]
	29(8,22) – 30(7,23)	(0,0,0)	183582.71	(0.10)	[74038]
	51(12,40) – 52(11,41)	(0,1,0)	184166.707	(*1.01)	[76000]
	59(9,51) – 58(10,48)	(0,1,0)	184257.575	(*0.83)	[76000]
	3(3, 1) – 4(2, 2)	(0,1,0)	184956.668	(*0.06)	[76000]
	20(2,18) – 20(1,19)	(0,0,0)	184969.80	(0.10)	[74038]
	39(5,35) – 38(6,32)	(0,1,0)	185155.091	(*0.27)	[76000]
	8(4, 4) – 9(3, 7)	(0,0,0)	185278.60	(0.10)	[74038]
	8(4, 4) – 9(3, 7)	(1,0,0)	186658.402	(*1.52)	[76000]
	37(4,34) – 36(5,31)	(0,0,0)	187055.577	(*0.03)	[76000]
	39(4,36) – 38(5,33)	(0,0,0)	187338.076	(*0.04)	[76000]
	35(9,27) – 36(8,28)	(0,1,0)	187359.672	(*0.34)	[76000]
	30(4,26) – 29(5,25)	(0,0,0)	187370.33	(0.10)	[74038]
	58(9,49) – 57(10,48)	(0,0,0)	187432.846	(*0.05)	[76000]
	34(9,25) – 35(8,28)	(0,0,0)	187446.75	(0.10)	[74038]
	20(2,18) – 20(1,19)	(0,1,0)	187636.97	(0.10)	[74038]
	24(2,22) – 25(1,25)	(0,2,0)	187646.854	(*1.24)	[76000]
	19(6,14) – 20(5,15)	(0,1,0)	188212.572	(*0.10)	[76000]
	9(2, 8) – 9(1, 9)	(0,0,0)	188654.948	(*0.02)	[76000]
	9(2, 8) – 9(1, 9)	(1,0,0)	188711.535	(*0.54)	[76000]
	2(2, 1) – 1(1, 0)	(0,0,1)	189205.939	(*0.28)	[76000]
	56(13,43) – 57(12,46)	(0,1,0)	189358.920	(*1.45)	[76000]
	53(8,46) – 52(9,43)	(0,0,0)	189575.30	(0.10)	[74038]
	48(7,41) – 47(8,40)	(0,1,0)	189785.362	(*0.51)	[76000]
	13(5, 9) – 14(4,10)	(0,0,0)	190148.65	(0.10)	[74038]
	20(2,18) – 20(1,19)	(0,2,0)	190344.781	(*1.38)	[76000]
	43(6,38) – 42(7,35)	(0,0,0)	191020.89	(0.10)	[74038]
	25(7,19) – 26(6,20)	(0,2,0)	191051.654	(*1.60)	[76000]
	39(10,30) – 40(9,31)	(0,0,0)	191066.910	(*0.02)	[76000]
	39(10,30) – 40(9,31)	(0,0,0)	191067.23	(0.10)	[74038]
	3(3, 1) – 4(2, 2)	(0,2,0)	191181.340	(*0.37)	[76000]
	36(5,31) – 35(6,30)	(0,0,0)	192236.18	(0.10)	[74038]
	9(2, 8) – 9(1, 9)	(0,1,0)	192612.43	(0.10)	[74038]
	2(2, 0) – 1(1, 1)	(0,0,0)	192651.02	(0.30)	[65015]
	2(2, 0) – 1(1, 1)	(1,0,0)	192697.215	(*0.25)	[76000]
	14(5, 9) – 15(4,12)	(0,2,0)	192739.939	(*0.97)	[76000]
	9(1, 9) – 8(0, 8)	(1,0,0)	192975.871	(*0.59)	[76000]
	40(10,30) – 41(9,33)	(0,1,0)	193215.131	(*0.55)	[76000]
	9(1, 9) – 8(0, 8)	(0,0,0)	193609.49	(0.10)	[74038]
	8(4, 4) – 9(3, 7)	(0,1,0)	193630.744	(*0.07)	[76000]
	9(1, 9) – 8(0, 8)	(0,1,0)	194268.841	(*0.05)	[76000]
	44(11,33) – 45(10,36)	(0,0,0)	194491.500	(*0.03)	[76000]
	44(11,33) – 45(10,36)	(0,0,0)	194491.75	(0.10)	[74038]
	10(2, 9) – 10(1,10)	(0,0,1)	194766.759	(*1.00)	[76000]
	9(1, 9) – 8(0, 8)	(0,2,0)	194978.121	(*0.36)	[76000]
	24(7,17) – 25(6,20)	(0,1,0)	194993.828	(*0.16)	[76000]
	18(6,12) – 19(5,15)	(0,0,0)	195080.44	(0.10)	[74038]
	19(2,17) – 18(3,16)	(0,0,1)	195273.818	(*1.81)	[76000]
	22(3,19) – 22(2,20)	(0,0,0)	195320.394	(*0.03)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	22(3,19) - 22(2,20)	(0,0,0)	195320.70	(0.10)	[74038]
	49(7,43) - 48(8,40)	(0,1,0)	195972.619	(*0.52)	[76000]
	2(2, 0) - 1(1, 1)	(0,1,0)	196177.856	(*0.06)	[76000]
	9(2, 8) - 9(1, 9)	(0,2,0)	196729.340	(*0.32)	[76000]
	20(3,17) - 20(2,18)	(0,0,0)	197142.18	(0.10)	[74038]
	39(5,35) - 38(6,32)	(0,0,0)	197585.500	(*0.03)	[76000]
	49(12,38) - 50(11,39)	(0,0,0)	197709.45	(0.10)	[74038]
	45(11,35) - 46(10,36)	(0,1,0)	198817.760	(*0.83)	[76000]
	42(6,36) - 41(7,35)	(0,0,0)	198847.86	(0.10)	[74038]
	23(7,17) - 24(6,18)	(0,0,0)	199415.904	(*0.02)	[76000]
	54(8,46) - 53(9,45)	(0,1,0)	199417.650	(*0.78)	[76000]
	22(3,19) - 22(2,20)	(0,1,0)	199757.069	(*0.07)	[76000]
	2(2, 0) - 1(1, 1)	(0,2,0)	199867.512	(*0.20)	[76000]
	16(1,15) - 16(0,16)	(1,0,0)	200075.270	(*1.63)	[76000]
	24(3,21) - 24(2,22)	(0,0,0)	200287.418	(*0.03)	[76000]
	24(3,21) - 24(2,22)	(0,0,0)	200287.53	(0.15)	[70055]
	54(13,41) - 55(12,44)	(0,0,0)	200727.543	(*0.07)	[76000]
	16(1,15) - 16(0,16)	(0,0,0)	200809.18	(0.15)	[70055]
	13(5, 9) - 14(4,10)	(0,1,0)	200888.182	(*0.09)	[76000]
	29(8,22) - 30(7,23)	(0,1,0)	201307.924	(*0.26)	[76000]
	12(0,12) - 11(1,11)	(0,2,0)	201688.205	(*0.37)	[76000]
	53(5,49) - 52(6,46)	(0,1,0)	201784.485	(*0.84)	[76000]
	19(6,14) - 20(5,15)	(0,2,0)	201919.295	(*1.44)	[76000]
	20(3,17) - 20(2,18)	(0,1,0)	201972.18	(0.10)	[74038]
	12(0,12) - 11(1,11)	(1,0,0)	202207.247	(*0.68)	[76000]
	8(4, 4) - 9(3, 7)	(0,2,0)	202365.662	(*0.71)	[76000]
	12(0,12) - 11(1,11)	(0,1,0)	202562.47	(0.10)	[74038]
	12(0,12) - 11(1,11)	(0,0,0)	203391.55	(0.10)	[74038]
	59(14,46) - 60(13,47)	(0,0,0)	203542.732	(*0.14)	[76000]
	28(8,20) - 29(7,23)	(0,0,0)	203570.15	(0.10)	[74038]
	16(1,15) - 16(0,16)	(0,1,0)	203652.70	(0.10)	[74038]
	50(12,38) - 51(11,41)	(0,1,0)	204186.721	(*1.22)	[76000]
	18(3,15) - 18(2,16)	(0,0,0)	204246.736	(*0.02)	[76000]
	24(3,21) - 24(2,22)	(0,1,0)	204331.67	(0.10)	[74038]
	7(4, 4) - 8(3, 5)	(0,0,0)	204384.30	(0.10)	[74038]
	11(2,10) - 11(1,11)	(1,0,0)	205272.722	(*0.84)	[76000]
	11(2,10) - 11(1,11)	(0,0,0)	205300.57	(0.10)	[74038]
	7(4, 4) - 8(3, 5)	(1,0,0)	205674.748	(*1.79)	[76000]
	16(1,15) - 16(0,16)	(0,2,0)	206514.907	(*0.59)	[76000]
	10(1,10) - 9(0, 9)	(0,0,1)	206578.948	(*1.02)	[76000]
	59(9,51) - 58(10,48)	(0,0,0)	206786.909	(*0.05)	[76000]
	34(9,25) - 35(8,28)	(0,1,0)	207420.160	(*0.42)	[76000]
	33(9,25) - 34(8,26)	(0,0,0)	207421.38	(0.15)	[70055]
	18(6,12) - 19(5,15)	(0,1,0)	208172.172	(*0.12)	[76000]
	48(7,41) - 47(8,40)	(0,0,0)	208302.80	(0.15)	[70055]
	3(2, 2) - 2(1, 1)	(1,0,0)	208669.602	(*0.28)	[76000]
	3(2, 2) - 2(1, 1)	(0,0,0)	208700.32	(0.15)	[70055]
	55(13,43) - 56(12,44)	(0,1,0)	209310.061	(*1.74)	[76000]
	18(3,15) - 18(2,16)	(0,1,0)	209433.782	(*0.07)	[76000]
	11(2,10) - 11(1,11)	(0,1,0)	209454.195	(*0.04)	[76000]
	53(5,49) - 52(6,46)	(0,0,0)	209874.37	(0.15)	[70055]
	12(5, 7) - 13(4,10)	(0,0,0)	209936.05	(0.15)	[70055]
	15(1,14) - 14(2,13)	(0,0,1)	209991.420	(*1.24)	[76000]
	60(9,51) - 59(10,50)	(0,1,0)	210563.102	(*1.20)	[76000]
	38(10,28) - 39(9,31)	(0,0,0)	211052.832	(*0.03)	[76000]
	38(10,28) - 39(9,31)	(0,0,0)	211053.10	(0.15)	[70055]
	3(2, 1) - 2(1, 2)	(0,0,1)	211460.819	(*0.27)	[76000]
	13(5, 9) - 14(4,10)	(0,2,0)	212117.596	(*1.17)	[76000]
	3(2, 2) - 2(1, 1)	(0,1,0)	212177.490	(*0.06)	[76000]
	7(4, 4) - 8(3, 5)	(0,1,0)	212726.061	(*0.08)	[76000]
	12(2,11) - 12(1,12)	(0,0,1)	213007.158	(*1.49)	[76000]
	26(3,23) - 26(2,24)	(0,0,0)	213068.40	(0.15)	[70055]
	55(8,48) - 54(9,45)	(0,1,0)	213177.160	(*0.84)	[76000]
	39(10,30) - 40(9,31)	(0,1,0)	213245.437	(*0.65)	[76000]
	20(2,18) - 19(3,17)	(0,2,0)	213398.076	(*0.62)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	49(7,43) - 48(8,40)	(0,0,0)	213703.00	(0.15)	[70055]
	11(2,10) - 11(1,11)	(0,2,0)	213765.113	(*0.45)	[76000]
	43(11,33) - 44(10,34)	(0,0,0)	214451.631	(*0.03)	[76000]
	43(11,33) - 44(10,34)	(0,0,0)	214451.89	(0.15)	[70055]
	41(5,37) - 40(6,34)	(0,1,0)	214491.553	(*0.37)	[76000]
	16(3,13) - 16(2,14)	(0,0,0)	214689.38	(0.15)	[70055]
	17(6,12) - 18(5,13)	(0,0,0)	214728.33	(0.15)	[70055]
	45(6,40) - 44(7,37)	(0,1,0)	214760.519	(*0.48)	[76000]
	23(7,17) - 24(6,18)	(0,1,0)	214835.549	(*0.19)	[76000]
	18(3,15) - 18(2,16)	(0,2,0)	214899.748	(*1.62)	[76000]
	26(2,24) - 27(1,27)	(0,0,0)	215094.54	(0.15)	[70055]
	3(2, 2) - 2(1, 1)	(0,2,0)	215817.307	(*0.22)	[76000]
	22(2,20) - 22(1,21)	(0,0,0)	216643.315	(*0.03)	[76000]
	26(3,23) - 26(2,24)	(0,1,0)	216758.621	(*0.14)	[76000]
	48(12,36) - 49(11,39)	(0,0,0)	217633.516	(*0.04)	[76000]
	44(11,33) - 45(10,36)	(0,1,0)	218825.004	(*0.99)	[76000]
	20(2,18) - 19(3,17)	(0,1,0)	218995.836	(*0.06)	[76000]
	22(7,15) - 23(6,18)	(0,0,0)	219276.002	(*0.02)	[76000]
	22(2,20) - 22(1,21)	(0,1,0)	219465.578	(*0.06)	[76000]
	54(8,46) - 53(9,45)	(0,0,0)	220102.68	(0.15)	[70055]
	16(3,13) - 16(2,14)	(0,1,0)	220165.277	(*0.06)	[76000]
	53(13,41) - 54(12,42)	(0,0,0)	220597.14	(0.15)	[70055]
	53(13,41) - 54(12,42)	(0,0,0)	220598.000	(*0.08)	[76000]
	56(5,51) - 57(4,54)	(0,0,0)	220618.273	(*0.43)	[76000]
	12(5, 7) - 13(4,10)	(0,1,0)	220657.711	(*0.10)	[76000]
	11(1,11) - 10(0,10)	(1,0,0)	221163.508	(*0.86)	[76000]
	28(8,20) - 29(7,23)	(0,1,0)	221277.361	(*0.31)	[76000]
	7(4, 4) - 8(3, 5)	(0,2,0)	221449.883	(*0.82)	[76000]
	44(6,38) - 43(7,37)	(0,2,0)	221739.160	(*1.85)	[76000]
	18(6,12) - 19(5,15)	(0,2,0)	221857.131	(*1.76)	[76000]
	11(1,11) - 10(0,10)	(0,0,0)	221965.21	(0.15)	[70055]
	11(1,11) - 10(0,10)	(0,1,0)	222424.370	(*0.05)	[76000]
	36(3,33) - 37(2,36)	(0,0,0)	222868.850	(*0.10)	[76000]
	11(1,11) - 10(0,10)	(0,2,0)	222928.633	(*0.49)	[76000]
	58(14,44) - 59(13,47)	(0,0,0)	223347.070	(*0.14)	[76000]
	27(8,20) - 28(7,21)	(0,0,0)	223434.47	(0.15)	[70055]
	13(0,13) - 12(1,12)	(0,0,1)	223473.266	(*1.23)	[76000]
	4(2, 3) - 3(1, 2)	(0,0,1)	223516.044	(*0.34)	[76000]
	6(4, 2) - 7(3, 5)	(0,0,0)	223883.650	(*0.02)	[76000]
	49(12,38) - 50(11,39)	(0,1,0)	224145.268	(*1.45)	[76000]
	20(2,18) - 19(3,17)	(0,0,0)	224264.830	(*0.02)	[76000]
	46(4,42) - 47(3,45)	(0,0,0)	224473.088	(*0.21)	[76000]
	38(5,33) - 37(6,32)	(0,2,0)	224810.581	(*1.12)	[76000]
	13(2,12) - 13(1,13)	(1,0,0)	225027.641	(*1.40)	[76000]
	13(2,12) - 13(1,13)	(0,0,0)	225153.671	(*0.02)	[76000]
	26(2,24) - 27(1,27)	(0,1,0)	225833.514	(*0.40)	[76000]
	16(3,13) - 16(2,14)	(0,2,0)	225930.732	(*1.18)	[76000]
	14(3,11) - 14(2,12)	(0,0,0)	226300.019	(*0.02)	[76000]
	41(5,37) - 40(6,34)	(0,0,0)	226508.507	(*0.04)	[76000]
	32(9,23) - 33(8,26)	(0,0,0)	227335.566	(*0.03)	[76000]
	33(9,25) - 34(8,26)	(0,1,0)	227377.711	(*0.49)	[76000]
	17(6,12) - 18(5,13)	(0,1,0)	227808.072	(*0.14)	[76000]
	26(3,23) - 25(4,22)	(0,2,0)	228279.972	(*1.13)	[76000]
	32(4,28) - 31(5,27)	(0,2,0)	229168.081	(*1.28)	[76000]
	54(13,41) - 55(12,44)	(0,1,0)	229208.863	(*2.04)	[76000]
	11(5, 7) - 12(4, 8)	(0,0,0)	229347.744	(*0.02)	[76000]
	13(2,12) - 13(1,13)	(0,1,0)	229545.219	(*0.05)	[76000]
	45(6,40) - 44(7,37)	(0,0,0)	229749.885	(*0.04)	[76000]
	37(10,28) - 38(9,29)	(0,0,0)	230964.932	(*0.03)	[76000]
	16(1,15) - 15(2,14)	(0,2,0)	231071.227	(*0.54)	[76000]
	12(5, 7) - 13(4,10)	(0,2,0)	231867.303	(*1.38)	[76000]
	14(3,11) - 14(2,12)	(0,1,0)	231980.514	(*0.06)	[76000]
	6(4, 2) - 7(3, 5)	(0,1,0)	232210.148	(*0.09)	[76000]
	51(5,47) - 50(6,44)	(0,1,0)	232463.414	(*0.76)	[76000]
	38(10,28) - 39(9,31)	(0,1,0)	233212.213	(*0.77)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	55(8,48) - 54(9,45)	(0,0,0)	233345.396	(*0.04)	[76000]
	60(9,51) - 59(10,50)	(0,0,0)	233400.941	(*0.09)	[76000]
	16(1,15) - 15(2,14)	(0,1,0)	233724.880	(*0.05)	[76000]
	59(14,46) - 60(13,47)	(0,1,0)	234010.068	(*2.80)	[76000]
	13(2,12) - 13(1,13)	(0,2,0)	234091.430	(*0.63)	[76000]
	28(3,25) - 28(2,26)	(0,0,0)	234187.157	(*0.05)	[76000]
	16(1,15) - 15(2,14)	(1,0,0)	234250.573	(*1.50)	[76000]
	42(11,31) - 43(10,34)	(0,0,0)	234352.781	(*0.03)	[76000]
	16(6,10) - 17(5,13)	(0,0,0)	234421.686	(*0.02)	[76000]
	22(7,15) - 23(6,18)	(0,1,0)	234678.553	(*0.22)	[76000]
	4(2, 2) - 3(1, 3)	(1,0,0)	234989.283	(*0.32)	[76000]
	4(2, 2) - 3(1, 3)	(0,0,0)	235151.686	(*0.02)	[76000]
	12(1,12) - 11(0,11)	(0,0,1)	235224.596	(*1.44)	[76000]
	56(5,51) - 57(4,54)	(0,1,0)	235295.598	(*1.60)	[76000]
	36(3,33) - 37(2,36)	(0,1,0)	235342.049	(*0.63)	[76000]
	16(1,15) - 15(2,14)	(0,0,0)	236216.655	(*0.02)	[76000]
	26(3,23) - 25(4,22)	(0,1,0)	237062.250	(*0.10)	[76000]
	12(3, 9) - 12(2,10)	(0,0,0)	237068.87	(0.15)	[70055]
	47(12,36) - 48(11,37)	(0,0,0)	237502.080	(*0.05)	[76000]
	43(5,39) - 42(6,36)	(0,1,0)	237521.157	(*0.47)	[76000]
	28(3,25) - 28(2,26)	(0,1,0)	237602.222	(*0.21)	[76000]
	12(3, 9) - 12(2,10)	(1,0,0)	237623.522	(*1.44)	[76000]
	14(3,11) - 14(2,12)	(0,2,0)	237952.324	(*0.89)	[76000]
	51(7,45) - 50(8,42)	(0,1,0)	238034.485	(*0.79)	[76000]
	46(4,42) - 47(3,45)	(0,1,0)	238243.297	(*0.87)	[76000]
	11(3, 8) - 11(2, 9)	(0,0,1)	238650.915	(*1.48)	[76000]
	4(2, 2) - 3(1, 3)	(0,1,0)	238697.625	(*0.06)	[76000]
	43(11,33) - 44(10,34)	(0,1,0)	238765.117	(*1.16)	[76000]
	21(7,15) - 22(6,16)	(0,0,0)	238992.557	(*0.03)	[76000]
	44(6,38) - 43(7,37)	(0,1,0)	239195.120	(*0.56)	[76000]
	38(5,33) - 37(6,32)	(0,1,0)	239752.482	(*0.35)	[76000]
	11(5, 7) - 12(4, 8)	(0,1,0)	240057.256	(*0.12)	[76000]
	52(13,39) - 53(12,42)	(0,0,0)	240420.023	(*0.08)	[76000]
	6(4, 2) - 7(3, 5)	(0,2,0)	240917.434	(*0.92)	[76000]
	18(1,17) - 18(0,18)	(0,0,0)	240942.781	(*0.02)	[76000]
	51(5,47) - 50(6,44)	(0,0,0)	241044.741	(*0.06)	[76000]
	27(8,20) - 28(7,21)	(0,1,0)	241126.037	(*0.36)	[76000]
	32(4,28) - 31(5,27)	(0,1,0)	241193.706	(*0.19)	[76000]
	5(2, 4) - 4(1, 3)	(1,0,0)	241426.511	(*0.42)	[76000]
	5(2, 4) - 4(1, 3)	(0,0,0)	241615.762	(*0.02)	[76000]
	50(7,43) - 49(8,42)	(0,1,0)	242239.609	(*0.86)	[76000]
	4(2, 2) - 3(1, 3)	(0,2,0)	242404.382	(*0.24)	[76000]
	14(0,14) - 13(1,13)	(0,2,0)	242754.134	(*0.57)	[76000]
	12(3, 9) - 12(2,10)	(0,1,0)	242872.822	(*0.05)	[76000]
	14(0,14) - 13(1,13)	(1,0,0)	242926.656	(*1.24)	[76000]
	5(4, 2) - 6(3, 3)	(0,0,0)	243087.725	(*0.02)	[76000]
	57(14,44) - 58(13,45)	(0,0,0)	243108.125	(*0.15)	[76000]
	26(8,18) - 27(7,21)	(0,0,0)	243245.324	(*0.03)	[76000]
	14(0,14) - 13(1,13)	(0,1,0)	243522.604	(*0.05)	[76000]
	48(12,36) - 49(11,39)	(0,1,0)	244047.814	(*1.68)	[76000]
	14(0,14) - 13(1,13)	(0,0,0)	244254.171	(*0.02)	[76000]
	18(1,17) - 18(0,18)	(0,1,0)	244386.519	(*0.07)	[76000]
	5(2, 4) - 4(1, 3)	(0,1,0)	245002.644	(*0.06)	[76000]
	26(3,23) - 25(4,22)	(0,0,0)	245339.367	(*0.03)	[76000]
	10(3, 7) - 10(2, 8)	(0,0,0)	245563.425	(*0.02)	[76000]
	9(3, 6) - 9(2, 7)	(0,0,1)	245765.351	(*0.90)	[76000]
	10(3, 7) - 10(2, 8)	(1,0,0)	246054.197	(*0.84)	[76000]
	31(9,23) - 32(8,24)	(0,0,0)	247169.510	(*0.03)	[76000]
	32(9,23) - 33(8,26)	(0,1,0)	247274.121	(*0.58)	[76000]
	16(6,10) - 17(5,13)	(0,1,0)	247485.146	(*0.17)	[76000]
	18(1,17) - 18(0,18)	(0,2,0)	247852.195	(*0.94)	[76000]
	15(2,14) - 15(1,15)	(0,0,0)	248057.371	(*0.02)	[76000]
	5(2, 4) - 4(1, 3)	(0,2,0)	248551.895	(*0.28)	[76000]
	56(8,48) - 55(9,47)	(0,1,0)	248828.559	(*1.29)	[76000]
	10(5, 5) - 11(4, 8)	(0,0,0)	248830.937	(*0.02)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	12(3, 9) - 12(2,10)	(0,2,0)	248964.379	(*0.66)	[76000]
	43(5,39) - 42(6,36)	(0,0,0)	248995.335	(*0.04)	[76000]
	53(13,41) - 54(12,42)	(0,1,0)	249056.648	(*2.37)	[76000]
	7(3, 4) - 7(2, 5)	(0,0,1)	250073.916	(*0.41)	[76000]
	13(1,13) - 12(0,12)	(1,0,0)	250214.698	(*1.34)	[76000]
	36(10,26) - 37(9,29)	(0,0,0)	250816.436	(*0.04)	[76000]
	47(6,42) - 46(7,39)	(0,1,0)	250980.296	(*0.67)	[76000]
	49(5,45) - 48(6,42)	(0,1,0)	250997.988	(*0.70)	[76000]
	13(1,13) - 12(0,12)	(0,0,0)	251199.620	(*0.02)	[76000]
	8(3, 5) - 8(2, 6)	(0,0,0)	251210.591	(*0.02)	[76000]
	11(5, 7) - 12(4, 8)	(0,2,0)	251253.568	(*1.60)	[76000]
	5(4, 2) - 6(3, 3)	(0,1,0)	251401.199	(*0.10)	[76000]
	10(3, 7) - 10(2, 8)	(0,1,0)	251428.462	(*0.05)	[76000]
	13(1,13) - 12(0,12)	(0,1,0)	251450.114	(*0.06)	[76000]
	8(3, 5) - 8(2, 6)	(1,0,0)	251649.421	(*0.48)	[76000]
	13(1,13) - 12(0,12)	(0,2,0)	251738.583	(*0.65)	[76000]
	5(3, 2) - 5(2, 3)	(0,0,1)	252147.794	(*0.44)	[76000]
	45(5,41) - 44(6,38)	(0,1,0)	252410.468	(*0.56)	[76000]
	32(4,28) - 31(5,27)	(0,0,0)	252564.151	(*0.03)	[76000]
	15(2,14) - 15(1,15)	(0,1,0)	252730.968	(*0.06)	[76000]
	3(3, 0) - 3(2, 1)	(0,0,1)	252856.529	(*0.81)	[76000]
	37(10,28) - 38(9,29)	(0,1,0)	253105.795	(*0.89)	[76000]
	4(3, 2) - 4(2, 3)	(0,0,1)	253124.839	(*0.63)	[76000]
	6(3, 4) - 6(2, 5)	(0,0,1)	253654.572	(*0.33)	[76000]
	58(14,44) - 59(13,47)	(0,1,0)	253790.428	(*3.23)	[76000]
	38(5,33) - 37(6,32)	(0,0,0)	253936.192	(*0.04)	[76000]
	15(6,10) - 16(5,11)	(0,0,0)	253956.668	(*0.03)	[76000]
	41(11,31) - 42(10,32)	(0,0,0)	254194.611	(*0.04)	[76000]
	6(3, 3) - 6(2, 4)	(0,0,0)	254280.544	(*0.02)	[76000]
	24(2,22) - 24(1,23)	(0,0,0)	254283.374	(*0.03)	[76000]
	21(7,15) - 22(6,16)	(0,1,0)	254380.596	(*0.26)	[76000]
	6(3, 3) - 6(2, 4)	(1,0,0)	254688.118	(*0.32)	[76000]
	6(2, 5) - 5(1, 4)	(0,0,1)	254795.300	(*0.68)	[76000]
	8(3, 6) - 8(2, 7)	(0,0,1)	254957.067	(*0.61)	[76000]
	4(3, 1) - 4(2, 2)	(0,0,0)	255553.313	(*0.02)	[76000]
	51(7,45) - 50(8,42)	(0,0,0)	255595.366	(*0.04)	[76000]
	44(6,38) - 43(7,37)	(0,0,0)	255818.651	(*0.05)	[76000]
	5(2, 3) - 4(1, 4)	(0,0,1)	255873.201	(*0.42)	[76000]
	4(3, 1) - 4(2, 2)	(1,0,0)	255947.531	(*0.47)	[76000]
	3(3, 1) - 3(2, 2)	(0,0,0)	255958.056	(*0.02)	[76000]
	5(3, 3) - 5(2, 4)	(0,0,0)	256246.953	(*0.02)	[76000]
	3(3, 1) - 3(2, 2)	(1,0,0)	256347.972	(*0.57)	[76000]
	5(3, 3) - 5(2, 4)	(1,0,0)	256633.038	(*0.37)	[76000]
	57(8,50) - 56(9,47)	(0,1,0)	256919.037	(*1.26)	[76000]
	8(3, 5) - 8(2, 6)	(0,1,0)	257099.235	(*0.06)	[76000]
	7(3, 5) - 7(2, 6)	(0,0,0)	257099.968	(*0.02)	[76000]
	46(12,34) - 47(11,37)	(0,0,0)	257319.051	(*0.06)	[76000]
	47(5,43) - 46(6,40)	(0,1,0)	257380.825	(*0.64)	[76000]
	24(2,22) - 24(1,23)	(0,1,0)	257420.291	(*0.09)	[76000]
	7(3, 5) - 7(2, 6)	(1,0,0)	257475.873	(*0.36)	[76000]
	10(3, 8) - 10(2, 9)	(0,0,1)	257494.589	(*1.15)	[76000]
	15(2,14) - 15(1,15)	(0,2,0)	257556.652	(*0.88)	[76000]
	10(3, 7) - 10(2, 8)	(0,2,0)	257575.362	(*0.46)	[76000]
	32(4,28) - 32(3,29)	(0,0,0)	258388.933	(*0.12)	[76000]
	42(11,31) - 43(10,34)	(0,1,0)	258646.305	(*1.33)	[76000]
	20(7,13) - 21(6,16)	(0,0,0)	258666.986	(*0.03)	[76000]
	9(3, 7) - 9(2, 8)	(0,0,0)	258942.195	(*0.02)	[76000]
	9(3, 7) - 9(2, 8)	(1,0,0)	259297.383	(*0.64)	[76000]
	10(5, 5) - 11(4, 8)	(0,1,0)	259525.318	(*0.13)	[76000]
	30(4,26) - 30(3,27)	(0,0,0)	259599.582	(*0.10)	[76000]
	5(4, 2) - 6(3, 3)	(0,2,0)	260094.680	(*1.01)	[76000]
	6(3, 3) - 6(2, 4)	(0,1,0)	260176.026	(*0.07)	[76000]
	51(13,39) - 52(12,40)	(0,0,0)	260195.303	(*0.09)	[76000]
	49(5,45) - 48(6,42)	(0,0,0)	260269.442	(*0.06)	[76000]
	26(8,18) - 27(7,21)	(0,1,0)	260920.154	(*0.42)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	50(7,43) - 49(8,42)	(0,0,0)	261062.860	(*0.06)	[76000]
	4(3, 1) - 4(2, 2)	(0,1,0)	261450.125	(*0.07)	[76000]
	12(3,10) - 12(2,11)	(0,0,1)	261762.927	(*1.86)	[76000]
	3(3, 1) - 3(2, 2)	(0,1,0)	261855.090	(*0.08)	[76000]
	5(3, 3) - 5(2, 4)	(0,1,0)	262144.767	(*0.07)	[76000]
	11(3, 9) - 11(2,10)	(0,0,0)	262256.893	(*0.02)	[76000]
	4(4, 0) - 5(3, 3)	(0,0,0)	262334.039	(*0.02)	[76000]
	28(2,26) - 29(1,29)	(0,0,0)	262524.652	(*0.09)	[76000]
	11(3, 9) - 11(2,10)	(1,0,0)	262576.573	(*1.11)	[76000]
	56(14,42) - 57(13,45)	(0,0,0)	262827.828	(*0.15)	[76000]
	25(8,18) - 26(7,19)	(0,0,0)	262969.605	(*0.04)	[76000]
	7(3, 5) - 7(2, 6)	(0,1,0)	262999.658	(*0.06)	[76000]
	45(5,41) - 44(6,38)	(0,0,0)	263216.665	(*0.05)	[76000]
	8(3, 5) - 8(2, 6)	(0,2,0)	263264.725	(*0.30)	[76000]
	30(3,27) - 30(2,28)	(0,0,0)	263544.142	(*0.07)	[76000]
	47(12,36) - 48(11,37)	(0,1,0)	263895.250	(*1.93)	[76000]
	32(4,28) - 32(3,29)	(0,1,0)	264129.526	(*0.67)	[76000]
	9(3, 7) - 9(2, 8)	(0,1,0)	264846.138	(*0.06)	[76000]
	34(4,30) - 34(3,31)	(0,0,0)	265482.304	(*0.15)	[76000]
	47(6,42) - 46(7,39)	(0,0,0)	265608.501	(*0.05)	[76000]
	30(4,26) - 30(3,27)	(0,1,0)	266030.473	(*0.49)	[76000]
	6(3, 3) - 6(2, 4)	(0,2,0)	266345.145	(*0.25)	[76000]
	30(3,27) - 30(2,28)	(0,1,0)	266815.483	(*0.31)	[76000]
	30(9,21) - 31(8,24)	(0,0,0)	266943.039	(*0.04)	[76000]
	15(6,10) - 16(5,11)	(0,1,0)	267006.398	(*0.19)	[76000]
	31(9,23) - 32(8,24)	(0,1,0)	267090.934	(*0.66)	[76000]
	47(5,43) - 46(6,40)	(0,0,0)	267428.499	(*0.05)	[76000]
	13(3,11) - 13(2,12)	(0,0,0)	267537.431	(*0.02)	[76000]
	4(3, 1) - 4(2, 2)	(0,2,0)	267619.031	(*0.32)	[76000]
	28(4,24) - 28(3,25)	(0,0,0)	267719.921	(*0.08)	[76000]
	13(3,11) - 13(2,12)	(1,0,0)	267803.211	(*1.95)	[76000]
	3(3, 1) - 3(2, 2)	(0,2,0)	268023.693	(*0.37)	[76000]
	9(5, 5) - 10(4, 6)	(0,0,0)	268168.445	(*0.03)	[76000]
	11(3, 9) - 11(2,10)	(0,1,0)	268169.741	(*0.06)	[76000]
	5(3, 3) - 5(2, 4)	(0,2,0)	268314.092	(*0.28)	[76000]
	52(13,39) - 53(12,42)	(0,1,0)	268856.223	(*2.70)	[76000]
	7(3, 5) - 7(2, 6)	(0,2,0)	269170.291	(*0.26)	[76000]
	56(8,48) - 55(9,47)	(0,0,0)	269762.320	(*0.09)	[76000]
	34(4,30) - 34(3,31)	(0,1,0)	270527.905	(*0.88)	[76000]
	35(10,26) - 36(9,27)	(0,0,0)	270605.121	(*0.04)	[76000]
	4(4, 0) - 5(3, 3)	(0,1,0)	270633.562	(*0.11)	[76000]
	10(5, 5) - 11(4, 8)	(0,2,0)	270705.043	(*1.82)	[76000]
	9(3, 7) - 9(2, 8)	(0,2,0)	271019.498	(*0.36)	[76000]
	7(2, 6) - 6(1, 5)	(1,0,0)	271195.499	(*0.66)	[76000]
	7(2, 6) - 6(1, 5)	(0,0,0)	271528.970	(*0.02)	[76000]
	36(10,26) - 37(9,29)	(0,1,0)	272938.715	(*1.02)	[76000]
	14(6, 8) - 15(5,11)	(0,0,0)	273462.766	(*0.03)	[76000]
	13(3,11) - 13(2,12)	(0,1,0)	273467.363	(*0.06)	[76000]
	57(14,44) - 58(13,45)	(0,1,0)	273527.777	(*3.68)	[76000]
	17(2,16) - 17(1,17)	(0,0,0)	273752.935	(*0.02)	[76000]
	40(11,29) - 41(10,32)	(0,0,0)	273982.332	(*0.05)	[76000]
	20(7,13) - 21(6,16)	(0,1,0)	274039.168	(*0.30)	[76000]
	11(3, 9) - 11(2,10)	(0,2,0)	274349.054	(*0.55)	[76000]
	28(2,26) - 29(1,29)	(0,1,0)	274745.680	(*0.60)	[76000]
	28(4,24) - 28(3,25)	(0,1,0)	274778.428	(*0.35)	[76000]
	7(2, 6) - 6(1, 5)	(0,1,0)	274789.262	(*0.07)	[76000]
	15(3,13) - 15(2,14)	(0,0,0)	275240.160	(*0.02)	[76000]
	38(3,35) - 39(2,38)	(0,0,0)	275375.148	(*0.18)	[76000]
	22(2,20) - 21(3,19)	(0,2,0)	276278.824	(*1.26)	[76000]
	57(8,50) - 56(9,47)	(0,0,0)	276992.84	(0.20)	[70055]
	45(12,34) - 46(11,35)	(0,0,0)	277085.96	(0.20)	[70055]
	7(2, 6) - 6(1, 5)	(0,2,0)	278212.023	(*0.40)	[76000]
	19(7,13) - 20(6,14)	(0,0,0)	278250.97	(0.20)	[70055]
	41(11,31) - 42(10,32)	(0,1,0)	278468.496	(*1.52)	[76000]
	53(7,47) - 52(8,44)	(0,1,0)	278711.217	(*1.11)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	17(2,16) - 17(1,17)	(0,1,0)	278755.000	(*0.07)	[76000]
	9(5, 5) - 10(4, 6)	(0,1,0)	278849.336	(*0.14)	[76000]
	4(4, 0) - 5(3, 3)	(0,2,0)	279312.238	(*1.09)	[76000]
	13(3,11) - 13(2,12)	(0,2,0)	279658.969	(*0.77)	[76000]
	50(13,37) - 51(12,40)	(0,0,0)	279926.187	(*0.10)	[76000]
	25(8,18) - 26(7,19)	(0,1,0)	280628.527	(*0.48)	[76000]
	26(4,22) - 26(3,23)	(0,0,0)	280807.28	(0.20)	[70055]
	15(3,13) - 15(2,14)	(0,1,0)	281200.233	(*0.06)	[76000]
	58(5,53) - 59(4,56)	(0,0,0)	281362.875	(*0.68)	[76000]
	48(4,44) - 49(3,47)	(0,0,0)	281401.961	(*0.35)	[76000]
	22(2,20) - 21(3,19)	(0,1,0)	281511.574	(*0.07)	[76000]
	6(2, 4) - 5(1, 5)	(1,0,0)	281635.292	(*0.49)	[76000]
	36(4,32) - 36(3,33)	(0,0,0)	281688.98	(0.20)	[70055]
	36(4,32) - 36(3,33)	(0,0,0)	281689.417	(*0.19)	[76000]
	15(1,15) - 14(0,14)	(0,0,0)	281762.60	(0.20)	[70055]
	15(1,15) - 14(0,14)	(0,1,0)	281814.224	(*0.06)	[76000]
	15(1,15) - 14(0,14)	(0,2,0)	281895.327	(*0.86)	[76000]
	6(2, 4) - 5(1, 5)	(0,0,0)	282036.514	(*0.02)	[76000]
	6(2, 4) - 5(1, 5)	(0,0,0)	282036.58	(0.20)	[70055]
	16(0,16) - 15(1,15)	(0,2,0)	282112.971	(*0.83)	[76000]
	20(1,19) - 20(0,20)	(0,0,0)	282292.80	(0.20)	[70055]
	20(1,19) - 20(0,20)	(0,0,0)	282292.805	(*0.03)	[76000]
	55(14,42) - 56(13,43)	(0,0,0)	282507.809	(*0.16)	[76000]
	24(8,16) - 25(7,19)	(0,0,0)	282636.078	(*0.04)	[76000]
	24(8,16) - 25(7,19)	(0,0,0)	282636.24	(0.20)	[70055]
	16(0,16) - 15(1,15)	(0,1,0)	282803.444	(*0.06)	[76000]
	8(2, 7) - 7(1, 6)	(0,0,1)	283132.514	(*1.17)	[76000]
	49(6,44) - 48(7,41)	(0,1,0)	283133.944	(*0.88)	[76000]
	16(0,16) - 15(1,15)	(0,0,0)	283464.60	(0.20)	[70055]
	16(0,16) - 15(1,15)	(0,0,0)	283464.728	(*0.02)	[76000]
	46(12,34) - 47(11,37)	(0,1,0)	283691.277	(*2.19)	[76000]
	17(2,16) - 17(1,17)	(0,2,0)	283906.959	(*1.25)	[76000]
	18(1,17) - 17(2,16)	(0,2,0)	284007.123	(*0.91)	[76000]
	6(2, 4) - 5(1, 5)	(0,1,0)	285639.674	(*0.07)	[76000]
	17(3,15) - 17(2,16)	(0,0,0)	285743.55	(0.20)	[70055]
	17(3,15) - 17(2,16)	(0,0,0)	285743.564	(*0.03)	[76000]
	33(5,29) - 34(2,32)	(0,0,0)	285768.27	(0.20)	[70055]
	36(4,32) - 36(3,33)	(0,1,0)	286094.791	(*1.13)	[76000]
	18(1,17) - 17(2,16)	(0,1,0)	286339.006	(*0.06)	[76000]
	22(2,20) - 21(3,19)	(0,0,0)	286416.32	(0.20)	[70055]
	22(2,20) - 21(3,19)	(0,0,0)	286416.332	(*0.03)	[76000]
	20(1,19) - 20(0,20)	(0,1,0)	286432.696	(*0.11)	[76000]
	14(6, 8) - 15(5,11)	(0,1,0)	286497.496	(*0.21)	[76000]
	29(9,21) - 30(8,22)	(0,0,0)	286651.066	(*0.05)	[76000]
	29(9,21) - 30(8,22)	(0,0,0)	286651.46	(0.20)	[70055]
	30(9,21) - 31(8,24)	(0,1,0)	286847.129	(*0.75)	[76000]
	15(3,13) - 15(2,14)	(0,2,0)	287415.051	(*1.08)	[76000]
	8(5, 3) - 9(4, 6)	(0,0,0)	287485.44	(0.20)	[70055]
	8(5, 3) - 9(4, 6)	(0,0,0)	287485.621	(*0.03)	[76000]
	26(4,22) - 26(3,23)	(0,1,0)	288379.128	(*0.24)	[76000]
	18(1,17) - 17(2,16)	(0,0,0)	288519.96	(0.20)	[70055]
	18(1,17) - 17(2,16)	(0,0,0)	288519.985	(*0.02)	[76000]
	51(13,39) - 52(12,40)	(0,1,0)	288609.312	(*3.06)	[76000]
	6(2, 4) - 5(1, 5)	(0,2,0)	289400.082	(*0.33)	[76000]
	38(3,35) - 39(2,38)	(0,1,0)	289522.461	(*0.97)	[76000]
	34(10,24) - 35(9,27)	(0,0,0)	290338.176	(*0.05)	[76000]
	20(1,19) - 20(0,20)	(0,2,0)	290604.771	(*1.47)	[76000]
	17(3,15) - 17(2,16)	(0,1,0)	291752.977	(*0.07)	[76000]
	35(10,26) - 36(9,27)	(0,1,0)	292709.164	(*1.15)	[76000]
	13(6, 8) - 14(5, 9)	(0,0,0)	292882.684	(*0.03)	[76000]
	56(14,42) - 57(13,45)	(0,1,0)	293224.020	(*4.15)	[76000]
	19(7,13) - 20(6,14)	(0,1,0)	293608.254	(*0.33)	[76000]
	39(11,29) - 40(10,30)	(0,0,0)	293717.461	(*0.06)	[76000]
	53(7,47) - 52(8,44)	(0,0,0)	296004.354	(*0.06)	[76000]
	26(2,24) - 26(1,25)	(0,0,0)	296168.71	(0.20)	[70055]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	26(2,24) - 26(1,25)	(0,0,0)	296168.776	(*0.04)	[76000]
	24(4,20) - 24(3,21)	(0,0,0)	296535.461	(*0.05)	[76000]
	24(4,20) - 24(3,21)	(0,0,0)	296535.49	(0.20)	[70055]
	44(12,32) - 45(11,35)	(0,0,0)	296806.168	(*0.07)	[76000]
	48(4,44) - 49(3,47)	(0,1,0)	297071.098	(*1.39)	[76000]
	49(6,44) - 48(7,41)	(0,0,0)	297257.207	(*0.06)	[76000]
	18(7,11) - 19(6,14)	(0,0,0)	297782.57	(0.20)	[70055]
	18(7,11) - 19(6,14)	(0,0,0)	297782.602	(*0.04)	[76000]
	17(3,15) - 17(2,16)	(0,2,0)	298007.927	(*1.55)	[76000]
	9(2, 8) - 8(1, 7)	(1,0,0)	298111.065	(*0.97)	[76000]
	8(5, 3) - 9(4, 6)	(0,1,0)	298152.293	(*0.16)	[76000]
	58(5,53) - 59(4,56)	(0,1,0)	298184.406	(*2.66)	[76000]
	40(11,29) - 41(10,32)	(0,1,0)	298236.711	(*1.71)	[76000]
	9(2, 8) - 8(1, 7)	(0,0,0)	298576.255	(*0.03)	[76000]
	52(7,45) - 51(8,44)	(0,1,0)	298864.700	(*1.37)	[76000]
	19(3,17) - 19(2,18)	(0,0,0)	299316.803	(*0.03)	[76000]
	49(13,37) - 50(12,38)	(0,0,0)	299614.496	(*0.11)	[76000]
	26(2,24) - 26(1,25)	(0,1,0)	299800.478	(*0.13)	[76000]
	59(8,52) - 58(9,49)	(0,1,0)	300182.051	(*1.78)	[76000]
	32(3,29) - 32(2,30)	(0,0,0)	300273.720	(*0.09)	[76000]
	24(8,16) - 25(7,19)	(0,1,0)	300278.766	(*0.54)	[76000]
	58(8,50) - 57(9,49)	(0,1,0)	301160.237	(*2.00)	[76000]
	46(6,40) - 45(7,39)	(0,1,0)	301252.951	(*0.91)	[76000]
	9(2, 8) - 8(1, 7)	(0,1,0)	301673.176	(*0.07)	[76000]
	19(2,18) - 19(1,19)	(0,0,0)	301896.609	(*0.03)	[76000]
	54(14,40) - 55(13,43)	(0,0,0)	302149.809	(*0.17)	[76000]
	23(8,16) - 24(7,17)	(0,0,0)	302236.082	(*0.05)	[76000]
	45(12,34) - 46(11,35)	(0,1,0)	303437.637	(*2.45)	[76000]
	32(3,29) - 32(2,30)	(0,1,0)	303591.895	(*0.44)	[76000]
	59(15,45) - 60(14,46)	(0,0,0)	304416.672	(*0.29)	[76000]
	24(4,20) - 24(3,21)	(0,1,0)	304474.920	(*0.17)	[76000]
	9(2, 8) - 8(1, 7)	(0,2,0)	304932.806	(*0.58)	[76000]
	7(2, 5) - 6(1, 6)	(0,0,1)	305324.373	(*0.80)	[76000]
	19(3,17) - 19(2,18)	(0,1,0)	305401.905	(*0.08)	[76000]
	28(3,25) - 27(4,24)	(0,1,0)	305455.136	(*0.15)	[76000]
	13(6, 8) - 14(5, 9)	(0,1,0)	305903.191	(*0.24)	[76000]
	28(9,19) - 29(8,22)	(0,0,0)	306303.414	(*0.05)	[76000]
	29(9,21) - 30(8,22)	(0,1,0)	306538.199	(*0.84)	[76000]
	7(5, 3) - 8(4, 4)	(0,0,0)	306738.957	(*0.03)	[76000]
	40(5,35) - 39(6,34)	(0,1,0)	307068.659	(*0.56)	[76000]
	38(4,34) - 38(3,35)	(0,0,0)	307185.992	(*0.24)	[76000]
	19(2,18) - 19(1,19)	(0,1,0)	307274.669	(*0.10)	[76000]
	50(13,37) - 51(12,40)	(0,1,0)	308318.227	(*3.42)	[76000]
	10(2, 9) - 9(1, 8)	(0,0,1)	308725.765	(*1.72)	[76000]
	30(2,28) - 31(1,31)	(0,0,0)	309548.305	(*0.14)	[76000]
	51(6,46) - 50(7,43)	(0,1,0)	309643.468	(*1.11)	[76000]
	33(10,24) - 34(9,25)	(0,0,0)	310016.746	(*0.06)	[76000]
	3(3, 0) - 2(2, 1)	(0,0,1)	310179.801	(*0.73)	[76000]
	38(4,34) - 38(3,35)	(0,1,0)	311073.069	(*1.44)	[76000]
	34(4,30) - 33(5,29)	(0,1,0)	311218.734	(*0.31)	[76000]
	12(6, 6) - 13(5, 9)	(0,0,0)	312258.520	(*0.04)	[76000]
	34(10,24) - 35(9,27)	(0,1,0)	312424.055	(*1.29)	[76000]
	22(4,18) - 22(3,19)	(0,0,0)	312542.553	(*0.05)	[76000]
	19(2,18) - 19(1,19)	(0,2,0)	312801.223	(*1.80)	[76000]
	55(14,42) - 56(13,43)	(0,1,0)	312880.785	(*4.64)	[76000]
	18(7,11) - 19(6,14)	(0,1,0)	313124.574	(*0.37)	[76000]
	3(3, 1) - 2(2, 0)	(0,0,0)	313279.710	(*0.03)	[76000]
	3(3, 1) - 2(2, 0)	(1,0,0)	313393.293	(*0.54)	[76000]
	38(11,27) - 39(10,30)	(0,0,0)	313403.645	(*0.07)	[76000]
	28(3,25) - 27(4,24)	(0,0,0)	313412.509	(*0.03)	[76000]
	17(1,17) - 16(0,16)	(0,2,0)	313432.995	(*1.17)	[76000]
	17(1,17) - 16(0,16)	(0,1,0)	313536.596	(*0.07)	[76000]
	17(1,17) - 16(0,16)	(0,0,0)	313660.809	(*0.03)	[76000]
	21(3,19) - 21(2,20)	(0,0,0)	316098.876	(*0.04)	[76000]
	21(3,19) - 21(2,20)	(0,0,0)	316099.01	(0.20)	[70055]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	43(12,32) - 44(11,33)	(0,0,0)	316481.219	(*0.08)	[76000]
	55(7,49) - 54(8,46)	(0,1,0)	317088.873	(*1.50)	[76000]
	17(7,11) - 18(6,12)	(0,0,0)	317250.402	(*0.04)	[76000]
	7(5, 3) - 8(4, 4)	(0,1,0)	317391.797	(*0.17)	[76000]
	39(11,29) - 40(10,30)	(0,1,0)	317952.566	(*1.90)	[76000]
	52(7,45) - 51(8,44)	(0,0,0)	318088.868	(*0.10)	[76000]
	46(6,40) - 45(7,39)	(0,0,0)	318238.524	(*0.07)	[76000]
	3(3, 1) - 2(2, 0)	(0,1,0)	319136.240	(*0.09)	[76000]
	48(13,35) - 49(12,38)	(0,0,0)	319262.285	(*0.12)	[76000]
	40(5,35) - 40(4,36)	(0,0,0)	319278.002	(*0.44)	[76000]
	42(5,37) - 42(4,38)	(0,0,0)	319699.891	(*0.53)	[76000]
	23(8,16) - 24(7,17)	(0,1,0)	319862.918	(*0.60)	[76000]
	18(0,18) - 17(1,17)	(0,2,0)	320061.888	(*1.23)	[76000]
	59(8,52) - 58(9,49)	(0,0,0)	320087.936	(*0.09)	[76000]
	22(4,18) - 22(3,19)	(0,1,0)	320702.663	(*0.12)	[76000]
	18(0,18) - 17(1,17)	(0,1,0)	320707.488	(*0.07)	[76000]
	18(0,18) - 17(1,17)	(0,0,0)	321330.140	(*0.03)	[76000]
	40(5,35) - 39(6,34)	(0,0,0)	321420.990	(*0.05)	[76000]
	53(14,40) - 54(13,41)	(0,0,0)	321755.414	(*0.18)	[76000]
	22(8,14) - 23(7,17)	(0,0,0)	321782.453	(*0.05)	[76000]
	21(3,19) - 21(2,20)	(0,1,0)	322293.795	(*0.09)	[76000]
	11(2,10) - 10(1, 9)	(1,0,0)	322438.169	(*1.43)	[76000]
	58(8,50) - 57(9,49)	(0,0,0)	322438.566	(*0.16)	[76000]
	34(4,30) - 33(5,29)	(0,0,0)	322475.806	(*0.04)	[76000]
	11(2,10) - 10(1, 9)	(0,0,0)	323026.404	(*0.03)	[76000]
	51(6,46) - 50(7,43)	(0,0,0)	323094.074	(*0.07)	[76000]
	44(12,32) - 45(11,35)	(0,1,0)	323137.180	(*2.73)	[76000]
	30(2,28) - 31(1,31)	(0,1,0)	323351.504	(*0.89)	[76000]
	22(1,21) - 22(0,22)	(0,0,0)	323526.418	(*0.04)	[76000]
	58(15,43) - 59(14,46)	(0,0,0)	323966.637	(*0.29)	[76000]
	59(6,54) - 58(7,51)	(0,1,0)	324004.163	(*2.22)	[76000]
	3(3, 1) - 2(2, 0)	(0,2,0)	325262.806	(*0.38)	[76000]
	12(6, 6) - 13(5, 9)	(0,1,0)	325264.504	(*0.26)	[76000]
	27(9,19) - 28(8,20)	(0,0,0)	325900.684	(*0.06)	[76000]
	11(2,10) - 10(1, 9)	(0,1,0)	325921.842	(*0.07)	[76000]
	6(5, 1) - 7(4, 4)	(0,0,0)	325960.406	(*0.03)	[76000]
	28(9,19) - 29(8,22)	(0,1,0)	326173.598	(*0.94)	[76000]
	40(3,37) - 41(2,40)	(0,0,0)	326411.492	(*0.30)	[76000]
	42(5,37) - 42(4,38)	(0,1,0)	326519.437	(*3.22)	[76000]
	20(4,16) - 20(3,17)	(0,0,0)	326867.525	(*0.04)	[76000]
	40(5,35) - 40(4,36)	(0,1,0)	327134.800	(*2.67)	[76000]
	38(5,33) - 38(4,34)	(0,0,0)	327217.569	(*0.37)	[76000]
	49(13,37) - 50(12,38)	(0,1,0)	327984.789	(*3.80)	[76000]
	22(1,21) - 22(0,22)	(0,1,0)	328421.634	(*0.16)	[76000]
	53(6,48) - 52(7,45)	(0,1,0)	328723.739	(*1.35)	[76000]
	11(2,10) - 10(1, 9)	(0,2,0)	328979.925	(*0.81)	[76000]
	4(3, 2) - 3(2, 1)	(0,0,1)	329131.782	(*0.54)	[76000]
	32(10,22) - 33(9,25)	(0,0,0)	329645.426	(*0.07)	[76000]
	44(5,39) - 44(4,40)	(0,0,0)	329690.770	(*0.62)	[76000]
	11(6, 6) - 12(5, 7)	(0,0,0)	331580.297	(*0.04)	[76000]
	33(10,24) - 34(9,25)	(0,1,0)	332084.684	(*1.43)	[76000]
	21(2,20) - 21(1,21)	(0,0,0)	332091.417	(*0.04)	[76000]
	4(3, 1) - 3(2, 2)	(0,0,0)	332505.226	(*0.03)	[76000]
	4(3, 1) - 3(2, 2)	(1,0,0)	332525.055	(*0.46)	[76000]
	17(7,11) - 18(6,12)	(0,1,0)	332577.422	(*0.41)	[76000]
	37(11,27) - 38(10,28)	(0,0,0)	333043.043	(*0.08)	[76000]
	59(6,54) - 58(7,51)	(0,0,0)	333360.746	(*0.20)	[76000]
	55(7,49) - 54(8,46)	(0,0,0)	333984.871	(*0.08)	[76000]
	8(2, 6) - 7(1, 7)	(1,0,0)	333989.456	(*0.77)	[76000]
	8(2, 6) - 7(1, 7)	(0,0,0)	334673.281	(*0.03)	[76000]
	20(1,19) - 19(2,18)	(0,2,0)	334774.398	(*1.55)	[76000]
	20(4,16) - 20(3,17)	(0,1,0)	335128.597	(*0.10)	[76000]
	44(5,39) - 44(4,40)	(0,1,0)	335474.412	(*3.81)	[76000]
	50(4,46) - 51(3,49)	(0,0,0)	335943.445	(*0.56)	[76000]
	38(5,33) - 38(4,34)	(0,1,0)	336031.177	(*2.17)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	23(3,21) - 23(2,22)	(0,0,0)	336089.259	(*0.05)	[76000]
	42(12,30) - 43(11,33)	(0,0,0)	336113.707	(*0.10)	[76000]
	6(5, 1) - 7(4, 4)	(0,1,0)	336599.328	(*0.18)	[76000]
	16(7, 9) - 17(6,12)	(0,0,0)	336669.578	(*0.05)	[76000]
	20(1,19) - 19(2,18)	(0,1,0)	336760.692	(*0.07)	[76000]
	57(6,52) - 56(7,49)	(0,1,0)	337356.915	(*1.87)	[76000]
	38(11,27) - 39(10,30)	(0,1,0)	337619.633	(*2.10)	[76000]
	21(2,20) - 21(1,21)	(0,1,0)	337892.327	(*0.15)	[76000]
	18(4,14) - 18(3,15)	(0,0,0)	338306.021	(*0.03)	[76000]
	4(3, 1) - 3(2, 2)	(0,1,0)	338348.547	(*0.09)	[76000]
	8(2, 6) - 7(1, 7)	(0,1,0)	338376.239	(*0.08)	[76000]
	55(6,50) - 54(7,47)	(0,1,0)	338522.793	(*1.59)	[76000]
	20(1,19) - 19(2,18)	(0,0,0)	338611.826	(*0.03)	[76000]
	47(13,35) - 48(12,36)	(0,0,0)	338871.363	(*0.13)	[76000]
	22(8,14) - 23(7,17)	(0,1,0)	339393.398	(*0.66)	[76000]
	28(2,26) - 28(1,27)	(0,0,0)	340316.557	(*0.06)	[76000]
	21(8,14) - 22(7,15)	(0,0,0)	341275.352	(*0.06)	[76000]
	53(6,48) - 52(7,45)	(0,0,0)	341323.526	(*0.09)	[76000]
	52(14,38) - 53(13,41)	(0,0,0)	341326.234	(*0.20)	[76000]
	40(4,36) - 40(3,37)	(0,0,0)	341403.975	(*0.30)	[76000]
	36(5,31) - 36(4,32)	(0,0,0)	341674.555	(*0.30)	[76000]
	8(2, 6) - 7(1, 7)	(0,2,0)	342229.937	(*0.48)	[76000]
	40(3,37) - 41(2,40)	(0,1,0)	342339.566	(*1.44)	[76000]
	23(3,21) - 23(2,22)	(0,1,0)	342435.982	(*0.13)	[76000]
	34(3,31) - 34(2,32)	(0,0,0)	342762.057	(*0.12)	[76000]
	43(12,32) - 44(11,33)	(0,1,0)	342791.926	(*3.01)	[76000]
	57(15,43) - 58(14,44)	(0,0,0)	343485.590	(*0.31)	[76000]
	24(2,22) - 23(3,21)	(0,1,0)	343923.814	(*0.10)	[76000]
	4(3, 1) - 3(2, 2)	(0,2,0)	344461.383	(*0.36)	[76000]
	11(6, 6) - 12(5, 7)	(0,1,0)	344572.000	(*0.28)	[76000]
	28(2,26) - 28(1,27)	(0,1,0)	344613.712	(*0.20)	[76000]
	40(4,36) - 40(3,37)	(0,1,0)	344972.956	(*1.80)	[76000]
	5(5, 1) - 6(4, 2)	(0,0,0)	345149.070	(*0.04)	[76000]
	13(2,12) - 12(1,11)	(0,0,0)	345338.481	(*0.03)	[76000]
	26(9,17) - 27(8,20)	(0,0,0)	345448.602	(*0.07)	[76000]
	27(9,19) - 28(8,20)	(0,1,0)	345754.121	(*1.03)	[76000]
	19(1,19) - 18(0,18)	(0,2,0)	346118.654	(*1.67)	[76000]
	34(3,31) - 34(2,32)	(0,1,0)	346365.135	(*0.62)	[76000]
	19(1,19) - 18(0,18)	(0,1,0)	346379.230	(*0.08)	[76000]
	16(4,12) - 16(3,13)	(0,0,0)	346523.905	(*0.03)	[76000]
	18(4,14) - 18(3,15)	(0,1,0)	346591.820	(*0.09)	[76000]
	19(1,19) - 18(0,18)	(0,0,0)	346652.145	(*0.03)	[76000]
	48(13,35) - 49(12,38)	(0,1,0)	347611.039	(*4.18)	[76000]
	57(6,52) - 56(7,49)	(0,0,0)	347829.535	(*0.15)	[76000]
	13(2,12) - 12(1,11)	(0,1,0)	347991.765	(*0.08)	[76000]
	24(2,22) - 23(3,21)	(0,0,0)	348387.919	(*0.03)	[76000]
	5(3, 2) - 4(2, 3)	(0,0,1)	348510.381	(*0.43)	[76000]
	31(10,22) - 32(9,23)	(0,0,0)	349226.531	(*0.08)	[76000]
	46(5,41) - 46(4,42)	(0,0,0)	349785.122	(*0.73)	[76000]
	55(6,50) - 54(7,47)	(0,0,0)	350110.578	(*0.11)	[76000]
	13(2,12) - 12(1,11)	(0,2,0)	350806.562	(*1.06)	[76000]
	10(6, 4) - 11(5, 7)	(0,0,0)	350862.844	(*0.04)	[76000]
	5(3, 3) - 4(2, 2)	(1,0,0)	351188.637	(*0.43)	[76000]
	5(3, 3) - 4(2, 2)	(0,0,0)	351257.201	(*0.03)	[76000]
	36(5,31) - 36(4,32)	(0,1,0)	351289.232	(*1.72)	[76000]
	32(10,22) - 33(9,25)	(0,1,0)	351695.543	(*1.57)	[76000]
	14(4,10) - 14(3,11)	(0,0,0)	351873.899	(*0.03)	[76000]
	11(4, 7) - 11(3, 8)	(0,0,1)	351921.906	(*1.85)	[76000]
	16(7, 9) - 17(6,12)	(0,1,0)	351981.594	(*0.45)	[76000]
	57(7,51) - 56(8,48)	(0,1,0)	351995.823	(*1.94)	[76000]
	36(11,25) - 37(10,28)	(0,0,0)	352638.566	(*0.09)	[76000]
	9(4, 5) - 9(3, 6)	(0,0,1)	353141.141	(*1.34)	[76000]
	10(4, 7) - 10(3, 8)	(0,0,1)	353433.636	(*1.49)	[76000]
	50(4,46) - 51(3,49)	(0,1,0)	353615.070	(*2.13)	[76000]
	7(4, 3) - 7(3, 4)	(0,0,1)	353689.530	(*1.66)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{16}O$	8(4, 5) - 8(3, 6)	(0,0,1)	353691.835	(*1.41)	[76000]
	6(4, 3) - 6(3, 4)	(0,0,1)	353859.553	(*2.00)	[76000]
	46(5,41) - 46(4,42)	(0,1,0)	354620.027	(*4.48)	[76000]
	16(4,12) - 16(3,13)	(0,1,0)	354799.987	(*0.07)	[76000]
	12(4, 8) - 12(3, 9)	(0,0,0)	355045.543	(*0.03)	[76000]
	32(2,30) - 33(1,33)	(0,0,0)	355154.199	(*0.23)	[76000]
	41(12,30) - 42(11,31)	(0,0,0)	355705.676	(*0.11)	[76000]
	5(5, 1) - 6(4, 2)	(0,1,0)	355774.180	(*0.20)	[76000]
	15(7, 9) - 16(6,10)	(0,0,0)	356040.637	(*0.05)	[76000]
	10(4, 6) - 10(3, 7)	(0,0,0)	356755.219	(*0.03)	[76000]
	20(0,20) - 19(1,19)	(0,2,0)	356970.850	(*1.88)	[76000]
	5(3, 3) - 4(2, 2)	(0,1,0)	357087.010	(*0.09)	[76000]
	13(4,10) - 13(3,11)	(0,0,0)	357165.36	(0.20)	[70055]
	13(4,10) - 13(3,11)	(0,0,0)	357165.410	(*0.03)	[76000]
	37(11,27) - 38(10,28)	(0,1,0)	357240.102	(*2.31)	[76000]
	15(4,12) - 15(3,13)	(0,0,0)	357241.19	(0.20)	[70055]
	15(4,12) - 15(3,13)	(0,0,0)	357241.209	(*0.03)	[76000]
	60(8,52) - 59(9,51)	(0,1,0)	357291.851	(*2.97)	[76000]
	10(4, 6) - 10(3, 7)	(1,0,0)	357313.574	(*1.46)	[76000]
	11(4, 8) - 11(3, 9)	(0,0,0)	357387.57	(0.20)	[70055]
	11(4, 8) - 11(3, 9)	(0,0,0)	357387.604	(*0.03)	[76000]
	8(4, 4) - 8(3, 5)	(0,0,0)	357581.482	(*0.03)	[76000]
	20(0,20) - 19(1,19)	(0,1,0)	357602.665	(*0.08)	[76000]
	9(4, 6) - 9(3, 7)	(0,0,0)	357671.78	(0.20)	[70055]
	9(4, 6) - 9(3, 7)	(0,0,0)	357671.851	(*0.03)	[76000]
	7(4, 4) - 7(3, 5)	(0,0,0)	357892.478	(*0.03)	[76000]
	6(4, 2) - 6(3, 3)	(0,0,0)	357925.885	(*0.03)	[76000]
	6(4, 2) - 6(3, 3)	(0,0,0)	357925.96	(0.20)	[70055]
	11(4, 8) - 11(3, 9)	(1,0,0)	357931.901	(*1.72)	[76000]
	17(4,14) - 17(3,15)	(0,0,0)	357962.89	(0.20)	[70055]
	17(4,14) - 17(3,15)	(0,0,0)	357962.919	(*0.03)	[76000]
	5(4, 2) - 5(3, 3)	(0,0,0)	358013.09	(0.20)	[70055]
	5(4, 2) - 5(3, 3)	(0,0,0)	358013.193	(*0.03)	[76000]
	4(4, 0) - 4(3, 1)	(0,0,0)	358037.928	(*0.03)	[76000]
	4(4, 0) - 4(3, 1)	(0,0,0)	358038.08	(0.20)	[70055]
	8(4, 4) - 8(3, 5)	(1,0,0)	358129.917	(*1.39)	[76000]
	20(0,20) - 19(1,19)	(0,0,0)	358215.630	(*0.03)	[76000]
	20(0,20) - 19(1,19)	(0,0,0)	358215.64	(0.20)	[70055]
	9(4, 6) - 9(3, 7)	(1,0,0)	358216.674	(*1.35)	[76000]
	7(4, 4) - 7(3, 5)	(1,0,0)	358437.023	(*1.54)	[76000]
	46(13,33) - 47(12,36)	(0,0,0)	358443.594	(*0.15)	[76000]
	6(4, 2) - 6(3, 3)	(1,0,0)	358471.081	(*1.75)	[76000]
	5(4, 2) - 5(3, 3)	(1,0,0)	358557.781	(*0.99)	[76000]
	21(8,14) - 22(7,15)	(0,1,0)	358870.594	(*0.72)	[76000]
	25(3,23) - 25(2,24)	(0,0,0)	359151.228	(*0.06)	[76000]
	19(4,16) - 19(3,17)	(0,0,0)	359770.702	(*0.04)	[76000]
$^{16}O^{34}S^{16}O$	23(4,20) - 22(5,17)	(0,0,0)	3093.068	(*0.02)	[76000]
	12(2,10) - 11(3, 9)	(0,0,0)	5433.933	(*0.03)	[76000]
	48(9,39) - 47(10,38)	(0,0,0)	5730.151	(*0.09)	[76000]
	43(8,36) - 42(9,33)	(0,0,0)	6010.424	(*0.06)	[76000]
	33(6,28) - 32(7,25)	(0,0,0)	6391.100	(*0.04)	[76000]
	21(5,17) - 22(4,18)	(0,0,0)	6991.319	(*0.03)	[76000]
	38(7,31) - 37(8,30)	(0,0,0)	7456.000	(*0.05)	[76000]
	12(2,10) - 13(1,13)	(0,0,0)	7911.749	(*0.04)	[76000]
	26(3,23) - 27(2,26)	(0,0,0)	8283.194	(*0.26)	[76000]
	32(7,25) - 33(6,28)	(0,1,0)	8694.0	(0.1)	[64015]
	10(2, 8) - 11(1,11)	(0,0,0)	9650.63	(0.05)	[59013]
	37(8,30) - 38(7,31)	(0,1,0)	9948.1	(0.1)	[64015]
	1(1, 1) - 2(0, 2)	(0,0,0)	10547.91	(0.05)	[59013]
	28(5,23) - 27(6,22)	(0,0,0)	11695.05	(0.10)	[64015]
	12(2,10) - 13(1,13)	(0,1,0)	12464.0	(0.1)	[64015]
	31(7,25) - 32(6,26)	(0,0,0)	12567.30	(0.10)	[64015]
	15(2,14) - 14(3,11)	(0,0,0)	13184.8	(0.1)	[62014]
	12(3, 9) - 13(3,12)	(0,0,0)	13207.9	(0.1)	[62014]
	29(5,25) - 28(6,22)	(0,1,0)	13272.4	(0.1)	[64015]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{34}S^{16}O$	25(2,24) - 24(3,21)	(0,1,0)	13778.5	(0.1)	[64015]
	10(2, 8) - 11(1,11)	(0,1,0)	13876.3	(0.1)	[64015]
	36(8,28) - 37(7,31)	(0,0,0)	14547.10	(0.05)	[62014]
	41(9,33) - 42(8,34)	(0,0,0)	14583.05	(0.05)	[62014]
	19(3,17) - 18(4,14)	(0,0,0)	14754.70	(0.05)	[62014]
	26(6,20) - 27(5,23)	(0,0,0)	14850.4	(0.1)	[62014]
	46(10,36) - 47(9,39)	(0,0,0)	15271.208	(*0.09)	[76000]
	18(3,15) - 17(4,14)	(0,1,0)	15406.8	(0.1)	[63016]
	34(6,28) - 33(7,27)	(0,1,0)	15737.8	(0.1)	[64015]
	14(2,12) - 15(1,15)	(0,0,0)	15994.1	(0.1)	[64015]
	37(3,35) - 36(4,32)	(0,0,0)	17055.107	(*3.14)	[76000]
	21(5,17) - 22(4,18)	(0,1,0)	17636.8	(0.1)	[63016]
	5(2, 4) - 6(1, 5)	(0,0,0)	17970.42	(0.10)	[54008]
	12(3, 9) - 13(2,12)	(0,1,0)	19095.3	(0.1)	[64015]
	25(2,24) - 24(3,21)	(0,0,0)	20260.80	(0.10)	[64015]
	16(4,12) - 17(3,15)	(0,0,0)	20548.19	(0.05)	[64019]
	8(2, 6) - 9(1, 9)	(0,0,0)	20699.26	(0.05)	[64019]
	14(2,12) - 15(1,15)	(0,1,0)	20981.8	(0.1)	[64015]
	5(2, 4) - 6(1, 5)	(0,1,0)	21297.8	(0.1)	[64015]
	18(3,15) - 17(4,14)	(0,0,0)	23732.99	(0.05)	[64019]
	8(2, 6) - 9(1, 9)	(0,1,0)	24678.2	(0.1)	[64015]
	15(4,12) - 16(3,13)	(0,0,0)	25171.04	(0.05)	[64019]
	29(5,25) - 28(6,22)	(0,0,0)	26038.35	(0.05)	[63016]
	49(9,41) - 48(10,38)	(0,0,0)	26505.40	(0.05)	[63016]
	17(2,16) - 16(3,13)	(0,1,0)	27296.5	(0.1)	[64015]
	39(7,33) - 38(8,30)	(0,0,0)	27398.00	(0.05)	[63016]
	26(6,20) - 27(5,23)	(0,1,0)	27632.7	(0.1)	[64015]
	44(8,36) - 43(9,35)	(0,0,0)	27657.15	(0.05)	[63016]
	31(7,25) - 32(6,26)	(0,1,0)	27723.8	(0.1)	[64015]
	8(1, 7) - 7(2, 6)	(0,1,0)	27756.6	(0.1)	[64015]
	16(4,12) - 17(3,15)	(0,1,0)	28677.7	(0.1)	[63016]
	4(0, 4) - 3(1, 3)	(0,1,0)	29863.8	(0.1)	[64015]
	24(4,20) - 23(5,19)	(0,1,0)	29895.2	(0.1)	[63016]
	8(1, 7) - 7(2, 6)	(0,0,0)	30975.45	(0.05)	[64019]
	34(6,28) - 33(7,27)	(0,0,0)	30977.38	(0.05)	[64019]
	4(0, 4) - 3(1, 3)	(0,0,0)	31011.18	(0.05)	[64019]
	25(6,20) - 26(5,21)	(0,0,0)	32272.34	(0.05)	[64019]
	35(6,30) - 34(7,27)	(0,1,0)	33149.3	(0.1)	[64015]
	17(2,16) - 16(3,13)	(0,0,0)	33212.81	(0.05)	[64019]
	15(4,12) - 16(3,13)	(0,1,0)	33437.9	(0.1)	[64015]
	16(2,14) - 17(1,17)	(0,0,0)	33672.10	(0.10)	[64015]
	35(8,28) - 36(7,29)	(0,0,0)	34811.01	(0.05)	[64019]
	30(7,23) - 31(6,26)	(0,0,0)	35126.56	(0.05)	[64019]
	40(9,31) - 41(8,34)	(0,0,0)	35664.80	(0.10)	[64015]
	45(10,36) - 46(9,37)	(0,0,0)	35905.60	(0.10)	[64015]
	20(5,15) - 21(4,18)	(0,0,0)	36294.54	(0.05)	[64019]
	21(3,19) - 20(4,16)	(0,1,0)	38992.4	(0.1)	[64015]
	23(2,22) - 22(3,19)	(0,0,0)	39024.10	(0.10)	[64015]
	19(2,18) - 18(3,15)	(0,1,0)	39138.5	(0.1)	[64015]
	6(2, 4) - 7(1, 7)	(0,0,0)	39819.20	(0.10)	[64015]
	24(4,20) - 23(5,19)	(0,0,0)	40652.42	(0.05)	[64019]
	25(4,22) - 24(5,19)	(0,0,0)	41540.90	(0.05)	[64019]
	9(3, 7) - 10(2, 8)	(0,0,0)	43619.91	(0.10)	[65015]
	10(3, 7) - 11(2,10)	(0,0,0)	44226.24	(0.10)	[65015]
	19(2,18) - 18(3,15)	(0,0,0)	45079.68	(0.10)	[65015]
	28(3,25) - 29(2,28)	(0,0,0)	45354.229	(*0.67)	[76000]
	21(3,19) - 20(4,16)	(0,0,0)	47002.34	(0.06)	[64011]
	21(2,20) - 20(3,17)	(0,0,0)	47293.11	(0.10)	[64011]
	50(9,41) - 49(10,40)	(0,0,0)	47920.301	(*0.19)	[76000]
	45(8,38) - 44(9,35)	(0,0,0)	48184.792	(*0.12)	[76000]
	35(6,30) - 34(7,27)	(0,0,0)	48233.110	(*0.07)	[76000]
	40(7,33) - 39(8,32)	(0,0,0)	50703.743	(*0.10)	[76000]
	19(5,15) - 20(4,16)	(0,0,0)	51519.484	(*0.05)	[76000]
	2(1, 1) - 2(0, 2)	(0,0,0)	51822.09	(0.10)	[65015]
	29(7,23) - 30(6,24)	(0,0,0)	54852.179	(*0.08)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{34}S^{16}O$	24(6,18) - 25(5,21)	(0,0,0)	55664.222	(*0.06)	[76000]
	34(8,26) - 35(7,29)	(0,0,0)	56006.690	(*0.10)	[76000]
	39(9,31) - 40(8,32)	(0,0,0)	56179.094	(*0.12)	[76000]
	35(3,33) - 34(4,30)	(0,0,0)	56285.118	(*1.87)	[76000]
	44(10,34) - 45(9,37)	(0,0,0)	56596.171	(*0.14)	[76000]
	49(11,39) - 50(10,40)	(0,0,0)	56768.227	(*0.25)	[76000]
	4(1, 3) - 4(0, 4)	(0,0,0)	57687.50	(0.10)	[65015]
	14(4,10) - 15(3,13)	(0,0,0)	57729.804	(*0.04)	[76000]
	30(5,25) - 29(6,24)	(0,0,0)	58010.584	(*0.05)	[76000]
	14(2,12) - 13(2,11)	(0,0,0)	58552.60	(0.10)	[65015]
	18(2,16) - 19(1,19)	(0,0,0)	60157.381	(*0.13)	[76000]
	3(2, 2) - 4(1, 3)	(0,0,0)	64316.383	(*0.02)	[76000]
	4(2, 2) - 5(1, 5)	(0,0,0)	65375.042	(*0.02)	[76000]
	31(5,27) - 30(6,24)	(0,0,0)	66636.015	(*0.09)	[76000]
	1(1, 1) - 0(0, 0)	(0,0,0)	67750.301	(*0.02)	[76000]
	6(1, 5) - 6(0, 6)	(0,0,0)	67768.79	(0.10)	[63011]
	41(7,35) - 40(8,32)	(0,0,0)	69796.418	(*0.18)	[76000]
	13(4,10) - 14(3,11)	(0,0,0)	70255.520	(*0.04)	[76000]
	46(8,38) - 45(9,37)	(0,0,0)	70685.753	(*0.29)	[76000]
	6(0, 6) - 5(1, 5)	(0,0,0)	74404.569	(*0.02)	[76000]
	23(6,18) - 24(5,19)	(0,0,0)	74580.840	(*0.10)	[76000]
	23(3,21) - 22(4,18)	(0,0,0)	74698.112	(*0.05)	[76000]
	18(5,13) - 19(4,16)	(0,0,0)	76031.295	(*0.07)	[76000]
	28(7,21) - 29(6,24)	(0,0,0)	76220.207	(*0.14)	[76000]
	36(6,30) - 35(7,29)	(0,0,0)	76252.537	(*0.13)	[76000]
	33(8,26) - 34(7,27)	(0,0,0)	76312.896	(*0.18)	[76000]
	38(9,29) - 39(8,32)	(0,0,0)	76866.719	(*0.23)	[76000]
	43(10,34) - 44(9,35)	(0,0,0)	77063.075	(*0.28)	[76000]
	20(3,17) - 19(4,16)	(0,0,0)	77231.396	(*0.04)	[76000]
	48(11,37) - 49(10,40)	(0,0,0)	77234.263	(*0.37)	[76000]
	27(4,24) - 26(5,21)	(0,0,0)	78195.118	(*0.08)	[76000]
	8(3, 5) - 9(2, 8)	(0,0,0)	78397.033	(*0.03)	[76000]
	10(1, 9) - 9(2, 8)	(0,0,0)	82124.317	(*0.03)	[76000]
	8(1, 7) - 8(0, 8)	(0,0,0)	83043.775	(*0.03)	[76000]
	33(3,31) - 32(4,28)	(0,0,0)	85973.142	(*1.09)	[76000]
	7(3, 5) - 8(2, 6)	(0,0,0)	88720.604	(*0.04)	[76000]
	30(3,27) - 31(2,30)	(0,0,0)	89307.345	(*1.44)	[76000]
	37(6,32) - 36(7,29)	(0,0,0)	90196.662	(*0.21)	[76000]
	47(8,40) - 46(9,37)	(0,0,0)	90863.612	(*0.48)	[76000]
	26(4,22) - 25(5,21)	(0,0,0)	92428.878	(*0.05)	[76000]
	17(5,13) - 18(4,14)	(0,0,0)	93852.163	(*0.09)	[76000]
	20(2,18) - 21(1,21)	(0,0,0)	94250.687	(*0.27)	[76000]
	42(7,35) - 41(8,34)	(0,0,0)	95241.956	(*0.36)	[76000]
	2(2, 0) - 3(1, 3)	(0,0,0)	95810.418	(*0.03)	[76000]
	12(4, 8) - 13(3,11)	(0,0,0)	95922.876	(*0.06)	[76000]
	25(3,23) - 24(4,20)	(0,0,0)	96075.192	(*0.10)	[76000]
	22(6,16) - 23(5,19)	(0,0,0)	96193.987	(*0.14)	[76000]
	27(7,21) - 28(6,22)	(0,0,0)	96204.234	(*0.20)	[76000]
	32(8,24) - 33(7,27)	(0,0,0)	96987.955	(*0.28)	[76000]
	37(9,29) - 38(8,30)	(0,0,0)	97236.841	(*0.38)	[76000]
	42(10,32) - 43(9,35)	(0,0,0)	97507.014	(*0.48)	[76000]
	47(11,37) - 48(10,38)	(0,0,0)	97581.131	(*0.60)	[76000]
	3(1, 3) - 2(0, 2)	(0,0,0)	102031.888	(*0.02)	[76000]
	10(1, 9) - 10(0,10)	(0,0,0)	104391.640	(*0.03)	[76000]
	31(3,29) - 30(4,26)	(0,0,0)	104914.876	(*0.62)	[76000]
	33(5,29) - 32(6,26)	(0,0,0)	106374.118	(*0.21)	[76000]
	32(5,27) - 31(6,26)	(0,0,0)	107567.650	(*0.15)	[76000]
	27(3,25) - 26(4,22)	(0,0,0)	109260.376	(*0.19)	[76000]
	29(4,26) - 28(5,23)	(0,0,0)	111902.681	(*0.17)	[76000]
	11(4, 8) - 12(3, 9)	(0,0,0)	112532.400	(*0.07)	[76000]
	43(7,37) - 42(8,34)	(0,0,0)	112552.945	(*0.50)	[76000]
	29(3,27) - 28(4,24)	(0,0,0)	112577.829	(*0.35)	[76000]
	6(3, 3) - 7(2, 6)	(0,0,0)	114574.470	(*0.04)	[76000]
	48(8,40) - 47(9,39)	(0,0,0)	114705.313	(*0.83)	[76000]
	16(2,14) - 15(3,13)	(0,0,0)	115291.373	(*0.04)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{34}S^{16}O$	21(6,16) - 22(5,17)	(0,0,0)	115722.337	(*0.18)	[76000]
	16(5,11) - 17(4,14)	(0,0,0)	115744.797	(*0.12)	[76000]
	26(7,19) - 27(6,22)	(0,0,0)	116859.971	(*0.28)	[76000]
	31(8,24) - 32(7,25)	(0,0,0)	117202.095	(*0.40)	[76000]
	36(9,27) - 37(8,30)	(0,0,0)	117632.286	(*0.55)	[76000]
	41(10,32) - 42(9,33)	(0,0,0)	117802.395	(*0.72)	[76000]
	46(11,35) - 47(10,38)	(0,0,0)	117863.615	(*0.91)	[76000]
	8(0, 8) - 7(1, 7)	(0,0,0)	118478.532	(*0.03)	[76000]
	38(6,32) - 37(7,31)	(0,0,0)	123913.330	(*0.40)	[76000]
	12(2,10) - 12(1,11)	(0,0,0)	124496.455	(*0.03)	[76000]
	10(2, 8) - 10(1, 9)	(0,0,0)	124614.078	(*0.03)	[76000]
	8(2, 6) - 8(1, 7)	(0,0,0)	128668.789	(*0.03)	[76000]
	14(2,12) - 14(1,13)	(0,0,0)	129803.36	(0.10)	[64011]
	5(3, 3) - 6(2, 4)	(0,0,0)	130584.353	(*0.05)	[76000]
	39(6,34) - 38(7,31)	(0,0,0)	131936.059	(*0.49)	[76000]
	12(1,11) - 12(0,12)	(0,0,0)	132114.04	(0.10)	[64011]
	5(1, 5) - 4(0, 4)	(0,0,0)	133471.47	(0.10)	[64011]
	49(8,42) - 48(9,39)	(0,0,0)	134016.806	(*1.12)	[76000]
	22(2,20) - 23(1,23)	(0,0,0)	134417.311	(*0.55)	[76000]
	10(4, 6) - 11(3, 9)	(0,0,0)	134535.348	(*0.08)	[76000]
	15(5,11) - 16(4,12)	(0,0,0)	134703.445	(*0.14)	[76000]
	6(2, 4) - 6(1, 5)	(0,0,0)	134826.12	(0.10)	[64011]
	12(1,11) - 11(2,10)	(0,0,0)	134873.84	(0.10)	[64011]
	22(3,19) - 21(4,18)	(0,0,0)	135566.28	(0.20)	[65015]
	20(6,14) - 21(5,17)	(0,0,0)	136343.910	(*0.24)	[76000]
	25(7,19) - 26(6,20)	(0,0,0)	136848.311	(*0.37)	[76000]
	30(8,22) - 31(7,25)	(0,0,0)	137521.137	(*0.54)	[76000]
	35(9,27) - 36(8,28)	(0,0,0)	137836.490	(*0.74)	[76000]
	40(10,30) - 41(9,33)	(0,0,0)	138042.080	(*0.99)	[76000]
	45(11,35) - 46(10,36)	(0,0,0)	138052.318	(*1.28)	[76000]
	32(3,29) - 33(2,32)	(0,0,0)	138206.111	(*2.72)	[76000]
	4(2, 2) - 4(1, 3)	(0,0,0)	141158.76	(0.10)	[64011]
	31(4,28) - 30(5,25)	(0,0,0)	141195.631	(*0.35)	[76000]
	44(7,37) - 43(8,36)	(0,0,0)	141511.657	(*0.89)	[76000]
	16(2,14) - 16(1,15)	(0,0,0)	141653.16	(0.10)	[64011]
	35(5,31) - 34(6,28)	(0,0,0)	144436.385	(*0.45)	[76000]
	2(2, 0) - 2(1, 1)	(0,0,0)	146020.435	(*0.04)	[76000]
	28(4,24) - 27(5,23)	(0,0,0)	149209.816	(*0.12)	[76000]
	4(3, 1) - 5(2, 4)	(0,0,0)	151917.609	(*0.06)	[76000]
	9(4, 6) - 10(3, 7)	(0,0,0)	152953.760	(*0.09)	[76000]
	3(2, 2) - 3(1, 3)	(0,0,0)	153015.056	(*0.04)	[76000]
	14(5, 9) - 15(4,12)	(0,0,0)	155233.078	(*0.17)	[76000]
	45(7,39) - 44(8,36)	(0,0,0)	155479.791	(*1.05)	[76000]
	19(6,14) - 20(5,15)	(0,0,0)	156033.766	(*0.29)	[76000]
	24(7,17) - 25(6,20)	(0,0,0)	157059.154	(*0.46)	[76000]
	29(8,22) - 30(7,23)	(0,0,0)	157588.822	(*0.68)	[76000]
	49(12,38) - 50(11,39)	(0,0,0)	157986.437	(*2.14)	[76000]
	34(9,25) - 35(8,28)	(0,0,0)	158002.676	(*0.96)	[76000]
	39(10,30) - 40(9,31)	(0,0,0)	158173.326	(*1.30)	[76000]
	44(11,33) - 45(10,36)	(0,0,0)	158173.582	(*1.69)	[76000]
	50(8,42) - 49(9,41)	(0,0,0)	160002.592	(*1.75)	[76000]
	5(2, 4) - 5(1, 5)	(0,0,0)	160143.598	(*0.03)	[76000]
	41(4,38) - 40(5,35)	(0,0,0)	160403.342	(*4.92)	[76000]
	18(2,16) - 18(1,17)	(0,0,0)	160802.570	(*0.04)	[76000]
	34(5,29) - 33(6,28)	(0,0,0)	161392.279	(*0.39)	[76000]
	10(0,10) - 9(1, 9)	(0,0,0)	162020.358	(*0.03)	[76000]
	7(1, 7) - 6(0, 6)	(0,0,0)	162775.893	(*0.04)	[76000]
	33(4,30) - 32(5,27)	(0,0,0)	164323.248	(*0.65)	[76000]
	14(1,13) - 14(0,14)	(0,0,0)	165620.635	(*0.05)	[76000]
	3(3, 1) - 4(2, 2)	(0,0,0)	170284.871	(*0.06)	[76000]
	7(2, 6) - 7(1, 7)	(0,0,0)	170546.918	(*0.03)	[76000]
	41(6,36) - 40(7,33)	(0,0,0)	172919.366	(*0.95)	[76000]
	8(4, 4) - 9(3, 7)	(0,0,0)	173207.430	(*0.11)	[76000]
	13(5, 9) - 14(4,10)	(0,0,0)	174576.699	(*0.20)	[76000]
	40(6,34) - 39(7,33)	(0,0,0)	174817.494	(*0.92)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{34}S^{16}O$	18(2,16) - 17(3,15)	(0,0,0)	174850.238	(*0.04)	[76000]
	18(6,12) - 19(5,15)	(0,0,0)	176093.740	(*0.34)	[76000]
	23(7,17) - 24(6,18)	(0,0,0)	176940.855	(*0.55)	[76000]
	28(8,20) - 29(7,23)	(0,0,0)	177647.898	(*0.83)	[76000]
	48(12,36) - 49(11,39)	(0,0,0)	178000.840	(*2.74)	[76000]
	33(9,25) - 34(8,26)	(0,0,0)	178041.514	(*1.19)	[76000]
	43(11,33) - 44(10,34)	(0,0,0)	178216.660	(*2.14)	[76000]
	38(10,28) - 39(9,31)	(0,0,0)	178238.645	(*1.63)	[76000]
	39(4,36) - 38(5,33)	(0,0,0)	178418.689	(*3.13)	[76000]
	24(2,22) - 25(1,25)	(0,0,0)	178845.749	(*1.09)	[76000]
	35(4,32) - 34(5,29)	(0,0,0)	179375.529	(*1.14)	[76000]
	37(5,33) - 36(6,30)	(0,0,0)	179720.739	(*0.84)	[76000]
	9(2, 8) - 9(1, 9)	(0,0,0)	184287.682	(*0.04)	[76000]
	37(4,34) - 36(5,31)	(0,0,0)	184533.839	(*1.92)	[76000]
	2(2, 0) - 1(1, 1)	(0,0,0)	187294.441	(*0.05)	[76000]
	20(2,18) - 20(1,19)	(0,0,0)	187475.199	(*0.05)	[76000]
	14(1,13) - 13(2,12)	(0,0,0)	188366.491	(*0.04)	[76000]
	20(3,17) - 20(2,18)	(0,0,0)	189123.89	(0.10)	[74038]
	22(3,19) - 22(2,20)	(0,0,0)	189392.475	(*0.05)	[76000]
	34(3,31) - 35(2,34)	(0,0,0)	189944.861	(*4.71)	[76000]
	46(7,39) - 45(8,38)	(0,0,0)	190124.650	(*1.80)	[76000]
	9(1, 9) - 8(0, 8)	(0,0,0)	191013.39	(0.10)	[74038]
	7(4, 4) - 8(3, 5)	(0,0,0)	192254.918	(*0.12)	[76000]
	12(5, 7) - 13(4,10)	(0,0,0)	194416.924	(*0.23)	[76000]
	18(3,15) - 18(2,16)	(0,0,0)	194812.06	(0.10)	[74038]
	17(6,12) - 18(5,13)	(0,0,0)	195742.598	(*0.40)	[76000]
	22(7,15) - 23(6,18)	(0,0,0)	196855.174	(*0.65)	[76000]
	24(3,21) - 24(2,22)	(0,0,0)	197044.30	(0.10)	[74038]
	27(8,20) - 28(7,21)	(0,0,0)	197556.367	(*1.00)	[76000]
	47(12,36) - 48(11,37)	(0,0,0)	197952.020	(*3.39)	[76000]
	32(9,23) - 33(8,26)	(0,0,0)	198019.766	(*1.44)	[76000]
	42(11,31) - 43(10,34)	(0,0,0)	198194.738	(*2.63)	[76000]
	37(10,28) - 38(9,29)	(0,0,0)	198218.242	(*1.98)	[76000]
	47(7,41) - 46(8,38)	(0,0,0)	198260.701	(*1.87)	[76000]
	24(3,21) - 23(4,20)	(0,0,0)	198348.54	(0.10)	[74038]
	11(2,10) - 11(1,11)	(0,0,0)	201376.411	(*0.04)	[76000]
	3(2, 2) - 2(1, 1)	(0,0,0)	203225.14	(0.10)	[74038]
	16(1,15) - 16(0,16)	(0,0,0)	203504.113	(*0.07)	[76000]
	12(0,12) - 11(1,11)	(0,0,0)	204136.203	(*0.04)	[76000]
	16(3,13) - 16(2,14)	(0,0,0)	204525.157	(*0.06)	[76000]
	39(5,35) - 38(6,32)	(0,0,0)	210817.315	(*1.46)	[76000]
	30(4,26) - 29(5,25)	(0,0,0)	211418.528	(*0.29)	[76000]
	6(4, 2) - 7(3, 5)	(0,0,0)	211762.922	(*0.13)	[76000]
	43(6,38) - 42(7,35)	(0,0,0)	212384.618	(*1.65)	[76000]
	26(3,23) - 26(2,24)	(0,0,0)	212981.530	(*0.14)	[76000]
	11(5, 7) - 12(4, 8)	(0,0,0)	213807.648	(*0.25)	[76000]
	16(6,10) - 17(5,13)	(0,0,0)	215468.680	(*0.46)	[76000]
	14(3,11) - 14(2,12)	(0,0,0)	215999.705	(*0.06)	[76000]
	21(7,15) - 22(6,16)	(0,0,0)	216594.318	(*0.75)	[76000]
	26(8,18) - 27(7,21)	(0,0,0)	217414.184	(*1.16)	[76000]
	46(12,34) - 47(11,37)	(0,0,0)	217845.246	(*4.08)	[76000]
	31(9,23) - 32(8,24)	(0,0,0)	217904.227	(*1.69)	[76000]
	41(11,31) - 42(10,32)	(0,0,0)	218105.268	(*3.15)	[76000]
	36(10,26) - 37(9,29)	(0,0,0)	218131.977	(*2.35)	[76000]
	11(1,11) - 10(0,10)	(0,0,0)	219355.005	(*0.04)	[76000]
	36(5,31) - 35(6,30)	(0,0,0)	220450.651	(*0.84)	[76000]
	22(2,20) - 22(1,21)	(0,0,0)	221114.956	(*0.06)	[76000]
	13(2,12) - 13(1,13)	(0,0,0)	221735.627	(*0.06)	[76000]
	26(2,24) - 27(1,27)	(0,0,0)	225582.158	(*2.00)	[76000]
	12(3, 9) - 12(2,10)	(0,0,0)	227031.868	(*0.05)	[76000]
	4(2, 2) - 3(1, 3)	(0,0,0)	229857.627	(*0.05)	[76000]
	42(6,36) - 41(7,35)	(0,0,0)	229983.884	(*1.82)	[76000]
	5(4, 2) - 6(3, 3)	(0,0,0)	230933.533	(*0.14)	[76000]
	10(5, 5) - 11(4, 8)	(0,0,0)	233296.754	(*0.28)	[76000]
	15(6,10) - 16(5,11)	(0,0,0)	235004.627	(*0.51)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{34}S^{16}O$	5(2, 4) - 4(1, 3)	(0,0,0)	235927.510	(*0.05)	[76000]
	10(3, 7) - 10(2, 8)	(0,0,0)	235951.920	(*0.04)	[76000]
	41(5,37) - 40(6,34)	(0,0,0)	236023.541	(*2.42)	[76000]
	20(2,18) - 19(3,17)	(0,0,0)	236225.085	(*0.05)	[76000]
	20(7,13) - 21(6,16)	(0,0,0)	236296.654	(*0.86)	[76000]
	25(8,18) - 26(7,19)	(0,0,0)	237170.594	(*1.33)	[76000]
	28(3,25) - 28(2,26)	(0,0,0)	237521.401	(*0.25)	[76000]
	45(12,34) - 46(11,35)	(0,0,0)	237681.830	(*4.83)	[76000]
	30(9,21) - 31(8,24)	(0,0,0)	237724.020	(*1.96)	[76000]
	40(11,29) - 41(10,32)	(0,0,0)	237955.512	(*3.70)	[76000]
	35(10,26) - 36(9,27)	(0,0,0)	237974.223	(*2.75)	[76000]
	49(7,43) - 48(8,40)	(0,0,0)	240410.711	(*3.03)	[76000]
	16(1,15) - 15(2,14)	(0,0,0)	241509.004	(*0.05)	[76000]
	48(7,41) - 47(8,40)	(0,0,0)	241889.524	(*3.27)	[76000]
	8(3, 5) - 8(2, 6)	(0,0,0)	241985.466	(*0.04)	[76000]
	18(1,17) - 18(0,18)	(0,0,0)	243935.843	(*0.11)	[76000]
	14(0,14) - 13(1,13)	(0,0,0)	244481.484	(*0.05)	[76000]
	15(2,14) - 15(1,15)	(0,0,0)	245178.627	(*0.08)	[76000]
	6(3, 3) - 6(2, 4)	(0,0,0)	245302.271	(*0.05)	[76000]
	4(3, 1) - 4(2, 2)	(0,0,0)	246686.166	(*0.07)	[76000]
	3(3, 1) - 3(2, 2)	(0,0,0)	247127.443	(*0.07)	[76000]
	5(3, 3) - 5(2, 4)	(0,0,0)	247440.335	(*0.06)	[76000]
	7(3, 5) - 7(2, 6)	(0,0,0)	248364.783	(*0.05)	[76000]
	13(1,13) - 12(0,12)	(0,0,0)	248698.677	(*0.05)	[76000]
	30(4,26) - 30(3,27)	(0,0,0)	249100.301	(*0.55)	[76000]
	45(6,40) - 44(7,37)	(0,0,0)	249300.231	(*2.69)	[76000]
	4(4, 0) - 5(3, 3)	(0,0,0)	250156.234	(*0.15)	[76000]
	9(3, 7) - 9(2, 8)	(0,0,0)	250358.373	(*0.04)	[76000]
	32(4,28) - 32(3,29)	(0,0,0)	251759.650	(*0.71)	[76000]
	9(5, 5) - 10(4, 6)	(0,0,0)	252615.760	(*0.31)	[76000]
	43(5,39) - 42(6,36)	(0,0,0)	253431.299	(*3.91)	[76000]
	11(3, 9) - 11(2,10)	(0,0,0)	253936.284	(*0.04)	[76000]
	28(4,24) - 28(3,25)	(0,0,0)	254278.440	(*0.41)	[76000]
	14(6, 8) - 15(5,11)	(0,0,0)	254517.463	(*0.57)	[76000]
	19(7,13) - 20(6,14)	(0,0,0)	255893.406	(*0.96)	[76000]
	24(8,16) - 25(7,19)	(0,0,0)	256866.037	(*1.51)	[76000]
	29(9,21) - 30(8,22)	(0,0,0)	257469.281	(*2.23)	[76000]
	39(11,29) - 40(10,30)	(0,0,0)	257746.305	(*4.27)	[76000]
	34(10,24) - 35(9,27)	(0,0,0)	257755.000	(*3.15)	[76000]
	13(3,11) - 13(2,12)	(0,0,0)	259617.155	(*0.05)	[76000]
	24(2,22) - 24(1,23)	(0,0,0)	260327.008	(*0.13)	[76000]
	34(4,30) - 34(3,31)	(0,0,0)	263437.457	(*0.96)	[76000]
	26(3,23) - 25(4,22)	(0,0,0)	264682.836	(*0.15)	[76000]
	26(4,22) - 26(3,23)	(0,0,0)	265489.203	(*0.29)	[76000]
	7(2, 6) - 6(1, 5)	(0,0,0)	265554.057	(*0.05)	[76000]
	15(3,13) - 15(2,14)	(0,0,0)	267871.010	(*0.06)	[76000]
	30(3,27) - 30(2,28)	(0,0,0)	270230.007	(*0.46)	[76000]
	17(2,16) - 17(1,17)	(0,0,0)	271410.116	(*0.10)	[76000]
	8(5, 3) - 9(4, 6)	(0,0,0)	271917.246	(*0.33)	[76000]
	28(2,26) - 29(1,29)	(0,0,0)	272787.883	(*3.45)	[76000]
	13(6, 8) - 14(5, 9)	(0,0,0)	273930.746	(*0.62)	[76000]
	18(7,11) - 19(6,14)	(0,0,0)	275435.465	(*1.06)	[76000]
	23(8,16) - 24(7,17)	(0,0,0)	276485.937	(*1.69)	[76000]
	6(2, 4) - 5(1, 5)	(0,0,0)	276999.580	(*0.05)	[76000]
	28(9,19) - 29(8,22)	(0,0,0)	277153.500	(*2.51)	[76000]
	33(10,24) - 34(9,25)	(0,0,0)	277474.379	(*3.57)	[76000]
	38(11,27) - 39(10,30)	(0,0,0)	277482.277	(*4.86)	[76000]
	32(4,28) - 31(5,27)	(0,0,0)	278834.580	(*0.58)	[76000]
	17(3,15) - 17(2,16)	(0,0,0)	279075.223	(*0.07)	[76000]
	15(1,15) - 14(0,14)	(0,0,0)	279429.946	(*0.06)	[76000]
	24(4,20) - 24(3,21)	(0,0,0)	280408.168	(*0.19)	[76000]
	47(6,42) - 46(7,39)	(0,0,0)	282337.615	(*4.20)	[76000]
	16(0,16) - 15(1,15)	(0,0,0)	283183.518	(*0.06)	[76000]
	36(4,32) - 36(3,33)	(0,0,0)	284658.332	(*1.41)	[76000]
	20(1,19) - 20(0,20)	(0,0,0)	285178.546	(*0.21)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{34}S^{16}O$	38(5,33) - 37(6,32)	(0,0,0)	285362.343	(*1.58)	[76000]
	44(6,38) - 43(7,37)	(0,0,0)	290449.092	(*3.25)	[76000]
	7(5, 3) - 8(4, 4)	(0,0,0)	291146.437	(*0.35)	[76000]
	9(2, 8) - 8(1, 7)	(0,0,0)	292257.222	(*0.06)	[76000]
	18(1,17) - 17(2,16)	(0,0,0)	293122.891	(*0.06)	[76000]
	12(6, 6) - 13(5, 9)	(0,0,0)	293297.820	(*0.67)	[76000]
	19(3,17) - 19(2,18)	(0,0,0)	293481.712	(*0.08)	[76000]
	17(7,11) - 18(6,12)	(0,0,0)	294905.270	(*1.17)	[76000]
	22(8,14) - 23(7,17)	(0,0,0)	296047.410	(*1.86)	[76000]
	22(4,18) - 22(3,19)	(0,0,0)	296499.762	(*0.12)	[76000]
	27(9,19) - 28(8,20)	(0,0,0)	296775.832	(*2.80)	[76000]
	32(10,22) - 33(9,25)	(0,0,0)	297138.223	(*3.99)	[76000]
	22(2,20) - 21(3,19)	(0,0,0)	298256.822	(*0.07)	[76000]
	19(2,18) - 19(1,19)	(0,0,0)	300049.125	(*0.16)	[76000]
	26(2,24) - 26(1,25)	(0,0,0)	303139.782	(*0.31)	[76000]
	3(3, 1) - 2(2, 0)	(0,0,0)	304332.081	(*0.08)	[76000]
	40(5,35) - 40(4,36)	(0,0,0)	307370.880	(*2.90)	[76000]
	32(3,29) - 32(2,30)	(0,0,0)	309816.127	(*0.85)	[76000]
	6(5, 1) - 7(4, 4)	(0,0,0)	310341.375	(*0.37)	[76000]
	38(5,33) - 38(4,34)	(0,0,0)	310380.610	(*2.55)	[76000]
	21(3,19) - 21(2,20)	(0,0,0)	311196.638	(*0.09)	[76000]
	17(1,17) - 16(0,16)	(0,0,0)	311485.349	(*0.07)	[76000]
	20(4,16) - 20(3,17)	(0,0,0)	311487.401	(*0.09)	[76000]
	11(6, 6) - 12(5, 7)	(0,0,0)	312604.180	(*0.72)	[76000]
	42(5,37) - 42(4,38)	(0,0,0)	313808.272	(*3.43)	[76000]
	16(7, 9) - 17(6,12)	(0,0,0)	314322.246	(*1.26)	[76000]
	38(4,34) - 38(3,35)	(0,0,0)	315193.760	(*2.22)	[76000]
	21(8,14) - 22(7,15)	(0,0,0)	315548.984	(*2.04)	[76000]
	11(2,10) - 10(1, 9)	(0,0,0)	316339.776	(*0.07)	[76000]
	26(9,17) - 27(8,20)	(0,0,0)	316343.520	(*3.08)	[76000]
	31(10,22) - 32(9,23)	(0,0,0)	316748.680	(*4.42)	[76000]
	18(0,18) - 17(1,17)	(0,0,0)	320597.164	(*0.08)	[76000]
	36(5,31) - 36(4,32)	(0,0,0)	321285.656	(*2.19)	[76000]
	4(3, 1) - 3(2, 2)	(0,0,0)	323528.736	(*0.08)	[76000]
	18(4,14) - 18(3,15)	(0,0,0)	323806.682	(*0.08)	[76000]
	22(1,21) - 22(0,22)	(0,0,0)	325997.431	(*0.42)	[76000]
	5(5, 1) - 6(4, 2)	(0,0,0)	329499.871	(*0.39)	[76000]
	8(2, 6) - 7(1, 7)	(0,0,0)	330191.096	(*0.06)	[76000]
	44(5,39) - 44(4,40)	(0,0,0)	330522.345	(*4.55)	[76000]
	21(2,20) - 21(1,21)	(0,0,0)	330667.603	(*0.30)	[76000]
	10(6, 4) - 11(5, 7)	(0,0,0)	331867.770	(*0.77)	[76000]
	23(3,21) - 23(2,22)	(0,0,0)	332173.712	(*0.14)	[76000]
	16(4,12) - 16(3,13)	(0,0,0)	332836.214	(*0.08)	[76000]
	28(3,25) - 27(4,24)	(0,0,0)	333363.959	(*0.30)	[76000]
	15(7, 9) - 16(6,10)	(0,0,0)	333685.543	(*1.36)	[76000]
	20(8,12) - 21(7,15)	(0,0,0)	334999.160	(*2.21)	[76000]
	25(9,17) - 26(8,18)	(0,0,0)	335858.844	(*3.37)	[76000]
	30(10,20) - 31(9,23)	(0,0,0)	336309.855	(*4.86)	[76000]
	34(5,29) - 34(4,30)	(0,0,0)	337875.821	(*1.80)	[76000]
	13(2,12) - 12(1,11)	(0,0,0)	338320.334	(*0.08)	[76000]
	14(4,10) - 14(3,11)	(0,0,0)	338785.687	(*0.07)	[76000]
	5(3, 3) - 4(2, 2)	(0,0,0)	342208.891	(*0.07)	[76000]
	20(1,19) - 19(2,18)	(0,0,0)	342231.598	(*0.07)	[76000]
	12(4, 8) - 12(3, 9)	(0,0,0)	342332.041	(*0.07)	[76000]
	10(4, 6) - 10(3, 7)	(0,0,0)	344245.411	(*0.08)	[76000]
	19(1,19) - 18(0,18)	(0,0,0)	344581.032	(*0.09)	[76000]
	13(4,10) - 13(3,11)	(0,0,0)	344807.922	(*0.07)	[76000]
	15(4,12) - 15(3,13)	(0,0,0)	344987.570	(*0.07)	[76000]
	11(4, 8) - 11(3, 9)	(0,0,0)	344998.203	(*0.07)	[76000]
	8(4, 4) - 8(3, 5)	(0,0,0)	345168.769	(*0.11)	[76000]
	9(4, 6) - 9(3, 7)	(0,0,0)	345285.703	(*0.09)	[76000]
	7(4, 4) - 7(3, 5)	(0,0,0)	345519.780	(*0.12)	[76000]
	6(4, 2) - 6(3, 3)	(0,0,0)	345553.235	(*0.13)	[76000]
	5(4, 2) - 5(3, 3)	(0,0,0)	345651.453	(*0.14)	[76000]
	4(4, 0) - 4(3, 1)	(0,0,0)	345678.961	(*0.15)	[76000]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{34}S^{16}O$	17(4,14) - 17(3,15)	(0,0,0)	345929.271	(*0.07)	[76000]
	28(2,26) - 28(1,27)	(0,0,0)	347482.960	(*0.67)	[76000]
	19(4,16) - 19(3,17)	(0,0,0)	348117.490	(*0.08)	[76000]

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{33}S^{16}O$	19(3,17) - 18(4,14)					(0,0,0)	9592.3	(0.2)	[64015]
	19(3,17) - 18(4,14)					(0,0,0)	9593.0	(0.2)	[64015]
	1(1, 1) - 2(0, 2)					(0,0,0)	11368.0	(0.2)	[68017]
	1(1, 1) - 2(0, 2)					(0,0,0)	11373.2	(0.2)	[68017]
	1(1, 1) - 2(0, 2)					(0,0,0)	11379.9	(0.2)	[68017]
	39(7,33) - 38(8,30)					(0,0,0)	14372.8	(0.2)	[64015]
	39(7,33) - 38(8,30)					(0,0,0)	14373.2	(0.2)	[64015]
	22(5,17) - 23(4,20)					(0,1,0)	14862.95	(0.5)	[62015]
	14(2,12) - 15(1,15)					(0,0,0)	15252.7	(0.2)	[62015]
	14(2,12) - 15(1,15)					(0,0,0)	15254.1	(0.2)	[62015]
	14(2,12) - 15(1,15)					(0,0,0)	15266.2	(0.2)	[62015]
	14(2,12) - 15(1,15)					(0,0,0)	15267.5	(0.2)	[62015]
	21(5,17) - 22(4,18)		45/2		47/2	(0,0,0)	15278.45	(0.1)	[62013]
	21(5,17) - 22(4,18)		43/2		45/2	(0,0,0)	15279.85	(0.1)	[62013]
	12(3, 9) - 13(2,12)		23/2		25/2	(0,0,0)	16634.8	(0.2)	[62013]
	12(3, 9) - 13(2,12)		21/2		23/2	(0,0,0)	16637.5	(0.2)	[62013]
	29(5,25) - 28(6,22)					(0,0,0)	16752.9	(0.2)	[62015]
	18(3,15) - 17(4,14)		37/2		35/2	(0,0,0)	16758.5	(0.1)	[62013]
	18(3,15) - 17(4,14)		39/2		37/2	(0,0,0)	16761.2	(0.1)	[62013]
	34(6,28) - 33(7,27)		69/2		67/2	(0,0,0)	19250.9	(0.1)	[62013]
	34(6,28) - 33(7,27)		71/2		69/2	(0,0,0)	19251.7	(0.1)	[62013]
	40(7,33) - 39(8,32)					(0,1,0)	19556.20	(0.20)	[64015]
	40(7,33) - 39(8,32)					(0,1,0)	19556.90	(0.20)	[64015]
	32(7,25) - 33(6,28)					(0,1,0)	20086.2	(0.2)	[62015]
	32(7,25) - 33(6,28)					(0,1,0)	20086.7	(0.2)	[62015]
	14(2,12) - 15(1,15)					(0,1,0)	20291.95	(0.20)	[62015]
	14(2,12) - 15(1,15)					(0,1,0)	20293.30	(0.20)	[62015]
	14(2,12) - 15(1,15)					(0,1,0)	20305.25	(0.20)	[62015]
	14(2,12) - 15(1,15)					(0,1,0)	20306.55	(0.20)	[62015]
	5(2, 4) - 6(1, 5)		7/2		9/2	(0,0,0)	20602.1	(0.1)	[62013]
	5(2, 4) - 6(1, 5)		13/2		15/2	(0,0,0)	20603.6	(0.1)	[62013]
	5(2, 4) - 6(1, 5)		9/2		11/2	(0,0,0)	20608.2	(0.1)	[62013]
	5(2, 4) - 6(1, 5)		11/2		13/2	(0,0,0)	20609.6	(0.1)	[62013]
	24(4,20) - 23(5,19)					(0,1,0)	20911.25	(0.20)	[64015]
	24(4,20) - 23(5,19)					(0,1,0)	20912.05	(0.5)	[62015]
	24(4,20) - 23(5,19)					(0,1,0)	20912.90	(0.20)	[64015]
	35(6,30) - 34(7,27)					(0,1,0)	21702.85	(0.5)	[62015]
	8(2, 6) - 9(1, 9)		17/2		19/2	(0,0,0)	22314.75	(0.05)	[62013]
	8(2, 6) - 9(1, 9)		15/2		17/2	(0,0,0)	22316.35	(0.05)	[62013]
	8(2, 6) - 9(1, 9)		19/2		21/2	(0,0,0)	22324.4	(0.1)	[62013]
	8(2, 6) - 9(1, 9)		17/2		15/2	(0,0,0)	22326.0	(0.1)	[62013]
	12(3, 9) - 13(2,12)		23/2		25/2	(0,1,0)	22614.00	(0.20)	[62015]
	12(3, 9) - 13(2,12)		21/2		23/2	(0,1,0)	22616.60	(0.20)	[62015]
	37(8,30) - 38(7,31)					(0,1,0)	23328.30	(0.20)	[64015]
	37(8,30) - 38(7,31)					(0,1,0)	23328.80	(0.20)	[64015]
	25(4,22) - 24(5,19)					(0,1,0)	23875.45	(0.5)	[62015]
	31(7,25) - 32(6,26)					(0,0,0)	23969.8	(0.2)	[62015]
	31(7,25) - 32(6,26)					(0,0,0)	23970.3	(0.2)	[62015]
	5(2, 4) - 6(1, 5)		7/2		9/2	(0,1,0)	23982.45	(0.20)	[62015]
	5(2, 4) - 6(1, 5)		13/2		15/2	(0,1,0)	23983.95	(0.20)	[62015]
	5(2, 4) - 6(1, 5)		9/2		11/2	(0,1,0)	23988.45	(0.02)	[62015]
	5(2, 4) - 6(1, 5)		11/2		13/2	(0,1,0)	23989.85	(0.02)	[62015]
	25(2,24) - 24(3,21)					(0,0,0)	24127.3	(0.2)	[62015]
	25(2,24) - 24(3,21)					(0,0,0)	24127.9	(0.2)	[62015]
	25(2,24) - 24(3,21)					(0,0,0)	24137.0	(0.2)	[62015]
	25(2,24) - 24(3,21)					(0,0,0)	24137.6	(0.2)	[62015]
	26(6,20) - 27(5,23)		55/2		57/2	(0,0,0)	24165.5	(0.1)	[62013]
	26(6,20) - 27(5,23)		53/2		55/2	(0,0,0)	24165.9	(0.1)	[62013]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{33}S^{16}O$	8(1, 7) - 7(2, 6)		17/2		15/2	(0,1,0)	24997.80	(0.02)	[62015]
	8(1, 7) - 7(2, 6)		15/2		13/2	(0,1,0)	24998.85	(0.02)	[62015]
	8(1, 7) - 7(2, 6)		19/2		17/2	(0,1,0)	25003.50	(0.20)	[62015]
	8(1, 7) - 7(2, 6)		13/2		11/2	(0,1,0)	25004.55	(0.20)	[62015]
	17(2,16) - 16(3,13)					(0,1,0)	25146.1	(0.2)	[62015]
	17(2,16) - 16(3,13)					(0,1,0)	25146.5	(0.2)	[62015]
	17(2,16) - 16(3,13)					(0,1,0)	25150.8	(0.2)	[62015]
	17(2,16) - 16(3,13)					(0,1,0)	25151.3	(0.2)	[62015]
	16(4,12) - 17(3,15)					(0,0,0)	26037.15	(0.2)	[62015]
	16(4,12) - 17(3,15)					(0,0,0)	26037.5	(0.2)	[62015]
	21(5,17) - 22(4,18)					(0,1,0)	26062.20	(0.20)	[64015]
	21(5,17) - 22(4,18)					(0,1,0)	26063.40	(0.20)	[64015]
	8(2, 6) - 9(1, 9)					(0,1,0)	26347.70	(0.20)	[64015]
	8(2, 6) - 9(1, 9)					(0,1,0)	26349.35	(0.20)	[64015]
	8(2, 6) - 9(1, 9)					(0,1,0)	26357.30	(0.20)	[64015]
	8(2, 6) - 9(1, 9)					(0,1,0)	26358.90	(0.20)	[64015]
	36(8,28) - 37(7,31)					(0,0,0)	27451.3	(0.2)	[62016]
	36(8,28) - 37(7,31)					(0,0,0)	27451.7	(0.2)	[62016]
	8(1, 7) - 7(2, 6)		17/2		15/2	(0,0,0)	28269.10	(0.05)	[62016]
	8(1, 7) - 7(2, 6)		15/2		13/2	(0,0,0)	28270.10	(0.05)	[62016]
	8(1, 7) - 7(2, 6)		19/2		17/2	(0,0,0)	28274.85	(0.05)	[62016]
	8(1, 7) - 7(2, 6)		13/2		11/2	(0,0,0)	28275.80	(0.05)	[62016]
	4(0, 4) - 3(1, 3)		9/2		7/2	(0,1,0)	29025.70	(0.05)	[62016]
	4(0, 4) - 3(1, 3)		7/2		5/2	(0,1,0)	29028.40	(0.05)	[62016]
	4(0, 4) - 3(1, 3)		11/2		9/2	(0,1,0)	29031.20	(0.05)	[62016]
	4(0, 4) - 3(1, 3)		5/2		3/2	(0,1,0)	29033.80	(0.05)	[62016]
	41(9,33) - 42(8,34)					(0,0,0)	29271.6	(0.2)	[62016]
	4(0, 4) - 3(1, 3)		9/2		7/2	(0,0,0)	30190.30	(0.05)	[62016]
	4(0, 4) - 3(1, 3)		7/2		5/2	(0,0,0)	30192.90	(0.05)	[62016]
	4(0, 4) - 3(1, 3)		11/2		9/2	(0,0,0)	30195.85	(0.05)	[62016]
	4(0, 4) - 3(1, 3)		5/2		3/2	(0,0,0)	30198.45	(0.05)	[62016]
	50(9,41) - 49(10,40)					(0,0,0)	31257.6	(0.2)	[65015]
	15(4,12) - 16(3,13)					(0,0,0)	31653.6	(0.2)	[65015]
	15(4,12) - 16(3,13)					(0,0,0)	31655.6	(0.2)	[65015]
	24(4,20) - 23(5,19)					(0,0,0)	31797.35	(0.2)	[65015]
	24(4,20) - 23(5,19)					(0,0,0)	31799.2	(0.2)	[65015]
	16(2,14) - 17(1,17)					(0,0,0)	31938.8	(0.2)	[65015]
	16(2,14) - 17(1,17)					(0,0,0)	31939.9	(0.2)	[65015]
	30(5,25) - 29(6,24)					(0,1,0)	34205.10	(0.20)	[64015]
	30(5,25) - 29(6,24)					(0,1,0)	34206.30	(0.20)	[64015]
	21(3,19) - 20(4,16)					(0,1,0)	34232.40	(0.20)	[64015]
	21(3,19) - 20(4,16)					(0,1,0)	34233.80	(0.20)	[64015]
	16(4,12) - 17(3,15)					(0,1,0)	34294.00	(0.20)	[64015]
	25(4,22) - 24(5,19)					(0,0,0)	34425.1	(0.2)	[65015]
	35(6,30) - 34(7,27)					(0,0,0)	37008.7	(0.2)	[68017]
	40(7,33) - 39(8,32)					(0,0,0)	37262.05	(0.2)	[65015]
	40(7,33) - 39(8,32)					(0,0,0)	37262.8	(0.2)	[65015]
	6(2, 4) - 7(1, 7)					(0,0,0)	41854.65	(0.2)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	41856.4	(0.2)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	41862.95	(0.2)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	41864.7	(0.2)	[68017]
	25(6,20) - 26(5,21)					(0,0,0)	41937.0	(0.2)	[68017]
	25(6,20) - 26(5,21)					(0,0,0)	41937.7	(0.2)	[68017]
	21(3,19) - 20(4,16)					(0,0,0)	42383.8	(0.2)	[64015]
	21(3,19) - 20(4,16)					(0,0,0)	42385.1	(0.2)	[64015]
	20(5,15) - 21(4,18)					(0,0,0)	43762.4	(0.2)	[68017]
	19(2,18) - 18(3,15)					(0,0,0)	44168.2	(0.2)	[68017]
	19(2,18) - 18(3,15)					(0,0,0)	44168.7	(0.2)	[68017]
	19(2,18) - 18(3,15)					(0,0,0)	44174.5	(0.2)	[68017]
	19(2,18) - 18(3,15)					(0,0,0)	44175.0	(0.2)	[68017]
	30(7,23) - 31(6,26)					(0,0,0)	46226.0	(0.2)	[68017]
	30(7,23) - 31(6,26)					(0,0,0)	46226.5	(0.2)	[68017]
	30(5,25) - 29(6,24)					(0,0,0)	47448.45	(0.2)	[68017]
	30(5,25) - 29(6,24)					(0,0,0)	47449.65	(0.2)	[68017]
	35(8,28) - 36(7,29)					(0,0,0)	47746.0	(0.2)	[68017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{33}S^{16}O$	21(2,20) - 20(3,17)					(0,0,0)	47813.3	(0.2)	[68017]
	10(3, 7) - 11(2,10)					(0,0,0)	48001.4	(0.2)	[68017]
	10(3, 7) - 11(2,10)					(0,0,0)	48003.1	(0.2)	[68017]
	9(3, 7) - 10(2, 8)					(0,0,0)	48174.5	(0.2)	[68017]
	9(3, 7) - 10(2, 8)					(0,0,0)	48175.0	(0.2)	[68017]
	9(3, 7) - 10(2, 8)					(0,0,0)	48177.8	(0.2)	[68017]
	9(3, 7) - 10(2, 8)					(0,0,0)	48178.3	(0.2)	[68017]
	40(9,31) - 41(8,34)					(0,0,0)	50227.1	(0.2)	[68017]
	45(10,36) - 46(9,37)					(0,0,0)	52180.2	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	52643.3	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	52647.75	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	52649.6	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	52653.9	(0.2)	[68017]
	14(2,12) - 13(3,11)					(0,0,0)	53385.1	(0.2)	[68017]
	14(2,12) - 13(3,11)					(0,0,0)	53385.6	(0.2)	[68017]
	14(2,12) - 13(3,11)					(0,0,0)	53389.7	(0.2)	[68017]
	14(2,12) - 13(3,11)					(0,0,0)	53390.25	(0.2)	[68017]
	18(2,16) - 19(1,19)					(0,0,0)	57410.0	(0.2)	[68017]
	18(2,16) - 19(1,19)					(0,0,0)	57411.1	(0.2)	[68017]
	18(2,16) - 19(1,19)					(0,0,0)	57424.35	(0.2)	[68017]
	18(2,16) - 19(1,19)					(0,0,0)	57425.4	(0.2)	[68017]
	31(5,27) - 30(6,24)					(0,0,0)	57473.4	(0.2)	[68017]
	31(5,27) - 30(6,24)					(0,0,0)	57473.7	(0.2)	[68017]
	4(1, 3) - 4(0, 4)					(0,0,0)	58425.4	(0.2)	[68017]
	4(1, 3) - 4(0, 4)					(0,0,0)	58427.8	(0.2)	[68017]
	4(1, 3) - 4(0, 4)					(0,0,0)	58432.3	(0.2)	[68017]
	4(1, 3) - 4(0, 4)					(0,0,0)	58434.6	(0.2)	[68017]

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{36}S^{16}O$	22(4,18) - 21(5,17)	(0,0,0)	8445.80	(0.10)	[64014]
	32(6,26) - 31(7,25)	(0,0,0)	8563.30	(0.10)	[64014]
	1(1, 1) - 2(0, 2)	(0,0,0)	9030.10	(0.10)	[64014]
	37(7,31) - 36(8,28)	(0,0,0)	9251.30	(0.10)	[64014]
	16(4,12) - 17(3,15)	(0,0,0)	10547.00	(0.10)	[64014]
	35(8,28) - 36(7,29)	(0,0,0)	10907.00	(0.10)	[64014]
	5(2, 4) - 6(1, 5)	(0,0,0)	13121.80	(0.10)	[64014]
	15(4,12) - 16(3,13)	(0,0,0)	13125.00	(0.10)	[64014]
	25(6,20) - 26(5,21)	(0,0,0)	14360.80	(0.10)	[64014]
	12(2,10) - 11(3, 9)	(0,0,0)	14405.20	(0.10)	[64014]
	30(7,23) - 31(6,26)	(0,0,0)	14683.10	(0.10)	[64014]
	5(2, 4) - 6(1, 5)	(0,1,0)	16352.30	(0.10)	[64014]
	23(4,20) - 22(5,17)	(0,0,0)	16524.60	(0.10)	[64014]
	14(2,12) - 15(1,15)	(0,0,0)	17616.30	(0.10)	[64014]
	8(2, 6) - 9(1, 9)	(0,0,0)	17808.60	(0.10)	[64014]
	15(2,14) - 14(3,11)	(0,0,0)	18263.00	(0.10)	[64014]
	20(5,15) - 21(4,18)	(0,0,0)	22604.25	(0.10)	[64014]
	19(3,17) - 18(4,14)	(0,0,0)	24075.70	(0.10)	[64014]
	33(6,28) - 32(7,25)	(0,0,0)	26963.30	(0.10)	[64014]
	28(5,23) - 27(6,22)	(0,0,0)	30359.80	(0.10)	[64014]
	4(0, 4) - 3(1, 3)	(0,1,0)	31393.60	(0.10)	[64014]
	4(0, 4) - 3(1, 3)	(0,0,0)	32508.85	(0.10)	[64014]
	9(3, 7) - 10(2, 8)	(0,0,0)	35197.90	(0.10)	[64014]
	8(1, 7) - 7(2, 6)	(0,0,0)	35947.80	(0.10)	[64014]
	6(2, 4) - 7(1, 7)	(0,0,0)	36113.80	(0.10)	[64014]
	17(2,16) - 16(3,13)	(0,0,0)	36645.70	(0.10)	[64014]
	18(3,15) - 17(4,14)	(0,0,0)	36747.60	(0.10)	[64014]
	19(5,15) - 20(4,16)	(0,0,0)	36842.80	(0.10)	[64014]
	16(2,14) - 17(1,17)	(0,0,0)	37184.60	(0.10)	[64014]
	10(3, 7) - 11(2,10)	(0,0,0)	37345.60	(0.10)	[64014]
	24(6,18) - 25(5,21)	(0,0,0)	38567.60	(0.10)	[64014]
$^{16}O^{32}S^{18}O$	6(2, 5) - 7(1, 6)	(0,1,0)	8153.20	(0.02)	[64012]
	28(6,23) - 29(5,24)	(0,0,0)	8360.60	(0.20)	[64015]
	23(5,18) - 24(4,21)	(0,0,0)	8412.20	(0.20)	[64015]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{18}O$	12(2,10) - 13(1,13)	(0,0,0)	8735.25	(0.20)	[64015]
	20(3,18) - 19(4,15)	(0,0,0)	9167.50	(0.20)	[64015]
	13(2,11) - 14(1,14)	(0,0,0)	9605.80	(0.20)	[64015]
	13(2,11) - 12(3,10)	(0,0,0)	9610.00	(0.20)	[63010]
	25(4,22) - 24(5,19)	(0,0,0)	10019.80	(0.20)	[63010]
	19(3,16) - 18(4,15)	(0,1,0)	10034.30	(0.02)	[64012]
	11(2, 9) - 12(1,12)	(0,0,0)	10047.00	(0.20)	[63010]
	16(2,15) - 15(3,12)	(0,0,0)	12064.30	(0.20)	[64015]
	34(7,28) - 35(6,29)	(0,1,0)	12109.90	(0.02)	[64012]
	13(3,10) - 14(2,13)	(0,0,0)	12658.00	(0.20)	[64015]
	14(2,12) - 15(1,15)	(0,0,0)	12681.65	(0.20)	[64015]
	30(5,25) - 29(6,24)	(0,0,0)	12763.20	(0.20)	[64015]
	41(7,35) - 40(8,32)	(0,0,0)	12817.40	(0.20)	[64015]
	31(5,27) - 30(6,24)	(0,1,0)	13095.05	(0.02)	[64012]
	12(2,10) - 13(1,13)	(0,1,0)	13108.50	(0.02)	[64012]
	28(6,22) - 29(5,25)	(0,0,0)	13120.10	(0.20)	[63010]
	1(1, 1) - 2(0, 2)	(0,0,0)	13291.25	(0.20)	[63010]
	17(4,14) - 18(3,15)	(0,1,0)	13461.20	(0.02)	[64012]
	10(2, 8) - 11(1,11)	(0,0,0)	13477.75	(0.20)	[63010]
	13(2,11) - 14(1,14)	(0,1,0)	14160.60	(0.02)	[64012]
	11(2, 9) - 12(1,12)	(0,1,0)	14261.50	(0.02)	[64012]
	11(3, 9) - 12(2,10)	(0,0,0)	14330.05	(0.20)	[63010]
	1(1, 1) - 2(0, 2)	(0,1,0)	14424.30	(0.02)	[64012]
	34(7,27) - 35(6,30)	(0,1,0)	14573.50	(0.02)	[64012]
	8(1, 7) - 7(2, 6)	(0,1,0)	15114.05	(0.02)	[64012]
	18(4,14) - 19(3,17)	(0,1,0)	15235.00	(0.02)	[64012]
	25(4,21) - 24(5,20)	(0,1,0)	15303.90	(0.02)	[64012]
	17(2,16) - 16(3,13)	(0,1,0)	16527.90	(0.02)	[64012]
	21(3,19) - 20(4,16)	(0,1,0)	17147.05	(0.02)	[64012]
	10(2, 8) - 11(1,11)	(0,1,0)	17553.80	(0.02)	[64012]
	33(7,27) - 34(6,28)	(0,0,0)	17727.75	(0.20)	[63010]
	15(2,13) - 16(1,16)	(0,0,0)	17949.10	(0.20)	[63010]
	26(4,23) - 25(5,20)	(0,1,0)	18081.20	(0.02)	[64012]
	19(3,16) - 18(4,15)	(0,0,0)	18095.30	(0.20)	[63010]
	8(1, 7) - 7(2, 6)	(0,0,0)	18261.70	(0.20)	[63010]
	13(3,10) - 14(2,13)	(0,1,0)	18321.30	(0.02)	[64012]
	22(5,18) - 23(4,19)	(0,0,0)	18597.70	(0.20)	[63010]
	9(2, 7) - 10(1,10)	(0,0,0)	18925.20	(0.20)	[63010]
	33(7,26) - 34(6,29)	(0,0,0)	19561.90	(0.20)	[63010]
	36(6,31) - 35(7,28)	(0,0,0)	19813.30	(0.20)	[63010]
	11(3, 9) - 12(2,10)	(0,1,0)	19972.30	(0.02)	[64012]
	28(6,23) - 29(5,24)	(0,1,0)	20916.10	(0.02)	[64012]
	31(5,26) - 30(6,25)	(0,1,0)	21781.50	(0.02)	[64012]
	17(2,16) - 16(3,13)	(0,0,0)	22326.70	(0.20)	[63010]
	9(2, 7) - 10(1,10)	(0,1,0)	22879.80	(0.02)	[64012]
	39(8,32) - 40(7,33)	(0,1,0)	22946.70	(0.02)	[64012]
	36(6,30) - 35(7,29)	(0,0,0)	23337.20	(0.20)	[63010]
	39(8,31) - 40(7,34)	(0,1,0)	23853.80	(0.02)	[64012]
	17(4,13) - 18(3,16)	(0,0,0)	24344.30	(0.20)	[63010]
	4(0, 4) - 3(1, 3)	(0,1,0)	24796.80	(0.02)	[64012]
	37(6,32) - 36(7,29)	(0,1,0)	24935.30	(0.02)	[64012]
	21(3,19) - 20(4,16)	(0,0,0)	25012.40	(0.20)	[63010]
	18(2,17) - 17(3,14)	(0,1,0)	25145.10	(0.02)	[64012]
	16(2,14) - 17(1,17)	(0,0,0)	25362.70	(0.20)	[63010]
	31(5,27) - 30(6,24)	(0,0,0)	25503.95	(0.20)	[63010]
	28(6,22) - 29(5,25)	(0,1,0)	25548.60	(0.02)	[64012]
	25(4,21) - 24(5,20)	(0,0,0)	25701.35	(0.20)	[63010]
	4(0, 4) - 3(1, 3)	(0,0,0)	25913.05	(0.20)	[63010]
	38(8,31) - 39(7,32)	(0,0,0)	26029.90	(0.20)	[63010]
	8(2, 6) - 9(1, 9)	(0,0,0)	26252.60	(0.20)	[63010]
	12(3, 9) - 13(2,12)	(0,0,0)	26567.20	(0.20)	[63010]
	38(8,30) - 39(7,33)	(0,0,0)	26706.90	(0.20)	[63010]
	22(5,17) - 23(4,20)	(0,0,0)	27018.70	(0.20)	[63010]
	5(2, 4) - 6(1, 5)	(0,0,0)	27599.80	(0.20)	[63010]
	16(4,13) - 17(3,14)	(0,0,0)	27983.70	(0.20)	[63010]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{18}O$	26(4,23) - 25(5,20)	(0,0,0)	28202.60	(0.20)	[63010]
	14(2,12) - 13(3,11)	(0,1,0)	28883.90	(0.02)	[64012]
	22(5,18) - 23(4,19)	(0,1,0)	28916.90	(0.02)	[64012]
	27(6,22) - 28(5,23)	(0,0,0)	29029.40	(0.20)	[63010]
	8(2, 6) - 9(1, 9)	(0,1,0)	30100.55	(0.02)	[64012]
	5(2, 4) - 6(1, 5)	(0,1,0)	30847.20	(0.02)	[64012]
	18(2,17) - 17(3,14)	(0,0,0)	30962.70	(0.20)	[63010]
	19(2,18) - 18(3,15)	(0,1,0)	31942.70	(0.02)	[64012]
	22(3,20) - 21(4,17)	(0,1,0)	32227.00	(0.02)	[64012]
	17(4,13) - 18(3,16)	(0,1,0)	32263.70	(0.02)	[64012]
	12(3, 9) - 13(2,12)	(0,1,0)	32306.20	(0.02)	[64012]
	32(5,28) - 31(6,25)	(0,1,0)	32342.00	(0.02)	[64012]
	27(6,21) - 28(5,24)	(0;0,0)	32436.80	(0.20)	[63010]
	33(7,27) - 34(6,28)	(0,1,0)	32453.90	(0.02)	[64012]
	44(9,36) - 45(8,37)	(0,1,0)	33095.55	(0.02)	[64012]
	44(9,35) - 45(8,38)	(0,1,0)	33418.15	(0.02)	[64012]
	43(9,35) - 44(8,36)	(0,0,0)	33830.10	(0.20)	[63010]
	43(9,34) - 44(8,37)	(0,0,0)	34071.95	(0.20)	[63010]
	33(7,26) - 34(6,29)	(0,1,0)	34220.85	(0.02)	[64012]
	31(5,26) - 30(6,25)	(0,0,0)	34421.90	(0.20)	[63010]
	14(2,12) - 13(3,11)	(0,0,0)	34462.20	(0.20)	[63010]
	20(3,17) - 19(4,16)	(0,1,0)	34558.20	(0.02)	[64012]
	17(2,15) - 18(1,18)	(0,0,0)	34849.60	(0.20)	[63010]
	27(4,24) - 26(5,21)	(0,1,0)	35959.40	(0.02)	[64012]
	16(4,13) - 17(3,14)	(0,1,0)	36007.10	(0.02)	[64012]
	20(2,19) - 19(3,16)	(0,1,0)	36743.60	(0.02)	[64012]
	22(5,17) - 23(4,20)	(0,1,0)	37194.20	(0.02)	[64012]
	10(3, 8) - 11(2, 9)	(0,0,0)	37345.20	(0.20)	[63010]
	19(2,18) - 18(3,15)	(0,0,0)	37783.90	(0.20)	[63010]
	32(7,26) - 33(6,27)	(0,0,0)	37826.50	(0.20)	[63010]
	32(7,25) - 33(6,28)	(0,0,0)	39127.40	(0.20)	[64015]
	37(6,32) - 36(7,29)	(0,0,0)	39594.40	(0.20)	[64015]
	21(5,17) - 22(4,18)	(0,0,0)	39724.40	(0.20)	[64015]
	22(3,20) - 21(4,17)	(0,0,0)	40061.40	(0.20)	[64015]
	11(3, 8) - 12(2,11)	(0,0,0)	41461.40	(0.20)	[64015]
	16(4,12) - 17(3,15)	(0,0,0)	41768.90	(0.20)	[64015]
	9(1, 8) - 8(2, 7)	(0,0,0)	41999.00	(0.20)	[64015]
	20(2,19) - 19(3,16)	(0,0,0)	42615.20	(0.20)	[64015]
	20(3,17) - 19(4,16)	(0,0,0)	42631.40	(0.20)	[64015]
	37(6,31) - 36(7,30)	(0,0,0)	44398.8	(0.20)	[65016]
	32(5,28) - 31(6,25)	(0,0,0)	44731.50	(0.20)	[65016]
	21(2,20) - 20(3,17)	(0,0,0)	45307.30	(0.20)	[65016]
	21(5,16) - 22(4,19)	(0,0,0)	45736.60	(0.20)	[65016]
	22(2,21) - 21(3,18)	(0,0,0)	45742.00	(0.20)	[65016]
	6(2, 4) - 7(1, 7)	(0,0,0)	45881.40	(0.20)	[65016]
	27(4,22) - 26(5,21)	(0,0,0)	46046.90	(0.20)	[65016]
	5(0, 5) - 4(1, 4)	(0,0,0)	46232.40	(0.20)	[65016]
	37(8,29) - 38(7,32)	(0,0,0)	46309.00	(0.20)	[65016]
	18(2,16) - 19(1,19)	(0,0,0)	46314.00	(0.20)	[65016]
	26(4,22) - 25(5,21)	(0,0,0)	49091.75	(0.20)	[65016]
	26(6,21) - 27(5,22)	(0,0,0)	49312.70	(0.20)	[65016]
	4(2, 3) - 5(1, 4)	(0,0,0)	49650.00	(0.20)	[65016]
	15(4,12) - 16(3,13)	(0,0,0)	49699.00	(0.20)	[65016]
	26(6,20) - 27(5,23)	(0,0,0)	51717.00	(0.20)	[65016]
	3(1, 2) - 3(0, 3)	(0,0,0)	54377.62	(0.20)	[65016]
	4(1, 3) - 4(0, 4)	(0,0,0)	57394.60	(0.20)	[65016]
	5(1, 4) - 5(0, 5)	(0,0,0)	61323.00	(0.20)	[63015]
	10(1, 9) - 9(2, 8)	(0,0,0)	66210.26	(0.20)	[65016]
	6(1, 5) - 6(0, 6)	(0,0,0)	66262.22	(0.20)	[65016]
	6(0, 6) - 5(1, 5)	(0,0,0)	66887.51	(0.20)	[65016]
	1(1, 1) - 0(0, 0)	(0,0,0)	67430.60	(0.20)	[65016]
	21(3,18) - 20(4,17)	(0,0,0)	68240.32	(0.20)	[65016]
	14(4,11) - 15(3,12)	(0,0,0)	70670.75	(0.20)	[65016]
	4(2, 2) - 5(1, 5)	(0,0,0)	70966.64	(0.20)	[65016]
	7(1, 6) - 7(0, 7)	(0,0,0)	72318.12	(0.20)	[65016]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{18}O$	8(1, 7) - 8(0, 8)	(0,0,0)	79599.06	(0.20)	[65016]
	7(0, 7) - 6(1, 6)	(0,0,0)	87752.92	(0.20)	[65016]
	9(1, 8) - 9(0, 9)	(0,0,0)	88201.66	(0.20)	[65016]
	11(1,10) - 10(2, 9)	(0,0,0)	90833.55	(0.20)	[65016]
	13(4,10) - 14(3,11)	(0,0,0)	91008.52	(0.20)	[65016]
	22(3,19) - 21(4,18)	(0,0,0)	94940.18	(0.20)	[65016]
	8(2, 6) - 8(1, 7)	(0,0,0)	131766.91	(0.20)	[65016]
	15(2,13) - 15(1,14)	(0,0,0)	131783.64	(0.20)	[65016]
	7(2, 5) - 7(1, 6)	(0,0,0)	134717.73	(0.20)	[65016]
	27(7,21) - 28(6,22)	(0,0,0)	135306.96	(0.20)	[65016]
	16(2,14) - 16(1,16)	(0,0,0)	136657.55	(0.20)	[65016]
	13(1,12) - 13(0,13)	(0,0,0)	136749.31	(0.20)	[65016]
	6(2, 4) - 6(1, 5)	(0,0,0)	137821.47	(0.20)	[65016]
	5(2, 3) - 5(1, 4)	(0,0,0)	140880.19	(0.20)	[65016]
	13(1,12) - 12(2,11)	(0,0,0)	141009.79	(0.20)	[65016]
	18(2,16) - 17(3,15)	(0,0,0)	141890.31	(0.20)	[65016]
	17(2,15) - 17(1,16)	(0,0,0)	143096.29	(0.20)	[65016]
	4(2, 2) - 4(1, 3)	(0,0,0)	143714.92	(0.20)	[65016]
	6(1, 6) - 5(0, 5)	(0,0,0)	144375.42	(0.20)	[65016]
$^{18}O^{32}S^{18}O$	8(1, 7) - 7(2, 6)	(0,1,0)	9102.9	(0.20)	[64012]
	12(2,10) - 13(1,13)	(0,0,0)	9250.06	(0.20)	[64015]
	14(3,11) - 15(2,14)	(0,1,0)	11137.30	(0.20)	[64012]
	14(2,12) - 15(1,15)	(0,0,0)	11364.95	(0.20)	[64015]
	8(1, 7) - 7(2, 6)	(0,0,0)	12073.4	(0.20)	[63010]
	40(8,32) - 41(7,35)	(0,0,0)	12741.40	(0.20)	[63010]
	23(5,19) - 24(4,20)	(0,0,0)	13043.10	(0.20)	[63010]
	12(2,10) - 13(1,13)	(0,1,0)	13342.50	(0.20)	[64015]
	21(3,19) - 20(4,16)	(0,0,0)	14007.70	(0.20)	[63010]
	1(1, 1) - 2(0, 2)	(0,0,0)	14117.55	(0.20)	[63010]
	10(2, 8) - 11(1,11)	(0,0,0)	15055.11	(0.20)	[63010]
	37(6,32) - 36(7,29)	(0,0,0)	15905.00	(0.20)	[63010]
	17(2,16) - 16(3,13)	(0,0,0)	16232.35	(0.20)	[63010]
	18(4,14) - 19(3,17)	(0,0,0)	17201.25	(0.20)	[63010]
	14(2,12) - 13(3,11)	(0,1,0)	17634.30	(0.20)	[64012]
	17(4,14) - 18(3,15)	(0,0,0)	17853.90	(0.20)	[63010]
	26(4,22) - 25(5,21)	(0,1,0)	19403.45	(0.20)	[64012]
	27(4,24) - 26(5,21)	(0,1,0)	20380.90	(0.20)	[64012]
	34(7,27) - 35(6,30)	(0,0,0)	21269.40	(0.20)	[63010]
	16(2,14) - 17(1,17)	(0,0,0)	21542.10	(0.20)	[63010]
	4(0, 4) - 3(1, 3)	(0,1,0)	21815.00	(0.20)	[64012]
	11(3, 9) - 12(2,10)	(0,0,0)	22553.10	(0.20)	[63010]
	23(5,19) - 24(4,20)	(0,1,0)	22758.30	(0.20)	[64012]
	45(9,37) - 46(8,38)	(0,0,0)	22790.00	(0.20)	[64015]
	4(0, 4) - 3(1, 3)	(0,0,0)	22865.95	(0.20)	[63010]
	14(2,12) - 13(3,11)	(0,0,0)	22889.20	(0.20)	[63010]
	18(4,14) - 19(3,17)	(0,1,0)	24658.10	(0.20)	[64012]
	43(7,37) - 42(8,34)	(0,0,0)	24731.60	(0.20)	[64015]
	17(4,14) - 18(3,15)	(0,1,0)	25407.35	(0.20)	[64012]
	20(3,17) - 19(4,16)	(0,0,0)	26479.60	(0.20)	[64015]
	19(2,18) - 18(3,15)	(0,1,0)	27014.70	(0.20)	[64012]
	11(3, 9) - 12(2,10)	(0,1,0)	27863.90	(0.20)	[64012]
	8(2, 6) - 9(1, 9)	(0,0,0)	28101.88	(0.20)	[63010]
	26(4,22) - 25(5,21)	(0,0,0)	29185.90	(0.20)	[63010]
	27(4,24) - 26(5,21)	(0,0,0)	29907.00	(0.20)	[63010]
	28(6,22) - 29(5,25)	(0,0,0)	30190.20	(0.20)	[63010]
	39(8,32) - 40(7,33)	(0,0,0)	30711.70	(0.20)	[63010]
	5(2, 4) - 6(1, 5)	(0,0,0)	31050.60	(0.20)	[63010]
	8(2, 6) - 9(1, 9)	(0,1,0)	31713.75	(0.20)	[64012]
	12(3, 9) - 13(2,12)	(0,0,0)	31919.30	(0.20)	[63010]
	19(2,18) - 18(3,15)	(0,0,0)	32533.10	(0.20)	[64015]
	32(5,27) - 31(6,26)	(0,0,0)	33376.50	(0.20)	[63010]
	5(2, 4) - 6(1, 5)	(0,1,0)	34112.85	(0.20)	[64012]
	34(7,27) - 35(6,30)	(0,1,0)	35071.50	(0.20)	[64012]
	23(3,21) - 22(4,18)	(0,1,0)	35229.00	(0.20)	[64015]
	21(2,20) - 20(3,17)	(0,1,0)	36287.40	(0.20)	[64015]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{18}O^{32}S^{18}O$	12(3, 9) - 13(2,12)	(0,1,0)	37325.80	(0.20)	[64012]
	33(7,27) - 34(6,28)	(0,0,0)	38475.00	(0.20)	[64015]
	22(5,17) - 23(4,20)	(0,0,0)	39724.40	(0.20)	[64015]
	4(1, 3) - 4(0, 4)	(0,0,0)	55568.22	(0.20)	[65016]
	10(0,10) - 9(1, 9)	(0,0,0)	140506.64	(0.20)	[65016]
	4(2, 2) - 4(1, 3)	(0,0,0)	140557.39	(0.20)	[65016]
$^{16}O^{34}S^{18}O$	33(7,27) - 34(6,28)	(0,1,0)	8315.20	(0.20)	[64015]
	11(2, 9) - 12(1,12)	(0,0,0)	8402.00	(0.20)	[63017]
	18(3,15) - 17(4,14)	(0,0,0)	8588.90	(0.20)	[63017]
	27(6,22) - 28(5,23)	(0,0,0)	8785.30	(0.20)	[63017]
	13(2,11) - 14(1,14)	(0,0,0)	9640.90	(0.20)	[63017]
	11(3, 9) - 12(2,10)	(0,1,0)	9950.70	(0.20)	[64015]
	33(7,26) - 34(6,29)	(0,1,0)	10750.70	(0.20)	[64015]
	24(4,20) - 23(5,19)	(0,1,0)	10763.60	(0.20)	[64015]
	10(2, 8) - 11(1,11)	(0,0,0)	11115.10	(0.20)	[63017]
	13(3,10) - 14(2,13)	(0,1,0)	11295.80	(0.20)	[64015]
	22(5,18) - 23(4,19)	(0,1,0)	11481.10	(0.20)	[64015]
	22(5,17) - 23(4,20)	(0,0,0)	11716.6	(0.20)	[63017]
	20(3,18) - 19(4,15)	(0,1,0)	12078.50	(0.20)	[64015]
	16(2,15) - 15(3,12)	(0,1,0)	12101.30	(0.20)	[64015]
	29(5,24) - 28(6,23)	(0,0,0)	12264.2	(0.20)	[63017]
	17(4,13) - 18(3,16)	(0,0,0)	13102.80	(0.20)	[63017]
	27(6,21) - 28(5,24)	(0,0,0)	13214.65	(0.20)	[63017]
	14(2,12) - 15(1,15)	(0,0,0)	13651.70	(0.20)	[63017]
	13(2,11) - 12(3,10)	(0,1,0)	14329.00	(0.20)	[64015]
	32(7,26) - 33(6,27)	(0,0,0)	14361.50	(0.20)	[63017]
	16(4,13) - 17(3,14)	(0,0,0)	14450.10	(0.20)	[63017]
	10(2, 8) - 11(1,11)	(0,1,0)	15084.85	(0.20)	[64015]
	25(4,22) - 24(5,19)	(0,1,0)	15154.70	(0.20)	[64015]
	26(2,25) - 25(3,22)	(0,0,0)	15896.10	(0.20)	[65016]
	9(2, 7) - 10(1,10)	(0,0,0)	15938.80	(0.20)	[63017]
	45(8,38) - 44(9,35)	(0,0,0)	15973.60	(0.20)	[64015]
	32(7,25) - 33(6,28)	(0,0,0)	16160.40	(0.20)	[63017]
	38(8,30) - 39(7,33)	(0,1,0)	16371.80	(0.20)	[64015]
	45(8,37) - 44(9,36)	(0,0,0)	16507.05	(0.20)	[64015]
	16(2,15) - 15(3,12)	(0,0,0)	17694.75	(0.20)	[63017]
	14(2,12) - 15(1,15)	(0,1,0)	18313.40	(0.20)	[64015]
	37(8,30) - 38(7,31)	(0,0,0)	19027.45	(0.20)	[64015]
	12(3, 9) - 13(2,12)	(0,0,0)	19285.00	(0.20)	[63017]
	20(3,18) - 19(4,15)	(0,0,0)	19705.20	(0.20)	[63017]
	37(8,29) - 38(7,32)	(0,0,0)	19729.20	(0.20)	[63017]
	13(2,11) - 12(3,10)	(0,0,0)	19774.20	(0.20)	[63017]
	9(2, 7) - 10(1,10)	(0,1,0)	19787.30	(0.20)	[64015]
	40(7,34) - 39(8,31)	(0,0,0)	19817.45	(0.20)	[63017]
	15(2,13) - 16(1,16)	(0,0,0)	19896.55	(0.20)	[63017]
	17(4,13) - 18(3,16)	(0,1,0)	20770.40	(0.20)	[64015]
	8(1, 7) - 7(2, 6)	(0,1,0)	20779.25	(0.20)	[64015]
	24(4,20) - 23(5,19)	(0,0,0)	20852.30	(0.20)	[63017]
	27(6,22) - 28(5,23)	(0,1,0)	20967.90	(0.20)	[64015]
	40(7,33) - 39(8,32)	(0,0,0)	21212.45	(0.20)	[63017]
	17(2,16) - 16(3,13)	(0,1,0)	21547.10	(0.20)	[64015]
	22(5,17) - 23(4,20)	(0,1,0)	21576.30	(0.20)	[64015]
	5(2, 4) - 6(1, 5)	(0,0,0)	22171.70	(0.20)	[63017]
	16(4,13) - 17(3,14)	(0,1,0)	22251.30	(0.20)	[64015]
	8(2, 6) - 9(1, 9)	(0,0,0)	22738.50	(0.20)	[63017]
	21(5,17) - 22(4,18)	(0,0,0)	22981.40	(0.20)	[63017]
	35(6,30) - 34(7,27)	(0,0,0)	23190.30	(0.20)	[63017]
	42(9,34) - 43(8,35)	(0,0,0)	23247.80	(0.20)	[63017]
	42(9,33) - 43(8,36)	(0,0,0)	23513.20	(0.20)	[63017]
	8(1, 7) - 7(2, 6)	(0,0,0)	23822.90	(0.20)	[63017]
	19(3,16) - 18(4,15)	(0,1,0)	24805.60	(0.20)	[64015]
	12(3, 9) - 13(2,12)	(0,1,0)	24845.00	(0.20)	[64015]
	25(4,22) - 24(5,19)	(0,0,0)	24973.75	(0.20)	[63017]
	27(6,21) - 28(5,24)	(0,1,0)	25271.00	(0.20)	[64015]
	5(2, 4) - 6(1, 5)	(0,1,0)	25315.10	(0.20)	[64015]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{34}S^{18}O$	30(5,26) - 29(6,23)	(0,0,0)	25373.00	(0.20)	[63017]
	8(2, 6) - 9(1, 9)	(0,1,0)	26480.95	(0.20)	[64015]
	4(0, 4) - 3(1, 3)	(0,1,0)	26521.30	(0.20)	[64015]
	25(2,24) - 24(3,21)	(0,0,0)	26570.40	(0.20)	[65016]
	35(6,29) - 34(7,28)	(0,0,0)	26713.60	(0.20)	[63017]
	17(2,16) - 16(3,13)	(0,0,0)	27151.95	(0.20)	[63017]
	21(3,19) - 20(4,16)	(0,1,0)	27449.10	(0.20)	[64015]
	4(0, 4) - 3(1, 3)	(0,0,0)	27603.40	(0.20)	[63017]
	10(3, 8) - 11(2, 9)	(0,0,0)	27782.85	(0.20)	[63017]
	36(6,31) - 35(7,28)	(0,1,0)	27932.20	(0.20)	[64015]
	16(2,14) - 17(1,17)	(0,0,0)	28312.60	(0.20)	[63017]
	32(7,26) - 33(6,27)	(0,1,0)	28654.40	(0.20)	[64015]
	18(2,17) - 17(3,14)	(0,1,0)	29216.90	(0.20)	[64015]
	26(6,21) - 27(5,22)	(0,0,0)	29374.40	(0.20)	[63017]
	16(4,12) - 17(3,15)	(0,0,0)	30294.45	(0.20)	[63017]
	21(5,16) - 22(4,19)	(0,0,0)	30338.35	(0.20)	[63017]
	32(7,25) - 33(6,28)	(0,1,0)	30383.75	(0.20)	[64015]
	7(2, 5) - 8(1, 8)	(0,0,0)	31348.60	(0.20)	[63017]
	26(6,20) - 27(5,23)	(0,0,0)	32505.70	(0.20)	[63017]
	31(5,27) - 30(6,24)	(0,1,0)	32566.50	(0.20)	[64015]
	19(3,16) - 18(4,15)	(0,0,0)	32649.00	(0.20)	[63017]
	21(5,17) - 22(4,18)	(0,1,0)	32985.50	(0.20)	[64015]
	26(4,23) - 25(5,20)	(0,1,0)	33089.90	(0.20)	[64015]
	10(3, 8) - 11(2, 9)	(0,1,0)	33270.40	(0.20)	[64015]
	36(6,30) - 35(7,29)	(0,1,0)	33398.75	(0.20)	[64015]
	11(3, 8) - 12(2,11)	(0,0,0)	33831.40	(0.20)	[63017]
	30(5,25) - 29(6,24)	(0,0,0)	33858.40	(0.20)	[63017]
	25(4,21) - 24(5,20)	(0,1,0)	33864.70	(0.20)	[64015]
	31(7,25) - 32(6,26)	(0,0,0)	34447.00	(0.20)	[63017]
	18(2,17) - 17(3,14)	(0,0,0)	34836.00	(0.20)	[63017]
	19(2,18) - 18(3,15)	(0,1,0)	34915.20	(0.20)	[64015]
	7(2, 5) - 8(1, 6)	(0,1,0)	34997.45	(0.20)	[64015]
	21(3,19) - 20(4,16)	(0,0,0)	35044.50	(0.20)	[63017]
	37(8,30) - 38(7,31)	(0,1,0)	35411.20	(0.20)	[64015]
	31(7,24) - 32(6,27)	(0,0,0)	35709.05	(0.20)	[63017]
	46(8,39) - 45(9,38)	(0,0,0)	35888.90	(0.20)	[64015]
	15(4,12) - 16(3,13)	(0,0,0)	36558.90	(0.20)	[63017]
	46(8,38) - 45(9,37)	(0,0,0)	36634.55	(0.20)	[64015]
	16(4,12) - 17(3,15)	(0,1,0)	37975.60	(0.20)	[64015]
	20(2,19) - 19(3,16)	(0,1,0)	38466.90	(0.20)	[64015]
	17(2,15) - 18(1,18)	(0,0,0)	38810.45	(0.20)	[64015]
	36(8,29) - 37(7,30)	(0,0,0)	38846.40	(0.20)	[64015]
	36(8,28) - 37(7,31)	(0,0,0)	39336.20	(0.20)	[64015]
	11(3, 8) - 12(2,11)	(0,1,0)	39379.00	(0.20)	[64015]
	14(2,12) - 13(3,11)	(0,1,0)	39543.80	(0.20)	[64015]
	41(7,35) - 40(8,32)	(0,0,0)	39751.30	(0.20)	[64015]
	19(2,18) - 18(3,15)	(0,0,0)	40552.70	(0.20)	[64015]
	6(2, 4) - 7(1, 7)	(0,0,0)	41584.40	(0.20)	[64015]
	41(7,34) - 40(8,33)	(0,0,0)	41688.40	(0.20)	[64015]
	36(6,31) - 35(7,28)	(0,0,0)	42960.80	(0.20)	[64015]
	20(5,16) - 21(4,17)	(0,0,0)	43889.65	(0.20)	[65016]
	20(2,19) - 19(3,16)	(0,0,0)	44132.70	(0.20)	[65016]
	14(2,12) - 13(3,11)	(0,0,0)	44948.60	(0.20)	[65016]
	9(1, 8) - 8(2, 7)	(0,0,0)	47629.10	(0.20)	[65016]
	5(0, 5) - 4(1, 4)	(0,0,0)	47911.50	(0.20)	[65016]
	1(1, 0) - 1(0, 1)	(0,0,0)	49018.00	(0.20)	[65016]
	22(3,20) - 21(4,17)	(0,0,0)	49460.30	(0.20)	[65016]
	25(6,19) - 26(5,22)	(0,0,0)	51754.90	(0.20)	[65016]
	3(1, 2) - 3(0, 3)	(0,0,0)	52731.31	(0.20)	[65016]
	4(1, 3) - 4(0, 4)	(0,0,0)	55842.49	(0.20)	[65016]
	1(1, 1) - 0(0, 0)	(0,0,0)	65607.34	(0.20)	[65016]
	6(0, 6) - 5(1, 5)	(0,0,0)	68541.75	(0.20)	[65016]
	7(1, 6) - 7(0, 7)	(0,0,0)	71303.86	(0.20)	[65016]
	8(1, 7) - 8(0, 8)	(0,0,0)	78871.39	(0.20)	[65016]
	9(1, 8) - 9(0, 9)	(0,0,0)	87819.13	(0.20)	[65016]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{34}S^{18}O$	9(0, 9) - 8(1, 8)	(0,0,0)	130994.97	(0.20)	[65016]
	16(2,14) - 16(1,15)	(0,0,0)	134836.31	(0.20)	[65016]
	5(2, 3) - 5(1, 4)	(0,0,0)	135407.44	(0.20)	[65016]
	13(1,12) - 13(0,13)	(0,0,0)	138138.96	(0.20)	[65016]
	4(2, 2) - 4(1, 3)	(0,0,0)	138275.10	(0.20)	[65016]
	3(2, 1) - 3(1, 2)	(0,0,0)	140774.79	(0.20)	[65016]
	6(1, 6) - 5(0, 5)	(0,0,0)	142054.37	(0.20)	[65016]
	17(2,15) - 17(1,16)	(0,0,0)	142105.33	(0.20)	[65016]
$^{18}O^{34}S^{18}O$	12(2,10) - 13(1,13)	(0,0,0)	8112.50	(0.20)	[64015]
	28(6,22) - 29(5,25)	(0,0,0)	10888.60	(0.20)	[64015]
	17(4,14) - 18(3,15)	(0,1,0)	11384.2	(0.3)	[64015]
	14(2,12) - 15(1,15)	(0,0,0)	11953.10	(0.20)	[64015]
	11(3, 9) - 12(2,10)	(0,0,0)	12763.20	(0.20)	[63017]
	30(5,25) - 29(6,24)	(0,0,0)	13653.10	(0.20)	[64015]
	41(7,35) - 40(8,32)	(0,0,0)	14170.80	(0.20)	[64015]
	8(1, 7) - 7(2, 6)	(0,1,0)	14777.2	(0.3)	[64015]
	33(7,27) - 34(6,28)	(0,0,0)	15905.0	(0.2)	[63017]
	17(2,16) - 16(3,13)	(0,1,0)	16188.9	(0.3)	[64015]
	10(2, 8) - 11(1,11)	(0,1,0)	16207.1	(0.3)	[64015]
	14(2,12) - 15(1,15)	(0,1,0)	16302.3	(0.3)	[64015]
	8(1, 7) - 7(2, 6)	(0,0,0)	17648.10	(0.20)	[63017]
	11(3, 9) - 12(2,10)	(0,1,0)	17910.7	(0.3)	[64015]
	17(2,16) - 16(3,13)	(0,0,0)	21479.40	(0.20)	[63017]
	38(8,30) - 39(7,33)	(0,0,0)	23148.00	(0.20)	[64015]
	4(0, 4) - 3(1, 3)	(0,1,0)	23551.5	(0.3)	[64015]
	22(5,17) - 23(4,20)	(0,0,0)	24294.25	(0.20)	[63017]
	21(3,19) - 20(4,16)	(0,0,0)	24397.80	(0.20)	[63017]
	8(2, 6) - 9(1, 9)	(0,0,0)	24460.20	(0.20)	[63017]
	12(3, 9) - 13(2,12)	(0,0,0)	24472.80	(0.20)	[63017]
	4(0, 4) - 3(1, 3)	(0,0,0)	24569.70	(0.20)	[63017]
	31(5,27) - 30(6,24)	(0,0,0)	25544.10	(0.20)	[64015]
	5(2, 4) - 6(1, 5)	(0,0,0)	25611.10	(0.20)	[63017]
	27(6,22) - 28(5,23)	(0,0,0)	25832.10	(0.20)	[63017]
	8(2, 6) - 9(1, 9)	(0,1,0)	27972.1	(0.3)	[64015]
	14(2,12) - 13(3,11)	(0,1,0)	28209.0	(0.3)	[64015]
	5(2, 4) - 6(1, 5)	(0,1,0)	28573.4	(0.3)	[64015]
	16(2,14) - 17(1,17)	(0,1,0)	28851.6	(0.3)	[64015]
	12(3, 9) - 13(3,12)	(0,1,0)	29709.1	(0.3)	[64015]
	14(2,12) - 13(3,11)	(0,0,0)	33297.65	(0.20)	[63017]
	32(7,25) - 33(6,28)	(0,0,0)	35145.30	(0.20)	[64015]
	19(2,18) - 18(3,15)	(0,0,0)	35920.50	(0.20)	[63017]
	21(5,17) - 22(4,18)	(0,0,0)	36186.60	(0.20)	[64015]
	37(6,32) - 36(7,29)	(0,0,0)	39152.20	(0.20)	[64015]
	20(3,17) - 19(4,16)	(0,0,0)	41356.30	(0.20)	[64015]
	21(2,20) - 20(3,17)	(0,0,0)	42837.30	(0.20)	[64015]
	6(2, 4) - 7(1, 7)	(0,0,0)	42922.10	(0.20)	[64015]
	4(1, 3) - 4(0, 4)	(0,0,0)	54003.07	(0.20)	[65016]
	10(0,10) - 9(1, 9)	(0,0,0)	141843.78	(0.20)	[65016]
	18(2,16) - 18(1,17)	(0,0,0)	142513.38	(0.20)	[65016]

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{33}S^{18}O$	13(3,10) - 14(2,13)					(0,0,0)	9008.8	(0.2)	[64013]
	13(3,10) - 14(2,13)					(0,0,0)	9011.7	(0.2)	[64013]
	11(3, 9) - 12(2,10)					(0,0,0)	9257.5	(0.2)	[64013]
	11(3, 9) - 12(2,10)					(0,0,0)	9261.5	(0.2)	[64013]
	13(2,11) - 14(1,14)					(0,0,0)	9570.7	(0.2)	[68017]
	13(2,11) - 14(1,14)					(0,0,0)	9572.0	(0.2)	[68017]
	22(5,18) - 23(4,19)					(0,0,0)	9783.1	(0.2)	[64013]
	22(5,18) - 23(4,19)					(0,0,0)	9784.5	(0.2)	[64013]
	35(6,30) - 34(7,27)					(0,0,0)	12003.6	(0.2)	[64013]
	10(2, 8) - 11(1,11)					(0,0,0)	12225.2	(0.2)	[64013]
	10(2, 8) - 11(1,11)					(0,0,0)	12226.7	(0.2)	[64013]
	10(2, 8) - 11(1,11)					(0,0,0)	12236.2	(0.2)	[64013]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{33}S^{18}O$	10(2, 8) - 11(1,11)					(0,0,0)	12237.7	(0.2)	[64013]
	24(4,20) - 23(5,19)					(0,0,0)	12244.25	(0.20)	[64013]
	24(4,20) - 23(5,19)					(0,0,0)	12245.9	(0.2)	[64013]
	1(1, 1) - 2(0, 2)					(0,0,0)	12402.6	(0.2)	[64013]
	1(1, 1) - 2(0, 2)					(0,0,0)	12407.9	(0.2)	[64013]
	1(1, 1) - 2(0, 2)					(0,0,0)	12414.6	(0.2)	[64013]
	38(8,30) - 39(7,33)					(0,0,0)	12947.4	(0.2)	[68017]
	20(3,18) - 19(4,15)					(0,0,0)	14639.4	(0.2)	[64013]
	20(3,18) - 19(4,15)					(0,0,0)	14640.5	(0.2)	[64013]
	13(2,11) - 12(3,10)					(0,0,0)	14838.0	(0.2)	[64013]
	13(2,11) - 12(3,10)					(0,0,0)	14842.2	(0.2)	[64013]
	16(2,15) - 15(3,12)					(0,0,0)	15012.2	(0.2)	[64013]
	16(2,15) - 15(3,12)					(0,0,0)	15016.1	(0.2)	[64013]
	30(5,26) - 29(6,23)					(0,0,0)	16104.4	(0.2)	[64013]
	9(2, 7) - 10(1,10)					(0,0,0)	17357.15	(0.20)	[64013]
	9(2, 7) - 10(1,10)					(0,0,0)	17358.7	(0.2)	[64013]
	9(2, 7) - 10(1,10)					(0,0,0)	17367.3	(0.2)	[64013]
	9(2, 7) - 10(1,10)					(0,0,0)	17368.8	(0.2)	[64013]
	25(4,22) - 24(5,19)					(0,0,0)	17760.3	(0.2)	[64013]
	17(4,13) - 18(3,16)					(0,0,0)	18524.35	(0.20)	[68017]
	27(6,22) - 28(5,23)					(0,0,0)	18618.6	(0.2)	[68017]
	27(6,22) - 28(5,23)					(0,0,0)	18619.5	(0.2)	[68017]
	15(2,13) - 16(1,16)					(0,0,0)	18889.1	(0.2)	[64013]
	15(2,13) - 16(1,16)					(0,0,0)	18890.3	(0.2)	[64013]
	15(2,13) - 16(1,16)					(0,0,0)	18902.6	(0.2)	[64013]
	15(2,13) - 16(1,16)					(0,0,0)	18903.9	(0.2)	[64013]
	22(5,17) - 23(4,20)					(0,0,0)	19111.3	(0.2)	[64013]
	16(4,13) - 17(3,14)					(0,0,0)	21026.6	(0.2)	[64013]
	16(4,13) - 17(3,14)					(0,0,0)	21028.9	(0.2)	[64013]
	8(1, 7) - 7(2, 6)					(0,0,0)	21127.05	(0.20)	[64013]
	8(1, 7) - 7(2, 6)					(0,0,0)	21128.1	(0.2)	[64013]
	8(1, 7) - 7(2, 6)					(0,0,0)	21132.9	(0.2)	[64013]
	8(1, 7) - 7(2, 6)					(0,0,0)	21133.9	(0.2)	[64013]
	27(6,21) - 28(5,24)					(0,0,0)	22516.5	(0.2)	[68017]
	12(3, 9) - 13(2,12)					(0,0,0)	22788.6	(0.2)	[64013]
	12(3, 9) - 13(2,12)					(0,0,0)	22791.1	(0.2)	[64013]
	30(5,25) - 29(6,24)					(0,0,0)	23589.2	(0.2)	[64013]
	30(5,25) - 29(6,24)					(0,0,0)	23590.3	(0.2)	[64013]
	8(2, 6) - 9(1, 9)					(0,0,0)	24417.8	(0.2)	[64013]
	8(2, 6) - 9(1, 9)					(0,0,0)	24419.4	(0.2)	[64013]
	8(2, 6) - 9(1, 9)					(0,0,0)	24427.3	(0.2)	[64013]
	8(2, 6) - 9(1, 9)					(0,0,0)	24428.9	(0.2)	[64013]
	5(2, 4) - 6(1, 5)					(0,0,0)	24795.75	(0.20)	[64013]
	5(2, 4) - 6(1, 5)					(0,0,0)	24801.8	(0.2)	[64013]
	5(2, 4) - 6(1, 5)					(0,0,0)	24803.2	(0.2)	[64013]
	17(2,16) - 16(3,13)					(0,0,0)	24870.5	(0.2)	[64013]
	17(2,16) - 16(3,13)					(0,0,0)	24875.1	(0.2)	[64013]
	19(3,16) - 18(4,15)					(0,0,0)	25562.6	(0.2)	[64013]
	19(3,16) - 18(4,15)					(0,0,0)	25565.4	(0.2)	[64013]
	32(7,26) - 33(6,27)					(0,0,0)	25748.1	(0.2)	[68017]
	32(7,26) - 33(6,27)					(0,0,0)	25748.7	(0.2)	[68017]
	4(0, 4) - 3(1, 3)					(0,0,0)	26782.4	(0.2)	[64013]
	4(0, 4) - 3(1, 3)					(0,0,0)	26785.0	(0.2)	[64013]
	4(0, 4) - 3(1, 3)					(0,0,0)	26787.9	(0.2)	[64013]
	4(0, 4) - 3(1, 3)					(0,0,0)	26790.6	(0.2)	[64013]
	32(7,25) - 33(6,28)					(0,0,0)	27284.2	(0.2)	[68017]
	21(3,19) - 20(4,16)					(0,0,0)	30234.4	(0.2)	[64013]
	21(3,19) - 20(4,16)					(0,0,0)	30235.6	(0.2)	[64013]
	21(5,17) - 22(4,18)					(0,0,0)	31114.9	(0.2)	[68017]
	21(5,17) - 22(4,18)					(0,0,0)	31116.1	(0.2)	[68017]
	36(6,31) - 35(7,28)					(0,0,0)	31754.0	(0.2)	[64013]
	18(2,17) - 17(3,14)					(0,0,0)	33028.3	(0.2)	[64013]
	18(2,17) - 17(3,14)					(0,0,0)	33033.5	(0.2)	[64013]
	7(2, 5) - 8(1, 8)					(0,0,0)	33242.9	(0.2)	[64013]
	7(2, 5) - 8(1, 8)					(0,0,0)	33244.5	(0.2)	[64013]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{33}S^{18}O$	7(2, 5) - 8(1, 8)					(0,0,0)	33251.6	(0.2)	[64013]
	7(2, 5) - 8(1, 8)					(0,0,0)	33253.2	(0.2)	[64013]
	25(4,21) - 24(5,20)					(0,0,0)	35080.5	(0.2)	[64013]
	25(4,21) - 24(5,20)					(0,0,0)	35082.4	(0.2)	[64013]
	31(5,27) - 30(6,24)					(0,0,0)	35365.1	(0.2)	[64013]
	26(4,23) - 25(5,20)					(0,0,0)	35807.4	(0.2)	[64013]
	16(4,12) - 17(3,15)					(0,0,0)	35834.1	(0.2)	[64013]
	36(6,30) - 35(7,29)					(0,0,0)	35903.4	(0.2)	[64013]
	36(6,30) - 35(7,29)					(0,0,0)	35904.2	(0.2)	[64013]
	11(3, 8) - 12(2,11)					(0,0,0)	37508.7	(0.2)	[64013]
	11(3, 8) - 12(2,11)					(0,0,0)	37510.7	(0.2)	[64013]
	26(6,21) - 27(5,22)					(0,0,0)	39051.4	(0.2)	[68017]
	26(6,21) - 27(5,22)					(0,0,0)	39052.2	(0.2)	[68017]
	19(2,18) - 18(3,15)					(0,0,0)	39294.0	(0.2)	[68017]
	19(2,18) - 18(3,15)					(0,0,0)	39300.2	(0.2)	[68017]
	14(2,12) - 13(3,11)					(0,0,0)	39855.2	(0.2)	[68017]
	14(2,12) - 13(3,11)					(0,0,0)	39859.8	(0.2)	[68017]
	26(6,20) - 27(5,23)					(0,0,0)	41804.4	(0.2)	[68017]
	26(6,20) - 27(5,23)					(0,0,0)	41804.9	(0.2)	[68017]
	23(2,22) - 22(3,19)					(0,0,0)	42437.6	(0.2)	[68017]
	23(2,22) - 22(3,19)					(0,0,0)	42438.1	(0.2)	[68017]
	15(4,12) - 16(3,13)					(0,0,0)	42938.8	(0.2)	[68017]
	15(4,12) - 16(3,13)					(0,0,0)	42940.6	(0.2)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	43651.1	(0.2)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	43652.8	(0.2)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	43659.2	(0.2)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	43661.0	(0.2)	[68017]
	9(1, 8) - 8(2, 7)					(0,0,0)	44900.2	(0.2)	[68017]
	9(1, 8) - 8(2, 7)					(0,0,0)	44901.2	(0.2)	[68017]
	9(1, 8) - 8(2, 7)					(0,0,0)	44905.9	(0.2)	[68017]
	9(1, 8) - 8(2, 7)					(0,0,0)	44906.9	(0.2)	[68017]
	22(3,20) - 21(4,17)					(0,0,0)	44970.0	(0.2)	[68017]
	22(3,20) - 21(4,17)					(0,0,0)	44971.6	(0.2)	[68017]
	31(5,26) - 30(6,25)					(0,0,0)	45529.5	(0.2)	[68017]
	31(5,26) - 30(6,25)					(0,0,0)	45530.8	(0.2)	[68017]
	31(7,25) - 32(6,26)					(0,0,0)	45719.1	(0.2)	[68017]
	31(7,25) - 32(6,26)					(0,0,0)	45719.7	(0.2)	[68017]
	31(7,24) - 32(6,27)					(0,0,0)	46795.7	(0.2)	[68017]
	31(7,24) - 32(6,27)					(0,0,0)	46797.6	(0.2)	[68017]
	4(2, 3) - 5(1, 4)					(0,0,0)	46876.2	(0.2)	[68017]
	5(0, 5) - 4(1, 4)					(0,0,0)	47096.8	(0.2)	[68017]
	5(0, 5) - 4(1, 4)					(0,0,0)	47098.6	(0.2)	[68017]
	5(0, 5) - 4(1, 4)					(0,0,0)	47101.8	(0.2)	[68017]
	5(0, 5) - 4(1, 4)					(0,0,0)	47103.8	(0.2)	[68017]
	18(2,16) - 19(1,19)					(0,0,0)	48800.0	(0.2)	[68017]
	1(1, 0) - 1(0, 1)					(0,0,0)	49859.9	(0.2)	[68017]
	1(1, 0) - 1(0, 1)					(0,0,0)	49866.0	(0.2)	[68017]
	1(1, 0) - 1(0, 1)					(0,0,0)	49870.2	(0.2)	[68017]
	20(3,17) - 19(4,16)					(0,0,0)	50407.3	(0.2)	[68017]
	20(3,17) - 19(4,16)					(0,0,0)	50410.2	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	51302.5	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	51307.1	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	51308.85	(0.20)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	51313.3	(0.2)	[68017]
	37(6,32) - 36(7,29)					(0,0,0)	51547.5	(0.2)	[68017]
	36(8,29) - 37(7,30)					(0,0,0)	51755.0	(0.2)	[68017]
	20(5,16) - 21(4,17)					(0,0,0)	51854.8	(0.2)	[68017]
	20(5,16) - 21(4,17)					(0,0,0)	51855.7	(0.2)	[68017]
	36(8,28) - 37(7,31)					(0,0,0)	52160.5	(0.2)	[68017]
	10(3, 7) - 11(2,10)					(0,0,0)	53009.8	(0.2)	[68017]
	10(3, 7) - 11(2,10)					(0,0,0)	53011.4	(0.2)	[68017]
	3(1, 2) - 3(0, 3)					(0,0,0)	53523.1	(0.2)	[68017]
	3(1, 2) - 3(0, 3)					(0,0,0)	53528.8	(0.2)	[68017]
	31(5,28) - 31(6,25)					(0,0,0)	54528.4	(0.2)	[68017]
	5(2, 3) - 6(1, 6)					(0,0,0)	55458.5	(0.2)	[68017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{33}S^{18}O$	5(2, 3) - 6(1, 6)					(0,0,0)	55460.4	(0.2)	[68017]
	5(2, 3) - 6(1, 6)					(0,0,0)	55466.1	(0.2)	[68017]
	5(2, 3) - 6(1, 6)					(0,0,0)	55468.0	(0.2)	[68017]
	20(5,15) - 21(4,18)					(0,0,0)	56533.6	(0.2)	[68017]
	4(1, 3) - 4(0, 4)					(0,0,0)	56587.7	(0.2)	[68017]
	4(1, 3) - 4(0, 4)					(0,0,0)	56590.2	(0.2)	[68017]
	4(1, 3) - 4(0, 4)					(0,0,0)	56594.6	(0.2)	[68017]
	4(1, 3) - 4(0, 4)					(0,0,0)	56597.0	(0.2)	[68017]
	37(6,31) - 36(7,30)					(0,0,0)	57197.4	(0.2)	[68017]
	23(3,21) - 22(4,18)					(0,0,0)	58675.0	(0.2)	[68017]
	23(3,21) - 22(4,18)					(0,0,0)	58676.8	(0.2)	[68017]
	26(4,22) - 25(5,21)					(0,0,0)	58838.6	(0.2)	[68017]
	26(4,22) - 25(5,21)					(0,0,0)	58839.7	(0.2)	[68017]
$^{18}O^{33}S^{18}O$	17(4,14) - 18(3,15)					(0,0,0)	10758.8	(0.2)	[68017]
	17(4,14) - 18(3,15)					(0,0,0)	10761.1	(0.2)	[68017]
	18(4,14) - 19(3,17)					(0,0,0)	11422.80	(0.20)	[68017]
	1(1, 1) - 2(0, 2)					(0,0,0)	13230.3	(0.2)	[68017]
	1(1, 1) - 2(0, 2)					(0,0,0)	13237.0	(0.2)	[68017]
	10(2, 8) - 11(1,11)					(0,0,0)	13702.2	(0.2)	[68017]
	8(1, 7) - 7(2, 6)					(0,0,0)	14945.2	(0.2)	[68017]
	8(1, 7) - 7(2, 6)					(0,0,0)	14951.1	(0.2)	[68017]
	31(5,27) - 30(6,24)					(0,0,0)	16239.7	(0.2)	[68017]
	17(2,16) - 16(3,13)					(0,0,0)	18989.8	(0.2)	[68017]
	17(2,16) - 16(3,13)					(0,0,0)	18994.0	(0.2)	[68017]
	21(3,19) - 20(4,16)					(0,0,0)	19408.8	(0.2)	[68017]
	28(6,22) - 29(5,25)					(0,0,0)	20229.1	(0.2)	[68017]
	4(0, 4) - 3(1, 3)					(0,0,0)	23742.0	(0.2)	[68017]
	4(0, 4) - 3(1, 3)					(0,0,0)	23744.7	(0.2)	[68017]
	4(0, 4) - 3(1, 3)					(0,0,0)	23747.7	(0.2)	[68017]
	4(0, 4) - 3(1, 3)					(0,0,0)	23750.2	(0.2)	[68017]
	8(2, 6) - 9(1, 9)					(0,0,0)	26202.0	(0.2)	[68017]
	8(2, 6) - 9(1, 9)					(0,0,0)	26203.6	(0.2)	[68017]
	8(2, 6) - 9(1, 9)					(0,0,0)	26211.3	(0.2)	[68017]
	8(2, 6) - 9(1, 9)					(0,0,0)	26212.9	(0.2)	[68017]
	33(7,27) - 34(6,28)					(0,0,0)	26344.9	(0.2)	[68017]
	12(3, 9) - 13(2,12)					(0,0,0)	28057.7	(0.2)	[68017]
	12(3, 9) - 13(2,12)					(0,0,0)	28059.95	(0.20)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	28241.3	(0.2)	[68017]
	14(2,12) - 13(3,11)					(0,0,0)	28241.3	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	28244.0	(0.2)	[68017]
	14(2,12) - 13(3,11)					(0,0,0)	28244.0	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	28245.8	(0.2)	[68017]
	14(2,12) - 13(3,11)					(0,0,0)	28245.8	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	28248.5	(0.2)	[68017]
	14(2,12) - 13(3,11)					(0,0,0)	28248.5	(0.2)	[68017]
	22(5,17) - 23(4,20)					(0,0,0)	31754.0	(0.2)	[68017]
	20(3,17) - 19(4,16)					(0,0,0)	34108.5	(0.2)	[68017]
	19(2,18) - 18(3,15)					(0,0,0)	34357.2	(0.2)	[68017]
	19(2,18) - 18(3,15)					(0,0,0)	34357.7	(0.2)	[68017]
	19(2,18) - 18(3,15)					(0,0,0)	34362.8	(0.2)	[68017]
	19(2,18) - 18(3,15)					(0,0,0)	34363.2	(0.2)	[68017]
	27(6,22) - 28(5,23)					(0,0,0)	35578.3	(0.2)	[68017]
	27(6,22) - 28(5,23)					(0,0,0)	35579.2	(0.2)	[68017]
	27(4,24) - 26(5,21)					(0,0,0)	37507.9	(0.2)	[68017]
	26(4,22) - 25(5,21)					(0,0,0)	38693.1	(0.2)	[68017]
	26(4,22) - 25(5,21)					(0,0,0)	38695.3	(0.2)	[68017]
	16(4,12) - 17(3,15)					(0,0,0)	44102.8	(0.2)	[68017]
	21(5,17) - 22(4,18)					(0,0,0)	44242.3	(0.2)	[68017]
	21(5,17) - 22(4,18)					(0,0,0)	44243.5	(0.2)	[68017]
	32(5,27) - 31(6,26)					(0,0,0)	44556.75	(0.20)	[68017]
	32(5,27) - 31(6,26)					(0,0,0)	44557.9	(0.2)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	45024.3	(0.2)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	45026.0	(0.2)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	45032.3	(0.2)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	45034.0	(0.2)	[68017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{18}O^{33}S^{18}O$	23(3,21) - 22(4,18)					(0,0,0)	47412.5	(0.2)	[68017]
	23(3,21) - 22(4,18)					(0,0,0)	47414.2	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	49910.0	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	49914.7	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	49916.5	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	49920.6	(0.2)	[68017]
	15(4,12) - 16(3,13)					(0,0,0)	52194.8	(0.2)	[68017]
	15(4,12) - 16(3,13)					(0,0,0)	52196.8	(0.2)	[68017]
	33(5,29) - 32(6,26)					(0,0,0)	52506.1	(0.2)	[68017]
	10(3, 7) - 11(2,10)					(0,0,0)	57089.5	(0.2)	[68017]
	10(3, 7) - 11(2,10)					(0,0,0)	57090.9	(0.2)	[68017]
$^{16}O^{32}S^{17}O$	33(7,26) - 34(6,29)					(0,0,0)	7994.20	(0.10)	[65017]
	40(7,33) - 39(8,32)					(0,0,0)	8101.25	(0.10)	[65017]
	13(3,10) - 14(2,13)					(0,0,0)	9309.05	(0.10)	[65017]
	11(2, 9) - 12(1,12)					(0,0,0)	9459.80	(0.10)	[65017]
	11(2, 9) - 12(1,12)					(0,0,0)	9460.90	(0.10)	[65017]
	11(2, 9) - 12(1,12)					(0,0,0)	9461.70	(0.10)	[65017]
	13(2,11) - 12(3,10)					(0,1,0)	9464.90	(0.10)	[65017]
	16(2,15) - 15(3,12)					(0,1,0)	9477.40	(0.10)	[65017]
	11(3, 9) - 12(2,10)					(0,0,0)	9562.70	(0.10)	[65017]
	11(3, 9) - 12(2,10)					(0,0,0)	9563.20	(0.10)	[65017]
	18(4,14) - 19(3,17)					(0,1,0)	9876.70	(0.10)	[65017]
	13(2,11) - 14(1,14)					(0,0,0)	9887.35	(0.10)	[65017]
	13(2,11) - 14(1,14)					(0,0,0)	9889.40	(0.10)	[65017]
	22(5,18) - 23(4,19)					(0,0,0)	10132.00	(0.10)	[64018]
	23(5,18) - 24(4,21)					(0,1,0)	11094.70	(0.10)	[65017]
	35(6,30) - 34(7,27)					(0,0,0)	12258.60	(0.10)	[65017]
	24(4,20) - 23(5,19)					(0,0,0)	12535.20	(0.10)	[64018]
	38(8,31) - 39(7,32)					(0,0,0)	12578.80	(0.10)	[64018]
	10(2, 8) - 11(1,11)					(0,0,0)	12614.60	(0.10)	[65017]
	10(2, 8) - 11(1,11)					(0,0,0)	12615.70	(0.10)	[65017]
	10(2, 8) - 11(1,11)					(0,0,0)	12616.45	(0.10)	[65017]
	1(1, 1) - 2(0, 2)		3/2		5/2	(0,0,0)	12777.30	(0.10)	[65017]
	1(1, 1) - 2(0, 2)		3/2		3/2	(0,0,0)	12777.30	(0.10)	[65017]
	1(1, 1) - 2(0, 2)		3/2		1/2	(0,0,0)	12777.30	(0.10)	[65017]
	1(1, 1) - 2(0, 2)		7/2		9/2	(0,0,0)	12777.70	(0.10)	[65017]
	1(1, 1) - 2(0, 2)		5/2		7/2	(0,0,0)	12779.10	(0.10)	[65017]
	1(1, 1) - 2(0, 2)		5/2		5/2	(0,0,0)	12779.10	(0.10)	[65017]
	38(8,30) - 39(7,33)					(0,0,0)	13425.70	(0.10)	[64018]
	14(2,12) - 15(1,15)					(0,0,0)	13544.60	(0.10)	[65017]
	14(2,12) - 15(1,15)					(0,0,0)	13545.80	(0.10)	[65017]
	14(2,12) - 15(1,15)					(0,0,0)	13546.90	(0.10)	[65017]
	26(2,25) - 25(3,22)					(0,1,0)	13876.30	(0.10)	[65017]
	1(1, 1) - 2(0, 2)					(0,1,0)	13942.60	(0.10)	[65017]
	20(3,18) - 19(4,15)					(0,0,0)	15017.30	(0.10)	[64018]
	13(3,10) - 14(2,13)					(0,1,0)	15219.80	(0.10)	[65017]
	13(2,11) - 12(3,10)					(0,0,0)	15239.50	(0.10)	[65017]
	35(6,29) - 34(7,28)					(0,0,0)	15356.30	(0.10)	[64018]
	11(3, 9) - 12(2,10)					(0,1,0)	15364.40	(0.10)	[65017]
	11(3, 9) - 12(2,10)					(0,1,0)	15364.90	(0.10)	[65017]
	16(2,15) - 15(3,12)					(0,0,0)	15414.50	(0.10)	[65017]
	16(2,15) - 15(3,12)					(0,0,0)	15415.20	(0.10)	[65017]
	28(6,22) - 29(5,25)					(0,1,0)	16147.20	(0.10)	[65017]
	30(5,26) - 29(6,23)					(0,0,0)	16494.10	(0.10)	[64018]
	10(2, 8) - 11(1,11)					(0,1,0)	16814.30	(0.10)	[65017]
	9(2, 7) - 10(1,10)		19/2		21/2	(0,0,0)	17894.65	(0.10)	[65017]
	9(2, 7) - 10(1,10)		21/2		23/2	(0,0,0)	17895.00	(0.10)	[65017]
	9(2, 7) - 10(1,10)		17/2		19/2	(0,0,0)	17895.00	(0.10)	[65017]
	9(2, 7) - 10(1,10)		15/2		17/2	(0,0,0)	17895.80	(0.10)	[65017]
	9(2, 7) - 10(1,10)		23/2		25/2	(0,0,0)	17896.35	(0.10)	[65017]
	9(2, 7) - 10(1,10)		13/2		15/2	(0,0,0)	17896.85	(0.10)	[65017]
	19(3,16) - 18(4,15)					(0,1,0)	17956.10	(0.10)	[65017]
	25(4,22) - 24(5,19)					(0,0,0)	18213.70	(0.10)	[64018]
	8(1, 7) - 7(2, 6)					(0,1,0)	18495.90	(0.10)	[65017]
	43(9,35) - 44(8,36)					(0,0,0)	18824.90	(0.10)	[64018]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{17}O$	17(4,13) - 18(3,16)					(0,0,0)	19112.05	(0.10)	[64018]
	43(9,34) - 44(8,37)					(0,0,0)	19137.20	(0.10)	[64018]
	27(6,22) - 28(5,23)					(0,0,0)	19236.40	(0.10)	[64018]
	15(2,13) - 16(1,16)		31/2		33/2	(0,0,0)	19480.85	(0.10)	[65017]
	15(2,13) - 16(1,16)		33/2		35/2	(0,0,0)	19481.10	(0.10)	[65017]
	15(2,13) - 16(1,16)		29/2		31/2	(0,0,0)	19481.50	(0.10)	[65017]
	15(2,13) - 16(1,16)		27/2		29/2	(0,0,0)	19482.05	(0.10)	[65017]
	15(2,13) - 16(1,16)		35/2		37/2	(0,0,0)	19483.15	(0.10)	[65017]
	15(2,13) - 16(1,16)		25/2		27/2	(0,0,0)	19483.55	(0.10)	[65017]
	17(2,16) - 16(3,13)					(0,1,0)	19608.30	(0.10)	[65017]
	22(5,17) - 23(4,20)					(0,0,0)	19728.50	(0.10)	[64018]
	26(2,25) - 25(3,22)					(0,0,0)	20521.70	(0.10)	[65017]
	22(5,18) - 23(4,19)					(0,1,0)	20758.20	(0.10)	[65017]
	33(7,27) - 34(6,28)					(0,1,0)	20926.70	(0.10)	[65017]
	36(6,30) - 35(7,29)					(0,1,0)	21609.90	(0.10)	[65017]
	16(4,13) - 17(3,14)					(0,0,0)	21688.20	(0.10)	[64018]
	16(4,13) - 17(3,14)					(0,0,0)	21688.60	(0.10)	[64018]
	8(1, 7) - 7(2, 6)					(0,0,0)	21727.60	(0.10)	[65017]
	8(1, 7) - 7(2, 6)					(0,0,0)	21728.15	(0.10)	[65017]
	8(1, 7) - 7(2, 6)					(0,0,0)	21728.55	(0.10)	[65017]
	9(2, 7) - 10(1,10)					(0,1,0)	21968.00	(0.10)	[65017]
	9(2, 7) - 10(1,10)					(0,1,0)	21969.00	(0.10)	[65017]
	9(2, 7) - 10(1,10)					(0,1,0)	21969.50	(0.10)	[65017]
	21(3,19) - 20(4,16)					(0,1,0)	22996.40	(0.10)	[65017]
	33(7,26) - 34(6,29)					(0,1,0)	23066.90	(0.10)	[65017]
	28(3,25) - 29(2,28)					(0,0,0)	23144.80	(0.10)	[65017]
	28(3,25) - 29(2,28)					(0,0,0)	23146.90	(0.10)	[65017]
	27(2,61) - 28(5,24)					(0,0,0)	23245.40	(0.10)	[64018]
	12(3, 9) - 13(2,12)					(0,0,0)	23489.70	(0.10)	[64018]
	31(5,27) - 30(6,24)					(0,1,0)	23563.55	(0.10)	[65017]
	30(5,25) - 29(6,24)					(0,0,0)	24192.00	(0.10)	[64018]
	15(2,13) - 16(1,16)					(0,1,0)	24644.90	(0.10)	[65017]
	15(2,13) - 16(1,16)					(0,1,0)	24646.40	(0.10)	[65017]
	8(2, 6) - 9(1, 9)		17/2		19/2	(0,0,0)	25160.00	(0.10)	[65017]
	8(2, 6) - 9(1, 9)		19/2		21/2	(0,0,0)	25160.30	(0.10)	[65017]
	8(2, 6) - 9(1, 9)		15/2		17/2	(0,0,0)	25160.30	(0.10)	[65017]
	8(2, 6) - 9(1, 9)		13/2		15/2	(0,0,0)	25161.00	(0.10)	[65017]
	8(2, 6) - 9(1, 9)		21/2		23/2	(0,0,0)	25161.60	(0.10)	[65017]
	8(2, 6) - 9(1, 9)		11/2		13/2	(0,0,0)	25162.05	(0.10)	[65017]
	25(4,21) - 24(5,20)					(0,1,0)	25315.30	(0.10)	[65017]
	5(2, 4) - 6(1, 5)		5/2		7/2	(0,0,0)	25541.40	(0.10)	[65017]
	5(2, 4) - 6(1, 5)		15/2		17/2	(0,0,0)	25541.65	(0.10)	[65017]
	5(2, 4) - 6(1, 5)		7/2		9/2	(0,0,0)	25542.15	(0.10)	[65017]
	5(2, 4) - 6(1, 5)		9/2		11/2	(0,0,0)	25542.60	(0.10)	[65017]
	5(2, 4) - 6(1, 5)		13/2		15/2	(0,0,0)	25542.60	(0.10)	[65017]
	5(2, 4) - 6(1, 5)		11/2		13/2	(0,0,0)	25542.85	(0.10)	[65017]
	17(2,16) - 16(3,13)					(0,0,0)	25560.20	(0.10)	[65017]
	17(2,16) - 16(3,13)					(0,0,0)	25560.70	(0.10)	[65017]
	17(2,16) - 16(3,13)					(0,0,0)	25561.00	(0.10)	[65017]
	19(3,16) - 18(4,15)					(0,0,0)	26257.90	(0.10)	[64018]
	19(3,16) - 18(4,15)					(0,0,0)	26258.50	(0.10)	[64018]
	26(4,23) - 25(5,20)					(0,1,0)	26394.80	(0.10)	[65017]
	4(0, 4) - 3(1, 3)					(0,1,0)	26412.70	(0.10)	[65017]
	4(0, 4) - 1(3, 1)					(0,1,0)	26413.60	(0.10)	[65017]
	32(7,26) - 33(6,27)					(0,0,0)	26584.10	(0.10)	[64018]
	17(4,13) - 18(3,16)					(0,1,0)	27247.70	(0.10)	[65017]
	41(7,35) - 40(8,32)					(0,0,0)	27359.30	(0.10)	[64018]
	4(0, 4) - 3(1, 3)					(0,0,0)	27560.40	(0.10)	[65017]
	4(0, 4) - 3(1, 3)					(0,0,0)	27561.30	(0.10)	[65017]
	4(0, 4) - 3(1, 3)					(0,0,0)	27561.70	(0.10)	[65017]
	16(2,14) - 17(1,17)					(0,0,0)	27639.80	(0.10)	[65017]
	16(2,14) - 17(1,17)					(0,0,0)	27640.00	(0.10)	[65017]
	16(2,14) - 17(1,17)					(0,0,0)	27640.50	(0.10)	[65017]
	16(2,14) - 17(1,17)					(0,0,0)	27641.10	(0.10)	[65017]
	18(2,17) - 17(3,14)					(0,1,0)	27986.60	(0.10)	[65017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{17}O$	18(2,17) - 17(3,14)					(0,1,0)	27987.40	(0.10)	[65017]
	32(7,25) - 33(6,28)					(0,0,0)	28163.20	(0.10)	[64018]
	5(2, 4) - 6(1, 5)					(0,1,0)	28877.60	(0.10)	[65017]
	5(2, 4) - 6(1, 5)					(0,1,0)	28878.70	(0.10)	[65017]
	41(7,34) - 40(8,33)					(0,0,0)	29011.55	(0.10)	[64018]
	8(2, 6) - 9(1, 9)					(0,1,0)	29121.90	(0.10)	[65017]
	12(3, 9) - 13(2,12)					(0,1,0)	29387.30	(0.10)	[65017]
	16(4,13) - 17(3,14)					(0,1,0)	29947.80	(0.10)	[65017]
	22(5,17) - 23(4,20)					(0,1,0)	30184.90	(0.10)	[65017]
	42(7,36) - 41(8,33)					(0,1,0)	30559.20	(0.10)	[65017]
	25(2,24) - 24(3,21)					(0,0,0)	30644.70	(0.10)	[64018]
	25(2,24) - 24(3,21)					(0,0,0)	30645.80	(0.10)	[64018]
	25(2,24) - 24(3,21)					(0,0,0)	30646.50	(0.10)	[64018]
	38(8,30) - 39(7,33)					(0,1,0)	30749.80	(0.10)	[65017]
	21(3,19) - 20(4,16)					(0,0,0)	31066.20	(0.10)	[64018]
	24(2,23) - 23(3,20)					(0,1,0)	32053.80	(0.10)	[65017]
	21(5,17) - 22(4,18)					(0,0,0)	32082.50	(0.10)	[64018]
	27(6,22) - 28(5,23)					(0,1,0)	32128.10	(0.10)	[65017]
	36(6,31) - 35(7,28)					(0,0,0)	32578.80	(0.10)	[64018]
	42(7,35) - 41(8,34)					(0,1,0)	32712.40	(0.10)	[65017]
	37(8,30) - 38(7,31)					(0,0,0)	33055.00	(0.10)	[64018]
	10(3, 8) - 11(2, 9)					(0,0,0)	33400.00	(0.10)	[65017]
	10(3, 8) - 11(2, 9)					(0,0,0)	33400.90	(0.10)	[65017]
	37(8,29) - 38(7,32)					(0,0,0)	33652.20	(0.10)	[64018]
	31(5,26) - 30(6,25)					(0,1,0)	33734.70	(0.10)	[65017]
	18(2,17) - 17(3,14)					(0,0,0)	33955.70	(0.10)	[64018]
	18(2,17) - 17(3,14)					(0,0,0)	33956.50	(0.10)	[64018]
	7(2, 5) - 8(1, 8)		15/2		17/2	(0,0,0)	34241.00	(0.10)	[65017]
	7(2, 5) - 8(1, 8)		17/2		19/2	(0,0,0)	34241.30	(0.10)	[65017]
	7(2, 5) - 8(1, 8)		13/2		15/2	(0,0,0)	34241.30	(0.10)	[65017]
	7(2, 5) - 8(1, 8)		11/2		13/2	(0,0,0)	34241.95	(0.10)	[65017]
	7(2, 5) - 8(1, 8)		19/2		21/2	(0,0,0)	34242.50	(0.10)	[65017]
	7(2, 5) - 8(1, 8)		9/2		11/2	(0,0,0)	34242.90	(0.10)	[65017]
	19(2,18) - 18(3,15)					(0,1,0)	34413.40	(0.10)	[65017]
	14(2,12) - 13(3,11)					(0,1,0)	35251.90	(0.10)	[65017]
	14(2,12) - 13(3,11)					(0,1,0)	35252.70	(0.10)	[65017]
	27(6,21) - 28(5,24)					(0,1,0)	36024.00	(0.10)	[65017]
	25(4,21) - 24(5,20)					(0,0,0)	36033.60	(0.10)	[64018]
	31(5,27) - 30(6,24)					(0,0,0)	36312.40	(0.10)	[64018]
	26(4,23) - 25(5,20)					(0,0,0)	36784.75	(0.10)	[64018]
	36(6,30) - 35(7,29)					(0,0,0)	36843.60	(0.10)	[64018]
	16(4,12) - 17(3,15)					(0,0,0)	36925.40	(0.10)	[64018]
	17(2,15) - 18(1,18)		35/2		37/2	(0,0,0)	37937.90	(0.10)	[65017]
	17(2,15) - 18(1,18)		37/2		39/2	(0,0,0)	37938.20	(0.10)	[65017]
	17(2,15) - 18(1,18)		33/2		35/2	(0,0,0)	37938.70	(0.10)	[65017]
	17(2,15) - 18(1,18)		31/2		33/2	(0,0,0)	37939.20	(0.10)	[65017]
	17(2,15) - 18(1,18)		39/2		41/2	(0,0,0)	37940.50	(0.10)	[65017]
	17(2,15) - 18(1,18)		29/2		31/2	(0,0,0)	37940.85	(0.10)	[65017]
	7(2, 5) - 8(1, 8)					(0,1,0)	38105.30	(0.10)	[65017]
	22(3,20) - 21(4,17)					(0,1,0)	38198.20	(0.10)	[65017]
	11(3, 8) - 12(2,11)					(0,0,0)	38638.10	(0.10)	[64018]
	20(2,19) - 19(3,16)					(0,1,0)	38707.30	(0.10)	[65017]
	21(5,16) - 22(4,19)					(0,0,0)	38943.00	(0.10)	[64018]
	42(9,34) - 43(8,35)					(0,0,0)	39098.30	(0.10)	[65017]
	42(9,33) - 43(8,36)					(0,0,0)	39317.20	(0.10)	[65017]
	26(6,21) - 27(5,22)					(0,0,0)	40260.40	(0.10)	[64018]
	19(2,18) - 18(3,15)					(0,0,0)	40403.30	(0.10)	[64018]
	14(2,12) - 13(3,11)					(0,0,0)	40985.25	(0.10)	[65017]
	14(2,12) - 13(3,11)					(0,0,0)	40986.20	(0.10)	[65017]
	29(3,26) - 30(2,29)					(0,0,0)	41642.70	(0.10)	[65017]
	32(7,26) - 33(6,27)					(0,1,0)	41711.60	(0.10)	[65017]
	21(5,17) - 22(4,18)					(0,1,0)	42671.30	(0.10)	[65017]
	9(1, 8) - 8(2, 7)					(0,1,0)	43027.70	(0.10)	[65017]
	9(1, 8) - 8(2, 7)					(0,1,0)	43028.80	(0.10)	[65017]
	26(6,20) - 27(5,23)					(0,0,0)	43092.00	(0.10)	[64018]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{32}S^{17}O$	32(5,28) - 31(6,25)					(0,1,0)	43305.50	(0.10)	[65017]
	37(6,31) - 36(7,30)					(0,1,0)	43470.30	(0.10)	[65017]
	20(3,17) - 19(4,16)					(0,1,0)	43509.70	(0.10)	[65017]
	15(4,12) - 16(3,13)					(0,0,0)	44237.60	(0.10)	[65017]
	11(3, 8) - 12(2,11)					(0,1,0)	44522.10	(0.10)	[65017]
	27(4,24) - 26(5,21)					(0,1,0)	44611.0	(0.10)	[65017]
	20(2,19) - 19(3,16)					(0,0,0)	44727.70	(0.10)	[65017]
	20(2,19) - 19(3,16)					(0,0,0)	44728.90	(0.10)	[65017]
	6(2, 4) - 7(1, 7)		13/2		15/2	(0,0,0)	44951.80	(0.10)	[65017]
	6(2, 4) - 7(1, 7)		15/2		17/2	(0,0,0)	44952.05	(0.10)	[65017]
	6(2, 4) - 7(1, 7)		11/2		13/2	(0,0,0)	44952.05	(0.10)	[65017]
	6(2, 4) - 7(1, 7)		9/2		11/2	(0,0,0)	44952.75	(0.10)	[65017]
	6(2, 4) - 7(1, 7)		17/2		19/2	(0,0,0)	44953.20	(0.10)	[65017]
	6(2, 4) - 7(1, 7)		7/2		9/2	(0,0,0)	44953.65	(0.10)	[65017]
	16(4,12) - 17(3,15)					(0,1,0)	45070.50	(0.10)	[65017]
	9(1, 8) - 8(2, 7)					(0,0,0)	46194.30	(0.10)	[65017]
	9(1, 8) - 8(2, 7)					(0,0,0)	46194.90	(0.10)	[65017]
	9(1, 8) - 8(2, 7)					(0,0,0)	46195.30	(0.10)	[65017]
	22(3,20) - 21(4,17)					(0,0,0)	46230.90	(0.10)	[65017]
	22(2,21) - 21(3,18)					(0,0,0)	46436.10	(0.10)	[65017]
	22(2,21) - 21(3,18)					(0,0,0)	46437.40	(0.10)	[65017]
	31(5,26) - 30(6,25)					(0,0,0)	46765.50	(0.10)	[65017]
	21(2,20) - 20(3,17)					(0,0,0)	46775.80	(0.10)	[65017]
	21(2,20) - 20(3,17)					(0,0,0)	46777.00	(0.10)	[65017]
	31(7,25) - 32(6,26)					(0,0,0)	47131.10	(0.10)	[65017]
	5(0, 5) - 4(1, 4)					(0,1,0)	47339.80	(0.10)	[65017]
	5(0, 5) - 4(1, 4)					(0,1,0)	47340.50	(0.10)	[65017]
	31(7,24) - 32(6,27)					(0,0,0)	48238.00	(0.10)	[65017]
	4(2, 3) - 5(1, 4)					(0,0,0)	48264.60	(0.10)	[65017]
	4(2, 3) - 5(1, 4)					(0,0,0)	48265.60	(0.10)	[65017]
	5(0, 5) - 4(1, 4)					(0,0,0)	48467.00	(0.10)	[65017]
	5(0, 5) - 4(1, 4)					(0,0,0)	48467.85	(0.10)	[65017]
	6(2, 4) - 7(1, 7)					(0,1,0)	48729.60	(0.10)	[65017]
	21(5,16) - 22(4,19)					(0,1,0)	49407.80	(0.10)	[65017]
	1(1, 0) - 1(0, 1)					(0,0,0)	51325.55	(0.10)	[65017]
	1(1, 0) - 1(0, 1)					(0,0,0)	51326.35	(0.10)	[65017]
	4(2, 3) - 5(1, 4)					(0,1,0)	51640.60	(0.10)	[65017]
	20(3,17) - 19(4,16)					(0,0,0)	51824.50	(0.10)	[65017]
	20(3,17) - 19(4,16)					(0,0,0)	51825.10	(0.10)	[65017]
	15(4,12) - 16(3,13)					(0,1,0)	52473.50	(0.10)	[65017]
	1(1, 1) - 0(0, 0)					(0,0,0)	68435.93	(0.10)	[65017]
	1(1, 1) - 0(0, 0)					(0,0,0)	68437.65	(0.10)	[65017]
$^{17}O^{32}S^{17}O$	28(6,23) - 29(5,24)					(0,0,0)	8009.1	(0.2)	[68037]
	23(5,18) - 24(4,21)					(0,0,0)	8146.1	(0.2)	[68037]
	20(3,18) - 19(4,15)					(0,0,0)	9331.0	(0.2)	[68037]
	13(2,11) - 12(3,10)					(0,0,0)	9763.0	(0.2)	[68037]
	25(4,22) - 24(5,19)					(0,0,0)	10253.9	(0.2)	[65017]
	16(2,15) - 15(3,12)					(0,0,0)	12142.7	(0.2)	[68037]
	13(3,10) - 14(2,13)					(0,0,0)	12431.7	(0.2)	[68037]
	28(6,22) - 29(5,25)					(0,0,0)	12781.25	(0.20)	[65017]
	30(5,25) - 29(6,24)					(0,0,0)	13088.1	(0.2)	[65017]
	17(4,14) - 18(3,15)					(0,1,0)	13196.4	(0.5)	[68037]
	41(7,35) - 40(8,32)					(0,0,0)	13236.9	(0.2)	[65017]
	1(1, 1) - 2(0, 2)					(0,0,0)	13240.4	(0.2)	[65017]
	1(1, 1) - 2(0, 2)					(0,0,0)	13241.4	(0.2)	[65017]
	1(1, 1) - 2(0, 2)					(0,0,0)	13242.4	(0.2)	[65017]
	1(1, 1) - 2(0, 2)					(0,0,0)	13243.4	(0.2)	[65017]
	10(2, 8) - 11(1,11)					(0,1,0)	13411.5	(0.5)	[68037]
	10(2, 8) - 11(1,11)					(0,0,0)	13412.6	(0.2)	[65017]
	10(2, 8) - 11(1,11)					(0,0,0)	13413.1	(0.2)	[65017]
	10(2, 8) - 11(1,11)					(0,0,0)	13414.3	(0.2)	[65017]
	10(2, 8) - 11(1,11)					(0,0,0)	13415.0	(0.2)	[65017]
	10(2, 8) - 11(1,11)					(0,0,0)	13416.4	(0.2)	[65017]
	11(3, 9) - 12(2,10)					(0,0,0)	14143.3	(0.2)	[65017]
	11(3, 9) - 12(2,10)					(0,0,0)	14143.8	(0.2)	[65017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{17}O^{32}S^{17}O$	11(3, 9) - 12(2,10)					(0,0,0)	14144.5	(0.2)	[65017]
	18(4,14) - 19(3,17)					(0,1,0)	15013.6	(0.5)	[68037]
	8(1, 7) - 7(2, 6)					(0,1,0)	15188.1	(0.5)	[68037]
	33(7,27) - 34(6,28)					(0,0,0)	17311.0	(0.2)	[65017]
	13(3,10) - 14(2,13)					(0,1,0)	18166.2	(0.5)	[68037]
	23(5,18) - 24(4,21)					(0,1,0)	18277.3	(0.5)	[68037]
	22(5,18) - 23(4,19)					(0,0,0)	18287.1	(0.2)	[68037]
	19(3,16) - 18(4,15)					(0,0,0)	18306.0	(0.2)	[68037]
	26(4,23) - 25(5,20)					(0,1,0)	18315.7	(0.5)	[68037]
	8(1, 7) - 7(2, 6)					(0,0,0)	18324.9	(0.2)	[65017]
	8(1, 7) - 7(2, 6)					(0,0,0)	18325.7	(0.2)	[65017]
	9(2, 7) - 10(1,10)					(0,0,0)	18841.8	(0.2)	[68037]
	9(2, 7) - 10(1,10)					(0,0,0)	18843.3	(0.2)	[68037]
	9(2, 7) - 10(1,10)					(0,0,0)	18845.2	(0.2)	[68037]
	33(7,26) - 34(6,29)					(0,0,0)	19151.95	(0.20)	[68037]
	36(6,31) - 35(7,28)					(0,0,0)	20162.6	(0.2)	[68037]
	28(6,23) - 29(5,24)					(0,1,0)	20524.8	(0.5)	[68037]
	17(2,16) - 16(3,13)					(0,0,0)	22376.3	(0.2)	[65017]
	36(6,30) - 35(7,29)					(0,0,0)	23699.25	(0.20)	[65017]
	17(4,13) - 18(3,16)					(0,0,0)	24117.2	(0.2)	[68037]
	4(0, 4) - 3(1, 3)					(0,1,0)	24787.4	(0.5)	[68037]
	21(3,19) - 20(4,16)					(0,0,0)	25143.1	(0.2)	[65017]
	28(6,22) - 29(5,25)					(0,1,0)	25169.4	(0.5)	[68037]
	18(2,17) - 17(3,14)					(0,1,0)	25185.5	(0.5)	[68037]
	16(2,14) - 17(1,17)					(0,0,0)	25363.7	(0.2)	[65017]
	38(8,31) - 39(7,32)					(0,0,0)	25548.0	(0.2)	[68037]
	31(5,27) - 30(6,24)					(0,0,0)	25780.05	(0.20)	[65017]
	4(0, 4) - 3(1, 3)					(0,0,0)	25899.8	(0.2)	[65017]
	4(0, 4) - 3(1, 3)					(0,0,0)	25900.3	(0.2)	[65017]
	4(0, 4) - 3(1, 3)					(0,0,0)	25900.9	(0.2)	[65017]
	25(4,21) - 24(5,20)					(0,0,0)	25960.2	(0.2)	[68037]
	8(2, 6) - 9(1, 9)					(0,0,0)	26149.4	(0.2)	[65017]
	8(2, 6) - 9(1, 9)					(0,0,0)	26149.8	(0.2)	[65017]
	8(2, 6) - 9(1, 9)					(0,0,0)	26150.1	(0.2)	[65017]
	8(2, 6) - 9(1, 9)					(0,0,0)	26150.6	(0.2)	[65017]
	8(2, 6) - 9(1, 9)					(0,0,0)	26151.4	(0.2)	[65017]
	8(2, 6) - 9(1, 9)					(0,0,0)	26152.7	(0.2)	[65017]
	38(8,30) - 39(7,33)					(0,0,0)	26228.1	(0.2)	[65017]
	12(3, 9) - 13(2,12)					(0,0,0)	26401.95	(0.20)	[65017]
	22(5,17) - 23(4,20)					(0,0,0)	26720.9	(0.2)	[65017]
	5(2, 4) - 6(1, 5)					(0,0,0)	27465.2	(0.2)	[65017]
	5(2, 4) - 6(1, 5)					(0,0,0)	27466.4	(0.2)	[65017]
	16(4,13) - 17(3,14)					(0,0,0)	27715.6	(0.2)	[68037]
	16(4,13) - 17(3,14)					(0,0,0)	27715.8	(0.2)	[68037]
	26(4,23) - 25(5,20)					(0,0,0)	28403.8	(0.2)	[68037]
	22(5,18) - 23(4,19)					(0,1,0)	28572.0	(0.5)	[68037]
	27(6,22) - 28(5,23)					(0,0,0)	28650.6	(0.2)	[65017]
	14(2,12) - 13(3,11)					(0,1,0)	29021.4	(0.5)	[68037]
	37(6,31) - 36(7,30)					(0,1,0)	29943.6	(0.5)	[68037]
	8(2, 6) - 9(1, 9)					(0,1,0)	29985.1	(0.5)	[68037]
	8(2, 6) - 9(1, 9)					(0,1,0)	29987.0	(0.5)	[68037]
	5(2, 4) - 6(1, 5)					(0,1,0)	30702.3	(0.5)	[68037]
	16(2,17) - 17(3,14)					(0,0,0)	30893.9	(0.2)	[68037]
	16(2,17) - 17(3,14)					(0,0,0)	30983.2	(0.2)	[68037]
	19(2,18) - 18(3,15)					(0,1,0)	31956.0	(0.5)	[68037]
	33(7,27) - 34(6,28)					(0,1,0)	31990.4	(0.5)	[68037]
	17(4,13) - 18(3,16)					(0,1,0)	32010.7	(0.5)	[68037]
	27(6,21) - 28(5,24)					(0,0,0)	32067.2	(0.2)	[68037]
	12(3, 9) - 13(2,12)					(0,1,0)	32122.35	(0.50)	[68037]
	22(3,20) - 21(4,17)					(0,1,0)	32350.6	(0.5)	[68037]
	32(5,28) - 31(6,25)					(0,1,0)	32626.3	(0.5)	[68037]
	42(7,36) - 41(8,33)					(0,0,0)	33124.6	(0.2)	[68037]
	43(9,35) - 44(8,36)					(0,0,0)	33283.3	(0.2)	[65017]
	43(9,34) - 44(8,37)					(0,0,0)	33526.6	(0.2)	[65017]
	33(7,26) - 34(6,29)					(0,1,0)	33763.9	(0.5)	[68037]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{17}O^{32}S^{17}O$	14(2,12) - 13(3,11)					(0,0,0)	34581.0	(0.2)	[65017]
	14(2,12) - 13(3,11)					(0,0,0)	34581.8	(0.2)	[65017]
	31(5,26) - 30(6,25)					(0,0,0)	34720.85	(0.20)	[68037]
	20(3,17) - 19(4,16)					(0,1,0)	34765.5	(0.5)	[68037]
	42(7,35) - 41(8,34)					(0,0,0)	34956.1	(0.2)	[65017]
	7(2, 5) - 8(1, 8)					(0,0,0)	35172.8	(0.2)	[68037]
	7(2, 5) - 8(1, 8)					(0,0,0)	35174.1	(0.2)	[68037]
	16(4,13) - 17(3,14)					(0,1,0)	35713.6	(0.5)	[68037]
	20(2,19) - 19(3,16)					(0,1,0)	36730.3	(0.5)	[68037]
	22(5,17) - 23(4,20)					(0,1,0)	36863.5	(0.5)	[68037]
	10(3, 8) - 11(2, 9)					(0,0,0)	37128.3	(0.2)	[68037]
	32(7,26) - 33(6,27)					(0,0,0)	37382.1	(0.2)	[68037]
	19(2,18) - 18(3,15)					(0,0,0)	37776.9	(0.2)	[65017]
	19(2,18) - 18(3,15)					(0,0,0)	37777.8	(0.2)	[68037]
	32(7,25) - 33(6,28)					(0,0,0)	38687.5	(0.2)	[68037]
	9(1, 8) - 8(2, 7)					(0,1,0)	38951.2	(0.5)	[68037]
	21(5,17) - 22(4,18)					(0,0,0)	39385.2	(0.2)	[68037]
	37(6,32) - 36(7,29)					(0,0,0)	39912.4	(0.2)	[68037]
	22(3,20) - 21(4,17)					(0,0,0)	40158.6	(0.2)	[68037]
	27(6,22) - 28(5,23)					(0,1,0)	41133.4	(0.5)	[68037]
	11(3, 8) - 12(2,11)					(0,0,0)	41267.0	(0.2)	[68037]
	16(4,12) - 17(3,15)					(0,0,0)	41510.8	(0.2)	[65017]
	9(1, 8) - 8(2, 7)					(0,0,0)	42025.8	(0.2)	[68037]
	9(1, 8) - 8(2, 7)					(0,0,0)	42026.7	(0.2)	[68037]
	20(3,17) - 19(4,16)					(0,0,0)	42812.6	(0.2)	[65017]
	23(2,22) - 22(3,19)					(0,0,0)	43732.7	(0.2)	[65017]
	27(6,21) - 28(5,24)					(0,1,0)	44457.7	(0.5)	[68037]
	32(5,28) - 31(6,25)					(0,0,0)	44975.3	(0.2)	[68037]
	5(0, 5) - 4(1, 4)					(0,1,0)	45093.0	(0.5)	[68037]
	5(0, 5) - 4(1, 4)					(0,1,0)	45094.6	(0.5)	[68037]
	5(0, 5) - 4(1, 4)					(0,1,0)	45095.0	(0.5)	[68037]
	21(2,20) - 20(3,17)					(0,0,0)	45245.8	(0.2)	[65017]
	21(2,20) - 20(3,17)					(0,0,0)	45247.2	(0.2)	[65017]
	21(2,20) - 20(3,17)					(0,0,0)	45248.2	(0.2)	[65017]
	37(8,30) - 38(7,31)					(0,0,0)	45321.2	(0.2)	[65017]
	21(5,16) - 22(4,19)					(0,0,0)	45407.9	(0.2)	[68037]
	22(2,21) - 21(3,18)					(0,0,0)	45655.7	(0.2)	[68037]
	22(2,21) - 21(3,18)					(0,0,0)	45657.2	(0.2)	[68037]
	22(2,21) - 21(3,18)					(0,0,0)	45658.4	(0.2)	[68037]
	6(2, 4) - 7(1, 7)					(0,0,0)	45735.25	(0.20)	[65017]
	6(2, 4) - 7(1, 7)					(0,0,0)	45736.2	(0.2)	[65017]
	6(2, 4) - 7(1, 7)					(0,0,0)	45737.9	(0.2)	[65017]
	37(8,29) - 38(7,32)					(0,0,0)	45800.8	(0.2)	[68037]
	5(0, 5) - 4(1, 4)					(0,0,0)	46186.8	(0.2)	[68037]
	5(0, 5) - 4(1, 4)					(0,0,0)	46187.3	(0.2)	[68037]
	5(0, 5) - 4(1, 4)					(0,0,0)	46187.8	(0.2)	[68037]
	27(4,24) - 26(5,21)					(0,0,0)	46214.55	(0.20)	[68037]
	18(2,16) - 19(1,19)					(0,0,0)	46309.0	(0.2)	[68037]
	18(2,16) - 19(1,19)					(0,0,0)	46310.8	(0.2)	[65017]
	23(3,21) - 22(4,18)					(0,1,0)	46447.2	(0.5)	[68037]
	11(3, 8) - 12(2,11)					(0,1,0)	46973.3	(0.5)	[68037]
	26(4,22) - 25(5,21)					(0,0,0)	49324.35	(0.20)	[68037]
	15(4,12) - 16(3,13)					(0,0,0)	49402.8	(0.2)	[68037]
	16(4,12) - 17(3,15)					(0,1,0)	49411.4	(0.5)	[68037]
	4(2, 3) - 5(1, 4)					(0,0,0)	49480.2	(0.2)	[68037]
	4(2, 3) - 5(1, 4)					(0,0,0)	49481.9	(0.2)	[68037]
	21(5,17) - 22(4,18)					(0,1,0)	49638.1	(0.5)	[68037]
	1(1, 0) - 1(0, 1)					(0,0,0)	50656.8	(0.2)	[68037]
	1(1, 0) - 1(0, 1)					(0,0,0)	50657.9	(0.2)	[68037]
	26(6,20) - 27(5,23)					(0,0,0)	51317.2	(0.2)	[65017]
	1(1, 0) - 1(0, 1)					(0,1,0)	51779.25	(0.50)	[68037]
	32(7,26) - 33(6,27)					(0,1,0)	52035.8	(0.5)	[68037]
	2(1, 1) - 2(0, 2)					(0,0,0)	52078.5	(0.2)	[68037]
	43(7,37) - 42(8,34)					(0,0,0)	53108.5	(0.2)	[68037]
	2(1, 1) - 2(0, 2)					(0,1,0)	53216.9	(0.5)	[68037]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{17}O^{32}S^{17}O$	28(4,25) - 27(5,22)					(0,1,0)	53572.4	(0.5)	[68037]
	23(3,21) - 22(4,18)					(0,0,0)	54216.5	(0.2)	[68037]
	3(1, 2) - 3(0, 3)					(0,0,0)	54263.4	(0.2)	[68037]
	3(1, 2) - 3(0, 3)					(0,0,0)	54264.3	(0.2)	[68037]
	3(1, 2) - 3(0, 3)					(0,0,0)	54265.0	(0.2)	[68037]
	3(1, 2) - 3(0, 3)					(0,1,0)	55428.0	(0.5)	[68037]
	32(5,27) - 31(6,25)					(0,0,0)	56980.05	(0.20)	[68037]
	31(7,25) - 32(6,26)					(0,0,0)	57215.1	(0.2)	[68037]
	4(1, 3) - 4(0, 4)					(0,0,0)	57277.1	(0.2)	[68037]
	5(2, 3) - 6(1, 6)					(0,0,0)	57658.25	(0.20)	[68037]
	5(2, 3) - 6(1, 6)					(0,0,0)	57659.2	(0.2)	[68037]
	31(7,24) - 32(6,27)					(0,0,0)	58129.6	(0.2)	[68037]
	15(4,11) - 16(3,14)					(0,0,0)	59214.7	(0.2)	[68037]
$^{16}O^{34}S^{17}O$	18(3,15) - 17(4,14)					(0,1,0)	7893.7	(0.2)	[65017]
	17(4,13) - 18(3,16)					(0,0,0)	7932.9	(0.2)	[65017]
	11(2, 9) - 12(1,12)					(0,0,0)	7950.5	(0.2)	[65017]
	11(2, 9) - 12(1,12)					(0,0,0)	7952.5	(0.2)	[65017]
	16(4,13) - 17(3,14)					(0,0,0)	8018.35	(0.20)	[65017]
	42(9,34) - 43(8,35)					(0,0,0)	8741.0	(0.2)	[65017]
	3(0, 3) - 2(1, 2)					(0,0,0)	8810.8	(0.2)	[65017]
	3(0, 3) - 2(1, 2)					(0,0,0)	8811.6	(0.2)	[65017]
	19(3,17) - 18(4,14)					(0,0,0)	9087.3	(0.2)	[65017]
	15(2,14) - 14(3,11)					(0,0,0)	9887.35	(0.20)	[65017]
	15(2,14) - 14(3,11)					(0,0,0)	9889.4	(0.2)	[65017]
	13(2,11) - 14(1,14)					(0,0,0)	10113.3	(0.2)	[65017]
	10(2, 8) - 11(1,11)					(0,0,0)	10361.0	(0.2)	[65017]
	1(1, 1) - 2(0, 2)					(0,0,0)	11068.05	(0.20)	[65017]
	39(7,33) - 38(8,30)					(0,0,0)	13376.9	(0.2)	[65017]
	24(4,21) - 23(5,18)					(0,0,0)	14458.65	(0.20)	[65017]
	22(5,17) - 23(4,20)					(0,1,0)	14583.2	(0.2)	[65017]
	39(7,32) - 38(8,31)					(0,0,0)	14615.0	(0.2)	[65017]
	14(2,12) - 15(1,15)					(0,0,0)	14731.2	(0.2)	[65017]
	14(2,12) - 15(1,15)					(0,0,0)	14732.5	(0.2)	[65017]
	14(2,12) - 15(1,15)					(0,0,0)	14733.5	(0.2)	[65017]
	9(2, 7) - 10(1,10)		19/2		21/2	(0,0,0)	14991.9	(0.1)	[65017]
	9(2, 7) - 10(1,10)		21/2		23/2	(0,0,0)	14992.2	(0.1)	[65017]
	9(2, 7) - 10(1,10)		17/2		19/2	(0,0,0)	14992.2	(0.1)	[65017]
	9(2, 7) - 10(1,10)		15/2		17/2	(0,0,0)	14992.9	(0.1)	[65017]
	9(2, 7) - 10(1,10)		23/2		25/2	(0,0,0)	14993.6	(0.1)	[65017]
	9(2, 7) - 10(1,10)		13/2		15/2	(0,0,0)	14994.1	(0.1)	[65017]
	34(6,29) - 33(7,26)					(0,0,0)	15110.4	(0.2)	[65017]
	16(2,15) - 15(3,12)					(0,1,0)	15127.6	(0.2)	[65017]
	21(5,17) - 22(4,18)					(0,0,0)	15183.1	(0.2)	[65017]
	17(4,13) - 18(3,16)					(0,1,0)	15810.1	(0.2)	[65017]
	29(5,25) - 28(6,22)					(0,0,0)	15849.8	(0.2)	[65017]
	18(3,15) - 17(4,14)					(0,0,0)	15951.0	(0.2)	[65017]
	18(3,15) - 17(4,14)					(0,0,0)	15951.6	(0.2)	[65017]
	16(4,13) - 17(3,14)					(0,1,0)	16052.5	(0.2)	[65017]
	12(3, 9) - 13(2,12)					(0,0,0)	16277.9	(0.2)	[65017]
	27(6,21) - 28(5,24)					(0,1,0)	16395.0	(0.2)	[65017]
	20(3,18) - 19(4,15)					(0,1,0)	17598.6	(0.2)	[65017]
	34(6,28) - 33(7,27)					(0,0,0)	18168.3	(0.2)	[65017]
	27(3,24) - 28(2,27)					(0,0,0)	18598.9	(0.2)	[65017]
	32(7,25) - 33(6,28)					(0,1,0)	19757.1	(0.2)	[65017]
	13(2,11) - 12(3,10)					(0,1,0)	19881.6	(0.2)	[65017]
	24(4,20) - 23(5,19)					(0,1,0)	20058.7	(0.2)	[65017]
	5(2, 4) - 6(1, 5)		5/2		7/2	(0,0,0)	20102.3	(0.1)	[65017]
	5(2, 4) - 6(1, 5)		7/2		9/2	(0,0,0)	20102.55	(0.10)	[65017]
	5(2, 4) - 6(1, 5)		7/2		9/2	(0,0,0)	20102.95	(0.10)	[65017]
	5(2, 4) - 6(1, 5)		9/2		11/2	(0,0,0)	20103.47	(0.10)	[65017]
	5(2, 4) - 6(1, 5)		13/2		15/2	(0,0,0)	20103.47	(0.10)	[65017]
	5(2, 4) - 6(1, 5)		11/2		13/2	(0,0,0)	20103.67	(0.10)	[65017]
	26(6,21) - 27(5,22)					(0,0,0)	20175.3	(0.2)	[65017]
	16(2,15) - 15(3,12)					(0,0,0)	20869.7	(0.2)	[65017]
	15(2,13) - 16(1,16)		31/2		33/2	(0,0,0)	21667.5	(0.1)	[65017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{34}S^{17}O$	15(2,13) - 16(1,16)		33/2		35/2	(0,0,0)	21667.8	(0.1)	[65017]
	15(2,13) - 16(1,16)		29/2		31/2	(0,0,0)	21668.2	(0.1)	[65017]
	15(2,13) - 16(1,16)		27/2		29/2	(0,0,0)	21668.8	(0.1)	[65017]
	15(2,13) - 16(1,16)		35/2		37/2	(0,0,0)	21669.9	(0.1)	[65017]
	15(2,13) - 16(1,16)		25/2		27/2	(0,0,0)	21670.35	(0.10)	[65017]
	8(2, 6) - 9(1, 9)		17/2		19/2	(0,0,0)	21707.55	(0.10)	[65017]
	8(2, 6) - 9(1, 9)		19/2		21/2	(0,0,0)	21707.9	(0.1)	[65017]
	8(2, 6) - 9(1, 9)		15/2		17/2	(0,0,0)	21707.9	(0.1)	[65017]
	8(2, 6) - 9(1, 9)		13/2		15/2	(0,0,0)	21708.6	(0.1)	[65017]
	8(2, 6) - 9(1, 9)		21/2		23/2	(0,0,0)	21709.2	(0.1)	[65017]
	8(2, 6) - 9(1, 9)		11/2		13/2	(0,0,0)	21709.65	(0.10)	[65017]
	12(3, 9) - 13(2,12)					(0,1,0)	21992.0	(0.2)	[65017]
	37(8,30) - 38(7,31)					(0,1,0)	22956.0	(0.2)	[65017]
	25(4,22) - 24(5,19)					(0,1,0)	23007.2	(0.2)	[65017]
	29(5,24) - 28(6,23)					(0,0,0)	23077.3	(0.2)	[65017]
	30(5,26) - 29(6,23)					(0,1,0)	23283.3	(0.2)	[65017]
	5(2, 4) - 6(1, 5)					(0,1,0)	23332.4	(0.2)	[65017]
	5(2, 4) - 6(1, 5)					(0,1,0)	23333.5	(0.2)	[65017]
	21(5,16) - 22(4,19)					(0,0,0)	23553.4	(0.2)	[65017]
	25(2,24) - 24(3,21)					(0,0,0)	23629.1	(0.2)	[65017]
	25(2,24) - 24(3,21)					(0,0,0)	23630.2	(0.2)	[65017]
	25(2,24) - 24(3,21)					(0,0,0)	23631.0	(0.2)	[65017]
	31(7,25) - 32(6,26)					(0,0,0)	23753.8	(0.2)	[65017]
	10(3, 8) - 11(2, 9)					(0,0,0)	23778.4	(0.2)	[65017]
	10(3, 8) - 11(2, 9)					(0,0,0)	23778.9	(0.2)	[65017]
	37(8,29) - 38(7,32)					(0,1,0)	23789.2	(0.2)	[65017]
	26(6,20) - 27(5,23)					(0,0,0)	23849.2	(0.2)	[65017]
	8(1, 7) - 7(2, 6)					(0,1,0)	24177.8	(0.2)	[65017]
	8(1, 7) - 7(2, 6)					(0,1,0)	24178.8	(0.2)	[65017]
	17(2,16) - 16(3,13)					(0,1,0)	24409.8	(0.2)	[65017]
	31(7,24) - 32(6,27)					(0,0,0)	25280.6	(0.2)	[65017]
	20(3,18) - 19(4,15)					(0,0,0)	25426.7	(0.2)	[65017]
	13(2,11) - 12(3,10)					(0,0,0)	25481.1	(0.2)	[65017]
	13(2,11) - 12(3,10)					(0,0,0)	25482.2	(0.2)	[65017]
	21(5,17) - 22(4,18)					(0,1,0)	25488.1	(0.2)	[65017]
	16(4,12) - 17(3,15)					(0,0,0)	25491.6	(0.2)	[65017]
	36(8,29) - 37(7,30)					(0,0,0)	26591.75	(0.20)	[65017]
	36(8,28) - 37(7,31)					(0,0,0)	27202.4	(0.2)	[65017]
	8(1, 7) - 7(2, 6)					(0,0,0)	27303.6	(0.2)	[65017]
	8(1, 7) - 7(2, 6)					(0,0,0)	27304.7	(0.2)	[65017]
	4(0, 4) - 3(1, 3)					(0,1,0)	28138.4	(0.2)	[65017]
	4(0, 4) - 3(1, 3)					(0,0,0)	29252.05	(0.20)	[65017]
	4(0, 4) - 3(1, 3)					(0,0,0)	29252.9	(0.2)	[65017]
	41(9,32) - 42(8,35)					(0,0,0)	29289.8	(0.2)	[65017]
	17(2,16) - 16(3,13)					(0,0,0)	30160.9	(0.2)	[65017]
	17(2,16) - 16(3,13)					(0,0,0)	30161.6	(0.2)	[65017]
	7(2, 5) - 8(1, 8)					(0,0,0)	30336.2	(0.2)	[65017]
	7(2, 5) - 8(1, 8)					(0,0,0)	30337.1	(0.2)	[65017]
	7(2, 5) - 8(1, 8)					(0,0,0)	30337.6	(0.2)	[65017]
	24(4,20) - 23(5,19)					(0,0,0)	30461.0	(0.2)	[65017]
	16(2,14) - 17(1,17)					(0,0,0)	30847.4	(0.2)	[65017]
	16(2,14) - 17(1,17)					(0,0,0)	30848.2	(0.2)	[65017]
	15(4,12) - 16(3,13)					(0,0,0)	30989.5	(0.2)	[65017]
	12(3, 9) - 13(2,12)					(0,0,0)	31057.2	(0.2)	[65017]
	18(2,17) - 17(3,14)					(0,1,0)	31784.7	(0.2)	[65017]
	18(2,17) - 17(3,14)					(0,1,0)	31785.6	(0.2)	[65017]
	26(6,21) - 27(5,22)					(0,1,0)	32683.5	(0.2)	[65017]
	19(3,16) - 18(4,15)					(0,1,0)	32927.0	(0.2)	[65017]
	25(4,22) - 24(5,19)					(0,0,0)	33090.3	(0.2)	[65017]
	24(2,23) - 23(3,20)					(0,0,0)	33096.8	(0.2)	[65017]
	24(2,23) - 23(3,20)					(0,0,0)	33097.7	(0.2)	[65017]
	24(2,23) - 23(3,20)					(0,0,0)	33098.35	(0.20)	[65017]
	21(3,19) - 20(4,16)					(0,1,0)	33132.6	(0.2)	[65017]
	16(4,12) - 17(3,15)					(0,1,0)	33382.2	(0.2)	[65017]
	21(5,16) - 22(4,19)					(0,1,0)	33698.2	(0.2)	[65017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{34}S^{17}O$	40(7,34) - 39(8,31)					(0,0,0)	33837.1	(0.2)	[65017]
	7(2, 5) - 8(1, 8)					(0,1,0)	34092.8	(0.2)	[65017]
	35(6,30) - 34(7,27)					(0,0,0)	35419.2	(0.2)	[65017]
	40(7,33) - 39(8,32)					(0,0,0)	35571.8	(0.2)	[65017]
	30(5,26) - 29(6,23)					(0,0,0)	35655.2	(0.2)	[65017]
	26(6,20) - 27(5,23)					(0,1,0)	36247.7	(0.2)	[65017]
	11(3, 8) - 12(2,11)					(0,1,0)	36759.8	(0.2)	[65017]
	28(3,25) - 29(2,28)					(0,0,0)	36778.7	(0.2)	[65017]
	20(5,16) - 21(4,17)					(0,0,0)	36891.6	(0.2)	[65017]
	19(2,18) - 18(3,15)					(0,1,0)	37052.8	(0.2)	[65017]
	18(2,17) - 17(3,14)					(0,0,0)	37548.4	(0.2)	[65017]
	18(2,17) - 17(3,14)					(0,0,0)	37549.2	(0.2)	[65017]
	31(7,25) - 32(6,26)					(0,1,0)	38437.2	(0.2)	[65017]
	15(4,12) - 16(3,13)					(0,1,0)	38996.6	(0.2)	[65017]
	35(6,29) - 34(7,28)					(0,0,0)	39668.4	(0.2)	[65017]
	6(2, 4) - 7(1, 7)					(0,0,0)	40683.7	(0.2)	[65017]
	6(2, 4) - 7(1, 7)					(0,0,0)	40684.6	(0.2)	[65017]
	6(2, 4) - 7(1, 7)					(0,0,0)	40684.95	(0.20)	[65017]
	6(2, 4) - 7(1, 7)					(0,0,0)	40685.6	(0.2)	[65017]
	21(3,19) - 20(4,16)					(0,0,0)	40923.5	(0.2)	[65017]
	19(3,16) - 18(4,15)					(0,0,0)	41007.9	(0.2)	[65017]
	25(6,20) - 26(5,21)					(0,0,0)	41106.2	(0.2)	[65017]
	36(6,31) - 35(7,28)					(0,1,0)	41149.6	(0.2)	[65017]
	26(4,23) - 25(5,20)					(0,1,0)	41297.6	(0.2)	[65017]
	17(2,15) - 18(1,18)					(0,0,0)	42172.4	(0.2)	[65017]
	20(5,15) - 21(4,18)					(0,0,0)	42776.5	(0.2)	[65017]
	19(2,18) - 18(3,15)					(0,0,0)	42832.8	(0.2)	[65017]
	19(2,18) - 18(3,15)					(0,0,0)	42833.9	(0.2)	[65017]
	4(2, 3) - 5(1, 4)					(0,0,0)	42883.15	(0.20)	[65017]
	4(2, 3) - 5(1, 4)					(0,0,0)	42884.2	(0.2)	[65017]
	15(4,11) - 16(3,14)					(0,0,0)	43464.35	(0.20)	[65017]
	25(6,19) - 26(5,22)					(0,0,0)	43666.1	(0.2)	[65017]
	30(7,24) - 31(6,25)					(0,0,0)	44276.55	(0.20)	[65017]
	22(2,21) - 21(3,18)					(0,0,0)	44530.2	(0.2)	[65017]
	22(2,21) - 21(3,18)					(0,0,0)	44531.7	(0.2)	[65017]
	30(7,23) - 31(6,26)					(0,0,0)	45334.6	(0.2)	[65017]
	30(5,25) - 29(6,24)					(0,0,0)	45575.0	(0.2)	[65017]
	20(2,19) - 19(3,16)					(0,0,0)	45840.7	(0.2)	[65017]
	20(2,19) - 19(3,16)					(0,0,0)	45841.9	(0.2)	[65017]
	21(2,20) - 20(3,17)					(0,0,0)	46436.1	(0.2)	[65017]
	21(2,20) - 20(3,17)					(0,0,0)	46437.4	(0.2)	[65017]
	10(3, 7) - 11(2,10)					(0,0,0)	46721.4	(0.2)	[65017]
	35(8,28) - 36(7,29)					(0,0,0)	46895.8	(0.2)	[65017]
	9(3, 7) - 10(2, 8)					(0,0,0)	46929.9	(0.2)	[65017]
	9(3, 7) - 10(2, 8)					(0,0,0)	46930.4	(0.2)	[65017]
	1(1, 0) - 1(0, 1)					(0,0,0)	49576.3	(0.2)	[65017]
	1(1, 0) - 1(0, 1)					(0,0,0)	49577.1	(0.2)	[65017]
	5(0, 5) - 4(1, 4)					(0,0,0)	50146.5	(0.2)	[65017]
	5(0, 5) - 4(1, 4)					(0,0,0)	50147.4	(0.2)	[65017]
	26(4,23) - 25(5,20)					(0,0,0)	51341.0	(0.2)	[65017]
	14(2,12) - 13(3,11)					(0,0,0)	51555.4	(0.2)	[65017]
	14(2,12) - 13(3,11)					(0,0,0)	51556.45	(0.20)	[65017]
	9(1, 8) - 8(2, 7)					(0,0,0)	51839.9	(0.2)	[65017]
	9(1, 8) - 8(2, 7)					(0,0,0)	51840.95	(0.20)	[65017]
	5(2, 3) - 6(1, 6)					(0,0,0)	52549.1	(0.2)	[65017]
	5(2, 3) - 6(1, 6)					(0,0,0)	52550.2	(0.2)	[65017]
	1(1, 1) - 0(0, 0)					(0,0,0)	66611.6	(0.2)	[65017]
	1(1, 1) - 0(0, 0)					(0,0,0)	66613.1	(0.2)	[65017]
$^{17}O^{34}S^{17}O$	12(2,10) - 13(1,13)					(0,0,0)	7865.0	(0.2)	[65017]
	12(2,10) - 13(1,13)					(0,0,0)	7867.2	(0.2)	[65017]
	27(6,22) - 28(5,23)					(0,0,0)	8345.0	(0.2)	[65017]
	18(3,15) - 17(4,14)					(0,0,0)	8873.9	(0.2)	[65017]
	22(5,17) - 23(4,20)					(0,0,0)	11378.45	(0.20)	[65017]
	1(1, 1) - 2(0, 2)					(0,0,0)	11528.4	(0.2)	[65017]
	17(4,13) - 18(3,16)					(0,0,0)	12847.9	(0.2)	[68037]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{17}O^{34}S^{17}O$	14(2,12) - 15(1,15)					(0,0,0)	13652.3	(0.2)	[65017]
	14(2,12) - 15(1,15)					(0,0,0)	13652.9	(0.2)	[65017]
	16(4,13) - 17(3,14)					(0,0,0)	14141.0	(0.2)	[68037]
	32(7,25) - 33(6,28)					(0,0,0)	15655.7	(0.2)	[65017]
	9(2, 7) - 10(1,10)					(0,0,0)	15851.4	(0.2)	[65017]
	9(2, 7) - 10(1,10)					(0,0,0)	15851.9	(0.2)	[65017]
	9(2, 7) - 10(1,10)					(0,0,0)	15852.6	(0.2)	[65017]
	9(2, 7) - 10(1,10)					(0,0,0)	15853.0	(0.2)	[65017]
	9(2, 7) - 10(1,10)					(0,0,0)	15853.8	(0.2)	[65017]
	9(2, 7) - 10(1,10)					(0,0,0)	15854.6	(0.2)	[65017]
	37(8,30) - 38(7,31)					(0,0,0)	18438.6	(0.2)	[65017]
	12(3, 9) - 13(2,12)					(0,0,0)	19103.4	(0.2)	[65017]
	37(8,29) - 38(7,32)					(0,0,0)	19145.0	(0.2)	[65017]
	13(2,11) - 12(3,10)					(0,0,0)	19959.5	(0.2)	[65017]
	40(7,34) - 39(8,31)					(0,0,0)	20346.1	(0.2)	[65017]
	24(4,20) - 23(5,19)					(0,0,0)	21196.7	(0.2)	[65017]
	5(2, 4) - 6(1, 5)					(0,0,0)	22023.3	(0.2)	[65017]
	5(2, 4) - 6(1, 5)					(0,0,0)	22024.5	(0.2)	[65017]
	21(5,17) - 22(4,18)					(0,0,0)	22592.1	(0.2)	[65017]
	8(2, 6) - 9(1, 9)					(0,0,0)	22629.6	(0.2)	[65017]
	8(2, 6) - 9(1, 9)					(0,0,0)	22630.0	(0.2)	[65017]
	8(2, 6) - 9(1, 9)					(0,0,0)	22630.4	(0.2)	[65017]
	8(2, 6) - 9(1, 9)					(0,0,0)	22631.0	(0.2)	[65017]
	8(2, 6) - 9(1, 9)					(0,0,0)	22631.7	(0.2)	[65017]
	8(2, 6) - 9(1, 9)					(0,0,0)	22633.0	(0.2)	[65017]
	35(6,30) - 34(7,27)					(0,0,0)	23637.9	(0.2)	[65017]
	8(1, 7) - 7(2, 6)					(0,0,0)	24904.5	(0.2)	[65017]
	8(1, 7) - 7(2, 6)					(0,0,0)	24904.9	(0.2)	[65017]
	25(4,22) - 24(5,19)					(0,0,0)	25248.3	(0.2)	[65017]
	30(5,26) - 29(6,23)					(0,0,0)	25735.5	(0.2)	[68037]
	17(2,16) - 16(3,13)					(0,0,0)	27208.6	(0.2)	[65017]
	17(2,16) - 16(3,13)					(0,0,0)	27209.5	(0.2)	[65017]
	4(0, 4) - 3(1, 3)					(0,0,0)	27597.2	(0.2)	[65017]
	4(0, 4) - 3(1, 3)					(0,0,0)	27598.2	(0.2)	[65017]
	26(6,21) - 27(5,22)					(0,0,0)	28909.9	(0.2)	[68037]
	21(5,16) - 22(4,19)					(0,0,0)	29969.6	(0.2)	[68037]
	16(4,12) - 17(3,15)					(0,0,0)	30008.25	(0.20)	[65017]
	26(6,20) - 27(5,23)					(0,0,0)	32053.8	(0.2)	[65017]
	19(3,16) - 18(4,15)					(0,0,0)	32909.3	(0.2)	[68037]
	19(3,16) - 18(4,15)					(0,0,0)	32909.7	(0.2)	[68037]
	11(3, 8) - 12(2,11)					(0,0,0)	33620.25	(0.20)	[68037]
	31(7,25) - 32(6,26)					(0,0,0)	33907.35	(0.20)	[65017]
	30(5,25) - 29(6,24)					(0,0,0)	34254.4	(0.2)	[65017]
	31(7,24) - 32(6,27)					(0,0,0)	35175.6	(0.2)	[68037]
	21(3,19) - 20(4,16)					(0,0,0)	35199.5	(0.2)	[65017]
	15(4,12) - 16(3,13)					(0,0,0)	36225.2	(0.2)	[68037]
	36(8,28) - 37(7,31)					(0,0,0)	38724.6	(0.2)	[65017]
	19(2,18) - 18(3,15)					(0,0,0)	40544.3	(0.2)	[65017]
	6(2, 4) - 7(1, 7)					(0,0,0)	41430.5	(0.2)	[65017]
	6(2, 4) - 7(1, 7)					(0,0,0)	41431.4	(0.2)	[65017]
	6(2, 4) - 7(1, 7)					(0,0,0)	41431.9	(0.2)	[65017]
	26(4,23) - 25(5,20)					(0,0,0)	43116.0	(0.2)	[68037]
	20(5,16) - 21(4,17)					(0,0,0)	43476.5	(0.2)	[68037]
	25(4,21) - 24(5,20)					(0,0,0)	44327.6	(0.2)	[68037]
	31(5,27) - 30(6,24)					(0,0,0)	44917.3	(0.2)	[65017]
	14(2,12) - 13(3,11)					(0,0,0)	45102.9	(0.2)	[65017]
	14(2,12) - 13(3,11)					(0,0,0)	45103.6	(0.2)	[65017]
	20(5,15) - 21(4,18)					(0,0,0)	48657.4	(0.2)	[65017]
	10(3, 7) - 11(2,10)					(0,0,0)	48956.5	(0.2)	[65017]
	9(3, 7) - 10(2, 8)					(0,0,0)	49874.3	(0.2)	[65017]
	3(1, 2) - 3(0, 3)					(0,0,0)	52616.7	(0.2)	[68037]
$^{16}O^{33}S^{17}O$	12(2,10) - 13(1,13)					(0,0,0)	8133.9	(0.2)	[68017]
	12(2,10) - 13(1,13)					(0,0,0)	8135.6	(0.2)	[68017]
	11(2, 9) - 12(1,12)					(0,0,0)	8640.1	(0.2)	[68017]
	11(2, 9) - 12(1,12)					(0,0,0)	8641.9	(0.2)	[68017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{33}S^{17}O$	11(2, 9) - 12(1,12)					(0,0,0)	8643.9	(0.2)	[68017]
	11(2, 9) - 12(1,12)					(0,0,0)	8651.8	(0.2)	[68017]
	11(2, 9) - 12(1,12)					(0,0,0)	8653.3	(0.2)	[68017]
	11(2, 9) - 12(1,12)					(0,0,0)	8655.3	(0.2)	[68017]
	27(6,22) - 28(5,23)					(0,0,0)	8734.75	(0.20)	[68017]
	27(6,22) - 28(5,23)					(0,0,0)	8735.4	(0.2)	[68017]
	18(3,15) - 17(4,14)					(0,0,0)	9054.0	(0.2)	[68017]
	18(3,15) - 17(4,14)					(0,0,0)	9056.6	(0.2)	[68017]
	10(2, 8) - 11(1,11)					(0,0,0)	11417.65	(0.20)	[68017]
	10(2, 8) - 11(1,11)					(0,0,0)	11419.4	(0.2)	[68017]
	10(2, 8) - 11(1,11)					(0,0,0)	11421.5	(0.2)	[68017]
	10(2, 8) - 11(1,11)					(0,0,0)	11428.7	(0.2)	[68017]
	10(2, 8) - 11(1,11)					(0,0,0)	11430.5	(0.2)	[68017]
	22(5,17) - 23(4,20)					(0,0,0)	11832.5	(0.2)	[68017]
	1(1, 1) - 2(0, 2)					(0,0,0)	11888.9	(0.2)	[68017]
	1(1, 1) - 2(0, 2)					(0,0,0)	11894.5	(0.2)	[68017]
	1(1, 1) - 2(0, 2)					(0,0,0)	11901.0	(0.2)	[68017]
	29(5,24) - 28(6,23)					(0,0,0)	12931.2	(0.2)	[68017]
	29(5,24) - 28(6,23)					(0,0,0)	12932.2	(0.2)	[68017]
	27(6,21) - 28(5,24)					(0,0,0)	13312.4	(0.2)	[68017]
	17(4,13) - 18(3,16)					(0,0,0)	13323.0	(0.2)	[68017]
	17(4,13) - 18(6,13)					(0,0,0)	13323.35	(0.20)	[68017]
	14(2,12) - 15(1,15)					(0,0,0)	14096.6	(0.2)	[68017]
	14(2,12) - 15(1,15)					(0,0,0)	14098.1	(0.2)	[68017]
	14(2,12) - 15(1,15)					(0,0,0)	14099.0	(0.2)	[68017]
	14(2,12) - 15(1,15)					(0,0,0)	14101.2	(0.2)	[68017]
	14(2,12) - 15(1,15)					(0,0,0)	14109.9	(0.2)	[68017]
	14(2,12) - 15(1,15)					(0,0,0)	14110.1	(0.2)	[68017]
	14(2,12) - 15(1,15)					(0,0,0)	14111.4	(0.2)	[68017]
	14(2,12) - 15(1,15)					(0,0,0)	14112.5	(0.2)	[68017]
	14(2,12) - 15(1,15)					(0,0,0)	14114.0	(0.2)	[68017]
	32(7,26) - 33(6,27)					(0,0,0)	14425.8	(0.2)	[68017]
	16(4,13) - 17(3,14)					(0,0,0)	14662.4	(0.2)	[68017]
	16(4,13) - 17(3,14)					(0,0,0)	14664.7	(0.2)	[68017]
	32(7,25) - 33(6,28)					(0,0,0)	16284.8	(0.2)	[68017]
	9(2, 7) - 10(1,10)					(0,0,0)	16369.2	(0.2)	[68017]
	9(2, 7) - 10(1,10)					(0,0,0)	16371.0	(0.2)	[68017]
	9(2, 7) - 10(1,10)					(0,0,0)	16379.7	(0.2)	[68017]
	9(2, 7) - 10(1,10)					(0,0,0)	16381.3	(0.2)	[68017]
	9(2, 7) - 10(1,10)					(0,0,0)	16382.9	(0.2)	[68017]
	45(8,37) - 44(9,36)					(0,0,0)	17438.0	(0.2)	[68017]
	16(2,15) - 15(3,12)					(0,0,0)	18274.3	(0.2)	[68017]
	16(2,15) - 15(3,12)					(0,0,0)	18278.3	(0.2)	[68017]
	37(8,30) - 38(7,31)					(0,0,0)	19174.1	(0.2)	[68017]
	37(8,29) - 38(7,32)					(0,0,0)	19900.2	(0.2)	[68017]
	12(3, 9) - 13(2,12)					(0,0,0)	19746.5	(0.2)	[68017]
	12(3, 9) - 13(2,12)					(0,0,0)	19749.0	(0.2)	[68017]
	20(3,18) - 19(4,15)					(0,0,0)	20425.6	(0.2)	[68017]
	20(3,18) - 19(4,15)					(0,0,0)	20426.6	(0.2)	[68017]
	13(2,11) - 12(3,10)					(0,0,0)	20507.0	(0.2)	[68017]
	13(2,11) - 12(3,10)					(0,0,0)	20511.2	(0.2)	[68017]
	15(2,13) - 16(1,16)					(0,0,0)	20548.2	(0.2)	[68017]
	15(2,13) - 16(1,16)					(0,0,0)	20557.3	(0.2)	[68017]
	15(2,13) - 16(1,16)					(0,0,0)	20558.6	(0.2)	[68017]
	15(2,13) - 16(1,16)					(0,0,0)	20559.7	(0.2)	[68017]
	40(7,34) - 39(8,31)					(0,0,0)	20788.4	(0.2)	[68017]
	40(7,34) - 39(8,31)					(0,0,0)	20788.8	(0.2)	[68017]
	24(4,20) - 23(5,19)					(0,0,0)	21730.1	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	22732.05	(0.20)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	22732.9	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	22733.5	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	22733.9	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	22734.3	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	22738.0	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	22738.75	(0.20)	[68017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{33}S^{17}O$	5(2, 4) - 6(1, 5)					(0,0,0)	22739.4	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	22739.9	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	22740.3	(0.2)	[68017]
	8(2, 6) - 9(1, 9)					(0,0,0)	23356.6	(0.2)	[68017]
	8(2, 6) - 9(1, 9)					(0,0,0)	23357.9	(0.2)	[68017]
	8(2, 6) - 9(1, 9)					(0,0,0)	23359.6	(0.2)	[68017]
	8(2, 6) - 9(1, 9)					(0,0,0)	23364.2	(0.2)	[68017]
	8(2, 6) - 9(1, 9)					(0,0,0)	23366.2	(0.2)	[68017]
	8(2, 6) - 9(1, 9)					(0,0,0)	23367.2	(0.2)	[68017]
	8(2, 6) - 9(1, 9)					(0,0,0)	23367.7	(0.2)	[68017]
	8(2, 6) - 9(1, 9)					(0,0,0)	23368.7	(0.2)	[68017]
	8(2, 6) - 9(1, 9)					(0,0,0)	23369.2	(0.2)	[68017]
	21(5,17) - 22(4,18)					(0,0,0)	23395.1	(0.2)	[68017]
	21(5,17) - 22(4,18)					(0,0,0)	23396.4	(0.2)	[68017]
	42(9,34) - 43(8,35)					(0,0,0)	23462.2	(0.2)	[68017]
	42(9,33) - 43(8,36)					(0,0,0)	23737.2	(0.2)	[68017]
	35(6,30) - 34(7,27)					(0,0,0)	24204.3	(0.2)	[68017]
	8(1, 7) - 7(2, 6)					(0,0,0)	24600.3	(0.2)	[68017]
	8(1, 7) - 7(2, 6)					(0,0,0)	24601.35	(0.20)	[68017]
	8(1, 7) - 7(2, 6)					(0,0,0)	24602.5	(0.2)	[68017]
	8(1, 7) - 7(2, 6)					(0,0,0)	24606.25	(0.20)	[68017]
	8(1, 7) - 7(2, 6)					(0,0,0)	24607.2	(0.2)	[68017]
	8(1, 7) - 7(2, 6)					(0,0,0)	24608.4	(0.2)	[68017]
	12(3, 9) - 13(2,12)					(0,1,0)	25550.1	(0.2)	[68037]
	12(3, 9) - 13(2,12)					(0,1,0)	25552.3	(0.2)	[68037]
	25(4,22) - 24(5,19)					(0,0,0)	25916.9	(0.2)	[68017]
	30(5,26) - 29(6,23)					(0,0,0)	26392.0	(0.2)	[68017]
	25(2,24) - 24(3,21)					(0,0,0)	27179.7	(0.2)	[68017]
	17(2,16) - 16(3,13)					(0,0,0)	27990.5	(0.2)	[68017]
	17(2,16) - 16(3,13)					(0,0,0)	27990.95	(0.20)	[68017]
	17(2,16) - 16(3,13)					(0,0,0)	27991.3	(0.2)	[68017]
	17(2,16) - 16(3,13)					(0,0,0)	27991.65	(0.20)	[68017]
	17(2,16) - 16(3,13)					(0,0,0)	27995.1	(0.2)	[68017]
	17(2,16) - 16(3,13)					(0,0,0)	27995.65	(0.20)	[68017]
	17(2,16) - 16(3,13)					(0,0,0)	27996.0	(0.2)	[68017]
	17(2,16) - 16(3,13)					(0,0,0)	27996.4	(0.2)	[68017]
	4(0, 4) - 3(1, 3)					(0,0,0)	28430.4	(0.2)	[68017]
	4(0, 4) - 3(1, 3)					(0,0,0)	28431.0	(0.2)	[68017]
	4(0, 4) - 3(1, 3)					(0,0,0)	28433.0	(0.2)	[68017]
	4(0, 4) - 3(1, 3)					(0,0,0)	28433.5	(0.2)	[68017]
	4(0, 4) - 3(1, 3)					(0,0,0)	28435.9	(0.2)	[68017]
	4(0, 4) - 3(1, 3)					(0,0,0)	28436.6	(0.2)	[68017]
	4(0, 4) - 3(1, 3)					(0,0,0)	28438.6	(0.2)	[68017]
	4(0, 4) - 3(1, 3)					(0,0,0)	28439.1	(0.2)	[68017]
	10(3, 8) - 11(2, 9)					(0,0,0)	28444.35	(0.20)	[68017]
	10(3, 8) - 11(2, 9)					(0,0,0)	28444.9	(0.2)	[68017]
	10(3, 8) - 11(2, 9)					(0,0,0)	28445.5	(0.2)	[68017]
	16(2,14) - 17(1,17)					(0,0,0)	29225.75	(0.20)	[68017]
	16(2,14) - 17(1,17)					(0,0,0)	29227.0	(0.2)	[68017]
	16(2,14) - 17(1,17)					(0,0,0)	29228.2	(0.2)	[68017]
	16(2,14) - 17(1,17)					(0,0,0)	29229.5	(0.2)	[68017]
	26(6,21) - 27(5,22)					(0,0,0)	29926.4	(0.2)	[68017]
	26(6,21) - 27(5,22)					(0,0,0)	29927.3	(0.2)	[68017]
	21(5,16) - 22(4,19)					(0,0,0)	30993.3	(0.2)	[68017]
	16(4,12) - 17(3,15)					(0,0,0)	31010.6	(0.2)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	32208.8	(0.2)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	32209.7	(0.2)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	32210.2	(0.2)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	32210.5	(0.2)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	32210.8	(0.2)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	32211.55	(0.20)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	32211.9	(0.2)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	32212.4	(0.2)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	32217.75	(0.20)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	32218.05	(0.20)	[68017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{33}S^{17}O$	7(2, 5) - 8(1, 8)					(0,0,0)	32218.7	(0.2)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	32219.25	(0.20)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	32219.65	(0.20)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	32220.4	(0.2)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	32220.75	(0.20)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	32221.35	(0.20)	[68017]
	26(6,20) - 27(5,23)					(0,0,0)	33162.8	(0.2)	[68017]
	19(3,16) - 18(4,15)					(0,0,0)	33824.6	(0.2)	[68017]
	19(3,16) - 18(4,15)					(0,0,0)	33827.6	(0.2)	[68017]
	11(3, 8) - 12(2,11)					(0,0,0)	34710.3	(0.2)	[68017]
	11(3, 8) - 12(2,11)					(0,0,0)	34712.45	(0.20)	[68017]
	31(7,25) - 32(6,26)					(0,0,0)	35094.8	(0.2)	[68017]
	31(7,25) - 32(6,26)					(0,0,0)	35095.4	(0.2)	[68017]
	30(5,25) - 29(6,24)					(0,0,0)	35159.7	(0.2)	[68017]
	30(5,25) - 29(6,24)					(0,0,0)	35161.0	(0.2)	[68017]
	24(2,23) - 23(3,20)					(0,0,0)	35807.4	(0.2)	[68017]
	18(2,17) - 17(3,14)					(0,0,0)	35879.6	(0.2)	[68017]
	18(2,17) - 17(3,14)					(0,0,0)	35885.1	(0.2)	[68017]
	21(3,19) - 20(4,16)					(0,0,0)	36201.35	(0.20)	[68017]
	21(3,19) - 20(4,16)					(0,0,0)	36202.7	(0.2)	[68017]
	31(7,24) - 32(6,27)					(0,0,0)	36400.0	(0.2)	[68017]
	31(7,24) - 32(6,27)					(0,0,0)	36400.7	(0.2)	[68017]
	46(8,39) - 45(9,36)					(0,0,0)	37374.0	(0.2)	[68017]
	15(4,12) - 16(3,13)					(0,0,0)	37423.1	(0.2)	[68017]
	15(4,12) - 16(3,13)					(0,0,0)	37425.0	(0.2)	[68017]
	46(8,38) - 45(9,37)					(0,0,0)	38127.0	(0.2)	[68017]
	36(8,29) - 37(7,30)					(0,0,0)	39567.0	(0.2)	[68017]
	36(8,29) - 37(7,30)					(0,0,0)	39567.4	(0.2)	[68017]
	17(2,15) - 18(1,18)					(0,0,0)	40050.3	(0.2)	[68017]
	17(2,15) - 18(1,18)					(0,0,0)	40051.5	(0.2)	[68017]
	17(2,15) - 18(1,18)					(0,0,0)	40052.7	(0.2)	[68017]
	17(2,15) - 18(1,18)					(0,0,0)	40054.0	(0.2)	[68017]
	17(2,15) - 18(1,18)					(0,0,0)	40064.6	(0.2)	[68017]
	17(2,15) - 18(1,18)					(0,0,0)	40065.5	(0.2)	[68017]
	17(2,15) - 18(1,18)					(0,0,0)	40067.0	(0.2)	[68017]
	17(2,15) - 18(1,18)					(0,0,0)	40068.0	(0.2)	[68017]
	36(8,28) - 37(7,31)					(0,0,0)	40074.2	(0.2)	[68017]
	11(3, 8) - 12(2,11)					(0,1,0)	40503.2	(0.2)	[68037]
	21(2,20) - 20(3,17)					(0,1,0)	40757.4	(0.2)	[68037]
	14(2,12) - 13(3,11)					(0,1,0)	40779.5	(0.2)	[68037]
	14(2,12) - 13(3,11)					(0,1,0)	40783.7	(0.2)	[68037]
	21(5,16) - 22(4,19)					(0,1,0)	41293.9	(0.2)	[68037]
	41(7,35) - 40(8,32)					(0,0,0)	41297.2	(0.2)	[68017]
	41(7,35) - 40(8,32)					(0,0,0)	41297.65	(0.20)	[68017]
	19(2,18) - 18(3,15)					(0,0,0)	41741.3	(0.2)	[68017]
	19(2,18) - 18(3,15)					(0,0,0)	41741.8	(0.2)	[68017]
	19(2,18) - 18(3,15)					(0,0,0)	41742.4	(0.2)	[68017]
	19(2,18) - 18(3,15)					(0,0,0)	41743.0	(0.2)	[68017]
	19(2,18) - 18(3,15)					(0,0,0)	41747.3	(0.2)	[68017]
	19(2,18) - 18(3,15)					(0,0,0)	41748.0	(0.2)	[68017]
	19(2,18) - 18(3,15)					(0,0,0)	41748.5	(0.2)	[68017]
	19(2,18) - 18(3,15)					(0,0,0)	41748.9	(0.2)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	42736.4	(0.2)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	42737.6	(0.2)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	42738.1	(0.2)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	42739.15	(0.20)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	42744.6	(0.2)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	42745.9	(0.2)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	42746.2	(0.2)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	42747.4	(0.2)	[68017]
	41(9,33) - 42(8,34)					(0,0,0)	43686.15	(0.20)	[68017]
	41(9,32) - 42(8,35)					(0,0,0)	43877.3	(0.2)	[68017]
	26(4,23) - 25(5,20)					(0,0,0)	44333.1	(0.2)	[68017]
	36(6,31) - 35(7,28)					(0,0,0)	44546.25	(0.20)	[68017]
	20(5,16) - 21(4,17)					(0,0,0)	44917.9	(0.2)	[68017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{33}S^{17}O$	20(5,16) - 21(4,17)					(0,0,0)	44919.05	(0.20)	[68017]
	31(5,26) - 30(6,25)					(0,1,0)	45177.2	(0.2)	[68037]
	31(5,26) - 30(6,25)					(0,1,0)	45178.5	(0.2)	[68037]
	20(2,19) - 19(3,16)					(0,0,0)	45400.2	(0.2)	[68017]
	20(2,19) - 19(3,16)					(0,0,0)	45400.8	(0.2)	[68017]
	20(2,19) - 19(3,16)					(0,0,0)	45401.6	(0.2)	[68017]
	20(2,19) - 19(3,16)					(0,0,0)	45402.2	(0.2)	[68017]
	20(2,19) - 19(3,16)					(0,0,0)	45409.4	(0.2)	[68017]
	4(2, 3) - 5(1, 4)					(0,0,0)	45484.1	(0.2)	[68017]
	4(2, 3) - 5(1, 4)					(0,0,0)	45485.1	(0.2)	[68017]
	4(2, 3) - 5(1, 4)					(0,0,0)	45485.95	(0.20)	[68017]
	4(2, 3) - 5(1, 4)					(0,0,0)	45486.9	(0.2)	[68017]
	4(2, 3) - 5(1, 4)					(0,0,0)	45490.5	(0.2)	[68017]
	4(2, 3) - 5(1, 4)					(0,0,0)	45491.4	(0.2)	[68017]
	4(2, 3) - 5(1, 4)					(0,0,0)	45492.3	(0.2)	[68017]
	4(2, 3) - 5(1, 4)					(0,0,0)	45493.1	(0.2)	[68017]
	25(4,21) - 24(5,20)					(0,0,0)	45564.0	(0.2)	[68017]
	25(4,21) - 24(5,20)					(0,0,0)	45565.9	(0.2)	[68017]
	22(2,21) - 21(3,18)					(0,0,0)	45589.5	(0.2)	[68017]
	22(2,21) - 21(3,18)					(0,0,0)	45589.9	(0.2)	[68017]
	26(6,20) - 27(5,23)					(0,1,0)	45746.2	(0.2)	[68037]
	9(1, 8) - 8(2, 7)					(0,1,0)	45991.6	(0.2)	[68037]
	9(1, 8) - 8(2, 7)					(0,1,0)	45992.6	(0.2)	[68037]
	9(1, 8) - 8(2, 7)					(0,1,0)	45993.6	(0.2)	[68037]
	9(1, 8) - 8(2, 7)					(0,1,0)	45997.2	(0.2)	[68037]
	9(1, 8) - 8(2, 7)					(0,1,0)	45998.1	(0.2)	[68037]
	31(5,27) - 30(6,24)					(0,0,0)	46159.9	(0.2)	[68017]
	14(2,12) - 13(3,11)					(0,0,0)	46421.6	(0.2)	[68017]
	14(2,12) - 13(3,11)					(0,0,0)	46426.2	(0.2)	[68017]
	21(2,20) - 20(3,17)					(0,0,0)	46713.7	(0.2)	[68017]
	21(2,20) - 20(3,17)					(0,0,0)	46714.7	(0.2)	[68017]
	21(2,20) - 20(3,17)					(0,0,0)	46715.5	(0.2)	[68017]
	21(2,20) - 20(3,17)					(0,0,0)	46716.0	(0.2)	[68017]
	46(10,36) - 47(9,39)					(0,0,0)	47660.4	(0.2)	[68017]
	15(4,11) - 16(3,14)					(0,0,0)	49079.75	(0.20)	[68017]
	9(1, 8) - 8(2, 7)					(0,0,0)	49103.4	(0.2)	[68017]
	9(1, 8) - 8(2, 7)					(0,0,0)	49104.3	(0.2)	[68017]
	9(1, 8) - 8(2, 7)					(0,0,0)	49109.0	(0.2)	[68017]
	9(1, 8) - 8(2, 7)					(0,0,0)	49109.9	(0.2)	[68017]
	5(0, 5) - 4(1, 4)					(0,0,0)	49331.6	(0.2)	[68017]
	5(0, 5) - 4(1, 4)					(0,0,0)	49333.5	(0.2)	[68017]
	5(0, 5) - 4(1, 4)					(0,0,0)	49336.8	(0.2)	[68017]
	5(0, 5) - 4(1, 4)					(0,0,0)	49338.8	(0.2)	[68017]
	36(6,30) - 35(7,29)					(0,0,0)	49555.6	(0.2)	[68017]
	36(6,30) - 35(7,29)					(0,0,0)	49556.4	(0.2)	[68017]
	20(5,15) - 21(4,18)					(0,0,0)	50254.1	(0.2)	[68017]
	1(1, 0) - 1(0, 1)					(0,0,0)	50418.4	(0.2)	[68017]
	1(1, 0) - 1(0, 1)					(0,0,0)	50424.6	(0.2)	[68017]
	1(1, 0) - 1(0, 1)					(0,0,0)	50429.4	(0.2)	[68017]
	10(3, 7) - 11(2,10)					(0,0,0)	50518.3	(0.2)	[68017]
	10(3, 7) - 11(2,10)					(0,0,0)	50520.0	(0.2)	[68017]
	25(6,20) - 26(5,21)					(0,0,0)	50717.8	(0.2)	[68017]
	25(6,20) - 26(5,21)					(0,0,0)	50718.5	(0.2)	[68017]
	22(3,20) - 21(4,17)					(0,0,0)	51024.0	(0.2)	[68017]
	22(3,20) - 21(4,17)					(0,0,0)	51025.7	(0.2)	[68017]
	9(3, 7) - 10(2, 8)					(0,0,0)	51468.8	(0.2)	[68017]
	9(3, 7) - 10(2, 8)					(0,0,0)	51469.5	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	51924.1	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	51928.5	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	51930.2	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	51934.8	(0.2)	[68017]
	25(6,19) - 26(5,22)					(0,0,0)	52970.8	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,1,0)	53079.8	(0.2)	[68037]
	2(1, 1) - 2(0, 2)					(0,1,0)	53086.0	(0.2)	[68037]
	3(1, 2) - 3(0, 3)					(0,0,0)	54243.2	(0.2)	[68017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{33}S^{17}O$	3(1, 2) - 3(0, 3)					(0,0,0)	54246.3	(0.2)	[68017]
	3(1, 2) - 3(0, 3)					(0,0,0)	54249.5	(0.2)	[68017]
	3(1, 2) - 3(0, 3)					(0,0,0)	54252.6	(0.2)	[68017]
	5(2, 3) - 6(1, 6)					(0,0,0)	54750.3	(0.2)	[68017]
	30(7,24) - 31(6,25)					(0,0,0)	55511.5	(0.2)	[68017]
	30(7,24) - 31(6,25)					(0,0,0)	55512.0	(0.2)	[68017]
	15(4,11) - 16(3,14)					(0,1,0)	57100.4	(0.2)	[68037]
	4(1, 3) - 4(0, 4)					(0,0,0)	57447.1	(0.2)	[68017]
	4(1, 3) - 4(0, 4)					(0,0,0)	57447.95	(0.20)	[68017]
	4(1, 3) - 4(0, 4)					(0,0,0)	57449.4	(0.2)	[68017]
	4(1, 3) - 4(0, 4)					(0,0,0)	57450.2	(0.2)	[68017]
	4(1, 3) - 4(0, 4)					(0,0,0)	57453.7	(0.2)	[68017]
	4(1, 3) - 4(0, 4)					(0,0,0)	57454.7	(0.2)	[68017]
	4(1, 3) - 4(0, 4)					(0,0,0)	57456.1	(0.2)	[68017]
	4(1, 3) - 4(0, 4)					(0,0,0)	57456.9	(0.2)	[68017]
	14(4,11) - 15(3,12)					(0,0,0)	59336.2	(0.2)	[68017]
	14(4,11) - 15(3,12)					(0,0,0)	59337.8	(0.2)	[68017]
$^{17}O^{33}S^{17}O$	40(7,33) - 39(8,32)					(0,0,0)	8475.9	(0.2)	[68017]
	13(3,10) - 14(2,13)					(0,0,0)	8864.7	(0.2)	[68017]
	13(3,10) - 14(2,13)					(0,0,0)	8867.6	(0.2)	[68017]
	11(2, 9) - 12(1,12)					(0,0,0)	9111.8	(0.2)	[68017]
	11(2, 9) - 12(1,12)					(0,0,0)	9113.5	(0.2)	[68017]
	11(2, 9) - 12(1,12)					(0,0,0)	9123.3	(0.2)	[68017]
	22(5,18) - 23(4,19)					(0,0,0)	9443.9	(0.2)	[68017]
	22(5,18) - 23(4,19)					(0,0,0)	9445.4	(0.2)	[68017]
	10(2, 8) - 11(1,11)					(0,0,0)	12160.8	(0.2)	[68017]
	10(2, 8) - 11(1,11)					(0,0,0)	12162.7	(0.2)	[68017]
	10(2, 8) - 11(1,11)					(0,0,0)	12172.3	(0.2)	[68017]
	10(2, 8) - 11(1,11)					(0,0,0)	12173.9	(0.2)	[68017]
	1(1, 1) - 2(0, 2)					(0,0,0)	12350.6	(0.2)	[68017]
	1(1, 1) - 2(0, 2)					(0,0,0)	12355.6	(0.2)	[68017]
	1(1, 1) - 2(0, 2)					(0,0,0)	12362.3	(0.2)	[68017]
	35(6,30) - 34(7,27)					(0,0,0)	12417.6	(0.2)	[68017]
	35(6,30) - 34(7,27)					(0,0,0)	12418.0	(0.2)	[68017]
	38(8,30) - 39(7,33)					(0,0,0)	12429.3	(0.2)	[68017]
	38(8,30) - 39(7,33)					(0,0,0)	12429.7	(0.2)	[68017]
	24(4,20) - 23(5,19)					(0,0,0)	12558.8	(0.2)	[68017]
	24(4,20) - 23(5,19)					(0,0,0)	12560.6	(0.2)	[68017]
	20(3,18) - 19(4,15)					(0,0,0)	14816.5	(0.2)	[68017]
	13(2,11) - 12(3,10)					(0,0,0)	15007.3	(0.2)	[68017]
	13(2,11) - 12(3,10)					(0,0,0)	15011.6	(0.2)	[68017]
	16(2,15) - 15(3,12)					(0,0,0)	15096.5	(0.2)	[68017]
	16(2,15) - 15(3,12)					(0,0,0)	15100.1	(0.2)	[68017]
	35(6,29) - 34(7,28)					(0,0,0)	15444.8	(0.2)	[68017]
	35(6,29) - 34(7,28)					(0,0,0)	15445.4	(0.2)	[68017]
	30(5,26) - 29(6,23)					(0,0,0)	16440.3	(0.2)	[68017]
	9(2, 7) - 10(1,10)					(0,0,0)	17273.25	(0.20)	[68017]
	9(2, 7) - 10(1,10)					(0,0,0)	17274.7	(0.2)	[68017]
	9(2, 7) - 10(1,10)					(0,0,0)	17283.05	(0.20)	[68017]
	25(4,22) - 24(5,19)					(0,0,0)	18014.9	(0.2)	[68017]
	27(6,22) - 28(5,23)					(0,0,0)	18208.8	(0.2)	[68017]
	17(4,13) - 18(3,16)					(0,0,0)	18282.8	(0.2)	[68017]
	22(5,17) - 23(4,20)					(0,0,0)	18792.9	(0.2)	[68017]
	16(4,13) - 17(3,14)					(0,0,0)	20738.0	(0.2)	[68017]
	16(4,13) - 17(3,14)					(0,0,0)	20740.2	(0.2)	[68017]
	8(1, 7) - 7(2, 6)					(0,0,0)	21199.5	(0.2)	[68017]
	8(1, 7) - 7(2, 6)					(0,0,0)	21200.4	(0.2)	[68017]
	8(1, 7) - 7(2, 6)					(0,0,0)	21201.3	(0.2)	[68017]
	8(1, 7) - 7(2, 6)					(0,0,0)	21205.2	(0.2)	[68017]
	8(1, 7) - 7(2, 6)					(0,0,0)	21206.0	(0.2)	[68017]
	8(1, 7) - 7(2, 6)					(0,0,0)	21207.2	(0.2)	[68017]
	46(8,39) - 45(9,36)					(0,0,0)	21614.5	(0.2)	[68017]
	27(6,21) - 28(5,24)					(0,0,0)	22119.9	(0.2)	[68017]
	27(6,21) - 28(5,24)					(0,0,0)	22120.35	(0.20)	[68017]
	12(3, 9) - 13(2,12)					(0,0,0)	22615.0	(0.2)	[68017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{17}O^{33}S^{17}O$	12(3, 9) - 13(2,12)					(0,0,0)	22617.5	(0.2)	[68017]
	30(5,25) - 29(6,24)					(0,0,0)	23949.4	(0.2)	[68017]
	30(5,25) - 29(6,24)					(0,0,0)	23950.5	(0.2)	[68017]
	8(2, 6) - 9(1, 9)					(0,0,0)	24311.7	(0.2)	[68017]
	8(2, 6) - 9(1, 9)					(0,0,0)	24313.2	(0.2)	[68017]
	8(2, 6) - 9(1, 9)					(0,0,0)	24314.9	(0.2)	[68017]
	8(2, 6) - 9(1, 9)					(0,0,0)	24321.2	(0.2)	[68017]
	8(2, 6) - 9(1, 9)					(0,0,0)	24322.8	(0.2)	[68017]
	8(2, 6) - 9(1, 9)					(0,0,0)	24324.4	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	24654.2	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	24655.4	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	24656.7	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	24660.2	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	24661.5	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	24662.7	(0.2)	[68017]
	17(2,16) - 16(3,13)					(0,0,0)	24924.0	(0.2)	[68017]
	17(2,16) - 16(3,13)					(0,0,0)	24928.6	(0.2)	[68017]
	32(7,26) - 33(7,27)					(0,0,0)	25268.3	(0.2)	[68017]
	19(3,16) - 18(4,15)					(0,0,0)	25798.1	(0.2)	[68017]
	19(3,16) - 18(4,15)					(0,0,0)	25800.95	(0.2)	[68017]
	4(0, 4) - 3(1, 3)					(0,0,0)	26772.8	(0.2)	[68017]
	4(0, 4) - 3(1, 3)					(0,0,0)	26773.5	(0.2)	[68017]
	4(0, 4) - 3(1, 3)					(0,0,0)	26778.4	(0.2)	[68017]
	4(0, 4) - 3(1, 3)					(0,0,0)	26778.8	(0.2)	[68017]
	4(0, 4) - 3(1, 3)					(0,0,0)	26779.2	(0.2)	[68017]
	4(0, 4) - 3(1, 3)					(0,0,0)	26780.95	(0.20)	[68017]
	4(0, 4) - 3(1, 3)					(0,0,0)	26781.7	(0.2)	[68017]
	32(7,25) - 33(6,28)					(0,0,0)	26811.4	(0.2)	[68017]
	41(7,35) - 40(8,32)					(0,0,0)	27159.2	(0.2)	[68017]
	41(7,34) - 40(8,33)					(0,0,0)	28776.8	(0.2)	[68017]
	41(7,34) - 40(8,33)					(0,0,0)	28777.4	(0.2)	[68017]
	21(3,19) - 20(4,16)					(0,0,0)	30377.7	(0.2)	[68017]
	21(3,19) - 20(4,16)					(0,0,0)	30378.9	(0.2)	[68017]
	21(5,17) - 22(4,18)					(0,0,0)	30750.6	(0.2)	[68017]
	21(5,17) - 22(4,18)					(0,0,0)	30751.8	(0.2)	[68017]
	37(8,30) - 38(7,31)					(0,0,0)	31477.1	(0.2)	[68017]
	37(8,29) - 38(7,32)					(0,0,0)	32062.0	(0.2)	[68017]
	36(6,31) - 35(7,28)					(0,0,0)	32138.4	(0.2)	[68017]
	36(6,31) - 35(7,28)					(0,0,0)	32138.9	(0.2)	[68017]
	10(3, 8) - 11(2, 9)					(0,0,0)	32189.1	(0.2)	[68017]
	10(3, 8) - 11(2, 9)					(0,0,0)	32191.55	(0.20)	[68017]
	10(3, 8) - 11(2, 9)					(0,0,0)	32192.1	(0.2)	[68017]
	10(3, 8) - 11(2, 9)					(0,0,0)	32192.6	(0.2)	[68017]
	18(2,17) - 17(3,14)					(0,0,0)	33051.1	(0.2)	[68017]
	18(2,17) - 17(3,14)					(0,0,0)	33056.5	(0.2)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	33116.15	(0.20)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	33117.9	(0.2)	[68017]
	25(4,21) - 24(5,20)					(0,0,0)	35372.7	(0.2)	[68017]
	25(4,21) - 24(5,20)					(0,0,0)	35373.4	(0.2)	[68017]
	16(4,12) - 17(3,15)					(0,0,0)	35561.6	(0.2)	[68017]
	31(5,27) - 30(6,24)					(0,0,0)	35669.2	(0.2)	[68017]
	26(4,23) - 25(5,20)					(0,0,0)	36029.1	(0.2)	[68017]
	36(6,30) - 35(7,29)					(0,0,0)	36306.0	(0.2)	[68017]
	36(6,30) - 35(7,29)					(0,0,0)	36307.0	(0.2)	[68017]
	42(9,34) - 43(8,35)					(0,0,0)	37272.7	(0.2)	[68017]
	11(3, 8) - 12(2,11)					(0,0,0)	37305.8	(0.2)	[68017]
	11(3, 8) - 12(2,11)					(0,0,0)	37308.8	(0.2)	[68017]
	21(5,16) - 22(4,19)					(0,0,0)	37434.4	(0.2)	[68017]
	42(9,33) - 43(8,36)					(0,0,0)	37487.5	(0.2)	[68017]
	26(6,21) - 27(5,22)					(0,0,0)	38615.6	(0.2)	[68017]
	26(6,21) - 27(5,22)					(0,0,0)	38616.5	(0.2)	[68017]
	19(2,18) - 18(3,15)					(0,0,0)	39287.5	(0.2)	[68017]
	19(2,18) - 18(3,15)					(0,0,0)	39294.0	(0.2)	[68017]
	14(2,12) - 13(3,11)					(0,0,0)	39992.4	(0.2)	[68017]
	14(2,12) - 13(3,11)					(0,0,0)	39996.8	(0.2)	[68017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{17}O^{33}S^{17}O$	26(6,20) - 27(5,23)					(0,0,0)	41378.2	(0.2)	[68017]
	26(6,20) - 27(5,23)					(0,0,0)	41378.7	(0.2)	[68017]
	23(2,22) - 22(3,19)					(0,0,0)	42316.9	(0.2)	[68017]
	15(4,12) - 16(3,13)					(0,0,0)	42623.8	(0.2)	[68017]
	15(4,12) - 16(3,13)					(0,0,0)	42625.6	(0.2)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	43500.8	(0.2)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	43501.3	(0.2)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	43509.45	(0.20)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	43509.9	(0.2)	[68017]
	9(1, 8) - 8(2, 7)					(0,0,0)	44942.8	(0.2)	[68017]
	9(1, 8) - 8(2, 7)					(0,0,0)	44943.7	(0.2)	[68017]
	9(1, 8) - 8(2, 7)					(0,0,0)	44944.6	(0.2)	[68017]
	22(3,20) - 21(4,17)					(0,0,0)	45078.8	(0.2)	[68017]
	22(3,20) - 21(4,17)					(0,0,0)	45080.3	(0.2)	[68017]
	31(7,25) - 32(6,26)					(0,0,0)	45212.5	(0.2)	[68017]
	31(7,25) - 32(6,26)					(0,0,0)	45213.1	(0.2)	[68017]
	31(5,26) - 30(6,25)					(0,0,0)	45866.4	(0.2)	[68017]
	31(5,26) - 30(6,25)					(0,0,0)	45867.8	(0.2)	[68017]
	31(7,24) - 32(6,27)					(0,0,0)	46294.2	(0.2)	[68017]
	31(7,24) - 32(6,27)					(0,0,0)	46294.7	(0.2)	[68017]
	5(0, 5) - 4(1, 4)					(0,0,0)	47056.7	(0.2)	[68017]
	5(0, 5) - 4(1, 4)					(0,0,0)	47058.5	(0.2)	[68017]
	5(0, 5) - 4(1, 4)					(0,0,0)	47061.2	(0.2)	[68017]
	5(0, 5) - 4(1, 4)					(0,0,0)	47061.8	(0.2)	[68017]
	5(0, 5) - 4(1, 4)					(0,0,0)	47063.0	(0.2)	[68017]
	42(7,35) - 41(8,34)					(0,0,0)	49324.35	(0.20)	[68017]
	1(1, 0) - 1(0, 1)					(0,0,0)	49749.3	(0.2)	[68017]
	1(1, 0) - 1(0, 1)					(0,0,0)	49755.7	(0.2)	[68017]
	1(1, 0) - 1(0, 1)					(0,0,0)	49760.8	(0.2)	[68017]
	36(8,29) - 37(7,30)					(0,0,0)	51177.6	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	51190.9	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	51195.5	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	51197.3	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	51201.8	(0.2)	[68017]
	21(4,17) - 20(5,16)					(0,0,0)	51465.2	(0.2)	[68017]
	21(4,17) - 20(5,16)					(0,0,0)	51466.3	(0.2)	[68017]
	36(8,28) - 37(7,31)					(0,0,0)	51585.5	(0.2)	[68017]
	37(6,32) - 36(7,29)					(0,0,0)	51904.0	(0.2)	[68017]
	10(3, 7) - 11(2,10)					(0,0,0)	52778.2	(0.2)	[68017]
	10(3, 7) - 11(2,10)					(0,0,0)	52779.8	(0.2)	[68017]
	15(4,11) - 16(3,14)					(0,0,0)	53180.0	(0.2)	[68017]
	3(1, 2) - 3(0, 3)					(0,0,0)	53409.1	(0.2)	[68017]
	3(1, 2) - 3(0, 3)					(0,0,0)	53412.8	(0.2)	[68017]
	3(1, 2) - 3(0, 3)					(0,0,0)	53415.9	(0.2)	[68017]
	27(4,24) - 26(5,21)					(0,0,0)	53657.4	(0.2)	[68017]
	9(3, 7) - 10(2, 8)					(0,0,0)	54398.1	(0.2)	[68017]
	32(5,28) - 31(6,25)					(0,0,0)	54800.0	(0.2)	[68017]
	5(2, 3) - 6(1, 6)					(0,0,0)	55285.1	(0.2)	[68017]
	5(2, 3) - 6(1, 6)					(0,0,0)	55286.0	(0.2)	[68017]
	5(2, 3) - 6(1, 6)					(0,0,0)	55287.0	(0.2)	[68017]
	5(2, 3) - 6(1, 6)					(0,0,0)	55287.9	(0.2)	[68017]
	5(2, 3) - 6(1, 6)					(0,0,0)	55292.6	(0.2)	[68017]
	5(2, 3) - 6(1, 6)					(0,0,0)	55293.7	(0.2)	[68017]
	5(2, 3) - 6(1, 6)					(0,0,0)	55294.7	(0.2)	[68017]
	20(5,15) - 21(4,18)					(0,0,0)	56153.4	(0.2)	[68017]
	20(5,15) - 21(4,18)					(0,0,0)	56154.7	(0.2)	[68017]
	4(1, 3) - 4(0, 4)					(0,0,0)	56470.5	(0.2)	[68017]
	4(1, 3) - 4(0, 4)					(0,0,0)	56473.6	(0.2)	[68017]
	4(1, 3) - 4(0, 4)					(0,0,0)	56476.9	(0.2)	[68017]
	4(1, 3) - 4(0, 4)					(0,0,0)	56478.0	(0.2)	[68017]
	4(1, 3) - 4(0, 4)					(0,0,0)	56480.5	(0.2)	[68017]
	37(6,31) - 36(7,30)					(0,0,0)	57579.6	(0.2)	[68017]
	37(6,31) - 36(7,30)					(0,0,0)	57580.2	(0.2)	[68017]
	26(6,20) - 25(5,21)					(0,0,0)	58665.4	(0.2)	[68017]
	26(6,20) - 25(5,21)					(0,0,0)	58666.1	(0.2)	[68017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{17}O^{33}S^{17}O$	23(3,21) - 22(4,18)					(0,0,0)	58747.8	(0.2)	[68017]
	23(3,21) - 22(4,18)					(0,0,0)	58749.7	(0.2)	[68017]
$^{17}O^{32}S^{18}O$	36(6,31) - 35(7,28)					(0,0,0)	8312.4	(0.2)	[65017]
	34(7,28) - 35(6,29)					(0,0,0)	8674.9	(0.2)	[65017]
	16(2,15) - 15(3,12)					(0,0,0)	8942.90	(0.20)	[65017]
	12(2,10) - 13(1,13)					(0,0,0)	8955.3	(0.2)	[65017]
	12(2,10) - 13(1,13)					(0,0,0)	8956.45	(0.20)	[65017]
	12(2,10) - 13(1,13)					(0,0,0)	8957.4	(0.2)	[65017]
	13(2,11) - 14(1,14)					(0,0,0)	9399.2	(0.2)	[65017]
	19(3,16) - 18(4,15)					(0,0,0)	10794.0	(0.2)	[65017]
	34(7,27) - 35(6,30)					(0,0,0)	10803.2	(0.2)	[65017]
	36(6,30) - 35(7,29)					(0,0,0)	11244.3	(0.2)	[65017]
	17(4,14) - 18(3,15)					(0,0,0)	11780.1	(0.2)	[65017]
	14(2,12) - 15(1,15)					(0,0,0)	11955.75	(0.20)	[65017]
	18(4,14) - 19(3,17)					(0,0,0)	12334.3	(0.2)	[65017]
	10(2, 8) - 11(1,11)					(0,0,0)	14247.5	(0.2)	[65017]
	10(2, 8) - 11(1,11)					(0,0,0)	14248.5	(0.2)	[65017]
	10(2, 8) - 11(1,11)					(0,0,0)	14249.4	(0.2)	[65017]
	8(1, 7) - 7(2, 6)					(0,0,0)	15093.9	(0.2)	[65017]
	8(1, 7) - 7(2, 6)					(0,0,0)	15095.0	(0.2)	[65017]
	23(5,18) - 24(4,21)					(0,0,0)	15358.5	(0.2)	[65017]
	13(3,10) - 14(2,13)					(0,0,0)	15485.80	(0.20)	[65017]
	31(5,27) - 30(6,24)					(0,0,0)	15708.2	(0.2)	[65017]
	25(4,21) - 24(5,20)					(0,0,0)	16465.6	(0.2)	[65017]
	15(2,13) - 16(1,16)					(0,0,0)	16612.8	(0.2)	[65017]
	15(2,13) - 16(1,16)					(0,0,0)	16613.5	(0.2)	[65017]
	15(2,13) - 16(1,16)					(0,0,0)	16614.1	(0.2)	[65017]
	15(2,13) - 16(1,16)					(0,0,0)	16615.2	(0.2)	[65017]
	28(6,23) - 29(5,24)					(0,0,0)	17732.7	(0.2)	[65017]
	11(3, 9) - 12(2,10)					(0,0,0)	18522.05	(0.20)	[65017]
	11(3, 9) - 12(2,10)					(0,0,0)	18522.7	(0.2)	[65017]
	42(7,36) - 41(8,33)					(0,0,0)	19045.2	(0.2)	[65017]
	17(2,16) - 16(3,13)					(0,0,0)	19251.8	(0.2)	[65017]
	39(8,31) - 40(7,34)					(0,0,0)	19410.15	(0.20)	[65017]
	21(3,19) - 20(4,16)					(0,0,0)	19422.5	(0.2)	[65017]
	9(2, 7) - 10(1,10)		19/2		21/2	(0,0,0)	19814.8	(0.2)	[65017]
	9(2, 7) - 10(1,10)		21/2		23/2	(0,0,0)	19815.25	(0.20)	[65017]
	9(2, 7) - 10(1,10)		17/2		19/2	(0,0,0)	19815.25	(0.20)	[65017]
	9(2, 7) - 10(1,10)		15/2		17/2	(0,0,0)	19815.85	(0.20)	[65017]
	9(2, 7) - 10(1,10)		23/2		25/2	(0,0,0)	19816.5	(0.2)	[65017]
	9(2, 7) - 10(1,10)		13/2		15/2	(0,0,0)	19816.95	(0.20)	[65017]
	26(4,23) - 25(5,20)					(0,0,0)	20359.6	(0.2)	[65017]
	42(7,35) - 41(8,34)					(0,0,0)	20521.7	(0.2)	[65017]
	13(3,10) - 14(2,13)					(0,1,0)	21063.5	(0.2)	[68037]
	28(6,22) - 29(5,25)					(0,0,0)	21809.3	(0.2)	[65017]
	16(2,14) - 17(1,17)					(0,0,0)	23340.0	(0.2)	[65017]
	16(2,14) - 17(1,17)					(0,0,0)	23342.4	(0.2)	[65017]
	31(5,26) - 30(6,25)					(0,0,0)	23364.2	(0.2)	[65017]
	11(3, 9) - 12(2,10)					(0,1,0)	23988.6	(0.2)	[68037]
	34(7,27) - 35(6,30)					(0,1,0)	25010.0	(0.2)	[68037]
	23(5,18) - 24(4,21)					(0,1,0)	25213.0	(0.2)	[68037]
	29(3,26) - 30(2,29)					(0,0,0)	25717.5	(0.2)	[65017]
	22(5,18) - 23(4,19)					(0,0,0)	26045.7	(0.2)	[65017]
	20(3,17) - 19(4,16)					(0,1,0)	26519.6	(0.2)	[68037]
	26(2,25) - 25(3,22)					(0,0,0)	26675.2	(0.2)	[65017]
	22(3,20) - 21(4,17)					(0,1,0)	26682.3	(0.2)	[68037]
	8(2, 6) - 9(1, 9)					(0,0,0)	27162.1	(0.2)	[65017]
	8(2, 6) - 9(1, 9)					(0,0,0)	27163.1	(0.2)	[65017]
	8(2, 6) - 9(1, 9)					(0,0,0)	27163.6	(0.2)	[65017]
	37(6,32) - 36(7,29)					(0,0,0)	27490.8	(0.2)	[65017]
	27(4,24) - 26(5,21)					(0,1,0)	28031.9	(0.2)	[68037]
	18(2,17) - 17(3,14)					(0,0,0)	28048.3	(0.2)	[65017]
	18(2,17) - 17(3,14)					(0,0,0)	28049.0	(0.2)	[65017]
	33(7,27) - 34(6,28)					(0,0,0)	28316.5	(0.2)	[65017]
	14(2,12) - 13(3,11)					(0,0,0)	28525.75	(0.20)	[65017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{17}O^{32}S^{18}O$	14(2,12) - 13(3,11)					(0,0,0)	28526.60	(0.20)	[65017]
	26(4,22) - 25(5,21)					(0,1,0)	28758.6	(0.2)	[68037]
	17(4,13) - 18(3,16)					(0,0,0)	28973.4	(0.2)	[65017]
	12(3, 9) - 13(2,12)					(0,0,0)	29260.15	(0.20)	[65017]
	12(3, 9) - 13(2,12)					(0,0,0)	29260.55	(0.20)	[65017]
	5(2, 4) - 6(1, 5)		5/2		7/2	(0,0,0)	29339.4	(0.2)	[65017]
	5(2, 4) - 6(1, 5)		15/2		17/2	(0,0,0)	29339.65	(0.20)	[65017]
	5(2, 4) - 6(1, 5)		7/2		9/2	(0,0,0)	29340.05	(0.20)	[65017]
	5(2, 4) - 6(1, 5)		9/2		11/2	(0,0,0)	29340.55	(0.20)	[65017]
	5(2, 4) - 6(1, 5)		13/2		15/2	(0,0,0)	29340.55	(0.20)	[65017]
	5(2, 4) - 6(1, 5)		11/2		13/2	(0,0,0)	29340.8	(0.2)	[65017]
	19(2,18) - 18(3,15)					(0,1,0)	29481.7	(0.2)	[68037]
	19(2,18) - 18(3,15)					(0,1,0)	29482.5	(0.2)	[68037]
	33(7,26) - 34(6,29)					(0,0,0)	29841.9	(0.2)	[65017]
	28(6,23) - 29(5,24)					(0,1,0)	29882.0	(0.2)	[68037]
	8(2, 6) - 9(1, 9)					(0,1,0)	30885.2	(0.2)	[68037]
	37(6,31) - 36(7,30)					(0,0,0)	31498.4	(0.2)	[65017]
	17(2,15) - 18(1,18)		35/2		37/2	(0,0,0)	32072.2	(0.2)	[65017]
	17(2,15) - 18(1,18)		33/2		35/2	(0,0,0)	32072.9	(0.2)	[65017]
	17(2,15) - 18(1,18)		31/2		33/2	(0,0,0)	32073.4	(0.2)	[65017]
	17(2,15) - 18(1,18)		39/2		41/2	(0,0,0)	32074.6	(0.2)	[65017]
	17(2,15) - 18(1,18)		29/2		31/2	(0,0,0)	32075.1	(0.2)	[65017]
	22(5,17) - 23(4,20)					(0,0,0)	33467.8	(0.2)	[65017]
	16(4,13) - 17(3,14)					(0,0,0)	33470.8	(0.2)	[65017]
	28(6,22) - 29(5,25)					(0,1,0)	33854.3	(0.2)	[68037]
	22(3,20) - 21(4,17)					(0,0,0)	34290.0	(0.2)	[65017]
	20(3,17) - 19(4,16)					(0,0,0)	34329.9	(0.2)	[65017]
	20(3,17) - 19(4,16)					(0,0,0)	34330.45	(0.20)	[65017]
	32(5,28) - 31(6,25)					(0,0,0)	34414.35	(0.20)	[65017]
	12(3, 9) - 13(2,12)					(0,1,0)	34823.1	(0.2)	[68037]
	9(1, 8) - 8(2, 7)					(0,1,0)	35098.2	(0.2)	[68037]
	19(2,18) - 18(3,15)					(0,0,0)	35152.1	(0.2)	[65017]
	19(2,18) - 18(3,15)					(0,0,0)	35153.1	(0.2)	[65017]
	7(2, 5) - 8(1, 8)					(0,0,0)	36133.0	(0.2)	[65017]
	7(2, 5) - 8(1, 8)					(0,0,0)	36134.0	(0.2)	[65017]
	7(2, 5) - 8(1, 8)					(0,0,0)	36134.6	(0.2)	[65017]
	17(4,13) - 18(3,16)					(0,1,0)	36652.0	(0.2)	[68037]
	27(6,22) - 28(5,23)					(0,0,0)	37637.1	(0.2)	[65017]
	27(4,24) - 26(5,21)					(0,0,0)	37822.4	(0.2)	[65017]
	9(1, 8) - 8(2, 7)					(0,0,0)	38091.9	(0.2)	[65017]
	9(1, 8) - 8(2, 7)					(0,0,0)	38093.0	(0.2)	[65017]
	38(8,30) - 39(7,33)					(0,0,0)	38485.4	(0.2)	[65017]
	26(4,22) - 25(5,21)					(0,0,0)	38851.3	(0.2)	[65017]
	7(2, 5) - 8(1, 8)					(0,1,0)	39766.2	(0.2)	[68037]
	20(2,19) - 19(3,16)					(0,0,0)	40393.6	(0.2)	[65017]
	23(3,21) - 22(4,18)					(0,1,0)	40716.6	(0.2)	[68037]
	10(3, 8) - 11(2, 9)					(0,0,0)	40720.80	(0.20)	[65017]
	16(4,13) - 17(3,14)					(0,1,0)	41236.6	(0.2)	[68037]
	22(5,17) - 23(4,20)					(0,1,0)	43331.5	(0.2)	[68037]
	23(2,22) - 22(3,19)					(0,0,0)	43607.45	(0.20)	[65017]
	21(2,20) - 20(3,17)					(0,0,0)	43625.0	(0.2)	[65017]
	21(2,20) - 20(3,17)					(0,0,0)	43626.2	(0.2)	[65017]
	11(3, 8) - 12(2,11)					(0,0,0)	43863.20	(0.20)	[65017]
	5(0, 5) - 4(1, 4)					(0,0,0)	44061.6	(0.2)	[65017]
	5(0, 5) - 4(1, 4)					(0,0,0)	44062.4	(0.2)	[65017]
	32(5,27) - 31(6,26)					(0,0,0)	44708.6	(0.2)	[65017]
	22(2,21) - 21(3,18)					(0,0,0)	44723.2	(0.2)	[65017]
	28(4,25) - 27(5,22)					(0,1,0)	45148.9	(0.2)	[68037]
	16(4,12) - 17(3,15)					(0,0,0)	45977.5	(0.2)	[65017]
	21(5,17) - 22(4,18)					(0,0,0)	46372.1	(0.2)	[65017]
	6(2, 4) - 7(1, 7)					(0,0,0)	46560.3	(0.2)	[65017]
	6(2, 4) - 7(1, 7)					(0,0,0)	46561.6	(0.2)	[65017]
	38(6,33) - 37(7,30)					(0,0,0)	46713.3	(0.2)	[65017]
	32(7,26) - 33(6,27)					(0,0,0)	46757.8	(0.2)	[65017]
	21(5,16) - 22(4,19)					(0,0,0)	51666.0	(0.2)	[65017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{17}O^{32}S^{18}O$	38(6,32) - 37(7,31)					(0,0,0)	52127.6	(0.2)	[65017]
$^{17}O^{34}S^{18}O$	13(3,10) - 14(2,13)					(0,0,0)	8528.9	(0.2)	[65017]
	11(3, 9) - 12(2,10)					(0,0,0)	8693.8	(0.2)	[65017]
	11(2, 9) - 12(1,12)					(0,0,0)	8820.7	(0.2)	[65017]
	22(5,18) - 23(4,19)					(0,0,0)	8984.9	(0.2)	[65017]
	10(2, 8) - 11(1,11)					(0,0,0)	11780.2	(0.2)	[65017]
	38(8,30) - 39(7,33)					(0,0,0)	11780.2	(0.2)	[65017]
	1(1, 1) - 2(0, 2)					(0,0,0)	11988.9	(0.2)	[65017]
	35(6,30) - 34(7,27)					(0,0,0)	12336.6	(0.2)	[65017]
	24(4,20) - 23(5,19)					(0,0,0)	12406.8	(0.2)	[65017]
	14(2,12) - 15(1,15)					(0,0,0)	12732.5	(0.2)	[65017]
	14(2,12) - 15(1,15)					(0,0,0)	12734.5	(0.2)	[65017]
	20(3,18) - 19(4,15)					(0,0,0)	14528.3	(0.2)	[65017]
	13(2,11) - 12(3,10)					(0,0,0)	14698.5	(0.2)	[65017]
	16(2,15) - 15(3,12)					(0,0,0)	14751.4	(0.2)	[65017]
	16(2,15) - 15(3,12)					(0,0,0)	14752.1	(0.2)	[65017]
	35(6,29) - 34(7,28)					(0,0,0)	15289.5	(0.2)	[65017]
	30(5,26) - 29(6,23)					(0,0,0)	16201.2	(0.2)	[65017]
	9(2, 7) - 10(1,10)					(0,0,0)	16743.1	(0.2)	[65017]
	9(2, 7) - 10(1,10)					(0,0,0)	16744.0	(0.2)	[65017]
	9(2, 7) - 10(1,10)					(0,0,0)	16744.8	(0.2)	[65017]
	27(6,22) - 28(5,23)					(0,0,0)	17467.8	(0.2)	[65017]
	17(4,13) - 18(3,16)					(0,0,0)	17635.25	(0.20)	[65017]
	25(4,22) - 24(5,19)					(0,0,0)	17684.6	(0.2)	[65017]
	22(5,17) - 23(4,20)					(0,0,0)	18087.4	(0.2)	[65017]
	15(2,13) - 16(1,16)					(0,0,0)	18352.2	(0.2)	[65017]
	16(4,13) - 17(3,14)					(0,0,0)	20003.6	(0.2)	[65017]
	8(1, 7) - 7(2, 6)					(0,0,0)	20666.8	(0.2)	[65017]
	8(1, 7) - 7(2, 6)					(0,0,0)	20667.8	(0.2)	[65017]
	27(6,21) - 28(5,24)					(0,0,0)	21279.0	(0.2)	[65017]
	12(3, 9) - 13(2,12)					(0,0,0)	21888.8	(0.2)	[65017]
	30(5,25) - 29(6,24)					(0,0,0)	23519.7	(0.2)	[65017]
	8(2, 6) - 9(1, 9)					(0,0,0)	23581.2	(0.2)	[65017]
	8(2, 6) - 9(1, 9)					(0,0,0)	23582.8	(0.2)	[65017]
	5(2, 4) - 6(1, 5)		19/2		21/2	(0,0,0)	23901.95	(0.20)	[65017]
	5(2, 4) - 6(1, 5)					(0,0,0)	23903.0	(0.2)	[65017]
	32(7,26) - 33(6,27)					(0,0,0)	24294.1	(0.2)	[65017]
	17(2,16) - 16(3,13)					(0,0,0)	24297.0	(0.2)	[65017]
	17(2,16) - 16(3,13)					(0,0,0)	24297.5	(0.2)	[65017]
	19(3,16) - 18(4,15)					(0,0,0)	25235.3	(0.2)	[65017]
	32(7,25) - 33(6,28)					(0,0,0)	25799.05	(0.20)	[65017]
	4(0, 4) - 3(1, 3)					(0,0,0)	26041.5	(0.2)	[65017]
	4(0, 4) - 3(1, 3)					(0,0,0)	26042.4	(0.2)	[65017]
	21(3,19) - 20(4,16)					(0,0,0)	29648.1	(0.2)	[65017]
	21(5,17) - 22(4,18)					(0,0,0)	29697.4	(0.2)	[65017]
	37(8,30) - 38(7,31)					(0,0,0)	30294.4	(0.2)	[65017]
	37(8,29) - 38(7,32)					(0,0,0)	30865.1	(0.2)	[65017]
	10(3, 8) - 11(2, 9)					(0,0,0)	31177.5	(0.2)	[65017]
	36(6,31) - 35(7,28)					(0,0,0)	31507.45	(0.20)	[65017]
	7(2, 5) - 8(1, 8)		15/2		17/2	(0,0,0)	32133.4	(0.2)	[65017]
	7(2, 5) - 8(1, 8)		17/2		19/2	(0,0,0)	32133.7	(0.2)	[65017]
	7(2, 5) - 8(1, 8)		13/2		15/2	(0,0,0)	32133.7	(0.2)	[65017]
	7(2, 5) - 8(1, 8)		11/2		13/2	(0,0,0)	32134.4	(0.2)	[65017]
	7(2, 5) - 8(1, 8)		19/2		21/2	(0,0,0)	32134.8	(0.2)	[65017]
	7(2, 5) - 8(1, 8)		9/2		11/2	(0,0,0)	32135.3	(0.2)	[65017]
	16(4,12) - 17(3,15)					(0,0,0)	34426.0	(0.2)	[65017]
	25(4,21) - 24(5,20)					(0,0,0)	34585.4	(0.2)	[65017]
	31(5,27) - 30(6,24)					(0,0,0)	34891.4	(0.2)	[65017]
	26(4,23) - 25(5,20)					(0,0,0)	35190.7	(0.2)	[65017]
	11(3, 8) - 12(2,11)					(0,0,0)	36163.0	(0.2)	[65017]
	21(5,16) - 22(4,19)					(0,0,0)	36204.7	(0.2)	[65017]
	26(6,21) - 27(5,22)					(0,0,0)	37305.8	(0.2)	[65017]
	19(2,18) - 18(3,15)					(0,0,0)	38240.4	(0.2)	[65017]
	14(2,12) - 13(3,11)					(0,0,0)	38982.4	(0.2)	[65017]
	26(6,20) - 27(5,23)					(0,0,0)	39997.8	(0.2)	[65017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{17}O^{34}S^{18}O$	23(2,22) - 22(3,19)					(0,0,0)	41133.5	(0.2)	[65017]
	15(4,12) - 16(3,13)					(0,0,0)	41276.9	(0.2)	[65017]
	6(2, 4) - 7(1, 7)					(0,0,0)	42224.2	(0.2)	[65017]
	20(2,19) - 19(3,16)					(0,0,0)	42282.5	(0.2)	[65017]
	20(2,19) - 19(3,16)					(0,0,0)	42283.6	(0.2)	[65017]
	9(1, 8) - 8(2, 7)					(0,0,0)	43735.7	(0.2)	[65017]
	9(1, 8) - 8(2, 7)					(0,0,0)	43736.6	(0.2)	[65017]
	22(2,21) - 21(3,18)					(0,0,0)	43815.6	(0.2)	[65017]
	22(3,20) - 21(4,17)					(0,0,0)	43930.6	(0.2)	[65017]
	21(2,20) - 21(3,17)					(0,0,0)	44175.4	(0.2)	[65017]
	21(2,20) - 21(3,17)					(0,0,0)	44177.3	(0.2)	[65017]
	31(7,24) - 32(6,27)					(0,0,0)	44738.2	(0.2)	[65017]
	31(5,26) - 30(6,25)					(0,0,0)	44829.6	(0.2)	[65017]
	4(2, 3) - 5(1, 4)					(0,0,0)	45326.5	(0.2)	[65017]
	4(2, 3) - 5(1, 4)					(0,0,0)	45327.45	(0.20)	[65017]
	5(0, 5) - 4(1, 4)					(0,0,0)	45752.1	(0.2)	[65017]
	5(0, 5) - 4(1, 4)					(0,0,0)	45752.9	(0.2)	[65017]
	18(2,16) - 19(1,19)					(0,0,0)	47448.4	(0.2)	[65017]
	18(2,16) - 19(1,19)					(0,0,0)	47449.6	(0.2)	[65017]
	1(1, 0) - 1(0, 1)					(0,0,0)	48332.2	(0.2)	[65017]
	2(1, 1) - 2(0, 2)					(0,0,0)	49731.8	(0.2)	[65017]
	2(1, 1) - 2(0, 2)					(0,0,0)	49732.4	(0.2)	[65017]
	20(5,15) - 21(4,17)					(0,0,0)	49832.5	(0.2)	[65017]
	36(8,28) - 37(7,31)					(0,0,0)	49845.6	(0.2)	[65017]
	15(4,11) - 16(3,14)					(0,0,0)	51547.4	(0.2)	[65017]
	3(1, 2) - 3(0, 3)					(0,0,0)	51887.5	(0.2)	[65017]
	9(3, 7) - 10(2, 8)					(0,0,0)	52762.4	(0.2)	[65017]
$^{17}O^{33}S^{17}O$	20(3,18) - 19(4,15)					(0,0,0)	9386.0	(0.2)	[68017]
	11(2, 9) - 12(1,12)					(0,0,0)	9642.8	(0.2)	[68017]
	11(2, 9) - 12(1,12)					(0,0,0)	9652.5	(0.2)	[68017]
	13(2,11) - 11(3,10)					(0,0,0)	9776.1	(0.2)	[68017]
	13(2,11) - 11(3,10)					(0,0,0)	9780.1	(0.2)	[68017]
	25(4,22) - 25(4,19)					(0,0,0)	10408.5	(0.2)	[68017]
	28(6,22) - 29(5,25)					(0,0,0)	11861.6	(0.2)	[68017]
	13(3,10) - 14(2,13)					(0,0,0)	11869.3	(0.2)	[68017]
	13(3,10) - 14(2,13)					(0,0,0)	11872.2	(0.2)	[68017]
	16(2,15) - 15(3,12)					(0,0,0)	11981.5	(0.2)	[68017]
	16(2,15) - 15(3,12)					(0,0,0)	11985.2	(0.2)	[68017]
	14(2,12) - 15(1,15)					(0,0,0)	12296.0	(0.2)	[68017]
	14(2,12) - 15(1,15)					(0,0,0)	12298.4	(0.2)	[68017]
	14(2,12) - 15(1,15)					(0,0,0)	12299.8	(0.2)	[68017]
	14(2,12) - 15(1,15)					(0,0,0)	12309.3	(0.2)	[68017]
	14(2,12) - 15(1,15)					(0,0,0)	12310.4	(0.2)	[68017]
	14(2,12) - 15(1,15)					(0,0,0)	12311.5	(0.2)	[68017]
	14(2,12) - 15(1,15)					(0,0,0)	12312.9	(0.2)	[68017]
	1(1, 1) - 2(0, 2)					(0,0,0)	12816.7	(0.2)	[68017]
	10(2, 8) - 11(1,11)					(0,0,0)	12941.4	(0.2)	[68017]
	10(2, 8) - 11(1,11)					(0,0,0)	12942.6	(0.2)	[68017]
	10(2, 8) - 11(1,11)					(0,0,0)	12947.3	(0.2)	[68017]
	10(2, 8) - 11(1,11)					(0,0,0)	12951.7	(0.2)	[68017]
	10(2, 8) - 11(1,11)					(0,0,0)	12953.3	(0.2)	[68017]
	30(5,25) - 29(6,24)					(0,0,0)	13328.9	(0.2)	[68017]
	30(5,25) - 29(6,24)					(0,0,0)	13329.8	(0.2)	[68017]
	11(3, 9) - 12(2,10)					(0,0,0)	13461.7	(0.2)	[68017]
	11(3, 9) - 12(2,10)					(0,0,0)	13465.3	(0.2)	[68017]
	33(7,27) - 34(6,28)					(0,0,0)	16139.1	(0.2)	[68017]
	22(5,18) - 23(4,19)					(0,0,0)	17279.5	(0.2)	[68017]
	22(5,18) - 23(4,19)					(0,0,0)	17280.8	(0.2)	[68017]
	33(7,26) - 34(6,29)					(0,0,0)	17945.2	(0.2)	[68017]
	8(1, 7) - 7(2, 6)					(0,0,0)	17965.0	(0.2)	[68017]
	8(1, 7) - 7(2, 6)					(0,0,0)	17966.4	(0.2)	[68017]
	8(1, 7) - 7(2, 6)					(0,0,0)	17970.5	(0.2)	[68017]
	8(1, 7) - 7(2, 6)					(0,0,0)	17971.9	(0.2)	[68017]
	19(3,16) - 18(4,15)					(0,0,0)	18204.2	(0.2)	[68017]
	19(3,16) - 18(4,15)					(0,0,0)	18206.9	(0.2)	[68017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{17}O^{33}S^{17}O$	9(2, 7) - 10(1,10)					(0,0,0)	18208.8	(0.2)	[68017]
	36(6,31) - 35(7,28)					(0,0,0)	20275.8	(0.2)	[68017]
	36(6,31) - 35(7,28)					(0,0,0)	20276.2	(0.2)	[68017]
	17(2,16) - 16(3,13)					(0,0,0)	21907.3	(0.2)	[68017]
	17(2,16) - 16(3,13)					(0,0,0)	21911.6	(0.2)	[68017]
	17(4,13) - 18(3,16)					(0,0,0)	23104.85	(0.20)	[68017]
	36(6,30) - 35(7,29)					(0,0,0)	23746.0	(0.2)	[68017]
	38(8,31) - 39(7,32)					(0,0,0)	24051.8	(0.2)	[68017]
	38(8,30) - 39(7,33)					(0,0,0)	24720.5	(0.2)	[68017]
	21(3,19) - 20(4,16)					(0,0,0)	24741.6	(0.2)	[68017]
	21(3,19) - 20(4,16)					(0,0,0)	24742.7	(0.2)	[68017]
	4(0, 4) - 3(1, 3)					(0,0,0)	25216.4	(0.2)	[68017]
	4(0, 4) - 3(1, 3)					(0,0,0)	25219.1	(0.2)	[68017]
	4(0, 4) - 3(1, 3)					(0,0,0)	25221.8	(0.2)	[68017]
	4(0, 4) - 3(1, 3)					(0,0,0)	25222.6	(0.2)	[68017]
	4(0, 4) - 3(1, 3)					(0,0,0)	25224.6	(0.2)	[68017]
	8(2, 6) - 9(1, 9)					(0,0,0)	25293.0	(0.2)	[68017]
	8(2, 6) - 9(1, 9)					(0,0,0)	25294.6	(0.2)	[68017]
	8(2, 6) - 9(1, 9)					(0,0,0)	25296.2	(0.2)	[68017]
	8(2, 6) - 9(1, 9)					(0,0,0)	25302.5	(0.2)	[68017]
	8(2, 6) - 9(1, 9)					(0,0,0)	25304.1	(0.2)	[68017]
	12(3, 9) - 13(2,12)					(0,0,0)	25436.3	(0.2)	[68017]
	12(3, 9) - 13(2,12)					(0,0,0)	25438.6	(0.2)	[68017]
	22(5,17) - 23(4,20)					(0,0,0)	25521.3	(0.2)	[68017]
	31(5,27) - 30(6,24)					(0,0,0)	25618.4	(0.2)	[68017]
	25(4,21) - 24(5,20)					(0,0,0)	25753.6	(0.2)	[68017]
	25(4,21) - 24(5,20)					(0,0,0)	25755.3	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	26531.0	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	26531.9	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	26533.1	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	26536.8	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	26537.7	(0.2)	[68017]
	5(2, 4) - 6(1, 5)					(0,0,0)	26539.1	(0.2)	[68017]
	16(4,13) - 17(3,14)					(0,0,0)	26547.0	(0.2)	[68017]
	16(4,13) - 17(3,14)					(0,0,0)	26549.1	(0.2)	[68017]
	27(6,22) - 28(5,23)					(0,0,0)	27262.0	(0.2)	[68017]
	27(6,22) - 28(5,23)					(0,0,0)	27262.9	(0.2)	[68017]
	26(4,23) - 25(5,20)					(0,0,0)	28042.3	(0.2)	[68017]
	18(2,17) - 17(3,14)					(0,0,0)	30249.4	(0.2)	[68017]
	18(2,17) - 17(3,14)					(0,0,0)	30254.4	(0.2)	[68017]
	27(6,21) - 28(5,24)					(0,0,0)	30607.4	(0.2)	[68017]
	43(9,34) - 44(8,37)					(0,0,0)	31716.5	(0.2)	[68017]
	43(9,34) - 44(8,37)					(0,0,0)	31716.95	(0.20)	[68017]
	42(7,36) - 41(8,33)					(0,0,0)	32992.1	(0.2)	[68017]
	42(7,36) - 41(8,33)					(0,0,0)	32992.5	(0.2)	[68017]
	14(2,12) - 13(3,11)					(0,0,0)	33903.2	(0.2)	[68017]
	14(2,12) - 13(3,11)					(0,0,0)	33907.4	(0.2)	[68017]
	17(2,15) - 18(1,18)					(0,0,0)	33922.9	(0.2)	[68017]
	17(2,15) - 18(1,18)					(0,0,0)	33923.9	(0.2)	[68017]
	17(2,15) - 18(1,18)					(0,0,0)	33925.0	(0.2)	[68017]
	17(2,15) - 18(1,18)					(0,0,0)	33937.0	(0.2)	[68017]
	17(2,15) - 18(1,18)					(0,0,0)	33938.1	(0.2)	[68017]
	17(2,15) - 18(1,18)					(0,0,0)	33939.2	(0.2)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	34052.6	(0.2)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	34053.6	(0.2)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	34054.0	(0.2)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	34054.4	(0.2)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	34055.2	(0.2)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	34055.6	(0.2)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	34061.5	(0.2)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	34062.3	(0.2)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	34062.8	(0.2)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	34063.2	(0.2)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	34064.0	(0.2)	[68017]
	7(2, 5) - 8(1, 8)					(0,0,0)	34064.3	(0.2)	[68017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{17}O^{33}S^{17}O$	31(5,26) - 30(6,25)					(0,0,0)	34371.0	(0.2)	[68017]
	31(5,26) - 30(6,25)					(0,0,0)	34372.2	(0.2)	[68017]
	42(7,35) - 41(8,34)					(0,0,0)	34793.0	(0.2)	[68017]
	42(7,35) - 41(8,34)					(0,0,0)	34793.6	(0.2)	[68017]
	32(7,26) - 33(7,27)					(0,0,0)	35656.7	(0.2)	[68017]
	32(7,26) - 33(7,27)					(0,0,0)	35657.25	(0.20)	[68017]
	19(2,18) - 18(3,15)					(0,0,0)	36824.0	(0.2)	[68017]
	19(2,18) - 18(3,15)					(0,0,0)	36830.5	(0.2)	[68017]
	32(7,25) - 33(6,28)					(0,0,0)	36937.6	(0.2)	[68017]
	21(5,17) - 22(4,18)					(0,0,0)	37796.1	(0.2)	[68017]
	21(5,17) - 22(4,18)					(0,0,0)	37797.2	(0.2)	[68017]
	22(3,20) - 21(4,17)					(0,0,0)	39319.7	(0.2)	[68017]
	22(3,20) - 21(4,17)					(0,0,0)	39321.3	(0.2)	[68017]
	37(6,32) - 36(7,29)					(0,0,0)	39476.1	(0.2)	[68017]
	11(3, 8) - 12(2,11)					(0,0,0)	39875.1	(0.2)	[68017]
	11(3, 8) - 12(2,11)					(0,0,0)	39877.0	(0.2)	[68017]
	16(4,12) - 17(3,15)					(0,0,0)	40004.0	(0.2)	[68017]
	9(1, 8) - 8(2, 7)					(0,0,0)	40999.8	(0.2)	[68017]
	9(1, 8) - 8(2, 7)					(0,0,0)	41000.8	(0.2)	[68017]
	9(1, 8) - 8(2, 7)					(0,0,0)	41005.4	(0.2)	[68017]
	9(1, 8) - 8(2, 7)					(0,0,0)	41006.5	(0.2)	[68017]
	20(2,19) - 19(3,16)					(0,0,0)	41463.5	(0.2)	[68017]
	20(2,19) - 19(3,16)					(0,0,0)	41469.8	(0.2)	[68017]
	20(3,17) - 19(4,16)					(0,0,0)	42037.6	(0.2)	[68017]
	20(3,17) - 19(4,16)					(0,0,0)	42040.6	(0.2)	[68017]
	37(8,30) - 38(7,31)					(0,0,0)	43277.85	(0.20)	[68017]
	37(8,30) - 38(7,31)					(0,0,0)	43278.35	(0.20)	[68017]
	21(5,16) - 22(4,19)					(0,0,0)	43681.7	(0.2)	[68017]
	21(2,20) - 20(3,17)					(0,0,0)	44019.5	(0.2)	[68017]
	21(2,20) - 20(3,17)					(0,0,0)	44026.5	(0.2)	[68017]
	37(6,31) - 36(7,30)					(0,0,0)	44206.5	(0.2)	[68017]
	37(6,31) - 36(7,30)					(0,0,0)	44207.35	(0.20)	[68017]
	32(5,28) - 31(6,25)					(0,0,0)	44273.9	(0.2)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	44310.2	(0.2)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	44318.4	(0.2)	[68017]
	6(2, 4) - 7(1, 7)					(0,0,0)	44319.4	(0.2)	[68017]
	5(0, 5) - 4(1, 4)					(0,0,0)	44931.9	(0.2)	[68017]
	5(0, 5) - 4(1, 4)					(0,0,0)	44933.8	(0.2)	[68017]
	5(0, 5) - 4(1, 4)					(0,0,0)	44937.1	(0.2)	[68017]
	5(0, 5) - 4(1, 4)					(0,0,0)	44938.0	(0.2)	[68017]
	5(0, 5) - 4(1, 4)					(0,0,0)	44939.0	(0.2)	[68017]
	18(2,16) - 19(1,19)					(0,0,0)	45093.2	(0.2)	[68017]
	27(4,24) - 26(5,21)					(0,0,0)	45344.9	(0.2)	[68017]
	26(6,21) - 27(5,22)					(0,0,0)	46958.3	(0.2)	[68017]
	26(6,21) - 27(5,22)					(0,0,0)	46959.0	(0.2)	[68017]
	15(4,12) - 16(3,13)					(0,0,0)	47634.5	(0.2)	[68017]
	15(4,12) - 16(3,13)					(0,0,0)	47636.4	(0.2)	[68017]
	4(2, 3) - 5(1, 4)					(0,0,0)	47927.6	(0.2)	[68017]
	4(2, 3) - 5(1, 4)					(0,0,0)	47928.5	(0.2)	[68017]
	4(2, 3) - 5(1, 4)					(0,0,0)	47929.5	(0.2)	[68017]
	4(2, 3) - 5(1, 4)					(0,0,0)	47930.1	(0.2)	[68017]
	4(2, 3) - 5(1, 4)					(0,0,0)	47934.3	(0.2)	[68017]
	4(2, 3) - 5(1, 4)					(0,0,0)	47935.2	(0.2)	[68017]
	4(2, 3) - 5(1, 4)					(0,0,0)	47936.0	(0.2)	[68017]
	26(6,20) - 27(5,23)					(0,0,0)	49318.95	(0.20)	[68017]
	42(9,34) - 43(8,35)					(0,0,0)	50536.5	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	50556.2	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	50560.8	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	50562.7	(0.2)	[68017]
	2(1, 1) - 2(0, 2)					(0,0,0)	50567.3	(0.2)	[68017]
	3(1, 2) - 3(0, 3)					(0,0,0)	52681.5	(0.2)	[68017]
	3(1, 2) - 3(0, 3)					(0,0,0)	52684.7	(0.2)	[68017]
	3(1, 2) - 3(0, 3)					(0,0,0)	52687.9	(0.2)	[68017]
	3(1, 2) - 3(0, 3)					(0,0,0)	52691.2	(0.2)	[68017]
	23(3,21) - 22(4,18)					(0,0,0)	52963.7	(0.2)	[68017]

TABLE 51.7. The microwave spectrum of SO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	F'	F'_1	F''	F''_1	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{17}O^{33}S^{17}O$	23(3,21) - 22(4,18)					(0,0,0)	52965.6	(0.2)	[68017]
	31(7,25) - 32(6,26)					(0,0,0)	54941.8	(0.2)	[68017]
	10(3, 7) - 11(2,10)					(0,0,0)	55038.2	(0.2)	[68017]
	10(3, 7) - 11(2,10)					(0,0,0)	55039.8	(0.2)	[68017]
	31(7,24) - 32(6,27)					(0,0,0)	55838.7	(0.2)	[68017]
	5(2, 3) - 6(1, 6)					(0,0,0)	55891.5	(0.2)	[68017]
	5(2, 3) - 6(1, 6)					(0,0,0)	55899.0	(0.2)	[68017]
	5(2, 3) - 6(1, 6)					(0,0,0)	55900.0	(0.2)	[68017]
	32(5,27) - 31(6,26)					(0,0,0)	56025.6	(0.2)	[68017]
	32(5,27) - 31(6,26)					(0,0,0)	56026.9	(0.2)	[68017]
	15(4,11) - 16(3,14)					(0,0,0)	57206.2	(0.2)	[68017]
	9(3, 7) - 10(2, 8)					(0,0,0)	57269.6	(0.2)	[68017]
	9(3, 7) - 10(2, 8)					(0,0,0)	57272.3	(0.2)	[68017]
	15(2,13) - 14(3,12)					(0,0,0)	58876.75	(0.20)	[68017]
	15(2,13) - 14(3,12)					(0,0,0)	58882.2	(0.2)	[68017]

*Calculated transition frequency.

Table 52. Rotational and centrifugal distortion constants for $^{80}SeO_2$ and $^{78}SeO_2$ in the ground vibrational state.

Watson's Determinable Parameters	$^{80}SeO_2$ Value[a] (MHz)	$^{78}SeO_2$ Value[a] (MHz)
A''	28 826.381(92)	29 037.626(105)
B''	8 676.6008(284)	8 676.4604(382)
C''	6 651.8491(266)	6 663.0034(323)
τ_1	0.11101(2149)	0.17091(3596)
τ_2	0.008619(4323)	0.02037(744)
τ_3[b]	0.10(6)	-0.05(10)
τ_{aaaa}	-2.2166(133)	-2.2107(217)
τ_{bbbb}	-0.047283(2327)	-0.041080(3764)
τ_{cccc}	$-0.9664(1244)\times10^{-2}$	$-0.578(178)\times10^{-2}$
Std. dev.	0.244	0.265
No. lines fit	26	23
μ_b (D)	2.62(5)[c]	
Derived Parameters (assuming planarity conditions)		
A'	28 826.373(92)	29 037.620(105)
B'	8 676.603(27)	8 676.469(35)
C'	6 651.910(28)	6 663.086(32)
τ'_{bbcc}	-0.0166(17)	-0.0121(31)
τ'_{ccaa}	$0.49(48)\times10^{-2}$	0.018(11)
τ'_{aabb}	0.123(15)	0.165(23)
$\tau_{aabb}(1)$	0.2106(69)	0.229(17)
$\tau_{aabb}(2)$	0.2088(79)	0.2365(90)
$\tau_{aabb}(3)$	0.2088(79)	0.2365(90)
$\tau_{abab}(1)$	-0.0440(44)	-0.0322(54)
$\tau_{abab}(2)$	-0.0424(71)	-0.038(13)
$\tau_{abab}(3)$	-0.0421(79)	-0.039(16)
$\Delta\tau$	$-0.12(37)\times10^{-3}$	$0.45(93)\times10^{-3}$

[a] The uncertainties quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

[c] Reference [72044].

Table 52.1. Rotational constants for SeO_2 [70035].

Isotopic Species	Vib. State v_1 v_2 v_3	A (MHz)	B(MHz)	C MHz)
$^{82}Se^{16}O_2$	0 0 0	28 624.76	8 676.47	6 640.98
$^{80}Se^{16}O_2$ [a]	1 0 0	28 763.70(72)	8 640.26(18)	6 623.25(27)
	0 1 0	29 261.86(57)	8 677.27(18)	6 638.58(12)
	0 2 0	29 712.50(80)	8 677.63(40)	6 625.06(40)
	0 0 1	28 651.43(80)	8 649.49(30)	6 631.49(30)
$^{78}Se^{16}O_2$ [a]	1 0 0	28 975.47	8 640.09	6 634.24
	0 1 0	29 477.03	8 677.11	6 649.60
	0 0 1	28 858.47	8 649.33	6 642.26
$^{77}Se^{16}O_2$	0 0 0	29 146.70	8 676.38	6 668.68
$^{76}Se^{16}O_2$	0 0 0	29 260.12	8 676.42	6 674.17

[a] See Table 52 for the ground state constants for these species.

TABLE 52.2. The microwave spectrum of SeO_2

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{82}SeO_2$	2(0, 2) - 1(1, 1)	(0,0,0)	10538.97	(0.30)	[70035]
	2(1, 1) - 2(0, 2)	(0,0,0)	24166.92	(0.30)	[70035]
	3(0, 3) - 2(1, 2)	(0,0,1)	27300.98	(0.30)	[70035]
	3(1, 2) - 3(0, 3)	(0,0,1)	27542.46	(0.30)	[70035]
	4(1, 3) - 4(0, 4)	(0,0,0)	32899.76	(0.30)	[70035]
$^{80}SeO_2$	8(4, 4) - 9(3, 7)	(0,0,0)	8415.48	(0.30)	[70035]
	2(0, 2) - 1(1, 1)	(0,1,0)	9902.89	(0.30)	[70035]
	2(0, 2) - 1(1, 1)	(0,0,0)	10362.29	(0.30)	[70035]
	18(6,12) - 17(7,11)	(0,0,0)	10813.95	(0.30)	[70035]
	13(6, 8) - 14(5, 9)	(0,0,0)	11514.72	(0.30)	[70035]
	13(4,10) - 12(5, 7)	(0,0,0)	14360.68	(0.30)	[70035]
	10(2, 8) - 11(1,11)	(0,0,0)	16193.20	(0.30)	[70035]
	10(3, 7) - 9(4, 6)	(0,0,0)	16545.56	(0.30)	[70035]
	9(2, 8) - 8(3, 5)	(0,1,0)	17342.54	(0.30)	[70035]
	10(5, 5) - 11(4, 8)	(0,0,0)	17922.40	(0.30)	[70035]
	9(2, 8) - 8(3, 5)	(0,0,0)	19564.22	(0.30)	[70035]
	7(4, 4) - 8(3, 5)	(0,0,0)	20958.70	(0.30)	[70035]
	11(3, 9) - 10(4, 7)	(0,0,0)	20999.34	(0.30)	[70035]
	1(1, 0) - 1(0, 1)	(0,0,1)	22019.48	(0.30)	[70035]
	15(7, 9) - 16(6,10)	(0,0,0)	23088.56	(0.30)	[70035]
	16(5,11) - 15(6,10)	(0,0,0)	23627.00	(0.30)	[70035]
	2(2, 0) - 3(1, 3)	(0,0,0)	23799.92	(0.30)	[70035]
	7(4, 4) - 8(3, 5)	(0,1,0)	24197.50	(0.30)	[70035]
	2(1, 1) - 2(0, 2)	(1,0,0)	24301.26	(0.30)	[70035]
	2(1, 1) - 2(0, 2)	(0,0,0)	24343.86	(0.30)	[70035]
	2(1, 1) - 2(0, 2)	(0,1,0)	24806.06	(0.30)	[70035]
	2(2, 0) - 3(1, 3)	(0,1,0)	25204.14	(0.30)	[70035]
	3(0, 3) - 2(1, 2)	(0,0,1)	27137.98	(0.30)	[70035]
	19(6,14) - 18(7,11)	(0,0,0)	27158.82	(0.30)	[70035]
	3(1, 2) - 3(0, 3)	(0,0,1)	27691.36	(0.30)	[70035]
	12(6, 6) - 13(5, 9)	(0,0,0)	28671.70	(0.30)	[70035]
	4(3, 1) - 5(2, 4)	(0,0,0)	29975.32	(0.30)	[70035]
	4(3, 1) - 5(2, 4)	(1,0,0)	30143.88	(0.30)	[70035]
	11(2,10) - 10(3, 7)	(0,1,0)	30752.92	(0.30)	[70035]
	4(3, 1) - 5(2, 4)	(0,1,0)	32240.54	(0.30)	[70035]
	8(2, 6) - 7(3, 5)	(0,1,0)	32498.68	(0.30)	[70035]
	11(2,10) - 10(3, 7)	(0,0,0)	32869.36	(0.30)	[70035]
	4(1, 3) - 4(0, 4)	(1,0,0)	32929.74	(0.30)	[70035]
	4(1, 3) - 4(0, 4)	(0,0,0)	33008.52	(0.30)	[70035]
	9(5, 5) - 10(4, 6)	(0,0,0)	33362.80	(0.30)	[70035]
	22(7,15) - 21(8,14)	(0,0,0)	33499.00	(0.30)	[70035]
	4(1, 3) - 4(0, 4)	(0,1,0)	33510.82	(0.30)	[70035]
	13(2,12) - 12(3, 9)	(0,0,0)	33591.88	(0.30)	[70035]

TABLE 52.2. The microwave spectrum of SeO_2—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{80}SeO_2$	9(5, 5) - 10(4, 6)	(1,0,0)	33766.24	(0.30)	[70035]
	17(8,10) - 18(7,11)	(0,0,0)	34276.06	(0.30)	[70035]
	8(2, 6) - 7(3, 5)	(1,0,0)	34365.88	(0.30)	[70035]
	8(2, 6) - 7(3, 5)	(0,0,0)	34827.08	(0.30)	[70035]
	1(1, 1) - 0(0, 0)	(1,0,0)	35386.42	(0.30)	[70035]
	1(1, 1) - 0(0, 0)	(0,0,0)	35477.84	(0.30)	[70035]
	1(1, 1) - 0(0, 0)	(0,1,0)	35899.18	(0.30)	[70035]
$^{78}SeO_2$	16(7, 9) - 17(6,12)	(0,0,0)	9252.78	(0.30)	[70035]
	2(0, 2) - 1(1, 1)	(0,1,0)	9712.72	(0.30)	[70035]
	8(4, 4) - 9(3, 7)	(0,0,0)	9756.00	(0.30)	[70035]
	2(0, 2) - 1(1, 1)	(0,0,0)	10176.23	(0.30)	[70035]
	13(4,10) - 12(5, 7)	(0,0,0)	12601.50	(0.30)	[70035]
	13(6, 8) - 14(5, 9)	(0,0,0)	13769.86	(0.30)	[70035]
	10(3, 7) - 9(4, 6)	(0,0,0)	14933.84	(0.30)	[70035]
	9(2, 8) - 8(3, 5)	(0,0,0)	18910.96	(0.30)	[70035]
	10(5, 5) - 11(4, 8)	(0,0,0)	19710.38	(0.30)	[70035]
	11(3, 9) - 10(4, 6)	(0,0,0)	19768.52	(0.30)	[70035]
	16(5,11) - 15(6,10)	(0,0,0)	21254.32	(0.30)	[70035]
	1(1, 0) - 1(0, 1)	(0,0,1)	22215.74	(0.30)	[70035]
	7(4, 4) - 8(3, 5)	(0,0,0)	22420.70	(0.30)	[70035]
	2(1, 1) - 2(0, 2)	(1,0,0)	24488.04	(0.30)	[70035]
	19(6,14) - 18(7,11)	(0,0,0)	24498.72	(0.30)	[70035]
	2(1, 1) - 2(0, 2)	(0,0,0)	24530.00	(0.30)	[70035]
	2(1, 1) - 2(0, 2)	(0,1,0)	24995.80	(0.30)	[70035]
	15(7, 9) - 16(6,10)	(0,0,0)	25716.20	(0.30)	[70035]
	3(1, 2) - 3(0, 3)	(0,0,1)	27847.86	(0.30)	[70035]
	3(0, 3) - 2(1, 2)	(0,0,1)	29966.08	(0.30)	[70035]
	12(6, 6) - 13(5, 9)	(0,0,0)	30875.34	(0.30)	[70035]
	4(3, 1) - 5(2, 4)	(0,0,0)	30930.80	(0.30)	[70035]
	20(9,11) - 21(8,14)	(0,0,0)	32246.60	(0.30)	[70035]
	11(2,10) - 10(3, 7)	(0,0,0)	32609.30	(0.30)	[70035]
	4(1, 3) - 4(0, 4)	(1,0,0)	33046.88	(0.30)	[70035]
	4(1, 3) - 4(0, 4)	(0,0,0)	33124.30	(0.30)	[70035]
	8(2, 6) - 7(3, 5)	(0,0,0)	33630.14	(0.30)	[70035]
	4(1, 3) - 4(0, 4)	(0,1,0)	33630.86	(0.30)	[70035]
	13(2,12) - 12(3, 9)	(0,0,0)	33912.36	(0.30)	[70035]
	9(5, 5) - 10(4, 6)	(0,0,0)	35187.34	(0.30)	[70035]
	1(1, 1) - 0(0, 0)	(1,0,0)	35609.16	(0.30)	[70035]
	1(1, 1) - 0(0, 0)	(0,0,0)	35699.82	(0.30)	[70035]
$^{77}SeO_2$	2(0, 2) - 1(1, 1)	(0,0,0)	10097.26	(0.30)	[70035]
	2(1, 1) - 2(0, 2)	(0,0,0)	24625.80	(0.30)	[70035]
	3(0, 3) - 2(1, 2)	(0,0,1)	26876.26	(0.30)	[70035]
	3(1, 2) - 3(0, 3)	(0,0,1)	27929.40	(0.30)	[70035]
	4(1, 3) - 4(0, 4)	(0,0,0)	33184.58	(0.30)	[70035]
$^{76}SeO_2$	2(0, 2) - 1(1, 1)	(0,0,0)	9979.71	(0.30)	[70035]
	1(1, 0) - 1(0, 1)	(0,0,1)	22465.54	(0.30)	[70035]
	2(1, 1) - 2(0, 2)	(0,0,0)	24725.78	(0.30)	[70035]
	4(1, 3) - 4(0, 4)	(0,0,0)	33247.40	(0.30)	[70035]

Table 53. Rotational and centrifugal distortion constants for $^{16}O_3$, $^{16}O^{18}O^{16}O$ and $^{16}O^{16}O^{18}O$ [76000].

Watson's Determinable Parameters	$^{16}O_3$ Value[a] (MHz)	$^{16}O^{18}O^{16}O$ Value[a] (MHz)	$^{16}O^{16}O^{18}O$ Value[a] (MHz)
A"	106 536.259(6)	98 646.71473(273)	104 573.1895(24)
B"	13 349.02873(100)	13 352.52852(54)	12 591.32208(44)
C"	11 834.53118(90)	11 731.94624(49)	11 212.65200(42)
τ_1	0.0580530(2314)	-0.0030321(1126)	0.0815267(812)
τ_2	-0.02874625(2927)	-0.03267022(1513)	-0.02383237(1013)
τ_3[b]	4.471(1)	3.8373(5)	4.3062(4)
τ_{aaaa}	-25.21339(125)	-21.59149(66)	-24.27298(50)
τ_{bbbb}	-0.07121405(1350)	-0.07118773(691)	-0.06334543(471)
τ_{cccc}	-0.0377270(103)	-0.03621058(595)	-0.03425890(470)
H_J	$0.1001(261)\times10^{-7}$	$0.1088(124)\times10^{-7}$	$0.9030(916)\times10^{-8}$
H_{JK}	$-0.2176(1027)\times10^{-6}$	$-0.1227(869)\times10^{-6}$	$-0.1506(619)\times10^{-6}$
H_{KJ}	$-0.55393(720)\times10^{-4}$	$-0.46879(408)\times10^{-4}$	$-0.50900(385)\times10^{-4}$
H_K	0.0011741(101)	$0.93268(418)\times10^{-3}$	0.0011095(41)
h_J[c]	$0.1063(85)\times10^{-7}$	$0.1127(66)\times10^{-7}$	$0.9107(592)\times10^{-8}$
h_{JK}	$0.262(110)\times10^{-6}$	$0.196(90)\times10^{-6}$	$0.207(87)\times10^{-6}$
h_K	$0.6816(546)\times10^{-4}$	$0.6137(539)\times10^{-4}$	$0.6132(492)\times10^{-4}$
Std. dev.	0.056	0.028	0.035
No. lines fit	117	93	180
Derived Parameters (Assuming planarity conditions)			
A'	106 536.234(6)	98 646.6909(27)	104 573.1673(24)
B'	13 349.0901(10)	13 352.5730(5)	12 591.3846(4)
C'	11 834.5235(9)	11 731.9241(5)	11 212.6524(4)
τ'_{bbcc}	-0.049199(11)	-0.0477592(60)	-0.0444102(41)
τ'_{ccaa}	0.122657(81)	0.088995(53)	0.125122(40)
τ'_{aabb}	-0.01541(19)	-0.044268(91)	0.000815(69)
$\tau_{aabb}(1)$	0.5585(1)	0.51726(7)	0.51546(5)
$\tau_{aabb}(2)$	0.5378(2)	0.49786(15)	0.49713(16)
$\tau_{aabb}(3)$	0.5378(2)	0.49786(15)	0.49713(16)
$\tau_{abab}(1)$	-0.28694(10)	-0.28076(5)	-0.25732(4)
$\tau_{abab}(2)$	-0.26831(21)	-0.26339(13)	-0.24074(14)
$\tau_{abab}(3)$	-0.26623(23)	-0.26131(15)	-0.23894(15)
$\Delta\tau$	$-0.4124(46)\times10^{-3}$	$-0.4358(33)\times10^{-3}$	$-0.3437(27)\times10^{-3}$

[a] The uncertainties quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

[c] Watson uses $2h_J$ for this parameter.

Table 53.1. Rotational and centrifugal distortion constants for $^{18}O^{16}O^{18}O$, $^{16}O^{18}O^{18}O$, and $^{18}O_3$ [76000].

Watson's Determinable Parameters	$^{18}O^{16}O^{18}O$ Value[a] (MHz)	$^{16}O^{18}O^{18}O$ Value[a] (MHz)	$^{18}O_3$ Value[a] (MHz)
A"	102 579.249(4)	96 684.94345(285)	94 689.3483(36)
B"	11 865.29029(71)	12 593.15886(54)	11 868.46370(63)
C"	10 612.00496(64)	11 115.84796(51)	10 522.87786(64)
τ_1	0.102117(136)	0.0232046(899)	0.0460185(875)
τ_2	-0.0194586(167)	-0.02735534(1171)	-0.0226809(113)
τ_3[b]	4.139(8)	3.6828(5)	3.5287(4)
τ_{aaaa}	-23.34556(98)	-20.72275(47)	-19.86888(72)
τ_{bbbb}	-0.05622077(802)	-0.06328626(558)	-0.05619313(509)
τ_{cccc}	-0.03101973(641)	-0.03286321(514)	-0.0297610(57)
H_J	$0.7463(1271)\times10^{-8}$	$0.6106(846)\times10^{-8}$	$0.5235(774)\times10^{-8}$
H_{JK}	$-0.1758(482)\times10^{-6}$	$-0.2335(808)\times10^{-6}$	$-0.588(544)\times10^{-7}$
H_{KJ}	$-0.45781(417)\times10^{-4}$	$-0.41848(394)\times10^{-4}$	$-0.39020(370)\times10^{-4}$
H_K	$0.10258(89)\times10^{-2}$	$0.86660(337)\times10^{-3}$	$0.81633(558)\times10^{-3}$
h_J[c]	$0.7357(373)\times10^{-8}$	$0.8671(613)\times10^{-8}$	$0.9156(648)\times10^{-8}$
h_{JK}	$0.241(49)\times10^{-6}$	$0.168(82)\times10^{-6}$	$-0.433(740)\times10^{-7}$
h_K	$0.5262(346)\times10^{-4}$	$0.5382(522)\times10^{-4}$	$0.5495(366)\times10^{-4}$
Std. dev.	0.038	0.040	0.041
No. lines fit	97	180	103
Derived Parameters (assuming planarity conditions)			
A'	102 579.229(40)	96 684.922(3)	94 689.329(4)
B'	11 865.3536(7)	12 593.2054(5)	11 868.5117(6)
C'	10 612.0127(6)	11 115.8345(5)	10 522.8723(6)
τ'_{bbcc}	-0.039969(7)	-0.043111(5)	-0.038839(4)
τ'_{ccaa}	0.12666(7)	0.09315(5)	0.09601(6)
τ'_{aabb}	0.01543(12)	-0.02683(8)	-0.01115(7)
$\tau_{aabb}(1)$	0.47575(9)	0.47672(6)	0.43920(7)
$\tau_{aabb}(2)$	0.45939(17)	0.45948(15)	0.42437(21)
$\tau_{aabb}(3)$	0.45939(17)	0.45948(15)	0.42437(21)
$\tau_{abab}(1)$	-0.23015(8)	-0.25177(5)	-0.22517(6)
$\tau_{abab}(2)$	-0.21531(15)	-0.23629(13)	-0.21181(19)
$\tau_{abab}(3)$	-0.21375(17)	-0.23449(14)	-0.21031(21)
$\Delta\tau$	$-0.288(3)\times10^{-3}$	$-0.365(3)\times10^{-3}$	$-0.296(4)\times10^{-3}$

[a] The uncertainties quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_1, τ_2, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

[c] Watson uses $2h_J$ for this parameter.

Table 53.2. Rotational and centrifugal distortion constants for $^{16}O_3$ in the ν_1=1, ν_2=1 and ν_3=1 vibrational states.

Watson's Determinable Parameters	Value for the (1,0,0) State (MHz) [70048]	Value for the (0,1,0) State (MHz) [76000][a]	Value for the (0,0,1) State (MHz) [70048]	Value for the (0,2,0) State (MHz) [70048]
A''	106 625.59(280)	108 137.69(29)	104 943.79(440)	109 795.91(300)
B''	13 272.68(50)	13 311.1264(368)	13 229.59(70)	13 272.88(60)
C''	11 764.82(30)[c]	11 765.1942(336)	11 726.05(50)[c]	11 694.26(60)
τ_1		0.03530(1702)		
τ_2		-0.030631(2017)		
τ_3[b]		4.48(6)		
τ_{aaaa}		-27.598(107)		
τ_{bbbb}		-0.071546(680)		
τ_{cccc}		-0.038352(530)		
Std. dev.		0.252		
No. Lines fit		17		
Derived Parameters (assuming planarity conditions)				
A'		108 137.66(29)		
B'		13 311.196(36)		
C'		11 765.166(34)		
τ'_{bbcc}		-0.04889(64)		
τ'_{ccaa}		0.1399(47)		
τ'_{aabb}		-0.0556(117)		
$\tau_{aabb}(1)$		0.6190(76)		
$\tau_{aabb}(2)$		0.5530(60)		
$\tau_{aabb}(3)$		0.5530(60)		
$\tau_{abab}(1)$		-0.3373(21)		
$\tau_{abab}(2)$		-0.2777(39)		
$\tau_{abab}(3)$		-0.2708(41)		
$\Delta\tau$		$-0.133(4)\times10^{-2}$		

[a] The uncertainties quoted are one standard deviation as estimated by the least squares fit. The number of significant figures quoted are necessary to reproduce the calculated transition frequencies within their standard deviations.

[b] Strictly speaking, τ_3 is not a determinable parameter, but is calculated from τ_2, τ_3, τ_{aaaa} and τ_{bbbb} using the planarity conditions.

[c] This is the unperturbed rotational constant C.

Table 53.3. Molecular Zeeman constants and electric dipole moment of $^{16}O_3$.

Parameters	Value	Reference
Zeeman constants:		
g_{aa} (μ_N)	-2.968(35)	[69027][a]
g_{bb} (μ_N)	-0.228(7)	[69027][a]
g_{cc} (μ_N)	-0.081(61)	[69027][a]
$2\chi_{aa}-\chi_{bb}-\chi_{cc}$ (erg/G^2·mole)	$98.0(56)\times10^{-6}$	[69027]
$2\chi_{bb}-\chi_{aa}-\chi_{cc}$ (erg/G^2·mole)	$-17.4(44)\times10^{-6}$	[69027]
Electric dipole moment:		
μ_b (D)	0.5324(24)	[71026]

[a] The g-factors determined by Weiffenbach [58003] are: $g_{aa} = -2.9889(87)\mu_N$, $g_{bb} = -0.2207(42)\mu_N$ and $g_{cc} = -0.0891(51)\mu_N$.

TABLE 53.4. The microwave spectrum of O_3

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{16}O^{16}O$	31(5,27) - 32(4,28)	(0,0,0)	789.675	(*0.02)	[76000]
	33(4,30) - 32(5,27)	(0,0,0)	1087.774	(*0.02)	[76000]
	4(0, 4) - 3(1, 3)	(0,1,0)	9077.22	(0.10)	[70048]
	21(2,20) - 20(3,17)	(0,0,0)	9201.	(0.50)	[53009]
	18(2,16) - 19(1,19)	(1,0,0)	9669.57	(0.10)	[70048]
	10(1, 9) - 9(2, 8)	(0,0,0)	10226.	(0.50)	[53009]
	16(2,14) - 17(1,17)	(1,0,0)	10272.31	(0.10)	[70048]
	4(0, 4) - 3(1, 3)	(1,0,0)	10518.32	(0.10)	[70048]
	35(2,34) - 34(3,31)	(0,0,0)	10613.461	(*0.12)	[76000]
	17(2,15) - 16(3,14)	(0,0,1)	10705.73	(0.10)	[70048]
	4(0, 4) - 3(1, 3)	(0,0,0)	11072.64	(0.10)	[69027]
	19(3,16) - 20(2,19)	(0,0,1)	12593.91	(0.10)	[70048]
	40(5,35) - 39(6,34)	(0,0,0)	14821.435	(*0.06)	[76000]
	23(4,20) - 24(3,21)	(0,0,0)	14866.	(0.50)	[53009]
	2(1, 2) - 3(0, 3)	(0,0,1)	15664.57	(0.10)	[70048]
	27(3,25) - 26(4,22)	(0,0,0)	16163.	(0.50)	[53009]
	8(2, 7) - 9(1, 8)	(0,0,1)	18672.97	(0.10)	[70048]
	14(2,12) - 15(1,15)	(1,0,0)	19215.88	(0.10)	[70048]
	18(3,15) - 19(2,18)	(1,0,0)	20309.34	(0.10)	[70048]
	23(2,22) - 22(3,19)	(0,1,0)	23551.06	(0.10)	[70048]
	18(3,15) - 19(2,18)	(0,0,0)	23859.66	(0.03)	[73042]
	38(6,32) - 39(5,35)	(0,0,0)	25511.	(0.50)	[53009]
	16(2,14) - 17(1,17)	(0,0,0)	25650.95	(0.03)	[73042]
	36(3,33) - 37(2,36)	(0,0,0)	27458.131	(*0.24)	[76000]
	41(5,37) - 40(6,34)	(0,0,0)	27862.	(0.50)	[53009]
	23(4,20) - 24(3,21)	(0,1,0)	27947.60	(0.10)	[70048]
	18(2,16) - 17(3,15)	(0,1,0)	28915.14	(0.10)	[70048]
	24(4,20) - 25(3,23)	(0,0,0)	28960.51	(0.03)	[73042]
	18(2,16) - 17(3,15)	(1,0,0)	29143.30	(0.10)	[70048]
	15(3,13) - 16(2,14)	(0,0,0)	30051.77	(0.03)	[73042]
	14(2,12) - 15(1,15)	(0,0,0)	30181.23	(0.03)	[73042]
	18(2,16) - 19(1,19)	(0,0,0)	30524.03	(0.03)	[73042]
	18(3,15) - 19(2,18)	(0,1,0)	34916.30	(0.10)	[70048]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{16}O^{16}O$	23(2,22) - 22(3,19)	(0,0,0)	36021.95	(0.03)	[73042]
	16(2,14) - 17(1,17)	(0,1,0)	36141.41	(0.10)	[70048]
	12(2,10) - 13(1,13)	(1,0,0)	36254.79	(0.10)	[70048]
	15(3,13) - 16(2,14)	(1,0,0)	36281.44	(0.10)	[70048]
	18(2,16) - 17(3,15)	(0,0,0)	37832.40	(0.03)	[73042]
	26(3,23) - 25(4,22)	(0,1,0)	39094.99	(0.10)	[70048]
	5(0, 5) - 4(1, 4)	(0,0,1)	39099.20	(0.10)	[70048]
	15(3,13) - 16(2,14)	(0,1,0)	39149.83	(0.10)	[70048]
	33(2,32) - 32(3,29)	(0,0,0)	39438.134	(*0.06)	[76000]
	14(2,12) - 15(1,15)	(0,1,0)	39459.16	(0.10)	[70048]
	15(2,13) - 16(1,16)	(0,0,1)	40733.37	(0.10)	[70048]
	25(2,24) - 24(3,21)	(0,1,0)	41922.10	(0.10)	[70048]
	18(2,16) - 19(1,19)	(0,1,0)	42427.79	(0.10)	[70048]
	1(1, 1) - 2(0, 2)	(0,0,0)	42832.62	(0.07)	[53010]
	1(1, 1) - 2(0, 2)	(1,0,0)	43059.90	(0.10)	[70048]
	24(4,20) - 25(3,23)	(0,1,0)	43190.84	(0.10)	[70048]
	12(2,10) - 13(1,13)	(0,0,0)	43653.31	(0.03)	[73042]
	37(6,32) - 38(5,33)	(0,0,0)	43853.59	(0.03)	[73042]
	1(1, 1) - 2(0, 2)	(0,1,0)	44686.09	(0.10)	[70048]
	20(2,18) - 21(1,21)	(0,0,0)	44871.161	(*0.03)	[76000]
	17(3,14) - 18(2,17)	(0,0,1)	45321.90	(0.10)	[70048]
	13(2,11) - 14(1,14)	(0,0,1)	45388.19	(0.10)	[70048]
	17(2,15) - 18(1,18)	(0,0,1)	45989.89	(0.10)	[70048]
	1(1, 1) - 2(0, 2)	(0,2,0)	46600.95	(0.10)	[70048]
	11(1,10) - 10(2, 9)	(0,0,1)	46688.20	(0.10)	[70048]
	16(2,14) - 17(1,17)	(0,2,0)	46977.39	(0.10)	[70048]
	15(3,13) - 16(2,14)	(0,2,0)	48532.16	(0.10)	[70048]
	14(2,12) - 15(1,15)	(0,2,0)	49041.20	(0.10)	[70048]
	30(5,25) - 31(4,28)	(0,0,0)	50034.93	(0.03)	[73042]
	35(4,32) - 34(5,29)	(0,0,0)	51053.04	(0.03)	[73042]
	12(2,10) - 13(1,13)	(0,1,0)	51913.43	(0.10)	[70048]
	26(3,23) - 25(4,22)	(0,0,0)	51975.70	(0.03)	[73042]
	7(2, 6) - 8(1, 7)	(0,0,0)	53688.18	(0.03)	[73042]
	18(2,16) - 19(1,19)	(0,2,0)	54725.88	(0.10)	[70048]
	25(2,24) - 24(3,21)	(0,0,0)	55354.47	(0.03)	[73042]
	14(3,12) - 15(2,13)	(0,0,1)	56313.97	(0.10)	[70048]
	7(2, 6) - 8(1, 7)	(1,0,0)	56322.72	(0.10)	[70048]
	29(3,27) - 28(4,24)	(0,0,0)	58093.93	(0.03)	[73042]
	20(2,18) - 21(1,21)	(0,1,0)	58385.94	(0.10)	[70048]
	31(2,30) - 30(3,27)	(0,0,0)	58411.075	(*0.04)	[76000]
	7(2, 6) - 8(1, 7)	(0,1,0)	58950.75	(0.10)	[70048]
	11(2, 9) - 12(1,12)	(0,0,1)	59371.52	(0.10)	[70048]
	16(3,13) - 17(2,16)	(1,0,0)	60127.35	(0.10)	[70048]
	12(2,10) - 13(1,13)	(0,2,0)	60443.42	(0.10)	[70048]
	10(2, 8) - 11(1,11)	(1,0,0)	60569.36	(0.10)	[70048]
	19(2,17) - 20(1,20)	(0,0,1)	61286.66	(0.10)	[70048]
	29(5,25) - 30(4,26)	(0,0,0)	61347.44	(0.03)	[73042]
	16(3,13) - 17(2,16)	(0,0,0)	61926.73	(0.03)	[73042]
	34(4,30) - 33(5,29)	(0,0,0)	63078.74	(0.03)	[73042]
	6(0, 6) - 5(1, 5)	(0,2,0)	63115.23	(0.10)	[70048]
	7(2, 6) - 8(1, 7)	(0,2,0)	64381.95	(0.10)	[70048]
	10(2, 8) - 11(1,11)	(0,0,0)	65236.13	(0.03)	[73042]
	6(0, 6) - 5(1, 5)	(0,1,0)	65267.04	(0.10)	[70048]
	27(2,26) - 26(3,23)	(0,0,0)	66058.52	(0.03)	[73042]
	12(1,11) - 11(2,10)	(0,2,0)	66210.09	(0.10)	[70048]
	6(0, 6) - 5(1, 5)	(1,0,0)	66333.14	(0.10)	[70048]
	29(2,28) - 28(3,25)	(0,0,0)	67249.68	(0.03)	[73042]
	6(0, 6) - 5(1, 5)	(0,0,0)	67356.24	(0.03)	[73042]
	22(2,20) - 23(1,23)	(0,0,0)	68421.947	(*0.03)	[76000]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+)$ - $J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{16}O^{16}O$	38(3,35) - 39(2,38)	(0,0,0)	73919.463	(*0.44)	[76000]
	42(5,37) - 41(6,36)	(0,0,0)	75849.631	(*0.10)	[76000]
	22(4,18) - 23(3,21)	(0,0,0)	76393.55	(0.03)	[73042]
	12(1,11) - 11(2,10)	(0,0,0)	76533.72	(0.03)	[73042]
	21(4,18) - 22(3,19)	(0,0,0)	77602.46	(0.03)	[73042]
	36(6,30) - 37(5,33)	(0,0,0)	78992.54	(0.03)	[73042]
	8(2, 6) - 9(1, 9)	(0,0,0)	93844.35	(0.05)	[71026]
	13(3,11) - 14(2,12)	(0,0,0)	93955.05	(0.05)	[71026]
	31(3,29) - 30(4,26)	(0,0,0)	95796.40	(0.05)	[71026]
	2(1, 1) - 2(0, 2)	(0,0,0)	96228.34	(0.05)	[71026]
	37(4,34) - 36(5,31)	(0,0,0)	99247.171	(*0.03)	[76000]
	24(2,22) - 25(1,25)	(0,0,0)	100637.311	(*0.04)	[76000]
	35(6,30) - 36(5,31)	(0,0,0)	100691.378	(*0.03)	[76000]
	4(1, 3) - 4(0, 4)	(0,0,0)	101736.87	(0.05)	[71026]
	28(5,23) - 29(4,26)	(0,0,0)	101835.42	(0.05)	[71026]
	14(3,11) - 15(2,14)	(0,0,0)	103878.39	(0.05)	[71026]
	20(2,18) - 19(3,17)	(0,0,0)	109559.33	(0.05)	[71026]
	6(1, 5) - 6(0, 6)	(0,0,0)	110836.04	(0.05)	[71026]
	5(2, 4) - 6(1, 5)	(0,0,0)	114979.20	(0.05)	[71026]
	1(1, 1) - 0(0, 0)	(0,0,0)	118364.50	(0.06)	[73042]
	27(5,23) - 28(4,24)	(0,0,0)	119277.62	(0.06)	[73042]
	28(3,25) - 27(4,24)	(0,0,0)	123349.09	(0.06)	[73042]
	8(1, 7) - 8(0, 8)	(0,0,0)	124087.38	(0.06)	[73042]
	8(0, 8) - 7(1, 7)	(0,0,0)	125389.44	(0.06)	[73042]
	20(4,16) - 21(3,19)	(0,0,0)	125413.25	(0.06)	[73042]
	40(3,37) - 41(2,40)	(0,0,0)	127715.362	(*0.76)	[76000]
	33(3,31) - 32(4,28)	(0,0,0)	128094.82	(0.10)	[71026]
	6(2, 4) - 7(1, 7)	(0,0,0)	128313.85	(0.10)	[71026]
	36(4,32) - 35(5,31)	(0,0,0)	130954.82	(0.06)	[73042]
	34(6,28) - 35(5,31)	(0,0,0)	132385.01	(0.06)	[73042]
	41(7,35) - 42(6,36)	(0,0,0)	136337.307	(*0.10)	[76000]
	19(4,16) - 20(3,17)	(0,0,0)	136860.24	(0.10)	[71026]
	26(2,24) - 27(1,27)	(0,0,0)	140767.27	(0.06)	[73042]
	10(1, 9) - 10(0,10)	(0,0,0)	142175.04	(0.06)	[73042]
	39(4,36) - 38(5,33)	(0,0,0)	144910.67	(0.06)	[73042]
	14(1,13) - 13(2,12)	(0,0,0)	144919.36	(0.06)	[73042]
	12(3, 9) - 13(2,12)	(0,0,0)	148744.87	(0.06)	[73042]
	35(3,33) - 34(4,30)	(0,0,0)	153724.19	(0.10)	[71026]
	26(5,21) - 27(4,24)	(0,0,0)	153953.19	(0.06)	[73042]
	11(3, 9) - 12(2,10)	(0,0,0)	154046.44	(0.06)	[73042]
	33(6,28) - 34(5,29)	(0,0,0)	156106.81	(0.06)	[73042]
	40(7,33) - 41(6,36)	(0,0,0)	164769.973	(*0.10)	[76000]
	3(1, 3) - 2(0, 2)	(0,0,0)	164951.82	(0.30)	[71026]
	12(1,11) - 12(0,12)	(0,0,0)	165784.45	(0.30)	[71026]
	4(2, 2) - 5(1, 5)	(0,0,0)	167572.71	(0.30)	[71026]
	37(3,35) - 36(4,32)	(0,0,0)	171412.53	(0.10)	[73042]
	3(2, 2) - 4(1, 3)	(0,0,0)	173485.54	(0.10)	[73042]
	25(5,21) - 26(4,22)	(0,0,0)	175186.39	(0.10)	[73042]
	18(4,14) - 19(3,17)	(0,0,0)	175445.70	(0.10)	[73042]
	41(3,39) - 40(4,36)	(0,0,0)	178576.991	(*0.12)	[76000]
	39(3,37) - 38(4,34)	(0,0,0)	180001.29	(0.10)	[73042]
	10(0,10) - 9(1, 9)	(0,0,0)	184377.82	(0.10)	[73042]
	22(2,20) - 21(3,19)	(0,0,0)	184748.72	(0.10)	[73042]
	32(6,26) - 33(5,29)	(0,0,0)	185556.83	(0.10)	[73042]
	41(4,38) - 40(5,33)	(0,0,0)	187132.48	(0.10)	[73042]
	28(2,26) - 29(1,29)	(0,0,0)	187884.766	(*0.11)	[76000]
	39(7,33) - 40(6,34)	(0,0,0)	190572.635	(*0.10)	[76000]
	17(4,14) - 18(3,15)	(0,0,0)	193351.30	(0.50)	[71026]
	14(1,13) - 14(0,14)	(0,0,0)	195430.51	(0.50)	[71026]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{16}O^{16}O$	10(3, 7) - 11(2,10)	(0,0,0)	195721.19	(0.50)	[71026]
	30(3,27) - 29(4,26)	(0,0,0)	199384.288	(*0.03)	[76000]
	38(4,34) - 37(5,33)	(0,0,0)	203453.154	(*0.07)	[76000]
	24(5,19) - 25(4,22)	(0,0,0)	206132.092	(*0.02)	[76000]
	5(1, 5) - 4(0, 4)	(0,0,0)	208642.44	(0.50)	[71026]
	31(6,26) - 32(5,27)	(0,0,0)	210423.10	(0.50)	[71026]
	2(2, 0) - 3(1, 3)	(0,0,0)	210762.330	(*0.01)	[76000]
	9(3, 7) - 10(2, 8)	(0,0,0)	210803.80	(0.50)	[71026]
	16(1,15) - 15(2,14)	(0,0,0)	214955.668	(*0.02)	[76000]
	38(7,31) - 39(6,34)	(0,0,0)	218118.775	(*0.10)	[76000]
	16(4,12) - 17(3,15)	(0,0,0)	226054.092	(*0.01)	[76000]
	23(5,19) - 24(4,20)	(0,0,0)	229575.008	(*0.02)	[76000]
	16(1,15) - 16(0,16)	(0,0,0)	231281.505	(*0.02)	[76000]
	16(2,14) - 16(1,15)	(0,0,0)	235709.84	(0.10)	[73042]
	14(2,12) - 14(1,13)	(0,0,0)	237146.135	(*0.02)	[76000]
	30(6,24) - 31(5,27)	(0,0,0)	238431.986	(*0.03)	[76000]
	18(2,16) - 18(1,17)	(0,0,0)	239093.26	(0.10)	[73042]
	30(2,28) - 31(1,31)	(0,0,0)	240904.117	(*0.22)	[76000]
	12(2,10) - 12(1,11)	(0,0,0)	242318.687	(*0.02)	[76000]
	12(0,12) - 11(1,11)	(0,0,0)	243453.70	(0.50)	[71026]
	37(7,31) - 38(6,32)	(0,0,0)	244145.861	(*0.10)	[76000]
	8(3, 5) - 9(2, 8)	(0,0,0)	244158.04	(0.50)	[71026]
	15(4,12) - 16(3,13)	(0,0,0)	247761.77	(0.12)	[73042]
	20(2,18) - 20(1,19)	(0,0,0)	248183.38	(0.12)	[73042]
	7(1, 7) - 6(0, 6)	(0,0,0)	249788.60	(0.12)	[73042]
	10(2, 8) - 10(1, 9)	(0,0,0)	249961.96	(0.12)	[73042]
	22(5,17) - 23(4,20)	(0,0,0)	258202.05	(0.12)	[73042]
	8(2, 6) - 8(1, 7)	(0,0,0)	258716.18	(0.12)	[73042]
	24(2,22) - 23(3,21)	(0,0,0)	262857.85	(0.12)	[73042]
	22(2,20) - 22(1,21)	(0,0,0)	263692.60	(0.12)	[73042]
	29(6,24) - 30(5,25)	(0,0,0)	263886.160	(*0.03)	[76000]
	7(3, 5) - 8(2, 6)	(0,0,0)	264925.914	(*0.01)	[76000]
	6(2, 4) - 6(1, 5)	(0,0,0)	267266.57	(0.12)	[73042]
	36(7,29) - 37(6,32)	(0,0,0)	271092.004	(*0.11)	[76000]
	18(1,17) - 18(0,18)	(0,0,0)	273050.90	(0.12)	[73042]
	4(2, 2) - 4(1, 3)	(0,0,0)	274478.38	(0.12)	[73042]
	14(4,10) - 15(3,13)	(0,0,0)	276923.54	(0.12)	[73042]
	2(2, 0) - 2(1, 1)	(0,0,0)	279485.90	(0.50)	[71026]
	32(3,29) - 31(4,28)	(0,0,0)	279892.46	(0.12)	[73042]
	40(4,36) - 39(5,35)	(0,0,0)	280994.648	(*0.14)	[76000]
	21(5,17) - 22(4,18)	(0,0,0)	282837.20	(0.12)	[73042]
	18(1,17) - 17(2,16)	(0,0,0)	286087.69	(0.12)	[73042]
	24(2,22) - 24(1,23)	(0,0,0)	286156.53	(0.12)	[73042]
	3(2, 2) - 3(1, 3)	(0,0,0)	286294.75	(0.12)	[73042]
	9(1, 9) - 8(0, 8)	(0,0,0)	288959.14	(0.12)	[73042]
	28(6,22) - 29(5,25)	(0,0,0)	290975.12	(0.12)	[73042]
	5(2, 4) - 5(1, 5)	(0,0,0)	293171.27	(0.12)	[73042]
	6(3, 3) - 7(2, 6)	(0,0,0)	293548.23	(0.12)	[73042]
	35(7,29) - 36(6,30)	(0,0,0)	297173.047	(*0.12)	[76000]
	32(2,30) - 33(1,33)	(0,0,0)	298600.699	(*0.42)	[76000]
	13(4,10) - 14(3,11)	(0,0,0)	300685.15	(0.12)	[73042]
	14(0,14) - 13(1,13)	(0,0,0)	301813.00	(0.12)	[73042]
	7(2, 6) - 7(1, 7)	(0,0,0)	303164.92	(0.12)	[73042]
	20(5,15) - 21(4,18)	(0,0,0)	310063.56	(0.12)	[73042]
	26(2,24) - 26(1,25)	(0,0,0)	315875.12	(0.12)	[73042]
	9(2, 8) - 9(1, 9)	(0,0,0)	316327.25	(0.12)	[73042]
	27(6,22) - 28(5,23)	(0,0,0)	316681.699	(*0.05)	[76000]
	5(3, 3) - 6(2, 4)	(0,0,0)	317195.06	(0.12)	[73042]
	20(1,19) - 20(0,20)	(0,0,0)	319996.54	(0.12)	[73042]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{16}O^{16}O$	34(7,27) - 35(6,30)	(0,0,0)	323703.949	(*0.13)	[76000]
	11(1,11) - 10(0,10)	(0,0,0)	326900.965	(*0.02)	[76000]
	12(4, 8) - 13(3,11)	(0,0,0)	327844.594	(*0.02)	[76000]
	41(8,34) - 42(7,35)	(0,0,0)	329787.355	(*0.32)	[76000]
	11(2,10) - 11(1,11)	(0,0,0)	332704.536	(*0.01)	[76000]
	2(2, 0) - 1(1, 1)	(0,0,0)	332881.728	(*0.02)	[76000]
	19(5,15) - 20(4,16)	(0,0,0)	335271.293	(*0.03)	[76000]
	26(6,20) - 27(5,23)	(0,0,0)	343180.727	(*0.05)	[76000]
	26(2,24) - 25(3,23)	(0,0,0)	343237.393	(*0.03)	[76000]
	4(3, 1) - 5(2, 4)	(0,0,0)	343505.668	(*0.02)	[76000]
	33(7,27) - 34(6,28)	(0,0,0)	349744.242	(*0.14)	[76000]
	13(2,12) - 13(1,13)	(0,0,0)	352323.98	(0.15)	[73042]
	11(4, 8) - 12(3, 9)	(0,0,0)	352592.934	(*0.03)	[76000]
	28(2,26) - 28(1,27)	(0,0,0)	352815.152	(*0.05)	[76000]
	3(2, 2) - 2(1, 1)	(0,0,0)	355018.03	(0.15)	[73042]
	40(8,32) - 41(7,35)	(0,0,0)	356087.648	(*0.33)	[76000]
	20(1,19) - 19(2,18)	(0,0,0)	357629.83	(0.15)	[73042]
	30(3,27) - 30(2,28)	(0,0,0)	358199.728	(*0.13)	[76000]
	16(0,16) - 15(1,15)	(0,0,0)	358853.35	(0.15)	[73042]
	34(2,32) - 35(1,35)	(0,0,0)	359649.332	(*0.71)	[76000]
	28(3,25) - 28(2,26)	(0,0,0)	359649.576	(*0.09)	[76000]
	18(5,13) - 19(4,16)	(0,0,0)	361669.410	(*0.04)	[76000]
	32(3,29) - 32(2,30)	(0,0,0)	363469.162	(*0.18)	[76000]
	42(4,38) - 41(5,37)	(0,0,0)	363714.341	(*0.25)	[76000]
	34(3,31) - 33(4,30)	(0,0,0)	364403.658	(*0.06)	[76000]
	13(1,13) - 12(0,12)	(0,0,0)	364449.88	(0.15)	[73042]
	26(3,23) - 26(2,24)	(0,0,0)	366776.879	(*0.06)	[76000]
	3(3, 1) - 4(2, 2)	(0,0,0)	368332.199	(*0.02)	[76000]
	25(6,20) - 26(5,21)	(0,0,0)	368949.332	(*0.06)	[76000]
	22(1,21) - 22(0,22)	(0,0,0)	371022.83	(0.15)	[73042]
	15(2,14) - 15(1,15)	(0,0,0)	375179.26	(0.15)	[73042]
	32(7,25) - 33(6,28)	(0,0,0)	375978.312	(*0.15)	[76000]
	34(3,31) - 34(2,32)	(0,0,0)	376238.179	(*0.25)	[76000]
	24(3,21) - 24(2,22)	(0,0,0)	378281.16	(0.15)	[73042]
	10(4, 6) - 11(3, 9)	(0,0,0)	378694.914	(*0.03)	[76000]
	39(8,32) - 40(7,33)	(0,0,0)	382190.762	(*0.35)	[76000]
	17(5,13) - 18(4,14)	(0,0,0)	387098.492	(*0.04)	[76000]
	4(2, 2) - 3(1, 3)	(0,0,0)	387287.632	(*0.02)	[76000]
	22(3,19) - 22(2,20)	(0,0,0)	392653.969	(*0.03)	[76000]
	24(6,18) - 25(5,21)	(0,0,0)	395063.152	(*0.07)	[76000]
	30(2,28) - 30(1,29)	(0,0,0)	396529.345	(*0.08)	[76000]
	36(3,33) - 36(2,34)	(0,0,0)	397027.490	(*0.34)	[76000]
$^{16}O^{18}O^{16}O$	33(2,32) - 32(3,29)	(0,0,0)	3832.957	(*0.07)	[76000]
	19(2,18) - 18(3,15)	(0,0,0)	4653.785	(*0.01)	[76000]
	37(5,33) - 36(6,30)	(0,0,0)	6967.065	(*0.03)	[76000]
	35(6,30) - 36(5,31)	(0,0,0)	10010.626	(*0.02)	[76000]
	16(2,14) - 15(3,13)	(0,0,0)	14868.760	(*0.01)	[76000]
	30(4,26) - 29(5,25)	(0,0,0)	16355.878	(*0.01)	[76000]
	21(4,18) - 22(3,19)	(0,0,0)	16669.913	(*0.01)	[76000]
	31(4,28) - 30(5,25)	(0,0,0)	17658.044	(*0.02)	[76000]
$^{16}O^{18}O^{16}O$	4(0, 4) - 3(1, 3)	(0,0,0)	18768.04	(0.03)	[73042]
	25(3,23) - 24(4,20)	(0,0,0)	19100.52	(0.03)	[73042]
	14(2,12) - 15(1,15)	(0,0,0)	22206.00	(0.03)	[73042]
	16(2,14) - 17(1,17)	(0,0,0)	23422.38	(0.03)	[73042]
	22(4,18) - 23(3,21)	(0,0,0)	26040.267	(*0.01)	[76000]
	7(2, 6) - 8(1, 7)	(0,0,0)	29227.72	(0.03)	[73042]
	16(3,13) - 17(2,16)	(0,0,0)	29889.31	(0.03)	[73042]
	12(2,10) - 13(1,13)	(0,0,0)	30914.15	(0.03)	[73042]
	21(2,20) - 20(3,17)	(0,0,0)	32839.83	(0.03)	[73042]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{18}O^{16}O$	28(5,23) - 29(4,26)	(0,0,0)	33190.15	(0.03)	[73042]
	18(2,16) - 19(1,19)	(0,0,0)	34814.88	(0.03)	[73042]
	31(2,30) - 30(3,27)	(0,0,0)	34969.17	(0.03)	[73042]
	1(1, 1) - 2(0, 2)	(0,0,0)	35143.15	(0.03)	[73042]
	10(1, 9) - 9(2, 8)	(0,0,0)	35280.14	(0.03)	[73042]
	34(3,31) - 35(2,34)	(0,0,0)	36989.452	(*0.15)	[76000]
	27(5,23) - 28(4,24)	(0,0,0)	44622.78	(0.03)	[73042]
	34(6,28) - 35(5,31)	(0,0,0)	46446.623	(*0.02)	[76000]
	10(2, 8) - 11(1,11)	(0,0,0)	48806.89	(0.03)	[73042]
	24(3,21) - 23(4,20)	(0,0,0)	49691.03	(0.03)	[73042]
	38(5,33) - 37(6,32)	(0,0,0)	49733.33	(0.03)	[73042]
	13(3,11) - 14(2,12)	(0,0,0)	51208.78	(0.03)	[73042]
	23(2,22) - 22(3,19)	(0,0,0)	53212.64	(0.03)	[73042]
	29(2,28) - 28(3,25)	(0,0,0)	55634.305	(*0.02)	[76000]
	20(2,18) - 21(1,21)	(0,0,0)	56182.31	(0.03)	[73042]
	39(5,35) - 38(6,32)	(0,0,0)	60136.58	(0.03)	[73042]
	27(3,25) - 26(4,22)	(0,0,0)	60818.26	(0.03)	[73042]
	25(2,24) - 24(3,21)	(0,0,0)	64424.11	(0.03)	[73042]
	27(2,26) - 26(3,23)	(0,0,0)	65427.81	(0.03)	[73042]
	33(4,30) - 32(5,27)	(0,0,0)	67120.592	(*0.02)	[76000]
	33(6,28) - 34(5,29)	(0,0,0)	67506.39	(0.03)	[73042]
	14(3,11) - 15(2,14)	(0,0,0)	69391.17	(0.03)	[73042]
	20(4,16) - 21(3,19)	(0,0,0)	73587.94	(0.03)	[73042]
	8(2, 6) - 9(1, 9)	(0,0,0)	74743.44	(0.03)	[73042]
	6(0, 6) - 5(1, 5)	(0,0,0)	75111.23	(0.03)	[73042]
	19(4,16) - 20(3,17)	(0,0,0)	78675.23	(0.03)	[73042]
	32(4,28) - 31(5,27)	(0,0,0)	81081.616	(*0.01)	[76000]
	26(5,21) - 27(4,24)	(0,0,0)	84833.826	(*0.01)	[76000]
	18(2,16) - 17(3,15)	(0,0,0)	85145.710	(*0.01)	[76000]
	36(3,33) - 37(2,36)	(0,0,0)	86418.325	(*0.29)	[76000]
	22(2,20) - 23(1,23)	(0,0,0)	86964.488	(*0.03)	[76000]
	2(1, 1) - 2(0, 2)	(0,0,0)	88552.928	(*2E-3)	[76000]
	5(2, 4) - 6(1, 5)	(0,0,0)	91010.005	(*0.01)	[76000]
	4(1, 3) - 4(0, 4)	(0,0,0)	94483.879	(*3E-3)	[76000]
	29(3,27) - 28(4,24)	(0,0,0)	97900.229	(*0.01)	[76000]
	32(6,26) - 33(5,29)	(0,0,0)	99828.589	(*0.02)	[76000]
	12(1,11) - 11(2,10)	(0,0,0)	102211.875	(*0.01)	[76000]
	25(5,21) - 26(4,22)	(0,0,0)	102658.587	(*0.01)	[76000]
	6(1, 5) - 6(0, 6)	(0,0,0)	104355.394	(*3E-3)	[76000]
	6(2, 4) - 7(1, 7)	(0,0,0)	107388.463	(*0.01)	[76000]
	1(1, 1) - 0(0, 0)	(0,0,0)	110373.253	(*3E-3)	[76000]
	12(3, 9) - 13(2,12)	(0,0,0)	112613.445	(*0.01)	[76000]
	11(3, 9) - 12(2,10)	(0,0,0)	113055.087	(*0.01)	[76000]
	35(4,32) - 34(5,29)	(0,0,0)	114434.155	(*0.02)	[76000]
	8(1, 7) - 8(0, 8)	(0,0,0)	118855.71	(0.06)	[73042]
	26(3,23) - 25(4,22)	(0,0,0)	120914.48	(0.06)	[73042]
	18(4,14) - 19(3,17)	(0,0,0)	122724.05	(0.06)	[73042]
	31(6,26) - 32(5,27)	(0,0,0)	123290.44	(0.06)	[73042]
	24(2,22) - 25(1,25)	(0,0,0)	126325.362	(*0.06)	[76000]
	31(3,29) - 30(4,26)	(0,0,0)	128963.504	(*0.01)	[76000]
	8(0, 8) - 7(1, 7)	(0,0,0)	133109.68	(0.06)	[73042]
	24(5,19) - 25(4,22)	(0,0,0)	136837.07	(0.06)	[73042]
	17(4,14) - 18(3,15)	(0,0,0)	137072.54	(0.06)	[73042]
	10(1, 9) - 10(0,10)	(0,0,0)	138792.54	(0.06)	[73042]
	37(7,31) - 38(6,32)	(0,0,0)	142052.957	(*0.05)	[76000]
	4(2, 2) - 5(1, 5)	(0,0,0)	145452.66	(0.06)	[73042]
	3(2, 2) - 4(1, 3)	(0,0,0)	149857.12	(0.06)	[73042]
	34(4,30) - 33(5,29)	(0,0,0)	150350.94	(0.06)	[73042]
	33(3,31) - 32(4,28)	(0,0,0)	152524.73	(0.06)	[73042]
	30(6,24) - 31(5,27)	(0,0,0)	152998.48	(0.06)	[73042]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{18}O^{16}O$	3(1, 3) - 2(0, 2)	(0,0,0)	156498.76	(0.06)	[73042]
	23(5,19) - 24(4,20)	(0,0,0)	158468.62	(0.06)	[73042]
	10(3, 7) - 11(2,10)	(0,0,0)	158518.73	(0.06)	[73042]
	37(4,34) - 36(5,31)	(0,0,0)	158647.74	(0.10)	[73042]
	20(2,18) - 19(3,17)	(0,0,0)	159255.79	(0.06)	[73042]
	12(1,11) - 12(0,12)	(0,0,0)	164906.240	(*0.01)	[76000]
	35(3,33) - 34(4,30)	(0,0,0)	167123.487	(*0.04)	[76000]
	36(7,29) - 37(6,32)	(0,0,0)	169914.471	(*0.05)	[76000]
	9(3, 7) - 10(2, 8)	(0,0,0)	171033.525	(*0.01)	[76000]
	14(1,13) - 13(2,12)	(0,0,0)	171144.20	(0.10)	[73042]
	37(3,35) - 36(4,32)	(0,0,0)	171492.418	(*0.08)	[76000]
	16(4,12) - 17(3,15)	(0,0,0)	172815.47	(0.10)	[73042]
	26(2,24) - 27(1,27)	(0,0,0)	173203.326	(*0.12)	[76000]
	29(6,24) - 30(5,25)	(0,0,0)	177776.87	(0.10)	[73042]
	2(2, 0) - 3(1, 3)	(0,0,0)	187878.937	(*0.01)	[76000]
	22(5,17) - 23(4,20)	(0,0,0)	188896.264	(*0.01)	[76000]
	10(0,10) - 9(1, 9)	(0,0,0)	191806.075	(*0.01)	[76000]
	15(4,12) - 16(3,13)	(0,0,0)	192688.170	(*0.01)	[76000]
	35(7,29) - 36(6,30)	(0,0,0)	195895.082	(*0.05)	[76000]
	28(3,25) - 27(4,24)	(0,0,0)	197141.715	(*0.01)	[76000]
	14(1,13) - 14(0,14)	(0,0,0)	197628.163	(*0.01)	[76000]
	5(1, 5) - 4(0, 4)	(0,0,0)	199549.105	(*0.01)	[76000]
	28(6,22) - 29(5,25)	(0,0,0)	205850.895	(*0.01)	[76000]
	8(3, 5) - 9(2, 8)	(0,0,0)	206272.312	(*0.01)	[76000]
	21(5,17) - 22(4,18)	(0,0,0)	212639.535	(*0.01)	[76000]
	14(2,12) - 14(1,13)	(0,0,0)	216065.439	(*0.01)	[76000]
	16(2,14) - 16(1,15)	(0,0,0)	217506.707	(*0.01)	[76000]
	12(2,10) - 12(1,11)	(0,0,0)	219325.601	(*0.01)	[76000]
	34(7,27) - 35(6,30)	(0,0,0)	223004.732	(*0.05)	[76000]
	14(4,10) - 15(3,13)	(0,0,0)	223396.67	(0.10)	[73042]
	18(2,16) - 18(1,17)	(0,0,0)	224761.85	(0.10)	[73042]
	36(4,32) - 35(5,31)	(0,0,0)	224812.925	(*0.04)	[76000]
	7(3, 5) - 8(2, 6)	(0,0,0)	225850.65	(0.10)	[73042]
	10(2, 8) - 10(1, 9)	(0,0,0)	225929.91	(0.10)	[73042]
	28(2,26) - 29(1,29)	(0,0,0)	226336.891	(*0.21)	[76000]
	27(6,22) - 28(5,23)	(0,0,0)	231276.598	(*0.01)	[76000]
	8(2, 6) - 8(1, 7)	(0,0,0)	234339.98	(0.10)	[73042]
	22(2,20) - 21(3,19)	(0,0,0)	236604.12	(0.10)	[73042]
	16(1,15) - 16(0,16)	(0,0,0)	236876.391	(*0.01)	[76000]
	20(2,18) - 20(1,19)	(0,0,0)	238716.14	(0.10)	[73042]
	7(1, 7) - 6(0, 6)	(0,0,0)	239965.03	(0.10)	[73042]
	20(5,15) - 21(4,18)	(0,0,0)	240817.090	(*0.01)	[76000]
	16(1,15) - 15(2,14)	(0,0,0)	241503.447	(*0.01)	[76000]
	6(2, 4) - 6(1, 5)	(0,0,0)	242998.119	(*0.01)	[76000]
	13(4,10) - 14(3,11)	(0,0,0)	246291.053	(*0.01)	[76000]
	33(7,27) - 34(6,28)	(0,0,0)	249077.445	(*0.05)	[76000]
	12(0,12) - 11(1,11)	(0,0,0)	250206.89	(0.12)	[73042]
	4(2, 2) - 4(1, 3)	(0,0,0)	250517.887	(*0.01)	[76000]
	6(3, 3) - 7(2, 6)	(0,0,0)	255224.211	(*0.01)	[76000]
	2(2, 0) - 2(1, 1)	(0,0,0)	255824.79	(0.12)	[73042]
	26(6,20) - 27(5,23)	(0,0,0)	258336.50	(0.12)	[73042]
	22(2,20) - 22(1,21)	(0,0,0)	260039.687	(*0.01)	[76000]
	3(2, 2) - 3(1, 3)	(0,0,0)	263109.06	(0.12)	[73042]
	19(5,15) - 20(4,16)	(0,0,0)	265623.40	(0.12)	[73042]
	5(2, 4) - 5(1, 5)	(0,0,0)	270476.67	(0.12)	[73042]
	12(4, 8) - 13(3,11)	(0,0,0)	274148.46	(0.12)	[73042]
	32(7,25) - 33(6,28)	(0,0,0)	275682.230	(*0.06)	[76000]
	30(3,27) - 29(4,26)	(0,0,0)	278115.74	(0.12)	[73042]
	5(3, 3) - 6(2, 4)	(0,0,0)	278392.09	(0.12)	[73042]
	9(1, 9) - 8(0, 8)	(0,0,0)	278452.26	(0.12)	[73042]
	7(2, 6) - 7(1, 7)	(0,0,0)	281193.14	(0.12)	[73042]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{18}O^{16}O$	18(1,17) - 18(0,18)	(0,0,0)	281985.70	(0.12)	[73042]
	25(6,20) - 26(5,21)	(0,0,0)	284018.78	(0.12)	[73042]
	30(2,28) - 31(1,31)	(0,0,0)	284292.113	(*0.36)	[76000]
	24(2,22) - 24(1,23)	(0,0,0)	289124.26	(0.12)	[73042]
	18(5,13) - 19(4,16)	(0,0,0)	292491.570	(*0.01)	[76000]
	9(2, 8) - 9(1, 9)	(0,0,0)	295318.60	(0.12)	[73042]
	11(4, 8) - 12(3, 9)	(0,0,0)	298517.30	(0.12)	[73042]
	31(7,25) - 32(6,26)	(0,0,0)	301718.469	(*0.06)	[76000]
	38(4,34) - 37(5,33)	(0,0,0)	304822.564	(*0.07)	[76000]
	4(3, 1) - 5(2, 4)	(0,0,0)	304885.91	(0.15)	[73042]
	14(0,14) - 13(1,13)	(0,0,0)	307474.97	(0.12)	[73042]
	2(2, 0) - 1(1, 1)	(0,0,0)	309234.66	(0.12)	[73042]
	24(6,18) - 25(5,21)	(0,0,0)	310445.24	(0.12)	[73042]
	18(1,17) - 17(2,16)	(0,0,0)	312551.34	(0.12)	[73042]
	11(2,10) - 11(1,11)	(0,0,0)	312901.24	(0.12)	[73042]
	11(1,11) - 10(0,10)	(0,0,0)	315915.54	(0.12)	[73042]
	24(2,22) - 23(3,21)	(0,0,0)	316451.64	(0.12)	[73042]
	17(5,13) - 18(4,14)	(0,0,0)	317754.43	(0.12)	[73042]
	37(8,30) - 38(7,31)	(0,0,0)	318847.520	(*0.16)	[76000]
	10(4, 6) - 11(3, 9)	(0,0,0)	324874.840	(*0.01)	[76000]
	26(2,24) - 26(1,25)	(0,0,0)	325956.62	(0.15)	[73042]
	30(7,23) - 31(6,26)	(0,0,0)	327972.012	(*0.06)	[76000]
	28(3,25) - 28(2,26)	(0,0,0)	328529.48	(0.15)	[73042]
	26(3,23) - 26(2,24)	(0,0,0)	329277.56	(0.15)	[73042]
	3(3, 1) - 4(2, 2)	(0,0,0)	329526.012	(*0.01)	[76000]
	3(2, 2) - 2(1, 1)	(0,0,0)	331054.92	(0.15)	[73042]
	20(1,19) - 20(0,20)	(0,0,0)	331796.44	(0.15)	[73042]
	13(2,12) - 13(1,13)	(0,0,0)	333958.97	(0.15)	[73042]
	30(3,27) - 30(2,28)	(0,0,0)	335135.613	(*0.03)	[76000]
	23(6,18) - 24(5,19)	(0,0,0)	336172.219	(*0.02)	[76000]
	24(3,21) - 24(2,22)	(0,0,0)	336200.407	(*0.02)	[76000]
	16(5,11) - 17(4,14)	(0,0,0)	343876.004	(*0.01)	[76000]
	36(8,28) - 37(7,31)	(0,0,0)	345026.828	(*0.17)	[76000]
	32(2,30) - 33(1,33)	(0,0,0)	345518.910	(*0.58)	[76000]
	22(3,19) - 22(2,20)	(0,0,0)	347795.408	(*0.02)	[76000]
	9(4, 6) - 10(3, 7)	(0,0,0)	349849.184	(*0.01)	[76000]
	32(3,29) - 32(2,30)	(0,0,0)	349949.903	(*0.05)	[76000]
	13(1,13) - 12(0,12)	(0,0,0)	353317.71	(0.15)	[73042]
	29(7,23) - 30(6,24)	(0,0,0)	353909.258	(*0.07)	[76000]
	15(2,14) - 15(1,15)	(0,0,0)	358459.90	(0.15)	[73042]
	22(6,16) - 23(5,19)	(0,0,0)	362193.910	(*0.03)	[76000]
	20(3,17) - 20(2,18)	(0,0,0)	362304.487	(*0.02)	[76000]
	16(0,16) - 15(1,15)	(0,0,0)	363086.94	(0.15)	[73042]
	32(3,29) - 31(4,28)	(0,0,0)	363238.863	(*0.03)	[76000]
	4(2, 2) - 3(1, 3)	(0,0,0)	363769.82	(0.15)	[73042]
	15(5,11) - 16(4,12)	(0,0,0)	369273.930	(*0.02)	[76000]
	28(2,26) - 28(1,27)	(0,0,0)	370006.907	(*0.02)	[76000]
	35(8,28) - 36(7,29)	(0,0,0)	371043.914	(*0.17)	[76000]
	34(3,31) - 34(2,32)	(0,0,0)	373495.715	(*0.08)	[76000]
	8(4, 4) - 9(3, 7)	(0,0,0)	375477.758	(*0.01)	[76000]
	5(2, 4) - 4(1, 3)	(0,0,0)	375541.92	(0.15)	[73042]
	18(3,15) - 18(2,16)	(0,0,0)	377873.599	(*0.02)	[76000]
	28(7,21) - 29(6,24)	(0,0,0)	379907.410	(*0.07)	[76000]
	20(1,19) - 19(2,18)	(0,0,0)	383403.661	(*0.01)	[76000]
	22(1,21) - 22(0,22)	(0,0,0)	384855.631	(*0.03)	[76000]
	17(2,16) - 17(1,17)	(0,0,0)	386309.164	(*0.01)	[76000]
	21(6,16) - 22(5,17)	(0,0,0)	387862.184	(*0.03)	[76000]
	15(1,15) - 14(0,14)	(0,0,0)	391487.627	(*0.01)	[76000]
	16(3,13) - 16(2,14)	(0,0,0)	392776.087	(*0.02)	[76000]
	14(5, 9) - 15(4,12)	(0,0,0)	394971.203	(*0.02)	[76000]
	34(8,26) - 35(7,29)	(0,0,0)	397036.957	(*0.18)	[76000]
	26(2,24) - 25(3,23)	(0,0,0)	397956.006	(*0.01)	[76000]
$^{16}O^{16}O^{18}O$	36(3,33) - 37(2,36)	(0,0,0)	1210.574	(*0.25)	[76000]
	9(2, 8) - 10(1, 9)	(0,0,0)	3244.218	(*0.01)	[76000]
	20(3,17) - 21(2,20)	(0,0,0)	5070.838	(*0.01)	[76000]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{16}O^{18}O$	40(6,35) - 41(5,36)	(0,0,0)	6455.915	(*0.02)	[76000]
	4(0, 4) - 3(1, 3)	(0,0,0)	6462.134	(*2E-3)	[76000]
	42(5,38) - 41(6,35)	(0,0,0)	7182.892	(*0.03)	[76000]
	26(4,22) - 27(3,25)	(0,0,0)	9225.728	(*0.01)	[76000]
	22(2,21) - 21(3,18)	(0,0,0)	9642.352	(*0.01)	[76000]
	33(5,28) - 34(4,31)	(0,0,0)	9823.307	(*0.01)	[76000]
	28(3,26) - 27(4,23)	(0,0,0)	11812.912	(*0.01)	[76000]
	18(2,16) - 17(3,15)	(0,0,0)	11826.468	(*0.01)	[76000]
	32(5,28) - 33(4,29)	(0,0,0)	12321.427	(*0.01)	[76000]
	35(4,32) - 34(5,29)	(0,0,0)	14042.633	(*0.01)	[76000]
	36(2,35) - 35(3,32)	(0,0,0)	14871.764	(*0.18)	[76000]
	26(3,23) - 25(4,22)	(0,0,0)	15084.688	(*0.01)	[76000]
	24(4,21) - 25(3,22)	(0,0,0)	15969.149	(*0.01)	[76000]
	34(4,30) - 33(5,29)	(0,0,0)	17147.114	(*0.01)	[76000]
	40(6,34) - 41(5,37)	(0,0,0)	18026.365	(*0.02)	[76000]
	2(1, 2) - 3(0, 3)	(0,0,0)	19263.50	(0.03)	[73042]
	37(3,34) - 38(2,37)	(0,0,0)	19347.855	(*0.33)	[76000]
	16(3,14) - 17(2,15)	(0,0,0)	20076.27	(0.03)	[73042]
	19(3,16) - 20(2,19)	(0,0,0)	21085.82	(0.03)	[73042]
	42(5,37) - 41(6,36)	(0,0,0)	21683.699	(*0.03)	[76000]
	23(2,22) - 22(3,19)	(0,0,0)	22916.17	(0.03)	[73042]
	17(2,15) - 18(1,18)	(0,0,0)	26388.441	(*0.01)	[76000]
	16(2,14) - 17(1,17)	(0,0,0)	26689.83	(0.03)	[73042]
	11(1,10) - 10(2, 9)	(0,0,0)	27607.88	(0.03)	[73042]
	18(2,16) - 19(1,19)	(0,0,0)	28239.164	(*0.01)	[76000]
	35(2,34) - 34(3,31)	(0,0,0)	28816.672	(*0.13)	[76000]
	15(2,13) - 16(1,16)	(0,0,0)	29111.14	(0.03)	[73042]
	25(4,21) - 26(3,24)	(0,0,0)	30877.75	(0.03)	[73042]
	29(3,27) - 28(4,24)	(0,0,0)	32138.23	(0.03)	[73042]
	19(2,17) - 20(1,20)	(0,0,0)	32253.42	(0.03)	[73042]
	43(5,39) - 42(6,36)	(0,0,0)	32326.576	(*0.03)	[76000]
	5(0, 5) - 4(1, 4)	(0,0,0)	32743.19	(0.03)	[73042]
	8(2, 7) - 9(1, 8)	(0,0,0)	33537.19	(0.03)	[73042]
	14(2,12) - 15(1,15)	(0,0,0)	33598.92	(0.03)	[73042]
	32(5,27) - 33(4,30)	(0,0,0)	33930.781	(*0.01)	[76000]
	39(6,34) - 40(5,35)	(0,0,0)	34103.100	(*0.02)	[76000]
	24(2,23) - 23(3,20)	(0,0,0)	34612.00	(0.03)	[73042]
	36(4,33) - 35(5,30)	(0,0,0)	37606.632	(*0.01)	[76000]
	18(3,15) - 19(2,18)	(0,0,0)	38268.50	(0.03)	[73042]
	20(2,18) - 21(1,21)	(0,0,0)	38423.30	(0.03)	[73042]
	38(3,35) - 39(2,38)	(0,0,0)	39445.405	(*0.44)	[76000]
	13(2,11) - 14(1,14)	(0,0,0)	40078.97	(0.03)	[73042]
	34(2,33) - 33(3,30)	(0,0,0)	40555.457	(*0.09)	[76000]
	31(5,27) - 32(4,28)	(0,0,0)	41063.997	(*0.01)	[76000]
	39(6,33) - 40(5,36)	(0,0,0)	43271.063	(*0.02)	[76000]
	1(1, 1) - 2(0, 2)	(0,0,0)	44383.45	(0.03)	[73042]
	25(2,24) - 24(3,21)	(0,0,0)	44593.96	(0.03)	[73042]
	19(2,17) - 18(3,16)	(0,0,0)	44626.17	(0.03)	[73042]
	23(4,20) - 24(3,21)	(0,0,0)	46086.69	(0.03)	[73042]
	21(2,19) - 22(1,22)	(0,0,0)	46723.20	(0.03)	[73042]
	27(3,24) - 26(4,23)	(0,0,0)	47129.29	(0.03)	[73042]
	35(4,31) - 34(5,30)	(0,0,0)	47419.02	(0.03)	[73042]
	12(2,10) - 13(1,13)	(0,0,0)	48458.39	(0.03)	[73042]
	33(2,32) - 32(3,29)	(0,0,0)	50035.051	(*0.06)	[76000]
	43(5,38) - 42(6,37)	(0,0,0)	50376.737	(*0.04)	[76000]
	15(3,13) - 16(2,14)	(0,0,0)	51069.52	(0.03)	[73042]
	30(3,28) - 29(4,25)	(0,0,0)	51641.84	(0.03)	[73042]
	26(2,25) - 25(3,22)	(0,0,0)	52731.82	(0.03)	[73042]
	24(4,20) - 25(3,23)	(0,0,0)	53051.59	(0.03)	[73042]
	17(3,14) - 18(2,17)	(0,0,0)	56490.449	(*0.01)	[76000]
	22(2,20) - 23(1,23)	(0,0,0)	57112.189	(*0.02)	[76000]
	32(2,31) - 31(3,28)	(0,0,0)	57219.926	(*0.03)	[76000]
	31(5,26) - 32(4,29)	(0,0,0)	58226.29	(0.03)	[73042]
	11(2, 9) - 12(1,12)	(0,0,0)	58628.49	(0.03)	[73042]
	27(2,26) - 26(3,23)	(0,0,0)	58905.53	(0.03)	[73042]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{16}O^{18}O$	12(1,11) - 11(2,10)	(0,0,0)	58989.60	(0.03)	[73042]
	6(0, 6) - 5(1, 5)	(0,0,0)	59518.16	(0.03)	[73042]
	37(4,34) - 36(5,31)	(0,0,0)	60801.03	(0.03)	[73042]
	38(6,33) - 39(5,34)	(0,0,0)	61313.47	(0.03)	[73042]
	39(3,36) - 40(2,39)	(0,0,0)	61397.725	(*0.57)	[76000]
	31(2,30) - 30(3,27)	(0,0,0)	62093.95	(0.03)	[73042]
	28(2,27) - 27(3,24)	(0,0,0)	63008.18	(0.03)	[73042]
	7(2, 6) - 8(1, 7)	(0,0,0)	63245.94	(0.03)	[73042]
	30(2,29) - 29(3,26)	(0,0,0)	64661.90	(0.03)	[73042]
	29(2,28) - 28(3,25)	(0,0,0)	64950.33	(0.03)	[73042]
	38(6,32) - 39(5,35)	(0,0,0)	68525.650	(*0.02)	[76000]
	30(5,26) - 31(4,27)	(0,0,0)	69156.36	(0.03)	[73042]
	23(2,21) - 24(1,24)	(0,0,0)	69535.47	(0.03)	[73042]
	31(3,29) - 30(4,26)	(0,0,0)	70207.56	(0.03)	[73042]
	10(2, 8) - 11(1,11)	(0,0,0)	70469.08	(0.03)	[73042]
	22(4,19) - 23(3,20)	(0,0,0)	75333.51	(0.03)	[73042]
	16(3,13) - 17(2,16)	(0,0,0)	75630.18	(0.03)	[73042]
	23(4,19) - 24(3,22)	(0,0,0)	75664.21	(0.03)	[73042]
	20(2,18) - 19(3,17)	(0,0,0)	78295.95	(0.03)	[73042]
	36(4,32) - 35(5,31)	(0,0,0)	78571.27	(0.03)	[73042]
	28(3,25) - 27(4,24)	(0,0,0)	80205.621	(*0.01)	[76000]
	14(3,12) - 15(2,13)	(0,0,0)	81156.991	(*0.01)	[76000]
	30(5,25) - 31(4,28)	(0,0,0)	82662.967	(*0.01)	[76000]
	38(4,35) - 37(5,32)	(0,0,0)	83550.628	(*0.02)	[76000]
	9(2, 7) - 10(1,10)	(0,0,0)	83853.097	(*0.01)	[76000]
	24(2,22) - 25(1,25)	(0,0,0)	83926.066	(*0.03)	[76000]
	40(3,37) - 41(2,40)	(0,0,0)	85089.599	(*0.73)	[76000]
	7(0, 7) - 6(1, 6)	(0,0,0)	86715.404	(*4E-3)	[76000]
	32(3,30) - 31(4,27)	(0,0,0)	87711.449	(*0.01)	[76000]
	37(6,32) - 38(5,33)	(0,0,0)	88137.290	(*0.01)	[76000]
	13(1,12) - 12(2,11)	(0,0,0)	90866.532	(*0.01)	[76000]
	6(2, 5) - 7(1, 6)	(0,0,0)	92349.015	(*5E-3)	[76000]
	1(1, 0) - 1(0, 1)	(0,0,0)	93354.479	(*2E-3)	[76000]
	37(6,31) - 38(5,34)	(0,0,0)	93768.754	(*0.01)	[76000]
	2(1, 1) - 2(0, 2)	(0,0,0)	94748.704	(*2E-3)	[76000]
	15(3,12) - 16(2,15)	(0,0,0)	95574.373	(*0.01)	[76000]
	29(5,25) - 30(4,26)	(0,0,0)	96671.051	(*0.01)	[76000]
	3(1, 2) - 3(0, 3)	(0,0,0)	96868.704	(*2E-3)	[76000]
	22(4,18) - 23(3,21)	(0,0,0)	98640.273	(*0.01)	[76000]
	8(2, 6) - 9(1, 9)	(0,0,0)	98651.373	(*0.01)	[76000]
	4(1, 3) - 4(0, 4)	(0,0,0)	99748.641	(*2E-3)	[76000]
	25(2,23) - 26(1,26)	(0,0,0)	100206.512	(*0.05)	[76000]
	5(1, 4) - 5(0, 5)	(0,0,0)	103433.549	(*2E-3)	[76000]
	21(4,18) - 22(3,19)	(0,0,0)	103782.491	(*0.01)	[76000]
	33(3,31) - 32(4,28)	(0,0,0)	104023.034	(*0.01)	[76000]
	39(4,36) - 38(5,33)	(0,0,0)	105772.423	(*0.02)	[76000]
	29(5,24) - 30(4,27)	(0,0,0)	107200.012	(*0.01)	[76000]
	6(1, 5) - 6(0, 6)	(0,0,0)	107978.674	(*3E-3)	[76000]
	13(3,11) - 14(2,12)	(0,0,0)	110359.375	(*0.01)	[76000]
	41(3,38) - 42(2,41)	(0,0,0)	110397.004	(*0.92)	[76000]
	37(4,33) - 36(5,32)	(0,0,0)	110677.739	(*0.02)	[76000]
	21(2,19) - 20(3,18)	(0,0,0)	112796.837	(*0.01)	[76000]
	7(1, 6) - 7(0, 7)	(0,0,0)	113448.363	(*3E-3)	[76000]
	8(0, 8) - 7(1, 7)	(0,0,0)	114253.419	(*5E-3)	[76000]
	29(3,26) - 28(4,25)	(0,0,0)	114338.758	(*0.01)	[76000]
	36(6,31) - 37(5,32)	(0,0,0)	114619.458	(*0.01)	[76000]
	7(2, 5) - 8(1, 8)	(0,0,0)	114737.430	(*0.01)	[76000]
	1(1, 1) - 0(0, 0)	(0,0,0)	115779.78	(0.06)	[73042]
	14(3,11) - 15(2,14)	(0,0,0)	116218.20	(0.06)	[73042]
	26(2,24) - 27(1,27)	(0,0,0)	118289.271	(*0.07)	[76000]
	36(6,30) - 37(5,33)	(0,0,0)	118982.80	(0.06)	[73042]
	34(3,32) - 33(4,29)	(0,0,0)	119006.48	(0.06)	[73042]
	8(1, 7) - 8(0, 8)	(0,0,0)	119914.35	(0.06)	[73042]
	5(2, 4) - 6(1, 5)	(0,0,0)	120828.50	(0.06)	[73042]
	21(4,17) - 22(3,20)	(0,0,0)	121912.86	(0.06)	[73042]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{16}O^{18}O$	14(1,13) - 13(2,12)	(0,0,0)	123198.64	(0.06)	[73042]
	28(5,24) - 29(4,25)	(0,0,0)	123675.96	(0.06)	[73042]
	40(4,37) - 39(5,34)	(0,0,0)	127375.470	(*0.02)	[76000]
	9(1, 8) - 9(0, 9)	(0,0,0)	127453.413	(*4E-3)	[76000]
	20(4,17) - 21(3,18)	(0,0,0)	131511.46	(0.06)	[73042]
	28(5,23) - 29(4,26)	(0,0,0)	131802.48	(0.06)	[73042]
	6(2, 4) - 7(1, 7)	(0,0,0)	131991.28	(0.06)	[73042]
	35(3,33) - 34(4,30)	(0,0,0)	132522.25	(0.06)	[73042]
	10(1, 9) - 10(0,10)	(0,0,0)	136143.99	(0.06)	[73042]
	42(3,39) - 43(2,42)	(0,0,0)	137187.887	(*0.14)	[76000]
	13(3,10) - 14(2,13)	(0,0,0)	137465.697	(*0.01)	[76000]
	27(2,25) - 28(1,28)	(0,0,0)	138077.680	(*0.10)	[76000]
	2(1, 2) - 1(0, 1)	(0,0,0)	138205.112	(*3E-3)	[76000]
	12(3,10) - 13(2,11)	(0,0,0)	138714.65	(0.06)	[73042]
	35(6,30) - 36(5,31)	(0,0,0)	140799.89	(0.06)	[73042]
	9(0, 9) - 8(1, 8)	(0,0,0)	142043.27	(0.06)	[73042]
	38(4,34) - 37(5,33)	(0,0,0)	143806.36	(0.06)	[73042]
	35(6,29) - 36(5,32)	(0,0,0)	144153.55	(0.06)	[73042]
	36(3,34) - 35(4,31)	(0,0,0)	144429.48	(0.06)	[73042]
	20(4,16) - 21(3,19)	(0,0,0)	145422.15	(0.06)	[73042]
	11(1,10) - 11(0,11)	(0,0,0)	146062.44	(0.06)	[73042]
	22(2,20) - 21(3,19)	(0,0,0)	148079.605	(*0.01)	[76000]
	41(4,38) - 40(5,35)	(0,0,0)	148260.77	(0.06)	[73042]
	4(2, 3) - 5(1, 4)	(0,0,0)	148669.18	(0.06)	[73042]
	30(3,27) - 29(4,26)	(0,0,0)	149536.93	(0.06)	[73042]
	27(5,23) - 28(4,24)	(0,0,0)	150233.67	(0.06)	[73042]
	5(2, 3) - 6(1, 6)	(0,0,0)	150302.66	(0.06)	[73042]
	37(3,35) - 36(4,32)	(0,0,0)	154588.566	(*0.02)	[76000]
	15(1,14) - 14(2,13)	(0,0,0)	155939.89	(0.06)	[73042]
	42(7,36) - 43(6,37)	(0,0,0)	156336.754	(*0.03)	[76000]
	27(5,22) - 28(4,25)	(0,0,0)	156440.76	(0.06)	[73042]
	12(1,11) - 12(0,12)	(0,0,0)	157278.14	(0.06)	[73042]
	42(7,35) - 43(6,38)	(0,0,0)	157646.814	(*0.03)	[76000]
	19(4,16) - 20(3,17)	(0,0,0)	158599.51	(0.06)	[73042]
	12(3, 9) - 13(2,12)	(0,0,0)	159229.44	(0.06)	[73042]
	28(2,26) - 29(1,29)	(0,0,0)	159466.359	(*0.14)	[76000]
	3(1, 3) - 2(0, 2)	(0,0,0)	159946.55	(0.06)	[73042]
	38(3,36) - 37(4,33)	(0,0,0)	162864.223	(*0.04)	[76000]
	11(3, 9) - 12(2,10)	(0,0,0)	166276.869	(*0.01)	[76000]
	34(6,29) - 35(5,30)	(0,0,0)	166713.934	(*0.01)	[76000]
	42(4,39) - 41(5,36)	(0,0,0)	168321.440	(*0.02)	[76000]
	19(4,15) - 20(3,18)	(0,0,0)	169116.010	(*0.01)	[76000]
	39(3,37) - 38(4,34)	(0,0,0)	169129.027	(*0.06)	[76000]
	34(6,28) - 35(5,31)	(0,0,0)	169270.027	(*0.01)	[76000]
	4(2, 2) - 5(1, 5)	(0,0,0)	169573.576	(*4E-3)	[76000]
	13(1,12) - 13(0,13)	(0,0,0)	169848.879	(*0.01)	[76000]
	10(0,10) - 9(1, 9)	(0,0,0)	169990.763	(*0.01)	[76000]
	43(3,41) - 42(4,38)	(0,0,0)	171994.792	(*0.26)	[76000]
	40(3,38) - 39(4,35)	(0,0,0)	173266.841	(*0.09)	[76000]
	42(3,40) - 41(4,37)	(0,0,0)	174773.417	(*0.19)	[76000]
	41(3,39) - 40(4,36)	(0,0,0)	175176.220	(*0.13)	[76000]
	3(2, 2) - 4(1, 3)	(0,0,0)	175858.42	(0.10)	[73042]
	26(5,22) - 27(4,23)	(0,0,0)	176401.20	(0.10)	[73042]
	39(4,35) - 38(5,34)	(0,0,0)	178016.237	(*0.04)	[76000]
	4(1, 4) - 3(0, 3)	(0,0,0)	181023.45	(0.10)	[73042]
	26(5,21) - 27(4,24)	(0,0,0)	181090.12	(0.10)	[73042]
	11(3, 8) - 12(2,11)	(0,0,0)	181430.479	(*0.01)	[76000]
	41(7,35) - 42(6,36)	(0,0,0)	181910.559	(*0.03)	[76000]
	29(2,27) - 30(1,30)	(0,0,0)	182341.580	(*0.19)	[76000]
	41(7,34) - 42(6,37)	(0,0,0)	182908.21	(0.10)	[73042]
	14(1,13) - 14(0,14)	(0,0,0)	183815.99	(0.10)	[73042]
	23(2,21) - 22(3,20)	(0,0,0)	184087.108	(*0.01)	[76000]
	18(4,15) - 19(3,16)	(0,0,0)	185124.46	(0.10)	[73042]
	31(3,28) - 30(4,27)	(0,0,0)	185791.013	(*0.01)	[76000]
	43(4,40) - 42(5,37)	(0,0,0)	187442.74	(0.10)	[73042]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{16}O^{18}O$	16(1,15) - 15(2,14)	(0,0,0)	189037.630	(*0.01)	[76000]
	3(2, 1) - 4(1, 4)	(0,0,0)	189719.838	(*4E-3)	[76000]
	33(6,28) - 34(5,29)	(0,0,0)	192392.492	(*0.01)	[76000]
	18(4,14) - 19(3,17)	(0,0,0)	192949.008	(*0.01)	[76000]
	10(3, 8) - 11(2, 9)	(0,0,0)	193113.551	(*0.01)	[76000]
	33(6,27) - 34(5,30)	(0,0,0)	194323.639	(*0.01)	[76000]
	11(0,11) - 10(1,10)	(0,0,0)	197999.560	(*0.01)	[76000]
	15(1,14) - 15(0,15)	(0,0,0)	199200.191	(*0.01)	[76000]
	5(1, 5) - 4(0, 4)	(0,0,0)	201466.886	(*0.01)	[76000]
	25(5,21) - 26(4,22)	(0,0,0)	202229.512	(*0.01)	[76000]
	2(2, 1) - 3(1, 2)	(0,0,0)	202385.572	(*5E-3)	[76000]
	10(3, 7) - 11(2,10)	(0,0,0)	203997.969	(*0.01)	[76000]
	25(5,20) - 26(4,23)	(0,0,0)	205730.404	(*0.01)	[76000]
	30(2,28) - 31(1,31)	(0,0,0)	206581.621	(*0.25)	[76000]
	40(7,34) - 41(6,35)	(0,0,0)	207330.516	(*0.03)	[76000]
	40(7,33) - 41(6,36)	(0,0,0)	208084.668	(*0.03)	[76000]
	2(2, 0) - 3(1, 3)	(0,0,0)	210672.385	(*5E-3)	[76000]
	17(4,14) - 18(3,15)	(0,0,0)	211160.865	(*0.01)	[76000]
	40(4,36) - 39(5,35)	(0,0,0)	213354.917	(*0.05)	[76000]
	16(1,15) - 16(0,16)	(0,0,0)	215998.726	(*0.01)	[76000]
	17(4,13) - 18(3,16)	(0,0,0)	216882.207	(*0.01)	[76000]
	32(6,27) - 33(5,28)	(0,0,0)	217862.725	(*0.01)	[76000]
	9(3, 7) - 10(2, 8)	(0,0,0)	219302.639	(*0.01)	[76000]
	32(6,26) - 33(5,29)	(0,0,0)	219308.322	(*0.01)	[76000]
	24(2,22) - 23(3,21)	(0,0,0)	220755.690	(*0.01)	[76000]
	6(1, 6) - 5(0, 5)	(0,0,0)	221319.72	(0.10)	[73042]
	17(1,16) - 16(2,15)	(0,0,0)	222432.264	(*0.01)	[76000]
	32(3,29) - 31(4,28)	(0,0,0)	223075.308	(*0.01)	[76000]
	12(0,12) - 11(1,11)	(0,0,0)	225974.92	(0.10)	[73042]
	9(3, 6) - 10(2, 9)	(0,0,0)	226868.662	(*0.01)	[76000]
	24(5,20) - 25(4,21)	(0,0,0)	227764.025	(*0.01)	[76000]
	24(5,19) - 25(4,22)	(0,0,0)	230345.525	(*0.01)	[76000]
	31(2,29) - 32(1,32)	(0,0,0)	232057.254	(*0.33)	[76000]
	16(2,14) - 16(1,15)	(0,0,0)	232525.09	(0.10)	[73042]
	39(7,33) - 40(6,34)	(0,0,0)	232610.637	(*0.03)	[76000]
	17(2,15) - 17(1,16)	(0,0,0)	232723.674	(*0.01)	[76000]
	39(7,32) - 40(6,35)	(0,0,0)	233176.406	(*0.03)	[76000]
	15(2,13) - 15(1,14)	(0,0,0)	233351.16	(0.10)	[73042]
	18(2,16) - 18(1,17)	(0,0,0)	234056.06	(0.10)	[73042]
	17(1,16) - 17(0,17)	(0,0,0)	234183.60	(0.10)	[73042]
	14(2,12) - 14(1,13)	(0,0,0)	235082.09	(0.10)	[73042]
	19(2,17) - 19(1,18)	(0,0,0)	236620.94	(0.10)	[73042]
	16(4,13) - 17(3,14)	(0,0,0)	236778.387	(*0.01)	[76000]
	13(2,11) - 13(1,12)	(0,0,0)	237587.28	(0.10)	[73042]
	20(2,18) - 20(1,19)	(0,0,0)	240507.479	(*0.01)	[76000]
	7(1, 7) - 6(0, 6)	(0,0,0)	240636.517	(*0.01)	[76000]
	12(2,10) - 12(1,11)	(0,0,0)	240727.174	(*0.01)	[76000]
	16(4,12) - 17(3,15)	(0,0,0)	240882.797	(*0.01)	[76000]
	31(6,26) - 32(5,27)	(0,0,0)	243148.326	(*0.01)	[76000]
	31(6,25) - 32(5,28)	(0,0,0)	244219.998	(*0.01)	[76000]
	11(2, 9) - 11(1,10)	(0,0,0)	244355.166	(*0.01)	[76000]
	8(3, 6) - 9(2, 7)	(0,0,0)	244928.482	(*0.01)	[76000]
	21(2,19) - 21(1,20)	(0,0,0)	245795.899	(*0.01)	[76000]
	10(2, 8) - 10(1, 9)	(0,0,0)	248321.23	(0.12)	[73042]
	41(4,37) - 40(5,36)	(0,0,0)	249855.700	(*0.07)	[76000]
	8(3, 5) - 9(2, 8)	(0,0,0)	249986.49	(0.12)	[73042]
	9(2, 7) - 9(1, 8)	(0,0,0)	252475.21	(0.12)	[73042]
	22(2,20) - 22(1,21)	(0,0,0)	252558.00	(0.12)	[73042]
	23(5,19) - 24(4,20)	(0,0,0)	253044.65	(0.12)	[73042]
	18(1,17) - 18(0,18)	(0,0,0)	253701.48	(0.12)	[73042]
	13(0,13) - 12(1,12)	(0,0,0)	253827.69	(0.12)	[73042]
	23(5,18) - 24(4,21)	(0,0,0)	254922.990	(*0.01)	[76000]
	18(1,17) - 17(2,16)	(0,0,0)	256057.20	(0.12)	[73042]
	8(2, 6) - 8(1, 7)	(0,0,0)	256671.551	(*0.01)	[76000]
	38(7,32) - 39(6,33)	(0,0,0)	257763.270	(*0.03)	[76000]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{16}O^{18}O$	25(2,23) - 24(3,22)	(0,0,0)	258016.42	(0.12)	[73042]
	38(7,31) - 39(6,34)	(0,0,0)	258184.346	(*0.03)	[76000]
	32(2,30) - 33(1,33)	(0,0,0)	258632.439	(*0.43)	[76000]
	8(1, 8) - 7(0, 7)	(0,0,0)	259482.83	(0.12)	[73042]
	7(2, 5) - 7(1, 6)	(0,0,0)	260771.94	(0.12)	[73042]
	23(2,21) - 23(1,22)	(0,0,0)	260856.62	(0.12)	[73042]
	33(3,30) - 32(4,29)	(0,0,0)	261348.68	(0.12)	[73042]
	15(4,12) - 16(3,13)	(0,0,0)	262040.713	(*0.01)	[76000]
	6(2, 4) - 6(1, 5)	(0,0,0)	264649.10	(0.12)	[73042]
	15(4,11) - 16(3,14)	(0,0,0)	264923.61	(0.12)	[73042]
	5(2, 3) - 5(1, 4)	(0,0,0)	268188.86	(0.12)	[73042]
	30(6,25) - 31(5,26)	(0,0,0)	268269.92	(0.12)	[73042]
	30(6,24) - 31(5,27)	(0,0,0)	269056.29	(0.12)	[73042]
	7(3, 5) - 8(2, 6)	(0,0,0)	270077.90	(0.12)	[73042]
	24(2,22) - 24(1,23)	(0,0,0)	270744.15	(0.12)	[73042]
	4(2, 2) - 4(1, 3)	(0,0,0)	271291.82	(0.12)	[73042]
	7(3, 4) - 8(2, 7)	(0,0,0)	273302.15	(0.12)	[73042]
	3(2, 1) - 3(1, 2)	(0,0,0)	273874.57	(0.12)	[73042]
	19(1,18) - 19(0,19)	(0,0,0)	274474.98	(0.12)	[73042]
	2(2, 0) - 2(1, 1)	(0,0,0)	275870.27	(0.12)	[73042]
	9(1, 9) - 8(0, 8)	(0,0,0)	277934.53	(0.12)	[73042]
	22(5,18) - 23(4,19)	(0,0,0)	278106.33	(0.12)	[73042]
	22(5,17) - 23(4,20)	(0,0,0)	279453.56	(0.12)	[73042]
	2(2, 1) - 2(1, 2)	(0,0,0)	279990.80	(0.12)	[73042]
	14(0,14) - 13(1,13)	(0,0,0)	281477.84	(0.12)	[73042]
	3(2, 2) - 3(1, 3)	(0,0,0)	282069.16	(0.12)	[73042]
	25(2,23) - 25(1,24)	(0,0,0)	282261.09	(0.12)	[73042]
	37(7,31) - 38(6,32)	(0,0,0)	282799.328	(*0.03)	[76000]
	37(7,30) - 38(6,33)	(0,0,0)	283110.117	(*0.03)	[76000]
	4(2, 3) - 4(1, 4)	(0,0,0)	284845.86	(0.12)	[73042]
	33(2,31) - 34(1,34)	(0,0,0)	286165.340	(*0.56)	[76000]
	14(4,11) - 15(3,12)	(0,0,0)	287005.01	(0.12)	[73042]
	42(4,38) - 41(5,37)	(0,0,0)	287535.850	(*0.10)	[76000]
	5(2, 4) - 5(1, 5)	(0,0,0)	288325.42	(0.12)	[73042]
	14(4,10) - 15(3,13)	(0,0,0)	288982.88	(0.12)	[73042]
	19(1,18) - 18(2,17)	(0,0,0)	289838.34	(0.12)	[73042]
	6(2, 5) - 6(1, 6)	(0,0,0)	292512.78	(0.12)	[73042]
	29(6,24) - 30(5,25)	(0,0,0)	293245.67	(0.12)	[73042]
	29(6,23) - 30(5,26)	(0,0,0)	293816.402	(*0.01)	[76000]
	6(3, 4) - 7(2, 5)	(0,0,0)	294836.13	(0.12)	[73042]
	26(2,24) - 26(1,25)	(0,0,0)	295432.72	(0.12)	[73042]
	26(2,24) - 25(3,23)	(0,0,0)	295795.86	(0.12)	[73042]
	10(1,10) - 9(0, 9)	(0,0,0)	296075.57	(0.12)	[73042]
	20(1,19) - 20(0,20)	(0,0,0)	296405.26	(0.12)	[73042]
	6(3, 3) - 7(2, 6)	(0,0,0)	296772.60	(0.12)	[73042]
	7(2, 6) - 7(1, 7)	(0,0,0)	297413.77	(0.12)	[73042]
	34(3,31) - 33(4,30)	(0,0,0)	300556.390	(*0.02)	[76000]
	21(5,17) - 22(4,18)	(0,0,0)	302979.31	(0.12)	[73042]
	8(2, 7) - 8(1, 8)	(0,0,0)	303033.87	(0.12)	[73042]
	21(5,16) - 22(4,19)	(0,0,0)	303930.75	(0.12)	[73042]
	36(7,30) - 37(6,31)	(0,0,0)	307728.492	(*0.04)	[76000]
	36(7,29) - 37(6,32)	(0,0,0)	307955.887	(*0.04)	[76000]
	15(0,15) - 14(1,14)	(0,0,0)	308858.09	(0.12)	[73042]
	9(2, 8) - 9(1, 9)	(0,0,0)	309378.98	(0.12)	[73042]
	27(2,25) - 27(1,26)	(0,0,0)	310267.38	(0.12)	[73042]
	13(4,10) - 14(3,11)	(0,0,0)	311722.05	(0.12)	[73042]
	13(4, 9) - 14(3,12)	(0,0,0)	313043.20	(0.12)	[73042]
	11(1,11) - 10(0,10)	(0,0,0)	313996.05	(0.12)	[73042]
	34(2,32) - 35(1,35)	(0,0,0)	314509.734	(*0.70)	[76000]
	10(2, 9) - 10(1,10)	(0,0,0)	316454.10	(0.12)	[73042]
	28(6,23) - 29(5,24)	(0,0,0)	318090.94	(0.12)	[73042]
	28(6,22) - 29(5,25)	(0,0,0)	318500.66	(0.12)	[73042]
	5(3, 3) - 6(2, 4)	(0,0,0)	319284.594	(*0.01)	[76000]
	21(1,20) - 21(0,21)	(0,0,0)	319375.36	(0.12)	[73042]
	5(3, 2) - 6(2, 5)	(0,0,0)	320360.75	(0.15)	[73042]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{16}O^{18}O$	20(1,19) - 19(2,18)	(0,0,0)	323696.163	(*0.01)	[76000]
	11(2,10) - 11(1,11)	(0,0,0)	324263.443	(*0.01)	[76000]
	2(2, 1) - 1(1, 0)	(0,0,0)	324841.416	(*0.01)	[76000]
	2(2, 0) - 1(1, 1)	(0,0,0)	326235.54	(0.15)	[73042]
	43(4,39) - 42(5,38)	(0,0,0)	326395.406	(*0.13)	[76000]
	28(2,26) - 28(1,27)	(0,0,0)	326752.326	(*0.01)	[76000]
	20(5,16) - 21(4,17)	(0,0,0)	327689.934	(*0.01)	[76000]
	20(5,15) - 21(4,18)	(0,0,0)	328350.61	(0.15)	[73042]
	12(1,12) - 11(0,11)	(0,0,0)	331789.04	(0.15)	[73042]
	35(7,29) - 36(6,30)	(0,0,0)	332559.395	(*0.04)	[76000]
	35(7,28) - 36(6,31)	(0,0,0)	332724.250	(*0.04)	[76000]
	12(2,11) - 12(1,12)	(0,0,0)	332810.014	(*0.01)	[76000]
	27(2,25) - 26(3,24)	(0,0,0)	334016.48	(0.15)	[73042]
	16(0,16) - 15(1,15)	(0,0,0)	335915.591	(*0.01)	[76000]
	12(4, 9) - 13(3,10)	(0,0,0)	336235.738	(*0.01)	[76000]
	12(4, 8) - 13(3,11)	(0,0,0)	337091.797	(*0.01)	[76000]
	35(3,32) - 34(4,31)	(0,0,0)	340632.145	(*0.03)	[76000]
	13(2,12) - 13(1,13)	(0,0,0)	342095.182	(*0.01)	[76000]
	27(6,22) - 28(5,23)	(0,0,0)	342819.887	(*0.02)	[76000]
	27(6,21) - 28(5,24)	(0,0,0)	343110.176	(*0.02)	[76000]
	22(1,21) - 22(0,22)	(0,0,0)	343254.587	(*0.01)	[76000]
	4(3, 2) - 5(2, 3)	(0,0,0)	343496.945	(*0.01)	[76000]
	35(2,33) - 36(1,36)	(0,0,0)	343516.840	(*0.88)	[76000]
	4(3, 1) - 5(2, 4)	(0,0,0)	344035.059	(*0.01)	[76000]
	29(2,27) - 29(1,28)	(0,0,0)	344853.469	(*0.02)	[76000]
	42(8,35) - 43(7,36)	(0,0,0)	346530.801	(*0.10)	[76000]
	42(8,34) - 43(7,37)	(0,0,0)	346594.074	(*0.10)	[76000]
	3(2, 2) - 2(1, 1)	(0,0,0)	347267.044	(*0.01)	[76000]
	13(1,13) - 12(0,12)	(0,0,0)	349546.895	(*0.01)	[76000]
	3(2, 1) - 2(1, 2)	(0,0,0)	351479.816	(*0.01)	[76000]
	14(2,13) - 14(1,14)	(0,0,0)	352118.35	(0.15)	[73042]
	19(5,15) - 20(4,16)	(0,0,0)	352260.723	(*0.01)	[76000]
	19(5,14) - 20(4,17)	(0,0,0)	352711.137	(*0.01)	[76000]
	31(3,28) - 31(2,29)	(0,0,0)	353247.273	(*0.03)	[76000]
	30(3,27) - 30(2,28)	(0,0,0)	353529.494	(*0.03)	[76000]
	32(3,29) - 32(2,30)	(0,0,0)	354471.668	(*0.04)	[76000]
	29(3,26) - 29(2,27)	(0,0,0)	355208.68	(0.15)	[73042]
	33(3,30) - 33(2,31)	(0,0,0)	357298.419	(*0.05)	[76000]
	34(7,28) - 35(6,29)	(0,0,0)	357299.754	(*0.05)	[76000]
	34(7,27) - 35(6,30)	(0,0,0)	357418.125	(*0.05)	[76000]
	21(1,20) - 20(2,19)	(0,0,0)	357544.71	(0.15)	[73042]
	28(3,25) - 28(2,26)	(0,0,0)	358161.46	(0.15)	[73042]
	11(4, 8) - 12(3, 9)	(0,0,0)	360584.13	(0.15)	[73042]
	11(4, 7) - 12(3,10)	(0,0,0)	361119.687	(*0.01)	[76000]
	34(3,31) - 34(2,32)	(0,0,0)	361809.72	(0.15)	[73042]
	27(3,24) - 27(2,25)	(0,0,0)	362250.02	(0.15)	[73042]
	17(0,17) - 16(1,16)	(0,0,0)	362613.44	(0.15)	[73042]
	15(2,14) - 15(1,15)	(0,0,0)	362876.70	(0.15)	[73042]
	30(2,28) - 30(1,29)	(0,0,0)	364513.29	(0.15)	[73042]
	26(3,23) - 26(2,24)	(0,0,0)	367323.91	(0.15)	[73042]
	14(1,14) - 13(0,13)	(0,0,0)	367357.21	(0.15)	[73042]
	26(6,21) - 27(5,22)	(0,0,0)	367444.09	(0.15)	[73042]
	3(3, 1) - 4(2, 2)	(0,0,0)	367538.613	(*0.01)	[76000]
	26(6,20) - 27(5,23)	(0,0,0)	367647.312	(*0.02)	[76000]
	3(3, 0) - 4(2, 3)	(0,0,0)	367769.223	(*0.01)	[76000]
	23(1,22) - 23(0,23)	(0,0,0)	367902.69	(0.15)	[73042]
	35(3,32) - 35(2,33)	(0,0,0)	368074.31	(0.15)	[73042]
	4(2, 3) - 3(1, 2)	(0,0,0)	369000.69	(0.15)	[73042]
	41(8,34) - 42(7,35)	(0,0,0)	371259.230	(*0.11)	[76000]
	41(8,33) - 42(7,36)	(0,0,0)	371305.082	(*0.11)	[76000]
	28(2,26) - 27(3,25)	(0,0,0)	372596.946	(*0.01)	[76000]
	36(2,34) - 37(1,37)	(0,0,0)	373037.633	(*0.09)	[76000]
	25(3,22) - 25(2,23)	(0,0,0)	373221.63	(0.15)	[73042]
	16(2,15) - 16(1,16)	(0,0,0)	374364.80	(0.15)	[73042]
	36(3,33) - 36(2,34)	(0,0,0)	376148.234	(*0.08)	[76000]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{16}O^{18}O$	18(5,14) - 19(4,15)	(0,0,0)	376711.176	(*0.01)	[76000]
	18(5,13) - 19(4,16)	(0,0,0)	377012.102	(*0.01)	[76000]
	4(2, 2) - 3(1, 3)	(0,0,0)	377502.58	(0.15)	[73042]
	24(3,21) - 24(2,22)	(0,0,0)	379772.93	(0.15)	[73042]
	36(3,33) - 35(4,32)	(0,0,0)	381500.031	(*0.04)	[76000]
	33(7,27) - 34(6,28)	(0,0,0)	381956.531	(*0.05)	[76000]
	33(7,26) - 34(6,29)	(0,0,0)	382040.664	(*0.05)	[76000]
	10(4, 7) - 11(3, 8)	(0,0,0)	384799.492	(*0.01)	[76000]
	10(4, 6) - 11(3, 9)	(0,0,0)	385121.039	(*0.01)	[76000]
	15(1,15) - 14(0,14)	(0,0,0)	385299.156	(*0.01)	[76000]
	31(2,29) - 31(1,30)	(0,0,0)	385651.148	(*0.03)	[76000]
	37(3,34) - 37(2,35)	(0,0,0)	386071.554	(*0.09)	[76000]
	17(2,16) - 17(1,17)	(0,0,0)	386574.458	(*0.01)	[76000]
	23(3,20) - 23(2,21)	(0,0,0)	386802.078	(*0.01)	[76000]
	18(0,18) - 17(1,17)	(0,0,0)	388930.092	(*0.01)	[76000]
	5(2, 4) - 4(1, 3)	(0,0,0)	390043.630	(*0.01)	[76000]
	22(1,21) - 21(2,20)	(0,0,0)	391294.380	(*0.01)	[76000]
	25(6,20) - 26(5,21)	(0,0,0)	391974.664	(*0.03)	[76000]
	25(6,19) - 26(5,22)	(0,0,0)	392114.742	(*0.03)	[76000]
	24(1,23) - 24(0,24)	(0,0,0)	393175.369	(*0.03)	[76000]
	22(3,19) - 22(2,20)	(0,0,0)	394132.548	(*0.01)	[76000]
	40(8,33) - 41(7,34)	(0,0,0)	395918.234	(*0.12)	[76000]
	40(8,32) - 41(7,35)	(0,0,0)	395951.184	(*0.12)	[76000]
	38(3,35) - 38(2,36)	(0,0,0)	397869.763	(*0.11)	[76000]
	18(2,17) - 18(1,18)	(0,0,0)	399494.699	(*0.01)	[76000]
$^{16}O^{18}O^{18}O$	21(2,20) - 20(3,17)	(0,0,0)	20681.13	(0.03)	[73042]
	15(2,13) - 16(1,16)	(0,0,0)	22226.86	(0.03)	[73042]
	16(2,14) - 17(1,17)	(0,0,0)	22552.10	(0.03)	[73042]
	14(2,12) - 15(1,15)	(0,0,0)	24189.71	(0.03)	[73042]
	17(3,14) - 18(2,17)	(0,0,0)	24932.73	(0.03)	[73042]
	17(2,15) - 18(1,18)	(0,0,0)	25195.46	(0.03)	[73042]
	17(2,15) - 16(3,14)	(0,0,0)	25257.46	(0.03)	[73042]
	23(4,19) - 24(3,22)	(0,0,0)	25387.65	(0.03)	[73042]
	13(2,11) - 14(1,14)	(0,0,0)	28384.01	(0.03)	[73042]
	18(2,16) - 19(1,19)	(0,0,0)	30161.41	(0.03)	[73042]
	22(2,21) - 21(3,18)	(0,0,0)	32800.36	(0.03)	[73042]
	12(2,10) - 13(1,13)	(0,0,0)	34726.84	(0.03)	[73042]
	32(2,31) - 31(3,28)	(0,0,0)	35002.90	(0.03)	[73042]
	1(1, 1) - 2(0, 2)	(0,0,0)	36688.20	(0.03)	[73042]
	27(3,25) - 26(4,22)	(0,0,0)	37340.71	(0.03)	[73042]
	19(2,17) - 20(1,20)	(0,0,0)	37431.09	(0.03)	[73042]
	14(3,12) - 15(2,13)	(0,0,0)	37977.84	(0.03)	[73042]
	29(5,24) - 30(4,27)	(0,0,0)	38503.62	(0.03)	[73042]
	7(2, 6) - 8(1, 7)	(0,0,0)	38859.57	(0.03)	[73042]
	5(0, 5) - 4(1, 4)	(0,0,0)	40475.34	(0.03)	[73042]
	16(3,13) - 17(2,16)	(0,0,0)	42697.08	(0.03)	[73042]
	23(2,22) - 22(3,19)	(0,0,0)	43110.16	(0.03)	[73042]
	11(2, 9) - 12(1,12)	(0,0,0)	43111.53	(0.03)	[73042]
	21(4,18) - 22(3,19)	(0,0,0)	44127.00	(0.03)	[73042]
	22(4,18) - 23(3,21)	(0,0,0)	47553.44	(0.03)	[73042]
	25(3,22) - 24(4,21)	(0,0,0)	48659.58	(0.03)	[73042]
	28(5,24) - 29(4,25)	(0,0,0)	49173.62	(0.03)	[73042]
	24(2,23) - 23(3,20)	(0,0,0)	51457.30	(0.03)	[73042]
	35(6,30) - 36(5,31)	(0,0,0)	51634.70	(0.03)	[73042]
	11(1,10) - 10(2, 9)	(0,0,0)	52863.67	(0.03)	[73042]
	10(2, 8) - 11(1,11)	(0,0,0)	53411.52	(0.03)	[73042]
	25(2,24) - 24(3,21)	(0,0,0)	57700.10	(0.03)	[73042]
	18(2,16) - 17(3,15)	(0,0,0)	58314.18	(0.03)	[73042]
	21(2,19) - 22(1,22)	(0,0,0)	58704.68	(0.03)	[73042]
	29(2,28) - 28(3,25)	(0,0,0)	59469.00	(0.03)	[73042]
	15(3,12) - 16(2,15)	(0,0,0)	61493.78	(0.03)	[73042]
	26(2,25) - 25(3,22)	(0,0,0)	61713.65	(0.03)	[73042]
	28(5,23) - 29(4,26)	(0,0,0)	62844.74	(0.03)	[73042]
	27(2,26) - 26(3,23)	(0,0,0)	63394.28	(0.03)	[73042]
	9(2, 7) - 10(1,10)	(0,0,0)	65486.13	(0.03)	[73042]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{18}O^{18}O$	6(0, 6) - 5(1, 5)	(0,0,0)	67283.39	(0.03)	[73042]
	13(3,11) - 14(2,12)	(0,0,0)	68133.10	(0.03)	[73042]
	6(2, 5) - 7(1, 6)	(0,0,0)	68208.59	(0.03)	[73042]
	21(4,17) - 22(3,20)	(0,0,0)	70178.48	(0.03)	[73042]
	20(4,17) - 21(3,18)	(0,0,0)	73105.58	(0.03)	[73042]
	29(3,27) - 28(4,24)	(0,0,0)	74821.06	(0.03)	[73042]
	27(5,23) - 28(4,24)	(0,0,0)	76828.73	(0.03)	[73042]
	34(6,29) - 35(5,30)	(0,0,0)	78404.10	(0.03)	[73042]
	8(2, 6) - 9(1, 9)	(0,0,0)	79186.93	(0.03)	[73042]
	35(4,32) - 34(5,29)	(0,0,0)	79324.02	(0.03)	[73042]
	27(3,24) - 26(4,23)	(0,0,0)	115977.20	(0.06)	[73042]
	19(4,15) - 20(3,18)	(0,0,0)	116472.99	(0.06)	[73042]
	13(1,12) - 12(2,11)	(0,0,0)	116724.43	(0.06)	[73042]
	32(3,30) - 31(4,27)	(0,0,0)	121696.81	(0.06)	[73042]
	8(0, 8) - 7(1, 7)	(0,0,0)	122016.61	(0.06)	[73042]
	9(1, 8) - 9(0, 9)	(0,0,0)	122753.88	(0.06)	[73042]
	12(3, 9) - 13(2,12)	(0,0,0)	122782.98	(0.06)	[73042]
	37(4,34) - 36(5,31)	(0,0,0)	123171.92	(0.06)	[73042]
	4(2, 3) - 5(1, 4)	(0,0,0)	124919.88	(0.06)	[73042]
	2(1, 2) - 1(0, 1)	(0,0,0)	130027.19	(0.06)	[73042]
	25(5,21) - 26(4,22)	(0,0,0)	130486.76	(0.06)	[73042]
	32(6,27) - 33(5,28)	(0,0,0)	130883.57	(0.06)	[73042]
	10(1, 9) - 10(0,10)	(0,0,0)	132354.45	(0.06)	[73042]
	35(4,31) - 34(5,30)	(0,0,0)	133644.15	(0.06)	[73042]
	33(3,31) - 32(4,28)	(0,0,0)	134195.48	(0.06)	[73042]
	25(5,20) - 26(4,23)	(0,0,0)	136429.96	(0.06)	[73042]
	18(4,14) - 19(3,17)	(0,0,0)	139999.97	(0.06)	[73042]
	11(1,10) - 11(0,11)	(0,0,0)	143336.34	(0.06)	[73042]
	11(3, 8) - 12(2,11)	(0,0,0)	144468.34	(0.06)	[73042]
	4(2, 2) - 5(1, 5)	(0,0,0)	147360.94	(0.06)	[73042]
	14(1,13) - 13(2,12)	(0,0,0)	149328.44	(0.06)	[73042]
	9(0, 9) - 8(1, 8)	(0,0,0)	149734.31	(0.06)	[73042]
	28(3,25) - 27(4,24)	(0,0,0)	151352.09	(0.06)	[73042]
	3(1, 3) - 2(0, 2)	(0,0,0)	151527.15	(0.06)	[73042]
	10(3, 8) - 11(2, 9)	(0,0,0)	153048.05	(0.06)	[73042]
	17(4,14) - 18(3,15)	(0,0,0)	155370.07	(0.06)	[73042]
	12(1,11) - 12(0,12)	(0,0,0)	155768.28	(0.06)	[73042]
	24(5,20) - 25(4,21)	(0,0,0)	156632.64	(0.06)	[73042]
	31(6,26) - 32(5,27)	(0,0,0)	156680.21	(0.06)	[73042]
	4(1, 4) - 3(0, 3)	(0,0,0)	172319.68	(0.10)	[73042]
	10(0,10) - 9(1, 9)	(0,0,0)	177538.61	(0.10)	[73042]
	9(3, 7) - 10(2, 8)	(0,0,0)	179704.41	(0.10)	[73042]
	16(4,13) - 17(3,14)	(0,0,0)	181537.22	(0.10)	[73042]
	37(7,30) - 38(6,33)	(0,0,0)	182027.88	(0.10)	[73042]
	30(6,25) - 31(5,26)	(0,0,0)	182229.78	(0.10)	[73042]
	15(1,14) - 14(2,13)	(0,0,0)	182301.41	(0.10)	[73042]
	23(5,19) - 24(4,20)	(0,0,0)	182406.21	(0.10)	[73042]
	40(4,37) - 39(5,34)	(0,0,0)	182781.62	(0.10)	[73042]
	30(6,24) - 31(5,27)	(0,0,0)	183796.12	(0.10)	[73042]
	14(1,13) - 14(0,14)	(0,0,0)	185150.33	(0.10)	[73042]
	16(4,12) - 17(3,15)	(0,0,0)	187525.70	(0.10)	[73042]
	15(1,14) - 15(0,15)	(0,0,0)	202115.85	(0.10)	[73042]
	19(2,17) - 19(1,18)	(0,0,0)	222852.65	(0.10)	[73042]
	10(2, 8) - 10(1, 9)	(0,0,0)	224160.70	(0.10)	[73042]
	30(3,27) - 29(4,26)	(0,0,0)	225453.08	(0.10)	[73042]
	9(2, 7) - 9(1, 8)	(0,0,0)	228137.31	(0.10)	[73042]
	20(2,18) - 20(1,19)	(0,0,0)	229020.08	(0.10)	[73042]
	8(2, 6) - 8(1, 7)	(0,0,0)	232280.10	(0.10)	[73042]
	14(4,11) - 15(3,12)	(0,0,0)	232497.93	(0.10)	[73042]
	28(6,22) - 29(5,25)	(0,0,0)	233523.25	(0.10)	[73042]
	7(3, 4) - 8(2, 7)	(0,0,0)	235103.62	(0.10)	[73042]
	14(4,10) - 15(3,13)	(0,0,0)	235392.12	(0.10)	[73042]
	23(2,21) - 22(3,20)	(0,0,0)	236109.50	(0.10)	[73042]
	7(2, 5) - 7(1, 6)	(0,0,0)	236421.70	(0.10)	[73042]
	17(1,16) - 17(0,17)	(0,0,0)	240401.23	(0.10)	[73042]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{18}O^{18}O$	6(2, 4) - 6(1, 5)	(0,0,0)	240406.06	(0.10)	[73042]
	4(2, 2) - 4(1, 3)	(0,0,0)	247355.11	(0.12)	[73042]
	17(1,16) - 16(2,15)	(0,0,0)	249060.07	(0.12)	[73042]
	8(1, 8) - 7(0, 7)	(0,0,0)	249416.74	(0.12)	[73042]
	3(2, 1) - 3(1, 2)	(0,0,0)	250091.48	(0.12)	[73042]
	2(2, 0) - 2(1, 1)	(0,0,0)	252217.22	(0.12)	[73042]
	6(3, 4) - 7(2, 5)	(0,0,0)	255970.10	(0.12)	[73042]
	2(2, 1) - 2(1, 2)	(0,0,0)	256629.81	(0.12)	[73042]
	13(4,10) - 14(3,11)	(0,0,0)	257437.42	(0.12)	[73042]
	23(2,21) - 23(1,22)	(0,0,0)	257541.56	(0.12)	[73042]
	27(6,22) - 28(5,23)	(0,0,0)	257679.28	(0.12)	[73042]
	20(5,16) - 21(4,17)	(0,0,0)	257992.23	(0.12)	[73042]
	27(6,21) - 28(5,24)	(0,0,0)	258259.87	(0.12)	[73042]
	6(3, 3) - 7(2, 6)	(0,0,0)	258396.67	(0.12)	[73042]
	3(2, 2) - 3(1, 3)	(0,0,0)	258858.27	(0.12)	[73042]
	20(5,15) - 21(4,18)	(0,0,0)	259123.20	(0.12)	[73042]
	13(4, 9) - 14(3,12)	(0,0,0)	259372.70	(0.12)	[73042]
	13(0,13) - 12(1,12)	(0,0,0)	260402.09	(0.12)	[73042]
	18(1,17) - 18(0,18)	(0,0,0)	261550.84	(0.12)	[73042]
	4(2, 3) - 4(1, 4)	(0,0,0)	261836.48	(0.12)	[73042]
	31(3,28) - 30(4,27)	(0,0,0)	264086.64	(0.12)	[73042]
	5(2, 4) - 5(1, 5)	(0,0,0)	265569.97	(0.12)	[73042]
	9(1, 9) - 8(0, 8)	(0,0,0)	267545.24	(0.12)	[73042]
	6(2, 5) - 6(1, 6)	(0,0,0)	270065.02	(0.12)	[73042]
	24(2,22) - 24(1,23)	(0,0,0)	270552.37	(0.12)	[73042]
	7(2, 6) - 7(1, 7)	(0,0,0)	275328.22	(0.12)	[73042]
	8(2, 7) - 8(1, 8)	(0,0,0)	281366.48	(0.12)	[73042]
	33(7,26) - 34(6,29)	(0,0,0)	281774.02	(0.12)	[73042]
	5(3, 2) - 6(2, 5)	(0,0,0)	281837.57	(0.12)	[73042]
	12(4, 9) - 13(3,10)	(0,0,0)	282099.96	(0.12)	[73042]
	26(6,21) - 27(5,22)	(0,0,0)	282504.88	(0.12)	[73042]
	18(1,17) - 17(2,16)	(0,0,0)	282677.32	(0.12)	[73042]
	19(5,15) - 20(4,16)	(0,0,0)	282743.62	(0.12)	[73042]
	26(6,20) - 27(5,23)	(0,0,0)	282911.49	(0.12)	[73042]
	19(5,14) - 20(4,17)	(0,0,0)	283515.33	(0.12)	[73042]
	19(1,18) - 19(0,19)	(0,0,0)	283880.08	(0.12)	[73042]
	25(2,23) - 25(1,24)	(0,0,0)	285349.77	(0.12)	[73042]
	10(1,10) - 9(0, 9)	(0,0,0)	285405.12	(0.12)	[73042]
	14(0,14) - 13(1,13)	(0,0,0)	287534.79	(0.12)	[73042]
	9(2, 8) - 9(1, 9)	(0,0,0)	288185.76	(0.12)	[73042]
	10(2, 9) - 10(1,10)	(0,0,0)	295791.68	(0.12)	[73042]
	2(2, 1) - 1(1, 0)	(0,0,0)	301092.94	(0.12)	[73042]
	26(2,24) - 26(1,25)	(0,0,0)	301918.69	(0.12)	[73042]
	2(2, 0) - 1(1, 1)	(0,0,0)	302589.65	(0.12)	[73042]
	11(1,11) - 10(0,10)	(0,0,0)	303103.63	(0.12)	[73042]
	32(3,29) - 31(4,38)	(0,0,0)	303685.74	(0.12)	[73042]
	11(2,10) - 11(1,11)	(0,0,0)	304187.93	(0.12)	[73042]
	4(3, 2) - 5(2, 3)	(0,0,0)	304711.21	(0.12)	[73042]
	4(3, 1) - 5(2, 4)	(0,0,0)	305385.96	(0.12)	[73042]
	11(4, 8) - 12(3, 9)	(0,0,0)	306537.74	(0.12)	[73042]
	25(6,20) - 26(5,21)	(0,0,0)	307198.60	(0.12)	[73042]
	20(1,19) - 20(0,20)	(0,0,0)	307243.83	(0.12)	[73042]
	11(4, 7) - 12(3,10)	(0,0,0)	307323.39	(0.12)	[73042]
	18(5,14) - 19(4,15)	(0,0,0)	307326.22	(0.12)	[73042]
	25(6,19) - 26(5,22)	(0,0,0)	307479.37	(0.12)	[73042]
	25(2,23) - 24(3,22)	(0,0,0)	311714.58	(0.12)	[73042]
	12(2,11) - 12(1,12)	(0,0,0)	313376.41	(0.12)	[73042]
	15(0,15) - 14(1,14)	(0,0,0)	314310.79	(0.12)	[73042]
	19(1,18) - 18(2,17)	(0,0,0)	316327.25	(0.12)	[73042]
	12(1,12) - 11(0,11)	(0,0,0)	320748.22	(0.12)	[73042]
	30(3,27) - 30(2,28)	(0,0,0)	325519.63	(0.15)	[73042]
	26(3,23) - 26(2,24)	(0,0,0)	327220.73	(0.15)	[73042]
	31(3,28) - 31(2,29)	(0,0,0)	329236.28	(0.15)	[73042]
	25(3,22) - 25(2,23)	(0,0,0)	331134.58	(0.15)	[73042]
	10(4, 6) - 11(3, 9)	(0,0,0)	331267.54	(0.15)	[73042]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{16}O^{18}O^{18}O$	21(1,20) - 21(0,21)	(0,0,0)	331482.89	(0.15)	[73042]
	17(5,13) - 18(4,14)	(0,0,0)	331765.32	(0.15)	[73042]
	14(2,13) - 14(1,14)	(0,0,0)	334125.29	(0.15)	[73042]
	32(3,29) - 32(2,30)	(0,0,0)	334810.58	(0.15)	[73042]
	15(2,14) - 15(1,15)	(0,0,0)	345675.72	(0.15)	[73042]
	14(1,14) - 13(0,13)	(0,0,0)	356274.72	(0.15)	[73042]
	22(1,21) - 22(0,22)	(0,0,0)	356430.51	(0.15)	[73042]
	16(2,15) - 16(1,16)	(0,0,0)	357997.84	(0.15)	[73042]
	29(2,27) - 29(1,28)	(0,0,0)	361677.43	(0.15)	[73042]
	17(2,16) - 17(1,17)	(0,0,0)	371077.90	(0.12)	[73042]
$^{18}O^{16}O^{18}O$	25(4,22) - 26(3,23)	(0,0,0)	18379.93	(0.03)	[73042]
	20(3,17) - 21(2,20)	(0,0,0)	19270.85	(0.03)	[73042]
	18(2,16) - 19(1,19)	(0,0,0)	27190.79	(0.03)	[73042]
	16(2,14) - 17(1,17)	(0,0,0)	28510.55	(0.03)	[73042]
	36(4,32) - 35(5,31)	(0,0,0)	31441.41	(0.03)	[73042]
	25(2,24) - 24(3,21)	(0,0,0)	32740.01	(0.03)	[73042]
	14(2,12) - 15(1,15)	(0,0,0)	37396.92	(0.03)	[73042]
	28(3,25) - 27(4,24)	(0,0,0)	41038.37	(0.03)	[73042]
	12(1,11) - 11(2,10)	(0,0,0)	42580.81	(0.03)	[73042]
	31(3,29) - 30(4,26)	(0,0,0)	44624.27	(0.03)	[73042]
	1(1, 1) - 2(0, 2)	(0,0,0)	45766.65	(0.03)	[73042]
	22(2,20) - 23(1,23)	(0,0,0)	47997.04	(0.03)	[73042]
	20(2,18) - 19(3,17)	(0,0,0)	49439.49	(0.03)	[73042]
	27(2,26) - 26(3,23)	(0,0,0)	49872.11	(0.03)	[73042]
	6(0, 6) - 5(1, 5)	(0,0,0)	52105.48	(0.03)	[73042]
	18(3,15) - 19(2,18)	(0,0,0)	52250.72	(0.03)	[73042]
	12(2,10) - 13(1,13)	(0,0,0)	53321.25	(0.03)	[73042]
	33(2,32) - 32(3,29)	(0,0,0)	56155.08	(0.03)	[73042]
	29(2,28) - 28(3,25)	(0,0,0)	59903.46	(0.03)	[73042]
	40(6,34) - 41(5,37)	(0,0,0)	60970.67	(0.03)	[73042]
	31(2,30) - 30(3,27)	(0,0,0)	62143.51	(0.03)	[73042]
	24(2,22) - 25(1,25)	(0,0,0)	69861.70	(0.03)	[73042]
	15(3,13) - 16(2,14)	(0,0,0)	70288.36	(0.03)	[73042]
	7(2, 6) - 8(1, 7)	(0,0,0)	72036.94	(0.03)	[73042]
	23(4,20) - 24(3,21)	(0,0,0)	74417.60	(0.03)	[73042]
	10(2, 8) - 11(1,11)	(0,0,0)	75531.71	(0.03)	[73042]
	24(4,20) - 25(3,23)	(0,0,0)	75914.89	(0.03)	[73042]
	33(3,31) - 32(4,28)	(0,0,0)	79159.85	(0.03)	[73042]
	8(1, 7) - 8(0, 8)	(0,0,0)	115939.17	(0.06)	[73042]
	22(4,18) - 23(3,21)	(0,0,0)	119532.27	(0.06)	[73042]
	13(3,11) - 14(2,12)	(0,0,0)	125273.59	(0.06)	[73042]
	10(1, 9) - 10(0,10)	(0,0,0)	130489.41	(0.06)	[73042]
	37(3,35) - 36(4,32)	(0,0,0)	134706.97	(0.06)	[73042]
	6(2, 4) - 7(1, 7)	(0,0,0)	135311.64	(0.06)	[73042]
	12(1,11) - 12(0,12)	(0,0,0)	149386.19	(0.06)	[73042]
	3(1, 3) - 2(0, 2)	(0,0,0)	155011.52	(0.06)	[73042]
	36(6,30) - 37(5,33)	(0,0,0)	156083.30	(0.10)	[73042]
	10(0,10) - 9(1, 9)	(0,0,0)	156250.68	(0.06)	[73042]
	28(5,23) - 29(4,26)	(0,0,0)	159662.76	(0.06)	[73042]
	32(3,29) - 31(4,28)	(0,0,0)	171165.66	(0.10)	[73042]
	4(2, 2) - 5(1, 5)	(0,0,0)	171225.50	(0.10)	[73042]
	14(1,13) - 14(0,14)	(0,0,0)	173099.87	(0.10)	[73042]
	30(2,28) - 31(1,31)	(0,0,0)	175818.99	(0.10)	[73042]
	11(3, 9) - 12(2,10)	(0,0,0)	177298.95	(0.10)	[73042]
	35(6,30) - 36(5,31)	(0,0,0)	177526.20	(0.10)	[73042]
	3(2, 2) - 4(1, 3)	(0,0,0)	177796.66	(0.10)	[73042]
	19(4,16) - 20(3,17)	(0,0,0)	178331.41	(0.10)	[73042]
	27(5,23) - 28(4,24)	(0,0,0)	178462.21	(0.10)	[73042]
	24(2,22) - 23(3,21)	(0,0,0)	181529.26	(0.10)	[73042]
	33(6,28) - 34(5,29)	(0,0,0)	225637.19	(0.10)	[73042]
	14(2,12) - 14(1,13)	(0,0,0)	233057.09	(0.10)	[73042]
	20(2,18) - 20(1,19)	(0,0,0)	233868.49	(0.10)	[73042]
	18(1,17) - 18(0,18)	(0,0,0)	235821.57	(0.10)	[73042]
	12(2,10) - 12(1,11)	(0,0,0)	239002.58	(0.10)	[73042]
	26(2,24) - 25(3,23)	(0,0,0)	251375.84	(0.12)	[73042]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{18}O^{16}O^{18}O$	24(5,19) - 25(4,22)	(0,0,0)	252599.54	(0.12)	[73042]
	8(2, 6) - 8(1, 7)	(0,0,0)	254368.06	(0.12)	[73042]
	16(4,12) - 17(3,15)	(0,0,0)	254405.32	(0.12)	[73042]
	24(2,22) - 24(1,23)	(0,0,0)	257401.45	(0.12)	[73042]
	6(2, 4) - 6(1, 5)	(0,0,0)	261784.30	(0.12)	[73042]
	14(0,14) - 13(1,13)	(0,0,0)	261887.82	(0.12)	[73042]
	9(1, 9) - 8(0, 8)	(0,0,0)	267152.94	(0.12)	[73042]
	4(2, 2) - 4(1, 3)	(0,0,0)	267888.43	(0.12)	[73042]
	2(2, 0) - 2(1, 1)	(0,0,0)	272067.53	(0.12)	[73042]
	31(6,26) - 32(5,27)	(0,0,0)	273107.20	(0.12)	[73042]
	23(5,19) - 24(4,20)	(0,0,0)	274408.15	(0.12)	[73042]
	7(3, 5) - 8(2, 6)	(0,0,0)	274450.12	(0.12)	[73042]
	20(1,19) - 20(0,20)	(0,0,0)	274488.53	(0.12)	[73042]
	15(4,12) - 16(3,13)	(0,0,0)	274878.70	(0.12)	[73042]
	26(2,24) - 26(1,25)	(0,0,0)	277625.74	(0.12)	[73042]
	3(2, 2) - 3(1, 3)	(0,0,0)	277703.21	(0.12)	[73042]
	5(2, 4) - 5(1, 5)	(0,0,0)	283387.36	(0.12)	[73042]
	20(1,19) - 19(2,18)	(0,0,0)	291385.22	(0.12)	[73042]
	7(2, 6) - 7(1, 7)	(0,0,0)	291641.44	(0.12)	[73042]
	22(5,17) - 23(4,20)	(0,0,0)	298858.92	(0.12)	[73042]
	6(3, 3) - 7(2, 6)	(0,0,0)	299351.99	(0.12)	[73042]
	14(4,10) - 15(3,13)	(0,0,0)	299826.46	(0.12)	[73042]
	11(1,11) - 10(0,10)	(0,0,0)	301410.03	(0.12)	[73042]
	9(2, 8) - 9(1, 9)	(0,0,0)	302504.36	(0.12)	[73042]
	28(2,26) - 28(1,27)	(0,0,0)	303846.23	(0.12)	[73042]
	16(0,16) - 15(1,15)	(0,0,0)	313735.72	(0.12)	[73042]
	11(2,10) - 11(1,11)	(0,0,0)	316013.81	(0.12)	[73042]
	22(1,21) - 22(0,22)	(0,0,0)	317269.89	(0.12)	[73042]
	2(2, 0) - 1(1, 1)	(0,0,0)	319528.69	(0.12)	[73042]
	5(3, 3) - 6(2, 4)	(0,0,0)	320745.17	(0.15)	[73042]
	21(5,17) - 22(4,18)	(0,0,0)	321233.31	(0.15)	[73042]
	13(4,10) - 14(3,11)	(0,0,0)	321512.19	(0.15)	[73042]
	13(2,12) - 13(1,13)	(0,0,0)	332197.70	(0.15)	[73042]
	13(1,13) - 12(0,12)	(0,0,0)	335067.54	(0.15)	[73042]
	28(3,25) - 28(2,26)	(0,0,0)	357696.94	(0.15)	[73042]
	11(4, 8) - 12(3, 9)	(0,0,0)	367485.81	(0.15)	[73042]
	19(5,15) - 20(4,16)	(0,0,0)	367542.24	(0.15)	[73042]
	4(2, 2) - 3(1, 3)	(0,0,0)	367794.94	(0.15)	[73042]
	26(3,23) - 26(2,24)	(0,0,0)	368217.53	(0.15)	[73042]
	17(2,16) - 17(1,17)	(0,0,0)	372594.99	(0.15)	[73042]
	5(2, 4) - 4(1, 3)	(0,0,0)	380050.25	(0.15)	[73042]
	24(3,21) - 24(2,22)	(0,0,0)	381077.83	(0.15)	[73042]
$^{18}O^{18}O^{18}O$	18(3,15) - 19(2,18)	(0,0,0)	21022.39	(0.03)	[73042]
	16(2,14) - 17(1,17)	(0,0,0)	22592.58	(0.03)	[73042]
	24(4,20) - 25(3,23)	(0,0,0)	25519.12	(0.03)	[73042]
	15(3,13) - 16(2,14)	(0,0,0)	26581.48	(0.03)	[73042]
	14(2,12) - 15(1,15)	(0,0,0)	26648.21	(0.03)	[73042]
	23(2,22) - 22(3,19)	(0,0,0)	32256.23	(0.03)	[73042]
	18(2,16) - 17(3,15)	(0,0,0)	33781.13	(0.03)	[73042]
	1(1, 1) - 2(0, 2)	(0,0,0)	38049.79	(0.03)	[73042]
	37(6,32) - 38(5,33)	(0,0,0)	38642.63	(0.03)	[73042]
	12(2,10) - 13(1,13)	(0,0,0)	38651.49	(0.03)	[73042]
	30(5,25) - 31(4,28)	(0,0,0)	44216.67	(0.03)	[73042]
	35(4,32) - 34(5,29)	(0,0,0)	45735.94	(0.03)	[73042]
	26(3,23) - 25(4,22)	(0,0,0)	46457.04	(0.03)	[73042]
	7(2, 6) - 8(1, 7)	(0,0,0)	47653.58	(0.03)	[73042]
	25(2,24) - 24(3,21)	(0,0,0)	49462.19	(0.03)	[73042]
	29(3,27) - 28(4,24)	(0,0,0)	51926.10	(0.03)	[73042]
	31(2,30) - 30(3,27)	(0,0,0)	52191.20	(0.03)	[73042]
	29(5,25) - 30(4,26)	(0,0,0)	54280.36	(0.03)	[73042]
	16(3,13) - 17(2,16)	(0,0,0)	54884.84	(0.03)	[73042]
	10(2, 8) - 11(1,11)	(0,0,0)	57862.32	(0.03)	[73042]
	27(2,26) - 26(3,23)	(0,0,0)	58991.86	(0.03)	[73042]
	6(0, 6) - 5(1, 5)	(0,0,0)	59917.31	(0.03)	[73042]
	29(2,28) - 28(3,25)	(0,0,0)	60055.76	(0.03)	[73042]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{18}O^{18}O^{18}O$	22(2,20) - 23(1,23)	(0,0,0)	60540.04	(0.03)	[73042]
	22(4,18) - 23(3,21)	(0,0,0)	67713.31	(0.03)	[73042]
	42(5,37) - 41(6,36)	(0,0,0)	67962.89	(0.03)	[73042]
	12(1,11) - 11(2,10)	(0,0,0)	68122.59	(0.03)	[73042]
	21(4,18) - 22(3,19)	(0,0,0)	68803.59	(0.03)	[73042]
	36(6,30) - 37(5,33)	(0,0,0)	69936.16	(0.03)	[73042]
	43(7,37) - 44(6,38)	(0,0,0)	71922.57	(0.03)	[73042]
	43(5,39) - 42(6,36)	(0,0,0)	72357.23	(0.03)	[73042]
	36(4,32) - 35(5,31)	(0,0,0)	116884.83	(0.06)	[73042]
	34(6,28) - 35(5,31)	(0,0,0)	117460.25	(0.06)	[73042]
	19(4,16) - 20(3,17)	(0,0,0)	121507.23	(0.06)	[73042]
	26(2,24) - 27(1,27)	(0,0,0)	124830.79	(0.06)	[73042]
	12(3, 9) - 13(2,12)	(0,0,0)	132100.98	(0.06)	[73042]
	26(5,21) - 27(4,24)	(0,0,0)	136675.75	(0.06)	[73042]
	11(3, 9) - 12(2,10)	(0,0,0)	136831.95	(0.06)	[73042]
	35(3,33) - 34(4,30)	(0,0,0)	136984.72	(0.06)	[73042]
	33(6,28) - 34(5,29)	(0,0,0)	138570.21	(0.06)	[73042]
	3(1, 3) - 2(0, 2)	(0,0,0)	146631.77	(0.06)	[73042]
	12(1,11) - 12(0,12)	(0,0,0)	147324.96	(0.06)	[73042]
	4(2, 2) - 5(1, 5)	(0,0,0)	148890.05	(0.06)	[73042]
	18(4,14) - 19(3,17)	(0,0,0)	155816.40	(0.06)	[73042]
	17(4,14) - 18(3,15)	(0,0,0)	171747.17	(0.10)	[73042]
	14(1,13) - 14(0,14)	(0,0,0)	173668.94	(0.10)	[73042]
	10(3, 7) - 11(2,10)	(0,0,0)	173876.60	(0.10)	[73042]
	24(5,19) - 25(4,22)	(0,0,0)	183095.32	(0.10)	[73042]
	5(1, 5) - 4(0, 4)	(0,0,0)	185482.79	(0.10)	[73042]
	31(6,26) - 32(5,27)	(0,0,0)	186910.78	(0.10)	[73042]
	8(2, 6) - 8(1, 7)	(0,0,0)	229948.55	(0.10)	[73042]
	24(2,22) - 23(3,21)	(0,0,0)	233899.06	(0.10)	[73042]
	22(2,20) - 22(1,21)	(0,0,0)	234365.11	(0.10)	[73042]
	29(6,24) - 30(5,25)	(0,0,0)	234486.07	(0.10)	[73042]
	7(3, 5) - 8(2, 6)	(0,0,0)	235418.84	(0.10)	[73042]
	6(2, 4) - 6(1, 5)	(0,0,0)	237546.99	(0.10)	[73042]
	2(2, 0) - 2(1, 1)	(0,0,0)	248404.74	(0,10)	[73042]
	32(3,29) - 31(4,28)	(0,0,0)	249245.57	(0.10)	[73042]
	21(5,17) - 22(4,18)	(0,0,0)	251328.18	(0.12)	[73042]
	24(2,22) - 24(1,23)	(0,0,0)	254339.32	(0.12)	[73042]
	18(1,17) - 17(2,16)	(0,0,0)	254446.38	(0.12)	[73042]
	3(2, 2) - 3(1, 3)	(0,0,0)	254454.10	(0.12)	[73042]
	9(1, 9) - 8(0, 8)	(0,0,0)	256908.52	(0.12)	[73042]
	28(6,22) - 29(5,25)	(0,0,0)	258589.84	(0.12)	[73042]
	5(2, 4) - 5(1, 5)	(0,0,0)	260563.66	(0.12)	[73042]
	6(3, 3) - 7(2, 6)	(0,0,0)	260866.10	(0.12)	[73042]
	13(4,10) - 14(3,11)	(0,0,0)	267197.94	(0.12)	[73042]
	14(0,14) - 13(1,13)	(0,0,0)	268378.35	(0.12)	[73042]
	7(2, 6) - 7(1, 7)	(0,0,0)	269442.65	(0.12)	[73042]
	20(5,15) - 21(4,18)	(0,0,0)	275544.40	(0.12)	[73042]
	9(2, 8) - 9(1, 9)	(0,0,0)	281137.37	(0.12)	[73042]
	27(6,22) - 28(5,23)	(0,0,0)	281462.06	(0.12)	[73042]
	5(3, 3) - 6(2, 4)	(0,0,0)	281893.26	(0.12)	[73042]
	20(1,19) - 20(0,20)	(0,0,0)	284382.18	(0.12)	[73042]
	11(1,11) - 10(0,10)	(0,0,0)	290652.29	(0.12)	[73042]
	12(4, 8) - 13(3,11)	(0,0,0)	291348.32	(0.12)	[73042]
	11(2,10) - 11(1,11)	(0,0,0)	295689.10	(0.12)	[73042]
	2(2, 0) - 1(1, 1)	(0,0,0)	295878.44	(0.12)	[73042]
	19(5,15) - 20(4,16)	(0,0,0)	297965.74	(0.12)	[73042]
	4(3, 1) - 5(2, 4)	(0,0,0)	305286.51	(0.12)	[73042]
	26(2,24) - 25(3,23)	(0,0,0)	305392.38	(0.12)	[73042]
	13(2,12) - 13(1,13)	(0,0,0)	313122.78	(0.12)	[73042]
	11(4, 8) - 12(3, 9)	(0,0,0)	313356.37	(0.12)	[73042]
	28(2,26) - 28(1,27)	(0,0,0)	313626.81	(0.12)	[73042]
	3(2, 2) - 2(1, 1)	(0,0,0)	315562.44	(0.12)	[73042]
	20(1,19) - 19(2,18)	(0,0,0)	318064.45	(0.12)	[73042]
	30(3,27) - 30(2,28)	(0,0,0)	318378.93	(0.12)	[73042]
	16(0,16) - 15(1,15)	(0,0,0)	319099.80	(0.12)	[73042]

TABLE 53.4. The microwave spectrum of O_3—Continued

Isotopic species	$J'(K'_-,K'_+) - J''(K''_-,K''_+)$	(ν_1,ν_2,ν_3)	Frequency (MHz)	(Unc.) (MHz)	Reference
$^{18}O^{18}O^{18}O$	28(3,25) - 28(2,26)	(0,0,0)	319658.56	(0.12)	[73042]
	26(3,23) - 26(2,24)	(0,0,0)	325992.28	(0.15)	[73042]
	22(1,21) - 22(0,22)	(0,0,0)	329742.24	(0.15)	[73042]
	15(2,14) - 15(1,15)	(0,0,0)	333432.78	(0.15)	[73042]
	34(3,31) - 34(2,32)	(0,0,0)	334467.70	(0.15)	[73042]
	5(2, 4) - 4(1, 3)	(0,0,0)	355629.04	(0.15)	[73042]
	17(2,16) - 17(1,17)	(0,0,0)	356573.28	(0.15)	[73042]
	15(1,15) - 14(0,14)	(0,0,0)	357794.81	(0.15)	[73042]
	9(4, 6) - 10(3, 7)	(0,0,0)	358923.60	(0.15)	[73042]
	20(3,17) - 20(2,18)	(0,0,0)	362907.29	(0.15)	[73042]
	18(0,18) - 17(1,17)	(0,0,0)	368366.19	(0.15)	[73042]
	18(3,15) - 18(2,16)	(0,0,0)	376576.79	(0.15)	[73042]
	24(1,23) - 24(0,24)	(0,0,0)	377592.83	(0.15)	[73042]
	28(2,26) - 27(3,25)	(0,0,0)	378262.22	(0.15)	[73042]
	22(1,21) - 21(2,20)	(0,0,0)	381348.92	(0.15)	[73042]

*Calculated transition frequency.

3. References to Spectral Data

[46000] T. W. Dakin, W. E. Good, and D. K. Coles, Phys. Rev. **70**, 560 (1946).
[46001] G. E. Becker and S. H. Autler, Phys. Rev. **70**, 300 (1946).
[46002] R. H. Dicke, R. Beringer, R. L. Kyhl, and A. B. Vane, Phys. Rev. **70**, 340 (1946).
[46003] C. H. Townes and F. R. Merritt, Phys. Rev. **70**, 558 (1946).
[47001] C. H. Townes, A. N. Holden, and F. R. Merritt, Phys. Rev. **72**, 513 (1947).
[47002] W. Gordy, W. V. Smith, A. G. Smith, and H. Ring, Phys. Rev. **72**, 259 (1947).
[47003] C. H. Townes, Phys. Rev. **71**, 909 (1947).
[47004] C. H. Townes, A. N. Holden, J. Bardeen, and F. R. Merritt, Phys. Rev. **71**, 644 (1947).
[47005] C. H. Townes, A. N. Holden, and F. R. Merritt, Phys. Rev. **71**, 64 (1947).
[47006] G. W. King, R. M. Hainer, and P. C. Cross, Phys. Rev. **71**, 433 (1947).
[47007] T. W. Dakin, W. E. Good, and D. K. Coles, Phys. Rev. **71**, 640 (1947).
[47008] D. K. Coles, E. S. Elyash, and J. G. Gorman, Phys. Rev. **72**, 973 (1947).
[47009] B. P. Dailey, S. Golden, and E. B. Wilson, Jr., Phys. Rev. **72**, 871 (1947).
[48002] C. H. Townes, A. N. Holden, and F. R. Merritt, Phys. Rev. **74**, 1113 (1948).
[48003] A. G. Smith, H. Ring, W. V. Smith, and W. Gordy, Phys. Rev. **74**, 370 (1948).
[48004] J. Bardeen and C. H. Townes, Phys. Rev. **73**, 627 (1948).
[48005] A. G. Smith, H. Ring, W. V. Smith, and W. Gordy, Phys. Rev. **73**, 633 (1948).
[48006] O. R. Gilliam, H. D. Edwards, and W. Gordy, Phys. Rev. **73**, 635 (1948).
[48007] A. Roberts, Phys. Rev. **73**, 1405 (1948).
[48008] C. H. Townes and S. Geschwind, Phys. Rev. **74**, 626 (1948).
[48009] C. K. Jen, Phys. Rev. **74**, 1396 (1948).
[48010] S. Golden, T. Wentink, R. Hillger, and M. W. P. Strandberg, Phys. Rev. **73**, 92 (1948).
[48011] M. W. P. Strandberg, T. Wentink, R. Hillger, G. H. Wannier, and M. L. Deutsch, Phys. Rev. **73**, 188 (1948).
[48012] M. W. P. Strandberg, Phys. Rev. **74**, 1245 (1948).
[49001] A. G. Smith, W. Gordy, J. W. Simmons, and W. V. Smith, Phys. Rev. **75**, 260 (1949).
[49002] C. H. Townes and L. C. Aamodt, Phys. Rev. **76**, 691 (1949).
[49003] M. W. P. Strandberg, T. Wentink, and A. G. Hill, Phys. Rev. **75**, 827 (1949).
[49004] M. W. P. Strandberg, T. Wentink, and R. L. Kyhl, Phys. Rev. **75**, 270 (1949).
[49005] W. Low and C. H. Townes, Phys. Rev. **75**, 529 (1949).
[49006] D. Bianco, G. Matlack, and A. Roberts, Phys. Rev. **76**, 473 (1949).
[49007] V. W. Cohen, W. S. Koski, and T. Wentink, Phys. Rev. **76**, 703 (1949).
[49008] C. K. Jen, Phys. Rev. **76**, 1494 (1949).
[49009] D. K. Coles and R. H. Hughes, Phys. Rev. **76**, 178A (1949).
[49010] M. W. P. Strandberg, J. Chem. Phys. **17**, 901 (1949).
[49011] C. K. Jen, Phys. Rev. **76**, 471 (1949).
[50005] J. W. Simmons and W. E. Anderson, Phys. Rev. **80**, 338 (1950).
[50006] R. G. Shulman, B. P. Dailey, and C. H. Townes, Phys. Rev. **78**, 145 (1950).
[50007] H. H. Nielsen, Phys. Rev. **78**, 296 (1950).
[50008] R. G. Shulman and C. H. Townes, Phys. Rev. **78**, 347 (1950).
[50009] J. W. Simmons, W. E. Anderson, and W. Gordy, Phys. Rev. **77**, 77 (1950); Errata: Phys. Rev. **86**, 1055 (1952).
[50010] V. Griffing, J. Chem. Phys. **18**, 744 (1950).
[50011] R. G. Shulman and C. H. Townes, Phys. Rev. **77**, 421 (1950).
[50012] S. Geschwind, H. Minden, and C. H. Townes, Phys. Rev. **78**, 174 (1950).
[50013] B. Bak, R. Sloan, and D. Williams, Phys. Rev. **80**, 101 (1950).
[50014] W. J. Pietenpol, J. D. Rogers, and D. Williams, Phys. Rev. **77**, 741 (1950).
[50015] H. J. Bernstein, J. Chem. Phys. **18**, 1514 (1950).
[50016] R. G. Shulman and C. H. Townes, Phys. Rev. **77**, 500 (1950).
[50017] J. R. Eshbach, R. E. Hillger, and C. K. Jen, Phys. Rev. **80**, 1106 (1950).
[50018] J. G. Castle, Jr. and R. Beringer, Phys. Rev. **80**, 114 (1950).
[51002] S. Geschwind, R. Gunther-Mohr, and C. H. Townes, Phys. Rev. **81**, 288 (1951).
[51003] A. L. Southern, H. W. Morgan, G. W. Keilholtz, and W. V. Smith, Anal. Chem. **23**, 1000 (1951).
[51004] Y. Ting, T. L. Weatherly, and D. Williams, Phys. Rev. **83**, 210 (1951).
[51005] J. D. Rogers, W. J. Pietenpol, and D. Williams, Phys. Rev. **83**, 431 (1951).
[51006] D. Magnuson, Phys. Rev. **83**, 485 (1951).
[51007] D. Magnuson, J. Chem. Phys. **19**, 1071 (1951).
[51008] C. K. Jen, Physica **17**, 378 (1951).
[51009] C. K. Jen, Phys. Rev. **81**, 197 (1951).
[51010] S. Geschwind and G. R. Gunther-Mohr, Phys. Rev. **81**, 882 (1951).
[51011] T. Wentink, W. S. Koski, and V. W. Cohen, Phys. Rev. **81**, 948 (1951). See also [74001].

[51012] J. N. Shoolery and A. H. Sharbaugh, Phys. Rev. **82**, 95 (1951).
[51013] C. M. Johnson, R. Trambarulo, and W. Gordy, Phys. Rev. **84**, 1178 (1951).
[51014] K. B. McAffee, Jr., Phys. Rev. **82**, 971 (1951).
[51015] M. H. Sirvetz, J. Chem. Phys. **19**, 938 (1951).
[51016] G. F. Crable and W. V. Smith, J. Chem. Phys. **19**, 502 (1951).
[51017] R. E. Hillger and M. W. P. Strandberg, Phys. Rev. **83**, 575 (1951).
[52008] S. J. Tetenbaum, Phys. Rev. **86**, 440 (1952).
[52009] A. H. Nethercot, Jr., J. A. Klein, and C. H. Townes, Phys. Rev. **86**, 798 (1952).
[52010] T. L. Weatherly, E. R. Manring, and D. Williams, Phys. Rev. **85**, 717 (1952).
[52011] T. L. Weatherly and D. Williams, Phys. Rev. **87**, 517 (1952).
[52012] W. A. Hardy, G. Silvey, and C. H. Townes, Phys. Rev. **85**, 494 (1952).
[52013] J. R. Eshbach and M. W. P. Strandberg, Phys. Rev. **85**, 24 (1952).
[52014] S. Geschwind, G. R. Gunther-Mohr, and G. Silvey, Phys. Rev. **85**, 474 (1952).
[52015] J. R. Eshbach, R. E. Hillger, and M. W. P. Strandberg, Phys. Rev. **85**, 532 (1952).
[52016] C. M. Johnson and D. M. Slager, Phys. Rev. **87**, 677 (1952).
[52017] S. J. Tetenbaum, Phys. Rev. **88**, 772 (1952).
[52018] C. I. Beard and D. R. Bianco, J. Chem. Phys. **20**, 1488 (1952).
[53006] S. N. Ghosh, R. Trambarulo, and W. Gordy, J. Chem. Phys. **21**, 308 (1953).
[53007] R. L. White, Phys. Rev. **91**, 1014 (1953).
[53008] W. A. Hardy, G. Silvey, C. H. Townes, B. F. Burke, M. W. P. Strandberg, G. W. Parker, and V. W. Cohen, Phys. Rev. **92**, 1532 (1953).
[53009] R. H. Hughes, J. Chem. Phys. **21**, 959 (1953).
[53010] R. Trambarulo, S. N. Ghosh, C. A. Burrus, and W. Gordy, J. Chem. Phys. **21**, 851 (1953).
[53011] W. C. King and W. Gordy, Phys. Rev. **90**, 319 (1953).
[53012] C. A. Burrus and W. Gordy, Phys. Rev. **92**, 274 (1953).
[53013] W. Gordy, J. Chem. Phys. **50**, 114 (1953).
[53014] C. K. Jen, D. R. Bianco, and J. T. Massey, J. Chem. Phys. **21**, 520 (1953).
[53015] B. F. Burke and M. W. P. Strandberg, Phys. Rev. **90**, 303 (1953).
[53016] Y. Beers and S. Weisbaum, Phys. Rev. **91**, 1014 (1953).
[53017] D. W. Posener and M. W. P. Strandberg, J. Chem. Phys. **21**, 1401 (1953).
[53018] H. D. Crawford, J. Chem. Phys. **21**, 2099 (1953).
[54000] R. J. Collier, Phys. Rev. **95**, 1201 (1954).
[54001] J. F. Westerkamp, Phys. Rev. **93**, 716 (1954).
[54002] W. A. Hardy and G. Silvey, Phys. Rev. **95**, 385 (1954).
[54003] H. Feeny, H. Lackner, P. Moser, and W. V. Smith, J. Chem. Phys. **22**, 79 (1954).
[54004] D. H. Baird and G. R. Bird, Rev. Sci. Instrum. **25**, 319 (1954).
[54005] B. F. Burke, M. W. P. Strandberg, V. W. Cohen, and W. S. Koski, Phys. Rev. **93**, 193 (1954).
[54006] W. C. King and W. Gordy, Phys. Rev. **93**, 407 (1954).
[54007] C. A. Burrus and W. Gordy, Phys. Rev. **93**, 897 (1954).
[54008] G. R. Bird and C. H. Townes, Phys. Rev. **94**, 1203 (1954).
[54009] F. A. Livima, A. V. Bushkovitch, and A. G. Rouse, Phys. Rev. **96**, 434 (1954).
[54010] D. Kivelson, J. Chem. Phys. **22**, 904 (1954).
[54011] T. F. Rogers, Phys. Rev. **93**, 248 (1954).
[54012] D. W. Posener and M. W. P. Strandberg, Phys. Rev. **95**, 374 (1954).
[55000] A. Javan, Phys. Rev. **99**, 1302 (1955).
[55001] W. V. Smith, H. A. Lackner, and A. B. Volkov, J. Chem. Phys. **23**, 389 (1955).
[55002] W. Low, Phys. Rev. **97**, 1664 (1955).
[55003] R. L. White, J. Chem. Phys. **23**, 249 (1955).
[55004] R. L. White, J. Chem. Phys. **23**, 253 (1955).
[55005] R. L. White, Rev. Mod. Phys. **27**, 276 (1955).
[55006] L. C. Aamodt and P. C. Fletcher, Phys. Rev. **98**, 1224 (1955).
[55007] R. S. Anderson, Phys. Rev. **97**, 1654 (1955).
[55008] S. H. Autler and C. H. Townes, Phys. Rev. **100**, 703 (1955).
[55009] C. S. E. Phillips, J. Chem. Phys. **23**, 2388 (1955).
[55010] S. Weisbaum, Y. Beers, and G. Herrmann, J. Chem. Phys. **23**, 1601 (1955).
[55011] D. W. Posener, J. Chem. Phys. **23**, 1728 (1955).
[56004] T. L. Weatherly and Q. Williams, J. Chem. Phys. **25**, 717 (1956).
[56005] C. A. Burrus and W. Gordy, Phys. Rev. **101**, 599 (1956).
[56006] L. Yarmus, Phys. Rev. **104**, 365 (1956).
[56007] A. Miyahara, H. Hirakawa, and K. Shimoda, J. Phys. Soc. Japan **11**, 335 (1956).
[56008] H. Hirakawa, T. Oka, and K. Shimoda, J. Phys. Soc. Japan **11**, 1208 (1956).
[56009] R. H. Hughes, J. Chem. Phys. **24**, 131 (1956).
[56010] L. Pierce, J. Chem. Phys. **24**, 139 (1956).
[56011] A. W. Jache, P. W. Moser, and W. Gordy, J. Chem. Phys. **25**, 209 (1956).
[56012] W. V. Smith, J. Chem. Phys. **25**, 510 (1956).
[56013] J. T. Cox and W. Gordy, Phys. Rev. **101**, 1298 (1956).
[56014] M. Cowan and W. Gordy, Phys. Rev. **104**, 551 (1956).
[56015] G. R. Bird, J. Chem. Phys. **25**, 1040 (1956).
[56016] G. Erlandsson and J. Cox, J. Chem. Phys. **25**, 778 (1956).
[57002] T. Oka and H. Hirakawa, J. Phys. Soc. Japan **12**, 820 (1957).
[57003] L. Yarmus, Phys. Rev. **105**, 928 (1957).
[57004] T. Oka, H. Hirakawa, and A. Miyahara, J. Phys. Soc. Japan **12**, 39 (1957).
[57005] V. G. Veselago, Zh. Eksper. Teor. Fiz. **32**, 620 (1957).
[57006] V. G. Veselago and A. M. Prokhorov, Sov. Phys. JETP **4**, 750 (1957).
[57007] S. A. Marshall and J. Weber, Phys. Rev. **105**, 1502 (1957).
[57008] R. Wertheimer and M. Clouard, C. R. Acad. Sci. (Paris) **245**, 1793 (1957).
[57009] D. W. Posener, Aust. J. Phys. **10**, 276 (1957).
[57010] M. J. Stevenson and C. H. Townes, Phys. Rev. **107**, 635 (1957).
[58002] C. C. Costain, J. Chem. Phys. **29**, 864 (1958).
[58003] G. C. Weiffenbach, Bull. Am. Phys. Soc. **3**, 213 (1958).
[58004] G. R. Bird, J. C. Baird, and R. B. Williams, J. Chem. Phys. **28**, 738 (1958).
[59000] D. F. Eagle, T. L. Weatherly, and Q. Williams, J. Chem. Phys. **30**, 603 (1959).
[59001] E. L. Beeson, J. Q. Williams, and T. L. Weatherly, Bull. Am. Phys. Soc. II **4**, 291 (1959).
[59002] R. H. Jackson and D. J. Millen, Proc. Chem. Soc. 10 (1959).
[59003] D. J. Meschi and R. J. Myers, J. Mol. Spectrosc. **3**, 405 (1959).
[59004] E. K. Gora, J. Mol. Spectrosc. **3**, 78 (1959).
[59005] C. A. Burrus, J. Chem. Phys. **30**, 976 (1959).
[59006] V. G. Veselago, Opt. Spectrosc. **6**, 286 (1959).
[59007] P. H. Verdier and E. B. Wilson, Jr., J. Chem. Phys. **30**, 1372 (1959).
[59008] A. Dymanus, Physica **25**, 859 (1959).
[59009] A. Dymanus, Phys. Rev. **116**, 351 (1959).
[59010] C. C. Lin, Phys. Rev. **116**, 903 (1959).
[59011] L. Pierce, J. Mol. Spectrosc. **3**, 575 (1959).
[59012] R. Wertheimer, C. R. Acad. Sci. (Paris) **248**, 1640 (1959).
[59013] W. E. Smith, Australian J. Phys. **12**, 109 (1959).
[59014] P. Thaddeus and J. Loubser, Nuovo Cimento **13**, 1060 (1959).
[59015] A. Battaglia, A. Gozzini, and E. Polacco, Nuovo Cimento, **14**, 1076 (1959).
[60001] J. Sheridan, J. K. Tyler, E. E. Aynsley, R. E. Dodd, and R. Little, Nature **185**, 96 (1960).
[60002] B. N. Bhattacharya and W. Gordy, Phys. Rev. **119**, 144 (1960).
[60003] J. W. Bransford, A. C. Kunkle, and A. W. Jache, J. Inorg. Nucl. Chem. **14**, 159 (1960).
[60004] T. Williams, J. Opt. Soc. Am. **50**, 1159 (1960).
[60005] M. Cowan and W. Gordy, Bull. Am. Phys. Soc. II **5**, 241 (1960).
[60006] D. W. Posener, Aust. J. Phys. **13**, 168 (1960).
[61001] T. Törring, Z. Phys. **161**, 179 (1961).
[61002] D. Marcuse, J. Appl. Phys. **32**, 743 (1961).

[61003] D. Marcuse, Proc. I.R.E. **49**, 1706 (1961).
[61004] J. D. Rogers and D. Williams, J. Chem. Phys. **34**, 2195 (1961).
[61005] D. J. Millen and J. Pannell, J. Chem. Soc. 1322 (1961).
[61006] R. F. Curl, Jr., J. L. Kinsey, J. G. Baker, J. C. Baird, G. R. Bird, R. F. Heidelberg, T. M. Sugden, D. R. Jenkins, and C. N. Kenney, Phys. Rev. **121**, 1119 (1961).
[61007] A. R. Hilton, Jr., A. W. Jache, J. B. Beal, Jr., W. D. Henderson, and R. J. Robinson, J. Chem. Phys. **34**, 1137 (1961).
[61008] L. Pierce, R. Jackson, and N. DiCianni, J. Chem. Phys. **35**, 2240 (1961).
[61009] A. Dymanus and H. A. Dijkerman, Physica **27**, 593 (1961).
[61010] C. O. Britt, C. W. Tolbert, and A. W. Straiton, J. Res. Natl. Bur. Stand. (U.S.) D **65**, 15 (1961).
[62003] T. Oka and Y. Morino, J. Mol. Spectrosc. **8**, 9 (1962).
[62004] K. Hijikata, C. C. Lin, and J. C. Baird, J. Chem. Phys. **36**, 1183 (1962).
[62005] R. F. Curl, Jr., R. F. Heidelberg, and J. L. Kinsey, Phys. Rev. **125**, 1993 (1962).
[62006] R. F. Curl, Jr., J. Chem. Phys. **37**, 779 (1962).
[62007] M. G. Krishna Pillai and R. F. Curl, Jr., J. Chem. Phys. **37**, 2921 (1962).
[62008] W. M. Tolles, J. L. Kinsey, R. F. Curl, and R. F. Heidelberg, J. Chem. Phys. **37**, 927 (1962).
[62009] J. G. Baker, D. R. Jenkins, C. N. Kenney, and T. M. Sugden, *Advances in Molecular Spectroscopy*, Pergamon Press, Oxford p. 1140 (1962).
[62010] R. H. Jackson and D. J. Millen, *Advances in Molecular Spectroscopy*, Pergamon Press, Oxford p. 1157 (1962).
[62011] T. Oka and Y. Morino, J. Mol. Spectrosc. **8**, 300 (1962).
[62012] A. G. Maki, E. K. Plyler, and E. D. Tidwell, J. Res. Natl. Bur. Stand. **66A**, 163 (1962).
[62013] R. Van Riet, Ann. Soc. Sci. Brux. **76**, 56 (1962).
[62014] M. de Hemptinne, F. Greindl, and R. Van Riet, Bull. Cl. Sci. Acad. R. Belg. **48**, 397 (1962).
[62015] R. Van Riet, Bull. Cl. Sci. Acad. R. Belg. **48**, 659 (1962).
[62016] R. Van Riet, Bull. Cl. Sci. Acad. R. Belg. **48**, 1291 (1962).
[62017] R. Van Riet, Bull. Cl. Sci. Acad. R. Belg. **48**, 731 (1962).
[62018] A. M. Mirri, P. Favero, A. Guarnieri, and G. Semerano, Boll. Fac. Chim. Ind. Bologna **20**, 110 (1962).
[62019] E. B. Treacy and Y. Beers, J. Chem. Phys. **36**, 1473 (1962).
[63005] J. K. Tyler and J. Sheridan, Trans. Faraday Soc. **59**, 2661 (1963).
[63006] W. H. Kirchhoff and E. B. Wilson, Jr., J. Am. Chem. Soc. **85**, 1726 (1963).
[63007] L. Pierce, N. DiCianni, and R. H. Jackson, J. Chem. Phys. **38**, 730 (1963).
[63008] L. Pierce and N. DiCianni, J. Chem. Phys. **38**, 2029 (1963).
[63009] J. A. Hodgeson, E. E. Sibert, and R. F. Curl, Jr., J. Phys. Chem. **67**, 2833 (1963).
[63010] M. deHemptinne, R. Van Riet, A. Defossez, F. Bruyninckx, and P. Dachelet, Ann. Soc. Sci. Brux. **77**, 163 (1963).
[63011] A. Bauer, J. Bellet, P. Pouzet, and A. Rémy, C. R. Acad. Sci. (Paris) **257**, 3148 (1963).
[63012] Krishnaji and S. Chandra, J. Chem. Phys. **38**, 232 (1963).
[63013] Krishnaji and S. Chandra, J. Chem. Phys. **38**, 1019 (1963).
[63014] Krishnaji and S. Chandra, J. Chem. Phys. **38**, 2690 (1963).
[63015] K. Takagi and S. Saito, J. Phys. Soc. Japan **18**, 1840 (1963).
[63016] R. Van Riet, Ann. Soc. Sci. Brux. **77**, 18 (1963).
[63017] M. de Hemptinne and R. Van Riet, Bull. Cl. Sci. Acad. R. Belg. **49**, 856 (1963).
[63018] L. Esterowitz, N.Y.U. Rept., Contract 285-35 (1963).
[63019] J. J. Gallagher, R. G. Strauch, and R. E. Cupp, Martin Co., Orlando, Florida, Rept. OR 3408 (1963).
[63020] A. Battaglia, M. Iannuzzi, and E. Polacco, Ric. Sci. Parte 2: Sez. A **3**, 385 (1963).
[64002] J. K. Tyler, J. Chem. Phys. **40**, 1170 (1964).
[64003] Krishnaji, S. Chandra, and S. L. Srivastava, J. Chem. Phys. **41**, 409 (1964).
[64004] Krishnaji and S. L. Srivastava, J. Chem. Phys. **41**, 2201 (1964).
[64005] Krishnaji and S. L. Srivastava, J. Chem. Phys. **41**, 2266 (1964).
[64006] F. Dorman and C. C. Lin, J. Mol. Spectrosc. **12**, 119 (1964).
[64007] F. R. Burden and D. J. Millen, J. Mol. Spectrosc. **14**, 97 (1964).
[64008] G. R. Bird, J. C. Baird, A. W. Jache, J. A. Hodgeson, R. F. Curl, Jr., A. C. Kunkle, J. W. Bransford, J. Rastrup-Andersen, and J. Rosenthal, J. Chem. Phys. **40**, 3378 (1964).
[64009] L. Esterowitz and J. Rosenthal, J. Chem. Phys. **40**, 1986 (1964).
[64010] W. J. Lafferty and D. R. Lide, Jr., J. Mol. Spectrosc. **14**, 407 (1964).
[64011] A. Bauer and J. Bellet, C. R. Acad. Sci. (Paris) **258**, 873 (1964).
[64012] R. Van Riet, Ann. Soc. Sci. Brux. **78**, 90 (1964).
[64013] R. Van Riet, Ann. Soc. Sci. Brux. **78**, 97 (1964).
[64014] R. Van Riet, Ann. Soc. Sci. Brux. **78**, 113 (1964).
[64015] R. Van Riet, Ann. Soc. Sci. Brux. **78**, 237 (1964).
[64016] Y. Morino, Y. Kikuchi, S. Saito, and E. Hirota, J. Mol. Spectrosc. **13**, 95 (1964).
[64017] A. Bauer, J. Bellet, P. Pouzet, and A. Rémy, C. R. Acad. Sci. (Paris) **259**, 761 (1964).
[64018] M. de Hemptinne, A. Defossez, F. Bruyninckx, G. Steenbeckeliers, and R. Van Riet, Bull. Cl. Sci. Acad. R. Belg. **50**, 1367 (1964).
[64019] A. Bauer and J. Bellet, J. Phys. **25**, 805 (1964).
[64020] P. Thaddeus, L. C. Krisher, and J. H. N. Loubser, J. Chem. Phys. **40**, 257 (1964).
[65000] H. W. DeWijn, Physica **31**, 1215 (1965).
[65007] A. Guarnieri and P. G. Favero, Nuovo Cimento **39**, 76 (1965).
[65008] S. L. Srivastava and V. Prakash, J. Chem. Phys. **42**, 3738 (1965).
[65009] W. J. Lafferty, D. R. Lide, Jr., and R. A. Toth, J. Chem. Phys. **43**, 2063 (1965).
[65010] R. L. Cook, J. Chem. Phys. **42**, 2927 (1965).
[65011] W. H. Flygare, J. Chem. Phys. **42**, 1157 (1965).
[65012] V. M. Rao, R. F. Curl, Jr., P. L. Timms, and J. L. Margrave, J. Chem. Phys. **43**, 2557 (1965).
[65013] K. R. Lindfors and C. D. Cornwell, J. Chem. Phys. **42**, 149 (1965).
[65015] J. Bellet, Ann. Phys. **10**, 827 (1965).
[65016] A. Bellet, C. Samson, and R. Van Riet, Bull. Cl. Sci. R. Belg. **51**, 893 (1965).
[65017] R. Van Riet and G. Steenbeckeliers, Acad. R. Belg. Cl. Sci. Mem. Collect 8 **36**, 1 (1965).
[65018] J. Bellet, Ph.D. Thesis, University Lille, Lille, France (1965).
[65019] D. McGibney, Ph.D. Thesis, Georgetown University, Washington, D.C. (1965).
[65020] C. Huiszoon and A. Dymanus, Physica **31**, 1049 (1965).
[65021] J. R. Rusk, J. Chem. Phys. **43**, 2919 (1965).
[65022] J. R. Rusk, J. Chem. Phys. **42**, 493 (1965).
[66003] C. Huiszoon and A. Dymanus, Phys. Lett. **21**, 164 (1966).
[66011] D. F. Eagle, T. L. Weatherly, and Q. Williams, J. Chem. Phys. **44**, 847 (1966).
[66012] A. M. Mirri and E. Mazzariol, Spectrochim. Acta **22**, 785 (1966). Erratum: ibid. **23A**, 3035 (1967).
[66013] F. X. Powell and D. R. Lide, Jr., J. Chem. Phys. **45**, 1067 (1966).
[66014] B. Senitzky, J. Chem. Phys. **45**, 409 (1966).
[66015] G. E. Herberich, R. H. Jackson, and D. J. Millen, J. Chem. Soc. A, 336 (1966).
[66016] R. L. Kuczkowski, D. R. Lide, Jr., and L. C. Krisher, J. Chem. Phys. **44**, 3131 (1966).
[66017] A. Guarnieri, G. Zuliani, and P. G. Favero, Nuovo Cimento B **45**, 84 (1966).
[66018] A. M. Mirri and A. Guarnieri, Rend. Acad. Sci. Fis. Mat. Lincei **40**, 641 (1966).
[66019] Y. Morino and S. Saito, J. Mol. Spectrosc. **19**, 435 (1966).
[66020] V. M. Rao and R. F. Curl, Jr., Trans. Am. Crystallogr. Assoc. **2**, 183 (1966).

[66021] V. M. Rao and R. F. Curl, Jr., J. Chem. Phys. **45**, 2032 (1966).
[66022] M. L. Unland and W. H. Flygare, J. Chem. Phys. **45**, 2421 (1966).
[66023] C. O. Britt and J. E. Boggs, J. Chem. Phys. **45**, 3877 (1966).
[66024] A. Battaglia, A. DiGiacomo, and S. Santucci, Nuovo Cimento B **43**, 89 (1966).
[66025] P. D. Foster, J. A. Hodgeson, and R. F. Curl, Jr., J. Chem. Phys. **45**, 3760 (1966).
[66026] R. M. Lees, R. F. Curl, Jr., and J. G. Baker, J. Chem. Phys. **45**, 2037 (1966).
[66027] M. Sancho and M. D. Harmony, J. Chem. Phys. **45**, 1812 (1966).
[66028] P. G. Favero, F. Scappini, and A. M. Mirri, Boll. Fac. Chim. Ind. Bologna **24**, 93 (1966).
[66029] B. Macke, J. Messelyn, and P. Wertheimer, J. Phys. **27**, 579 (1966).
[66030] M. Lichtenstein, V. E. Derr, and J. J. Gallagher, J. Mol. Spectrosc. **20**, 391 (1966).
[66031] L. Frenkel and D. Woods, Proc. Inst. Electr. Eng. **54**, 498 (1966).
[67000] W. J. Lafferty and D. R. Lide, Jr., J. Mol. Spectrosc. **23**, 94 (1967).
[67001] J. LeGrand, B. Macke, and J. Messelyn, C. R. Acad. Sci. Paris **B264**, 60 (1967).
[67006] A. G. Maki and D. R. Lide, Jr., J. Chem. Phys. **47**, 3206 (1967).
[67007] T. Oka, J. Chem. Phys. **47**, 13 (1967).
[67008] A. M. Ronn and E. B. Wilson, Jr., J. Chem. Phys. **46**, 3262 (1967).
[67009] M. Winnewisser and H. K. Bodenseh, Z. Naturforsch. **22a**, 1724 (1967).
[67010] Y. Morino and C. Matsumura, Bull. Chem. Soc. Japan **40**, 1101 (1967).
[67011] D. R. Lide, Jr. and R. L. Kuczkowski, J. Chem. Phys. **46**, 4768 (1967).
[67012] A. M. Mirri and A. Guarnieri, Spectrochim. Acta **23A**, 2159 (1967).
[67013] R. L. Cook and W. H. Kirchhoff, J. Chem. Phys. **47**, 4521 (1967).
[67014] H. Bluyssen, A. Dymanus, and J. Verhoeven, Phys. Lett. **24A**, 482 (1967).
[67015] Krishnaji and S. L. Srivastava, J. Chem. Phys. **47**, 1885 (1967).
[67016] L. H. Scharpen, J. S. Muenter, and V. W. Laurie, J. Chem. Phys. **46**, 2431 (1967).
[67017] S. Chandra and R. A. Yadav, Indian J. Pure Appl. Phys. **5**, 491 (1967).
[67018] R. M. Hill, D. E. Kaplan, G. F. Herrmann, and S. K. Ichiki, Phys. Rev. Lett. **18**, 105 (1967).
[67019] M.-K. Lo and W. H. Flygare, Phys. Rev. **154**, 93 (1967).
[67020] A. G. Maki, J. Mol. Spectrosc. **23**, 110 (1967).
[67021] Y. Morino and C. Matsumura, Bull. Chem. Soc. Japan **40**, 1095 (1967).
[67022] W. S. Benedict and R. F. Calfee, Environmental Sci. Serv. Admin. Prof. Paper 2, U.S. GPO, June 1967.
[67023] H. Bluyssen, J. Verhoeven, and A. Dymanus, Phys. Lett. **25A**, 214 (1967).
[67024] H. Bluyssen, A. Dymanus, J. Reuss, and J. Verhoeven, Phys. Lett. **25A**, 584 (1967).
[67025] R. T. Hall and J. M. Dowling, J. Chem. Phys. **47**, 2454 (1967); Erratum: J. Chem. Phys. **54**, 4968 (1971).
[67026] R. A. Ashby, J. Mol. Spectrosc. **23**, 439 (1967).
[67027] T. H. Edwards, N. K. Moncur, and L. E. Snyder, J. Chem. Phys. **46**, 2139 (1967).
[68009] J. S. Murphy and J. E. Boggs, J. Chem. Phys. **49**, 3333 (1968).
[68013] W. J. Lafferty, J. Mol. Spectrosc. **25**, 359 (1968).
[68014] J. Verhoeven, H. Bluyssen, and A. Dymanus, Phys. Lett. **26A**, 424 (1968).
[68015] B. Th. Berendts and A. Dymanus, J. Chem. Phys. **49**, 2632 (1968).
[68016] B. Th. Berendts and A. Dymanus, J. Chem. Phys. **48**, 1361 (1968).
[68017] R. Van Riet and G. Steenbeckeliers, Ann. Soc. Sci. Brux. **82**, 127 (1968).
[68018] G. W. Flynn, J. Mol. Spectrosc. **28**, 1 (1968).
[68019] H. Taft and B. P. Dailey, J. Chem. Phys. **48**, 597 (1968).
[68020] J. S. Muenter, J. Chem. Phys. **48**, 4544 (1968).
[68031] R. M. Lees and T. Oka, J. Chem. Phys. **49**, 4234 (1968).
[68032] T. Tanaka and Y. Morino, J. Chem. Phys. **49**, 2877 (1968).
[68033] Y. Morino and T. Nakagawa, J. Mol. Spectrosc. **26**, 496 (1968).
[68034] A. Fayt, Ann. Soc. Sci. Brux. **82**, 101 (1968).
[68035] I. P. French and T. E. Arnold, Jr., J. Mol. Spectrosc. **27**, 218 (1968).
[68036] G. Steenbeckeliers, Ann. Soc. Sci. Brux. **82**, 331 (1968).
[68037] R. Van Riet, G. Steenbeckeliers, and F. Bruyninckx, Ann. Soc. Sci. Brux. **82**, 405 (1968).
[68038] M. S. Cord, J. D. Peterson, M. S. Lojko, and R. H. Haas, Nat. Bur. Stand. (U.S.) Monograph 70, Vol. IV (1968).
[68039] R. E. Cupp, R. A. Kempf, and J. J. Gallagher, Phys. Rev. **171**, 60 (1968).
[69010] W. H. Flygare, W. Hüttner, R. L. Shoemaker, and P. D. Foster, J. Chem. Phys. **50**, 1714 (1969).
[69021] F. DeLucia and W. Gordy, Phys. Rev. **187**, 58 (1969).
[69022] T. Nakagawa and Y. Morino, J. Mol. Spectrosc. **31**, 208 (1969).
[69023] R. G. Gordon, P. E. Larson, C. H. Thomas, and E. B. Wilson, Jr., J. Chem. Phys. **50**, 1388 (1969).
[69024] D. C. Lindsey, D. G. Lister, and D. J. Millen, Chem. Comm. 950 (1969).
[69025] D. R. Lide, Jr. and C. Matsumura, J. Chem. Phys. **50**, 3080 (1969).
[69026] K. S. Buckton, A. C. Legon, and D. J. Millen, Trans. Faraday Soc. **65**, 1975 (1969).
[69027] J. M. Pochan, R. G. Stone, and W. H. Flygare, J. Chem. Phys. **51**, 4278 (1969).
[69028] D. R. Johnson and F. X. Powell, Science **164**, 950 (1969).
[69029] C. Matsumura and D. R. Lide, Jr., J. Chem. Phys. **50**, 71 (1969).
[69030] H. J. Liebe, M. C. Thompson, Jr., and T. A. Dillon, J. Quant. Radiat. Transfer **9**, 31 (1969).
[69031] J. Verhoeven, A. Dymanus, and H. Bluyssen, J. Chem. Phys. **50**, 3330 (1969).
[69032] J. S. Murphy and J. E. Boggs, J. Chem. Phys. **51**, 3891 (1969).
[69033] S. G. Kukolich, J. Chem. Phys. **50**, 3731 (1969).
[69034] H. J. Liebe and T. A. Dillon, J. Chem. Phys. **50**, 727 (1969).
[69035] H. Taft and B. P. Dailey, J. Chem. Phys. **51**, 1002 (1969).
[69037] A. M. Mirri, G. Corbelli, and P. Forti, J. Chem. Phys. **50**, 4118 (1969).
[69038] W. H. Flygare, R. L. Shoemaker, and W. Hüttner, J. Chem. Phys. **50**, 2414 (1969).
[69039] S. Saito, J. Mol. Spectrosc. **30**, 1 (1969).
[69040] B. Macke, J. Messelyn, and R. Wertheimer, J. Phys. Paris **30**, 665 (1969).
[69041] S. Chandra and R. A. Yadav, Indian Pure Appl. Phys. **7**, 715 (1969).
[69042] R. D. Brown, F. R. Burden, and G. M. Mohay, Aust. J. Chem. **22**, 251 (1969).
[69043] P. K. Bhattacharyya and B. P. Dailey, J. Chem. Phys. **51**, 3051 (1969).
[69044] A. Battaglia, M. Cattani, and O. Tarrini, Nuovo Cimento B **61**, 193 (1969).
[69048] C. C. Costain, Can. J. Phys. **47**, 2431 (1969).
[69049] A. Battaglia and G. Boudouris, Nuovo Cimento Lett. **2**, 515 (1969).
[69050] T. Nakagawa and Y. Morino, Bull. Chem. Soc. Japan **42**, 2212 (1969).
[69051] J. R. Izatt, H. Sakai, and W. S. Benedict, J. Opt. Soc. Am. **59**, 19 (1969).
[69052] P. E. Fraley, K. N. Rao, and L. H. Jones, J. Mol. Spectrosc. **29**, 312 (1969).
[69053] P. E. Fraley and K. N. Rao, J. Mol. Spectrosc. **29**, 348 (1969).

[69054] J. E. Pearson, D. T. Llewellyn-Jones, and R. J. Knight, Infrared Phys. **9**, 53 (1969).
[70007] P. Helminger, F. C. DeLucia, and W. Gordy, Phys. Rev. Lett. **25**, 1397 (1970).
[70018] D. J. Millen and D. Mitra, Trans. Faraday Soc. **66**, 2414 (1970).
[70019] W. Hüttner and K. Morgenstern, Z. Naturforsch. **25a**, 547 (1970).
[70020] S. Saito and T. Amano, J. Mol. Spectrosc. **34**, 383 (1970).
[70021] T. Beppu, E. Hirota, and Y. Morino, J. Mol. Spectrosc. **36**, 386 (1970).
[70022] R. P. Mariella, Jr. and R. F. Curl, Jr., J. Chem. Phys. **52**, 757 (1970).
[70023] J. Bellet and G. Steenbeckeliers, C. R. Acad. Sci. Paris **271**, 1208 (1970).
[70024] J. Verhoeven and A. Dymanus, J. Chem. Phys. **52**, 3222 (1970).
[70025] F. X. Powell and D. R. Johnson, Phys. Rev. Lett. **24**, 637 (1970).
[70026] W. S. Benedict, S. A. Clough, L. Frenkel, and T. E. Sullivan, J. Chem. Phys. **53**, 2565 (1970).
[70027] D. A. Stephenson and R. G. Strauch, J. Mol. Spectrosc. **35**, 494 (1970).
[70028] G. Steenbeckeliers and J. Bellet, C. R. Acad. Sci. Paris **270**, 1039 (1970).
[70029] L. H. Scharpen, J. S. Muenter, and V. W. Laurie, J. Chem. Phys. **53**, 2513 (1970).
[70030] R. Pearson, T. Sullivan, and L. Frenkel, J. Mol. Spectrosc. **34**, 440 (1970).
[70031] P. Glorieux, J. LeGrand, B. Macke, and J. Messelyn, C. R. Acad. Sci. Paris **270B**, 1412 (1970).
[70032] Krishnaji and V. Prakash, J. Chem. Phys. **52**, 2837 (1970).
[70033] Krishnaji and V. Prakash, J. Chem. Phys. **52**, 4674 (1970).
[70034] Krishnaji and V. Prakash, J. Chem. Phys. **53**, 1590 (1970).
[70035] H. Takeo, E. Hirota, and Y. Morino, J. Mol. Spectrosc. **34**, 370 (1970).
[70036] R. S. Winton and W. Gordy, Phys. Lett. **32A**, 219 (1970).
[70037] R. L. Shoemaker and W. H. Flygare, Chem. Phys. Lett. **6**, 576 (1970).
[70046] H. E. Radford and C. V. Kurtz, J. Res. Nat. Bur. Stand. (U.S.) **74A**, 791 (1970).
[70047] L. W. Hrubesh, E. A. Rinehart, and R. E. Anderson, J. Mol. Spectrosc. **36**, 354 (1970).
[70048] T. Tanaka and Y. Morino, J. Mol. Spectrosc. **33**, 538 (1970).
[70049] F. H. DeLeeuw and A. Dymanus, Chem. Phys. Lett. **7**, 288 (1970).
[70050] M. Cattani, J. Chem. Phys. **52**, 4566 (1970).
[70051] J. Gilbert, Rev. Sci. Instrum. **41**, 1050 (1970).
[70052] A. Fayt, Ann. Soc. Sci. Brux. **84**, 69 (1970).
[70053] F. C. DeLucia and W. Gordy, Submillimeter Waves **20**, 99 (1970).
[70054] R. T. Hall and J. M. Dowling, J. Chem. Phys. **52**, 1161 (1970).
[70055] G. Steenbeckeliers, Université de Lille, France (Private communication, 1970).
[70056] S. Freund, Ph.D. Thesis, Harvard University, Cambridge, Mass. (1970).
[70057] G. R. Tomasevich, Ph.D. Thesis, Harvard University, Cambridge, Mass. (1970).
[70058] P. C. Pandey and S. L. Srivastava, Indian J. Pure Appl. Phys. **8**, 245 (1970).
[70059] G. Steenbeckeliers and J. Bellet (Unpublished report, Universite de Louvain, Belgium, Oct. 1970).
[71004] H. Takeo, R. F. Curl, Jr., and P. W. Wilson, J. Mol. Spectrosc. **38**, 464 (1971).
[71005] P. Helminger, F. C. DeLucia, and W. Gordy, Bull. Am. Phys. Soc. **16**, 531 (1971).
[71006] V. Prakash and J. E. Boggs, J. Chem. Phys. **55**, 1492 (1971).
[71019] I. C. Bowater, J. M. Brown, and A. Carrington, J. Chem. Phys. **54**, 4957 (1971).
[71020] J. W. C. Johns, J. M. R. Stone, and G. Winnewisser, J. Mol. Spectrosc. **38**, 437 (1971).
[71021] G. Winnewisser, A. G. Maki, and D. R. Johnson, J. Mol. Spectrosc. **39**, 149 (1971).
[71022] C. Hirose and R. F. Curl, Jr., J. Chem. Phys. **55**, 5120 (1971).
[71023] A. M. Mirri, F. Scappini, and G. Cazzoli, J. Mol. Spectrosc. **38**, 218 (1971).
[71024] D. G. Lister and D. J. Millen, Trans. Faraday Soc. **67**, 601 (1971).
[71025] A. H. Clark, J. Mol. Struct. **7**, 481 (1971).
[71026] M. Lichtenstein, J. J. Gallagher, and S. A. Clough, J. Mol. Spectrosc. **40**, 10 (1971).
[71027] J. S. Murphy and J. E. Boggs, J. Chem. Phys. **54**, 2443 (1971).
[71028] I. C. Story, V. I. Metchnik, and R. W. Parsons, J. Phys. B **4**, 593 (1971).
[71029] A. Fayt and R. Vandenhaute, Ann. Soc. Sci. Brux. **85**, 105 (1971).
[71030] J. LeMaire, J. Houriez, J. Thibault, and B. Maillard, J. Phys. Paris **32**, 35 (1971).
[71031] P. C. Pandey, K. K. Kirty, and S. L. Srivastava, J. Phys. B **4**, 786 (1971).
[71032] C. Huiszoon, Rev. Sci. Instrum. **42**, 477 (1971).
[71033] F. C. DeLucia and J. W. Cederberg, J. Mol. Spectrosc. **40**, 52 (1971).
[71034] P. Helminger, R. L. Cook, and F. C. DeLucia, J. Mol. Spectrosc. **40**, 125 (1971).
[71035] W. J. Lafferty, J. Bellet, and G. Steenbeckeliers, C. R. Acad. Sci. Paris B **273**, 388 (1971).
[71036] G. Steenbeckeliers and J. Bellet, C. R. Acad. Sci. Paris, B **273**, 471 (1971).
[71037] F. C. DeLucia, R. L. Cook, P. Helminger, and W. Gordy, J. Chem. Phys. **55**, 5334 (1971).
[71038] G. Steenbeckeliers (Private communication, July 1971).
[72011] J. J. Ewing, H. L. Tigelaar, and W. H. Flygare, J. Chem. Phys. **56**, 1957 (1972).
[72025] S. Saito, Astrophys. J. Lett. **178**, L95 (1972).
[72026] J. B. Simpson, J. G. Smith, and D. H. Whiffen, J. Mol. Spectrosc. **44**, 558 (1972).
[72027] T. Amano and E. Hirota, J. Chem. Phys. **57**, 5608 (1972).
[72029] H. Kim, E. F. Pearson, and E. H. Appelman, J. Chem. Phys. **56**, 1 (1972).
[72030] E. F. Pearson and H. Kim, J. Chem. Phys. **57**, 4230 (1972).
[72031] W. H. Kirchhoff, J. Mol. Spectrosc. **41**, 333 (1972).
[72032] H. Takeo and R. F. Curl, Jr., J. Mol. Spectrosc. **43**, 21 (1972).
[72033] S. Saito and K. Takagi, Astrophys. J. Lett. **175**, L47 (1972).
[72034] K. Takagi and S. Saito, J. Mol. Spectrosc. **44**, 81 (1972).
[72035] S. Chandra and A. Dymanus, Chem. Phys. Lett. **13**, 105 (1972).
[72036] J. M. L. J. Reinartz, W. L. Meerts, and A. Dymanus, Chem. Phys. Lett. **16**, 576 (1972).
[72037] A. Fayt, Ann. Soc. Sci. Brux. **86**, 61 (1972).
[72038] M. Redon and M. Fourrier, Chem. Phys. Lett. **17**, 114 (1972).
[72039] R. P. Netterfield, R. W. Parsons, and J. A. Roberts, J. Phys. B **5**, 146 (1972).
[72040] P. Hoyng, H. A. Dijkerman, and G. Roitenberg, Physica **57**, 57 (1972).
[72041] Krishnaji, S. L. Srivastava, and P. C. Pandey, Chem. Phys. Lett. **13**, 372 (1972).
[72042] G. D. T. Tejwani, J. Chem. Phys. **57**, 4676 (1972).
[72043] R. F. Curl, Jr., K. M. Evenson, and J. S. Wells, J. Chem. Phys. **56**, 5143 (1972).
[72044] H. Takeo, E. Hirota, and Y. Morino, J. Mol. Spectrosc. **41**, 420 (1972).
[72045] S. Mizumoto, J. Izumi, T. Beppu, and E. Hirota, Bull. Chem. Soc. Japan **45**, 786 (1972).
[72046] P. Helminger, R. L. Cook, and F. C. DeLucia, J. Chem. Phys. **56**, 4581 (1972).
[72047] R. L. Cook, F. C. DeLucia, and P. Helminger, J. Mol. Spectrosc. **41**, 123 (1972).
[72048] J. Bellet, G. Steenbeckeliers, and P. Stouffs, C. R. Acad. Sci. Paris B **275**, 501 (1972).
[72049] F. C. DeLucia, P. Helminger, R. L. Cook, and W. Gordy, Phys. Rev. A **5**, 487 (1972).

[72050] F. C. DeLucia, P. Helminger, R. L. Cook, and W. Gordy, Phys. Rev. A **6**, 1324 (1972).
[72051] A. H. Brittain, A. P. Cox, G. Duxbury, T. G. Hersey, and R. G. Jones, Mol. Phys. **24**, 843 (1972).
[72052] Y. Beers and G. P. Klein, J. Res. Nat. Bur. Stand., **76A**, 521 (1972).
[72053] P. C. Pandey and S. L. Srivastava, J. Phys. B **5**, 997 (1972).
[73010] S. L. Hartford, W. C. Allen, C. L. Norris, E. F. Pearson, and W. H. Flygare, Chem. Phys. Lett. **18**, 153 (1973).
[73026] S. E. Novick, P. Davies, S. J. Harris, and W. Klemperer, J. Chem. Phys. **59**, 2273 (1973).
[73027] E. F. Pearson and R. V. McCormick, J. Chem. Phys. **58**, 1619 (1973).
[73028] G. L. Blackman, R. D. Brown, and F. R. Burden, J. Chem. Phys. **59**, 3760 (1973).
[73029] S. L. Rock, J. C. McGurk, and W. H. Flygare, Chem. Phys. Lett. **19**, 153 (1973).
[73030] W. H. Kirchhoff, D. R. Lide, Jr., and F. X. Powell, J. Mol. Spectrosc. **47**, 491 (1973).
[73031] J. B. Cohen and E. B. Wilson, Jr., J. Chem. Phys. **58**, 456 (1973).
[73032] J. B. Cohen and E. B. Wilson, Jr., J. Chem. Phys. **58**, 442 (1973).
[73033] S. Gustafson and W. Gordy, J. Chem. Phys. **58**, 5181 (1973).
[73034] S. L. Rock, E. F. Pearson, E. H. Appelman, C. L. Norris, and W. H. Flygare, J. Chem. Phys. **59**, 3940 (1973).
[73035] W. H. Kirchhoff, D. R. Johnson, and F. X. Powell, J. Mol. Spectrosc. **48**, 157 (1973).
[73036] H. Shoji, T. Tanaka, and E. Hirota, J. Mol. Spectrosc. **47**, 268 (1973).
[73037] E. F. Pearson and M. B. Trueblood, J. Chem. Phys. **58**, 826 (1973).
[73038] S. Saito and K. Takagi, J. Mol. Spectrosc. **47**, 99 (1973).
[73039] E. F. Pearson and M. B. Trueblood, Astrophys. J. Lett. **179**, L146 (1973).
[73040] P. Helminger, F. C. DeLucia, and W. H. Kirchhoff, J. Phys. Chem. Ref. Data **2**, 215 (1973).
[73041] R. L. Cook, G. Winnewisser, and D. C. Lindsey, J. Mol. Spectrosc. **46**, 276 (1973).
[73042] J. C. DePannemaecker, Ph.D. Thesis, Univ. Sci. Tech. Lille, France, 1973.
[73043] D. S. Olson, C. O. Britt, V. Prakash, and J. E. Boggs, J. Phys. B **6**, 206 (1973).
[73044] G. P. Srivastava, H. O. Gautam, and A. Kumar, J. Phys. B **6**, 743 (1973).
[73045] A. G. Maki and D. R. Johnson, J. Mol. Spectrosc. **47**, 226 (1973).
[73046] I. C. Bowater, J. M. Brown, and A. Carrington, Proc. R. Soc. London **A333**, 265 (1973).
[73047] P. S. H. Bolman, J. M. Brown, A. Carrington, and G. J. Lycett, Proc. R. Soc. London **A335**, 113 (1973).
[73048] G. P. Srivastava, A. Kumar, and D. Kumar, Mol. Phys. **26**, 693 (1973).
[73049] T. Tanaka, A. D. English, R. W. Field, D. A. Jennings, and D. O. Harris, J. Chem. Phys. **59**, 5217 (1973).
[73050] J. H. Carpenter, J. Mol. Spectrosc. **46**, 348 (1973).
[73051] W. H. Yang, J. A. Roberts, and G. D. T. Tejwani, J. Chem. Phys. **58**, 4916 (1973).
[73052] J. H. S. Wang, D. E. Oates, A. Ben-Reuven, and S. G. Kukolich, J. Chem. Phys. **59**, 5268 (1973).
[73053] J. H. S. Wang, J. M. Levy, S. G. Kukolich, and J. I. Steinfeld, Chem. Phys. **1**, 141 (1973).
[73054] H. Taft, P. Bhattacharyya, N. Smith, and B. P. Dailey, Chem. Phys. Lett. **22**, 113 (1973).
[73055] A. H. Brittain, P. J. Manor, and R. H. Schwendeman, J. Chem. Phys. **58**, 5735 (1973).
[73056] J. Bellet, W. J. Lafferty, and G. Steenbeckeliers, J. Mol. Spectrosc. **47**, 388 (1973).
[73057] G. Steenbeckeliers and J. Bellet, J. Mol. Spectrosc. **45**, 10 (1973).
[73058] F. C. DeLucia, P. Helminger, W. Gordy, H. W. Morgen, and P. A. Staats, Phys. Rev. A **8**, 2785 (1973).
[73059] S. A. Clough, Y. Beers, G. P. Klein, and L. S. Rothman, J. Chem. Phys. **59**, 2254 (1973).
[73060] T. R. Dyke and J. S. Muenter, J. Chem. Phys. **59**, 3125 (1973).
[73061] J. Bellet (Private communication, July 1973).
[73062] G. Steenbeckeliers (Private communication, July 1973).
[73063] G. Strey and I. M. Mills, Mol. Phys. **26**, 129 (1973).
[73064] G. P. Srivastava, H. O. Gautam, and A. Kumar, J. Phys. B **6**, 743 (1973).
[73065] S. C. Hurlock, K. N. Rao, L. A. Weller, and P. K. L. Yin, J. Mol. Spectrosc. **48**, 372 (1973).
[74001] A. G. Maki, J. Phys. Chem. Ref. Data **3**, 221 (1974).
[74002] K. D. Tucker, M. L. Kutner, and P. Thaddeus, Astrophys. J. Lett. **193**, L115 (1974).
[74003] R. D. Brown, F. R. Burden, P. D. Godfrey, and I. R. Gillard, J. Mol. Spectrosc. **25**, 301 (1974).
[74004] H. E. Radford, K. M. Evenson, and C. J. Howard, J. Chem. Phys. **60**, 3178 (1974).
[74005] F. C. DeLucia, P. Helminger, and W. H. Kirchhoff, J. Phys. Chem. Ref. Data **3**, 211 (1974).
[74006] E. Tiemann, J. Hoeft, F. J. Lovas, and D. R. Johnson, J. Chem. Phys. **60**, 5000 (1974).
[74007] J. C. McGurk, R. T. Hofmann, and W. H. Flygare, J. Chem. Phys. **60**, 2922 (1974).
[74008] S. C. Hurlock, W. J. Lafferty, and K. N. Rao, J. Mol. Spectrosc. **50**, 246 (1974).
[74009] S. J. Harris, S. E. Novick, W. Klemperer, and W. E. Falconer, J. Chem. Phys. **61**, 193 (1974).
[74010] T. Chikaraishi and E. Hirota, Kyushu University, Fukuoka, Japan (Private communication, 1974).
[74011] S. G. Kukolich (Private communication, Nov. 1974).
[74012] M. R. Verter and H. Rabitz, J. Chem. Phys. **61**, 3707 (1974).
[74013] J. C. McGurk, H. Mäder, R. T. Hofmann, T. G. Schmalz, and W. H. Flygare, J. Chem. Phys. **61**, 3759 (1974).
[74014] R. M. Garvey and F. C. DeLucia, J. Mol. Spectrosc. **50**, 38 (1974).
[74015] G. Simons, J. Chem. Phys. **61**, 369 (1974).
[74016] W. J. Lafferty and R. L. Sams, Mol. Phys. **28**, 861 (1974).
[74017] D. S. Burch, W. H. Tanttila, and M. Mizushima, J. Chem. Phys. **61**, 1607 (1974).
[74018] C. J. Howard and K. M. Evenson, J. Chem. Phys. **61**, 1943 (1974).
[74019] T. Tanaka, R. W. Field, and D. O. Harris, J. Chem. Phys. **61**, 3401 (1974).
[74020] R. E. Smalley, B. L. Ramakrishna, D. H. Levy, and L. Wharton, J. Chem. Phys. **61**, 4363 (1974).
[74021] S. J. Harris, S. E. Novick, and W. Klemperer, J. Chem. Phys. **60**, 3208 (1974).
[74022] J. A. Austin, D. H. Levy, C. A. Gottlieb, and H. E. Radford, J. Chem. Phys. **60**, 207 (1974).
[74023] T. Tanaka, K. Abe, and R. F. Curl, Jr., J. Mol. Spectrosc. **49**, 310 (1974).
[74024] A. F. Krupnov, Radiophysical Research Institute Gorky, USSR (Unpublished work, 1974).
[74025] B. E. Turner, Astrophys. J. Lett. **193**, L83 (1974).
[74026] S. Green, J. A. Montgomery, Jr., and P. Thaddeus, Astrophys. J. Lett. **193**, L89 (1974).
[74027] R. E. Davis and J. S. Muenter, Chem. Phys. Lett. **24**, 343 (1974).
[74028] J. M. L. J. Reinartz and A. Dymanus, Chem. Phys. Lett. **24**, 346 (1974).
[74029] M. Bogey, A. Bauer, and S. Maes, Chem. Phys. Lett. **24**, 516 (1974).
[74030] P. Glorieux and B. Macke, Chem. Phys. **4**, 120 (1974).
[74031] W. A. Cady, J. Chem. Phys. **60**, 3318 (1974).
[74032] S. G. Kukolich, D. E. Oates, and J. H. S. Wang, J. Chem. Phys. **61**, 4686 (1974).
[74033] N. W. Larsen and B. P. Winnewisser, Z. Naturforsch. **29a**, 1213 (1974).

[74034] P. A. Baron, P. D. Godfrey, and D. O. Harris, J. Chem. Phys. **60**, 3723 (1974).
[74035] B. Fabricant and J. S. Muenter, J. Mol. Spectrosc. **53**, 57 (1974).
[74036] R. L. Cook, F. C. DeLucia, and P. Helminger, J. Mol. Spectrosc. **53**, 62 (1974).
[74037] P. Helminger, F. C. DeLucia, W. Gordy, P. A. Staats, and H. W. Morgan, Phys. Rev. **A10**, 1072 (1974).
[74038] G. H. M. Schonk (Private communication, Aug. 1974). These unpublished measurements by G. H. M. Schonk, Katholieke Universiteit, Nijmegen, The Netherlands were assigned by the author.
[74039] E. F. Pearson, C. L. Norris, and W. H. Flygare, J. Chem. Phys. **60**, 1761 (1974).
[74040] J. C. McGurk, T. G. Schmalz, and W. H. Flygare, J. Chem. Phys. **60**, 4181 (1974).
[74041] J. H. Carpenter, J. D. Cooper, J. B. Simpson, J. C. Smith, and D. H. Whiffen, J. Phys. E **7**, 678 (1974).
[74042] W. R. M. Graham, K. I. Dismuke, and W. Weltner, Jr., J. Chem. Phys. **60**, 3817 (1974).
[74043] A. R. Hoy and P. R. Bunker, J. Mol. Spectrosc. **52**, 439 (1974).
[74044] A. V. Burenin, A. N. Valbov, L. I. Gershtein, E. N. Karyakin, A. F. Krupnov, A. V. Maslovskii, and S. M. Shchapin, Opt. Spectrosc. **37**, 676 (1974).
[74045] S. R. Brown, J. Chem. Phys. **60**, 1722 (1974).
[74046] M. Jinguji, C. A. McDowell, and P. Raghunathan, J. Chem. Phys. **61**, 1489 (1974).
[75000] K. H. Casleton and S. G. Kukolich, J. Chem. Phys. **62**, 2696 (1975).
[75001] A. F. Krupnov and A. V. Burenin, in *Molecular Spectroscopy: Modern Research*, Vol. 2, K. Narahari Rao, Ed., Academic Press, New York, 1976.
[75002] J. M. Hollis, L. E. Snyder, D. Buhl, and P. T. Giguere, Astrophys. J. **200**, 584 (1975).
[75003] R. C. Woods, T. A. Dixon, R. J. Saykally, and P. G. Szanto, Phys. Rev. Lett. **35**, 1269 (1975).
[75004] J. T. Hougen, H. E. Radford, K. M. Evenson, and C. J. Howard, J. Mol. Spectrosc. **56**, 210 (1975).
[75007] F. C. DeLucia, J. Mol. Spectrosc. **55**, 271 (1975).
[75008] I. R. Dagg, G. E. Reesor, and A. M. C. Wong, Can. J. Phys. **53**, 861 (1975).
[75009] F. C. DeLucia and P. Helminger, J. Mol. Spectrosc. **56**, 138 (1975).
[75010] G. Cazzoli, R. Cervellati, and A. M. Mirri, J. Mol. Spectrosc. **56**, 422 (1975).
[75011] P. Kuijpers, T. Törring, and A. Dymanus, Z. Naturforsch. **30a**, 1256 (1975).
[75012] M. Suzuki and A. Guarnieri, Z. Naturforsch. **30a**, 497 (1975).
[75013] R. L. Sams and A. G. Maki, J. Mol. Struct. **26**, 107 (1975).
[75014] V. Spirko and G. K. Speirs, J. Mol. Spectrosc. **55**, 151 (1975).
[75015] C. G. Stevens and R. N. Zare, J. Mol. Spectrosc. **56**, 167 (1975).
[75016] T. Tanaka, R. W. Field, and D. O. Harris, J. Mol. Spectrosc. **56**, 188 (1975).
[75017] P. Thaddeus and B. E. Turner, Astrophys. J. Lett. **201**, L25 (1975).
[75018] M. Bogey, J. Phys. B **8**, 1934 (1975).
[75019] Y. Beers and C. J. Howard, J. Chem. Phys. **63**, 4212 (1975).
[75020] R. L. Cook, F. C. DeLucia, and P. Helminger, J. Mol. Struct. **28**, 237 (1975).
[75021] S. L. Coy, J. Chem. Phys. **63**, 5145 (1975).
[75022] W. K. Liu and R. A. Marcus, J. Chem. Phys. **63**, 290 (1975); Erratum: J. Chem. Phys. **63**, 4564 (1975).
[75023] A. Foord, J. G. Smith, and D. H. Whiffen, Mol. Phys. **29**, 1685 (1975).
[75024] D. E. Fitz and R. A. Marcus, J. Chem. Phys. **62**, 3788 (1975).
[75025] K. H. Casleton, K. R. Chien, P. B. Foreman, and S. G. Kukolich, Chem. Phys. Lett. **36**, 308 (1975).
[75026] P. Helminger and F. C. DeLucia, J. Mol. Spectrosc. **58**, 375 (1975).
[75027] A. A. Kalinkevich, Opt. Spectrosc. **39**, 330 (1975).
[75028] G. D. T. Tejwani and E. S. Yeung, J. Chem. Phys. **63**, 4562 (1975).
[75029] S. M. Freund, J. T. Hougen, and W. J. Lafferty, Can. J. Phys. **53**, 1929 (1975).
[75030] G. D. T. Tejwani and E. S. Yeung, J. Chem. Phys. **63**, 1513 (1975).
[75031] J. W. Fleming and R. P. Wayne, Chem. Phys. Lett. **32**, 135 (1975).
[75032] H. Mäder, J. Ekkers, W. Hoke, and W. H. Flygare, J. Chem. Phys. **62**, 4380 (1975).
[75033] R. B. Nerf, Jr., J. Mol. Spectrosc. **58**, 479 (1975).
[75034] S. E. Novick, S. J. Harris, K. C. Janda, and W. Klemperer, Can. J. Phys. **53**, 2007 (1975).
[75035] J. M. Brown and D. A. Ramsay, Can. J. Phys. **53**, 2232 (1975).
[75036] A. Cabana, M. Laurin, W. J. Lafferty, and R. L. Sams, Can. J. Phys. **53**, 1902 (1975).
[76000] F. J. Lovas (Present work).
[76001] W. J. Lafferty (Private communication, 1976).
[76002] L. E. Snyder and J. M. Hollis, Astrophys. J. Lett. **204**, L1 (1976).
[76003] L. E. Snyder, J. M. Hollis, F. J. Lovas, and B. L. Ulich, Astrophys. J. **209**, 67 (1976).
[76004] R. J. Saykally, P. G. Szanto, T. G. Anderson, and R. C. Woods, Astrophys. J. Lett. **204**, L143 (1976).
[76005] R. J. Saykally, T. A. Dixon, T. G. Anderson, P. G. Szanto, and R. C. Woods, Astrophys. J. Lett. **205**, L101 (1976).
[76006] R. C. Woods (Private communication, 1976).
[76007] S. M. Freund, P. D. Godfrey, and W. Klemperer (Private communication from S. M. Freund, Sept. 1976).
[76008] Y. Beers and C. J. Howard, J. Chem. Phys. **64**, 1541 (1976).
[76009] G. L. Blackman, R. D. Brown, P. D. Godfrey, and H. I. Gunn, Nature **261**, 395 (1976).
[76010] R. D. Brown, P. D. Godfrey, J. W. V. Storey, and F. O. Clark, Nature **262**, 672 (1976).
[76011] R. A. Creswell, E. F. Pearson, M. Winnewisser, and G. W. Winnewisser, Z. Naturforsch. **31a**, 221 (1976).
[76012] R. J. Saykally, P. G. Szanto, T. G. Anderson, and R. C. Woods (Reported at the 31st Symposium on Molecular Spectroscopy, Columbus, Ohio 1976).
[76013] R. C. Woods, R. J. Saykally, T. A. Dixon, P. G. Szanto, and T. G. Anderson (Reported at the 31st Symposium on Molecular Spectroscopy, Columbus, Ohio 1976).
[76014] R. J. Saykally, P. G. Szanto, T. G. Anderson, T. A. Dixon, and R. C. Woods (Reported at the 31st Symposium on Molecular Spectroscopy, Columbus, Ohio 1976).
[76015] A. G. Maki, R. L. Sams, and R. Pearson, Jr., J. Mol. Spectrosc. **64**, 452 (1977).
[76016] K. Tanaka and E. Hirota, J. Mol. Spectrosc. **59**, 286 (1976).
[76017] R. A. Creswell, S. R. Brown, and R. H. Schwendeman, J. Chem. Phys. **64**, 1820 (1976).
[76018] T. Tanaka and D. O. Harris, J. Mol. Spectrosc. **59**, 413 (1976).
[76019] L. W. Hrubesh and R. F. Curl, Jr., J. Mol. Spectrosc. **61**, 144 (1976).
[76020] A. Cabana, M. L. C. Pepin, and W. J. Lafferty, J. Mol. Spectrosc. **59**, 13 (1976).
[76021] W. E. Hoke, D. R. Bauer, J. Ekkers, and W. H. Flygare, J. Chem. Phys. **64**, 5276 (1976).
[76022] G. W. Hills, D. L. Philen, R. F. Curl, Jr., and P. K. Tittel, Chem. Phys. **12**, 107 (1976).
[76023] J. M. Cook, G. W. Hills, and R. F. Curl, Jr., Astrophys. J. Lett. **207**, L139 (1976).
[76024] G. W. Hills and J. M. Cook, Astrophys. J. Lett. **209**, L157 (1976).
[76025] E. F. Pearson, R. A. Creswell, M. Winnewisser, and G. Winnewisser, Z. Naturforsch. **31a**, 1394 (1976).
[76026] W. F. Kolbe, B. Leskovar, and H. Buscher, J. Mol. Spectrosc. **59**, 86 (1976).
[76027] B. A. Andreev, A. V. Burenin, A. F. Krupnov, and S. M. Shchapin, Opt. Spectrosc. **39**, 491 (1975).
[76028] B. A. Andreev, A. V. Burenin, E. N. Karyakin, A. F. Krupnov, and S. M. Shchapin, J. Mol. Spectrosc. **62**, 125 (1976).

[76029] S. E. Novick, K. C. Janda, S. L. Holmgren, M. Waldman, and W. Klemperer, J. Chem. Phys. **65**, 1114 (1976).
[76030] J. T. Murray, W. A. Little, Jr., Q. Williams, and T. L. Weatherly, J. Chem. Phys. **65**, 985 (1976).
[76031] S. Saito, J. Mol. Spectrosc. **65**, 229 (1977).
[76032] P. Kuipers, T. Törring, and A. Dymanus, Chem. Phys. **15**, 457 (1976).
[76035] J. M. L. J. Reinartz, Ph.D. Thesis, Katholieke Universiteit te Nijmegen, Netherlands, 1976.
[76036] E. F. Pearson, B. P. Winnewisser, and M. B. Trueblood, Z. Naturforsch. **31a**, 1259 (1976).

4. Appendix

4.1. Molecular Structures for Triatomic Molecules

Although none of the structures reported in the literature were reanalyzed in the present work, for completeness the structural parameters reported are given here in table A.1. Since the equilibrium, r_e, and substitution r_s, structures are considered most reliable, these are quoted when available.

4.2. Discussion of Centrifugal Distortion Analysis of F_2O

Historically, the analysis of the rotational spectrum of F_2O has caused considerable difficulty. The first observations on F_2O (Hilton et al. [61007] and Bransford et al. [60003]) were incorrectly interpreted and later Pierce et al. [63007] provided the correct assignments from a detailed centrifugal distortion analysis of new spectral measurements [61008] and [63007]. Although these results appeared consistent, Kirchhoff [72031] found that the $36_{4,32}$–$37_{3,36}$ transition reported in [63007] at 29473.73 MHz was erroneous. His conclusion was based on a detailed statistical analysis and several new measurements.

While examining Kirchhoff's calculations, provided to the author by W. H. Kirchhoff, it was noted that two of the resolved triplet (spin-rotation splitting) rotational lines reported by Pierce and DiCianni [63008] had been overlooked. Further, the questionable transitions of Hilton et al. assigned in [61007] were quite reasonably not included in the previous calculations. When the two new transitions, $24_{2,23}$–$23_{3,20}$ at 17257.86 MHz and $25_{3,22}$–$26_{2,25}$ at 14720.63 MHz, from [63008] were added to Kirchhoff's basic analysis, the fit substantially degraded with a standard deviation of 0.157 MHz versus 0.096 MHz without the two new transitions.

Following the procedure of successively eliminating one transition at a time as described by Kirchhoff [72031], three transitions were found which substantially degrade the fit, namely:

Transition	Frequency	σ_{Fit} (when excluded)
$17_{2,15}$–$18_{1,18}$	59 137.55	0.129 MHz
$22_{2,21}$–$21_{3,18}$	38 675.10	0.136 MHz
$25_{3,22}$–$26_{2,25}$	14 720.63	0.125 MHz

where σ_{Fit} is the standard deviation of the fit when each of the transitions is independently eliminated, as compared to $\sigma=0.157$ when all are included.

When all three of these questionable transitions were simultaneously eliminated from the fit, the standard deviation dropped significantly to 0.070 MHz and all transitions in the fit exhibited reasonable statistical behavior. In addition, the predicted frequency for the 14720 line was only 0.17 MHz higher than observed (t–test$=0.5$) while the 59137 line was predicted 2.5 MHz higher than observed (t–test$=14.2$) and the 38675 line was predicted 1.1 MHz higher (t–test$=12.6$). A calculation with only the latter two transitions (59.1 GHz and 38.6 GHz) eliminated appeared consistent. In the final analysis two of the low frequency lines from Hilton et al. were also included since they were in good agreement in all the fits which did not contain the questionable transitions.

The final results of this reanalysis are shown in table A.2 and compared to the results obtained with Kirchhoff's data set. In the upper part of the table all of the transitions excluded from the present analysis are given. The deviation found for the $17_{2,15}$–$18_{1,18}$ of $\sim$–2 MHz and $\sim$–1 MHz deviation for the $22_{2,21}$–$21_{3,18}$ suggest recording errors, i.e., the actual observed frequencies probably were 59139.55 and 38676.10, respectively. Note also the divergence between the present results and Kirchhoff's for the $36_{4,32}$–$37_{3,35}$ line with $\Delta\nu\sim-31$ MHz versus $\Delta\nu\sim+31$ MHz. This is also indicated in comparing the $\Delta\nu$'s and $t(\Delta\nu)$ results for the new transitions in the middle of table A.2. Although not added to the fit, the remaining lines from Hilton et al. [61007] in the 92–104 GHz range appear to be assigned correctly by Pierce et al. [63007] based on the expected measurement uncertainty.

The difficulties encountered in the analysis of F_2O are indicative of assigning spectral lines solely based on agreement with frequency predictions. Pierce et al. [63007] were forced to employ this method since Stark effect for lines with $J>5$ were unresolved. Thus, it is not surprising to find several transitions which are misassigned. Ideally, some additional measurements on F_2O should be made in order to firmly establish the assignments and provide a centrifugal distortion analysis which results in better quality sextic parameters than presently obtainable. In the lower portion of table A.2 a list of predicted transitions is given. Observation of these transitions would remove any lingering doubts between the present analysis and those previously reported. Some additional confidence can be placed in the present results since the two new lines fit (17.2 GHz and 14.7 GHz) have been observed as triplets and are in good agreement with the spin-rotation analysis of Flygare [65011].

After this review was submitted a sample of F_2O was obtained and new measurements were performed to resolve the questions relating to the analysis on F_2O. The measurements shown in table A.2.1, were carried out in a parallel plate Stark-modulated spectrometer with fields up to about 3000 V/cm. Many of the observed transitions with $J>30$ occurred as K-doublets which assisted in the assignment. Several of the transitions predicted in table A.2. were measured and agreed well with the reanalysis described above. The molecular constants obtained by combining the new measurements with the data in table 34.3. are given in table 34.

Table A.1. The molecular structures of triatomic molecules.

Molecule (ABC)	Type	r_{AB} (Å)	r_{BC} (Å)	∠ABC	Reference
$Ar^{35}ClF$	r_o	3.330	1.63178[a]	168.87°	[74009]
$Ar^{37}ClF$	r_o	3.329	1.63175[a]	168.94°	[74009]
ArClF	r_e	3.286			[74009]
$Ar^{35}ClH$	r_o	4.0065	1.2839	41.53°	[73026]
$Ar^{37}ClH$	r_o	4.0058	1.2839	41.53°	[73026]
$Ar^{35}ClD$	r_o	4.0247	1.2813	33.71°	[73026]
$Ar^{37}ClD$	r_o	4.0242	1.2813	33.71°	[73026]
ArFH	r_o	3.540	...	48.20(7)°	[74021]
HBS	r_s	1.1692(4)	1.5995(4)	180°	[73027]
BrNO	r_s	2.140(2)	1.146(10)	114.50(50)°	[70018]
BrCN	r_o	1.789(10)	1.160(10)	180°	[48003]
ClCN	r_s	1.631	1.159	180°	[63005]
	r_e	1.629(6)	1.160(7)	180°	[65009]
FCN	r_s	1.262	1.159	180°	[63005]
CF_2	r_a	1.3035(1)	1.3035(1)	104.78(2)°	[73030]
HCN	r_s	1.0635(3)	1.1551(2)	180°	[75007]
	r_e	1.0655(5)	1.15321(10)	180°	[71021]
HNC	r_s	0.98607(9)	1.17168(22)	180°	[76025]
HCO	r_a	1.1102	1.1712	127.4°	[74022]
	r_o	1.125	1.175	124.95°	[75035]
HCO^+	r_s	1.0930	1.1071	180°	[76013]
HCP	r_s	1.067	1.542	180°	[64002]
	r_e	1.0692(8)	1.5398(2)	180°	[73063]
ICN	r_o	1.9952	1.1581	180°	[72026]
OCS	r_e	1.1543(10)	1.5628(10)	180°	[73045]
OCSe	r_e	1.1535(1)	1.7098(1)	180°	[76015]
SCSe	r_o	1.553	1.695	180°	[71022]
SCTe	r_o	1.557	1.904	180°	[54002]
KrClF	r_e	3.3136	1.63178[a]	180°	[75034]
	r_o	3.388	1.63178[a]	169.93°	[75034]

[a] Assumed

Table A.1. Structure constants (continued)

Molecule (ABC)	Type	r_{AB} (Å)	r_{BC} (Å)	∠ABC	Reference
HOCl	r_s	0.97	1.690	102.5°	[71023]
ClNO	r_s	1.975	1.139	113.3°	[61005]
NSCl	r_s	1.450	2.161	117.7°	[70021]
ClO_2	r_s	1.471	1.471	117.5°	[62005]
Cl_2O	r_o	1.7004	1.7004	110.86°	[66015]
Cl_2S	r_o	2.014	2.014	102.8°	[72028]
CsOH	r_e	2.391(2)	0.960(10)	180°	[69025]
HOF	r_o	0.966	1.442	96.8°	[72030]
FNO	r_s	1.512	1.136	110.1°	[69026]
NSF	r_a	1.448	1.643	116.9°	[67013]
GeF_2	r_e	1.7321	1.7321	97.148°	[72032]
NF_2	r_o	1.3494	1.3494	103.3°	[74003]
OF_2	r_e	1.4053	1.4053	103.07°	[66019]
SF_2	r_e	1.5875(2)	1.5875(2)	97.96(2)°	[74010]
SiF_2	r_e	1.5901(1)	1.5901(1)	100.77(2)°	[73036]
KOH	r_o	2.2115	0.9120	180°	[73037]
LiOH	r_e	1.580	0.950	180°	[76007]
HNO	r_o	1.0628	1.2116	108.6°	b
HNN^+	r_o	1.0406	1.0949	180°	[76014]
RbOH	r_e	2.301(2)	0.957(10)	180°	[69025]
HO_2	r_o	0.977	1.335	104.1°	[76008]
H_2O	r_e	0.9587	0.9587	103.9°	[74036]
H_2S	r_e	1.3356	1.3356	92.11°	[67027][c]
H_2Se	r_e	1.4605(30)	1.4605(30)	90.92(12)°	[62011]
NO_2	r_e	1.1947	1.1947	133.82°	[75036]
NNO	r_s	1.1286(3)	1.1876(3)	180°	[58002]
SSO	r_o	1.883	1.464	118.2°	[74006]
SO_2	r_e	1.43076(13)	1.43076(13)	119.33(1)°	[69039]
SeO_2	r_e	1.6076(6)	1.6076(6)	113.83°	[70035]
O_3	r_e	1.2717(2)	1.2717(2)	116.78°	[70048]

[b] F. W. Dalby, Can. J. Phys. 36, 1336 (1958).

[c] See also [75020].

Table A.2. Centrifugal distortion analysis of F_2O.

Transition $J'_{K'_P,K'_0} \leftarrow J''_{K''_P,K''_0}$	Measured Frequency (MHz)	Unweighted Fit $\Delta\nu$[a] (MHz)	Unweighted Fit $t(\Delta\nu)$	Kirchhoff's Fit $\Delta\nu$[a] (MHz)	Kirchhoff's Fit $t(\Delta\nu)$
Transitions not included in present analysis:					
$7_{0,7} \leftarrow 6_{1,6}$	104 837.67	0.350	3.1	0.450	3.7
$9_{1,8} \leftarrow 9_{0,9}$	97 965.32	0.321	2.1	0.957	5.8
$10_{1,9} \leftarrow 9_{2,8}$	97 879.86	0.375	3.2	0.688	5.4
$11_{4,7} \leftarrow 12_{3,10}$	98 425.89	0.557	4.5	0.600	4.4
$16_{5,11} \leftarrow 17_{4,14}$	92 195.43	0.569	4.6	0.762	5.3
$17_{2,15} \leftarrow 18_{1,18}$	59 137.55	-1.962	-11.1	-0.059[b]	-1.7
$22_{2,21} \leftarrow 21_{3,18}$	38 675.10	-1.104	-10.5	-0.188[b]	-2.8
$36_{4,32} \leftarrow 37_{3,35}$	29 473.73	-30.740	-16.0	+31.045	+4.6
Additional transitions not included in Kirchhoff's fit:					
$18_{2,17} \leftarrow 17_{3,14}$	46 795.92	0.160	2.0	0.725	6.9
$21_{2,20} \leftarrow 20_{3,17}$	45 089.32	0.089	1.2	1.215	10.1
$24_{2,23} \leftarrow 23_{3,20}$	17 257.96	-0.044	-0.6	-1.360	-6.9
$25_{3,22} \leftarrow 26_{2,25}$	14 720.63	-0.003	-0.1	8.184	10.6

Some predicted transitions with standard deviations:

	Present Results ν_0 calc.	Kirchhoff's Results ν_0 calc.
$19_{2,17} \leftarrow 20_{1,20}$	95 193.233±0.33	95 187.297±0.31
$26_{3,23} \leftarrow 27_{2,26}$	34 189.509±0.18	34 175.032±1.35
$27_{3,24} \leftarrow 28_{2,27}$	55 661.343±0.34	55 637.913±2.21
$28_{3,25} \leftarrow 29_{2,28}$	78 868.074±0.59	78 832.342±3.41
$29_{3,26} \leftarrow 30_{2,29}$	103 521.610±0.96	103 469.450±5.04
$30_{3,28} \leftarrow 29_{4,25}$	101 226.877±0.36	101 212.210±1.43
$31_{3,29} \leftarrow 30_{4,26}$	90 570.656±0.38	90 555.764±1.50
$32_{3,30} \leftarrow 31_{4,27}$	76 921.974±0.36	76 908.831±1.35
$35_{3,33} \leftarrow 34_{4,30}$	19 751.208±0.42	19 764.853±1.47
$35_{4,31} \leftarrow 36_{3,34}$	3 945.408±1.03	3 911.673±3.69
$36_{4,32} \leftarrow 37_{3,35}$	29 504.470±1.91	29 442.685±6.80
$37_{4,33} \leftarrow 38_{3,36}$	56 618.503±3.13	56 519.049±11.04
$38_{4,34} \leftarrow 39_{3,37}$	84 965.079±4.75	84 816.543±16.62

[a] Observed minus calculated frequency.

[b] Transitions included in Kirchhoff's analysis [71031].

[c] Not fit in Kirchhoff's analysis [71031].

Table A.2.1 New Millimeter Measurements on F_2O.[a]

$J'_{K'_{-1},K'_{+1}}$ - $J''_{K''_{-1},K''_{+1}}$	Measured[b] Frequency (MHz)	Calculated[b] Frequency (MHz)
$^{44}_{8,37}$ - $^{43}_{9,34}$	84401.810(45)	84401.795(35)
$^{30}_{5,26}$ - $^{29}_{6,23}$	84702.445(45)	84702.521(26)
$^{40}_{10,31}$ - $^{41}_{9,32}$	84993.425(45)	84993.505(27)
$^{40}_{10,30}$ - $^{41}_{9,33}$	85021.925(75)	85022.011(28)
$^{44}_{8,36}$ - $^{43}_{9,35}$	85824.800(80)	85824.794(36)
$^{21}_{6,15}$ - $^{22}_{5,18}$	86123.975(45)	86123.939(35)
$^{2}_{1,2}$ - $^{1}_{0,1}$	86283.335(45)	86283.354(22)
$^{8}_{1,7}$ - $^{8}_{0,8}$	86721.320(45)	86721.327(31)
$^{49}_{9,41}$ - $^{48}_{10,38}$	89202.875(75)	89202.865(46)
$^{26}_{4,23}$ - $^{25}_{5,20}$	89804.135(30)	89804.138(25)
$^{49}_{9,40}$ - $^{48}_{10,39}$	89813.855(75)	89813.879(47)
$^{16}_{5,12}$ - $^{17}_{4,13}$	90135.08(10)	90135.031(26)
$^{35}_{9,27}$ - $^{36}_{8,28}$	90339.200(30)	90339.231(27)
$^{35}_{9,26}$ - $^{36}_{8,29}$	90405.110(45)	90405.115(27)
$^{31}_{3,29}$ - $^{30}_{4,26}$	90569.98(10)	90569.989(22)
$^{2}_{2,0}$ - $^{3}_{1,3}$	91298.240(75)	91298.201(25)
$^{23}_{3,21}$ - $^{22}_{4,18}$	91780.385(30)	91780.399(28)
$^{16}_{5,11}$ - $^{17}_{4,14}$	92194.835(45)	92194.826(26)
$^{35}_{6,30}$ - $^{34}_{7,27}$	94190.375(45)	94190.439(36)
$^{19}_{2,17}$ - $^{20}_{1,20}$	95193.890(45)[c]	95193.873(60)
$^{30}_{8,23}$ - $^{31}_{7,24}$	95789.780(45)	95789.749(27)
$^{30}_{8,22}$ - $^{31}_{7,25}$	95937.560(45)	95937.496(27)
$^{49}_{12,38}$ - $^{50}_{11,39}$	95995.640(45)	95995.650(46)
$^{49}_{12,37}$ - $^{50}_{11,40}$	95998.940(45)	95998.887(46)

[a] Unpublished work of F.J. Lovas and R.D. Suenram, National Bureau of Standards, 1978. Also included in the analysis was the $1_{1,1}$ - $2_{0,2}$ at 7803.49(1) MHz reported privately by J. Muenter.

[b] Numbers in parentheses are measured uncertainties or standard deviation of calculated value and refer to the last digits given.

[c] This is the middle component of a resolved triplet. The other lines occur at 95193.575(45) MHz and 95194.220(45) MHz.