Forbidden Lines in ns^2np^k Ground Configurations and *nsnp* Excited Configurations of Beryllium through Molybdenum Atoms and Ions

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Forbidden Lines in ns^2np^k Ground Configurations and $nsnp$ Excited Configurations of Beryllium through Molybdenum Atoms and Ions

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Observed and predicted wavelengths of magnetic dipole lines arising within ground configurations of the type ns^2np^k ($n=2$ and 3, $k=1$ to 5) are compiled. For $n=2$ the compilation includes the elements B through Kr, and for $k=5$ it extends to Mo. For $n=3$ Al through Mo are included. In addition the $2s2p$ excited configuration of the Be I isoelectronic sequence for Be through Kr and $3s3p$ of the Mg sequence for Mg through Mo are included. For each line we give a calculated value for the transition probability obtained mainly from the Dirac-Fock method or from the use of scaled radial integrals. The calculated wavelengths are obtained from known energy levels or from levels derived from scaled radial integrals. A small group of electric quadrupole lines seen in astronomical sources are included. The list contains 1660 predicted wavelengths in the range 100 Å to 25.9 mm and 406 observed wavelengths in the range 325 Å to 609 μm.

Key words: astronomy; magnetic-dipole lines; spectra; tokamak; transition probabilities; wavelengths.

Contents

List of Tables

1. Introduction

Forbidden lines have long been used in the analysis of astrophysical plasmas (solar, stellar, nebular, etc.). In the infrared they are among the strongest stellar lines, and many of those of the light atoms have been measured. Spectra of the solar corona and solar flares are rich in magnetic dipole lines (M1) in the visible and ultraviolet for the elements nitrogen through nickel. In recent years these lines have achieved new importance for diagnostics of low-density, magnetically-confined, high-temperature laboratory plasmas generated in tokamaks. This research has extended the range of elements of interest to heavier atoms that may be injected into the plasma to measure ion temperatures in the range of 0.5 to 20 keV by Doppler broadening and to observe plasma dynamics such as plasma rotation and transport of impurities.

On the basis of recent advances in the determination of energy level structures of highly ionized atoms of the iron period, one may predict the wavelengths of M1 lines with high accuracy for this range of elements. From a study of the behavior of the radial energy integrals fitted to these levels, and from numerous M1 lines identified for ions of copper to molybdenum, it became possible to extend the predictions to ions through molybdenum. We have compiled the observed and predicted wavelengths of magnetic dipole lines arising within ground configurations of the type ns^2np^k ($n=2$ and 3, $k=1$ to 5). For $n=2$, we include the elements B through Kr, and for $k=5$ the tables extend to Mo. For $n=3$, Al through Mo are included. In addition, the $2s2p$ excited configuration of the Be I isoelectronic sequence for Be through Kr and $3s3p$ of the Mg I sequence for Mg through Mo are included.

It will probably be difficult to observe the $nsnp$ ($^3P_{0,1,2}-{}^1P_1$) transitions in the Be I and Mg I sequences because the very large electric-dipole transition probability of the $ns^2\ {}^1S_0-nsnp\ {}^1P_1$ resonant transition will tend to rapidly deplete the $nsnp\ {}^1P_1$ level. Similarly, but to a lesser extent, the $^3P_0-{}^3P_1$ transition can be expected to be weak because of the $ns^2\ {}^1S_0-nsnp\ {}^3P_1$ transition. However, we have included these magnetic-dipole transitions for the sake of completeness.

All measured lines that we consider correctly identified are included. Some are only tentatively classified by the authors, but appear to be reasonable on the basis of predictions along isoelectronic sequences. Some are omitted because they are far from satisfying this criterion.

We have also included a selected group of electric quadrupole lines (E2) that are frequently observed in ns^2np^2 and ns^2np^4 configurations; these are the $^1D_2-{}^1S_0$ transitions.

Calculations of line strengths and transition probabilities have been made for all of these lines by both relativistic and non-relativistic methods. We have given preference to the relativistic results. Calculations by both methods for the $n=3$ shell differ on the average by only 5% (see Sec. 6, Ref. 1).

2. Predicted Wavelengths

For Be through Ni, predicted values for the wavelengths of the M1 and E2 lines were obtained from the known energy levels by the Ritz principal of deriving wavelengths from energy differences. Their uncertainties are derived from the reported level uncertainties. The source of data for each of these atoms and ions is given in Sec. 7 below.

From Cu through Mo predictions of wavelengths of M1 lines within the $3s^23p^k$ configurations by Sugar and Kaufman[1] are quoted. These are preferred to *ab initio* calculations because they are semi-empirically derived

by fitting radial energy integrals to the known levels beginning with potassium, and have been found to give more accurate wavelength predictions. The uncertainty estimates are derived as prescribed in that paper. Contributions to the uncertainty by each integral in the calculation was estimated, and the combined effect was given as a monotonically increasing function of atomic number. These estimates appear to be high by a factor of two, as indicated by many subsequently identified lines.

We predicted the lines of the $3s3p$ configurations for inclusion here. The radial integrals $G^1(sp)$ and ζ_p were fit to known levels from potassium to molybdenum. These parameters were then interpolated for ions for which the levels are not known, and predictions were made by diagonalizing the energy matrices. Measured emission lines of copper in this sequence from Sugar and Kaufman[2] were combined with the M1 transition $3s3p\ ^3P_2-{}^3P_1$ from Denne *et al.*[3] to establish the levels of this ion. Denne *et al.* measured this same transition for Ge, Se, Zr, and Mo. The intersystem lines $3s^2\ ^1S_0-3s3p\ ^3P_1$ were observed by Finkenthal *et al.*[4] for Ge, Se, Zr, and Mo. Values for the $3s^2\ ^1S_0-3s3p\ ^1P_1$ lines were provided by Fawcett and Hayes[5] for Zn to Se and from Reader[6] for Sr to Mo.

Edlén has made a comparison of the known levels of the $n=2$ shell (Li to F sequences) with the relativistic Dirac-Fock *ab initio* calculations available in the literature, and has derived analytical expressions for the differences. By this means he has predicted level values through Kr. We used his results to obtain predicted wavelengths from Cu to Kr for the beryllium-to-oxygen isoelectronic sequences[7-10] and from Cu to Mo for the fluorine isoelectronic sequence.[7]

We include a total of 1660 predicted wavelengths.

3. Observed Wavelengths

With a few exceptions the M1 and E2 lines of carbon through argon have been observed only from astronomical sources, including gaseous nebulae, stars, and the solar corona. These sources have also provided considerable iron-period data. The most common laboratory source generating copious forbidden lines is the tokamak, which contains a magnetically-confined, high-temperature plasma with an ion density similar to that of the solar corona. By injecting any impurity element, magnetic dipole lines of that element may be seen in stages of ionization determined by the plasma temperature. All of the scandium and titanium data, most of the chromium and nickel data, and all from copper to molybdenum are from tokamak observations.

We have included a small group of E2 lines comprising the $^1D_2-{}^1S_0$ transition of the ns^2np^2 and ns^2np^4 configurations ($n=2$, 3) because of their prominence in nebular sources.

The sources of observed data that we have credited are not necessarily the original discoverers of the lines, but are those providing the best measurements. In some cases, such as for spectra of the solar corona, the authors have given the line identifications for wavelengths observed by others. References for the observed wavelengths are given in Sec. 8, each preceded by a symbol that is used to identify them in the tables. We include 406 observed wavelengths.

4. Predicted Transition Probabilities

In most cases multiconfiguration Dirac-Fock calculations of line strengths are available. These calculations do not generally converge for neutral and singly ionized atoms, but non-relativistic calculations have been made in every such case. Line strengths for the magnetic-dipole lines of Be I, B I, B II, C I, C II, N I, N II, O I, O II and F II were taken from Wiese *et al.*[11] Those for Si I and P I were taken from Wiese *et al.*[12] Line strengths for the magnetic-dipole lines of the isoelectronic sequences of B I, C I, N I and F I were taken, except as noted above, from Cheng *et al.*[13] Those for the Al I, Si I, and P I sequences were taken, except as noted above, from Huang.[14-16] Those for the Cl I sequence, with a few exceptions, are from Huang *et al.*[17] For Cl-like Ga, Ge, As, Y and Zr the line strengths were interpolated from values of neighboring ions. The relativistic calculations are not available for the Be, Mg, and S isoelectronic sequences. The transition probabilities for all magnetic-dipole lines of the Be-like, Mg-like, and S-like ions were calculated in the manner described in Sugar and Kaufman.[1] These are non-relativistic calculations in intermediate coupling. They agree within a few percent with relativistic calculations in the $n=3$ sequences for which both are available.

Line strengths for the electric-quadrupole lines of $2s^22p^k\ (^1D_2-{}^1S_0)$ [$k=2$] of C I and N II and [$k=4$] of O I and F II are from Wiese *et al.*[11] Those for the remainder of the carbon sequence, O III through Ni XXIII, and for the remainder of the oxygen sequence, Ne III through Ni XXI, are from Cheng *et al.*[13] The transition probabilities for these lines in the sulfur sequence, $3s^23p^4$, for S I through Ni XIII, are from Mendoza and Zeippen.[18] Those from Cu XIV through Mo XXVII are from Biemont and Hansen.[19] The one for Si I, $3s^23p^2$, is from Mendoza and Zeippen.[20] For the remainder of this sequence, P II through Mo XXIX, we used the line strengths given by Huang.[15]

Relations between transition probabilities $A(s^{-1})$ and line strengths S are given explicitly as

$$A = \frac{2.697 \times 10^{13}}{\lambda^3 g} S(\mathrm{M1}),$$

$$A = \frac{1.680 \times 10^{18}}{\lambda^5 g} S(\mathrm{E2}),$$

where λ is the transition wavelength in Å and g is the $2J+1$ degeneracy of the upper level. S(M1) in Bohr magneton units (μ_B) and S(E2) in atomic units (ea_0^2) are the magnetic-dipole and electric-quadrupole line strengths, respectively.

The magnetic-dipole transition rate in almost all cases is a few orders of magnitude greater than the electric-quadrupole transition rate. We have added the E2 rate to the M1 rate in those cases for which the former is greater than 1 % of the latter. This is true only for some of the N I ($2p^3$) and P I ($3p^3$) sequence transitions. An asterisk following the transition rate in the tables shows where this occurs.

5. Data Table Information

The tables contain the predicted and observed wavelengths and predicted transition probabilities for magnetic-dipole transitions within ns^2np^k ($k=1-5$) and $nsnp$ configurations; $n=2$ for beryllium through sodium, $n=2$, 3 for magnesium through krypton, and $n=3$ for rubidium through molybdenum. The F-sequence is given through molybdenum. The electric quadrupole transition $^1D_2-{}^1S_0$ for $k=2$, 4 is included because it is frequently observed. The data are presented in two formats. In Tables 1–39 the lines are segregated according to element and within each element are listed in order of increasing wavelength. In Table 40 all lines are merged and sorted by wavelength. The columns from left to right in order of appearance contain the following information:

Column No.	Description
1	Wavelengths (observed and predicted) in Å below 20 000 Å, in micrometers (μm) between 2 and 1000 μm, and in millimeters (mm) between 1 and 26 mm. Wavelengths given without units are in Å. Wavelengths in vacuum are given below 2000 Å, in air between 2000 Å and 5 μm, and in vacuum above 5 μm. Each wavelength is followed by its uncertainty in parentheses. Tentative identifications are preceded by "T".
2	Transition probabilities (A) are written as a factor times 10 to a power. The power of ten follows the decimal factor. For example, 2.20 +4 means 2.20×10^4. An asterisk following the transition probability indicates that the E2 rate for the transition is greater than 1 % of the M1 rate and has been added to that value.
3	Spectrum.
4	Electronic configuration.
5	Line classification. Lower level is given first.
6	Ionization energy in thousands of electron volts (keV).[21–23]
7	References for observed wavelengths. Definitions of symbols are given in Sec. 8, "References for Observed Wavelengths."

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B I
Edlén, B., Olme, A., Herzberg, G., and Johns, J. W. C. (1970), J. Opt. Soc. Am. **60,** 889.

B II
Olme, A. (1970), Phys. Scr. **1,** 256.

C I
Johansson, L. (1966), Ark. Fys. **31,** 201; Kaufman, V., and Ward, J. F. (1966), J. Opt. Soc. Am. **56,** 1591.

C II
Cooksy, A. L., Blake, G. A., and Saykally, R. J. (1985), Astrophys. J. (submitted).

C III
Bockasten, K. (1955), Ark. Fys. **9,** 457.

N I
Eriksson, K. B. S. (1966), Ark. Fys. **33,** 357.

N II
Eriksson, K. B. S. (1983), Phys. Scr. **28,** 593; Bowen, I. S. (1955), Astrophys. J. **121,** 306; Cooksy, A. L., and Saykally, R. J. (1985), Astrophys. J. (submitted).

N III
Eriksson, K. B. S. (1958), Ark. Fys. **13,** 303.

N IV
Hallin, R. (1966), Ark. Fys. **32,** 201.

O I
Eriksson, K. B. S. (1965), Ark. Fys. **30,** 199.

O II
De Roberts, M. M., Osterbrock, D. E., and McKee, C. F. (1985), Astrophys. J. **293,** 459.

O III
Pettersson, S. -G. (1982), Phys. Scr. **26,** 296.

O IV
Bromander, J. (1969), Ark. Fys. **40,** 257.

O V
Moore, C. E. (1980), Natl. Stand. Ref. Data Ser., Natl. Bur. Stand. (U.S.) 3, Sec. 9.

F I
Stanton, A. C., and Kolb, C. E. (1980), J. Chem. Phys. **72,** 6637.

F II
Palenius, H. P. (1968), Ark. Fys. **39,** 15.

F III
Palenius, H. P. (1970), Phys. Scr. **1,** 113.

F IV
Palenius, H. P. (1971), Research Rep., Phys. Dept., Univ. Lund, 20 pp.

F V
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F VI
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Ne II
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Ne III
Persson, W. (1971), Phys. Scr. **3,** 133; Bowen, I. S. (1955), Astrophys. J. **121,** 306; Bowen, I. S. (1960), Astrophys. J. **132,** 1.

Ne IV
Lindeberg, S. (1972), Uppsala Univ., Inst. Phys., Report UUIP—759, 18 pp.

Ne V
Lindeberg, S. (1972), Uppsala Univ., Inst. Phys., Report UUIP—759, 18 pp.; Forrest, W. J., McCarthy, J. F., and Houck, J. R. (1980), Astrophys. J. **240,** L37.

Ne VI
Lindeberg, S. (1972), Uppsala Univ., Inst. Phys., Report UUIP—759, 18 pp.

Ne VII
Lindeberg, S. (1972), Uppsala Univ., Inst. Phys., Report UUIP—759, 18 pp.

Na III through Na VIII
Martin, W. C., and Zalubas, R. (1981), J. Phys. Chem. Ref. Data **10,** 153.

Mg I, and Mg IV through Mg IX
Martin, W. C., and Zalubas, R. (1980), J. Phys. Chem. Ref. Data **9,** 1.

Al I, II and Al V through Al X
Martin, W. C., and Zalubas, R. (1979), J. Phys. Chem. Ref. Data **8,** 817.

Si I, II, III and Si VI through Si XI
Martin, W. C., and Zalubas, R. (1983), J. Phys. Chem. Ref. Data **12,** 323.

P I through P IV and P VII through P XII
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S I
Kaufman, V. (1982), Phys. Scr. **26,** 439.

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Energy levels derived from: Bowen, I. S. (1955), Astrophys. J. **121,** 306; Trauger, J. T., Munch, G., and Roesler, F. L. (1980), Astrophys. J. **236,** 1035.

S III
Energy levels drived from: Bowen, I. S. (1955), Astrophys. J. **121,** 306; Bowen, I. S. (1960), Astrophys. J. **132,** 1; Baluteau, J. -P., Bussoletti, E., Anderegg, M., Moorwood, A. F. M., and Coron, N. (1976), Astrophys. J. **210,** L45; Herter, T., Briotta, D. A., Gull, G. E., Shure, M. A., and Houck, J. R. (1982), Astrophys. J. **259,** L109.

S IV
Smitt, R., Svensson, L. A., and Outred, M. (1976), Phys. Scr. **13,** 293.

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Joelsson, I., Zetterberg, P. O., and Magnusson, C. E. (1981), Phys. Scr. **23,** 1087.

S VIII
Edlén, B. (1969), Sol. Phys. **9,** 439.

S IX
Feldman, U., and Doschek, G. A. (1977), J. Opt. Soc. Am. **67,** 726; Edlén, B. (1983), Phys. Scr. **28,** 51.

S X
Sandlin, G. D., Brueckner, G. E., and Tousey, R. (1977), Astrophys. J. **214,** 898; Feldman, U., and Doschek, G. A. (1977), J. Opt. Soc. Am. **67,** 726; Edlén, B. (1984), Phys. Scr. **30,** 135.

S XI
Feldman, U., and Doschek, G. A. (1977), J. Opt. Soc. Am. **67,** 726; Edlén, B. (1985), Phys. Scr. (submitted).

S XII
Jefferies, J. T. (1969), Mem. Soc. R. Sci. Liege **17,** 213.

Cl I
Dagenais, M., Johns, J. W. C., and McKellar, A. R. W. (1976), Can. J. Phys. **54,** 1438.

Cl II
Radziemski, L. J., Jr., and Kaufman, V. (1974), J. Opt. Soc. Am. **64,** 366.

Cl III
Kaufman, V. (1985), unpublished data; Bowen, I. S. (1955), Astrophys. J. **121,** 306; Bowen, I. S. (1960), Astrophys. J. **132,** 1.

Cl IV
Kaufman, V. (1985), unpublished data; Bowen, I. S. (1955), Astrophys. J. **121,** 306.

Cl V
Bowen, I. S. (1934), Phys. Rev. **45,** 401.

Cl VI
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Cl XI
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Cl XII
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Cl XIII
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Cl XIV
Edlén, B. (1983), Phys. Scr. **28,** 51.

Ar II
Yamada, C., Kanamori, H., and Hirota, E. (1985), J. Chem. Phys. **83,** 552.

Ar III
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Ar IV
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Ar V
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Ar VI
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Ar VII
Phillips, L. W., and Parker, W. L. (1941), Phys. Rev. **60,** 301. The triplet levels have been adjusted.

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Ar XI
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B(60) Bowen, I. S. (1960), Astrophys. J. **132,** 1.

BBAMC Baluteau, J. -P., Bussoletti, E., Anderegg, M., Moorwood, A. F. M., and Coron, N. (1976), Astrophys. J. **210,** L45.

BDGRG Bava, E., DeMarchi, A., Godone, A., Rovera, G. D., and Giusfredi, G. (1983), Opt. Commun. **47,** 193.

BGBR Burrell, K. H., Groebner, R. J., Brooks, N. H., and Rottler, L. (1984), Phys. Rev. A **29,** 1343.

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CS Cooksy, A. L., and Saykally, R. J. (1985), Astrophys. J. (submitted).

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DHST Denne, B., Hinnov, E., Suckewer, S., and Timberlake, J. (1984), J. Opt. Soc. Am. B **1,** 296.

DHLS Davies, P. B., Handy, B. J., Lloyd, E. K. M., and Smith, D. R. (1978), J. Chem. Phys. **68,** 1135.

DJM Dagenais, M., Johns, J. W. C., and McKellar, A. R. W. (1976), Can. J. Phys. **54,** 1438.

E Edlén, B. (1942), Z. Astrophys. **22,** 30.

E-pr Evenson, K. M. (March 1985), private communication.

E(65) Eriksson, K. B. S. (1965), Ark. Fys. **30,** 199.

E(66) Eriksson, K. B. S. (1966), Ark. Fys. **33,** 357.

E(78) Eriksson, K. B. S. (1978), Astrophys. J. **222,** 398.

ECZ Eidelsberg. M.. Crifo-Magnant. F.. and Zeippen. C. J. (1981), Astron. Astrophys. Suppl. Ser. **43,** 455.

FBM Finkenthal, M., Bell, R. E., Moos, H. W., and TFR Group (1984), J. Appl. Phys. **56,** 2012.

FMH Forrest, W. J., McCarthy, J. F., and Houck, J. R. (1980), Astrophys. J. **240,** L37.

GJ Grasdalen, G. L., and Joyce, R. R. (1976), Nature **259,** 187.

H Hinnov, E. (Oct. 1985), private communication.

HBGSH Herter, T., Briotta, D. A., Gull, G. E., Shure, M. A., and Houck, J. R. (1982), Astrophys. J. **259,** L109.

HSCS Hinnov, E., Suckewer, S., Cohen, S., and Sato, K. (1982), Phys. Rev. A **25,** 2293.

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RPSKR Roberts, J. R., Pittman, T. L., Sugar, J., Kaufman, V., and Rowan, W. L. (1985), unpublished data from TEXT.

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SCCFH Suckewer, S., Cecchi, J., Cohen, S., Fonck, R., and Hinnov, E. (1980), Phys. Lett. A **80,** 259.

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Table 1. Beryllium: wavelengths and transition probabilities

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	4856.061(13)	9.58 -7	Be I	2s 2p	$^3P_0$ - $^1P_1$	0.009	
	4856.212(10)	9.19 -3	Be I	2s 2p	$^3P_1$ - $^1P_1$	0.009	
	4856.766(13)	1.19 -6	Be I	2s 2p	$^3P_2$ - $^1P_1$	0.009	
	4.25(8) mm	1.76 -10	Be I	2s 2p	$^3P_1$ - $^3P_2$	0.009	
	15.6(1.0) mm	4.74 -12	Be I	2s 2p	$^3P_0$ - $^3P_1$	0.009	

Table 2. Boron: wavelengths and transition probabilities

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	2772.35(4)	8.52 -5	B II	2s 2p	$^3P_0$ - $^1P_1$	0.048	
	2772.78(4)	2.01 -1	B II	2s 2p	$^3P_1$ - $^1P_1$	0.048	
	2774.01(4)	1.07 -4	B II	2s 2p	$^3P_2$ - $^1P_1$	0.048	
	625.(17) μm	5.52 -8	B II	2s 2p	$^3P_1$ - $^3P_2$	0.048	
	655.6(7) μm	3.19 -8	B I	$2s^2$ 2p	$^2P_{1/2}$ - $^2P_{3/2}$	0.008	
	1.79(14) mm	3.14 -9	B II	2s 2p	$^3P_0$ - $^3P_1$	0.048	

Table 3. Carbon: wavelengths and transition probabilities

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	1999.95(4)	1.22 -3	C III	2s 2p	$^3P_0$ - $^1P_1$	0.048	
	2000.90(4)	1.04 -3	C III	2s 2p	$^3P_1$ - $^1P_1$	0.048	
	2003.16(4)	1.52 -3	C III	2s 2p	$^3P_2$ - $^1P_1$	0.048	
4621.57(10)	4621.570(5)	2.60 -3	C I	$2s^2$ $2p^2$	$^3P_1$ - $^1S_0$	0.011	P
8727.18(10)	Q 8727.141(22)	5.01 -1	C I	$2s^2$ $2p^2$	$^1D_2$ - $^1S_0$	0.011	Sw
	9824.109(22)	7.79 -5	C I	$2s^2$ $2p^2$	$^3P_1$ - $^1D_2$	0.011	
9850.28(10)	9850.243(22)	2.30 -4	C I	$2s^2$ $2p^2$	$^3P_2$ - $^1D_2$	0.011	Sw
157.74084(21)	157.74084(21)μm	2.29 -6	C II	$2s^2$ 2p	$^2P_{1/2}$ - $^2P_{3/2}$	0.024	CBS
	177.4(9) μm	2.10 -6	C III	2s 2p	$^3P_1$ - $^3P_2$	0.048	
370.4140(15)	370.37(19) μm	2.65 -7	C I	$2s^2$ $2p^2$	$^3P_1$ - $^3P_2$	0.011	SE(80)
	422.(4) μm	3.00 -7	C III	2s 2p	$^3P_0$ - $^3P_1$	0.048	
609.1333(8)	609.4(4) μm	7.95 -8	C I	$2s^2$ $2p^2$	$^3P_0$ - $^3P_1$	0.011	SE(80)

Table 4. Nitrogen: wavelengths and transition probabilities

Wavelength Observed	Wavelength Calculated		A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	1575.183(4)		1.09 -2	N IV	2s 2p	$^3P_0$ - $^1P_1$	0.077	
	1576.750(4)		8.33 -3	N IV	2s 2p	$^3P_1$ - $^1P_1$	0.077	
	1580.338(4)		1.35 -2	N IV	2s 2p	$^3P_2$ - $^1P_1$	0.077	
	3062.838(13)		3.40 -2	N II	$2s^2$ $2p^2$	$^3P_1$ - $^1S_0$	0.030	
3466.4970(6)	3466.497(1)		6.18 -3	N I	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	0.015	E(66)
3466.5434(12)	3466.543(1)		2.46 -3	N I	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	0.015	E(66)
5197.94(10)	5197.901(14)		1.62 -5*	N I	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	0.015	B(55)
5200.41(10)	5200.257(14)		6.92 -6*	N I	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	0.015	B(55)
5754.57(4)	Q 5754.64(5)		1.08 +0	N II	$2s^2$ $2p^2$	$^1D_2$ - $^1S_0$	0.030	B(55)
6548.06(4)	6548.03(5)		1.04 -3	N II	$2s^2$ $2p^2$	$^3P_1$ - $^1D_2$	0.030	B(55)
6583.39(7)	6583.41(5)		3.02 -3	N II	$2s^2$ $2p^2$	$^3P_2$ - $^1D_2$	0.030	B(55)
10397.74(10)	10397.74(5)		5.48 -2*	N I	$2s^2$ $2p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	0.015	P
	10407.17(5)		2.47 -2*	N I	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	0.015	
	10407.59(6)		4.71 -2*	N I	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	0.015	
57.330(3)	57.343(3)	μm	4.77 -5	N III	$2s^2$ 2p	$^2P_{1/2}$ - $^2P_{3/2}$	0.047	MSFJK
	69.44(7)	μm	3.63 -5	N IV	2s 2p	$^3P_1$ - $^3P_2$	0.077	
121.88887(12)	121.88887(12)	μm	7.47 -6	N II	$2s^2$ $2p^2$	$^3P_1$ - $^3P_2$	0.030	CS
	158.5(4)	μm	6.00 -6	N IV	2s 2p	$^3P_0$ - $^3P_1$	0.077	
	205.5(4)	μm	2.07 -6	N II	$2s^2$ $2p^2$	$^3P_0$ - $^3P_1$	0.030	
	1.148(9)	mm	1.07 -8	N I	$2s^2$ $2p^3$	$^2D_{5/2}$ - $^2D_{3/2}$	0.015	
	25.9(8)	mm	5.17 -13	N I	$2s^2$ $2p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	0.015	

Table 5. Oxygen: wavelengths and transition probabilities

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	1301.148(12)	6.10 -2	O V	2s 2p	$^3P_0$ - $^1P_1$	0.114	
	1303.456(12)	4.57 -2	O V	2s 2p	$^3P_1$ - $^1P_1$	0.114	
	1308.688(12)	7.49 -2	O V	2s 2p	$^3P_2$ - $^1P_1$	0.114	
	2320.9510(16)	3.27 -1	O III	$2s^2$ $2p^2$	$^3P_1$ - $^1S_0$	0.055	
	2470.21(2)	2.38 -2	O II	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	0.035	
	2470.33(2)	5.95 -2	O II	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	0.035	
2972.288(1)	2972.2864(13)	6.68 -2	O I	$2s^2$ $2p^4$	$^3P_1$ - $^1S_0$	0.014	E(65)
3726.04(2)	3726.03(2)	1.69 -4*	O II	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	0.035	B(55)
3728.80(2)	3728.82(3)	5.01 -5*	O II	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	0.035	B(55)
4363.19(2)	Q 4363.209(8)	2.65 +0	O III	$2s^2$ $2p^2$	$^1D_2$ - $^1S_0$	0.055	B(55)
4958.93(2)	4958.910(7)	6.37 -3	O III	$2s^2$ $2p^2$	$^3P_1$ - $^1D_2$	0.055	B(55)
5006.86(2)	5006.843(8)	4.67 -2	O III	$2s^2$ $2p^2$	$^3P_2$ - $^1D_2$	0.055	B(55)
5577.34(10)	Q 5577.338(4)	1.34 +0	O I	$2s^2$ $2p^4$	$^1D_2$ - $^1S_0$	0.014	P
6300.304(2)	6300.304(6)	5.11 -3	O I	$2s^2$ $2p^4$	$^3P_2$ - $^1D_2$	0.014	E(65)
6363.776(2)	6363.776(6)	1.65 -3	O I	$2s^2$ $2p^4$	$^3P_1$ - $^1D_2$	0.014	E(65)
7319.92(10)	7319.92(20)	1.15 -1*	O II	$2s^2$ $2p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	0.035	B(55)
7330.19(10)	7329.63(20)	1.01 -1*	O II	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	0.035	B(55)
	7330.70(20)	6.14 -2*	O II	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	0.035	
25.87(2)	25.913(13) μm	5.17 -4	O IV	$2s^2$ 2p	$^2P_{1/2}$ - $^2P_{3/2}$	0.077	FMH
	32.61(8) μm	3.55 -4	O V	2s 2p	$^3P_1$ - $^3P_2$	0.114	
51.8145(5)	51.815(1) μm	9.69 -5	O III	$2s^2$ $2p^2$	$^3P_1$ - $^3P_2$	0.055	MSFJK
63.18371(3)	63.185(6) μm	8.91 -5	O I	$2s^2$ $2p^4$	$^3P_2$ - $^3P_1$	0.014	E-pr
	73.5(4) μm	5.81 -5	O V	2s 2p	$^3P_0$ - $^3P_1$	0.114	
88.356(2)	88.3564(22) μm	2.61 -5	O III	$2s^2$ $2p^2$	$^3P_0$ - $^3P_1$	0.055	MSFJK
145.52548(8)	145.53(13) μm	1.75 -5	O I	$2s^2$ $2p^4$	$^3P_1$ - $^3P_0$	0.014	DHLS
	497.3(1.7) μm	1.25 -7	O II	$2s^2$ $2p^3$	$^2D_{5/2}$ - $^2D_{3/2}$	0.035	
	5.00(6) mm	4.39 -12	O II	$2s^2$ $2p^3$	$^2P_{3/2}$ - $^2P_{1/2}$	0.035	

Table 6. Fluorine: wavelengths and transition probabilities

Wavelength Observed	Wavelength Calculated		A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	1108.13(7)		2.56 -1	F VI	2s 2p	$^3P_0$ - $^1P_1$	0.157	
	1111.33(7)		1.90 -1	F VI	2s 2p	$^3P_1$ - $^1P_1$	0.157	
	1118.49(7)		3.11 -1	F VI	2s 2p	$^3P_2$ - $^1P_1$	0.157	
	1875.73(7)		1.51 +0	F IV	$2s^2$ $2p^2$	$^3P_1$ - $^1S_0$	0.087	
	1939.435(11)		3.52 -1	F III	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	0.063	
	1939.465(11)		1.44 -1	F III	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	0.063	
	2242.61(4)		4.93 -1	F II	$2s^2$ $2p^4$	$^3P_1$ - $^1S_0$	0.035	
	2929.70(4)		3.63 -4*	F III	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	0.063	
	2932.78(4)		1.63 -4*	F III	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	0.063	
	Q 3532.17(25)		3.52 +0	F IV	$2s^2$ $2p^2$	$^1D_2$ - $^1S_0$	0.087	
3997.37(10)	3997.37(9)		3.17 -2	F IV	$2s^2$ $2p^2$	$^3P_1$ - $^1D_2$	0.087	B(60)
4060.22(10)	4060.21(9)		1.39 -1	F IV	$2s^2$ $2p^2$	$^3P_2$ - $^1D_2$	0.087	B(60)
	Q 4157.75(12)		2.10 +0	F II	$2s^2$ $2p^4$	$^1D_2$ - $^1S_0$	0.035	
	4789.45(12)		3.83 -2	F II	$2s^2$ $2p^4$	$^3P_2$ - $^1D_2$	0.035	
	4868.99(17)		1.21 -2	F II	$2s^2$ $2p^4$	$^3P_1$ - $^1D_2$	0.035	
	5721.20(19)		3.05 -1*	F III	$2s^2$ $2p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	0.063	
	5732.95(19)		2.08 -1*	F III	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	0.063	
	5733.21(19)		2.74 -1*	F III	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	0.063	
	13.432(9)	μm	3.71 -3	F V	$2s^2$ 2p	$^2P_{1/2}$ - $^2P_{3/2}$	0.114	
	17.36(21)	μm	2.39 -3	F VI	2s 2p	$^3P_1$ - $^3P_2$	0.157	
24.7475(15)	24.740(12)	μm	1.19 -3	F I	$2s^2$ $2p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	0.017	SK
	25.83(4)	μm	7.82 -4	F IV	$2s^2$ $2p^2$	$^3P_1$ - $^3P_2$	0.087	
	29.33(4)	μm	8.91 -4	F II	$2s^2$ $2p^4$	$^3P_2$ - $^3P_1$	0.035	
	38.5(1.0)	μm	3.87 -4	F VI	2s 2p	$^3P_0$ - $^3P_1$	0.157	
	44.07(21)	μm	2.10 -4	F IV	$2s^2$ $2p^2$	$^3P_0$ - $^3P_1$	0.087	
	67.2(3)	μm	1.78 -4	F II	$2s^2$ $2p^4$	$^3P_1$ - $^3P_0$	0.035	
	279.(6)	μm	7.45 -7	F III	$2s^2$ $2p^3$	$^2D_{5/2}$ - $^2D_{3/2}$	0.063	
	12.(7)	mm	5.20 -12	F III	$2s^2$ $2p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	0.063	

Table 7. Neon: wavelengths and transition probabilities

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	964.20(10)	8.85 -1	Ne VII	2s 2p	$^3P_0$ - $^1P_1$	0.207	
	968.45(19)	6.54 -1	Ne VII	2s 2p	$^3P_1$ - $^1P_1$	0.207	
	977.86(20)	1.06 +0	Ne VII	2s 2p	$^3P_2$ - $^1P_1$	0.207	
1574.82(5)	1574.60(13)	5.50 +0	Ne V	$2s^2$ $2p^2$	$^3P_1$ - $^1S_0$	0.126	ST
1601.5	1600.0(5)	1.41 +0	Ne IV	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	0.097	SBT
1601.7	1600.1(5)	5.90 -1	Ne IV	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	0.097	SBT
	1814.63(5)	2.76 +0	Ne III	$2s^2$ $2p^4$	$^3P_1$ - $^1S_0$	0.064	
	2418.2(1.2)	2.65 -3*	Ne IV	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	0.097	
	2420.9(1.2)	6.03 -4*	Ne IV	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	0.097	
	Q 2972.8(5)	4.39 +0	Ne V	$2s^2$ $2p^2$	$^1D_2$ - $^1S_0$	0.126	
3342.5(3)	Q 3342.42(17)	4.28 +0	Ne III	$2s^2$ $2p^4$	$^1D_2$ - $^1S_0$	0.064	B(60)
3345.84(2)	3345.83(16)	1.24 -1	Ne V	$2s^2$ $2p^2$	$^3P_1$ - $^1D_2$	0.126	B(55)
3425.87(2)	3425.87(17)	4.36 -1	Ne V	$2s^2$ $2p^2$	$^3P_2$ - $^1D_2$	0.126	B(55)
3868.76(2)	3868.752(15)	1.39 -1	Ne III	$2s^2$ $2p^4$	$^3P_2$ - $^1D_2$	0.064	B(55)
3967.47(2)	3967.46(4)	5.95 -2	Ne III	$2s^2$ $2p^4$	$^3P_1$ - $^1D_2$	0.064	B(55)
4714.25(4)	4714.22(6)	6.19 -1*	Ne IV	$2s^2$ $2p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	0.097	B(55)
4724.15(4)	4724.17(6)	6.41 -1*	Ne IV	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	0.097	B(55)
4725.62(4)	4725.60(6)	5.92 -1*	Ne IV	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	0.097	B(55)
	7.642(6) μm	2.01 -2	Ne VI	$2s^2$ 2p	$^2P_{1/2}$ - $^2P_{3/2}$	0.158	
	10.06(7) μm	1.25 -2	Ne VII	2s 2p	$^3P_1$ - $^3P_2$	0.207	
12.81355(2)	12.81355(2) μm	8.55 -3	Ne II	$2s^2$ $2p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	0.041	YKH
	14.32(3) μm	4.59 -3	Ne V	$2s^2$ $2p^2$	$^3P_1$ - $^3P_2$	0.126	
	15.555(5) μm	5.97 -3	Ne III	$2s^2$ $2p^4$	$^3P_2$ - $^3P_1$	0.064	
	22.0(3) μm	1.99 -3	Ne VII	2s 2p	$^3P_0$ - $^3P_1$	0.207	
24.28(2)	24.28(2) μm	1.27 -3	Ne V	$2s^2$ $2p^2$	$^3P_0$ - $^3P_1$	0.126	FMH
36.02(1)	36.02(4) μm	1.15 -3	Ne III	$2s^2$ $2p^4$	$^3P_1$ - $^3P_0$	0.064	SHG
	223.7(1.4) μm	1.44 -6	Ne IV	$2s^2$ $2p^3$	$^2D_{5/2}$ - $^2D_{3/2}$	0.097	
	1.56(7) mm	2.36 -9	Ne IV	$2s^2$ $2p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	0.097	

Table 8. Sodium: wavelengths and transition probabilities

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	852.31(5)	2.62 +0	Na VIII	2s 2p	$^3P_0$ - $^1P_1$	0.264	
	857.66(5)	1.92 +0	Na VIII	2s 2p	$^3P_1$ - $^1P_1$	0.264	
	869.64(5)	3.08 +0	Na VIII	2s 2p	$^3P_2$ - $^1P_1$	0.264	
	1356.6(4)	1.69 +1	Na VI	$2s^2$ $2p^2$	$^3P_1$ - $^1S_0$	0.172	
	1365.1(6)	4.74 +0	Na V	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	0.138	
	1365.8(6)	1.96 +0	Na V	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	0.138	
	1529.29(5)	9.48 +0	Na IV	$2s^2$ $2p^4$	$^3P_1$ - $^1S_0$	0.099	
	2066.9(1.4)	1.78 -2*	Na V	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	0.138	
	2068.4(1.4)	1.73 -3*	Na V	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	0.138	
	Q 2568.9(1.9)	5.27 +0	Na VI	$2s^2$ $2p^2$	$^1D_2$ - $^1S_0$	0.172	
	Q 2803.74(18)	5.43 +0	Na IV	$2s^2$ $2p^4$	$^1D_2$ - $^1S_0$	0.099	
	2872.7(1.9)	4.06 -1	Na VI	$2s^2$ $2p^2$	$^3P_1$ - $^1D_2$	0.172	
	2971.9(1.8)	1.27 +0	Na VI	$2s^2$ $2p^2$	$^3P_2$ - $^1D_2$	0.172	
3241.68(10)	3241.63(15)	5.75 -1	Na IV	$2s^2$ $2p^4$	$^3P_2$ - $^1D_2$	0.099	B(60)
3362.20(10)	3362.24(16)	2.03 -1	Na IV	$2s^2$ $2p^4$	$^3P_1$ - $^1D_2$	0.099	B(60)
	4010.9(2.3)	1.40 +0*	Na V	$2s^2$ $2p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	0.138	
	4016.7(2.3)	1.91 +0*	Na V	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	0.138	
	4022.7(2.3)	1.43 +0*	Na V	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	0.138	
	4.675(22) μm	8.80 -2	Na VII	$2s^2$ 2p	$^2P_{1/2}$ - $^2P_{3/2}$	0.209	
	6.23(3) μm	5.27 -2	Na VIII	2s 2p	$^3P_1$ - $^3P_2$	0.264	
	7.319(5) μm	4.59 -2	Na III	$2s^2$ $2p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	0.072	
	8.61(9) μm	2.11 -2	Na VI	$2s^2$ $2p^2$	$^3P_1$ - $^3P_2$	0.172	
	9.039(12) μm	3.04 -2	Na IV	$2s^2$ $2p^4$	$^3P_2$ - $^3P_1$	0.099	
	13.66(13) μm	8.27 -3	Na VIII	2s 2p	$^3P_0$ - $^3P_1$	0.264	
	14.3(3) μm	6.14 -3	Na VI	$2s^2$ $2p^2$	$^3P_0$ - $^3P_1$	0.172	
	21.29(6) μm	5.58 -3	Na IV	$2s^2$ $2p^4$	$^3P_1$ - $^3P_0$	0.099	
	270.(100) μm	4.55 -7	Na V	$2s^2$ $2p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	0.138	
	278.(110) μm	7.50 -7	Na V	$2s^2$ $2p^3$	$^2D_{5/2}$ - $^2D_{3/2}$	0.138	

Table 9. Magnesium: wavelengths and transition probabilities

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	762.29(20)	6.92 +0	Mg IX	2s 2p	$^3P_0$ - $^1P_1$	0.328	
	768.90(20)	5.05 +0	Mg IX	2s 2p	$^3P_1$ - $^1P_1$	0.328	
	783.72(21)	7.95 +0	Mg IX	2s 2p	$^3P_2$ - $^1P_1$	0.328	
1189.82(1)	1189.82(16)	4.58 +1	Mg VII	$2s^2$ $2p^2$	$^3P_1$ - $^1S_0$	0.225	SBT
1190.07(1)	1190.074(20)	1.37 +1	Mg VI	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	0.187	SBT
1191.62(1)	1191.611(20)	5.62 +0	Mg VI	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	0.187	SBT
1324.44(1)	1324.58(8)	2.79 +1	Mg V	$2s^2$ $2p^4$	$^3P_1$ - $^1S_0$	0.141	SBT
1805.94(1)	1805.94(7)	2.75 -2*	Mg VI	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	0.187	SBT
	1806.49(17)	4.58 -3*	Mg VI	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	0.187	
	Q 2261.5(6)	6.16 +0	Mg VII	$2s^2$ $2p^2$	$^1D_2$ - $^1S_0$	0.225	
	Q 2417.5(3)	6.59 +0	Mg V	$2s^2$ $2p^4$	$^1D_2$ - $^1S_0$	0.141	
	2509.2(7)	1.17 +0	Mg VII	$2s^2$ $2p^2$	$^3P_1$ - $^1D_2$	0.225	
	2629.1(8)	3.36 +0	Mg VII	$2s^2$ $2p^2$	$^3P_2$ - $^1D_2$	0.225	
	2782.7(3)	1.86 +0	Mg V	$2s^2$ $2p^4$	$^3P_2$ - $^1D_2$	0.141	
	2928.0(4)	5.85 -1	Mg V	$2s^2$ $2p^4$	$^3P_1$ - $^1D_2$	0.141	
	3486.7(6)	3.33 +0*	Mg VI	$2s^2$ $2p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	0.187	
	3488.7(3)	5.06 +0*	Mg VI	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	0.187	
	3502.0(3)	3.48 +0*	Mg VI	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	0.187	
	7573.179(8)	1.95 -4	Mg I	3s 3p	$^3P_0$ - $^1P_1$	0.008	
	7584.704(8)	1.46 -4	Mg I	3s 3p	$^3P_1$ - $^1P_1$	0.008	
	7608.206(8)	2.40 -4	Mg I	3s 3p	$^3P_2$ - $^1P_1$	0.008	
3.0275(20)	3.0275(20) μm	3.24 -1	Mg VIII	$2s^2$ 2p	$^2P_{1/2}$ - $^2P_{3/2}$	0.266	MNM
	4.06(4) μm	1.91 -1	Mg IX	2s 2p	$^3P_1$ - $^3P_2$	0.328	
	4.487(4) μm	1.99 -1	Mg IV	$2s^2$ $2p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	0.109	
	5.50(3) μm	8.09 -2	Mg VII	$2s^2$ $2p^2$	$^3P_1$ - $^3P_2$	0.225	
5.60(2)	5.608(9) μm	1.27 -1	Mg V	$2s^2$ $2p^4$	$^3P_2$ - $^3P_1$	0.141	RSW
	8.87(17) μm	2.94 -2	Mg IX	2s 2p	$^3P_0$ - $^3P_1$	0.328	
	9.03(9) μm	2.44 -2	Mg VII	$2s^2$ $2p^2$	$^3P_0$ - $^3P_1$	0.225	
	13.54(5) μm	2.17 -2	Mg V	$2s^2$ $2p^4$	$^3P_1$ - $^3P_0$	0.141	
	92.3(1.2) μm	1.13 -5	Mg VI	$2s^2$ $2p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	0.187	
245.6157(7)	245.62(9) μm	9.00 -7	Mg I	3s 3p	$^3P_1$ - $^3P_2$	0.008	ILME
498.592792(3)	498.5(4) μm	1.00 -7	Mg I	3s 3p	$^3P_0$ - $^3P_1$	0.008	BDGRG
	595.(190) μm	7.63 -8	Mg VI	$2s^2$ $2p^3$	$^2D_{5/2}$ - $^2D_{3/2}$	0.187	

Table 10. Aluminum: wavelengths and transition probabilities

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	688.03(17)	1.67 +1	Al X	2s 2p	$^3P_0$ - $^1P_1$	0.399	
	695.93(18)	1.21 +1	Al X	2s 2p	$^3P_1$ - $^1P_1$	0.399	
	713.98(18)	1.87 +1	Al X	2s 2p	$^3P_2$ - $^1P_1$	0.399	
	1054.08(3)	3.51 +1	Al VII	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	0.241	
	1057.05(3)	1.44 +1	Al VII	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	0.241	
	1058.0(7)	1.12 +2	Al VIII	$2s^2$ $2p^2$	$^3P_1$ - $^1S_0$	0.285	
	1169.85(14)	7.29 +1	Al VI	$2s^2$ $2p^4$	$^3P_1$ - $^1S_0$	0.154	
	1603.36(8)	1.22 -2*	Al VII	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	0.241	
1604.80(4)	1604.80(5)	4.26 -1*	Al VII	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	0.241	ST
	Q 2018.(3)	7.09 +0	Al VIII	$2s^2$ $2p^2$	$^1D_2$ - $^1S_0$	0.285	
	Q 2124.9(6)	7.79 +0	Al VI	$2s^2$ $2p^4$	$^1D_2$ - $^1S_0$	0.154	
	2222.(3)	3.06 +0	Al VIII	$2s^2$ $2p^2$	$^3P_1$ - $^1D_2$	0.285	
	2365.(3)	8.13 +0	Al VIII	$2s^2$ $2p^2$	$^3P_2$ - $^1D_2$	0.285	
	2428.4(6)	5.15 +0	Al VI	$2s^2$ $2p^4$	$^3P_2$ - $^1D_2$	0.154	
	2601.0(7)	1.48 +0	Al VI	$2s^2$ $2p^4$	$^3P_1$ - $^1D_2$	0.154	
	3070.7(3)	7.22 +0	Al VII	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	0.241	
	3076.0(4)	1.27 +1*	Al VII	$2s^2$ $2p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	0.241	
	3096.0(3)	8.12 +0*	Al VII	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	0.241	
	4451.311(14)	3.07 -3	Al II	3s 3p	$^3P_0$ - $^1P_1$	0.019	
	4463.409(14)	2.31 -3	Al II	3s 3p	$^3P_1$ - $^1P_1$	0.019	
	4488.233(14)	3.74 -3	Al II	3s 3p	$^3P_2$ - $^1P_1$	0.019	
2.040(7)	2.044(4) μm	1.05 +0	Al IX	$2s^2$ 2p	$^2P_{1/2}$ - $^2P_{3/2}$	0.330	GJ
	2.753(20) μm	6.16 -1	Al X	2s 2p	$^3P_1$ - $^3P_2$	0.399	
2.879(14)	2.9045(17)μm	7.34 -1	Al V	$2s^2$ $2p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	0.154	GJ
3.661(14)	3.6593(19)μm	4.58 -1	Al VI	$2s^2$ $2p^4$	$^3P_2$ - $^3P_1$	0.154	GJ
3.72(2)	3.689(3) μm	2.68 -1	Al VIII	$2s^2$ $2p^2$	$^3P_1$ - $^3P_2$	0.285	GJ
	5.85(10) μm	8.96 -2	Al VIII	$2s^2$ $2p^2$	$^3P_0$ - $^3P_1$	0.285	
	6.06(12) μm	9.19 -2	Al X	2s 2p	$^3P_0$ - $^3P_1$	0.399	
	9.116(6) μm	7.10 -2	Al VI	$2s^2$ $2p^4$	$^3P_1$ - $^3P_0$	0.154	
	37.6(6) μm	1.67 -4	Al VII	$2s^2$ $2p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	0.241	
	80.72(5) μm	2.54 -5	Al II	3s 3p	$^3P_1$ - $^3P_2$	0.019	
	89.237(8) μm	1.25 -5	Al I	$3s^2$ 3p	$^2P_{1/2}$ - $^2P_{3/2}$	0.006	
	164.26(20) μm	4.10 -6	Al II	3s 3p	$^3P_0$ - $^3P_1$	0.019	
	179.(11) μm	1.86 -6	Al VII	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2D_{5/2}$	0.241	

Table 11. Silicon: wavelengths and transition probabilities

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	625.48(6)	3.75 +1	Si XI	2s 2p	$^3P_0$ - $^1P_1$	0.476	
	634.78(6)	2.68 +1	Si XI	2s 2p	$^3P_1$ - $^1P_1$	0.476	
	656.34(6)	4.05 +1	Si XI	2s 2p	$^3P_2$ - $^1P_1$	0.476	
	944.38(4)	8.14 +1	Si VIII	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	0.304	
	949.24(4)	3.37 +1	Si VIII	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	0.304	
	950.08(23)	2.51 +2	Si IX	$2s^2$ $2p^2$	$^3P_1$ - $^1S_0$	0.351	
	1049.2(3)	1.73 +2	Si VII	$2s^2$ $2p^4$	$^3P_1$ - $^1S_0$	0.247	
1440.50(1)	1440.497(10)	3.42 -2*	Si VIII	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	0.304	SBT
1445.75(1)	1445.753(10)	1.70 +0	Si VIII	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	0.304	SBT
	Q 1822.4(8)	8.01 +0	Si IX	$2s^2$ $2p^2$	$^1D_2$ - $^1S_0$	0.351	
	Q 1895.0(9)	9.01 +0	Si VII	$2s^2$ $2p^4$	$^1D_2$ - $^1S_0$	0.247	
1984.88(2)	1984.88(3)	7.40 +0	Si IX	$2s^2$ $2p^2$	$^3P_1$ - $^1D_2$	0.351	SBT
2146.64(4)	2146.64(5)	1.28 +1	Si VII	$2s^2$ $2p^4$	$^3P_2$ - $^1D_2$	0.247	SBT
2149.26(5)	2149.31(3)	1.83 +1	Si IX	$2s^2$ $2p^2$	$^3P_2$ - $^1D_2$	0.351	SBT
	2350.02(18)	3.37 +0	Si VII	$2s^2$ $2p^4$	$^3P_1$ - $^1D_2$	0.247	
	2722.4(4)	2.83 +1	Si VIII	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	0.304	
	2741.2(4)	1.69 +1*	Si VIII	$2s^2$ $2p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	0.304	
	2763.1(4)	1.79 +1*	Si VIII	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	0.304	
	3314.727(16)	1.85 -2	Si III	3s 3p	$^3P_0$ - $^1P_1$	0.033	
	3328.921(16)	1.37 -2	Si III	3s 3p	$^3P_1$ - $^1P_1$	0.033	
	3358.189(16)	2.22 -2	Si III	3s 3p	$^3P_2$ - $^1P_1$	0.033	
	6526.781(3)	3.55 -2	Si I	$3s^2$ $3p^2$	$^3P_1$ - $^1S_0$	0.008	
10991.42(10)	Q 10991.413(9)	7.96 -1	Si I	$3s^2$ $3p^2$	$^1D_2$ - $^1S_0$	0.008	P
14305.(4)	14301.(4)	3.07 +0	Si X	$2s^2$ 2p	$^2P_{1/2}$ - $^2P_{3/2}$	0.401	MNM
	16068.297(18)	9.75 -4	Si I	$3s^2$ $3p^2$	$^3P_1$ - $^1D_2$	0.008	
	16454.531(19)	2.71 -3	Si I	$3s^2$ $3p^2$	$^3P_2$ - $^1D_2$	0.008	
	19320.(50)	1.80 +0	Si XI	2s 2p	$^3P_1$ - $^3P_2$	0.476	
19590.(70)	19641.(11)	2.37 +0	Si VI	$2s^2$ $2p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	0.205	GJ
2.474(7)	2.4807(18)μm	1.47 +0	Si VII	$2s^2$ $2p^4$	$^3P_2$ - $^3P_1$	0.247	GJ
	2.5839(5) μm	7.79 -1	Si IX	$2s^2$ $2p^2$	$^3P_1$ - $^3P_2$	0.351	
3.92(2)	3.928(11) μm	2.95 -1	Si IX	$2s^2$ $2p^2$	$^3P_0$ - $^3P_1$	0.351	GJ
	4.27(3) μm	2.59 -1	Si XI	2s 2p	$^3P_0$ - $^3P_1$	0.476	
	6.515(18) μm	1.94 -1	Si VII	$2s^2$ $2p^4$	$^3P_1$ - $^3P_0$	0.247	
	18.45(24) μm	1.40 -3	Si VIII	$2s^2$ $2p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	0.304	
	34.8141(18)μm	2.13 -4	Si II	$3s^2$ 3p	$^2P_{1/2}$ - $^2P_{3/2}$	0.016	
	38.207(21) μm	2.41 -4	Si III	3s 3p	$^3P_1$ - $^3P_2$	0.033	
	39.62(11) μm	1.70 -4	Si VIII	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2D_{5/2}$	0.304	
	68.473(3) μm	4.20 -5	Si I	$3s^2$ $3p^2$	$^3P_1$ - $^3P_2$	0.008	
	77.77(9) μm	3.86 -5	Si III	3s 3p	$^3P_0$ - $^3P_1$	0.033	
129.68173(4)	129.676(16) μm	8.25 -6	Si I	$3s^2$ $3p^2$	$^3P_0$ - $^3P_1$	0.008	IEBL

Table 12. Phosphorus: wavelengths and transition probabilities

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	571.87(7)	9.46 +1	P XII	2s 2p	$^3P_0$ - $^1P_1$	0.561	
	582.57(5)	6.76 +1	P XII	2s 2p	$^3P_1$ - $^1P_1$	0.561	
	607.95(8)	1.01 +2	P XII	2s 2p	$^3P_2$ - $^1P_1$	0.561	
	853.61(15)	1.74 +2	P IX	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	0.372	
	860.08(21)	5.24 +2	P X	$2s^2$ $2p^2$	$^3P_1$ - $^1S_0$	0.424	
	861.26(15)	7.34 +1	P IX	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	0.372	
	952.1(3)	3.82 +2	P VIII	$2s^2$ $2p^4$	$^3P_1$ - $^1S_0$	0.310	
	1307.51(5)	9.90 -2*	P IX	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	0.372	
1317.65(3)	1318.06(5)	5.46 +0	P IX	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	0.372	ST
	Q 1659.2(8)	8.99 +0	P X	$2s^2$ $2p^2$	$^1D_2$ - $^1S_0$	0.424	
	Q 1708.5(1.0)	1.03 +0	P VIII	$2s^2$ $2p^4$	$^1D_2$ - $^1S_0$	0.310	
	1785.8(9)	1.68 +1	P X	$2s^2$ $2p^2$	$^3P_1$ - $^1D_2$	0.424	
	1913.7(9)	2.90 +1	P VIII	$2s^2$ $2p^4$	$^3P_2$ - $^1D_2$	0.310	
	1974.5(1.1)	3.86 +1	P X	$2s^2$ $2p^2$	$^3P_2$ - $^1D_2$	0.424	
	2150.0(1.6)	7.03 +0	P VIII	$2s^2$ $2p^4$	$^3P_1$ - $^1D_2$	0.310	
	2421.7(1.2)	6.11 +1	P IX	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	0.372	
	2458.2(1.2)	3.54 +1*	P IX	$2s^2$ $2p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	0.372	
	2484.3(1.2)	3.72 +1*	P IX	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	0.372	
	2682.154(10)	7.33 -2	P IV	3s 3p	$^3P_0$ - $^1P_1$	0.051	
	2698.696(10)	5.40 -2	P IV	3s 3p	$^3P_1$ - $^1P_1$	0.051	
	2733.280(11)	8.66 -2	P IV	3s 3p	$^3P_2$ - $^1P_1$	0.051	
	4669.25(6)	1.62 -1	P II	$3s^2$ $3p^2$	$^3P_1$ - $^1S_0$	0.019	
	5332.416(11)	1.08 -1	P I	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	0.010	
	5339.621(11)	4.26 -2	P I	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	0.010	
	Q 7875.99(17)	2.24 +0	P II	$3s^2$ $3p^2$	$^1D_2$ - $^1S_0$	0.019	
	8787.54(3)	1.96 -4*	P I	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	0.010	
	8799.61(3)	2.97 -4*	P I	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	0.010	
	10308.(3)	8.20 +0	P XI	$2s^2$ 2p	$^2P_{1/2}$ - $^2P_{3/2}$	0.479	
	11468.2(4)	3.62 -3	P II	$3s^2$ $3p^2$	$^3P_1$ - $^1D_2$	0.019	
	11882.8(4)	5.13 -2	P II	$3s^2$ $3p^2$	$^3P_2$ - $^1D_2$	0.019	
	13533.61(10)	7.45 -2*	P I	$3s^2$ $3p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	0.010	
	13562.27(10)	1.13 -1*	P I	$3s^2$ $3p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	0.010	
	13580.12(10)	1.01 -1*	P I	$3s^2$ $3p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	0.010	
	13745.(6)	6.92 +0	P VII	$2s^2$ $2p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	0.264	
	13951.(40)	4.75 +0	P XII	2s 2p	$^3P_1$ - $^3P_2$	0.561	
	17350.(80)	4.28 +0	P VIII	$2s^2$ $2p^4$	$^3P_2$ - $^3P_1$	0.310	
	18680.(100)	2.05 +0	P X	$2s^2$ $2p^2$	$^3P_1$ - $^3P_2$	0.424	
	2.708(21) μm	8.99 -1	P X	$2s^2$ $2p^2$	$^3P_0$ - $^3P_1$	0.424	
	3.112(22) μm	6.80 -1	P XII	2s 2p	$^3P_0$ - $^3P_1$	0.561	
	4.85(8) μm	4.70 -1	P VIII	$2s^2$ $2p^4$	$^3P_1$ - $^3P_0$	0.310	
	9.62(26) μm	9.74 -3	P IX	$2s^2$ $2p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	0.372	

Table 12. Phosphorus: wavelengths and transition probabilities - Continued

Wavelength Observed	Wavelength Calculated		A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	16.34(11)	μm	2.39 -3	P IX	$2s^2\ 2p^3$	$^2D_{3/2}$ - $^2D_{5/2}$	0.372	
	17.885(5)	μm	1.57 -3	P III	$3s^2\ 3p$	$^2P_{1/2}$ - $^2P_{3/2}$	0.030	
	21.336(6)	μm	1.38 -3	P IV	3s 3p	$^3P_1$ - $^3P_2$	0.051	
	32.87(3)	μm	3.80 -4	P II	$3s^2\ 3p^2$	$^3P_1$ - $^3P_2$	0.019	
	43.77(3)	μm	2.18 -4	P IV	3s 3p	$^3P_0$ - $^3P_1$	0.051	
	60.64(7)	μm	8.05 -5	P II	$3s^2\ 3p^2$	$^3P_0$ - $^3P_1$	0.019	
	395.3(9)	μm	1.45 -7	P I	$3s^2\ 3p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	0.010	
	640.6(2.3)	μm	4.10 -8	P I	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2D_{5/2}$	0.010	

Table 13. Sulfur: wavelengths and transition probabilities

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	525.21(6)	1.58 +2	S XIII	2s 2p	$^3P_0 - {}^1P_1$	0.652	
	537.29(6)	1.10 +2	S XIII	2s 2p	$^3P_1 - {}^1P_1$	0.652	
	566.96(7)	1.57 +2	S XIII	2s 2p	$^3P_2 - {}^1P_1$	0.652	
	776.37(3)	3.48 +2	S X	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.447	
	782.96(17)	1.04 +3	S XI	$2s^2\ 2p^2$	$^3P_1 - {}^1S_0$	0.505	
	787.56(3)	1.50 +2	S X	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.447	
	871.73(16)	7.91 +2	S IX	$2s^2\ 2p^4$	$^3P_1 - {}^1S_0$	0.379	
1196.24(1)	1196.245(14)	2.87 -1*	S X	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{5/2}$	0.447	SBT
1212.96(1)	1212.970(15)	1.64 +1	S X	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{3/2}$	0.447	SBT
	Q 1520.2(7)	1.00 +1	S XI	$2s^2\ 2p^2$	$^1D_2 - {}^1S_0$	0.505	
	Q 1552.7(4)	1.17 +1	S IX	$2s^2\ 2p^4$	$^1D_2 - {}^1S_0$	0.379	
1614.51(3)	1614.5(7)	3.62 +1	S XI	$2s^2\ 2p^2$	$^3P_1 - {}^1D_2$	0.505	SBT
1715.44(1)	1715.41(12)	6.18 +1	S IX	$2s^2\ 2p^4$	$^3P_2 - {}^1D_2$	0.379	SBT
1826.21(2)	1826.2(9)	7.69 +1	S XI	$2s^2\ 2p^2$	$^3P_2 - {}^1D_2$	0.505	SBT
	1987.7(6)	1.36 +1	S IX	$2s^2\ 2p^4$	$^3P_1 - {}^1D_2$	0.379	
	2156.28(24)	1.25 +2	S X	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{3/2}$	0.447	
	2211.26(25)	6.92 +1	S X	$2s^2\ 2p^3$	$^2D_{5/2} - {}^2P_{3/2}$	0.447	
	2244.84(26)	7.20 +1	S X	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{1/2}$	0.447	
	2265.5(8)	2.30 -1	S V	3s 3p	$^3P_0 - {}^1P_1$	0.073	
	2284.63(18)	1.68 -1	S V	3s 3p	$^3P_1 - {}^1P_1$	0.073	
	2325.1(8)	2.65 -1	S V	3s 3p	$^3P_2 - {}^1P_1$	0.073	
3721.69(10)	3721.68(10)	6.83 -1	S III	$3s^2\ 3p^2$	$^3P_1 - {}^1S_0$	0.035	B(60)
4068.60(2)	4068.60(3)	2.20 -1	S II	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.023	B(55)
4076.35(2)	4076.35(3)	7.44 -2	S II	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.023	B(55)
4589.2606(5)	4589.2606(14)	3.5 -1	S I	$3s^2\ 3p^4$	$^3P_1 - {}^1S_0$	0.010	E(78)
6312.06(4)	Q 6312.1(4)	3.22 +0	S III	$3s^2\ 3p^2$	$^1D_2 - {}^1S_0$	0.035	B(55)
6716.47(2)	6716.467(23)	2.65 -4*	S II	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{5/2}$	0.023	TMR
6730.85(2)	6730.847(23)	5.37 -4*	S II	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{3/2}$	0.023	TMR
7611.0(4)	7611.2(6)	2.04 +1	S XII	$2s^2$ 2p	$^2P_{1/2} - {}^2P_{3/2}$	0.565	J
7725.0461(7)	Q 7725.046(4)	1.53 +0	S I	$3s^2\ 3p^4$	$^1D_2 - {}^1S_0$	0.010	E(78)
	9068.9(7)	1.62 -2	S III	$3s^2\ 3p^2$	$^3P_1 - {}^1D_2$	0.035	
	9531.0(7)	9.40 -2	S III	$3s^2\ 3p^2$	$^3P_2 - {}^1D_2$	0.035	
T 9911.(1)	9911.8(1.0)	1.84 +1	S VIII	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.329	J
	10264.(30)	1.20 +1	S XIII	2s 2p	$^3P_1 - {}^3P_2$	0.652	
	10286.66(22)	1.32 -1*	S II	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{3/2}$	0.023	
	10320.42(22)	2.22 -1*	S II	$3s^2\ 3p^3$	$^2D_{5/2} - {}^2P_{3/2}$	0.023	
	10336.33(22)	1.95 -1*	S II	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{1/2}$	0.023	
10821.177(5)	10821.176(6)	2.75 -2	S I	$3s^2\ 3p^4$	$^3P_2 - {}^1D_2$	0.010	E(78)
	11305.854(9)	8.0 -3	S I	$3s^2\ 3p^4$	$^3P_1 - {}^1D_2$	0.010	
	12520.(20)	1.14 +1	S IX	$2s^2\ 2p^4$	$^3P_2 - {}^3P_1$	0.379	
	13924.(50)	4.94 +0	S XI	$2s^2\ 2p^2$	$^3P_1 - {}^3P_2$	0.505	

Table 13. Sulfur: wavelengths and transition probabilities - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	19200.(70)	2.51 +0	S XI	$2s^2\ 2p^2$	$^3P_0$ - $^3P_1$	0.505	
	2.336(15) μm	1.58 +0	S XIII	2s 2p	$^3P_0$ - $^3P_1$	0.652	
	3.75(3) μm	1.01 +0	S IX	$2s^2\ 2p^4$	$^3P_1$ - $^3P_0$	0.379	
	5.467(21) μm	5.22 -2	S X	$2s^2\ 2p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	0.447	
	8.676(11) μm	1.58 -2	S X	$2s^2\ 2p^3$	$^2D_{3/2}$ - $^2D_{5/2}$	0.447	
10.5105(1)	10.5141(22)μm	7.73 -3	S IV	$3s^2$ 3p	$^2P_{1/2}$ - $^2P_{3/2}$	0.047	L
	13.12(26) μm	5.49 -3	S V	3s 3p	$^3P_1$ - $^3P_2$	0.073	
18.7129(4)	18.7129(5) μm	2.06 -3	S III	$3s^2\ 3p^2$	$^3P_1$ - $^3P_2$	0.035	BBAMC
	25.2490(3) μm	1.40 -3	S I	$3s^2\ 3p^4$	$^3P_2$ - $^3P_1$	0.010	
	27.1(1.1) μm	9.16 -4	S V	3s 3p	$^3P_0$ - $^3P_1$	0.073	
33.47(2)	33.47(2) μm	4.78 -4	S III	$3s^2\ 3p^2$	$^3P_0$ - $^3P_1$	0.035	HBGSH
	56.311(5) μm	3.02 -4	S I	$3s^2\ 3p^4$	$^3P_1$ - $^3P_0$	0.010	
	214.1(1.3) μm	9.13 -7	S II	$3s^2\ 3p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	0.023	
	314.5(7) μm	3.46 -7	S II	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2D_{5/2}$	0.023	

Table 14. Chlorine: wavelengths and transition probabilities

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	483.99(17)	3.02 +2	Cl XIV	2s 2p	$^3P_0$ - $^1P_1$	0.750	
	497.59(17)	2.08 +2	Cl XIV	2s 2p	$^3P_1$ - $^1P_1$	0.750	
	531.69(20)	2.85 +2	Cl XIV	2s 2p	$^3P_2$ - $^1P_1$	0.750	
	708.6(5)	6.54 +2	Cl XI	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	0.529	
	716.1(5)	1.95 +3	Cl XII	$2s^2$ $2p^2$	$^3P_1$ - $^1S_0$	0.592	
	724.4(5)	2.94 +2	Cl XI	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	0.529	
	804.0(3)	1.55 +3	Cl X	$2s^2$ $2p^4$	$^3P_1$ - $^1S_0$	0.456	
	1100.3(1.2)	8.08 -1*	Cl XI	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	0.529	
	1125.5(1.3)	4.51 +1	Cl XI	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	0.529	
	Q 1400.8(2.8)	1.11 +1	Cl XII	$2s^2$ $2p^2$	$^1D_2$ - $^1S_0$	0.592	
	Q 1420.6(1.4)	1.32 +1	Cl X	$2s^2$ $2p^4$	$^1D_2$ - $^1S_0$	0.456	
	1464.9(2.2)	7.49 +1	Cl XII	$2s^2$ $2p^2$	$^3P_1$ - $^1D_2$	0.592	
	1542.7(1.2)	1.25 +2	Cl X	$2s^2$ $2p^4$	$^3P_2$ - $^1D_2$	0.456	
	1698.0(2.9)	1.46 +2	Cl XII	$2s^2$ $2p^2$	$^3P_2$ - $^1D_2$	0.592	
	1852.4(1.8)	2.54 +1	Cl X	$2s^2$ $2p^4$	$^3P_1$ - $^1D_2$	0.456	
	1913.1(8)	2.49 +2	Cl XI	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	0.529	
	1967.(4)	6.14 -1	Cl VI	3s 3p	$^3P_0$ - $^1P_1$	0.097	
	1989.(4)	4.46 -1	Cl VI	3s 3p	$^3P_1$ - $^1P_1$	0.097	
	1990.8(8)	1.31 +2	Cl XI	$2s^2$ $2p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	0.529	
	2031.6(9)	1.35 +3	Cl XI	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	0.529	
	2035.(4)	6.93 -1	Cl VI	3s 3p	$^3P_2$ - $^1P_1$	0.097	
	3118.55(8)	2.19 +0	Cl IV	$3s^2$ $3p^2$	$^3P_1$ - $^1S_0$	0.053	
3342.9(3)	3342.80(20)	6.91 -1	Cl III	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	0.040	B(60)
3353.33(10)	3353.17(22)	1.22 -1	Cl III	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	0.040	B(60)
	3677.855(8)	1.37 +0	Cl II	$3s^2$ $3p^4$	$^3P_1$ - $^1S_0$	0.024	
5323.29(10)	Q 5323.3(3)	4.14 +0	Cl IV	$3s^2$ $3p^2$	$^1D_2$ - $^1S_0$	0.053	B(55)
5517.66(10)	5517.71(6)	8.07 -4*	Cl III	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	0.040	B(55)
5537.6(3)	5537.88(6)	3.44 -3*	Cl III	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	0.040	B(55)
	5746.(20)	4.73 +1	Cl XIII	$2s^2$ 2p	$^2P_{1/2}$ - $^2P_{3/2}$	0.657	
	Q 6161.835(21)	2.06 +0	Cl II	$3s^2$ $3p^4$	$^1D_2$ - $^1S_0$	0.024	
	7334.(11)	4.55 +1	Cl IX	$2s^2$ $2p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	0.400	
7530.54(10)	7529.9(4)	5.57 -2	Cl IV	$3s^2$ $3p^2$	$^3P_1$ - $^1D_2$	0.053	B(55)
	7756.(40)	2.80 +1	Cl XIV	2s 2p	$^3P_1$ - $^3P_2$	0.750	
8045.63(10)	8046.1(5)	2.08 -1	Cl IV	$3s^2$ $3p^2$	$^3P_2$ - $^1D_2$	0.053	B(55)
	8433.65(12)	3.39 -1*	Cl III	$3s^2$ $3p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	0.040	
	8480.85(12)	3.87 -1*	Cl III	$3s^2$ $3p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	0.040	
	8500.00(13)	3.60 -1*	Cl III	$3s^2$ $3p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	0.040	
	8578.697(29)	1.07 -1	Cl II	$3s^2$ $3p^4$	$^3P_2$ - $^1D_2$	0.024	
	9123.60(5)	2.98 -2	Cl II	$3s^2$ $3p^4$	$^3P_1$ - $^1D_2$	0.024	
	9223.(18)	2.83 +1	Cl X	$2s^2$ $2p^4$	$^3P_2$ - $^3P_1$	0.456	
	10672.(24)	1.09 +1	Cl XII	$2s^2$ $2p^2$	$^3P_1$ - $^3P_2$	0.592	

Table 14. Chlorine: wavelengths and transition probabilities - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	13774.(40)	6.78 +0	Cl XII	$2s^2\ 2p^2$	$^3P_0$ - $^3P_1$	0.592	
	17700.(220)	3.52 +0	Cl XIV	2s 2p	$^3P_0$ - $^3P_1$	0.750	
	3.051(20) μm	1.87 +0	Cl X	$2s^2\ 2p^4$	$^3P_1$ - $^3P_0$	0.456	
	3.263(23) μm	2.40 -1	Cl XI	$2s^2\ 2p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	0.529	
	4.91(5) μm	8.53 -2	Cl XI	$2s^2\ 2p^3$	$^2D_{3/2}$ - $^2D_{5/2}$	0.529	
	6.704(9) μm	2.98 -2	Cl V	$3s^2$ 3p	$^2P_{1/2}$ - $^2P_{3/2}$	0.068	
	8.58(5) μm	2.10 -2	Cl VI	3s 3p	$^3P_1$ - $^3P_2$	0.097	
11.333347(15)	11.333347(15)μm	1.24 -2	Cl I	$3s^2\ 3p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	0.013	DJM
	11.741(7) μm	8.32 -3	Cl IV	$3s^2\ 3p^2$	$^3P_1$ - $^3P_2$	0.053	
	14.3678(8) μm	7.50 -3	Cl II	$3s^2\ 3p^4$	$^3P_2$ - $^3P_1$	0.024	
	18.08(23) μm	3.16 -3	Cl VI	3s 3p	$^3P_0$ - $^3P_1$	0.097	
	20.354(21) μm	2.13 -3	Cl IV	$3s^2\ 3p^2$	$^3P_0$ - $^3P_1$	0.053	
	33.281(8) μm	1.50 -3	Cl II	$3s^2\ 3p^4$	$^3P_1$ - $^3P_0$	0.024	
	108.07(21) μm	7.08 -6	Cl III	$3s^2\ 3p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	0.040	
	151.6(4) μm	3.08 -6	Cl III	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2D_{5/2}$	0.040	

Table 15. Argon: wavelengths and transition probabilities

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	447.33(14)	5.55 +2	Ar XV	2s 2p	$^3P_0 - {}^1P_1$	0.855	
	462.19(15)	3.75 +2	Ar XV	2s 2p	$^3P_1 - {}^1P_1$	0.855	
	501.15(18)	4.93 +2	Ar XV	2s 2p	$^3P_2 - {}^1P_1$	0.855	
	648.93(27)	1.17 +3	Ar XII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.618	
	656.73(28)	3.51 +3	Ar XIII	$2s^2\ 2p^2$	$^3P_1 - {}^1S_0$	0.686	
	669.97(29)	5.49 +2	Ar XII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.618	
	746.0(4)	2.91 +3	Ar XI	$2s^2\ 2p^4$	$^3P_1 - {}^1S_0$	0.539	
	1018.6(7)	2.17 +0*	Ar XII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{5/2}$	0.618	
	1054.9(8)	1.11 +2	Ar XII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{3/2}$	0.618	
	Q 1296.8(1.2)	1.23 +1	Ar XIII	$2s^2\ 2p^2$	$^1D_2 - {}^1S_0$	0.686	
	Q 1304.9(1.2)	1.49 +1	Ar XI	$2s^2\ 2p^4$	$^1D_2 - {}^1S_0$	0.539	
T 1331.52(1)	1330.5(1.1)	1.50 +2	Ar XIII	$2s^2\ 2p^2$	$^3P_1 - {}^1D_2$	0.686	SBT
1392.12(1)	1392.1(1.0)	2.41 +2	Ar XI	$2s^2\ 2p^4$	$^3P_2 - {}^1D_2$	0.539	SBT
T 1582.56(1)	1584.3(1.6)	2.66 +2	Ar XIII	$2s^2\ 2p^2$	$^3P_2 - {}^1D_2$	0.686	SBT
	1686.3(1.8)	4.76 +2	Ar XII	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{3/2}$	0.618	
	1737.3(1.5)	1.46 +0	Ar VII	3s 3p	$^3P_0 - {}^1P_1$	0.124	
	1741.9(2.1)	4.21 +1	Ar XI	$2s^2\ 2p^4$	$^3P_1 - {}^1D_2$	0.539	
	1762.0(1.6)	1.05 +0	Ar VII	3s 3p	$^3P_1 - {}^1P_1$	0.124	
	1787.9(2.0)	2.40 +2	Ar XII	$2s^2\ 2p^3$	$^2D_{5/2} - {}^2P_{3/2}$	0.618	
	1815.8(1.7)	1.60 +0	Ar VII	3s 3p	$^3P_2 - {}^1P_1$	0.124	
	1836.2(2.2)	2.41 +2	Ar XII	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{1/2}$	0.618	
	2691.04(19)	5.89 +0	Ar V	$3s^2\ 3p^2$	$^3P_1 - {}^1S_0$	0.075	
	2853.654(24)	1.88 +0	Ar IV	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.060	
	2868.15(5)	7.60 -1	Ar IV	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.060	
3109.08(30)	3109.17(5)	4.09 +0	Ar III	$3s^2\ 3p^4$	$^3P_1 - {}^1S_0$	0.041	B(60)
4412.4(2)	4416.(4)	1.04 +2	Ar XIV	$2s^2$ 2p	$^2P_{1/2} - {}^2P_{3/2}$	0.756	D
4625.54(10)	Q 4625.34(14)	5.18 +0	Ar V	$3s^2\ 3p^2$	$^1D_2 - {}^1S_0$	0.075	B(55)
4711.33(2)	4711.339(11)	2.07 -3*	Ar IV	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{5/2}$	0.060	B(55)
4740.20(2)	4740.199(11)	1.72 -2*	Ar IV	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{3/2}$	0.060	B(55)
5191.82(10)	Q 5191.79(14)	2.59 +0	Ar III	$3s^2\ 3p^4$	$^1D_2 - {}^1S_0$	0.041	B(55)
5533.4(4)	5533.39(21)	1.06 +2	Ar X	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.479	J
T 5926.	5944.(25)	6.20 +1	Ar XV	2s 2p	$^3P_1 - {}^3P_2$	0.855	P
6435.10(10)	6435.1(1.0)	1.61 -1	Ar V	$3s^2\ 3p^2$	$^3P_1 - {}^1D_2$	0.075	B(55)
T 6917.	6931.(24)	6.63 +1	Ar XI	$2s^2\ 2p^4$	$^3P_2 - {}^3P_1$	0.539	P
7005.67(10)	7005.7(1.2)	4.70 -1	Ar V	$3s^2\ 3p^2$	$^3P_2 - {}^1D_2$	0.075	B(55)
7135.80(4)	7135.78(10)	3.24 -1	Ar III	$3s^2\ 3p^4$	$^3P_2 - {}^1D_2$	0.041	B(55)
7170.62(10)	7170.47(16)	8.40 -1*	Ar IV	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{3/2}$	0.060	B(55)
7237.26(30)	7237.54(16)	7.08 -1*	Ar IV	$3s^2\ 3p^3$	$^2D_{5/2} - {}^2P_{3/2}$	0.060	B(55)
7262.76(30)	7262.7(3)	6.96 -1*	Ar IV	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{1/2}$	0.060	B(55)
7751.06(10)	7751.12(11)	8.44 -2	Ar III	$3s^2\ 3p^4$	$^3P_1 - {}^1D_2$	0.041	B(55)
	8303.(40)	2.29 +1	Ar XIII	$2s^2\ 2p^2$	$^3P_1 - {}^3P_2$	0.686	

Table 15. Argon: wavelengths and transition probabilities - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	10159.(40)	1.68 +1	Ar XIII	$2s^2\ 2p^2$	$^3P_0 - {}^3P_1$	0.686	
	13904.(140)	7.34 +0	Ar XV	2s 2p	$^3P_0 - {}^3P_1$	0.855	
	2.066(24) μm	9.24 -1	Ar XII	$2s^2\ 2p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.618	
	2.60(5) μm	3.00 +0	Ar XI	$2s^2\ 2p^4$	$^3P_1 - {}^3P_0$	0.539	
	2.97(6) μm	3.77 -1	Ar XII	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2D_{5/2}$	0.618	
	4.527(5) μm	9.69 -2	Ar VI	$3s^2$ 3p	$^2P_{1/2} - {}^2P_{3/2}$	0.091	
	5.95(5) μm	6.41 -2	Ar VII	3s 3p	$^3P_1 - {}^3P_2$	0.124	
6.985274(3)	6.985274(3)μm	5.28 -2	Ar II	$3s^2\ 3p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.028	YKH
	7.904(22) μm	2.72 -2	Ar V	$3s^2\ 3p^2$	$^3P_1 - {}^3P_2$	0.075	
8.9910(1)	8.9910(1) μm	3.06 -2	Ar III	$3s^2\ 3p^4$	$^3P_2 - {}^3P_1$	0.041	L
	12.42(22) μm	9.36 -3	Ar VII	3s 3p	$^3P_0 - {}^3P_1$	0.124	
	13.07(7) μm	8.03 -3	Ar V	$3s^2\ 3p^2$	$^3P_0 - {}^3P_1$	0.075	
	21.842(6) μm	5.31 -3	Ar III	$3s^2\ 3p^4$	$^3P_1 - {}^3P_0$	0.041	
	56.47(21) μm	4.94 -5	Ar IV	$3s^2\ 3p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.060	
	77.41(4) μm	2.30 -5	Ar IV	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2D_{5/2}$	0.060	

Table 16. Potassium: wavelengths and transition probabilities

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	414.5(4)	9.84 +2	K XVI	2s 2p	$^3P_0 - {}^1P_1$	0.97	
	430.5(4)	6.54 +2	K XVI	2s 2p	$^3P_1 - {}^1P_1$	0.97	
	474.6(5)	8.19 +2	K XVI	2s 2p	$^3P_2 - {}^1P_1$	0.97	
	594.6(4)	1.98 +3	K XIII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.71	
	603.58(20)	6.10 +3	K XIV	$2s^2\ 2p^2$	$^3P_1 - {}^1S_0$	0.79	
	622.1(4)	9.91 +2	K XIII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.71	
	694.13(25)	5.27 +3	K XII	$2s^2\ 2p^4$	$^3P_1 - {}^1S_0$	0.63	
	945.1(9)	5.58 +0*	K XIII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{5/2}$	0.71	
	993.6(1.0)	2.54 +2	K XIII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{3/2}$	0.71	
	Q 1199.5(9)	1.71 +1	K XII	$2s^2\ 2p^4$	$^1D_2 - {}^1S_0$	0.63	
	Q 1204.8(9)	1.36 +1	K XIV	$2s^2\ 2p^2$	$^1D_2 - {}^1S_0$	0.79	
	1209.5(7)	2.91 +2	K XIV	$2s^2\ 2p^2$	$^3P_1 - {}^1D_2$	0.79	
	1255.4(6)	4.49 +2	K XII	$2s^2\ 2p^4$	$^3P_2 - {}^1D_2$	0.63	
	1477.4(9)	4.71 +2	K XIV	$2s^2\ 2p^2$	$^3P_2 - {}^1D_2$	0.79	
	1480.8(5)	8.84 +2	K XIII	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{3/2}$	0.71	
	1554.(5)	3.23 +0	K VIII	3s 3p	$^3P_0 - {}^1P_1$	0.15	
	1581.(5)	2.30 +0	K VIII	3s 3p	$^3P_1 - {}^1P_1$	0.15	
	1603.3(5)	4.23 +2	K XIII	$2s^2\ 2p^3$	$^2D_{5/2} - {}^2P_{3/2}$	0.71	
	1643.(5)	3.43 +0	K VIII	3s 3p	$^3P_2 - {}^1P_1$	0.15	
	1647.4(1.2)	6.84 +1	K XII	$2s^2\ 2p^4$	$^3P_1 - {}^1D_2$	0.63	
	1664.0(6)	4.07 +2	K XIII	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{1/2}$	0.71	
	2367.52(8)	1.40 +1	K VI	$3s^2\ 3p^2$	$^3P_1 - {}^1S_0$	0.10	
	2494.24(12)	4.56 +0	K V	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.08	
	2514.45(13)	1.90 +0	K V	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.08	
	2711.07(10)	1.05 +1	K IV	$3s^2\ 3p^4$	$^3P_1 - {}^1S_0$	0.06	
	3448.(4)	2.19 +2	K XV	$2s^2$ 2p	$^2P_{1/2} - {}^2P_{3/2}$	0.86	
	Q 4100.40(24)	5.92 +0	K VI	$3s^2\ 3p^2$	$^1D_2 - {}^1S_0$	0.10	
4122.63(10)	4122.6(3)	4.96 -3*	K V	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{5/2}$	0.08	B(55)
4163.30(10)	4163.3(3)	8.06 -2*	K V	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{3/2}$	0.08	B(55)
T 4256.4	4249.(4)	2.34 +2	K XI	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.56	P
4510.93(10)	Q 4510.92(29)	3.18 +0	K IV	$3s^2\ 3p^4$	$^1D_2 - {}^1S_0$	0.06	B(60)
	4635.(15)	1.31 +2	K XVI	2s 2p	$^3P_1 - {}^3P_2$	0.97	
	5274.(4)	1.50 +2	K XII	$2s^2\ 2p^4$	$^3P_2 - {}^3P_1$	0.63	
	5602.4(4)	4.13 -1	K VI	$3s^2\ 3p^2$	$^3P_1 - {}^1D_2$	0.10	
6101.83(10)	6101.8(4)	8.38 -1	K IV	$3s^2\ 3p^4$	$^3P_2 - {}^1D_2$	0.06	B(55)
	6221.9(1.1)	1.97 +0*	K V	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{3/2}$	0.08	
	6228.6(5)	1.03 +0	K VI	$3s^2\ 3p^2$	$^3P_2 - {}^1D_2$	0.10	
	6315.1(1.1)	1.34 +0*	K V	$3s^2\ 3p^3$	$^2D_{5/2} - {}^2P_{3/2}$	0.08	
	6349.2(1.1)	1.37 +0*	K V	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{1/2}$	0.08	
	6669.(11)	4.37 +1	K XIV	$2s^2\ 2p^2$	$^3P_1 - {}^3P_2$	0.79	
	6795.0(7)	2.03 -1	K IV	$3s^2\ 3p^4$	$^3P_1 - {}^1D_2$	0.06	

Table 16. Potassium: wavelengths and transition probabilities - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	7554.(11)	4.06 +1	K XIV	$2s^2\ 2p^2$	$^3P_0$ - $^3P_1$	0.79	
	11110.(90)	1.45 +1	K XVI	2s 2p	$^3P_0$ - $^3P_1$	0.97	
	13450.(40)	3.25 +0	K XIII	$2s^2\ 2p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	0.71	
	19380.(80)	1.32 +0	K XIII	$2s^2\ 2p^3$	$^2D_{3/2}$ - $^2D_{5/2}$	0.71	
	2.351(12) μm	4.01 +0	K XII	$2s^2\ 2p^4$	$^3P_1$ - $^3P_0$	0.63	
	3.1899(10)μm	2.77 -1	K VII	$3s^2$ 3p	$^2P_{1/2}$ - $^2P_{3/2}$	0.12	
	4.213(13) μm	1.79 -1	K VIII	3s 3p	$^3P_1$ - $^3P_2$	0.15	
	4.6153(21)μm	1.83 -1	K III	$3s^2\ 3p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	0.05	
	5.575(4) μm	7.74 -2	K VI	$3s^2\ 3p^2$	$^3P_1$ - $^3P_2$	0.10	
	5.983(4) μm	1.04 -1	K IV	$3s^2\ 3p^4$	$^3P_2$ - $^3P_1$	0.06	
	8.823(8) μm	2.61 -2	K VI	$3s^2\ 3p^2$	$^3P_0$ - $^3P_1$	0.10	
	8.99(6) μm	2.52 -2	K VIII	3s 3p	$^3P_0$ - $^3P_1$	0.15	
	15.39(3) μm	1.51 -2	K IV	$3s^2\ 3p^4$	$^3P_1$ - $^3P_0$	0.06	
	31.1(3) μm	2.94 -4	K V	$3s^2\ 3p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	0.08	
	42.2(5) μm	1.41 -4	K V	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2D_{5/2}$	0.08	

Table 17. Calcium: wavelengths and transition probabilities

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	384.13(8)	1.72 +3	Ca XVII	2s 2p	$^3P_0 - {}^1P_1$	1.16	
	401.35(9)	1.12 +3	Ca XVII	2s 2p	$^3P_1 - {}^1P_1$	1.16	
	451.12(11)	1.33 +3	Ca XVII	2s 2p	$^3P_2 - {}^1P_1$	1.16	
	545.38(13)	3.23 +3	Ca XIV	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.82	
	555.21(15)	1.03 +4	Ca XV	$2s^2\ 2p^2$	$^3P_1 - {}^1S_0$	0.89	
	580.05(14)	1.73 +3	Ca XIV	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.82	
	648.71(21)	9.17 +3	Ca XIII	$2s^2\ 2p^4$	$^3P_1 - {}^1S_0$	0.73	
	880.9(3)	1.35 +1*	Ca XIV	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{5/2}$	0.82	
	944.6(4)	5.35 +2	Ca XIV	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{3/2}$	0.82	
	1098.4(1)	5.51 +2	Ca XV	$2s^2\ 2p^2$	$^3P_1 - {}^1D_2$	0.89	
	Q 1106.1(8)	1.96 +1	Ca XIII	$2s^2\ 2p^4$	$^1D_2 - {}^1S_0$	0.73	
	Q 1122.7(6)	1.50 +1	Ca XV	$2s^2\ 2p^2$	$^1D_2 - {}^1S_0$	0.89	
T 1133.68	1133.7(5)	8.06 +2	Ca XIII	$2s^2\ 2p^4$	$^3P_2 - {}^1D_2$	0.73	CFD
	1290.5(4)	1.62 +3	Ca XIV	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{3/2}$	0.82	
T 1375.95(3)	1375.95(5)	8.10 +2	Ca XV	$2s^2\ 2p^2$	$^3P_2 - {}^1D_2$	0.89	SBT
	1402.4(2.0)	6.68 +0	Ca IX	3s 3p	$^3P_0 - {}^1P_1$	0.19	
	1431.8(4)	7.25 +2	Ca XIV	$2s^2\ 2p^3$	$^2D_{5/2} - {}^2P_{3/2}$	0.82	
	1432.5(2.1)	4.70 +0	Ca IX	3s 3p	$^3P_1 - {}^1P_1$	0.19	
	1502.2(2.3)	6.80 +0	Ca IX	3s 3p	$^3P_2 - {}^1P_1$	0.19	
	1503.1(5)	6.66 +2	Ca XIV	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{1/2}$	0.82	
	1568.7(1.0)	1.05 +2	Ca XIII	$2s^2\ 2p^4$	$^3P_1 - {}^1D_2$	0.73	
	2110.97(13)	3.04 +1	Ca VII	$3s^2\ 3p^2$	$^3P_1 - {}^1S_0$	0.13	
	2214.5(1.0)	1.00 +1	Ca VI	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.11	
	2242.1(1.0)	4.28 +0	Ca VI	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.11	
	2412.9(1)	2.40 +1	Ca V	$3s^2\ 3p^4$	$^3P_1 - {}^1S_0$	0.08	
	2737.(4)	4.37 +2	Ca XVI	$2s^2$ 2p	$^2P_{1/2} - {}^2P_{3/2}$	0.97	
3327.5(4)	3327.8(6)	4.87 +2	Ca XII	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.66	J
	3637.(4)	2.70 +2	Ca XVII	2s 2p	$^3P_1 - {}^3P_2$	1.16	
	3669.1(2.7)	1.17 -2*	Ca VI	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{5/2}$	0.11	
3688.2(2.5)	Q 3686.6(4)	6.81 +0	Ca VII	$3s^2\ 3p^2$	$^1D_2 - {}^1S_0$	0.13	
	3725.4(2.8)	2.42 -1*	Ca VI	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{3/2}$	0.11	
	Q 3997.88(23)	3.73 +0	Ca V	$3s^2\ 3p^4$	$^1D_2 - {}^1S_0$	0.08	
4087.1(4)	4087.2(5)	3.19 +2	Ca XIII	$2s^2\ 2p^4$	$^3P_2 - {}^3P_1$	0.73	J
4939.48(20)	4939.6(7)	9.74 -1	Ca VII	$3s^2\ 3p^2$	$^3P_1 - {}^1D_2$	0.13	T
5309.18(10)	5309.11(28)	1.95 +0	Ca V	$3s^2\ 3p^4$	$^3P_2 - {}^1D_2$	0.08	B(55)
5446.0	5443.9(8)	7.90 +1	Ca XV	$2s^2\ 2p^2$	$^3P_1 - {}^3P_2$	0.89	P
5460.7	5460.7(8)	4.31 +0*	Ca VI	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{3/2}$	0.11	T
5586.3	5586.3(9)	2.58 +0*	Ca VI	$3s^2\ 3p^3$	$^2D_{5/2} - {}^2P_{3/2}$	0.11	T
5618.58(20)	5618.8(9)	2.15 +0	Ca VII	$3s^2\ 3p^2$	$^3P_2 - {}^1D_2$	0.13	T
	5631.7(9)	2.70 +0*	Ca VI	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{1/2}$	0.11	
5693.6(4)	5693.5(6)	9.40 +1	Ca XV	$2s^2\ 2p^2$	$^3P_0 - {}^3P_1$	0.89	J

Table 12. Calcium wavelengths and transition probabilities - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
6086.92(10)	6086.4(5)	4.35 -1	Ca V	$3s^2\ 3p^4$	$^3P_1 - {}^1D_2$	0.08	B(55)
	8950.(22)	2.77 +1	Ca XVII	2s 2p	$^3P_0 - {}^3P_1$	1.16	
	9122.(18)	1.01 +1	Ca XIV	$2s^2\ 2p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.82	
	13070.(40)	4.19 +0	Ca XIV	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2D_{5/2}$	0.82	
	2.258(15) μm	4.46 +0	Ca XIII	$2s^2\ 2p^4$	$^3P_1 - {}^3P_0$	0.73	
2.32(2)	2.3205(11)μm	7.20 -1	Ca VIII	$3s^2\ 3p$	$^2P_{1/2} - {}^2P_{3/2}$	0.15	GJ
	3.088(13) μm	4.54 -1	Ca IX	3s 3p	$^3P_1 - {}^3P_2$	0.19	
3.18(3)	3.2061(10)μm	5.46 -1	Ca IV	$3s^2\ 3p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.07	GJ
	4.086(5) μm	1.96 -1	Ca VII	$3s^2\ 3p^2$	$^3P_1 - {}^3P_2$	0.13	
	4.1574(17)μm	3.09 -1	Ca V	$3s^2\ 3p^4$	$^3P_2 - {}^3P_1$	0.08	
	6.154(8) μm	7.67 -2	Ca VII	$3s^2\ 3p^2$	$^3P_0 - {}^3P_1$	0.13	
	6.67(6) μm	6.16 -2	Ca IX	3s 3p	$^3P_0 - {}^3P_1$	0.19	
	11.482(19) μm	3.62 -2	Ca V	$3s^2\ 3p^4$	$^3P_1 - {}^3P_0$	0.08	
	17.99(9) μm	1.50 -3	Ca VI	$3s^2\ 3p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.11	
	24.30(17) μm	7.34 -4	Ca VI	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2D_{5/2}$	0.11	

Table 18. Scandium: wavelengths and transition probabilities

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	356.84(7)	2.90 +3	Sc XVIII	2s 2p	$^3P_0$ - $^1P_1$	1.21	
	375.12(7)	1.85 +3	Sc XVIII	2s 2p	$^3P_1$ - $^1P_1$	1.21	
	430.66(9)	2.06 +3	Sc XVIII	2s 2p	$^3P_2$ - $^1P_1$	1.21	
	498.88(6)	5.09 +3	Sc XV	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	0.93	
511.2(5)	510.83(13)	1.68 +4	Sc XVI	$2s^2$ $2p^2$	$^3P_1$ - $^1S_0$	1.01	H
	541.01(7)	2.96 +3	Sc XV	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	0.93	
606.5(5)	606.77(15)	1.55 +4	Sc XIV	$2s^2$ $2p^4$	$^3P_1$ - $^1S_0$	0.83	H
	819.94(17)	3.20 +1*	Sc XV	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	0.93	
899.8(5)	899.28(20)	1.07 +3	Sc XV	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	0.93	H
	996.0(5)	1.02 +3	Sc XVI	$2s^2$ $2p^2$	$^3P_1$ - $^1D_2$	1.01	
	Q 1018.4(6)	2.28 +1	Sc XIV	$2s^2$ $2p^4$	$^1D_2$ - $^1S_0$	0.83	
	1022.6(4)	1.41 +3	Sc XIV	$2s^2$ $2p^4$	$^3P_2$ - $^1D_2$	0.83	
	Q 1048.7(8)	1.65 +1	Sc XVI	$2s^2$ $2p^2$	$^1D_2$ - $^1S_0$	1.01	
	1120.45(27)	2.90 +3	Sc XV	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	0.93	
	1274.0(3)	1.21 +3	Sc XV	$2s^2$ $2p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	0.93	
	1276.0(7)	1.31 +1	Sc X	3s 3p	$^3P_0$ - $^1P_1$	0.23	
	1276.6(8)	1.36 +3	Sc XVI	$2s^2$ $2p^2$	$^3P_2$ - $^1D_2$	1.01	
	1309.6(7)	9.11 +0	Sc X	3s 3p	$^3P_1$ - $^1P_1$	0.23	
	1358.0(4)	1.05 +3	Sc XV	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	0.93	
	1387.8(8)	1.28 +1	Sc X	3s 3p	$^3P_2$ - $^1P_1$	0.23	
	1501.2(9)	1.56 +2	Sc XIV	$2s^2$ $2p^4$	$^3P_1$ - $^1D_2$	0.83	
	1901.41(26)	6.12 +1	Sc VIII	$3s^2$ $3p^2$	$^3P_1$ - $^1S_0$	0.16	
	1988.0(8)	2.05 +1	Sc VII	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	0.14	
	2024.2(8)	8.93 +0	Sc VII	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	0.14	
	2178.99(7)	5.09 +1	Sc VI	$3s^2$ $3p^4$	$^3P_1$ - $^1S_0$	0.11	
2190.5(2)	2190.52(19)	8.53 +2	Sc XVII	$2s^2$ 2p	$^2P_{1/2}$ - $^2P_{3/2}$	1.09	SCCFH
2637.2(2)	2637.18(21)	9.78 +2	Sc XIII	$2s^2$ $2p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	0.76	SCCFH
2907.9(3)	2907.82(24)	5.29 +2	Sc XVIII	2s 2p	$^3P_1$ - $^3P_2$	1.21	SH(82)
3206.1(3)	3206.36(21)	6.55 +2	Sc XIV	$2s^2$ $2p^4$	$^3P_2$ - $^3P_1$	0.83	SCCFH
	3305.9(2.2)	2.78 -2*	Sc VII	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	0.14	
	Q 3350.5(8)	7.70 +0	Sc VIII	$3s^2$ $3p^2$	$^1D_2$ - $^1S_0$	0.16	
	3381.7(2.3)	7.32 -1	Sc VII	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	0.14	
	Q 3592.01(18)	4.31 +0	Sc VI	$3s^2$ $3p^4$	$^1D_2$ - $^1S_0$	0.11	
4354.3(4)	4354.4(4)	2.08 +2	Sc XVI	$2s^2$ $2p^2$	$^3P_0$ - $^3P_1$	1.01	SCCFH
	4393.4(1.4)	2.15 +0	Sc VIII	$3s^2$ $3p^2$	$^3P_1$ - $^1D_2$	0.16	
4530.3(4)	4530.4(5)	1.34 +2	Sc XVI	$2s^2$ $2p^2$	$^3P_1$ - $^3P_2$	1.01	SCCFH
	4673.12(22)	4.19 +0	Sc VI	$3s^2$ $3p^4$	$^3P_2$ - $^1D_2$	0.11	
	4820.6(7)	8.96 +0*	Sc VII	$3s^2$ $3p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	0.14	
	4983.4(7)	4.91 +0*	Sc VII	$3s^2$ $3p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	0.14	
	5042.8(7)	5.15 +0*	Sc VII	$3s^2$ $3p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	0.14	
	5121.7(1.9)	4.25 +0	Sc VIII	$3s^2$ $3p^2$	$^3P_2$ - $^1D_2$	0.16	

Table 18. Scandium: wavelengths and transition probabilities - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	5539.6(4)	8.49 -1	Sc VI	$3s^2\ 3p^4$	$^3P_1 - {}^1D_2$	0.11	
	6404.(9)	2.82 +1	Sc XV	$2s^2\ 2p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.93	
	7319.(11)	5.01 +1	Sc XVIII	2s 2p	$^3P_0 - {}^3P_1$	1.21	
	9291.(18)	1.13 +1	Sc XV	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2D_{5/2}$	0.93	
	17353.(12)	1.72 +0	Sc IX	$3s^2$ 3p	$^2P_{1/2} - {}^2P_{3/2}$	0.18	
	2.3112(4) μm	1.46 +0	Sc V	$3s^2\ 3p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.09	
	2.321(4) μm	1.09 +0	Sc X	3s 3p	$^3P_1 - {}^3P_2$	0.23	
	2.396(12) μm	3.66 +0	Sc XIV	$2s^2\ 2p^4$	$^3P_1 - {}^3P_0$	0.83	
	2.9877(9) μm	8.29 -1	Sc VI	$3s^2\ 3p^4$	$^3P_2 - {}^3P_1$	0.11	
	3.090(7) μm	4.51 -1	Sc VIII	$3s^2\ 3p^2$	$^3P_1 - {}^3P_2$	0.16	
	4.400(10) μm	2.09 -1	Sc VIII	$3s^2\ 3p^2$	$^3P_0 - {}^3P_1$	0.16	
	4.984(18) μm	1.40 -1	Sc X	3s 3p	$^3P_0 - {}^3P_1$	0.23	
	9.001(11) μm	7.49 -2	Sc VI	$3s^2\ 3p^4$	$^3P_1 - {}^3P_0$	0.11	
	10.94(3) μm	6.61 -3	Sc VII	$3s^2\ 3p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.14	
	14.76(6) μm	2.99 -3	Sc VII	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2D_{5/2}$	0.14	

Table 19. Titanium: wavelengths and transition probabilities

	Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
		331.68(3)	4.79 +3	Ti XIX	$2s\ 2p$	$^3P_0 - {}^1P_1$	1.35	
		350.78(4)	2.99 +3	Ti XIX	$2s\ 2p$	$^3P_1 - {}^1P_1$	1.35	
		412.47(5)	3.11 +3	Ti XIX	$2s\ 2p$	$^3P_2 - {}^1P_1$	1.35	
	456.1(3)	456.10(5)	7.72 +3	Ti XVI	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{3/2}$	1.04	H
	470.4(3)	470.54(11)	2.68 +4	Ti XVII	$2s^2\ 2p^2$	$^3P_1 - {}^1S_0$	1.13	H
	505.9(3)	505.82(6)	4.94 +3	Ti XVI	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{1/2}$	1.04	H
		567.41(16)	2.55 +4	Ti XV	$2s^2\ 2p^4$	$^3P_1 - {}^1S_0$	0.94	
		764.99(15)	7.16 +1*	Ti XVI	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{5/2}$	1.04	
	861.8(1)	861.85(19)	2.00 +3	Ti XVI	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{3/2}$	1.04	H
T	899.7(3)	900.9(4)	1.84 +3	Ti XVII	$2s^2\ 2p^2$	$^3P_1 - {}^1D_2$	1.13	H
	919.73(8)	919.71(9)	2.42 +3	Ti XV	$2s^2\ 2p^4$	$^3P_2 - {}^1D_2$	0.94	PSS
		Q 936.3(4)	2.72 +1	Ti XV	$2s^2\ 2p^4$	$^1D_2 - {}^1S_0$	0.94	
	968.9(3)	968.80(20)	5.16 +3	Ti XVI	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{3/2}$	1.04	H
		Q 985.0(7)	1.77 +1	Ti XVII	$2s^2\ 2p^2$	$^1D_2 - {}^1S_0$	1.13	
	1129.2(4)	1129.6(3)	1.99 +3	Ti XVI	$2s^2\ 2p^3$	$^2D_{5/2} - {}^2P_{3/2}$	1.04	FBM
		1165.69(19)	2.46 +1	Ti XI	$3s\ 3p$	$^3P_0 - {}^1P_1$	0.27	
		1177.4(7)	2.25 +3	Ti XVII	$2s^2\ 2p^2$	$^3P_2 - {}^1D_2$	1.13	
		1201.63(20)	1.68 +1	Ti XI	$3s\ 3p$	$^3P_1 - {}^1P_1$	0.27	
	1224.1(4)	1224.4(3)	1.60 +3	Ti XVI	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{1/2}$	1.04	FBM
		1289.09(24)	2.27 +1	Ti XI	$3s\ 3p$	$^3P_2 - {}^1P_1$	0.27	
	1440.2(8)	1440.05(22)	2.23 +2	Ti XV	$2s^2\ 2p^4$	$^3P_1 - {}^1D_2$	0.94	FBM
		1724.7(4)	1.17 +2	Ti IX	$3s^2\ 3p^2$	$^3P_1 - {}^1S_0$	0.19	
	1778.1(1)	1778.09(10)	1.59 +3	Ti XVIII	$2s^2\ 2p$	$^2P_{1/2} - {}^2P_{3/2}$	1.22	SFH
		1797.5(6)	3.90 +1	Ti VIII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.17	
		1845.4(7)	1.75 +1	Ti VIII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.17	
		1989.38(18)	1.01 +2	Ti VII	$3s^2\ 3p^4$	$^3P_1 - {}^1S_0$	0.14	
	2117.1(2)	2117.12(18)	1.89 +3	Ti XIV	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.86	SFH
	2344.6(2)	2344.5(2.3)	1.01 +3	Ti XIX	$2s\ 2p$	$^3P_1 - {}^3P_2$	1.35	PSS
	2544.8(1)	2544.54(19)	1.30 +3	Ti XV	$2s^2\ 2p^4$	$^3P_2 - {}^3P_1$	0.94	SFH
		3006.1(1.8)	6.62 -2*	Ti VIII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{5/2}$	0.17	
		Q 3071.8(1.3)	8.58 +0	Ti IX	$3s^2\ 3p^2$	$^1D_2 - {}^1S_0$	0.19	
		3105.6(1.9)	2.00 +0	Ti VIII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{3/2}$	0.17	
		Q 3259.5(6)	4.92 +0	Ti VII	$3s^2\ 3p^4$	$^1D_2 - {}^1S_0$	0.14	
	3370.8(2)	3370.80(23)	4.44 +2	Ti XVII	$2s^2\ 2p^2$	$^3P_0 - {}^3P_1$	1.13	SFH
	3834.4(2)	3834.4(4)	2.15 +2	Ti XVII	$2s^2\ 2p^2$	$^3P_1 - {}^3P_2$	1.13	SFH
		3930.3(2.2)	4.52 -1	Ti IX	$3s^2\ 3p^2$	$^3P_1 - {}^1D_2$	0.19	
		4143.1(7)	8.46 +0	Ti VII	$3s^2\ 3p^4$	$^3P_2 - {}^1D_2$	0.14	
		4264.4(5)	1.77 +1*	Ti VIII	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{3/2}$	0.17	
		4467.6(6)	9.10 +0*	Ti VIII	$3s^2\ 3p^3$	$^2D_{5/2} - {}^2P_{3/2}$	0.17	
		4544.4(6)	9.44 +0*	Ti VIII	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{1/2}$	0.17	
	4635.6(3)	4639.(5)	7.19 +1	Ti XVI	$2s^2\ 2p^3$	$^2P_{1/2} - {}^2P_{3/2}$	1.04	H

Table 17. Titanium wavelengths and transition probabilities - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	4700.(3)	8.05 +0	Ti IX	$3s^2\ 3p^2$	$^3P_2 - {}^1D_2$	0.19	
	5101.7(1.2)	1.54 +0	Ti VII	$3s^2\ 3p^4$	$^3P_1 - {}^1D_2$	0.14	
	6092.(16)	8.71 +1	Ti XIX	2s 2p	$^3P_0 - {}^3P_1$	1.35	
	6806.(10)	2.80 +1	Ti XVI	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2D_{5/2}$	1.04	
	13254.(7)	3.86 +0	Ti X	$3s^2$ 3p	$^2P_{1/2} - {}^2P_{3/2}$	0.22	
	17150.(30)	3.56 +0	Ti VI	$3s^2\ 3p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.12	
	17710.(40)	2.43 +0	Ti XI	3s 3p	$^3P_1 - {}^3P_2$	0.27	
	2.2050(10)μm	2.06 +0	Ti VII	$3s^2\ 3p^4$	$^3P_2 - {}^3P_1$	0.14	
	2.401(8) μm	9.55 -1	Ti IX	$3s^2\ 3p^2$	$^3P_1 - {}^3P_2$	0.19	
	3.205(10) μm	5.39 -1	Ti IX	$3s^2\ 3p^2$	$^3P_0 - {}^3P_1$	0.19	
	3.270(22) μm	1.41 +0	Ti XV	$2s^2\ 2p^4$	$^3P_1 - {}^3P_0$	0.94	
	3.896(21) μm	3.00 -1	Ti XI	3s 3p	$^3P_0 - {}^3P_1$	0.27	
	6.923(14) μm	2.57 -2	Ti VIII	$3s^2\ 3p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.17	
	7.386(15) μm	1.34 -1	Ti VII	$3s^2\ 3p^4$	$^3P_1 - {}^3P_0$	0.14	
	9.382(25) μm	1.24 -2	Ti VIII	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2D_{5/2}$	0.17	

Table 20. Vanadium: wavelengths and transition probabilities

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	308.26(21)	7.77 +3	V XX	2s 2p	$^3P_0$ - $^1P_1$	1.49	
	327.98(24)	4.75 +3	V XX	2s 2p	$^3P_1$ - $^1P_1$	1.49	
	396.0(4)	4.57 +3	V XX	2s 2p	$^3P_2$ - $^1P_1$	1.49	
	415.80(5)	1.13 +4	V XVII	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	1.17	
T 434.2(2)	432.82(19)	4.19 +4	V XVIII	$2s^2$ $2p^2$	$^3P_1$ - $^1S_0$	1.26	FBM
	472.99(6)	8.10 +3	V XVII	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	1.17	
529.9(2)	529.75(15)	4.09 +4	V XVI	$2s^2$ $2p^4$	$^3P_1$ - $^1S_0$	1.06	FBM
	712.96(14)	1.53 +2	V XVII	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	1.17	
	813.3(4)	3.33 +3	V XVIII	$2s^2$ $2p^2$	$^3P_1$ - $^1D_2$	1.26	
	826.2(3)	4.05 +3	V XVI	$2s^2$ $2p^4$	$^3P_2$ - $^1D_2$	1.06	
	826.92(19)	3.57 +3	V XVII	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	1.17	
	836.33(20)	9.04 +3	V XVII	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	1.17	
Q	857.1(5)	3.33 +1	V XVI	$2s^2$ $2p^4$	$^1D_2$ - $^1S_0$	1.06	
Q	925.2(1.0)	1.93 +1	V XVIII	$2s^2$ $2p^2$	$^1D_2$ - $^1S_0$	1.26	
	997.61(28)	3.23 +3	V XVII	$2s^2$ $2p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	1.17	
	1072.2(1.6)	4.22 +1	V XII	3s 3p	$^3P_0$ - $^1P_1$	0.31	
1078.2(1.4)	1078.5(6)	3.67 +3	V XVIII	$2s^2$ $2p^2$	$^3P_2$ - $^1D_2$	1.26	FBM
	1105.1(3)	2.35 +3	V XVII	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	1.17	
	1108.9(1.7)	2.85 +1	V XII	3s 3p	$^3P_1$ - $^1P_1$	0.31	
	1204.5(2.1)	3.72 +1	V XII	3s 3p	$^3P_2$ - $^1P_1$	0.31	
	1386.9(1.0)	3.07 +2	V XVI	$2s^2$ $2p^4$	$^3P_1$ - $^1D_2$	1.06	
1457.6(9)	1458.(4)	2.89 +3	V XIX	$2s^2$ 2p	$^2P_{1/2}$ - $^2P_{3/2}$	1.36	FBM
	1573.04(18)	2.11 +2	V X	$3s^2$ $3p^2$	$^3P_1$ - $^1S_0$	0.23	
	1633.3(5)	7.05 +1	V IX	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	0.21	
	1694.1(6)	3.28 +1	V IX	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	0.21	
1719.4(1.7)	1721.4(1.5)	3.52 +3	V XV	$2s^2$ $2p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	0.98	FBM
	1830.39(24)	1.89 +2	V VIII	$3s^2$ $3p^4$	$^3P_1$ - $^1S_0$	0.17	
	1908.(5)	1.86 +3	V XX	2s 2p	$^3P_1$ - $^3P_2$	1.49	
2042.7(8)	2042.8(8)	2.47 +3	V XVI	$2s^2$ $2p^4$	$^3P_2$ - $^3P_1$	1.06	FBM
	2633.6(1.4)	9.19 +2	V XVIII	$2s^2$ $2p^2$	$^3P_0$ - $^3P_1$	1.26	
	2752.6(1.6)	1.57 -1*	V IX	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	0.21	
Q	2836.7(6)	9.45 +0	V X	$3s^2$ $3p^2$	$^1D_2$ - $^1S_0$	0.23	
	2880.3(1.7)	4.98 +0	V IX	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	0.21	
Q	2978.1(6)	5.61 +0	V VIII	$3s^2$ $3p^4$	$^1D_2$ - $^1S_0$	0.17	
	3307.(3)	3.24 +2	V XVIII	$2s^2$ $2p^2$	$^3P_1$ - $^3P_2$	1.26	
	3438.(3)	1.71 +2	V XVII	$2s^2$ $2p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	1.17	
	3528.9(9)	9.10 +0	V X	$3s^2$ $3p^2$	$^3P_1$ - $^1D_2$	0.23	
	3692.8(7)	1.62 +1	V VIII	$3s^2$ $3p^4$	$^3P_2$ - $^1D_2$	0.17	
	3770.2(1.0)	3.34 +1	V IX	$3s^2$ $3p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	0.21	
	4014.1(1.1)	1.64 +1*	V IX	$3s^2$ $3p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	0.21	
	4110.7(1.2)	1.66 +1*	V IX	$3s^2$ $3p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	0.21	

Table 20. Vanadium: wavelengths and transition probabilities - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	4330.0(1.3)	1.47 +1	V X	$3s^2\ 3p^2$	$^3P_2 - {}^1D_2$	0.23	
	4746.1(1.6)	2.60 +0	V VIII	$3s^2\ 3p^4$	$^3P_1 - {}^1D_2$	0.17	
	5127.(40)	1.46 +2	V XX	2s 2p	$^3P_0 - {}^3P_1$	1.49	
	5172.(8)	6.21 +1	V XVII	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2D_{5/2}$	1.17	
	10311.(5)	8.19 +0	V XI	$3s^2\ 3p$	$^2P_{1/2} - {}^2P_{3/2}$	0.26	
	13038.(3)	8.11 +0	V VII	$3s^2\ 3p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.15	
	13963.(280)	4.82 +0	V XII	3s 3p	$^3P_1 - {}^3P_2$	0.31	
	16640.(14)	4.76 +0	V VIII	$3s^2\ 3p^4$	$^3P_2 - {}^3P_1$	0.17	
	19080.(30)	1.88 +0	V X	$3s^2\ 3p^2$	$^3P_1 - {}^3P_2$	0.23	
	2.392(3) μm	1.29 +0	V X	$3s^2\ 3p^2$	$^3P_0 - {}^3P_1$	0.23	
	3.24(15) μm	5.67 -1	V XII	3s 3p	$^3P_0 - {}^3P_1$	0.31	
	4.552(15) μm	8.87 -2	V IX	$3s^2\ 3p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.21	
	6.207(27) μm	4.23 -2	V IX	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2D_{5/2}$	0.21	
	6.362(29) μm	2.08 -1	V VIII	$3s^2\ 3p^4$	$^3P_1 - {}^3P_0$	0.17	
	9.78(26) μm	5.10 -2	V XVI	$2s^2\ 2p^4$	$^3P_1 - {}^3P_0$	1.06	

Table 21. Chromium: wavelengths and transition probabilities

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	286.51(17)	1.24 +4	Cr XXI	2s 2p	$^3P_0$ - $^1P_1$	1.63	
	306.80(5)	7.42 +3	Cr XXI	2s 2p	$^3P_1$ - $^1P_1$	1.63	
378.0(3)	378.1(3)	1.61 +4	Cr XVIII	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	1.30	DH
	381.6(3)	6.56 +3	Cr XXI	2s 2p	$^3P_2$ - $^1P_1$	1.63	
398.4(3)	398.42(16)	6.38 +4	Cr XIX	$2s^2$ $2p^2$	$^3P_1$ - $^1S_0$	1.40	HSCS
442.1(3)	442.3(4)	1.31 +4	Cr XVIII	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	1.30	DH
493.8(3)	493.79(24)	6.42 +4	Cr XVII	$2s^2$ $2p^4$	$^3P_1$ - $^1S_0$	1.19	HSCS
663.1(3)	663.1(9)	3.22 +2	Cr XVIII	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	1.30	DH
722.1(3)	722.56(16)	1.56 +4	Cr XVIII	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	1.30	DH
731.1(3)	731.07(8)	5.62 +3	Cr XIX	$2s^2$ $2p^2$	$^3P_1$ - $^1D_2$	1.40	HSCS
740.75(3)	740.75(3)	6.67 +3	Cr XVII	$2s^2$ $2p^4$	$^3P_2$ - $^1D_2$	1.19	PSS
	Q 781.9(6)	4.19 +1	Cr XVII	$2s^2$ $2p^4$	$^1D_2$ - $^1S_0$	1.19	
793.3(3)	793.3(1.3)	6.12 +3	Cr XVIII	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	1.30	HSCS
	Q 875.6(8)	2.03 +1	Cr XIX	$2s^2$ $2p^2$	$^1D_2$ - $^1S_0$	1.40	
	879.96(23)	5.14 +3	Cr XVIII	$2s^2$ $2p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	1.30	
979.0(3)	979.06(14)	5.93 +3	Cr XIX	$2s^2$ $2p^2$	$^3P_2$ - $^1D_2$	1.40	HSCS
	988.5(1.0)	7.59 +1	Cr XIII	3s 3p	$^3P_0$ - $^1P_1$	0.35	
	999.6(3)	3.33 +3	Cr XVIII	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	1.30	
	1028.49(10)	5.03 +1	Cr XIII	3s 3p	$^3P_1$ - $^1P_1$	0.35	
	1135.8(1.3)	6.25 +1	Cr XIII	3s 3p	$^3P_2$ - $^1P_1$	0.35	
1205.9(3)	1205.9(3)	5.11 +3	Cr XX	$2s^2$ 2p	$^2P_{1/2}$ - $^2P_{3/2}$	1.50	HSCS
1340.7(4)	1340.09(20)	4.09 +2	Cr XVII	$2s^2$ $2p^4$	$^3P_1$ - $^1D_2$	1.19	FBM
1410.60(2)	1410.62(4)	6.39 +3	Cr XVI	$2s^2$ $2p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	1.10	PSS
1440.01(2)	1440.8(2.1)	3.68 +2	Cr XI	$3s^2$ $3p^2$	$^3P_1$ - $^1S_0$	0.27	SBT
1489.04(3)	1489.05(16)	1.21 +2	Cr X	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	0.24	SBT
1564.30(2)	1564.09(17)	5.89 +1	Cr X	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	0.24	SBT
1566.4(1)	1565.(5)	3.38 +3	Cr XXI	2s 2p	$^3P_1$ - $^3P_2$	1.63	Su
1656.3(3)	1656.29(27)	4.58 +3	Cr XVII	$2s^2$ $2p^4$	$^3P_2$ - $^3P_1$	1.19	HSCS
	1693.9(6)	3.40 +2	Cr IX	$3s^2$ $3p^4$	$^3P_1$ - $^1S_0$	0.21	
2090.9(3)	2090.9(4)	1.81 +3	Cr XIX	$2s^2$ $2p^2$	$^3P_0$ - $^3P_1$	1.40	HSCS
	2534.1(5)	3.67 -1*	Cr X	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	0.24	
2606.4(3)	2606.4(3)	3.80 +2	Cr XVIII	$2s^2$ $2p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	1.30	DH
	Q 2634.(7)	1.03 +1	Cr XI	$3s^2$ $3p^2$	$^1D_2$ - $^1S_0$	0.27	
	2694.4(5)	1.14 +1	Cr X	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	0.24	
	Q 2733.6(1.5)	6.41 +0	Cr IX	$3s^2$ $3p^4$	$^1D_2$ - $^1S_0$	0.21	
2885.4(3)	2885.4(1.2)	4.69 +2	Cr XIX	$2s^2$ $2p^2$	$^3P_1$ - $^3P_2$	1.40	HSCS
3178.	3177.9(7)	1.77 +1	Cr XI	$3s^2$ $3p^2$	$^3P_1$ - $^1D_2$	0.27	M
	3301.1(5)	2.99 +1	Cr IX	$3s^2$ $3p^4$	$^3P_2$ - $^1D_2$	0.21	
	3326.4(8)	6.22 +1	Cr X	$3s^2$ $3p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	0.24	
	3608.2(9)	2.86 +1*	Cr X	$3s^2$ $3p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	0.24	
	3725.8(1.0)	2.82 +1*	Cr X	$3s^2$ $3p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	0.24	

Table 21. Chromium: wavelengths and transition probabilities - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
3996.8(4)	3996.6(1.1)	2.60 +1	Cr XI	$3s^2\ 3p^2$	$^3P_2$ - $^1D_2$	0.27	J
4038.6(3)	4039.(7)	1.27 +2	Cr XVIII	$2s^2\ 2p^3$	$^2D_{3/2}$ - $^2D_{5/2}$	1.30	DH
	4330.(40)	2.38 +2	Cr XXI	2s 2p	$^3P_0$ - $^3P_1$	1.63	
	4450.5(1.4)	4.19 +0	Cr IX	$3s^2\ 3p^4$	$^3P_1$ - $^1D_2$	0.21	
8153.8(4)	8153.7(7)	1.66 +1	Cr XII	$3s^2\ 3p$	$^2P_{1/2}$ - $^2P_{3/2}$	0.30	J
	10106.4(2.0)	1.74 +1	Cr VIII	$3s^2\ 3p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	0.18	
	10878.(120)	1.03 +1	Cr XIII	3s 3p	$^3P_1$ - $^3P_2$	0.35	
	12783.(8)	1.04 +1	Cr IX	$3s^2\ 3p^4$	$^3P_2$ - $^3P_1$	0.21	
	15514.(17)	3.46 +0	Cr XI	$3s^2\ 3p^2$	$^3P_1$ - $^3P_2$	0.27	
	18059.(16)	2.98 +0	Cr XI	$3s^2\ 3p^2$	$^3P_0$ - $^3P_1$	0.27	
	2.54(6) μm	1.13 +0	Cr XIII	3s 3p	$^3P_0$ - $^3P_1$	0.35	
	3.103(7) μm	2.74 -1	Cr X	$3s^2\ 3p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	0.24	
	4.260(13) μm	1.28 -1	Cr X	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2D_{5/2}$	0.24	
	4.3(4) μm	1.93 -1	Cr XVII	$2s^2\ 2p^4$	$^3P_0$ - $^3P_1$	1.19	
	5.787(24) μm	2.73 -1	Cr IX	$3s^2\ 3p^4$	$^3P_1$ - $^3P_0$	0.21	

Table 22. Manganese: wavelengths and transition probabilities

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	266.37(28)	1.94 +4	Mn XXII	2s 2p	$^3P_0$ - $^1P_1$	1.79	
	286.70(25)	1.14 +4	Mn XXII	2s 2p	$^3P_1$ - $^1P_1$	1.79	
	342.78(26)	2.19 +4	Mn XIX	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	1.44	
	365.6(5)	9.65 +4	Mn XX	$2s^2$ $2p^2$	$^3P_1$ - $^1S_0$	1.54	
	368.4(5)	9.16 +3	Mn XXII	2s 2p	$^3P_2$ - $^1P_1$	1.79	
	413.0(4)	2.08 +4	Mn XIX	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	1.44	
	457.8(8)	9.94 +4	Mn XVIII	$2s^2$ $2p^4$	$^3P_1$ - $^1S_0$	1.32	
	615.6(8)	6.50 +2	Mn XIX	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	1.44	
	625.2(1.1)	2.66 +4	Mn XIX	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	1.44	
	655.0(1.2)	9.56 +3	Mn XX	$2s^2$ $2p^2$	$^3P_1$ - $^1D_2$	1.54	
	664.0(1.4)	1.08 +4	Mn XVIII	$2s^2$ $2p^4$	$^3P_2$ - $^1D_2$	1.32	
Q	707.2(2.1)	5.53 +1	Mn XVIII	$2s^2$ $2p^4$	$^1D_2$ - $^1S_0$	1.32	
	758.9(1.3)	1.02 +4	Mn XIX	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	1.44	
	773.5(1.7)	8.13 +3	Mn XIX	$2s^2$ $2p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	1.44	
Q	827.7(2.5)	2.16 +1	Mn XX	$2s^2$ $2p^2$	$^1D_2$ - $^1S_0$	1.54	
	880.2(2.2)	9.51 +3	Mn XX	$2s^2$ $2p^2$	$^3P_2$ - $^1D_2$	1.54	
	906.3(2.3)	4.54 +3	Mn XIX	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	1.44	
	914.8(8)	1.26 +2	Mn XIV	3s 3p	$^3P_0$ - $^1P_1$	0.40	
	956.7(9)	8.21 +1	Mn XIV	3s 3p	$^3P_1$ - $^1P_1$	0.40	
	1006.4(3.0)	8.79 +3	Mn XXI	$2s^2$ 2p	$^2P_{1/2}$ - $^2P_{3/2}$	1.64	
	1073.8(1.2)	9.75 +1	Mn XIV	3s 3p	$^3P_2$ - $^1P_1$	0.40	
	1170.(7)	1.12 +4	Mn XVII	$2s^2$ $2p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	1.24	
	1293.(4)	5.94 +3	Mn XXII	2s 2p	$^3P_1$ - $^3P_2$	1.79	
	1298.(6)	5.30 +2	Mn XVIII	$2s^2$ $2p^4$	$^3P_1$ - $^1D_2$	1.32	
1322.23(4)	1322.(6)	6.20 +2	Mn XII	$3s^2$ $3p^2$	$^3P_1$ - $^1S_0$	0.31	ST
	1359.(4)	8.17 +3	Mn XVIII	$2s^2$ $2p^4$	$^3P_2$ - $^3P_1$	1.32	
1359.57(2)	1359.58(9)	2.00 +2	Mn XI	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	0.29	SBT
1450.49(5)	1450.43(10)	1.02 +2	Mn XI	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	0.29	SBT
	1574.2(7)	5.90 +2	Mn X	$3s^2$ $3p^4$	$^3P_1$ - $^1S_0$	0.25	
	1678.(6)	3.46 +3	Mn XX	$2s^2$ $2p^2$	$^3P_0$ - $^3P_1$	1.54	
	2015.(11)	7.98 +2	Mn XIX	$2s^2$ $2p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	1.44	
	2341.09(27)	8.33 -1*	Mn XI	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	0.29	
Q	2456.(19)	1.12 +1	Mn XII	$3s^2$ $3p^2$	$^1D_2$ - $^1S_0$	0.31	
Q	2516.5(2.7)	7.24 +0	Mn X	$3s^2$ $3p^4$	$^1D_2$ - $^1S_0$	0.25	
	2538.3(3)	2.42 +1	Mn XI	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	0.29	
	2559.(19)	6.43 +2	Mn XX	$2s^2$ $2p^2$	$^3P_1$ - $^3P_2$	1.54	
	2860.(12)	3.35 +1	Mn XII	$3s^2$ $3p^2$	$^3P_1$ - $^1D_2$	0.31	
	2925.9(6)	1.13 +2	Mn XI	$3s^2$ $3p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	0.29	
	2956.0(2.6)	5.33 +1	Mn X	$3s^2$ $3p^4$	$^3P_2$ - $^1D_2$	0.25	
	3240.6(7)	4.73 +1*	Mn XI	$3s^2$ $3p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	0.29	
	3259.(30)	2.35 +2	Mn XIX	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2D_{5/2}$	1.44	

Table 22. Manganese: wavelengths and transition probabilities - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	3381.9(8)	4.89 +1*	Mn XI	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{1/2}$	0.29	
3685.5(4)	3682.(19)	4.48 +1	Mn XII	$3s^2\ 3p^2$	$^3P_2 - {}^1D_2$	0.31	J
	3756.(36)	3.73 +2	Mn XXII	2s 2p	$^3P_0 - {}^3P_1$	1.79	
	4200.(5)	6.42 +0	Mn X	$3s^2\ 3p^4$	$^3P_1 - {}^1D_2$	0.25	
6536.3(4)	6536.3(4)	3.22 +1	Mn XIII	$3s^2\ 3p$	$^2P_{1/2} - {}^2P_{3/2}$	0.34	J
	7968.5(1.3)	3.55 +1	Mn IX	$3s^2\ 3p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.22	
	8770.(110)	1.97 +1	Mn XIV	3s 3p	$^3P_1 - {}^3P_2$	0.40	
	9978.(4)	2.18 +1	Mn X	$3s^2\ 3p^4$	$^3P_2 - {}^3P_1$	0.25	
	12817.(230)	6.03 +0	Mn XII	$3s^2\ 3p^2$	$^3P_1 - {}^3P_2$	0.31	
	13885.(190)	6.52 +0	Mn XII	$3s^2\ 3p^2$	$^3P_0 - {}^3P_1$	0.31	
	14200.(600)	5.15 +0	Mn XVIII	$2s^2\ 2p^4$	$^3P_0 - {}^3P_1$	1.32	
	2.09(6) μm	2.03 +0	Mn XIV	3s 3p	$^3P_0 - {}^3P_1$	0.40	
	2.170(3) μm	7.80 -1	Mn XI	$3s^2\ 3p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.29	
	3.013(6) μm	3.54 -1	Mn XI	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2D_{5/2}$	0.29	
	5.624(18) μm	2.90 -1	Mn X	$3s^2\ 3p^4$	$^3P_1 - {}^3P_0$	0.25	

Table 23. Iron: wavelengths and transition probabilities

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	247.12(14)	3.01 +4	Fe XXIII	2s 2p	$^3P_0$ - $^1P_1$	1.96	
	267.59(12)	1.72 +4	Fe XXIII	2s 2p	$^3P_1$ - $^1P_1$	1.96	
309.26(3)	309.6(3)	2.91 +4	Fe XX	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	1.58	SBST
	335.5(3)	1.43 +5	Fe XXI	$2s^2$ $2p^2$	$^3P_1$ - $^1S_0$	1.69	
	355.80(22)	1.26 +4	Fe XXIII	2s 2p	$^3P_2$ - $^1P_1$	1.96	
	384.8(4)	3.27 +4	Fe XX	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	1.58	
424.26(5)	424.27(7)	1.50 +5	Fe XIX	$2s^2$ $2p^4$	$^3P_1$ - $^1S_0$	1.47	W
541.35(5)	541.42(12)	4.49 +4	Fe XX	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	1.58	W
567.76(5)	568.9(1.0)	1.27 +3	Fe XX	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	1.58	W
585.8(3)	585.79(17)	1.59 +4	Fe XXI	$2s^2$ $2p^2$	$^3P_1$ - $^1D_2$	1.69	HSCS
592.234(6)	592.235(7)	1.73 +4	Fe XIX	$2s^2$ $2p^4$	$^3P_2$ - $^1D_2$	1.47	PSS
Q	639.84(16)	7.33 +1	Fe XIX	$2s^2$ $2p^4$	$^1D_2$ - $^1S_0$	1.47	
679.3(3)	679.39(20)	1.27 +4	Fe XX	$2s^2$ $2p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	1.58	H
	723.2(1.6)	1.64 +4	Fe XX	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	1.58	
Q	785.3(1.9)	2.27 +1	Fe XXI	$2s^2$ $2p^2$	$^1D_2$ - $^1S_0$	1.69	
786.1(3)	786.1(3)	1.51 +4	Fe XXI	$2s^2$ $2p^2$	$^3P_2$ - $^1D_2$	1.69	HSCS
	822.2(3)	6.01 +3	Fe XX	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	1.58	
845.55(1)	845.5(3)	1.48 +4	Fe XXII	$2s^2$ 2p	$^2P_{1/2}$ - $^2P_{3/2}$	1.80	SH(82)
	847.43(20)	2.09 +2	Fe XV	3s 3p	$^3P_0$ - $^1P_1$	0.46	
	890.84(17)	1.34 +2	Fe XV	3s 3p	$^3P_1$ - $^1P_1$	0.46	
974.86(2)	974.858(19)	1.93 +4	Fe XVIII	$2s^2$ $2p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	1.36	PSS
	1019.4(3)	1.50 +2	Fe XV	3s 3p	$^3P_2$ - $^1P_1$	0.46	
1079.3(3)	1079.3(5)	1.02 +4	Fe XXIII	2s 2p	$^3P_1$ - $^3P_2$	1.96	HSCS
1118.060(10)	1118.055(25)	1.45 +4	Fe XIX	$2s^2$ $2p^4$	$^3P_2$ - $^3P_1$	1.47	PSS
1216.43(1)	1216.46(15)	1.01 +3	Fe XIII	$3s^2$ $3p^2$	$^3P_1$ - $^1S_0$	0.36	SBT
1242.00(1)	1242.00(8)	3.17 +2	Fe XII	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	0.33	SBT
	1259.27(4)	6.72 +2	Fe XIX	$2s^2$ $2p^4$	$^3P_1$ - $^1D_2$	1.47	
1349.40(1)	1349.36(9)	1.73 +2	Fe XII	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	0.33	SBT
1354.08(5)	1354.10(9)	6.49 +3	Fe XXI	$2s^2$ $2p^2$	$^3P_0$ - $^3P_1$	1.69	SBT
1467.06(1)	1467.4(1.1)	9.90 +2	Fe XI	$3s^2$ $3p^4$	$^3P_1$ - $^1S_0$	0.29	SBT
	1585.5(1.1)	1.59 +3	Fe XX	$2s^2$ $2p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	1.58	
2169.08(2)	2169.69(24)	1.84 +0*	Fe XII	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	0.33	SBT
2298.0(3)	2298.0(5)	8.46 +2	Fe XXI	$2s^2$ $2p^2$	$^3P_1$ - $^3P_2$	1.69	HSCS
Q	2301.3(5)	1.20 +1	Fe XIII	$3s^2$ $3p^2$	$^1D_2$ - $^1S_0$	0.36	
Q	2321.0(2.7)	8.31 +0	Fe XI	$3s^2$ $3p^4$	$^1D_2$ - $^1S_0$	0.29	
2405.68(1)	2405.1(3)	4.81 +1	Fe XII	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	0.33	SBT
2565.93(6)	2566.7(5)	2.00 +2	Fe XII	$3s^2$ $3p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	0.33	SBT
2578.77(1)	2578.84(14)	4.57 +1	Fe XIII	$3s^2$ $3p^2$	$^3P_1$ - $^1D_2$	0.36	SBT
2648.71(2)	2648.67(7)	9.23 +1	Fe XI	$3s^2$ $3p^4$	$^3P_2$ - $^1D_2$	0.29	SBT
2665.1(3)	2665.2(3.0)	4.17 +2	Fe XX	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2D_{5/2}$	1.58	SH(78)
	2902.8(6)	8.13 +1*	Fe XII	$3s^2$ $3p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	0.33	

Table 2. Iron wavelengths and transition probabilities - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
3072.0(4)	3072.0(7)	7.21 +1*	Fe XII	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{1/2}$	0.33	J
	3230.(16)	5.70 +2	Fe XXIII	2s 2p	$^3P_0 - {}^3P_1$	1.96	
3388.5(4)	3388.05(23)	5.75 +1	Fe XIII	$3s^2\ 3p^2$	$^3P_2 - {}^1D_2$	0.36	J
3986.8(4)	3986.80(22)	9.44 +0	Fe XI	$3s^2\ 3p^4$	$^3P_1 - {}^1D_2$	0.29	J
5302.86(6)	5302.9(6)	6.02 +1	Fe XIV	$3s^2\ 3p$	$^2P_{1/2} - {}^2P_{3/2}$	0.39	E
6374.6(4)	6374.53(4)	6.94 +1	Fe X	$3s^2\ 3p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.26	J
	7045.(20)	4.03 +1	Fe XIX	$2s^2\ 2p^4$	$^3P_0 - {}^3P_1$	1.47	
7058.6(4)	7060.(10)	3.74 +1	Fe XV	3s 3p	$^3P_1 - {}^3P_2$	0.46	J
7891.8(4)	7891.8(6)	4.37 +1	Fe XI	$3s^2\ 3p^4$	$^3P_2 - {}^3P_1$	0.29	J
10746.8(4)	10746.9(5)	1.40 +1	Fe XIII	$3s^2\ 3p^2$	$^3P_0 - {}^3P_1$	0.36	J
10797.9(4)	10797.9(7)	9.87 +0	Fe XIII	$3s^2\ 3p^2$	$^3P_1 - {}^3P_2$	0.36	J
	15606.(17)	2.04 +0	Fe XII	$3s^2\ 3p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.33	
	17390.(60)	3.58 +0	Fe XV	3s 3p	$^3P_0 - {}^3P_1$	0.46	
	2.217(3) μm	8.68 -1	Fe XII	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2D_{5/2}$	0.33	
	6.082(19) μm	2.23 -1	Fe XI	$3s^2\ 3p^4$	$^3P_1 - {}^3P_0$	0.29	

Table 24. Cobalt: wavelengths and transition probabilities

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	229.40(15)	4.59 +4	Co XXIV	2s 2p	$^3P_0$ - $^1P_1$	2.12	
	249.80(18)	2.57 +4	Co XXIV	2s 2p	$^3P_1$ - $^1P_1$	2.12	
	278.55(17)	3.72 +4	Co XXI	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	1.74	
	307.89(27)	2.09 +5	Co XXII	$2s^2$ $2p^2$	$^3P_1$ - $^1S_0$	1.85	
	345.0(3)	1.68 +4	Co XXIV	2s 2p	$^3P_2$ - $^1P_1$	2.12	
	356.8(3)	5.10 +4	Co XXI	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	1.74	
	390.9(4)	2.17 +5	Co XX	$2s^2$ $2p^4$	$^3P_1$ - $^1S_0$	1.60	
	471.8(6)	7.39 +4	Co XXI	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	1.74	
	522.1(6)	2.43 +3	Co XXI	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	1.74	
	523.3(8)	2.58 +4	Co XXII	$2s^2$ $2p^2$	$^3P_1$ - $^1D_2$	1.85	
	528.3(6)	2.73 +4	Co XX	$2s^2$ $2p^4$	$^3P_2$ - $^1D_2$	1.60	
Q	574.9(9)	1.01 +2	Co XX	$2s^2$ $2p^4$	$^1D_2$ - $^1S_0$	1.60	
	597.1(1.0)	1.95 +4	Co XXI	$2s^2$ $2p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	1.74	
	680.1(1.0)	2.62 +4	Co XXI	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	1.74	
	696.5(1.4)	2.38 +4	Co XXII	$2s^2$ $2p^2$	$^3P_2$ - $^1D_2$	1.85	
	717.9(1.5)	2.42 +4	Co XXIII	$2s^2$ 2p	$^2P_{1/2}$ - $^2P_{3/2}$	1.96	
Q	747.9(1.6)	2.36 +1	Co XXII	$2s^2$ $2p^2$	$^1D_2$ - $^1S_0$	1.85	
	750.6(1.6)	7.57 +3	Co XXI	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	1.74	
	786.2(1.3)	3.42 +2	Co XVI	3s 3p	$^3P_0$ - $^1P_1$	0.51	
	819.9(1.3)	3.25 +4	Co XIX	$2s^2$ $2p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	1.49	
	831.9(1.4)	2.14 +2	Co XVI	3s 3p	$^3P_1$ - $^1P_1$	0.51	
	905.1(2.3)	1.74 +4	Co XXIV	2s 2p	$^3P_1$ - $^3P_2$	2.12	
	930.9(1.9)	2.47 +4	Co XX	$2s^2$ $2p^4$	$^3P_2$ - $^3P_1$	1.60	
	972.7(1.9)	2.26 +2	Co XVI	3s 3p	$^3P_2$ - $^1P_1$	0.51	
	1102.2(2.7)	1.12 +4	Co XXII	$2s^2$ $2p^2$	$^3P_0$ - $^3P_1$	1.85	
	1123.0(9)	1.60 +3	Co XIV	$3s^2$ $3p^2$	$^3P_1$ - $^1S_0$	0.41	
	1134.17(26)	4.85 +2	Co XIII	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	0.38	
	1221.(4)	8.38 +2	Co XX	$2s^2$ $2p^4$	$^3P_1$ - $^1D_2$	1.60	
	1258.5(3)	2.87 +2	Co XIII	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	0.38	
	1270.(5)	3.02 +3	Co XXI	$2s^2$ $2p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	1.74	
	1368.7(5)	1.62 +3	Co XII	$3s^2$ $3p^4$	$^3P_1$ - $^1S_0$	0.34	
	2011.8(8)	3.96 +0*	Co XIII	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	0.38	
	2104.(12)	1.05 +3	Co XXII	$2s^2$ $2p^2$	$^3P_1$ - $^3P_2$	1.85	
Q	2137.9(1.3)	9.72 +0	Co XII	$3s^2$ $3p^4$	$^1D_2$ - $^1S_0$	0.34	
Q	2166.(3)	1.27 +1	Co XIV	$3s^2$ $3p^2$	$^1D_2$ - $^1S_0$	0.41	
	2245.5(1.4)	3.49 +2	Co XIII	$3s^2$ $3p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	0.38	
	2247.(14)	6.75 +2	Co XXI	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2D_{5/2}$	1.74	
	2290.2(1.0)	9.05 +1	Co XIII	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	0.38	
	2331.(4)	1.09 +2	Co XIV	$3s^2$ $3p^2$	$^3P_1$ - $^1D_2$	0.41	
	2373.4(1.1)	1.56 +2	Co XII	$3s^2$ $3p^4$	$^3P_2$ - $^1D_2$	0.34	
	2598.0(1.9)	1.33 +2*	Co XIII	$3s^2$ $3p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	0.38	

Table 24. Cobalt: wavelengths and transition probabilities - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	2791.7(2.2)	1.10 +2*	Co XIII	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{1/2}$	0.38	
	2809.(22)	8.48 +2	Co XXIV	2s 2p	$^3P_0 - {}^3P_1$	2.12	
	3110.(7)	1.24 +2	Co XIV	$3s^2\ 3p^2$	$^3P_2 - {}^1D_2$	0.41	
3801.2	3801.(4)	1.34 +1	Co XII	$3s^2\ 3p^4$	$^3P_1 - {}^1D_2$	0.34	P
	4249.(50)	1.75 +2	Co XX	$2s^2\ 2p^4$	$^3P_0 - {}^3P_1$	1.60	
4350.6	4352.(10)	1.09 +2	Co XV	$3s^2\ 3p$	$^2P_{1/2} - {}^2P_{3/2}$	0.44	P
T 5188.5	5168.(13)	1.30 +2	Co XI	$3s^2\ 3p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.31	P
5744.	5746.(19)	7.01 +1	Co XVI	3s 3p	$^3P_1 - {}^3P_2$	0.51	P
	6319.(8)	8.42 +1	Co XII	$3s^2\ 3p^4$	$^3P_2 - {}^3P_1$	0.34	
	8310.(34)	2.99 +1	Co XIV	$3s^2\ 3p^2$	$^3P_0 - {}^3P_1$	0.41	
	9300.(60)	1.50 +1	Co XIV	$3s^2\ 3p^2$	$^3P_1 - {}^3P_2$	0.41	
	11478.(40)	4.98 +0	Co XIII	$3s^2\ 3p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.38	
	14300.(120)	6.17 +0	Co XVI	3s 3p	$^3P_0 - {}^3P_1$	0.51	
	16550.(70)	2.04 +0	Co XIII	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2D_{5/2}$	0.38	
	8.00(18) μm	9.59 -2	Co XII	$3s^2\ 3p^4$	$^3P_1 - {}^3P_0$	0.34	

Table 25. Nickel: wavelengths and transition probabilities

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	212.81(16)	6.91 +4	Ni XXV	2s 2p	$^3P_0$ - $^1P_1$	2.30	
	232.89(11)	3.79 +4	Ni XXV	2s 2p	$^3P_1$ - $^1P_1$	2.30	
	249.94(19)	4.60 +4	Ni XXII	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	1.89	
	282.4(3)	3.02 +5	Ni XXIII	$2s^2$ $2p^2$	$^3P_1$ - $^1S_0$	2.01	
	330.6(4)	7.80 +4	Ni XXII	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	1.89	
	334.9(4)	2.21 +4	Ni XXV	2s 2p	$^3P_2$ - $^1P_1$	2.30	
	359.1(5)	3.31 +5	Ni XXI	$2s^2$ $2p^4$	$^3P_1$ - $^1S_0$	1.76	
	412.3(5)	1.20 +5	Ni XXII	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	1.89	
465.4(3)	465.40(17)	4.15 +4	Ni XXIII	$2s^2$ $2p^2$	$^3P_1$ - $^1D_2$	2.01	HSCS
471.15(5)	471.14(6)	4.24 +4	Ni XXI	$2s^2$ $2p^4$	$^3P_2$ - $^1D_2$	1.76	W
477.6(3)	477.6(3)	4.48 +3	Ni XXII	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	1.89	HSCS
Q	514.0(8)	1.44 +2	Ni XXI	$2s^2$ $2p^4$	$^1D_2$ - $^1S_0$	1.76	
	524.3(9)	2.99 +4	Ni XXII	$2s^2$ $2p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	1.89	
609.9(3)	609.9(3)	3.94 +4	Ni XXIV	$2s^2$ 2p	$^2P_{1/2}$ - $^2P_{3/2}$	2.13	HSCS
614.8(3)	614.8(3)	3.71 +4	Ni XXIII	$2s^2$ $2p^2$	$^3P_2$ - $^1D_2$	2.01	HSCS
634.8(3)	634.8(3)	4.11 +4	Ni XXII	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	1.89	HSCS
	689.8(1.5)	9.11 +3	Ni XXII	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	1.89	
694.64(3)	694.64(3)	5.34 +4	Ni XX	$2s^2$ $2p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	1.65	PSS
Q	718.1(2.1)	2.37 +1	Ni XXIII	$2s^2$ $2p^2$	$^1D_2$ - $^1S_0$	2.01	
	730.35(16)	5.37 +2	Ni XVII	3s 3p	$^3P_0$ - $^1P_1$	0.57	
	764.6(1.8)	2.87 +4	Ni XXV	2s 2p	$^3P_1$ - $^3P_2$	2.30	
	777.06(19)	3.30 +2	Ni XVII	3s 3p	$^3P_1$ - $^1P_1$	0.57	
779.5(3)	779.48(12)	4.14 +4	Ni XXI	$2s^2$ $2p^4$	$^3P_2$ - $^3P_1$	1.76	HSCS
911.0(3)	911.00(25)	2.07 +4	Ni XXIII	$2s^2$ $2p^2$	$^3P_0$ - $^3P_1$	2.01	HSCS
	928.76(27)	3.26 +2	Ni XVII	3s 3p	$^3P_2$ - $^1P_1$	0.57	
	1025.(5)	5.61 +3	Ni XXII	$2s^2$ $2p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	1.89	
	1033.2(5)	2.50 +3	Ni XV	$3s^2$ $3p^2$	$^3P_1$ - $^1S_0$	0.46	
	1034.9(5)	7.17 +2	Ni XIV	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	0.43	
1174.72(5)	1174.720(7)	4.66 +2	Ni XIV	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	0.43	SBT
1191.1(4)	1191.0(3)	1.01 +3	Ni XXI	$2s^2$ $2p^4$	$^3P_1$ - $^1D_2$	1.76	FBM
1277.23(1)	1277.231(18)	2.57 +3	Ni XIII	$3s^2$ $3p^4$	$^3P_1$ - $^1S_0$	0.38	SBT
1866.75(1)	1866.751(17)	8.27 +0*	Ni XIV	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	0.43	SBT
1917.3(2)	1914.98(21)	1.32 +3	Ni XXIII	$2s^2$ $2p^2$	$^3P_1$ - $^3P_2$	2.01	H
1928.7(3)	1929.(6)	1.03 +3	Ni XXII	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2D_{5/2}$	1.89	H
	1966.1(1.9)	5.97 +2	Ni XIV	$3s^2$ $3p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	0.43	
Q	1968.38(4)	1.16 +1	Ni XIII	$3s^2$ $3p^4$	$^1D_2$ - $^1S_0$	0.38	
Q	2046.5(2.1)	1.34 +1	Ni XV	$3s^2$ $3p^2$	$^1D_2$ - $^1S_0$	0.46	
2085.51(5)	2085.51(3)	1.94 +2	Ni XV	$3s^2$ $3p^2$	$^3P_1$ - $^1D_2$	0.46	SBT
2125.50(2)	2125.500(23)	2.58 +2	Ni XIII	$3s^2$ $3p^4$	$^3P_2$ - $^1D_2$	0.38	SBT
2184.26(5)	2184.259(24)	1.63 +2	Ni XIV	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	0.43	SBT
	2321.6(2.7)	2.11 +2*	Ni XIV	$3s^2$ $3p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	0.43	

Table 25. Nickel: wavelengths and transition probabilities - Continued

Wavelength Observed	Wavelength Calculated		A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	2467.(19)		1.23 +3	Ni XXV	2s 2p	$^3P_0$ - $^3P_1$	2.30	
	2539.96(5)		1.59 +2	Ni XIV	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	0.43	
2818.2(3)	2817.7(3)		5.72 +2	Ni XXI	$2s^2\ 2p^4$	$^3P_0$ - $^3P_1$	1.76	HSCS
	2818.01(6)		2.05 +2	Ni XV	$3s^2\ 3p^2$	$^3P_2$ - $^1D_2$	0.46	
3601.1(4)	3600.0(2.6)		1.93 +2	Ni XVI	$3s^2$ 3p	$^2P_{1/2}$ - $^2P_{3/2}$	0.50	J
	3636.50(9)		1.84 +1	Ni XIII	$3s^2\ 3p^4$	$^3P_1$ - $^1D_2$	0.38	
4231.2(4)	4230.9(1.8)		2.37 +2	Ni XII	$3s^2\ 3p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	0.35	J
T 4744.	4756.(10)		1.23 +2	Ni XVII	3s 3p	$^3P_1$ - $^3P_2$	0.57	P
5115.8(4)	5115.81(10)		1.57 +2	Ni XIII	$3s^2\ 3p^4$	$^3P_2$ - $^3P_1$	0.38	J
6701.7(4)	6701.68(22)		5.65 +1	Ni XV	$3s^2\ 3p^2$	$^3P_0$ - $^3P_1$	0.46	J
8024.1(4)	8024.1(5)		2.27 +1	Ni XV	$3s^2\ 3p^2$	$^3P_1$ - $^3P_2$	0.46	J
	8690.(40)		1.11 +1	Ni XIV	$3s^2\ 3p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	0.43	
	12150.(60)		1.00 +1	Ni XVII	3s 3p	$^3P_0$ - $^3P_1$	0.57	
	12815.0(1.2)		4.27 +0	Ni XIV	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2D_{5/2}$	0.43	
	19.3(4)	μm	-	Ni XIII	$3s^2\ 3p^4$	$^3P_1$ - $^3P_0$	0.38	

Table 26. Copper: wavelengths and transition probabilities

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	197.66(09)	1.02 +5	Cu XXVI	2s 2p	$^3P_0$ - $^1P_1$	2.41	
	216.89(11)	5.55 +4	Cu XXVI	2s 2p	$^3P_1$ $^1P_1$	2.41	
	223.66(14)	5.48 +4	Cu XXIII	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	1.94	
	257.61(19)	4.38 +5	Cu XXIV	$2s^2$ $2p^2$	$^3P_1$ - $^1S_0$	2.09	
	304.96(26)	1.18 +5	Cu XXIII	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	1.94	
	326.00(24)	2.85 +4	Cu XXVI	2s 2p	$^3P_2$ - $^1P_1$	2.41	
	328.6(3)	4.85 +5	Cu XXII	$2s^2$ $2p^4$	$^3P_1$ - $^1S_0$	1.67	
	362.0(4)	1.90 +5	Cu XXIII	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	1.94	
414.1(3)	414.0(5)	6.53 +4	Cu XXIV	$2s^2$ $2p^2$	$^3P_1$ - $^1D_2$	2.09	HSCS
420.0(3)	419.8(5)	6.52 +4	Cu XXII	$2s^2$ $2p^4$	$^3P_2$ - $^1D_2$	1.67	HSCS
434.8(3)	434.7(5)	7.98 +3	Cu XXIII	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	1.94	HSCS
	Q 458.3(6)	2.10 +2	Cu XXII	$2s^2$ $2p^4$	$^1D_2$ - $^1S_0$	1.67	
	460.7(6)	4.53 +4	Cu XXIII	$2s^2$ $2p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	1.94	
522.8(3)	522.66(27)	6.26 +4	Cu XXV	$2s^2$ 2p	$^2P_{1/2}$ - $^2P_{3/2}$	2.22	HSCS
540.0(3)	539.8(8)	5.78 +4	Cu XXIV	$2s^2$ $2p^2$	$^3P_2$ - $^1D_2$	2.09	HSCS
585.0(3)	585.3(1.0)	6.40 +4	Cu XXIII	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	1.94	HSCS
592.3(3)	592.2(4)	8.62 +4	Cu XXI	$2s^2$ $2p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	1.54	HSCS
	636.7(1.2)	1.05 +4	Cu XXIII	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	1.94	
648.0(3)	648.0(6)	4.74 +4	Cu XXVI	2s 2p	$^3P_1$ - $^3P_2$	2.41	HSCS
657.7(3)	657.7(1.2)	6.78 +4	Cu XXII	$2s^2$ $2p^4$	$^3P_2$ - $^3P_1$	1.67	
	670.1(1.8)	8.36 +2	Cu XVIII	3s 3p	$^3P_0$ - $^1P_1$	0.60	
	Q 681.9(1.3)	2.53 +1	Cu XXIV	$2s^2$ $2p^2$	$^1D_2$ - $^1S_0$	2.09	
	726.4(2.1)	5.04 +2	Cu XVIII	3s 3p	$^3P_1$ - $^1P_1$	0.60	
756.9(3)	757.0(1.6)	3.55 +4	Cu XXIV	$2s^2$ $2p^2$	$^3P_0$ - $^3P_1$	2.09	HSCS
	839.0(2.0)	1.00 +4	Cu XXIII	$2s^2$ $2p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	1.94	
	890.4(3.2)	4.63 +2	Cu XVIII	3s 3p	$^3P_2$ - $^1P_1$	0.60	
944.6(2)	942.4(1.8)	1.03 +3	Cu XV	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	0.48	DHST
952.8(3)	953.3(1.8)	3.81 +3	Cu XVI	$3s^2$ $3p^2$	$^3P_1$ - $^1S_0$	0.52	DHSC
	1097.1(2.4)	7.45 +2	Cu XV	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	0.48	
	1161.(4)	1.21 +3	Cu XXII	$2s^2$ $2p^4$	$^3P_1$ - $^1D_2$	1.67	
	1191.3(2.8)	4.01 +3	Cu XIV	$3s^2$ $3p^4$	$^3P_1$ - $^1S_0$	0.44	
1691.0(3)	1690.(8)	1.49 +3	Cu XXIII	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2D_{5/2}$	1.94	H
	1718.(5)	1.01 +3	Cu XV	$3s^2$ $3p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	0.48	
	1731.(5)	1.68 +1*	Cu XV	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	0.48	
1776.0(3)	1777.(9)	1.57 +3	Cu XXIV	$2s^2$ $2p^2$	$^3P_1$ - $^3P_2$	2.09	HSCS
	Q 1805.(7)	1.42 +1	Cu XIV	$3s^2$ $3p^4$	$^1D_2$ - $^1S_0$	0.44	
1872.0(3)	1874.(6)	3.32 +2	Cu XVI	$3s^2$ $3p^2$	$^3P_1$ - $^1D_2$	0.52	H
	1906.(7)	4.18 +2	Cu XIV	$3s^2$ $3p^4$	$^3P_2$ - $^1D_2$	0.44	
	Q 1940.(7)	1.39 +1	Cu XVI	$3s^2$ $3p^2$	$^1D_2$ - $^1S_0$	0.52	
	1985.(11)	1.55 +3	Cu XXII	$2s^2$ $2p^4$	$^3P_0$ - $^3P_1$	1.67	
	2068.(9)	3.33 +2*	Cu XV	$3s^2$ $3p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	0.48	

Table 26. Copper: wavelengths and transition probabilities - Continued

Wavelength Observed	Wavelength Calculated		A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
2085.3(2)	2086.(9)		2.81 +2	Cu XV	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	0.48	DHST
	2228.(7)		1.55 +3	Cu XXVI	2s 2p	$^3P_0$ - $^3P_1$	2.41	
	2312.(10)		2.27 +2	Cu XV	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	0.48	
T 2539.7(3)	2555.(12)		3.28 +2	Cu XVI	$3s^2\ 3p^2$	$^3P_2$ - $^1D_2$	0.52	DHSC
3007.6(3)	3007.6(1.0)		3.30 +2	Cu XVII	$3s^2\ 3p$	$^2P_{1/2}$ - $^2P_{3/2}$	0.55	HSCS
3500.4(3)	3500.4(1.0)		4.19 +2	Cu XIII	$3s^2\ 3p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	0.41	HSCS
	3502.(20)		2.43 +2	Cu XIV	$3s^2\ 3p^4$	$^3P_1$ - $^1D_2$	0.44	
3941.6(3)	3941.6(2.2)		2.16 +2	Cu XVIII	3s 3p	$^3P_1$ - $^3P_2$	0.60	DHSC
4183.4(3)	4181.(20)		2.83 +2	Cu XIV	$3s^2\ 3p^4$	$^3P_2$ - $^3P_1$	0.44	RPSKR
5375.8(3)	5393.(30)		1.07 +2	Cu XVI	$3s^2\ 3p^2$	$^3P_0$ - $^3P_1$	0.52	DHSC
	6683.(40)		2.37 +1	Cu XV	$3s^2\ 3p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	0.48	
	7030.(50)		3.25 +1	Cu XVI	$3s^2\ 3p^2$	$^3P_1$ - $^3P_2$	0.52	
	10130.(100)		8.43 +0	Cu XV	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2D_{5/2}$	0.48	
	10436.(120)		1.59 +1	Cu XVIII	3s 3p	$^3P_0$ - $^3P_1$	0.60	
	13.9(4)	μm	5.80 -3	Cu XIV	$3s^2\ 3p^4$	$^3P_0$ - $^3P_1$	0.44	

Table 27. Zinc: wavelengths and transition probabilities

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	183.18(11)	1.50 +5	Zn XXVII	2s 2p	$^3P_0$ - $^1P_1$	2.60	
	199.73(14)	6.31 +4	Zn XXIV	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	2.10	
	201.65(14)	8.03 +4	Zn XXVII	2s 2p	$^3P_1$ - $^1P_1$	2.60	
	235.54(24)	6.23 +5	Zn XXV	$2s^2$ $2p^2$	$^3P_1$ - $^1S_0$	2.27	
	280.37(28)	1.76 +5	Zn XXIV	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	2.10	
	299.8(4)	7.03 +5	Zn XXIII	$2s^2$ $2p^4$	$^3P_1$ - $^1S_0$	1.97	
	317.4(3)	3.62 +4	Zn XXVII	2s 2p	$^3P_2$ - $^1P_1$	2.60	
	319.4(4)	2.96 +5	Zn XXIV	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	2.10	
	368.2(6)	1.01 +5	Zn XXV	$2s^2$ $2p^2$	$^3P_1$ - $^1D_2$	2.27	
	374.1(6)	9.91 +4	Zn XXIII	$2s^2$ $2p^4$	$^3P_2$ - $^1D_2$	1.97	
	393.7(6)	1.38 +4	Zn XXIV	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	2.10	
	405.4(6)	6.79 +4	Zn XXIV	$2s^2$ $2p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	2.10	
Q	407.8(7)	3.12 +2	Zn XXIII	$2s^2$ $2p^4$	$^1D_2$ - $^1S_0$	1.97	
	450.4(3)	9.78 +4	Zn XXVI	$2s^2$ 2p	$^2P_{1/2}$ - $^2P_{3/2}$	2.40	
	473.2(1.0)	8.88 +4	Zn XXV	$2s^2$ $2p^2$	$^3P_2$ - $^1D_2$	2.27	
	507.9(4)	1.37 +5	Zn XXII	$2s^2$ $2p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	1.83	
	533.0(1.0)	9.91 +4	Zn XXIV	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	2.10	
	552.9(6)	7.57 +4	Zn XXVII	2s 2p	$^3P_1$ - $^3P_2$	2.60	
	558.7(1.3)	1.09 +5	Zn XXIII	$2s^2$ $2p^4$	$^3P_2$ - $^3P_1$	1.97	
	591.6(1.2)	1.17 +4	Zn XXIV	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	2.10	
	632.2(2.3)	1.28 +3	Zn XIX	3s 3p	$^3P_0$ - $^1P_1$	0.70	
	634.0(1.7)	5.95 +4	Zn XXV	$2s^2$ $2p^2$	$^3P_0$ - $^3P_1$	2.27	
Q	653.8(1.8)	2.61 +1	Zn XXV	$2s^2$ $2p^2$	$^1D_2$ - $^1S_0$	2.27	
	680.2(1.9)	7.56 +2	Zn XIX	3s 3p	$^3P_1$ - $^1P_1$	0.70	
	694.4(1.7)	1.73 +4	Zn XXIV	$2s^2$ $2p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	2.10	
	856.6(2.9)	6.43 +2	Zn XIX	3s 3p	$^3P_2$ - $^1P_1$	0.70	
	856.6(1.9)	1.42 +3	Zn XVI	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	0.55	
	879.4(2.0)	5.69 +3	Zn XVII	$3s^2$ $3p^2$	$^3P_1$ - $^1S_0$	0.59	
	1024.6(2.7)	1.17 +3	Zn XVI	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	0.55	
	1109.(3)	6.13 +3	Zn XV	$3s^2$ $3p^4$	$^3P_1$ - $^1S_0$	0.51	
	1132.(5)	1.42 +3	Zn XXIII	$2s^2$ $2p^4$	$^3P_1$ - $^1D_2$	1.97	
	1459.(9)	3.73 +3	Zn XXIII	$2s^2$ $2p^4$	$^3P_0$ - $^3P_1$	1.97	
1507.5(1.0)	1504.(5)	1.68 +3	Zn XVI	$3s^2$ $3p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	0.55	RPSKR
	1507.(8)	2.02 +3	Zn XXIV	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2D_{5/2}$	2.10	
	1602.(6)	3.32 +1*	Zn XVI	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	0.55	
Q	1651.(7)	1.78 +1	Zn XV	$3s^2$ $3p^4$	$^1D_2$ - $^1S_0$	0.51	
	1659.(12)	1.84 +3	Zn XXV	$2s^2$ $2p^2$	$^3P_1$ - $^3P_2$	2.27	
1676.9(2)	1680.(7)	5.56 +2	Zn XVII	$3s^2$ $3p^2$	$^3P_1$ - $^1D_2$	0.59	RPSKR
1702.8(2)	1706.(7)	6.67 +2	Zn XV	$3s^2$ $3p^4$	$^3P_2$ - $^1D_2$	0.51	RPSKR
	1842.(8)	5.15 +2	Zn XVI	$3s^2$ $3p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	0.55	
Q	1846.(9)	1.43 +1	Zn XVII	$3s^2$ $3p^2$	$^1D_2$ - $^1S_0$	0.59	

Table 27. Zinc: wavelengths and transition probabilities - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	1990.(5)	4.69 +2	Zn XVI	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	0.55	
	2000.(8)[a]	2.13 +3	Zn XXVII	2s 2p	$^3P_0$ - $^3P_1$	2.60	
	2111.(10)	3.11 +2	Zn XVI	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	0.55	
2284.6(1)	2293.(10)	5.26 +2	Zn XVII	$3s^2\ 3p^2$	$^3P_2$ - $^1D_2$	0.59	BGBR
2532.0(1)	2531.5(1.0)	5.53 +2	Zn XVIII	$3s^2$ 3p	$^2P_{1/2}$ - $^2P_{3/2}$	0.63	BGBR
2922.3(1)	2922.5(1.0)	7.20 +2	Zn XIV	$3s^2\ 3p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	0.47	BGBR
3296.2(2)	3304.0(3)	3.67 +2	Zn XIX	3s 3p	$^3P_1$ - $^3P_2$	0.70	BGBR
	3374.(15)	3.15 +1	Zn XV	$3s^2\ 3p^4$	$^3P_1$ - $^1D_2$	0.51	
3450.4(2)	3449.(20)	4.98 +2	Zn XV	$3s^2\ 3p^4$	$^3P_2$ - $^3P_1$	0.51	BGBR
4355.0(3)	4365.(25)	2.00 +2	Zn XVII	$3s^2\ 3p^2$	$^3P_0$ - $^3P_1$	0.59	RPSKR
	5224.(30)	4.83 +1	Zn XVI	$3s^2\ 3p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	0.55	
	6266.(50)	4.40 +1	Zn XVII	$3s^2\ 3p^2$	$^3P_1$ - $^3P_2$	0.59	
	8206.(100)	1.54 +1	Zn XVI	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2D_{5/2}$	0.55	
	8952.(150)	2.46 +1	Zn XIX	3s 3p	$^3P_0$ - $^3P_1$	0.70	
	4.0(2) μm	2.39 -1	Zn XV	$3s^2\ 3p^4$	$^3P_0$ - $^3P_1$	0.51	

[a]This is a wavelength in vacuum.

Table 28. Gallium: wavelengths and transition probabilities

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	169.66(13)	2.19 +5	Ga XXVIII	2s 2p	$^3P_0$ - $^1P_1$	2.79	
	178.06(13)	7.58 +4	Ga XXV	$2s^2\ 2p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	2.28	
	187.22(16)	1.15 +5	Ga XXVIII	2s 2p	$^3P_1$ - $^1P_1$	2.79	
	215.25(26)	8.79 +5	Ga XXVI	$2s^2\ 2p^2$	$^3P_1$ - $^1S_0$	2.45	
	256.91(28)	2.59 +5	Ga XXV	$2s^2\ 2p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	2.28	
	272.9(4)	1.01 +6	Ga XXIV	$2s^2\ 2p^4$	$^3P_1$ - $^1S_0$	2.14	
	283.1(3)	4.52 +5	Ga XXV	$2s^2\ 2p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	2.28	
	309.4(4)	4.52 +4	Ga XXVIII	2s 2p	$^3P_2$ - $^1P_1$	2.79	
	327.5(6)	1.55 +5	Ga XXVI	$2s^2\ 2p^2$	$^3P_1$ - $^1D_2$	2.45	
	333.4(6)	1.49 +5	Ga XXIV	$2s^2\ 2p^4$	$^3P_2$ - $^1D_2$	2.14	
	355.0(5)	2.34 +4	Ga XXV	$2s^2\ 2p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	2.28	
	357.2(5)	2.28 +5	Ga XXV	$2s^2\ 2p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	2.28	
Q	362.4(7)	4.65 +2	Ga XXIV	$2s^2\ 2p^4$	$^1D_2$ - $^1S_0$	2.14	
	390.12(23)	1.50 +5	Ga XXVII	$2s^2$ 2p	$^2P_{1/2}$ - $^2P_{3/2}$	2.59	
	414.6(1.0)	1.35 +5	Ga XXVI	$2s^2\ 2p^2$	$^3P_2$ - $^1D_2$	2.45	
	437.95(29)	2.13 +5	Ga XXIII	$2s^2\ 2p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	1.99	
	474.1(6)	1.19 +5	Ga XXVIII	2s 2p	$^3P_1$ - $^3P_2$	2.79	
	477.6(1.3)	1.72 +5	Ga XXIV	$2s^2\ 2p^4$	$^3P_2$ - $^3P_1$	2.14	
	479.9(1.0)	1.52 +5	Ga XXV	$2s^2\ 2p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	2.28	
	535.1(1.6)	9.76 +4	Ga XXVI	$2s^2\ 2p^2$	$^3P_0$ - $^3P_1$	2.45	
	552.9(1.3)	1.25 +4	Ga XXV	$2s^2\ 2p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	2.28	
	580.1(1.4)	2.91 +4	Ga XXV	$2s^2\ 2p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	2.28	
	588.6(2.0)	1.93 +3	Ga XX	3s 3p	$^3P_0$ - $^1P_1$	0.70	
Q	628.0(2.2)	2.69 +1	Ga XXVI	$2s^2\ 2p^2$	$^1D_2$ - $^1S_0$	2.45	
	636.7(1.6)	1.12 +3	Ga XX	3s 3p	$^3P_1$ - $^1P_1$	0.70	
	776.9(2.0)	1.91 +3	Ga XVII	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	0.62	
813.1(3)	811.1(2.1)	8.40 +3	Ga XVIII	$3s^2\ 3p^2$	$^3P_1$ - $^1S_0$	0.66	RPSKR
	825.7(2.7)	8.75 +2	Ga XX	3s 3p	$^3P_2$ - $^1P_1$	0.70	
	955.9(2.8)	1.82 +3	Ga XVII	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	0.62	
	1030.(3)	9.22 +3	Ga XVI	$3s^2\ 3p^4$	$^3P_1$ - $^1S_0$	0.58	
	1105.(7)	1.66 +3	Ga XXIV	$2s^2\ 2p^4$	$^3P_1$ - $^1D_2$	2.14	
	1108.(7)	8.11 +3	Ga XXIV	$2s^2\ 2p^4$	$^3P_0$ - $^3P_1$	2.14	
1319.1(3)	1319.(5)	2.76 +3	Ga XVII	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	0.62	RPSKR
	1365.(8)	2.62 +3	Ga XXV	$2s^2\ 2p^3$	$^2D_{3/2}$ - $^2D_{5/2}$	2.28	
	1478.(6)	6.39 +1*	Ga XVII	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	0.62	
1503.7(3)	1503.(6)	9.15 +2	Ga XVIII	$3s^2\ 3p^2$	$^3P_1$ - $^1D_2$	0.66	RPSKR
Q	1506.(7)	2.28 +1	Ga XVI	$3s^2\ 3p^4$	$^1D_2$ - $^1S_0$	0.58	
	1526.(6)	1.05 +3	Ga XVI	$3s^2\ 3p^4$	$^3P_2$ - $^1D_2$	0.58	
	1559.(14)	2.11 +3	Ga XXVI	$2s^2\ 2p^2$	$^3P_1$ - $^3P_2$	2.45	
	1638.(7)	7.79 +2	Ga XVII	$3s^2\ 3p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	0.62	
Q	1762.(9)	1.46 +1	Ga XVIII	$3s^2\ 3p^2$	$^1D_2$ - $^1S_0$	0.66	

Table 28. Gallium: wavelengths and transition probabilities - Continued

Wavelength Observed	Wavelength Calculated		A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	1808.(9)		2.86 +3	Ga XXVIII	2s 2p	$^3P_0$ - $^3P_1$	2.79	
	1890.(10)		7.64 +2	Ga XVII	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	0.62	
	1934.(10)		4.11 +2	Ga XVII	$3s^2$ $3p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	0.62	
	2046.(10)		8.33 +2	Ga XVIII	$3s^2$ $3p^2$	$^3P_2$ - $^1D_2$	0.66	
	2146.9(1.0)		9.07 +2	Ga XIX	$3s^2$ 3p	$^2P_{1/2}$ - $^2P_{3/2}$	0.70	
2456.3(3)	2459.7(1.0)		1.21 +3	Ga XV	$3s^2$ $3p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	0.54	RPSKR
	2780.(6)		6.13 +2	Ga XX	3s 3p	$^3P_1$ - $^3P_2$	0.70	
	2868.(15)		8.54 +2	Ga XVI	$3s^2$ $3p^4$	$^3P_2$ - $^3P_1$	0.58	
	3258.(20)		4.00 +1	Ga XVI	$3s^2$ $3p^4$	$^3P_1$ - $^1D_2$	0.58	
	3566.(20)		3.62 +2	Ga XVIII	$3s^2$ $3p^2$	$^3P_0$ - $^3P_1$	0.66	
	4150.(30)		9.37 +1	Ga XVII	$3s^2$ $3p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	0.62	
	5650.(60)		5.74 +1	Ga XVIII	$3s^2$ $3p^2$	$^3P_1$ - $^3P_2$	0.66	
	6790.(80)		2.65 +1	Ga XVII	$3s^2$ $3p^3$	$^2D_{3/2}$ - $^2D_{5/2}$	0.62	
	7800.(100)		3.70 +1	Ga XX	3s 3p	$^3P_0$ - $^3P_1$	0.70	
	2.00(7)	μm	1.82 +0	Ga XVI	$3s^2$ $3p^4$	$^3P_0$ - $^3P_1$	0.58	

Table 29. Germanium: wavelengths and transition probabilities

	Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
		157.03(14)	3.16 +5	Ge XXIX	2s 2p	$^3P_0 - {}^1P_1$	3.00	
		158.58(12)	8.86 +4	Ge XXVI	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{3/2}$	2.46	
		173.59(17)	1.64 +5	Ge XXIX	2s 2p	$^3P_1 - {}^1P_1$	3.00	
		196.65(27)	1.23 +6	Ge XXVII	$2s^2\ 2p^2$	$^3P_1 - {}^1S_0$	2.64	
		234.74(27)	3.76 +5	Ge XXVI	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{1/2}$	2.46	
		247.9(4)	1.44 +6	Ge XXV	$2s^2\ 2p^4$	$^3P_1 - {}^1S_0$	2.31	
		251.8(3)	6.76 +5	Ge XXVI	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{3/2}$	2.46	
		291.5(6)	2.33 +5	Ge XXVII	$2s^2\ 2p^2$	$^3P_1 - {}^1D_2$	2.64	
	297.5(3)	297.4(6)	2.22 +5	Ge XXV	$2s^2\ 2p^4$	$^3P_2 - {}^1D_2$	2.31	H
		301.9(5)	5.56 +4	Ge XXIX	2s 2p	$^3P_2 - {}^1P_1$	3.00	
		315.2(5)	3.49 +5	Ge XXVI	$2s^2\ 2p^3$	$^2D_{5/2} - {}^2P_{3/2}$	2.46	
	319.1(3)	319.1(5)	3.83 +4	Ge XXVI	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{5/2}$	2.46	H
		Q 321.8(7)	7.02 +2	Ge XXV	$2s^2\ 2p^4$	$^1D_2 - {}^1S_0$	2.31	
	339.5(3)	339.51(17)	2.28 +5	Ge XXVIII	$2s^2$ 2p	$^2P_{1/2} - {}^2P_{3/2}$	2.79	H
		363.4(9)	2.04 +5	Ge XXVII	$2s^2\ 2p^2$	$^3P_2 - {}^1D_2$	2.64	
	379.5(1)	379.59(22)	3.27 +5	Ge XXIV	$2s^2\ 2p^3$	$^2P_{3/2} - {}^2P_{1/2}$	2.16	H
	408.7(3)	408.5(6)	1.84 +5	Ge XXIX	2s 2p	$^3P_1 - {}^3P_2$	3.00	H
	410.7(3)	410.6(1.2)	2.66 +5	Ge XXV	$2s^2\ 2p^4$	$^3P_2 - {}^3P_1$	2.31	HSCS
	427.9(3)	428.2(9)	2.33 +5	Ge XXVI	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{3/2}$	2.46	HSCS
	454.8(3)	454.7(1.5)	1.57 +5	Ge XXVII	$2s^2\ 2p^2$	$^3P_0 - {}^3P_1$	2.64	HSCS
		488.80(18)	4.78 +4	Ge XXVI	$2s^2\ 2p^3$	$^2P_{1/2} - {}^2P_{3/2}$	2.46	
		519.6(1.3)	1.30 +4	Ge XXVI	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{1/2}$	2.46	
		547.9(8)	2.89 +3	Ge XXI	3s 3p	$^3P_0 - {}^1P_1$	0.80	
		595.6(7)	1.64 +3	Ge XXI	3s 3p	$^3P_1 - {}^1P_1$	0.80	
		Q 604.2(2.6)	2.75 +1	Ge XXVII	$2s^2\ 2p^2$	$^1D_2 - {}^1S_0$	2.64	
	703.6(2)	703.1(1.9)	2.47 +3	Ge XVIII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.69	DHST
	746.9(3)	747.7(2.1)	1.22 +4	Ge XIX	$3s^2\ 3p^2$	$^3P_1 - {}^1S_0$	0.73	H
		797.7(1.3)	1.17 +3	Ge XXI	3s 3p	$^3P_2 - {}^1P_1$	0.80	
T	859.9(3)	864.(5)	1.64 +4	Ge XXV	$2s^2\ 2p^4$	$^3P_0 - {}^3P_1$	2.31	H
T	890.2(2)	890.(3)	2.80 +3	Ge XVIII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.69	DHST
T	952.9(3)	954.(3)	1.37 +4	Ge XVII	$3s^2\ 3p^4$	$^3P_1 - {}^1S_0$	0.64	DHSC
		1079.20(8)	1.90 +3	Ge XXV	$2s^2\ 2p^4$	$^3P_1 - {}^1D_2$	2.31	
		1161.(5)	4.32 +3	Ge XVIII	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{3/2}$	0.69	
		1252.(8)	3.28 +3	Ge XXVI	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2D_{5/2}$	2.46	
		1343.(6)	1.48 +3	Ge XIX	$3s^2\ 3p^2$	$^3P_1 - {}^1D_2$	0.73	
		1360.(6)	1.18 +2*	Ge XVIII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{5/2}$	0.69	
		1364.(6)	1.63 +3	Ge XVII	$3s^2\ 3p^4$	$^3P_2 - {}^1D_2$	0.63	
		Q 1368.(7)	2.99 +1	Ge XVII	$3s^2\ 3p^4$	$^1D_2 - {}^1S_0$	0.64	
		1456.(7)	1.18 +3	Ge XVIII	$3s^2\ 3p^3$	$^2D_{5/2} - {}^2P_{3/2}$	0.69	
	1473.7(1)	1474.(15)	2.39 +3	Ge XXVII	$2s^2\ 2p^2$	$^3P_1 - {}^3P_2$	2.64	H
		1646.(9)	3.76 +3	Ge XXIX	2s 2p	$^3P_0 - {}^3P_1$	3.00	

Table 29. Germanium: wavelengths and transition probabilities - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	Q 1687.(9)	1.48 +1	Ge XIX	$3s^2\ 3p^2$	$^1D_2 - {}^1S_0$	0.73	
T 1778.8(2)	1779.(10)	5.22 +2	Ge XVIII	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{1/2}$	0.69	DHST
T 1782.0(2)	1783.(10)	1.22 +3	Ge XVIII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{3/2}$	0.69	DHST
1810.4(3)	1816.(10)	1.31 +3	Ge XIX	$3s^2\ 3p^2$	$^3P_2 - {}^1D_2$	0.73	H
1832.7(3)	1832.2(1.0)	1.46 +3	Ge XX	$3s^2\ 3p$	$^2P_{1/2} - {}^2P_{3/2}$	0.77	DHSC
2085.1(1)	2085.1(1.0)	1.98 +3	Ge XVI	$3s^2\ 3p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.60	DHSC
2350.2(3)	2350.2(4)	1.01 +3	Ge XXI	3s 3p	$^3P_1 - {}^3P_2$	0.80	DHSC
2406.9(3)	2404.(14)	1.43 +3	Ge XVII	$3s^2\ 3p^4$	$^3P_2 - {}^3P_1$	0.64	DHSC
2933.7(2)	2938.(18)	6.39 +2	Ge XIX	$3s^2\ 3p^2$	$^3P_0 - {}^3P_1$	0.73	DHSC
T 3131.3(3)	3150.(20)	4.97 +1	Ge XVII	$3s^2\ 3p^4$	$^3P_1 - {}^1D_2$	0.64	DHSC
	3340.(20)	1.75 +2	Ge XVIII	$3s^2\ 3p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.69	
5170.3(3)	5150.(50)	7.24 +1	Ge XIX	$3s^2\ 3p^2$	$^3P_1 - {}^3P_2$	0.73	DHSC
T 5702.4(2)	5730.(60)	4.28 +1	Ge XVIII	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2D_{5/2}$	0.69	DHST
	6840.(50)	5.46 +1	Ge XXI	3s 3p	$^3P_0 - {}^3P_1$	0.80	
	12060.(200)	7.99 +0	Ge XVII	$3s^2\ 3p^4$	$^3P_0 - {}^3P_1$	0.64	

Table 30. Arsenic: wavelengths and transition probabilities

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	141.19(11)	9.89 +4	As XXVII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{3/2}$	2.64	
	145.25(14)	4.52 +5	As XXX	2s 2p	$^3P_0 - {}^1P_1$	3.20	
	160.74(17)	2.31 +5	As XXX	2s 2p	$^3P_1 - {}^1P_1$	3.20	
	179.63(27)	1.71 +6	As XXVIII	$2s^2\ 2p^2$	$^3P_1 - {}^1S_0$	2.83	
	213.99(26)	5.42 +5	As XXVII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{1/2}$	2.64	
	224.83(29)	9.95 +5	As XXVII	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{3/2}$	2.64	
	225.0(4)	2.04 +6	As XXVI	$2s^2\ 2p^4$	$^3P_1 - {}^1S_0$	2.49	
	259.8(6)	3.47 +5	As XXVIII	$2s^2\ 2p^2$	$^3P_1 - {}^1D_2$	2.83	
	265.5(6)	3.27 +5	As XXVI	$2s^2\ 2p^4$	$^3P_2 - {}^1D_2$	2.49	
	278.8(4)	5.24 +5	As XXVII	$2s^2\ 2p^3$	$^2D_{5/2} - {}^2P_{3/2}$	2.64	
Q	286.0(7)	1.07 +3	As XXVI	$2s^2\ 2p^4$	$^1D_2 - {}^1S_0$	2.49	
	286.1(5)	6.10 +4	As XXVII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{5/2}$	2.64	
	294.8(6)	6.77 +4	As XXX	2s 2p	$^3P_2 - {}^1P_1$	3.20	
	296.78(18)	3.41 +5	As XXIX	$2s^2\ 2p$	$^2P_{1/2} - {}^2P_{3/2}$	2.99	
	319.0(9)	3.05 +5	As XXVIII	$2s^2\ 2p^2$	$^3P_2 - {}^1D_2$	2.83	
	330.58(22)	4.95 +5	As XXV	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	2.34	
	353.5(5)	2.82 +5	As XXX	2s 2p	$^3P_1 - {}^3P_2$	3.20	
	354.9(1.1)	4.07 +5	As XXVI	$2s^2\ 2p^4$	$^3P_2 - {}^3P_1$	2.49	
	379.6(8)	3.56 +5	As XXVII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{3/2}$	2.64	
	388.9(1.3)	2.47 +5	As XXVIII	$2s^2\ 2p^2$	$^3P_0 - {}^3P_1$	2.83	
	415.0(1.0)	7.69 +4	As XXVII	$2s^2\ 2p^3$	$^2P_{1/2} - {}^2P_{3/2}$	2.64	
	490.6(1.4)	1.32 +4	As XXVII	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{1/2}$	2.64	
	510.0(1.5)	4.26 +3	As XXII	3s 3p	$^3P_0 - {}^1P_1$	0.90	
	556.9(1.3)	2.38 +3	As XXII	3s 3p	$^3P_1 - {}^1P_1$	0.90	
Q	582.2(2.9)	2.81 +1	As XXVIII	$2s^2\ 2p^2$	$^1D_2 - {}^1S_0$	2.83	
	634.8(1.8)	3.11 +3	As XIX	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.76	
	688.(4)	3.10 +4	As XXVI	$2s^2\ 2p^4$	$^3P_0 - {}^3P_1$	2.49	
	689.0(2.1)	1.75 +4	As XX	$3s^2\ 3p^2$	$^3P_1 - {}^1S_0$	0.81	
	771.6(2.4)	1.54 +3	As XXII	3s 3p	$^3P_2 - {}^1P_1$	0.90	
	828.(3)	4.24 +3	As XIX	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.76	
	881.(3)	2.00 +4	As XVIII	$3s^2\ 3p^4$	$^3P_1 - {}^1S_0$	0.71	
	1025.(4)	7.06 +3	As XIX	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{3/2}$	0.76	
	1055.(9)	2.17 +3	As XXVI	$2s^2\ 2p^4$	$^3P_1 - {}^1D_2$	2.49	
	1162.(8)	3.96 +3	As XXVII	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2D_{5/2}$	2.64	
1195.3(2)	1199.(5)	2.34 +3	As XX	$3s^2\ 3p^2$	$^3P_1 - {}^1D_2$	0.81	RPSKR
	1219.(6)	2.49 +3	As XVIII	$3s^2\ 3p^4$	$^3P_2 - {}^1D_2$	0.71	
Q	1238.(6)	4.04 +1	As XVIII	$3s^2\ 3p^4$	$^1D_2 - {}^1S_0$	0.71	
	1246.(6)	2.18 +2*	As XIX	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{5/2}$	0.76	
1292.4(2)	1294.(6)	1.77 +3	As XIX	$3s^2\ 3p^3$	$^2D_{5/2} - {}^2P_{3/2}$	0.76	RPSKR
	1400.(17)	2.68 +3	As XXVIII	$2s^2\ 2p^2$	$^3P_1 - {}^3P_2$	2.83	
	1507.(10)	4.85 +3	As XXX	2s 2p	$^3P_0 - {}^3P_1$	3.20	

Table 30. Arsenic: wavelengths and transition probabilities - Continued

	Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	1573.2(5)	1573.2(1.0)	2.30 +3	As XXI	$3s^2\ 3p$	$^2P_{1/2} - {}^2P_{3/2}$	0.85	RKSPR
T	1600.3(2)	1606.(10)	2.03 +3	As XX	$3s^2\ 3p^2$	$^3P_2 - {}^1D_2$	0.81	RPSKR
		Q 1619.(11)	1.49 +1	As XX	$3s^2\ 3p^2$	$^1D_2 - {}^1S_0$	0.81	
		1642.(10)	6.39 +2	As XIX	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{1/2}$	0.76	
	1660.4(2)	1668.(10)	1.93 +3	As XIX	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{3/2}$	0.76	RPSKR
	1777.2(3)	1779.8(1.0)	3.18 +3	As XVII	$3s^2\ 3p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.67	RPSKR
		2000.7(2.8)	1.63 +3	As XXII	3s 3p	$^3P_1 - {}^3P_2$	0.90	
	2032.6(3)	2030.(14)	2.34 +3	As XVIII	$3s^2\ 3p^4$	$^3P_2 - {}^3P_1$	0.71	RPSKR
	2438.0(3)	2440.(16)	1.10 +3	As XX	$3s^2\ 3p^2$	$^3P_0 - {}^3P_1$	0.81	RPSKR
		2724.(20)	3.15 +2	As XIX	$3s^2\ 3p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.76	
		3051.(20)	6.07 +1	As XVIII	$3s^2\ 3p^4$	$^3P_1 - {}^1D_2$	0.71	
		4730.(50)	8.91 +1	As XX	$3s^2\ 3p^2$	$^3P_1 - {}^3P_2$	0.81	
		4920.(60)	6.56 +1	As XIX	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2D_{5/2}$	0.76	
		6055.(70)	7.84 +1	As XXII	3s 3p	$^3P_0 - {}^3P_1$	0.90	
		7990.(100)	2.63 +1	As XVIII	$3s^2\ 3p^4$	$^3P_0 - {}^3P_1$	0.71	

Table 31. Selenium: wavelengths and transition probabilities

	Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
		125.75(11)	1.02 +5	Se XXVIII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{3/2}$	2.83	
		134.29(14)	6.41 +5	Se XXXI	2s 2p	$^3P_0 - {}^1P_1$	3.42	
		148.67(17)	3.24 +5	Se XXXI	2s 2p	$^3P_1 - {}^1P_1$	3.42	
		164.08(27)	2.37 +6	Se XXIX	$2s^2\ 2p^2$	$^3P_1 - {}^1S_0$	3.03	
		194.75(27)	7.71 +5	Se XXVIII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{1/2}$	2.83	
		201.31(29)	1.44 +6	Se XXVIII	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{3/2}$	2.83	
		204.0(4)	2.88 +6	Se XXVII	$2s^2\ 2p^4$	$^3P_1 - {}^1S_0$	2.68	
		231.8(5)	5.10 +5	Se XXIX	$2s^2\ 2p^2$	$^3P_1 - {}^1D_2$	3.03	
		237.4(6)	4.76 +5	Se XXVII	$2s^2\ 2p^4$	$^3P_2 - {}^1D_2$	2.68	
		247.0(4)	7.72 +5	Se XXVIII	$2s^2\ 2p^3$	$^2D_{5/2} - {}^2P_{3/2}$	2.83	
	Q	254.2(6)	1.65 +3	Se XXVII	$2s^2\ 2p^4$	$^1D_2 - {}^1S_0$	2.68	
		256.2(5)	9.50 +4	Se XXVIII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{5/2}$	2.83	
		260.50(14)	5.04 +5	Se XXX	$2s^2$ 2p	$^2P_{1/2} - {}^2P_{3/2}$	3.20	
		280.4(8)	4.51 +5	Se XXIX	$2s^2\ 2p^2$	$^3P_2 - {}^1D_2$	3.03	
		288.0(6)	8.13 +4	Se XXXI	2s 2p	$^3P_2 - {}^1P_1$	3.42	
	289.1(3)	289.16(17)	7.39 +5	Se XXVI	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	2.52	H
		307.3(5)	4.25 +5	Se XXXI	2s 2p	$^3P_1 - {}^3P_2$	3.42	
		308.3(9)	3.37 +5	Se XXVII	$2s^2\ 2p^4$	$^3P_2 - {}^3P_1$	2.68	
		334.7(1.1)	3.83 +5	Se XXIX	$2s^2\ 2p^2$	$^3P_0 - {}^3P_1$	3.03	
		335.0(8)	5.40 +5	Se XXVIII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{3/2}$	2.83	
		354.9(9)	1.21 +5	Se XXVIII	$2s^2\ 2p^3$	$^2P_{1/2} - {}^2P_{3/2}$	2.83	
		465.2(1.5)	1.32 +4	Se XXVIII	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{1/2}$	2.83	
		474.8(1.3)	6.20 +3	Se XXIII	3s 3p	$^3P_0 - {}^1P_1$	1.00	
		520.6(1.1)	3.40 +3	Se XXIII	3s 3p	$^3P_1 - {}^1P_1$	1.00	
		557.(3)	5.60 +4	Se XXVII	$2s^2\ 2p^4$	$^3P_0 - {}^3P_1$	2.68	
	Q	562.(3)	2.88 +1	Se XXIX	$2s^2\ 2p^2$	$^1D_2 - {}^1S_0$	3.03	
T	569.2(5)	572.0(1.6)	3.77 +3	Se XX	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.83	H
T	639.6(3)	634.5(2.0)	2.49 +4	Se XXI	$3s^2\ 3p^2$	$^3P_1 - {}^1S_0$	0.88	DHSC
		747.7(2.2)	1.99 +3	Se XXIII	3s 3p	$^3P_2 - {}^1P_1$	1.00	
T	766.6(2)	767.(3)	6.36 +3	Se XX	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.83	DHST
	810.3(3)	811.(3)	2.89 +4	Se XIX	$3s^2\ 3p^4$	$^3P_1 - {}^1S_0$	0.79	H
T	908.8(2)	908.(4)	1.10 +4	Se XX	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{3/2}$	0.83	DHST
		1032.(11)	2.44 +3	Se XXVII	$2s^2\ 2p^4$	$^3P_1 - {}^1D_2$	2.68	
		1070.(6)	3.65 +3	Se XXI	$3s^2\ 3p^2$	$^3P_1 - {}^1D_2$	0.88	
		1089.(8)	4.68 +3	Se XXVIII	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2D_{5/2}$	2.83	
		1090.(6)	3.77 +3	Se XIX	$3s^2\ 3p^4$	$^3P_2 - {}^1D_2$	0.79	
	Q	1117.(6)	5.56 +1	Se XIX	$3s^2\ 3p^4$	$^1D_2 - {}^1S_0$	0.79	
		1137.(6)	3.88 +2*	Se XX	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{5/2}$	0.83	
		1151.(6)	2.62 +3	Se XX	$3s^2\ 3p^3$	$^2D_{5/2} - {}^2P_{3/2}$	0.83	
		1335.(18)	2.97 +3	Se XXIX	$2s^2\ 2p^2$	$^3P_1 - {}^3P_2$	3.03	
		1357.9(1.0)	3.58 +3	Se XXII	$3s^2$ 3p	$^2P_{1/2} - {}^2P_{3/2}$	0.93	

Table 31. Selenium: wavelengths and transition probabilities - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	1388.(10)	6.14 +3	Se XXXI	2s 2p	$^3P_0$ - $^3P_1$	3.42	
	1416.(8)	3.13 +3	Se XXI	$3s^2$ $3p^2$	$^3P_2$ - $^1D_2$	0.88	
	1524.(9)	7.51 +2	Se XX	$3s^2$ $3p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	0.83	
1527.8(3)	1527.8(1.0)	5.03 +3	Se XVIII	$3s^2$ $3p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	0.74	DHSC
1545.9(2)	1545.(9)	3.01 +3	Se XX	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	0.83	DHST
	Q 1558.(10)	1.49 +1	Se XXI	$3s^2$ $3p^2$	$^1D_2$ - $^1S_0$	0.88	
1714.1(3)	1714.1(4)	2.58 +3	Se XXIII	3s 3p	$^3P_1$ - $^3P_2$	1.00	DHSC
1727.7(3)	1726.(12)	3.76 +3	Se XIX	$3s^2$ $3p^4$	$^3P_2$ - $^3P_1$	0.79	DHSC
2042.0(3)	2043.(15)	1.85 +3	Se XXI	$3s^2$ $3p^2$	$^3P_0$ - $^3P_1$	0.88	DHSC
	2246.(15)	5.48 +2	Se XX	$3s^2$ $3p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	0.83	
T 2935.8(3)	2958.(20)	7.31 +1	Se XIX	$3s^2$ $3p^4$	$^3P_1$ - $^1D_2$	0.79	DHSC
4276.0(3)	4305.(40)	9.47 +1	Se XX	$3s^2$ $3p^3$	$^2D_{3/2}$ - $^2D_{5/2}$	0.83	DHSC
4396.5(3)[a]	4383.(50)	1.07 +2	Se XXI	$3s^2$ $3p^2$	$^3P_1$ - $^3P_2$	0.88	DHSC
	5397.(60)	1.10 +2	Se XXIII	3s 3p	$^3P_0$ - $^3P_1$	1.00	
T 5645.0(3)[a]	5620.(80)	7.22 +1	Se XIX	$3s^2$ $3p^4$	$^3P_0$ - $^3P_1$	0.79	DHSC

[a]Alternate wavelength for these transitions were given by reference BGBR. They are 4424.1(2) and 5593.9(6) Å for Se XXI and Se XIX, respectively.

Table 32. Bromine: wavelengths and transition probabilities

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	112.07(11)	9.08 +4	Br XXIX	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{3/2}$	3.03	
	124.10(12)	9.02 +5	Br XXXII	2s 2p	$^3P_0 - {}^1P_1$	3.64	
	137.37(15)	4.51 +5	Br XXXII	2s 2p	$^3P_1 - {}^1P_1$	3.64	
	149.90(22)	3.24 +6	Br XXX	$2s^2\ 2p^2$	$^3P_1 - {}^1S_0$	3.24	
	177.03(27)	1.09 +6	Br XXIX	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{1/2}$	3.03	
	180.71(28)	2.07 +6	Br XXIX	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{3/2}$	3.03	
	184.9(3)	4.02 +6	Br XXVIII	$2s^2\ 2p^4$	$^3P_1 - {}^1S_0$	2.87	
	207.1(4)	7.42 +5	Br XXX	$2s^2\ 2p^2$	$^3P_1 - {}^1D_2$	3.24	
	212.4(4)	6.87 +5	Br XXVIII	$2s^2\ 2p^4$	$^3P_2 - {}^1D_2$	2.87	
	219.3(4)	4.50 +5	Br XXIX	$2s^2\ 2p^3$	$^2D_{5/2} - {}^2P_{3/2}$	3.03	
Q	226.4(5)	2.54 +3	Br XXVIII	$2s^2\ 2p^4$	$^1D_2 - {}^1S_0$	2.87	
	229.2(4)	1.46 +5	Br XXIX	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{5/2}$	3.03	
	229.55(13)	7.37 +5	Br XXXI	$2s^2\ 2p$	$^2P_{1/2} - {}^2P_{3/2}$	3.41	
	247.2(6)	6.59 +5	Br XXX	$2s^2\ 2p^2$	$^3P_2 - {}^1D_2$	3.24	
	253.98(16)	1.09 +6	Br XXVII	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	2.70	
	268.2(4)	6.32 +5	Br XXXII	2s 2p	$^3P_1 - {}^3P_2$	3.64	
	269.1(7)	9.10 +5	Br XXVIII	$2s^2\ 2p^4$	$^3P_2 - {}^3P_1$	2.87	
	281.5(6)	9.66 +4	Br XXXII	2s 2p	$^3P_2 - {}^1P_1$	3.64	
	289.6(8)	5.85 +5	Br XXX	$2s^2\ 2p^2$	$^3P_0 - {}^3P_1$	3.24	
	295.0(7)	8.10 +5	Br XXIX	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{3/2}$	3.03	
	305.4(8)	1.88 +5	Br XXIX	$2s^2\ 2p^3$	$^2P_{1/2} - {}^2P_{3/2}$	3.03	
	442.2(1.4)	8.93 +3	Br XXIV	3s 3p	$^3P_0 - {}^1P_1$	1.10	
	442.6(1.7)	1.29 +4	Br XXIX	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{1/2}$	3.03	
	458.3(2.1)	9.72 +4	Br XXVIII	$2s^2\ 2p^4$	$^3P_0 - {}^3P_1$	2.87	
	486.6(1.2)	4.81 +3	Br XXIV	3s 3p	$^3P_1 - {}^1P_1$	1.10	
	514.4(1.5)	4.44 +3	Br XXI	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.91	
Q	542.7(2.9)	2.94 +1	Br XXX	$2s^2\ 2p^2$	$^1D_2 - {}^1S_0$	3.24	
	584.1(1.9)	3.51 +4	Br XXII	$3s^2\ 3p^2$	$^3P_1 - {}^1S_0$	0.96	
	709.5(2.8)	9.37 +3	Br XXI	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.91	
	725.9(2.7)	2.52 +3	Br XXIV	3s 3p	$^3P_2 - {}^1P_1$	1.10	
	745.(3)	4.14 +4	Br XX	$3s^2\ 3p^4$	$^3P_1 - {}^1S_0$	0.86	
	808.(4)	1.60 +4	Br XXI	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{3/2}$	0.91	
	956.(5)	5.58 +3	Br XXII	$3s^2\ 3p^2$	$^3P_1 - {}^1D_2$	0.96	
	975.(5)	5.64 +3	Br XX	$3s^2\ 3p^4$	$^3P_2 - {}^1D_2$	0.86	
Q	1006.(5)	7.80 +1	Br XX	$3s^2\ 3p^4$	$^1D_2 - {}^1S_0$	0.86	
	1010.(10)	2.73 +3	Br XXVIII	$2s^2\ 2p^4$	$^3P_1 - {}^1D_2$	2.87	
	1024.(6)	3.84 +3	Br XXI	$3s^2\ 3p^3$	$^2D_{5/2} - {}^2P_{3/2}$	0.91	
	1028.(9)	5.41 +3	Br XXIX	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2D_{5/2}$	3.03	
	1034.(6)	6.60 +2	Br XXI	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{5/2}$	0.91	
	1178.1(1.0)	5.48 +3	Br XXIII	$3s^2\ 3p$	$^2P_{1/2} - {}^2P_{3/2}$	1.01	
	1248.(8)	4.76 +3	Br XXII	$3s^2\ 3p^2$	$^3P_2 - {}^1D_2$	0.96	

Table 32. Bromine: wavelengths and transition probabilities - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	1279.(16)	3.27 +3	Br XXX	$2s^2\ 2p^2$	$^3P_1 - {}^3P_2$	3.24	
	1286.(9)	7.65 +3	Br XXXII	2s 2p	$^3P_0 - {}^3P_1$	3.64	
	1319.1(1.0)	7.82 +3	Br XIX	$3s^2\ 3p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.81	
	1416.(10)	4.66 +3	Br XXI	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{3/2}$	0.91	
	1422.(10)	8.50 +2	Br XXI	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{1/2}$	0.91	
	1476.(3)	4.01 +3	Br XXIV	3s 3p	$^3P_1 - {}^3P_2$	1.10	
	1476.(10)	5.93 +3	Br XX	$3s^2\ 3p^4$	$^3P_2 - {}^3P_1$	0.86	
Q	1502.(12)	1.49 +1	Br XXII	$3s^2\ 3p^2$	$^1D_2 - {}^1S_0$	0.96	
	1723.(15)	3.04 +3	Br XXII	$3s^2\ 3p^2$	$^3P_0 - {}^3P_1$	0.96	
	1871.(15)	9.27 +2	Br XXI	$3s^2\ 3p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.91	
	2871.(30)	8.68 +1	Br XX	$3s^2\ 3p^4$	$^3P_1 - {}^1D_2$	0.86	
	3825.(40)	1.30 +2	Br XXI	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2D_{5/2}$	0.91	
	4087.(40)	1.26 +2	Br XXII	$3s^2\ 3p^2$	$^3P_1 - {}^3P_2$	0.96	
	4130.(50)	1.74 +2	Br XX	$3s^2\ 3p^4$	$^3P_0 - {}^3P_1$	0.86	
	4844.(60)	1.51 +2	Br XXIV	3s 3p	$^3P_0 - {}^3P_1$	1.10	

Table 33. Krypton: wavelengths and transition probabilities

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	99.99(10)	9.37 +4	Kr XXX	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{3/2}$	3.23	
	114.65(11)	1.13 +6	Kr XXXIII	2s 2p	$^3P_0 - {}^1P_1$	3.87	
	126.80(13)	6.24 +5	Kr XXXIII	2s 2p	$^3P_1 - {}^1P_1$	3.87	
	137.00(19)	4.42 +6	Kr XXXI	$2s^2\ 2p^2$	$^3P_1 - {}^1S_0$	3.46	
	160.82(26)	1.52 +6	Kr XXX	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{1/2}$	3.23	
	162.61(26)	2.93 +6	Kr XXX	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{3/2}$	3.23	
	167.60(28)	5.59 +6	Kr XXIX	$2s^2\ 2p^4$	$^3P_1 - {}^1S_0$	3.07	
	185.4(3)	1.07 +6	Kr XXXI	$2s^2\ 2p^2$	$^3P_1 - {}^1D_2$	3.46	
	190.4(4)	9.82 +5	Kr XXIX	$2s^2\ 2p^4$	$^3P_2 - {}^1D_2$	3.07	
	195.1(4)	6.40 +5	Kr XXX	$2s^2\ 2p^3$	$^2D_{5/2} - {}^2P_{3/2}$	3.23	
Q	201.8(4)	3.87 +3	Kr XXIX	$2s^2\ 2p^4$	$^1D_2 - {}^1S_0$	3.07	
	203.01(12)	1.06 +6	Kr XXXII	$2s^2$ 2p	$^2P_{1/2} - {}^2P_{3/2}$	3.63	
	205.1(4)	2.19 +5	Kr XXX	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{5/2}$	3.23	
	218.4(5)	9.54 +5	Kr XXXI	$2s^2\ 2p^2$	$^3P_2 - {}^1D_2$	3.46	
	223.95(15)	1.59 +6	Kr XXVIII	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	2.90	
	235.1(4)	9.29 +5	Kr XXXIII	2s 2p	$^3P_1 - {}^3P_2$	3.87	
	235.9(6)	1.34 +6	Kr XXIX	$2s^2\ 2p^4$	$^3P_2 - {}^3P_1$	3.07	
	252.0(6)	8.78 +5	Kr XXXI	$2s^2\ 2p^2$	$^3P_0 - {}^3P_1$	3.46	
	259.7(7)	1.21 +6	Kr XXX	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{3/2}$	3.23	
	264.4(7)	2.86 +5	Kr XXX	$2s^2\ 2p^3$	$^2P_{1/2} - {}^2P_{3/2}$	3.23	
	275.3(6)	1.14 +5	Kr XXXIII	2s 2p	$^3P_2 - {}^1P_1$	3.87	
	381.8(1.4)	1.63 +5	Kr XXIX	$2s^2\ 2p^4$	$^3P_0 - {}^3P_1$	3.07	
	411.8(1.2)	1.27 +4	Kr XXV	3s 3p	$^3P_0 - {}^1P_1$	1.22	
	422.5(1.8)	1.25 +4	Kr XXX	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{1/2}$	3.23	
	454.5(1.1)	6.75 +3	Kr XXV	3s 3p	$^3P_1 - {}^1P_1$	1.22	
	462.(5)	5.04 +3	Kr XXII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.99	
Q	524.8(2.7)	3.02 +1	Kr XXXI	$2s^2\ 2p^2$	$^1D_2 - {}^1S_0$	3.46	
	538.(5)	4.88 +4	Kr XXIII	$3s^2\ 3p^2$	$^3P_1 - {}^1S_0$	1.05	
	654.(5)	1.37 +4	Kr XXII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.99	
	683.3(2.9)	5.87 +4	Kr XXI	$3s^2\ 3p^4$	$^3P_1 - {}^1S_0$	0.94	
	705.7(2.5)	3.16 +3	Kr XXV	3s 3p	$^3P_2 - {}^1P_1$	1.22	
	721.(3)	2.52 +4	Kr XXII	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{3/2}$	0.99	
853.8(1.0)	854.(5)	8.43 +3	Kr XXIII	$3s^2\ 3p^2$	$^3P_1 - {}^1D_2$	1.05	RPSKR
868.4(2)	872.(5)	8.35 +3	Kr XXI	$3s^2\ 3p^4$	$^3P_2 - {}^1D_2$	0.94	RPSKR
Q	905.(5)	1.11 +2	Kr XXI	$3s^2\ 3p^4$	$^1D_2 - {}^1S_0$	0.94	
912.0(3)	912.(5)	5.59 +3	Kr XXII	$3s^2\ 3p^3$	$^2D_{5/2} - {}^2P_{3/2}$	0.99	RPSKR
	936.(5)	1.11 +3	Kr XXII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{5/2}$	0.99	
	977.(9)	6.14 +3	Kr XXX	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2D_{5/2}$	3.23	
	989.(10)	3.04 +4	Kr XXIX	$2s^2\ 2p^4$	$^3P_1 - {}^1D_2$	3.07	
	1027.0(1.0)	8.27 +3	Kr XXIV	$3s^2$ 3p	$^2P_{1/2} - {}^2P_{3/2}$	1.10	
	1099.(7)	7.17 +3	Kr XXIII	$3s^2\ 3p^2$	$^3P_2 - {}^1D_2$	1.05	

Table 22. Krypton wavelengths and transition probabilities - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
1142.5(2)	1144.7(1.0)	1.20 +4	Kr XX	$3s^2\ 3p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	0.89	RPSKR
	1197.(9)	9.39 +3	Kr XXXIII	2s 2p	$^3P_0$ - $^3P_1$	3.87	
	1228.(15)	3.57 +3	Kr XXXI	$2s^2\ 2p^2$	$^3P_1$ - $^3P_2$	3.46	
1268.7(2)	1269.(9)	9.19 +3	Kr XXI	$3s^2\ 3p^4$	$^3P_2$ - $^3P_1$	0.94	RPSKR
1277.1(1.0)	1277.0(2.3)	6.16 +3	Kr XXV	3s 3p	$^3P_1$ - $^3P_2$	1.22	RPSKR
	1286.(9)	7.16 +3	Kr XXII	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	0.99	
	1333.(9)	9.30 +2	Kr XXII	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	0.99	
	Q 1450.(12)	1.48 +1	Kr XXIII	$3s^2\ 3p^2$	$^1D_2$ - $^1S_0$	1.05	
1461.8(2)	1462.(10)	4.91 +3	Kr XXIII	$3s^2\ 3p^2$	$^3P_0$ - $^3P_1$	1.05	RPSKR
	1572.(10)	1.53 +3	Kr XXII	$3s^2\ 3p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	0.99	
	2788.(25)	1.02 +2	Kr XXI	$3s^2\ 3p^4$	$^3P_1$ - $^1D_2$	0.94	
	3134.(30)	3.81 +2	Kr XXI	$3s^2\ 3p^4$	$^3P_0$ - $^3P_1$	0.94	
	3446.(30)	1.72 +2	Kr XXII	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2D_{5/2}$	0.99	
3840.9(3)	3832.(40)	1.46 +2	Kr XXIII	$3s^2\ 3p^2$	$^3P_1$ - $^3P_2$	1.05	RPSKR
	4376.(50)	2.04 +2	Kr XXV	3s 3p	$^3P_0$ - $^3P_1$	1.22	

Table 34. Rubidium: wavelengths and transition probabilities

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	198.18(16)	2.29 +6	Rb XXIX	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	3.10	
	383.4(1.0)	1.80 +4	Rb XXVI	3s 3p	$^3P_0 - {}^1P_1$	1.30	
	416.2(1.2)	5.51 +3	Rb XXIII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{3/2}$	1.07	
	424.3(9)	9.39 +3	Rb XXVI	3s 3p	$^3P_1 - {}^1P_1$	1.30	
	494.6(1.7)	6.76 +4	Rb XXIV	$3s^2\ 3p^2$	$^3P_1 - {}^1S_0$	1.13	
	603.6(2.5)	1.93 +4	Rb XXIII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{1/2}$	1.07	
	625.4(2.6)	8.27 +4	Rb XXII	$3s^2\ 3p^4$	$^3P_1 - {}^1S_0$	1.02	
	648.2(2.8)	3.67 +4	Rb XXIII	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{3/2}$	1.07	
	687.0(2.4)	3.91 +3	Rb XXVI	3s 3p	$^3P_2 - {}^1P_1$	1.30	
	764.(4)	1.25 +4	Rb XXIV	$3s^2\ 3p^2$	$^3P_1 - {}^1D_2$	1.13	
	781.(4)	1.22 +4	Rb XXII	$3s^2\ 3p^4$	$^3P_2 - {}^1D_2$	1.02	
Q	813.(5)	1.60 +2	Rb XXII	$3s^2\ 3p^4$	$^1D_2 - {}^1S_0$	1.02	
	817.(5)	7.95 +3	Rb XXIII	$3s^2\ 3p^3$	$^2D_{5/2} - {}^2P_{3/2}$	1.07	
	849.(5)	1.80 +3	Rb XXIII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{5/2}$	1.07	
	899.2(9)	1.23 +4	Rb XXV	$3s^2$ 3p	$^2P_{1/2} - {}^2P_{3/2}$	1.19	
	969.(6)	1.07 +4	Rb XXIV	$3s^2\ 3p^2$	$^3P_2 - {}^1D_2$	1.13	
	998.1(9)	1.80 +4	Rb XXI	$3s^2\ 3p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.97	
	1098.(7)	1.40 +4	Rb XXII	$3s^2\ 3p^4$	$^3P_2 - {}^3P_1$	1.02	
	1109.4(1.7)	9.32 +3	Rb XXVI	3s 3p	$^3P_1 - {}^3P_2$	1.30	
	1161.(7)	1.08 +4	Rb XXIII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{3/2}$	1.07	
	1250.(8)	7.75 +3	Rb XXIV	$3s^2\ 3p^2$	$^3P_0 - {}^3P_1$	1.13	
	1257.(8)	9.83 +2	Rb XXIII	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{1/2}$	1.07	
	1341.(8)	2.42 +3	Rb XXIII	$3s^2\ 3p^3$	$^2P_{1/2} - {}^2P_{3/2}$	1.07	
Q	1403.(10)	1.48 +1	Rb XXIV	$3s^2\ 3p^2$	$^1D_2 - {}^1S_0$	1.13	
	2442.(20)	7.71 +2	Rb XXII	$3s^2\ 3p^4$	$^3P_0 - {}^3P_1$	1.02	
	2710.(25)	1.18 +2	Rb XXII	$3s^2\ 3p^4$	$^3P_1 - {}^1D_2$	1.02	
	3152.(30)	2.17 +2	Rb XXIII	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2D_{5/2}$	1.07	
	3611.(40)	1.67 +2	Rb XXIV	$3s^2\ 3p^2$	$^3P_1 - {}^3P_2$	1.13	
	3975.(40)	2.70 +2	Rb XXVI	3s 3p	$^3P_0 - {}^3P_1$	1.30	

Table 35. Strontium: wavelengths and transition probabilities

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	175.99(15)	3.27 +6	Sr XXX	$2s^2\ 2p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	3.31	
	356.9(9)	2.52 +4	Sr XXVII	3s 3p	$^3P_0$ - $^1P_1$	1.40	
	371.9(1.0)	6.00 +3	Sr XXIV	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	1.16	
	395.8(8)	1.30 +4	Sr XXVII	3s 3p	$^3P_1$ - $^1P_1$	1.40	
	455.0(1.5)	9.30 +4	Sr XXV	$3s^2\ 3p^2$	$^3P_1$ - $^1S_0$	1.22	
	552.8(2.3)	2.81 +4	Sr XXIV	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	1.16	
	571.8(2.4)	1.16 +5	Sr XXIII	$3s^2\ 3p^4$	$^3P_1$ - $^1S_0$	1.10	
	580.9(2.4)	5.39 +4	Sr XXIV	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	1.16	
	669.7(2.3)	4.77 +3	Sr XXVII	3s 3p	$^3P_2$ - $^1P_1$	1.40	
	684.(3)	1.84 +4	Sr XXV	$3s^2\ 3p^2$	$^3P_1$ - $^1D_2$	1.22	
	700.(3)	1.78 +4	Sr XXIII	$3s^2\ 3p^4$	$^3P_2$ - $^1D_2$	1.10	
	726.(4)	1.15 +4	Sr XXIV	$3s^2\ 3p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	1.16	
Q	730.(4)	2.32 +2	Sr XXIII	$3s^2\ 3p^4$	$^1D_2$ - $^1S_0$	1.10	
	762.(4)	2.91 +3	Sr XXIV	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	1.16	
	790.6(8)	1.81 +4	Sr XXVI	$3s^2$ 3p	$^2P_{1/2}$ - $^2P_{3/2}$	1.28	
	855.(5)	1.57 +4	Sr XXV	$3s^2\ 3p^2$	$^3P_2$ - $^1D_2$	1.22	
	874.1(8)	2.69 +4	Sr XXII	$3s^2\ 3p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	1.05	
	954.(6)	2.11 +4	Sr XXIII	$3s^2\ 3p^4$	$^3P_2$ - $^3P_1$	1.10	
	967.5(1.3)	1.39 +4	Sr XXVII	3s 3p	$^3P_1$ - $^3P_2$	1.40	
	1034.(7)	1.66 +4	Sr XXIV	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	1.16	
	1074.(7)	1.21 +4	Sr XXV	$3s^2\ 3p^2$	$^3P_0$ - $^3P_1$	1.22	
	1137.(8)	3.90 +3	Sr XXIV	$3s^2\ 3p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	1.16	
	1188.(8)	1.02 +3	Sr XXIV	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	1.16	
Q	1359.(10)	1.47 +1	Sr XXV	$3s^2\ 3p^2$	$^1D_2$ - $^1S_0$	1.22	
	1945.(15)	1.47 +3	Sr XXIII	$3s^2\ 3p^4$	$^3P_0$ - $^3P_1$	1.10	
	2636.(25)	1.36 +2	Sr XXIII	$3s^2\ 3p^4$	$^3P_1$ - $^1D_2$	1.10	
	2898.(30)	2.69 +2	Sr XXIV	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2D_{5/2}$	1.16	
	3418.(40)	1.89 +2	Sr XXV	$3s^2\ 3p^2$	$^3P_1$ - $^3P_2$	1.22	
	3630.(30)	3.52 +2	Sr XXVII	3s 3p	$^3P_0$ - $^3P_1$	1.40	

Table 36. Yttrium: wavelengths and transition probabilities

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	156.78(12)	4.63 +6	Y XXXI	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	3.52	
	331.9(8)	3.52 +4	Y XXVIII	3s 3p	$^3P_0 - {}^1P_1$	1.50	
	333.6(9)	6.31 +3	Y XXV	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{3/2}$	1.24	
	368.6(7)	1.79 +4	Y XXVIII	3s 3p	$^3P_1 - {}^1P_1$	1.50	
	418.6(1.4)	1.26 +5	Y XXVI	$3s^2\ 3p^2$	$^3P_1 - {}^1S_0$	1.32	
	506.7(2.1)	3.96 +4	Y XXV	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{1/2}$	1.24	
	522.4(2.2)	1.60 +5	Y XXIV	$3s^2\ 3p^4$	$^3P_1 - {}^1S_0$	1.18	
	523.7(2.2)	1.62 +4	Y XXV	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{3/2}$	1.24	
	614.(3)	8.92 +3	Y XXVI	$3s^2\ 3p^2$	$^3P_1 - {}^1D_2$	1.32	
	629.(3)	2.55 +4	Y XXIV	$3s^2\ 3p^4$	$^3P_2 - {}^1D_2$	1.18	
	650.(3)	4.03 +4	Y XXV	$3s^2\ 3p^3$	$^2D_{5/2} - {}^2P_{3/2}$	1.24	
	653.6(2.2)	3.68 +4	Y XXVIII	3s 3p	$^3P_2 - {}^1P_1$	1.50	
Q	656.(4)	3.40 +2	Y XXIV	$3s^2\ 3p^4$	$^1D_2 - {}^1S_0$	1.18	
	686.(5)	9.24 +3	Y XXV	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{5/2}$	1.24	
698.3(2)	697.9(7)	2.60 +4	Y XXVII	$3s^2$ 3p	$^2P_{1/2} - {}^2P_{3/2}$	1.37	RPSKR
	756.(5)	2.26 +4	Y XXVI	$3s^2\ 3p^2$	$^3P_2 - {}^1D_2$	1.32	
769.1(4)	768.8(7)	9.67 +3	Y XXIII	$3s^2\ 3p^5$	$^2P_{3/2} - {}^2P_{1/2}$	1.12	RPSKR
833.1(2)	833.(5)	2.07 +4	Y XXIV	$3s^2\ 3p^4$	$^3P_2 - {}^3P_1$	1.18	RPSKR
	845.6(1.0)	1.64 +4	Y XXVIII	3s 3p	$^3P_1 - {}^3P_2$	1.50	
914.7(1.0)	919.(6)	1.15 +4	Y XXV	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{3/2}$	1.24	RPSKR
927.7(3)	929.(6)	1.80 +4	Y XXVI	$3s^2\ 3p^2$	$^3P_0 - {}^3P_1$	1.32	RPSKR
	977.(7)	5.87 +3	Y XXV	$3s^2\ 3p^3$	$^2P_{1/2} - {}^2P_{3/2}$	1.24	
	1129.(8)	2.70 +4	Y XXV	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{1/2}$	1.24	
Q	1317.(10)	6.95 +2	Y XXVI	$3s^2\ 3p^2$	$^1D_2 - {}^1S_0$	1.32	
1572.9(1.0)	1576.(12)	1.92 +3	Y XXIV	$3s^2\ 3p^4$	$^3P_0 - {}^3P_1$	1.18	RPSKR
	2565.(30)	3.52 +1	Y XXIV	$3s^2\ 3p^4$	$^3P_1 - {}^1D_2$	1.18	
2717.8(3)	2700.(30)	7.87 +0	Y XXV	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2D_{5/2}$	1.24	RPSKR
3254.8(1.0)	3250.(40)	2.44 +2	Y XXVI	$3s^2\ 3p^2$	$^3P_1 - {}^3P_2$	1.32	RPSKR
	3330.(30)	4.52 +2	Y XXVIII	3s 3p	$^3P_0 - {}^3P_1$	1.50	

Table 37. Zirconium: wavelengths and transition probabilities

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	140.09(10)	6.48 +6	Zr XXXII	$2s^2\ 2p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	3.74	
	299.4(8)	6.58 +3	Zr XXVI	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	1.32	
	308.6(7)	4.88 +4	Zr XXIX	3s 3p	$^3P_0$ - $^1P_1$	1.60	
	343.1(6)	2.45 +4	Zr XXIX	3s 3p	$^3P_1$ - $^1P_1$	1.60	
	385.2(1.3)	1.72 +5	Zr XXVII	$3s^2\ 3p^2$	$^3P_1$ - $^1S_0$	1.41	
463.2(2)	463.9(1.9)	5.54 +4	Zr XXVI	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	1.32	DHST
474.1(2)	473.2(2.0)	1.09 +5	Zr XXVI	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	1.32	DHST
T 477.1(5)	477.0(2.0)	2.21 +5	Zr XXV	$3s^2\ 3p^4$	$^3P_1$ - $^1S_0$	1.26	H
551.5(3)	551.1(2.6)	3.83 +4	Zr XXVII	$3s^2\ 3p^2$	$^3P_1$ - $^1D_2$	1.41	DH
564.9(3)	565.4(2.7)	3.63 +4	Zr XXV	$3s^2\ 3p^4$	$^3P_2$ - $^1D_2$	1.26	DHSC
582.3(2)	582.(3)	2.29 +4	Zr XXVI	$3s^2\ 3p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	1.32	DHST
	Q 590.(3)	5.00 +2	Zr XXV	$3s^2\ 3p^4$	$^1D_2$ - $^1S_0$	1.26	
616.0(2)	616.(3)	6.97 +3	Zr XXVI	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	1.32	DHST
618.5(3)	618.5(7)	3.78 +4	Zr XXVIII	$3s^2$ 3p	$^2P_{1/2}$ - $^2P_{3/2}$	1.47	DHSC
	638.5(2.0)	6.88 +3	Zr XXIX	3s 3p	$^3P_2$ - $^1P_1$	1.60	
670.8(3)	670.(4)	3.31 +4	Zr XXVII	$3s^2\ 3p^2$	$^3P_2$ - $^1D_2$	1.41	DH
679.1(3)	679.5(7)	5.73 +4	Zr XXIV	$3s^2\ 3p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	1.20	DHSC
731.8(2)	731.(5)	4.58 +4	Zr XXV	$3s^2\ 3p^4$	$^3P_2$ - $^3P_1$	1.26	DHSC
741.5(3)	741.5(4)	3.04 +4	Zr XXIX	3s 3p	$^3P_1$ - $^3P_2$	1.60	DHSC
807.1(3)	807.(5)	2.77 +4	Zr XXVII	$3s^2\ 3p^2$	$^3P_0$ - $^3P_1$	1.41	DHSC
812.1(2)	815.(5)	3.73 +4	Zr XXVI	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	1.32	DHST
846.2(2)	844.(5)	9.25 +3	Zr XXVI	$3s^2\ 3p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	1.32	DHST
	1077.(8)	1.02 +3	Zr XXVI	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	1.32	
	Q 1279.(10)	1.47 +1	Zr XXVII	$3s^2\ 3p^2$	$^1D_2$ - $^1S_0$	1.41	
	1296.(10)	4.59 +3	Zr XXV	$3s^2\ 3p^4$	$^3P_0$ - $^3P_1$	1.26	
T 2476.	2497.(30)	1.76 +2	Zr XXV	$3s^2\ 3p^4$	$^3P_1$ - $^1D_2$	1.26	DHSC
2549.8(2)	2529.(30)	3.80 +2	Zr XXVI	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2D_{5/2}$	1.32	DHST
	3067.(30)	5.73 +2	Zr XXIX	3s 3p	$^3P_0$ - $^3P_1$	1.60	
3101.1(3)	3094.(40)	2.37 +2	Zr XXVII	$3s^2\ 3p^2$	$^3P_1$ - $^3P_2$	1.41	H

Table 38. Niobium: wavelengths and transition probabilities

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
	125.54(8)	9.00 +6	Nb XXXIII	$2s^2\ 2p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	3.96	
	268.9(7)	6.66 +3	Nb XXVII	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	1.41	
	286.8(6)	6.70 +4	Nb XXX	3s 3p	$^3P_0$ - $^1P_1$	1.70	
	319.0(5)	3.33 +4	Nb XXX	3s 3p	$^3P_1$ - $^1P_1$	1.70	
	354.(5)	2.32 +5	Nb XXVIII	$3s^2\ 3p^2$	$^3P_1$ - $^1S_0$	1.50	
	424.4(1.6)	7.69 +4	Nb XXVII	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	1.41	
	428.7(1.7)	1.51 +5	Nb XXVII	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	1.41	
	435.5(1.8)	3.03 +3	Nb XXVI	$3s^2\ 3p^4$	$^3P_1$ - $^1S_0$	1.34	
	495.8(2.3)	5.43 +4	Nb XXVIII	$3s^2\ 3p^2$	$^3P_1$ - $^1D_2$	1.50	
	509.0(2.4)	5.13 +4	Nb XXVI	$3s^2\ 3p^4$	$^3P_2$ - $^1D_2$	1.34	
	522.5(2.5)	3.21 +4	Nb XXVII	$3s^2\ 3p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	1.41	
Q	530.(3)	7.37 +2	Nb XXVI	$3s^2\ 3p^4$	$^1D_2$ - $^1S_0$	1.34	
	550.5(6)	5.38 +4	Nb XXIX	$3s^2$ 3p	$^2P_{1/2}$ - $^2P_{3/2}$	1.56	
	554.2(2.7)	1.05 +4	Nb XXVII	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	1.41	
	596.(3)	4.70 +4	Nb XXVIII	$3s^2\ 3p^2$	$^3P_2$ - $^1D_2$	1.50	
	601.6(6)	8.23 +4	Nb XXV	$3s^2\ 3p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	1.28	
	623.6(2.0)	8.15 +3	Nb XXX	3s 3p	$^3P_2$ - $^1P_1$	1.70	
	644.(4)	6.64 +4	Nb XXVI	$3s^2\ 3p^4$	$^3P_2$ - $^3P_1$	1.34	
	653.1(6)	4.42 +4	Nb XXX	3s 3p	$^3P_1$ - $^3P_2$	1.70	
	705.(5)	4.11 +4	Nb XXVIII	$3s^2\ 3p^2$	$^3P_0$ - $^3P_1$	1.50	
	722.(5)	5.50 +4	Nb XXVII	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	1.41	
	734.(5)	1.39 +4	Nb XXVII	$3s^2\ 3p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	1.41	
	1030.(8)	1.01 +3	Nb XXVII	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	1.41	
	1080.(8)	7.66 +3	Nb XXVI	$3s^2\ 3p^4$	$^3P_0$ - $^3P_1$	1.34	
Q	1243.(10)	1.47 +1	Nb XXVIII	$3s^2\ 3p^2$	$^1D_2$ - $^1S_0$	1.50	
	2386.(30)	4.39 +2	Nb XXVII	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2D_{5/2}$	1.41	
	2433.(30)	1.99 +2	Nb XXVI	$3s^2\ 3p^4$	$^3P_1$ - $^1D_2$	1.34	
	2839.(25)	7.16 +2	Nb XXX	3s 3p	$^3P_0$ - $^3P_1$	1.70	
	2958.(40)	2.63 +2	Nb XXVIII	$3s^2\ 3p^2$	$^3P_1$ - $^3P_2$	1.50	

wavelengths and transition probabilities

	Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (obs. λ)
		112.80(6)	1.24 +7	Mo XXXIV	$2s^2\ 2p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	4.19	
		241.8(6)	6.65 +3	Mo XXVIII	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	1.49	
		266.6(4)	9.14 +4	Mo XXXI	3s 3p	$^3P_0$ - $^1P_1$	1.80	
		296.6(4)	4.50 +4	Mo XXXI	3s 3p	$^3P_1$ - $^1P_1$	1.80	
T	325.3(3)	326.2(1.0)	3.10 +5	Mo XXIX	$3s^2\ 3p^2$	$^3P_1$ - $^1S_0$	1.59	DHSC
	387.7(3)	388.2(1.5)	1.05 +5	Mo XXVIII	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	1.49	DHST
	389.9(2)	389.1(1.5)	2.10 +5	Mo XXVIII	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	1.49	DHST
	397.2(3)	397.6(1.6)	4.13 +5	Mo XXVII	$3s^2\ 3p^4$	$^3P_1$ - $^1S_0$	1.43	H
	446.9(2)	446.8(2.0)	7.59 +4	Mo XXIX	$3s^2\ 3p^2$	$^3P_1$ - $^1D_2$	1.59	H
	458.6(2)	459.0(2.1)	7.18 +4	Mo XXVII	$3s^2\ 3p^4$	$^3P_2$ - $^1D_2$	1.43	DHSC
	470.0(2)	469.8(2.2)	4.42 +4	Mo XXVIII	$3s^2\ 3p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	1.49	DHST
		Q 478.(2)	1.08 +3	Mo XXVII	$3s^2\ 3p^4$	$^1D_2$ - $^1S_0$	1.43	
	490.1(3)	490.1(5)	7.60 +4	Mo XXX	$3s^2$ 3p	$^2P_{1/2}$ - $^2P_{3/2}$	1.66	DHSC
	498.2(2)	498.5(2.5)	1.55 +4	Mo XXVIII	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	1.49	DHST
	530.3(3)	530.3(2.8)	6.68 +4	Mo XXIX	$3s^2\ 3p^2$	$^3P_2$ - $^1D_2$	1.59	H
	534.9(3)	534.9(5)	1.17 +5	Mo XXVI	$3s^2\ 3p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	1.37	DHSC
	569.8(1)	569.(3)	9.50 +4	Mo XXVII	$3s^2\ 3p^4$	$^3P_2$ - $^3P_1$	1.43	DHSC
	577.5(3)	577.5(4)	6.33 +4	Mo XXXI	3s 3p	$^3P_1$ - $^3P_2$	1.80	DHSC
T	609.8(3)	609.6(1.5)	9.56 +3	Mo XXXI	3s 3p	$^3P_2$ - $^1P_1$	1.80	DHSC
	618.5(3)	618.(4)	6.03 +4	Mo XXIX	$3s^2\ 3p^2$	$^3P_0$ - $^3P_1$	1.59	DHSC
	637.1(2)	639.(4)	8.04 +4	Mo XXVIII	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	1.49	DHST
	643.0(5)	642.(4)	2.04 +4	Mo XXVIII	$3s^2\ 3p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	1.49	DHST
		910.(8)	1.24 +4	Mo XXVII	$3s^2\ 3p^4$	$^3P_0$ - $^3P_1$	1.43	
		989.(8)	9.74 +2	Mo XXVIII	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	1.49	
		Q 1209.(14)	1.47 +1	Mo XXIX	$3s^2\ 3p^2$	$^1D_2$ - $^1S_0$	1.59	
	2285.4(1)	2264.(30)	5.01 +2	Mo XXVIII	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2D_{5/2}$	1.49	DHSC
	2350.8(3)	2371.(30)	2.23 +2	Mo XXVII	$3s^2\ 3p^4$	$^3P_1$ - $^1D_2$	1.43	H
		2640.(25)	8.82 +2	Mo XXXI	3s 3p	$^3P_0$ - $^3P_1$	1.80	
	2841.1(2)	2834.(40)	2.91 +2	Mo XXIX	$3s^2\ 3p^2$	$^3P_1$ - $^3P_2$	1.49	DHSC

Table 40. Wavelengths and transition probabilities ordered by wavelength

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
	99.99(10)	9.37 +4	Kr XXX	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{3/2}$	3.23	
	112.07(11)	9.08 +4	Br XXIX	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{3/2}$	3.03	
	112.80(6)	1.24 +7	Mo XXXIV	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	4.19	
	114.65(11)	1.26 +6	Kr XXXIII	2s 2p	$^3P_0 - {}^1P_1$	3.87	
	124.10(12)	9.02 +5	Br XXXII	2s 2p	$^3P_0 - {}^1P_1$	3.64	
	125.54(8)	9.00 +6	Nb XXXIII	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	3.96	
	125.75(11)	1.02 +5	Se XXVIII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{3/2}$	2.83	
	126.80(13)	6.24 +5	Kr XXXIII	2s 2p	$^3P_1 - {}^1P_1$	3.87	
	134.29(14)	6.41 +5	Se XXXI	2s 2p	$^3P_0 - {}^1P_1$	3.42	
	137.00(19)	4.42 +6	Kr XXXI	$2s^2\ 2p^2$	$^3P_1 - {}^1S_0$	3.46	
	137.37(15)	4.51 +5	Br XXXII	2s 2p	$^3P_1 - {}^1P_1$	3.64	
	140.09(10)	6.48 +6	Zr XXXII	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	3.74	
	141.19(11)	9.89 +4	As XXVII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{3/2}$	2.64	
	145.25(14)	4.52 +5	As XXX	2s 2p	$^3P_0 - {}^1P_1$	3.20	
	148.67(17)	3.24 +5	Se XXXI	2s 2p	$^3P_1 - {}^1P_1$	3.42	
	149.90(22)	3.24 +6	Br XXX	$2s^2\ 2p^2$	$^3P_1 - {}^1S_0$	3.24	
	156.78(12)	4.63 +6	Y XXXI	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	3.52	
	157.03(14)	3.16 +5	Ge XXIX	2s 2p	$^3P_0 - {}^1P_1$	3.00	
	158.58(12)	8.86 +4	Ge XXVI	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{3/2}$	2.46	
	160.74(17)	2.31 +5	As XXX	2s 2p	$^3P_1 - {}^1P_1$	3.20	
	160.82(26)	1.52 +6	Kr XXX	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{1/2}$	3.23	
	162.61(26)	2.93 +6	Kr XXX	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{3/2}$	3.23	
	164.08(27)	2.37 +6	Se XXIX	$2s^2\ 2p^2$	$^3P_1 - {}^1S_0$	3.03	
	167.60(28)	5.59 +6	Kr XXIX	$2s^2\ 2p^4$	$^3P_1 - {}^1S_0$	3.07	
	169.66(13)	2.19 +5	Ga XXVIII	2s 2p	$^3P_0 - {}^1P_1$	2.79	
	173.59(17)	1.64 +5	Ge XXIX	2s 2p	$^3P_1 - {}^1P_1$	3.00	
	175.99(15)	3.27 +6	Sr XXX	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	3.31	
	177.03(27)	1.09 +6	Br XXIX	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{1/2}$	3.03	
	178.06(13)	7.58 +4	Ga XXV	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{3/2}$	2.28	
	179.63(27)	1.71 +6	As XXVIII	$2s^2\ 2p^2$	$^3P_1 - {}^1S_0$	2.83	
	180.71(28)	2.07 +6	Br XXIX	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{3/2}$	3.03	
	183.18(11)	1.50 +5	Zn XXVII	2s 2p	$^3P_0 - {}^1P_1$	2.60	
	184.9(3)	4.02 +6	Br XXVIII	$2s^2\ 2p^4$	$^3P_1 - {}^1S_0$	2.87	
	185.4(3)	1.07 +6	Kr XXXI	$2s^2\ 2p^2$	$^3P_1 - {}^1D_2$	3.46	
	187.22(16)	1.15 +5	Ga XXVIII	2s 2p	$^3P_1 - {}^1P_1$	2.79	
	190.4(4)	9.82 +5	Kr XXIX	$2s^2\ 2p^4$	$^3P_2 - {}^1D_2$	3.07	
	194.75(27)	7.71 +5	Se XXVIII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{1/2}$	2.83	
	195.1(4)	6.40 +5	Kr XXX	$2s^2\ 2p^3$	$^2D_{5/2} - {}^2P_{3/2}$	3.23	
	196.65(27)	1.23 +6	Ge XXVII	$2s^2\ 2p^2$	$^3P_1 - {}^1S_0$	2.64	
	197.66(09)	1.02 +5	Cu XXVI	2s 2p	$^3P_0 - {}^1P_1$	2.41	
	198.18(16)	2.29 +6	Rb XXIX	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	3.10	
	199.73(14)	6.31 +4	Zn XXIV	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{3/2}$	2.10	

Table 40. Wavelengths and transition probabilities ordered by wavelength - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
	201.31(29)	1.44 +6	Se XXVIII	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{3/2}$	2.83	
	201.65(14)	8.03 +4	Zn XXVII	2s 2p	$^3P_1 - {}^1P_1$	2.60	
Q	201.8(4)	3.87 +3	Kr XXIX	$2s^2\ 2p^4$	$^1D_2 - {}^1S_0$	3.07	
	203.01(12)	1.06 +6	Kr XXXII	$2s^2$ 2p	$^2P_{1/2} - {}^2P_{3/2}$	3.63	
	204.0(4)	2.88 +6	Se XXVII	$2s^2\ 2p^4$	$^3P_1 - {}^1S_0$	2.68	
	205.1(4)	2.19 +5	Kr XXX	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{5/2}$	3.23	
	207.1(4)	7.42 +5	Br XXX	$2s^2\ 2p^2$	$^3P_1 - {}^1D_2$	3.24	
	212.4(4)	6.87 +5	Br XXVIII	$2s^2\ 2p^4$	$^3P_2 - {}^1D_2$	2.87	
	212.81(16)	6.91 +4	Ni XXV	2s 2p	$^3P_0 - {}^1P_1$	2.30	
	213.99(26)	5.42 +5	As XXVII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{1/2}$	2.64	
	215.25(26)	8.79 +5	Ga XXVI	$2s^2\ 2p^2$	$^3P_1 - {}^1S_0$	2.45	
	216.89(11)	5.55 +4	Cu XXVI	2s 2p	$^3P_1 - {}^1P_1$	2.41	
	218.4(5)	9.54 +5	Kr XXXI	$2s^2\ 2p^2$	$^3P_2 - {}^1D_2$	3.46	
	219.3(4)	4.50 +5	Br XXIX	$2s^2\ 2p^3$	$^2D_{5/2} - {}^2P_{3/2}$	3.03	
	223.66(14)	5.48 +4	Cu XXIII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{3/2}$	1.94	
	223.95(15)	1.59 +6	Kr XXVIII	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	2.90	
	224.83(29)	9.95 +5	As XXVII	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{3/2}$	2.64	
	225.0(4)	2.04 +6	As XXVI	$2s^2\ 2p^4$	$^3P_1 - {}^1S_0$	2.49	
Q	226.4(5)	2.54 +3	Br XXVIII	$2s^2\ 2p^4$	$^1D_2 - {}^1S_0$	2.87	
	229.2(4)	1.46 +5	Br XXIX	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{5/2}$	3.03	
	229.40(15)	4.59 +4	Co XXIV	2s 2p	$^3P_0 - {}^1P_1$	2.12	
	229.55(13)	7.37 +5	Br XXXI	$2s^2$ 2p	$^2P_{1/2} - {}^2P_{3/2}$	3.41	
	231.8(5)	5.10 +5	Se XXIX	$2s^2\ 2p^2$	$^3P_1 - {}^1D_2$	3.03	
	232.89(11)	3.79 +4	Ni XXV	2s 2p	$^3P_1 - {}^1P_1$	2.30	
	234.74(27)	3.76 +5	Ge XXVI	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{1/2}$	2.46	
	235.1(4)	9.29 +5	Kr XXXIII	2s 2p	$^3P_1 - {}^3P_2$	3.87	
	235.54(24)	6.23 +5	Zn XXV	$2s^2\ 2p^2$	$^3P_1 - {}^1S_0$	2.27	
	235.9(6)	1.34 +6	Kr XXIX	$2s^2\ 2p^4$	$^3P_2 - {}^3P_1$	3.07	
	237.4(6)	4.76 +5	Se XXVII	$2s^2\ 2p^4$	$^3P_2 - {}^1D_2$	2.68	
	241.8(6)	6.65 +3	Mo XXVIII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{3/2}$	1.49	
	247.0(4)	7.72 +5	Se XXVIII	$2s^2\ 2p^3$	$^2D_{5/2} - {}^2P_{3/2}$	2.83	
	247.12(14)	3.01 +4	Fe XXIII	2s 2p	$^3P_0 - {}^1P_1$	1.96	
	247.2(6)	6.59 +5	Br XXX	$2s^2\ 2p^2$	$^3P_2 - {}^1D_2$	3.24	
	247.9(4)	1.44 +6	Ge XXV	$2s^2\ 2p^4$	$^3P_1 - {}^1S_0$	2.31	
	249.80(18)	2.57 +4	Co XXIV	2s 2p	$^3P_1 - {}^1P_1$	2.12	
	249.94(19)	4.60 +4	Ni XXII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{3/2}$	1.89	
	251.8(3)	6.76 +5	Ge XXVI	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{3/2}$	2.46	
	252.0(6)	8.78 +5	Kr XXXI	$2s^2\ 2p^2$	$^3P_0 - {}^3P_1$	3.46	
	253.98(16)	1.09 +6	Br XXVII	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	2.70	
O	254.2(6)	1.65 +3	Se XXVII	$2s^2\ 2p^4$	$^1D_2 - {}^1S_0$	2.68	
	256.2(5)	9.50 +4	Se XXVIII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{5/2}$	2.83	
	256.91(28)	2.59 +5	Ga XXV	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{1/2}$	2.28	

Table 40. Wavelengths and transition probabilities ordered by wavelength - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
	257.61(19)	4.38 +5	Cu XXIV	$2s^2\ 2p^2$	$^3P_1 - {}^1S_0$	2.09	
	259.7(7)	1.21 +6	Kr XXX	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{3/2}$	3.23	
	259.8(6)	3.47 +5	As XXVIII	$2s^2\ 2p^2$	$^3P_1 - {}^1D_2$	2.83	
	260.50(14)	5.04 +5	Se XXX	$2s^2\ 2p$	$^2P_{1/2} - {}^2P_{3/2}$	3.20	
	264.4(7)	2.86 +5	Kr XXX	$2s^2\ 2p^3$	$^2P_{1/2} - {}^2P_{3/2}$	3.23	
	265.5(6)	3.27 +5	As XXVI	$2s^2\ 2p^4$	$^3P_2 - {}^1D_2$	2.49	
	266.37(28)	1.94 +4	Mn XXII	$2s\ 2p$	$^3P_0 - {}^1P_1$	1.79	
	266.6(4)	9.14 +4	Mo XXXI	$3s\ 3p$	$^3P_0 - {}^1P_1$	1.80	
	267.59(12)	1.72 +4	Fe XXIII	$2s\ 2p$	$^3P_1 - {}^1P_1$	1.96	
	268.2(4)	6.32 +5	Br XXXII	$2s\ 2p$	$^3P_1 - {}^3P_2$	3.64	
	268.9(7)	6.66 +3	Nb XXVII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{3/2}$	1.41	
	269.1(7)	9.10 +5	Br XXVIII	$2s^2\ 2p^4$	$^3P_2 - {}^3P_1$	2.87	
	272.9(4)	1.01 +6	Ga XXIV	$2s^2\ 2p^4$	$^3P_1 - {}^1S_0$	2.14	
	275.3(6)	1.14 +5	Kr XXXIII	$2s\ 2p$	$^3P_2 - {}^1P_1$	3.87	
	278.55(17)	3.72 +4	Co XXI	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{3/2}$	1.74	
	278.8(4)	5.24 +5	As XXVII	$2s^2\ 2p^3$	$^2D_{5/2} - {}^2P_{3/2}$	2.64	
	280.37(28)	1.76 +5	Zn XXIV	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{1/2}$	2.10	
	280.4(8)	4.51 +5	Se XXIX	$2s^2\ 2p^2$	$^3P_2 - {}^1D_2$	3.03	
	281.5(6)	9.66 +4	Br XXXII	$2s\ 2p$	$^3P_2 - {}^1P_1$	3.64	
	282.4(3)	3.02 +5	Ni XXIII	$2s^2\ 2p^2$	$^3P_1 - {}^1S_0$	2.01	
	283.1(3)	4.52 +5	Ga XXV	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{3/2}$	2.28	
Q	286.0(7)	1.07 +3	As XXVI	$2s^2\ 2p^4$	$^1D_2 - {}^1S_0$	2.49	
	286.1(5)	6.10 +4	As XXVII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{5/2}$	2.64	
	286.51(17)	1.24 +4	Cr XXI	$2s\ 2p$	$^3P_0 - {}^1P_1$	1.63	
	286.70(25)	1.14 +4	Mn XXII	$2s\ 2p$	$^3P_1 - {}^1P_1$	1.79	
	286.8(6)	6.70 +4	Nb XXX	$3s\ 3p$	$^3P_0 - {}^1P_1$	1.70	
	288.0(6)	8.13 +4	Se XXXI	$2s\ 2p$	$^3P_2 - {}^1P_1$	3.42	
289.1(3)	289.16(17)	7.39 +5	Se XXVI	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	2.52	H
	289.6(8)	5.65 +5	Br XXX	$2s^2\ 2p^2$	$^3P_0 - {}^3P_1$	3.24	
	291.5(6)	2.33 +5	Ge XXVII	$2s^2\ 2p^2$	$^3P_1 - {}^1D_2$	2.64	
	294.8(6)	6.77 +4	As XXX	$2s\ 2p$	$^3P_2 - {}^1P_1$	3.20	
	295.0(7)	8.10 +5	Br XXIX	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{3/2}$	3.03	
	296.6(4)	4.50 +4	Mo XXXI	$3s\ 3p$	$^3P_1 - {}^1P_1$	1.80	
	296.78(18)	3.41 +5	As XXIX	$2s^2\ 2p$	$^2P_{1/2} - {}^2P_{3/2}$	2.99	
297.5(3)	297.4(6)	2.22 +5	Ge XXV	$2s^2\ 2p^4$	$^3P_2 - {}^1D_2$	2.31	H
	299.4(8)	6.58 +3	Zr XXVI	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{3/2}$	1.32	
	299.8(4)	7.03 +5	Zn XXIII	$2s^2\ 2p^4$	$^3P_1 - {}^1S_0$	1.97	
	301.9(5)	5.56 +4	Ge XXIX	$2s\ 2p$	$^3P_2 - {}^1P_1$	3.00	
	304.96(26)	1.18 +5	Cu XXIII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{1/2}$	1.94	
	305.4(8)	1.88 +5	Br XXIX	$2s^2\ 2p^3$	$^2P_{1/2} - {}^2P_{3/2}$	3.03	
	306.80(5)	7.42 +3	Cr XXI	$2s\ 2p$	$^3P_1 - {}^1P_1$	1.63	
	307.3(5)	4.52 +4	Se XXXI	$2s\ 2p$	$^3P_1 - {}^3P_2$	3.42	

Table 40. Wavelengths and transition probabilities ordered by wavelength - Continued

	Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
		307.89(27)	2.09 +5	Co XXII	$2s^2\ 2p^2$	$^3P_1 - {}^1S_0$	1.85	
		308.26(21)	7.77 +3	V XX	2s 2p	$^3P_0 - {}^1P_1$	1.49	
		308.3(9)	3.37 +5	Se XXVII	$2s^2\ 2p^4$	$^3P_2 - {}^3P_1$	2.68	
		308.6(7)	4.88 +4	Zr XXIX	3s 3p	$^3P_0 - {}^1P_1$	1.60	
		309.4(4)	4.52 +4	Ga XXVIII	2s 2p	$^3P_2 - {}^1P_1$	2.79	
	309.26(3)	309.6(3)	2.91 +4	Fe XX	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{3/2}$	1.58	SBST
		315.2(5)	3.49 +5	Ge XXVI	$2s^2\ 2p^3$	$^2D_{5/2} - {}^2P_{3/2}$	2.46	
		317.4(3)	3.62 +4	Zn XXVII	2s 2p	$^3P_2 - {}^1P_1$	2.60	
		319.0(5)	3.33 +4	Nb XXX	3s 3p	$^3P_1 - {}^1P_1$	1.70	
		319.0(9)	3.05 +5	As XXVIII	$2s^2\ 2p^2$	$^3P_2 - {}^1D_2$	2.83	
	319.1(3)	319.1(5)	3.83 +4	Ge XXVI	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{5/2}$	2.46	H
		319.4(4)	2.96 +5	Zn XXIV	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{3/2}$	2.10	
		Q 321.8(7)	7.02 +2	Ge XXV	$2s^2\ 2p^4$	$^1D_2 - {}^1S_0$	2.31	
T	325.3(3)	326.2(1.0)	3.10 +5	Mo XXIX	$3s^2\ 3p^2$	$^3P_1 - {}^1S_0$	1.59	DHSC
		326.00(24)	2.85 +4	Cu XXVI	2s 2p	$^3P_2 - {}^1P_1$	2.41	
		327.5(6)	1.55 +5	Ga XXVI	$2s^2\ 2p^2$	$^3P_1 - {}^1D_2$	2.45	
		327.98(24)	4.75 +3	V XX	2s 2p	$^3P_1 - {}^1P_1$	1.49	
		328.6(3)	4.85 +5	Cu XXII	$2s^2\ 2p^4$	$^3P_1 - {}^1S_0$	1.67	
		330.58(22)	4.95 +5	As XXV	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	2.34	
		330.6(4)	7.80 +4	Ni XXII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{1/2}$	1.89	
		331.68(3)	4.79 +3	Ti XIX	2s 2p	$^3P_0 - {}^1P_1$	1.35	
		331.9(8)	3.52 +4	Y XXVIII	3s 3p	$^3P_0 - {}^1P_1$	1.50	
		333.4(6)	1.49 +5	Ga XXIV	$2s^2\ 2p^4$	$^3P_2 - {}^1D_2$	2.14	
		333.6(9)	6.31 +3	Y XXV	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{3/2}$	1.24	
		334.7(1.1)	3.83 +5	Se XXIX	$2s^2\ 2p^2$	$^3P_0 - {}^3P_1$	3.03	
		334.9(4)	2.21 +4	Ni XXV	2s 2p	$^3P_2 - {}^1P_1$	2.30	
		335.0(8)	5.40 +5	Se XXVIII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{3/2}$	2.83	
		335.5(3)	1.43 +5	Fe XXI	$2s^2\ 2p^2$	$^3P_1 - {}^1S_0$	1.69	
	339.5(3)	339.51(17)	2.28 +5	Ge XXVIII	$2s^2$ 2p	$^2P_{1/2} - {}^2P_{3/2}$	2.79	H
		342.78(26)	2.19 +4	Mn XIX	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{3/2}$	1.44	
		343.1(6)	2.45 +4	Zr XXIX	3s 3p	$^3P_1 - {}^1P_1$	1.60	
		345.0(3)	1.68 +4	Co XXIV	2s 2p	$^3P_2 - {}^1P_1$	2.12	
		350.78(4)	2.99 +3	Ti XIX	2s 2p	$^3P_1 - {}^1P_1$	1.35	
		353.5(5)	2.82 +5	As XXX	2s 2p	$^3P_1 - {}^3P_2$	3.20	
		354.(5)	2.32 +5	Nb XXVIII	$3s^2\ 3p^2$	$^3P_1 - {}^1S_0$	1.50	
		354.9(1.1)	4.07 +5	As XXVI	$2s^2\ 2p^4$	$^3P_2 - {}^3P_1$	2.49	
		354.9(9)	1.21 +5	Se XXVIII	$2s^2\ 2p^3$	$^2P_{1/2} - {}^2P_{3/2}$	2.83	
		355.0(5)	2.34 +4	Ga XXV	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{5/2}$	2.28	
		355.80(22)	1.26 +4	Fe XXIII	2s 2p	$^3P_2 - {}^1P_1$	1.96	
		356.8(3)	5.10 +4	Co XXI	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{1/2}$	1.74	
		356.84(7)	2.90 +3	Sc XVIII	2s 2p	$^3P_0 - {}^1P_1$	1.21	
		356.9(9)	2.52 +4	Sr XXVII	3s 3p	$^3P_0 - {}^1P_1$	1.40	

Table 40. Wavelengths and transition probabilities ordered by wavelength - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
	357.2(5)	2.28 +5	Ga XXV	$2s^2\ 2p^3$	$^2D_{5/2} - {}^2P_{3/2}$	2.28	
	359.1(5)	3.31 +5	Ni XXI	$2s^2\ 2p^4$	$^3P_1 - {}^1S_0$	1.76	
	362.0(4)	1.90 +5	Cu XXIII	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{3/2}$	1.94	
	Q 362.4(7)	4.65 +2	Ga XXIV	$2s^2\ 2p^4$	$^1D_2 - {}^1S_0$	2.14	
	363.4(9)	2.04 +5	Ge XXVII	$2s^2\ 2p^2$	$^3P_2 - {}^1D_2$	2.64	
	365.6(5)	9.65 +4	Mn XX	$2s^2\ 2p^2$	$^3P_1 - {}^1S_0$	1.54	
	368.2(6)	1.01 +5	Zn XXV	$2s^2\ 2p^2$	$^3P_1 - {}^1D_2$	2.27	
	368.4(5)	9.16 +3	Mn XXII	2s 2p	$^3P_2 - {}^1P_1$	1.79	
	368.6(7)	1.79 +4	Y XXVIII	3s 3p	$^3P_1 - {}^1P_1$	1.50	
	371.9(1.0)	6.00 +3	Sr XXIV	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{3/2}$	1.16	
	374.1(6)	9.91 +4	Zn XXIII	$2s^2\ 2p^4$	$^3P_2 - {}^1D_2$	1.97	
	375.12(7)	1.85 +3	Sc XVIII	2s 2p	$^3P_1 - {}^1P_1$	1.21	
378.0(3)	378.1(3)	1.61 +4	Cr XVIII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{3/2}$	1.30	DH
379.5(1)	379.59(22)	3.27 +5	Ge XXIV	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	2.16	H
	379.6(8)	3.56 +5	As XXVII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{3/2}$	2.64	
	381.6(3)	6.56 +3	Cr XXI	2s 2p	$^3P_2 - {}^1P_1$	1.63	
	381.8(1.4)	1.63 +5	Kr XXIX	$2s^2\ 2p^4$	$^3P_0 - {}^3P_1$	3.07	
	383.4(1.0)	1.80 +4	Rb XXVI	3s 3p	$^3P_0 - {}^1P_1$	1.30	
	384.13(8)	1.72 +3	Ca XVII	2s 2p	$^3P_0 - {}^1P_1$	1.16	
	384.8(4)	3.27 +4	Fe XX	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{1/2}$	1.58	
	385.2(1.3)	1.72 +5	Zr XXVII	$3s^2\ 3p^2$	$^3P_1 - {}^1S_0$	1.41	
387.7(3)	388.2(1.5)	1.05 +5	Mo XXVIII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{1/2}$	1.49	DHST
	388.9(1.3)	2.47 +5	As XXVIII	$2s^2\ 2p^2$	$^3P_0 - {}^3P_1$	2.83	
389.9(2)	389.1(1.5)	2.10 +5	Mo XXVIII	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{3/2}$	1.49	DHST
	390.12(23)	1.50 +5	Ga XXVII	$2s^2$ 2p	$^2P_{1/2} - {}^2P_{3/2}$	2.59	
	390.9(4)	2.17 +5	Co XX	$2s^2\ 2p^4$	$^3P_1 - {}^1S_0$	1.60	
	393.7(6)	1.38 +4	Zn XXIV	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{5/2}$	2.10	
	395.8(8)	1.30 +4	Sr XXVII	3s 3p	$^3P_1 - {}^1P_1$	1.40	
	396.0(4)	4.57 +3	V XX	2s 2p	$^3P_2 - {}^1P_1$	1.49	
397.2(3)	397.6(1.6)	4.13 +5	Mo XXVII	$3s^2\ 3p^4$	$^3P_1 - {}^1S_0$	1.43	H
398.4(3)	398.42(16)	6.38 +4	Cr XIX	$2s^2\ 2p^2$	$^3P_1 - {}^1S_0$	1.40	HSCS
	401.35(9)	1.12 +3	Ca XVII	2s 2p	$^3P_1 - {}^1P_1$	1.16	
	405.4(6)	6.79 +4	Zn XXIV	$2s^2\ 2p^3$	$^2D_{5/2} - {}^2P_{3/2}$	2.10	
	Q 407.8(7)	3.12 +2	Zn XXIII	$2s^2\ 2p^4$	$^1D_2 - {}^1S_0$	1.97	
408.7(3)	408.5(6)	1.84 +5	Ge XXIX	2s 2p	$^3P_1 - {}^3P_2$	3.00	H
410.7(3)	410.6(1.2)	2.66 +5	Ge XXV	$2s^2\ 2p^4$	$^3P_2 - {}^3P_1$	2.31	HSCS
	411.8(1.2)	1.27 +4	Kr XXV	3s 3p	$^3P_0 - {}^1P_1$	1.22	
	412.3(5)	1.20 +5	Ni XXII	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{3/2}$	1.89	
	412.47(5)	3.11 +3	Ti XIX	2s 2p	$^3P_2 - {}^1P_1$	1.35	
	413.0(4)	2.08 +4	Mn XIX	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{1/2}$	1.44	
414.1(3)	414.0(5)	6.53 +4	Cu XXIV	$2s^2\ 2p^2$	$^3P_1 - {}^1D_2$	2.09	HSCS
	414.5(4)	9.84 +2	K XVI	2s 2p	$^3P_0 - {}^1P_1$	0.97	

Table 40. Wavelengths and transition probabilities ordered by wavelength - Continued

	Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
		414.6(1.0)	1.35 +5	Ga XXVI	$2s^2\ 2p^2$	$^3P_2 - {}^1D_2$	2.45	
		415.0(1.0)	7.69 +4	As XXVII	$2s^2\ 2p^3$	$^2P_{1/2} - {}^2P_{3/2}$	2.64	
		415.80(5)	1.13 +4	V XVII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{3/2}$	1.17	
		416.2(1.2)	5.51 +3	Rb XXIII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{3/2}$	1.07	
		418.6(1.4)	1.26 +5	Y XXVI	$3s^2\ 3p^2$	$^3P_1 - {}^1S_0$	1.32	
	420.0(3)	419.8(5)	6.52 +4	Cu XXII	$2s^2\ 2p^4$	$^3P_2 - {}^1D_2$	1.67	HSCS
		422.5(1.8)	1.25 +4	Kr XXX	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{1/2}$	3.23	
		424.4(1.6)	7.69 +4	Nb XXVII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{1/2}$	1.41	
	424.26(5)	424.27(7)	1.50 +5	Fe XIX	$2s^2\ 2p^4$	$^3P_1 - {}^1S_0$	1.47	W
		424.3(9)	9.39 +3	Rb XXVI	3s 3p	$^3P_1 - {}^1P_1$	1.30	
	427.9(3)	428.2(9)	2.33 +5	Ge XXVI	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{3/2}$	2.46	HSCS
		428.7(1.7)	1.51 +5	Nb XXVII	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{3/2}$	1.41	
		430.5(4)	6.54 +2	K XVI	2s 2p	$^3P_1 - {}^1P_1$	0.97	
		430.66(9)	2.06 +3	Sc XVIII	2s 2p	$^3P_2 - {}^1P_1$	1.21	
T	434.2(2)	432.82(19)	4.19 +4	V XVIII	$2s^2\ 2p^2$	$^3P_1 - {}^1S_0$	1.26	FBM
	434.8(3)	434.7(5)	7.98 +3	Cu XXIII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{5/2}$	1.94	HSCS
		435.5(1.8)	3.03 +3	Nb XXVI	$3s^2\ 3p^4$	$^3P_1 - {}^1S_0$	1.34	
		437.95(29)	2.13 +5	Ga XXIII	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	1.99	
		442.2(1.4)	8.93 +3	Br XXIV	3s 3p	$^3P_0 - {}^1P_1$	1.10	
	442.1(3)	442.3(4)	1.31 +4	Cr XVIII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{1/2}$	1.30	DH
		442.6(1.7)	1.29 +4	Br XXIX	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{1/2}$	3.03	
	446.9(2)	446.8(2.0)	7.59 +4	Mo XXIX	$3s^2\ 3p^2$	$^3P_1 - {}^1D_2$	1.59	H
		447.33(14)	5.55 +2	Ar XV	2s 2p	$^3P_0 - {}^1P_1$	0.855	
		450.4(3)	9.78 +4	Zn XXVI	$2s^2$ 2p	$^2P_{1/2} - {}^2P_{3/2}$	2.40	
		451.12(11)	1.33 +3	Ca XVII	2s 2p	$^3P_2 - {}^1P_1$	1.16	
		454.5(1.1)	6.75 +3	Kr XXV	3s 3p	$^3P_1 - {}^1P_1$	1.22	
	454.8(3)	454.7(1.5)	1.57 +5	Ge XXVII	$2s^2\ 2p^2$	$^3P_0 - {}^3P_1$	2.64	HSCS
		455.0(1.5)	9.30 +4	Sr XXV	$3s^2\ 3p^2$	$^3P_1 - {}^1S_0$	1.22	
	456.1(3)	456.10(5)	7.72 +3	Ti XVI	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{3/2}$	1.04	H
		457.8(8)	9.94 +4	Mn XVIII	$2s^2\ 2p^4$	$^3P_1 - {}^1S_0$	1.32	
		458.3(2.1)	9.72 +4	Br XXVIII	$2s^2\ 2p^4$	$^3P_0 - {}^3P_1$	2.87	
	Q	458.3(6)	2.10 +2	Cu XXII	$2s^2\ 2p^4$	$^1D_2 - {}^1S_0$	1.67	
	458.6(2)	459.0(2.1)	7.18 +4	Mo XXVII	$3s^2\ 3p^4$	$^3P_2 - {}^1D_2$	1.43	DHSC
		460.7(6)	4.53 +4	Cu XXIII	$2s^2\ 2p^3$	$^2D_{5/2} - {}^2P_{3/2}$	1.94	
		462.(5)	5.04 +3	Kr XXII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.99	
		462.19(15)	3.75 +2	Ar XV	2s 2p	$^3P_1 - {}^1P_1$	0.855	
	463.2(2)	463.9(1.9)	5.54 +4	Zr XXVI	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{1/2}$	1.32	DHST
		465.2(1.5)	1.32 +4	Se XXVIII	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{1/2}$	2.83	
	465.4(3)	465.40(17)	4.15 +4	Ni XXIII	$2s^2\ 2p^2$	$^3P_1 - {}^1D_2$	2.01	HSCS
	470.0(2)	469.8(2.2)	4.42 +4	Mo XXVIII	$3s^2\ 3p^3$	$^2D_{5/2} - {}^2P_{3/2}$	1.49	DHST
	470.4(3)	470.54(11)	2.68 +4	Ti XVII	$2s^2\ 2p^2$	$^3P_1 - {}^1S_0$	1.13	H
	471.15(5)	471.14(6)	4.24 +4	Ni XXI	$2s^2\ 2p^4$	$^3P_2 - {}^1D_2$	1.76	W

Table 40. Wavelengths and transition probabilities ordered by wavelength - Continued

	Wavelength Observed		Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
			471.8(6)	7.39 +4	Co XXI	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{3/2}$	1.74	
			472.99(6)	8.10 +3	V XVII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{1/2}$	1.17	
	474.1(2)		473.2(2.0)	1.09 +5	Zr XXVI	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{3/2}$	1.32	DHST
			473.2(1.0)	8.88 +4	Zn XXV	$2s^2\ 2p^2$	$^3P_2 - {}^1D_2$	2.27	
			474.1(6)	1.19 +5	Ga XXVIII	2s 2p	$^3P_1 - {}^3P_2$	2.79	
			474.6(5)	8.19 +2	K XVI	2s 2p	$^3P_2 - {}^1P_1$	0.97	
			474.8(1.3)	6.20 +3	Se XXIII	3s 3p	$^3P_0 - {}^1P_1$	1.00	
T	477.1(5)		477.0(2.0)	2.21 +5	Zr XXV	$3s^2\ 3p^4$	$^3P_1 - {}^1S_0$	1.26	H
			477.6(1.3)	1.72 +5	Ga XXIV	$2s^2\ 2p^4$	$^3P_2 - {}^3P_1$	2.14	
	477.6(3)		477.6(3)	4.48 +3	Ni XXII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{5/2}$	1.89	HSCS
		Q	478.(2)	1.08 +3	Mo XXVII	$3s^2\ 3p^4$	$^1D_2 - {}^1S_0$	1.43	
			479.9(1.0)	1.52 +5	Ga XXV	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{3/2}$	2.28	
			483.99(17)	3.02 +2	Cl XIV	2s 2p	$^3P_0 - {}^1P_1$	0.750	
			486.6(1.2)	4.81 +3	Br XXIV	3s 3p	$^3P_1 - {}^1P_1$	1.10	
			488.80(18)	4.78 +4	Ge XXVI	$2s^2\ 2p^3$	$^2P_{1/2} - {}^2P_{3/2}$	2.46	
	490.1(3)		490.1(5)	7.60 +4	Mo XXX	$3s^2$ 3p	$^2P_{1/2} - {}^2P_{3/2}$	1.66	DHSC
			490.6(1.4)	1.32 +4	As XXVII	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{1/2}$	2.64	
	493.8(3)		493.79(24)	6.42 +4	Cr XVII	$2s^2\ 2p^4$	$^3P_1 - {}^1S_0$	1.19	HSCS
			494.6(1.7)	6.76 +4	Rb XXIV	$3s^2\ 3p^2$	$^3P_1 - {}^1S_0$	1.13	
			495.8(2.3)	5.43 +4	Nb XXVIII	$3s^2\ 3p^2$	$^3P_1 - {}^1D_2$	1.50	
			497.59(17)	2.08 +2	Cl XIV	2s 2p	$^3P_1 - {}^1P_1$	0.750	
	498.2(2)		498.5(2.5)	1.55 +4	Mo XXVIII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{5/2}$	1.49	DHST
			498.88(6)	5.09 +3	Sc XV	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.93	
			501.15(18)	4.93 +2	Ar XV	2s 2p	$^3P_2 - {}^1P_1$	0.855	
	505.9(3)		505.82(6)	4.94 +3	Ti XVI	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{1/2}$	1.04	H
			506.7(2.1)	3.96 +4	Y XXV	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{1/2}$	1.24	
			507.9(4)	1.37 +5	Zn XXII	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	1.83	
			509.0(2.4)	5.13 +4	Nb XXVI	$3s^2\ 3p^4$	$^3P_2 - {}^1D_2$	1.34	
			510.0(1.5)	4.26 +3	As XXII	3s 3p	$^3P_0 - {}^1P_1$	0.90	
	511.2(5)		510.83(13)	1.68 +4	Sc XVI	$2s^2\ 2p^2$	$^3P_1 - {}^1S_0$	1.01	H
			514.4(1.5)	4.44 +3	Br XXI	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.91	
		Q	514.0(8)	1.44 +2	Ni XXI	$2s^2\ 2p^4$	$^1D_2 - {}^1S_0$	1.76	
			519.6(1.3)	1.30 +4	Ge XXVI	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{1/2}$	2.46	
			520.6(1.1)	3.40 +3	Se XXIII	3s 3p	$^3P_1 - {}^1P_1$	1.00	
			522.5(2.5)	3.21 +4	Nb XXVII	$3s^2\ 3p^3$	$^2D_{5/2} - {}^2P_{3/2}$	1.41	
			522.4(2.2)	1.60 +5	Y XXIV	$3s^2\ 3p^4$	$^3P_1 - {}^1S_0$	1.18	
			522.1(6)	2.43 +3	Co XXI	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{5/2}$	1.74	
	522.8(3)		522.66(27)	6.26 +4	Cu XXV	$2s^2$ 2p	$^2P_{1/2} - {}^2P_{3/2}$	2.22	HSCS
			523.3(8)	2.58 +4	Co XXII	$2s^2\ 2p^2$	$^3P_1 - {}^1D_2$	1.85	
			523.7(2.2)	1.62 +4	Y XXV	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{3/2}$	1.24	
			524.3(9)	2.99 +4	Ni XXII	$2s^2\ 2p^3$	$^2D_{5/2} - {}^2P_{3/2}$	1.89	
		Q	524.8(2.7)	3.02 +1	Kr XXXI	$2s^2\ 2p^2$	$^1D_2 - {}^1S_0$	3.46	

Table 40. Wavelengths and transition probabilities ordered by wavelength - Continued

	Wavelength Observed		Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
			525.21(6)	1.58 +2	S XIII	2s 2p	$^3P_0 - {}^1P_1$	0.652	
			528.3(6)	2.73 +4	Co XX	$2s^2\ 2p^4$	$^3P_2 - {}^1D_2$	1.60	
	529.9(2)		529.75(15)	4.09 +4	V XVI	$2s^2\ 2p^4$	$^3P_1 - {}^1S_0$	1.06	FBM
		Q	530.(3)	7.37 +2	Nb XXVI	$3s^2\ 3p^4$	$^1D_2 - {}^1S_0$	1.34	
	530.3(3)		530.3(2.8)	6.68 +4	Mo XXIX	$3s^2\ 3p^2$	$^3P_2 - {}^1D_2$	1.59	H
			531.69(20)	2.85 +2	Cl XIV	2s 2p	$^3P_2 - {}^1P_1$	0.750	
			533.0(1.0)	9.91 +4	Zn XXIV	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{3/2}$	2.10	
	534.9(3)		534.9(5)	1.17 +5	Mo XXVI	$3s^2\ 3p^5$	$^2P_{3/2} - {}^2P_{1/2}$	1.37	DHSC
			535.1(1.6)	9.76 +4	Ga XXVI	$2s^2\ 2p^2$	$^3P_0 - {}^3P_1$	2.45	
			537.29(6)	1.10 +2	S XIII	2s 2p	$^3P_1 - {}^1P_1$	0.652	
			538.(5)	4.88 +4	Kr XXIII	$3s^2\ 3p^2$	$^3P_1 - {}^1S_0$	1.05	
	540.0(3)		539.8(8)	5.78 +4	Cu XXIV	$2s^2\ 2p^2$	$^3P_2 - {}^1D_2$	2.09	HSCS
			541.01(7)	2.96 +3	Sc XV	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.93	
	541.35(5)		541.42(12)	4.49 +4	Fe XX	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{3/2}$	1.58	W
		Q	542.7(2.9)	2.94 +1	Br XXX	$2s^2\ 2p^2$	$^1D_2 - {}^1S_0$	3.24	
			545.38(13)	3.23 +3	Ca XIV	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.82	
			547.9(8)	2.89 +3	Ge XXI	3s 3p	$^3P_0 - {}^1P_1$	0.80	
			550.5(6)	5.38 +4	Nb XXIX	$3s^2\ 3p$	$^2P_{1/2} - {}^2P_{3/2}$	1.56	
	551.5(3)		551.1(2.6)	3.83 +4	Zr XXVII	$3s^2\ 3p^2$	$^3P_1 - {}^1D_2$	1.41	DH
			552.9(1.3)	1.25 +4	Ga XXV	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{1/2}$	2.28	
			552.9(6)	7.57 +4	Zn XXVII	2s 2p	$^3P_1 - {}^3P_2$	2.60	
			552.8(2.3)	2.81 +4	Sr XXIV	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{1/2}$	1.16	
			554.2(2.7)	1.05 +4	Nb XXVII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{5/2}$	1.41	
			555.21(15)	1.03 +4	Ca XV	$2s^2\ 2p^2$	$^3P_1 - {}^1S_0$	0.89	
			556.9(1.3)	2.38 +3	As XXII	3s 3p	$^3P_1 - {}^1P_1$	0.90	
			557.(3)	5.60 +4	Se XXVII	$2s^2\ 2p^4$	$^3P_0 - {}^3P_1$	2.68	
			558.7(1.3)	1.09 +5	Zn XXIII	$2s^2\ 2p^4$	$^3P_2 - {}^3P_1$	1.97	
		Q	562.(3)	2.88 +1	Se XXIX	$2s^2\ 2p^2$	$^1D_2 - {}^1S_0$	3.03	
	564.9(3)		565.4(2.7)	3.63 +4	Zr XXV	$3s^2\ 3p^4$	$^3P_2 - {}^1D_2$	1.26	DHSC
			566.96(7)	1.57 +2	S XIII	2s 2p	$^3P_2 - {}^1P_1$	0.652	
			567.41(16)	2.55 +4	Ti XV	$2s^2\ 2p^4$	$^3P_1 - {}^1S_0$	0.94	
	567.76(5)		568.9(1.0)	1.27 +3	Fe XX	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{5/2}$	1.58	W
	569.8(1)		569.(3)	9.50 +4	Mo XXVII	$3s^2\ 3p^4$	$^3P_2 - {}^3P_1$	1.43	DHSC
			571.87(7)	9.46 +1	P XII	2s 2p	$^3P_0 - {}^1P_1$	0.561	
T	569.2(5)		572.0(1.6)	3.77 +3	Se XX	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.83	H
			571.8(2.4)	1.16 +5	Sr XXIII	$3s^2\ 3p^4$	$^3P_1 - {}^1S_0$	1.10	
		Q	574.9(9)	1.01 +2	Co XX	$2s^2\ 2p^4$	$^1D_2 - {}^1S_0$	1.60	
	577.5(3)		577.5(4)	6.33 +4	Mo XXXI	3s 3p	$^3P_1 - {}^3P_2$	1.80	DHSC
			580.05(14)	1.73 +3	Ca XIV	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.82	
			580.1(1.4)	2.91 +4	Ga XXV	$2s^2\ 2p^3$	$^2P_{1/2} - {}^2P_{3/2}$	2.28	
			580.9(2.4)	5.39 +4	Sr XXIV	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{3/2}$	1.16	
	582.3(2)		582.(3)	2.29 +4	Zr XXVI	$3s^2\ 3p^3$	$^2D_{5/2} - {}^2P_{3/2}$	1.32	DHST

Table 40. Wavelengths and transition probabilities ordered by wavelength - Continued

	Wavelength Observed		Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
		Q	582.2(2.9)	2.81 +1	As XXVIII	$2s^2\ 2p^2$	$^1D_2 - {}^1S_0$	2.83	
			582.57(5)	6.76 +1	P XII	2s 2p	$^3P_1 - {}^1P_1$	0.561	
			584.1(1.9)	3.51 +4	Br XXII	$3s^2\ 3p^2$	$^3P_1 - {}^1S_0$	0.96	
	585.0(3)		585.3(1.0)	6.40 +4	Cu XXIII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{3/2}$	1.94	HSCS
	585.8(3)		585.79(17)	1.59 +4	Fe XXI	$2s^2\ 2p^2$	$^3P_1 - {}^1D_2$	1.69	HSCS
			588.6(2.0)	1.93 +3	Ga XX	3s 3p	$^3P_0 - {}^1P_1$	0.70	
		Q	590.(3)	5.00 +2	Zr XXV	$3s^2\ 3p^4$	$^1D_2 - {}^1S_0$	1.26	
			591.6(1.2)	1.17 +4	Zn XXIV	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{1/2}$	2.10	
	592.3(3)		592.2(4)	8.62 +4	Cu XXI	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	1.54	HSCS
	592.234(6)		592.235(7)	1.73 +4	Fe XIX	$2s^2\ 2p^4$	$^3P_2 - {}^1D_2$	1.47	PSS
			594.6(4)	1.98 +3	K XIII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.71	
			595.6(7)	1.64 +3	Ge XXI	3s 3p	$^3P_1 - {}^1P_1$	0.80	
			596.(3)	4.70 +4	Nb XXVIII	$3s^2\ 3p^2$	$^3P_2 - {}^1D_2$	1.50	
			597.1(1.0)	1.95 +4	Co XXI	$2s^2\ 2p^3$	$^2D_{5/2} - {}^2P_{3/2}$	1.74	
			601.6(6)	8.23 +4	Nb XXV	$3s^2\ 3p^5$	$^2P_{3/2} - {}^2P_{1/2}$	1.28	
			603.58(20)	6.10 +3	K XIV	$2s^2\ 2p^2$	$^3P_1 - {}^1S_0$	0.79	
			603.6(2.5)	1.93 +4	Rb XXIII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{1/2}$	1.07	
		Q	604.2(2.6)	2.75 +1	Ge XXVII	$2s^2\ 2p^2$	$^1D_2 - {}^1S_0$	2.64	
	606.5(5)		606.77(15)	1.55 +4	Sc XIV	$2s^2\ 2p^4$	$^3P_1 - {}^1S_0$	0.83	H
			607.95(8)	1.01 +2	P XII	2s 2p	$^3P_2 - {}^1P_1$	0.561	
T	609.8(3)		609.6(1.5)	9.56 +3	Mo XXXI	3s 3p	$^3P_2 - {}^1P_1$	1.80	DHSC
	609.9(3)		609.9(3)	3.94 +4	Ni XXIV	$2s^2\ 2p$	$^2P_{1/2} - {}^2P_{3/2}$	2.13	HSCS
			614.(3)	8.92 +3	Y XXVI	$3s^2\ 3p^2$	$^3P_1 - {}^1D_2$	1.32	
	614.8(3)		614.8(3)	3.71 +4	Ni XXIII	$2s^2\ 2p^2$	$^3P_2 - {}^1D_2$	2.01	HSCS
			615.6(8)	6.50 +2	Mn XIX	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{5/2}$	1.44	
	616.0(2)		616.(3)	6.97 +3	Zr XXVI	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{5/2}$	1.32	DHST
	618.5(3)		618.(4)	6.03 +4	Mo XXIX	$3s^2\ 3p^2$	$^3P_0 - {}^3P_1$	1.59	DHSC
	618.5(3)		618.5(7)	3.78 +4	Zr XXVIII	$3s^2$ 3p	$^2P_{1/2} - {}^2P_{3/2}$	1.47	DHSC
			622.1(4)	9.91 +2	K XIII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.71	
			623.6(2.0)	8.15 +3	Nb XXX	3s 3p	$^3P_2 - {}^1P_1$	1.70	
			625.4(2.6)	8.27 +4	Rb XXII	$3s^2\ 3p^4$	$^3P_1 - {}^1S_0$	1.02	
			625.2(1.1)	2.66 +4	Mn XIX	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{3/2}$	1.44	
			625.48(6)	3.75 +1	Si XI	2s 2p	$^3P_0 - {}^1P_1$	0.476	
		Q	628.0(2.2)	2.69 +1	Ga XXVI	$2s^2\ 2p^2$	$^1D_2 - {}^1S_0$	2.45	
			629.(3)	2.55 +4	Y XXIV	$3s^2\ 3p^4$	$^3P_2 - {}^1D_2$	1.18	
			632.2(2.3)	1.28 +3	Zn XIX	3s 3p	$^3P_0 - {}^1P_1$	0.70	
			634.0(1.7)	5.95 +4	Zn XXV	$2s^2\ 2p^2$	$^3P_0 - {}^3P_1$	2.27	
			634.78(6)	2.68 +1	Si XI	2s 2p	$^3P_1 - {}^1P_1$	0.476	
	634.8(3)		634.8(3)	4.11 +4	Ni XXII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{3/2}$	1.89	HSCS
T	639.6(3)		634.5(2.0)	2.49 +4	Se XXI	$3s^2\ 3p^2$	$^3P_1 - {}^1S_0$	0.88	DHSC
			634.8(1.8)	3.11 +3	As XIX	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.76	
			636.7(1.2)	1.05 +4	Cu XXIII	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{1/2}$	1.94	

Table 40. Wavelengths and transition probabilities ordered by wavelength - Continued

Wavelength Observed		Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
		636.7(1.6)	1.12 +3	Ga XX	3s 3p	$^3P_1 - {}^1P_1$	0.70	
		638.5(2.0)	6.88 +3	Zr XXIX	3s 3p	$^3P_2 - {}^1P_1$	1.60	
637.1(2)		639.(4)	8.04 +4	Mo XXVIII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{3/2}$	1.49	DHST
	Q	639.84(16)	7.33 +1	Fe XIX	$2s^2\ 2p^4$	$^1D_2 - {}^1S_0$	1.47	
643.0(5)		642.(4)	2.04 +4	Mo XXVIII	$3s^2\ 3p^3$	$^2P_{1/2} - {}^2P_{3/2}$	1.49	DHST
		644.(4)	6.64 +4	Nb XXVI	$3s^2\ 3p^4$	$^3P_2 - {}^3P_1$	1.34	
648.0(3)		648.0(6)	4.74 +4	Cu XXVI	2s 2p	$^3P_1 - {}^3P_2$	2.41	HSCS
		648.71(21)	9.17 +3	Ca XIII	$2s^2\ 2p^4$	$^3P_1 - {}^1S_0$	0.73	
		648.93(27)	1.17 +3	Ar XII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.618	
		648.8(2.8)	3.67 +4	Rb XXIII	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{3/2}$	1.07	
		650.(3)	4.03 +4	Y XXV	$3s^2\ 3p^3$	$^2D_{5/2} - {}^2P_{3/2}$	1.24	
		653.1(6)	4.42 +4	Nb XXX	3s 3p	$^3P_1 - {}^3P_2$	1.70	
		653.6(2.2)	3.68 +4	Y XXVIII	3s 3p	$^3P_2 - {}^1P_1$	1.50	
	Q	653.8(1.8)	2.61 +1	Zn XXV	$2s^2\ 2p^2$	$^1D_2 - {}^1S_0$	2.27	
		654.(5)	1.37 +4	Kr XXII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.99	
		655.0(1.2)	9.56 +3	Mn XX	$2s^2\ 2p^2$	$^3P_1 - {}^1D_2$	1.54	
	Q	656.(4)	3.40 +2	Y XXIV	$3s^2\ 3p^4$	$^1D_2 - {}^1S_0$	1.18	
		656.34(6)	4.05 +1	Si XI	2s 2p	$^3P_2 - {}^1P_1$	0.476	
		656.73(28)	3.51 +3	Ar XIII	$2s^2\ 2p^2$	$^3P_1 - {}^1S_0$	0.686	
657.7(3)		657.7(1.2)	6.78 +4	Cu XXII	$2s^2\ 2p^4$	$^3P_2 - {}^3P_1$	1.67	
663.1(3)		663.1(9)	3.22 +2	Cr XVIII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{5/2}$	1.30	DH
		664.0(1.4)	1.08 +4	Mn XVIII	$2s^2\ 2p^4$	$^3P_2 - {}^1D_2$	1.32	
		669.7(2.3)	4.77 +3	Sr XXVII	3s 3p	$^3P_2 - {}^1P_1$	1.40	
		669.97(29)	5.49 +2	Ar XII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.618	
670.8(3)		670.(4)	3.31 +4	Zr XXVII	$3s^2\ 3p^2$	$^3P_2 - {}^1D_2$	1.41	DH
		679.1(1.8)	8.36 +2	Cu XVIII	3s 3p	$^3P_0 - {}^1P_1$	0.60	
679.3(3)		679.39(20)	1.27 +4	Fe XX	$2s^2\ 2p^3$	$^2D_{5/2} - {}^2P_{3/2}$	1.58	H
679.1(3)		679.5(7)	5.73 +4	Zr XXIV	$3s^2\ 3p^5$	$^2P_{3/2} - {}^2P_{1/2}$	1.20	DHSC
		680.1(1.0)	2.62 +4	Co XXI	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{3/2}$	1.74	
		680.2(1.9)	7.56 +2	Zn XIX	3s 3p	$^3P_1 - {}^1P_1$	0.70	
	Q	681.9(1.3)	2.53 +1	Cu XXIV	$2s^2\ 2p^2$	$^1D_2 - {}^1S_0$	2.09	
		683.3(2.9)	5.87 +4	Kr XXI	$3s^2\ 3p^4$	$^3P_1 - {}^1S_0$	0.94	
		684.(3)	1.84 +4	Sr XXV	$3s^2\ 3p^2$	$^3P_1 - {}^1D_2$	1.22	
		686.(5)	9.24 +3	Y XXV	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{5/2}$	1.24	
		687.0(2.4)	3.91 +3	Rb XXVI	3s 3p	$^3P_2 - {}^1P_1$	1.30	
		688.(4)	3.10 +4	As XXVI	$2s^2\ 2p^4$	$^3P_0 - {}^3P_1$	2.49	
		688.03(17)	1.67 +1	Al X	2s 2p	$^3P_0 - {}^1P_1$	0.399	
		689.0(2.1)	1.75 +4	As XX	$3s^2\ 3p^2$	$^3P_1 - {}^1S_0$	0.81	
		689.8(1.5)	9.11 +3	Ni XXII	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{1/2}$	1.89	
		694.13(25)	5.27 +3	K XII	$2s^2\ 2p^4$	$^3P_1 - {}^1S_0$	0.63	
		694.4(1.7)	1.73 +4	Zn XXIV	$2s^2\ 2p^3$	$^2P_{1/2} - {}^2P_{3/2}$	2.10	
694.64(3)		694.64(3)	5.34 +4	Ni XX	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	1.65	PSS

Table 40. Wavelengths and transition probabilities ordered by wavelength - Continued

Wavelength Observed		Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
		695.93(18)	1.21 +1	Al X	2s 2p	$^3P_1$ - $^1P_1$	0.399	
		696.5(1.4)	2.38 +4	Co XXII	$2s^2$ $2p^2$	$^3P_2$ - $^1D_2$	1.85	
698.3(2)		697.9(7)	2.60 +4	Y XXVII	$3s^2$ 3p	$^2P_{1/2}$ - $^2P_{3/2}$	1.37	RPSKR
		700.(3)	1.78 +4	Sr XXIII	$3s^2$ $3p^4$	$^3P_2$ - $^1D_2$	1.10	
703.6(2)		703.1(1.9)	2.47 +3	Ge XVIII	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	0.69	DHST
		705.(5)	4.11 +4	Nb XXVIII	$3s^2$ $3p^2$	$^3P_0$ - $^3P_1$	1.50	
		705.7(2.5)	3.16 +3	Kr XXV	3s 3p	$^3P_2$ - $^1P_1$	1.22	
	Q	707.2(2.1)	5.53 +1	Mn XVIII	$2s^2$ $2p^4$	$^1D_2$ - $^1S_0$	1.32	
		708.6(5)	6.54 +2	Cl XI	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	0.529	
		709.5(2.8)	9.37 +3	Br XXI	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	0.91	
		712.96(14)	1.53 +2	V XVII	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	1.17	
		713.98(18)	1.87 +1	Al X	2s 2p	$^3P_2$ - $^1P_1$	0.399	
		716.1(5)	1.95 +3	Cl XII	$2s^2$ $2p^2$	$^3P_1$ - $^1S_0$	0.592	
		717.9(1.5)	2.42 +4	Co XXIII	$2s^2$ 2p	$^2P_{1/2}$ - $^2P_{3/2}$	1.96	
	Q	718.1(2.1)	2.37 +1	Ni XXIII	$2s^2$ $2p^2$	$^1D_2$ - $^1S_0$	2.01	
		721.(3)	2.52 +4	Kr XXII	$3s^2$ $3p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	0.99	
		722.(5)	5.50 +4	Nb XXVII	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	1.41	
722.1(3)		722.56(16)	1.56 +4	Cr XVIII	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	1.30	DH
		723.2(1.6)	1.64 +4	Fe XX	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	1.58	
		724.4(5)	2.94 +2	Cl XI	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	0.529	
		725.9(2.7)	2.52 +3	Br XXIV	3s 3p	$^3P_2$ - $^1P_1$	1.10	
		726.(4)	1.15 +4	Sr XXIV	$3s^2$ $3p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	1.16	
		726.4(2.1)	5.04 +2	Cu XVIII	3s 3p	$^3P_1$ - $^1P_1$	0.60	
	Q	730.(4)	2.32 +2	Sr XXIII	$3s^2$ $3p^4$	$^1D_2$ - $^1S_0$	1.10	
		730.35(16)	5.37 +2	Ni XVII	3s 3p	$^3P_0$ - $^1P_1$	0.57	
731.8(2)		731.(5)	4.58 +4	Zr XXV	$3s^2$ $3p^4$	$^3P_2$ - $^3P_1$	1.26	DHSC
731.1(3)		731.07(8)	5.62 +3	Cr XIX	$2s^2$ $2p^2$	$^3P_1$ - $^1D_2$	1.40	HSCS
		734.(5)	1.39 +4	Nb XXVII	$3s^2$ $3p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	1.41	
740.75(3)		740.75(3)	6.67 +3	Cr XVII	$2s^2$ $2p^4$	$^3P_2$ - $^1D_2$	1.19	PSS
741.5(3)		741.5(4)	3.04 +4	Zr XXIX	3s 3p	$^3P_1$ - $^3P_2$	1.60	DHSC
		745.(3)	4.14 +4	Br XX	$3s^2$ $3p^4$	$^3P_1$ - $^1S_0$	0.86	
		746.0(4)	2.91 +3	Ar XI	$2s^2$ $2p^4$	$^3P_1$ - $^1S_0$	0.539	
		747.7(2.2)	1.99 +3	Se XXIII	3s 3p	$^3P_2$ - $^1P_1$	1.00	
	Q	747.9(1.6)	2.36 +1	Co XXII	$2s^2$ $2p^2$	$^1D_2$ - $^1S_0$	1.85	
746.9(3)		747.7(2.1)	1.22 +4	Ge XIX	$3s^2$ $3p^2$	$^3P_1$ - $^1S_0$	0.73	H
		750.6(1.6)	7.57 +3	Co XXI	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	1.74	
		756.(5)	2.26 +4	Y XXVI	$3s^2$ $3p^2$	$^3P_2$ - $^1D_2$	1.32	
756.9(3)		757.0(1.6)	3.55 +4	Cu XXIV	$2s^2$ $2p^2$	$^3P_0$ - $^3P_1$	2.09	HSCS
		758.9(1.3)	1.02 +4	Mn XIX	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	1.44	
		762.(4)	2.91 +3	Sr XXIV	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	1.16	
		762.29(20)	6.92 +0	Mg IX	2s 2p	$^3P_0$ - $^1P_1$	0.328	
		764.(4)	1.25 +4	Rb XXIV	$3s^2$ $3p^2$	$^3P_1$ - $^1D_2$	1.13	

Table 40. Wavelengths and transition probabilities ordered by wavelength - Continued

	Wavelength Observed		Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
			764.6(1.8)	2.87 +4	Ni XXV	2s 2p	$^3P_1$ - $^3P_2$	2.30	
			764.99(15)	7.16 +1*	Ti XVI	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	1.04	
T	766.6(2)		767.(3)	6.36 +3	Se XX	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	0.83	DHST
	769.1(4)		768.8(7)	9.67 +3	Y XXIII	$3s^2$ $3p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	1.12	RPSKR
			768.90(20)	5.05 +0	Mg IX	2s 2p	$^3P_1$ - $^1P_1$	0.328	
			771.6(2.4)	1.54 +3	As XXII	3s 3p	$^3P_2$ - $^1P_1$	0.90	
			773.5(1.7)	8.13 +3	Mn XIX	$2s^2$ $2p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	1.44	
			776.37(3)	3.48 +2	S X	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	0.447	
			776.9(2.0)	1.91 +3	Ga XVII	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	0.62	
			777.06(19)	3.30 +2	Ni XVII	3s 3p	$^3P_1$ - $^1P_1$	0.57	
	779.5(3)		779.48(12)	4.14 +4	Ni XXI	$2s^2$ $2p^4$	$^3P_2$ - $^3P_1$	1.76	HSCS
			781.(4)	1.22 +4	Rb XXII	$3s^2$ $3p^4$	$^3P_2$ - $^1D_2$	1.02	
		Q	781.9(6)	4.19 +1	Cr XVII	$2s^2$ $2p^4$	$^1D_2$ - $^1S_0$	1.19	
			782.96(17)	1.04 +3	S XI	$2s^2$ $2p^2$	$^3P_1$ - $^1S_0$	0.505	
			783.72(21)	7.95 +0	Mg IX	2s 2p	$^3P_2$ - $^1P_1$	0.328	
		Q	785.3(1.9)	2.27 +1	Fe XXI	$2s^2$ $2p^2$	$^1D_2$ - $^1S_0$	1.69	
	786.1(3)		786.1(3)	1.51 +4	Fe XXI	$2s^2$ $2p^2$	$^3P_2$ - $^1D_2$	1.69	HSCS
			786.2(1.3)	3.42 +2	Co XVI	3s 3p	$^3P_0$ - $^1P_1$	0.51	
			787.56(3)	1.50 +2	S X	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	0.447	
			790.6(8)	1.81 +4	Sr XXVI	$3s^2$ 3p	$^2P_{1/2}$ - $^2P_{3/2}$	1.28	
	793.3(3)		793.3(1.3)	6.12 +3	Cr XVIII	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	1.30	HSCS
			797.7(1.3)	1.17 +3	Ge XXI	3s 3p	$^3P_2$ - $^1P_1$	0.80	
			804.0(3)	1.55 +3	Cl X	$2s^2$ $2p^4$	$^3P_1$ - $^1S_0$	0.456	
	807.1(3)		807.(5)	2.77 +4	Zr XXVII	$3s^2$ $3p^2$	$^3P_0$ - $^3P_1$	1.41	DHSC
			808.(4)	1.68 +4	Br XXI	$3s^2$ $3p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	0.91	
	813.1(3)		811.1(2.1)	8.40 +3	Ga XVIII	$3s^2$ $3p^2$	$^3P_1$ - $^1S_0$	0.66	RPSKR
T	810.3(3)		811.(3)	2.89 +4	Se XIX	$3s^2$ $3p^4$	$^3P_1$ - $^1S_0$	0.79	H
		Q	813.(5)	1.60 +2	Rb XXII	$3s^2$ $3p^4$	$^1D_2$ - $^1S_0$	1.02	
			813.3(4)	3.33 +3	V XVIII	$2s^2$ $2p^2$	$^3P_1$ - $^1D_2$	1.26	
	812.1(2)		815.(5)	3.73 +4	Zr XXVI	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	1.32	DHST
			817.(5)	7.95 +3	Rb XXIII	$3s^2$ $3p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	1.07	
			819.9(1.3)	3.25 +4	Co XIX	$2s^2$ $2p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	1.49	
			819.94(17)	3.20 +1*	Sc XV	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	0.93	
			822.2(3)	6.01 +3	Fe XX	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	1.58	
			825.7(2.7)	8.75 +2	Ga XX	3s 3p	$^3P_2$ - $^1P_1$	0.70	
			826.2(3)	4.05 +3	V XVI	$2s^2$ $2p^4$	$^3P_2$ - $^1D_2$	1.06	
			826.92(19)	3.57 +3	V XVII	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	1.17	
		Q	827.7(2.5)	2.16 +1	Mn XX	$2s^2$ $2p^2$	$^1D_2$ - $^1S_0$	1.54	
			828.(3)	4.24 +3	As XIX	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	0.76	
			831.9(1.4)	2.14 +2	Co XVI	3s 3p	$^3P_1$ - $^1P_1$	0.51	
	833.1(2)		833.(5)	2.07 +4	Y XXIV	$3s^2$ $3p^4$	$^3P_2$ - $^3P_1$	1.18	RPSKR
			836.33(20)	9.04 +3	V XVII	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	1.17	

Table 40. Wavelengths and transition probabilities ordered by wavelength - Continued

	Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
		839.0(2.0)	1.00 +4	Cu XXIII	$2s^2\ 2p^3$	$^2P_{1/2} - {}^2P_{3/2}$	1.94	
	846.2(2)	844.(5)	9.25 +3	Zr XXVI	$3s^2\ 3p^3$	$^2P_{1/2} - {}^2P_{3/2}$	1.32	DHST
	845.55(1)	845.5(3)	1.48 +4	Fe XXII	$2s^2\ 2p$	$^2P_{1/2} - {}^2P_{3/2}$	1.80	SH(82)
		845.6(1.0)	1.64 +4	Y XXVIII	3s 3p	$^3P_1 - {}^3P_2$	1.50	
		847.43(20)	2.09 +2	Fe XV	3s 3p	$^3P_0 - {}^1P_1$	0.46	
		849.(5)	1.80 +3	Rb XXIII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{5/2}$	1.07	
		852.31(5)	2.62 +0	Na VIII	2s 2p	$^3P_0 - {}^1P_1$	0.264	
		853.61(15)	1.74 +2	P IX	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.372	
	853.8(1.0)	854.(5)	8.43 +3	Kr XXIII	$3s^2\ 3p^2$	$^3P_1 - {}^1D_2$	1.05	RPSKR
		855.(5)	1.57 +4	Sr XXV	$3s^2\ 3p^2$	$^3P_2 - {}^1D_2$	1.22	
		856.6(2.9)	6.43 +2	Zn XIX	3s 3p	$^3P_2 - {}^1P_1$	0.70	
		856.6(1.9)	1.42 +3	Zn XVI	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.55	
	Q	857.1(5)	3.33 +1	V XVI	$2s^2\ 2p^4$	$^1D_2 - {}^1S_0$	1.06	
		857.66(5)	1.92 +0	Na VIII	2s 2p	$^3P_1 - {}^1P_1$	0.264	
		860.08(21)	5.24 +2	P X	$2s^2\ 2p^2$	$^3P_1 - {}^1S_0$	0.424	
		861.26(15)	7.34 +1	P IX	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.372	
	861.8(1)	861.85(19)	2.00 +3	Ti XVI	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{3/2}$	1.04	H
T	859.9(3)	864.(5)	1.64 +4	Ge XXV	$2s^2\ 2p^4$	$^3P_0 - {}^3P_1$	2.31	H
		869.64(5)	3.08 +0	Na VIII	2s 2p	$^3P_2 - {}^1P_1$	0.264	
		871.73(16)	7.91 +2	S IX	$2s^2\ 2p^4$	$^3P_1 - {}^1S_0$	0.379	
	868.4(2)	872.(5)	8.35 +3	Kr XXI	$3s^2\ 3p^4$	$^3P_2 - {}^1D_2$	0.94	RPSKR
		874.1(8)	2.69 +4	Sr XXII	$3s^2\ 3p^5$	$^2P_{3/2} - {}^2P_{1/2}$	1.05	
	Q	875.6(8)	2.03 +1	Cr XIX	$2s^2\ 2p^2$	$^1D_2 - {}^1S_0$	1.40	
		879.96(23)	5.14 +3	Cr XVIII	$2s^2\ 2p^3$	$^2D_{5/2} - {}^2P_{3/2}$	1.30	
		879.4(2.0)	5.69 +3	Zn XVII	$3s^2\ 3p^2$	$^3P_1 - {}^1S_0$	0.59	
		880.2(2.2)	9.51 +3	Mn XX	$2s^2\ 2p^2$	$^3P_2 - {}^1D_2$	1.54	
		880.9(3)	1.35 +1*	Ca XIV	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{5/2}$	0.82	
		881.(3)	2.00 +4	As XVIII	$3s^2\ 3p^4$	$^3P_1 - {}^1S_0$	0.71	
T	890.2(2)	890.(3)	2.80 +3	Ge XVIII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.69	DHST
		890.4(3.2)	4.63 +2	Cu XVIII	3s 3p	$^3P_2 - {}^1P_1$	0.60	
		890.84(17)	1.34 +2	Fe XV	3s 3p	$^3P_1 - {}^1P_1$	0.46	
		899.2(9)	1.23 +4	Rb XXV	$3s^2\ 3p$	$^2P_{1/2} - {}^2P_{3/2}$	1.19	
	899.8(5)	899.28(20)	1.07 +3	Sc XV	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{3/2}$	0.93	H
T	899.7(3)	900.9(4)	1.84 +3	Ti XVII	$2s^2\ 2p^2$	$^3P_1 - {}^1D_2$	1.13	H
	Q	905.(5)	1.11 +2	Kr XXI	$3s^2\ 3p^4$	$^1D_2 - {}^1S_0$	0.94	
		905.1(2.3)	1.74 +4	Co XXIV	2s 2p	$^3P_1 - {}^3P_2$	2.12	
		906.3(2.3)	4.54 +3	Mn XIX	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{1/2}$	1.44	
T	908.8(2)	908.(4)	1.10 +4	Se XX	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{3/2}$	0.83	DHST
		910.(8)	1.24 +4	Mo XXVII	$3s^2\ 3p^4$	$^3P_0 - {}^3P_1$	1.43	
	911.0(3)	911.00(25)	2.07 +4	Ni XXIII	$2s^2\ 2p^2$	$^3P_0 - {}^3P_1$	2.01	HSCS
	912.0(3)	912.(5)	5.59 +3	Kr XXII	$3s^2\ 3p^3$	$^2D_{5/2} - {}^2P_{3/2}$	0.99	RPSKR
		914.8(8)	1.26 +2	Mn XIV	3s 3p	$^3P_0 - {}^1P_1$	0.40	

Table 40. Wavelengths and transition probabilities ordered by wavelength - Continued

	Wavelength Observed		Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
	914.7(1.0)		919.(6)	1.15 +4	Y XXV	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{3/2}$	1.24	RPSKR
	919.73(8)		919.71(9)	2.42 +3	Ti XV	$2s^2\ 2p^4$	$^3P_2 - {}^1D_2$	0.94	PSS
		Q	925.2(1.0)	1.93 +1	V XVIII	$2s^2\ 2p^2$	$^1D_2 - {}^1S_0$	1.26	
			928.76(27)	3.26 +2	Ni XVII	3s 3p	$^3P_2 - {}^1P_1$	0.57	
	927.7(3)		929.(6)	1.80 +4	Y XXVI	$3s^2\ 3p^2$	$^3P_0 - {}^3P_1$	1.32	RPSKR
			930.9(1.9)	2.47 +4	Co XX	$2s^2\ 2p^4$	$^3P_2 - {}^3P_1$	1.60	
			936.(5)	1.11 +3	Kr XXII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{5/2}$	0.99	
		Q	936.3(4)	2.72 +1	Ti XV	$2s^2\ 2p^4$	$^1D_2 - {}^1S_0$	0.94	
	944.6(2)		942.4(1.8)	1.03 +3	Cu XV	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.48	DHST
			944.38(4)	8.14 +1	Si VIII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.304	
			944.6(4)	5.35 +2	Ca XIV	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{3/2}$	0.82	
			945.1(9)	5.58 +0*	K XIII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{5/2}$	0.71	
			949.24(4)	3.37 +1	Si VIII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.304	
			950.08(23)	2.51 +2	Si IX	$2s^2\ 2p^2$	$^3P_1 - {}^1S_0$	0.351	
			952.1(3)	3.82 +2	P VIII	$2s^2\ 2p^4$	$^3P_1 - {}^1S_0$	0.310	
	952.8(3)		953.3(1.8)	3.81 +3	Cu XVI	$3s^2\ 3p^2$	$^3P_1 - {}^1S_0$	0.52	DHSC
			954.(6)	2.11 +4	Sr XXIII	$3s^2\ 3p^4$	$^3P_2 - {}^3P_1$	1.10	
T	952.9(3)		954.(3)	1.37 +4	Ge XVII	$3s^2\ 3p^4$	$^3P_1 - {}^1S_0$	0.64	DHSC
			955.9(2.8)	1.82 +3	Ga XVII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.62	
			956.(5)	5.58 +3	Br XXII	$3s^2\ 3p^2$	$^3P_1 - {}^1D_2$	0.96	
			956.7(9)	8.21 +1	Mn XIV	3s 3p	$^3P_1 - {}^1P_1$	0.40	
			964.20(19)	8.85 -1	Ne VII	2s 2p	$^3P_0 - {}^1P_1$	0.207	
			967.5(1.3)	1.39 +4	Sr XXVII	3s 3p	$^3P_1 - {}^3P_2$	1.40	
			968.45(19)	6.54 -1	Ne VII	2s 2p	$^3P_1 - {}^1P_1$	0.207	
	968.9(3)		968.80(20)	5.16 +3	Ti XVI	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{3/2}$	1.04	H
			969.(6)	1.07 +4	Rb XXIV	$3s^2\ 3p^2$	$^3P_2 - {}^1D_2$	1.13	
			972.7(1.9)	2.26 +2	Co XVI	3s 3p	$^3P_2 - {}^1P_1$	0.51	
	974.86(2)		974.858(19)	1.93 +4	Fe XVIII	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	1.36	PSS
			975.(5)	5.64 +3	Br XX	$3s^2\ 3p^4$	$^3P_2 - {}^1D_2$	0.86	
			977.(7)	5.87 +3	Y XXV	$3s^2\ 3p^3$	$^2P_{1/2} - {}^2P_{3/2}$	1.24	
			977.(9)	6.14 +3	Kr XXX	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2D_{5/2}$	3.23	
			977.86(20)	1.06 +0	Ne VII	2s 2p	$^3P_2 - {}^1P_1$	0.207	
	979.0(3)		979.06(14)	5.93 +3	Cr XIX	$2s^2\ 2p^2$	$^3P_2 - {}^1D_2$	1.40	HSCS
		Q	985.0(7)	1.77 +1	Ti XVII	$2s^2\ 2p^2$	$^1D_2 - {}^1S_0$	1.13	
			988.5(1.0)	7.59 +1	Cr XIII	3s 3p	$^3P_0 - {}^1P_1$	0.35	
			989.(10)	3.04 +4	Kr XXIX	$2s^2\ 2p^4$	$^3P_1 - {}^1D_2$	3.07	
			989.(8)	9.74 +2	Mo XXVIII	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{1/2}$	1.49	
			993.6(1.0)	2.54 +2	K XIII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{3/2}$	0.71	
			996.0(5)	1.02 +3	Sc XVI	$2s^2\ 2p^2$	$^3P_1 - {}^1D_2$	1.01	
			997.61(28)	3.23 +3	V XVII	$2s^2\ 2p^3$	$^2D_{5/2} - {}^2P_{3/2}$	1.17	
			998.1(9)	1.80 +4	Rb XXI	$3s^2\ 3p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.97	
			999.6(3)	3.33 +3	Cr XVIII	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{1/2}$	1.30	

Table 40. Wavelengths and transition probabilities ordered by wavelength - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
	Q 1006.(5)	7.80 +1	Br XX	$3s^2\ 3p^4$	$^1D_2 - {}^1S_0$	0.86	
	1006.4(3.0)	8.79 +3	Mn XXI	$2s^2\ 2p$	$^2P_{1/2} - {}^2P_{3/2}$	1.64	
	1010.(10)	2.73 +3	Br XXVIII	$2s^2\ 2p^4$	$^3P_1 - {}^1D_2$	2.87	
	Q 1018.4(6)	2.28 +1	Sc XIV	$2s^2\ 2p^4$	$^1D_2 - {}^1S_0$	0.83	
	1018.6(7)	2.17 +0*	Ar XII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{5/2}$	0.618	
	1019.4(3)	1.50 +2	Fe XV	3s 3p	$^3P_2 - {}^1P_1$	0.46	
	1022.6(4)	1.41 +3	Sc XIV	$2s^2\ 2p^4$	$^3P_2 - {}^1D_2$	0.83	
	1024.(6)	3.84 +3	Br XXI	$3s^2\ 3p^3$	$^2D_{5/2} - {}^2P_{3/2}$	0.91	
	1024.6(2.7)	1.17 +3	Zn XVI	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.55	
	1025.(5)	5.61 +3	Ni XXII	$2s^2\ 2p^3$	$^2P_{1/2} - {}^2P_{3/2}$	1.89	
	1025.(4)	7.06 +3	As XIX	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{3/2}$	0.76	
	1027.0(1.0)	8.27 +3	Kr XXIV	$3s^2\ 3p$	$^2P_{1/2} - {}^2P_{3/2}$	1.10	
	1028.(9)	5.41 +3	Br XXIX	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2D_{5/2}$	3.03	
	1028.49(10)	5.03 +1	Cr XIII	3s 3p	$^3P_1 - {}^1P_1$	0.35	
	1030.(8)	1.01 +3	Nb XXVII	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{1/2}$	1.41	
	1030.(3)	9.22 +3	Ga XVI	$3s^2\ 3p^4$	$^3P_1 - {}^1S_0$	0.58	
	1032.(11)	2.44 +3	Se XXVII	$2s^2\ 2p^4$	$^3P_1 - {}^1D_2$	2.68	
	1033.2(5)	2.50 +3	Ni XV	$3s^2\ 3p^2$	$^3P_1 - {}^1S_0$	0.46	
	1034.(7)	1.66 +4	Sr XXIV	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{3/2}$	1.16	
	1034.(6)	6.60 +2	Br XXI	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{5/2}$	0.91	
	1034.9(5)	7.17 +2	Ni XIV	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.43	
	Q 1048.7(8)	1.65 +1	Sc XVI	$2s^2\ 2p^2$	$^1D_2 - {}^1S_0$	1.01	
	1049.2(3)	1.73 +2	Si VII	$2s^2\ 2p^4$	$^3P_1 - {}^1S_0$	0.247	
	1054.08(3)	3.51 +1	Al VII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.241	
	1054.9(8)	1.11 +2	Ar XII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{3/2}$	0.618	
	1055.(9)	2.17 +3	As XXVI	$2s^2\ 2p^4$	$^3P_1 - {}^1D_2$	2.49	
	1057.05(3)	1.44 +1	Al VII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.241	
	1058.0(7)	1.12 +2	Al VIII	$2s^2\ 2p^2$	$^3P_1 - {}^1S_0$	0.285	
	1070.(6)	3.65 +3	Se XXI	$3s^2\ 3p^2$	$^3P_1 - {}^1D_2$	0.88	
	1072.2(1.6)	4.22 +1	V XII	3s 3p	$^3P_0 - {}^1P_1$	0.31	
	1073.8(1.2)	9.75 +1	Mn XIV	3s 3p	$^3P_2 - {}^1P_1$	0.40	
	1074.(7)	1.21 +4	Sr XXV	$3s^2\ 3p^2$	$^3P_0 - {}^3P_1$	1.22	
	1077.(8)	1.02 +3	Zr XXVI	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{1/2}$	1.32	
1078.2(1.4)	1078.5(6)	3.67 +3	V XVIII	$2s^2\ 2p^2$	$^3P_2 - {}^1D_2$	1.26	FBM
	1079.20(8)	1.90 +3	Ge XXV	$2s^2\ 2p^4$	$^3P_1 - {}^1D_2$	2.31	
1079.3(3)	1079.3(5)	1.02 +4	Fe XXIII	2s 2p	$^3P_1 - {}^3P_2$	1.96	HSCS
	1080.(8)	7.66 +3	Nb XXVI	$3s^2\ 3p^4$	$^3P_0 - {}^3P_1$	1.34	
	1089.(8)	4.68 +3	Se XXVIII	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2D_{5/2}$	2.83	
	1090.(6)	3.77 +3	Se XIX	$3s^2\ 3p^4$	$^3P_2 - {}^1D_2$	0.79	
	1097.1(2.4)	7.45 +2	Cu XV	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.48	
	1098.(7)	1.40 +4	Rb XXII	$3s^2\ 3p^4$	$^3P_2 - {}^3P_1$	1.02	
	1098.4(1)	5.51 +2	Ca XV	$2s^2\ 2p^2$	$^3P_1 - {}^1D_2$	0.89	

Table 40. Wavelengths and transition probabilities ordered by wavelength - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
	1099.(7)	7.17 +3	Kr XXIII	$3s^2\ 3p^2$	$^3P_2 - {}^1D_2$	1.05	
	1100.3(1.2)	8.08 -1*	Cl XI	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{5/2}$	0.529	
	1102.2(2.7)	1.12 +4	Co XXII	$2s^2\ 2p^2$	$^3P_0 - {}^3P_1$	1.85	
	1105.(7)	1.66 +3	Ga XXIV	$2s^2\ 2p^4$	$^3P_1 - {}^1D_2$	2.14	
	1105.1(3)	2.35 +3	V XVII	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{1/2}$	1.17	
	Q 1106.1(8)	1.96 +1	Ca XIII	$2s^2\ 2p^4$	$^1D_2 - {}^1S_0$	0.73	
	1108.(7)	8.11 +3	Ga XXIV	$2s^2\ 2p^4$	$^3P_0 - {}^3P_1$	2.14	
	1108.13(7)	2.56 -1	F VI	2s 2p	$^3P_0 - {}^1P_1$	0.157	
	1108.9(1.7)	2.85 +1	V XII	3s 3p	$^3P_1 - {}^1P_1$	0.31	
	1109.(3)	6.13 +3	Zn XV	$3s^2\ 3p^4$	$^3P_1 - {}^1S_0$	0.51	
	1109.4(1.7)	9.32 +3	Rb XXVI	3s 3p	$^3P_1 - {}^3P_2$	1.30	
	1111.33(7)	1.90 -1	F VI	2s 2p	$^3P_1 - {}^1P_1$	0.157	
	Q 1117.(6)	5.56 +1	Se XIX	$3s^2\ 3p^4$	$^1D_2 - {}^1S_0$	0.79	
1118.060(10)	1118.055(25)	1.45 +4	Fe XIX	$2s^2\ 2p^4$	$^3P_2 - {}^3P_1$	1.47	PSS
	1118.49(7)	3.11 -1	F VI	2s 2p	$^3P_2 - {}^1P_1$	0.157	
	1120.45(27)	2.90 +3	Sc XV	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{3/2}$	0.93	
	Q 1122.7(6)	1.50 +1	Ca XV	$2s^2\ 2p^2$	$^1D_2 - {}^1S_0$	0.89	
	1123.0(9)	1.60 +3	Co XIV	$3s^2\ 3p^2$	$^3P_1 - {}^1S_0$	0.41	
	1125.5(1.3)	4.51 +1	Cl XI	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{3/2}$	0.529	
	1129.(8)	2.70 +4	Y XXV	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{1/2}$	1.24	
1129.2(4)	1129.6(3)	1.99 +3	Ti XVI	$2s^2\ 2p^3$	$^2D_{5/2} - {}^2P_{3/2}$	1.04	FBM
	1132.(5)	1.42 +3	Zn XXIII	$2s^2\ 2p^4$	$^3P_1 - {}^1D_2$	1.97	
T 1133.68	1133.7(5)	8.06 +2	Ca XIII	$2s^2\ 2p^4$	$^3P_2 - {}^1D_2$	0.73	CFD
	1134.17(26)	4.85 +2	Co XIII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.38	
	1135.8(1.3)	6.25 +1	Cr XIII	3s 3p	$^3P_2 - {}^1P_1$	0.35	
	1137.(6)	3.88 +2*	Se XX	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{5/2}$	0.83	
	1137.(8)	3.90 +3	Sr XXIV	$3s^2\ 3p^3$	$^2P_{1/2} - {}^2P_{3/2}$	1.16	
1142.5(2)	1144.7(1.0)	1.20 +4	Kr XX	$3s^2\ 3p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.89	RPSKR
	1151.(6)	2.62 +3	Se XX	$3s^2\ 3p^3$	$^2D_{5/2} - {}^2P_{3/2}$	0.83	
	1161.(4)	1.21 +3	Cu XXII	$2s^2\ 2p^4$	$^3P_1 - {}^1D_2$	1.67	
	1161.(5)	4.32 +3	Ge XVIII	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{3/2}$	0.69	
	1161.(7)	1.08 +4	Rb XXIII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{3/2}$	1.07	
	1162.(8)	3.96 +3	As XXVII	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2D_{5/2}$	2.64	
	1165.69(19)	2.46 +1	Ti XI	3s 3p	$^3P_0 - {}^1P_1$	0.27	
	1169.85(14)	7.29 +1	Al VI	$2s^2\ 2p^4$	$^3P_1 - {}^1S_0$	0.154	
	1170.(7)	1.12 +4	Mn XVII	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	1.24	
1174.72(5)	1174.720(7)	4.66 +2	Ni XIV	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.43	SBT
	1177.4(7)	2.25 +3	Ti XVII	$2s^2\ 2p^2$	$^3P_2 - {}^1D_2$	1.13	
	1178.1(1.0)	5.48 +3	Br XXIII	$3s^2$ 3p	$^2P_{1/2} - {}^2P_{3/2}$	1.01	
	1188.(8)	1.02 +3	Sr XXIV	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{1/2}$	1.16	
1189.82(1)	1189.82(16)	4.58 +1	Mg VII	$2s^2\ 2p^2$	$^3P_1 - {}^1S_0$	0.225	SBT
1190.07(1)	1190.074(20)	1.37 +1	Mg VI	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.187	SBT

Table 40. Wavelengths and transition probabilities ordered by wavelength - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
	1191.3(2.8)	4.01 +3	Cu XIV	$3s^2\ 3p^4$	$^3P_1 - {}^1S_0$	0.44	
1191.1(4)	1191.0(3)	1.01 +3	Ni XXI	$2s^2\ 2p^4$	$^3P_1 - {}^1D_2$	1.76	FBM
1191.62(1)	1191.611(20)	5.62 +0	Mg VI	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.187	SBT
1196.24(1)	1196.245(14)	2.87 -1*	S X	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{5/2}$	0.447	SBT
	1197.(9)	9.39 +3	Kr XXXIII	2s 2p	$^3P_0 - {}^3P_1$	3.87	
1195.3(2)	1199.(5)	2.34 +3	As XX	$3s^2\ 3p^2$	$^3P_1 - {}^1D_2$	0.81	RPSKR
	Q 1199.5(9)	1.71 +1	K XII	$2s^2\ 2p^4$	$^1D_2 - {}^1S_0$	0.63	
	1201.63(20)	1.68 +1	Ti XI	3s 3p	$^3P_1 - {}^1P_1$	0.27	
	1204.5(2.1)	3.72 +1	V XII	3s 3p	$^3P_2 - {}^1P_1$	0.31	
	Q 1204.8(9)	1.36 +1	K XIV	$2s^2\ 2p^2$	$^1D_2 - {}^1S_0$	0.79	
1205.9(3)	1205.9(3)	5.11 +3	Cr XX	$2s^2$ 2p	$^2P_{1/2} - {}^2P_{3/2}$	1.50	HSCS
	Q 1209.(14)	1.47 +1	Mo XXIX	$3s^2\ 3p^2$	$^1D_2 - {}^1S_0$	1.59	
	1209.5(7)	2.91 +2	K XIV	$2s^2\ 2p^2$	$^3P_1 - {}^1D_2$	0.79	
1212.96(1)	1212.970(15)	1.64 +1	S X	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{3/2}$	0.447	SBT
1216.43(1)	1216.46(15)	1.01 +3	Fe XIII	$3s^2\ 3p^2$	$^3P_1 - {}^1S_0$	0.36	SBT
	1219.(6)	2.49 +3	As XVIII	$3s^2\ 3p^4$	$^3P_2 - {}^1D_2$	0.71	
	1221.(4)	8.38 +2	Co XX	$2s^2\ 2p^4$	$^3P_1 - {}^1D_2$	1.60	
1224.1(4)	1224.4(3)	1.60 +3	Ti XVI	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{1/2}$	1.04	FBM
	1228.(15)	3.57 +3	Kr XXXI	$2s^2\ 2p^2$	$^3P_1 - {}^3P_2$	3.46	
	Q 1238.(6)	4.04 +1	As XVIII	$3s^2\ 3p^4$	$^1D_2 - {}^1S_0$	0.71	
1242.00(1)	1242.00(8)	3.17 +2	Fe XII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.33	SBT
	Q 1243.(10)	1.47 +1	Nb XXVIII	$3s^2\ 3p^2$	$^1D_2 - {}^1S_0$	1.50	
	1246.(6)	2.180+2*	As XIX	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{5/2}$	0.76	
	1248.(8)	4.76 +3	Br XXII	$3s^2\ 3p^2$	$^3P_2 - {}^1D_2$	0.96	
	1250.(8)	7.75 +3	Rb XXIV	$3s^2\ 3p^2$	$^3P_0 - {}^3P_1$	1.13	
	1252.(8)	3.28 +3	Ge XXVI	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2D_{5/2}$	2.46	
	1255.4(6)	4.49 +2	K XII	$2s^2\ 2p^4$	$^3P_2 - {}^1D_2$	0.63	
	1257.(8)	9.83 +2	Rb XXIII	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{1/2}$	1.07	
	1258.5(3)	2.87 +2	Co XIII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.38	
	1259.27(4)	6.72 +2	Fe XIX	$2s^2\ 2p^4$	$^3P_1 - {}^1D_2$	1.47	
1268.7(2)	1269.(9)	9.19 +3	Kr XXI	$3s^2\ 3p^4$	$^3P_2 - {}^3P_1$	0.94	RPSKR
	1270.(5)	3.02 +3	Co XXI	$2s^2\ 2p^3$	$^2P_{1/2} - {}^2P_{3/2}$	1.74	
	1274.0(3)	1.21 +3	Sc XV	$2s^2\ 2p^3$	$^2D_{5/2} - {}^2P_{3/2}$	0.93	
	1276.0(7)	1.31 +1	Sc X	3s 3p	$^3P_0 - {}^1P_1$	0.23	
	1276.6(8)	1.36 +3	Sc XVI	$2s^2\ 2p^2$	$^3P_2 - {}^1D_2$	1.01	
1277.1(1.0)	1277.0(2.3)	6.16 +3	Kr XXV	3s 3p	$^3P_1 - {}^3P_2$	1.22	RPSKR
1277.23(1)	1277.231(18)	2.57 +3	Ni XIII	$3s^2\ 3p^4$	$^3P_1 - {}^1S_0$	0.38	SBT
	Q 1279.(10)	1.47 +1	Zr XXVII	$3s^2\ 3p^2$	$^1D_2 - {}^1S_0$	1.41	
	1279.(16)	3.27 +3	Br XXX	$2s^2\ 2p^2$	$^3P_1 - {}^3P_2$	3.24	
	1286.(9)	7.16 +3	Kr XXII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{3/2}$	0.99	
	1286.(9)	7.65 +3	Br XXXII	2s 2p	$^3P_0 - {}^3P_1$	3.64	
	1289.09(24)	2.27 +1	Ti XI	3s 3p	$^3P_2 - {}^1P_1$	0.27	

Table 40. Wavelengths and transition probabilities ordered by wavelength - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
	1290.5(4)	1.62 +3	Ca XIV	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{3/2}$	0.82	
	1293.(4)	5.94 +3	Mn XXII	2s 2p	$^3P_1 - {}^3P_2$	1.79	
1292.4(2)	1294.(6)	1.77 +3	As XIX	$3s^2\ 3p^3$	$^2D_{5/2} - {}^2P_{3/2}$	0.76	RPSKR
	1296.(10)	4.59 +3	Zr XXV	$3s^2\ 3p^4$	$^3P_0 - {}^3P_1$	1.26	
	Q 1296.8(1.2)	1.23 +1	Ar XIII	$2s^2\ 2p^2$	$^1D_2 - {}^1S_0$	0.686	
	1298.(6)	5.30 +2	Mn XVIII	$2s^2\ 2p^4$	$^3P_1 - {}^1D_2$	1.32	
	1301.148(12)	6.10 -2	O V	2s 2p	$^3P_0 - {}^1P_1$	0.114	
	1303.456(12)	4.57 -2	O V	2s 2p	$^3P_1 - {}^1P_1$	0.114	
	Q 1304.9(1.2)	1.49 +1	Ar XI	$2s^2\ 2p^4$	$^1D_2 - {}^1S_0$	0.539	
	1307.51(5)	9.90 -2*	P IX	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{5/2}$	0.372	
	1308.688(12)	7.49 -2	O V	2s 2p	$^3P_2 - {}^1P_1$	0.114	
	1309.6(7)	9.11 +0	Sc X	3s 3p	$^3P_1 - {}^1P_1$	0.23	
	Q 1317.(10)	6.95 +2	Y XXVI	$3s^2\ 3p^2$	$^1D_2 - {}^1S_0$	1.32	
1317.65(3)	1318.06(5)	5.46 +0	P IX	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{3/2}$	0.372	ST
1319.1(3)	1319.(5)	2.76 +3	Ga XVII	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{3/2}$	0.62	RPSKR
	1319.1(1.0)	7.82 +3	Br XIX	$3s^2\ 3p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.81	
1322.23(4)	1322.(6)	6.20 +2	Mn XII	$3s^2\ 3p^2$	$^3P_1 - {}^1S_0$	0.31	ST
1324.44(1)	1324.58(8)	2.79 +1	Mg V	$2s^2\ 2p^4$	$^3P_1 - {}^1S_0$	0.141	SBT
T 1331.52(1)	1330.5(1.1)	1.50 +2	Ar XIII	$2s^2\ 2p^2$	$^3P_1 - {}^1D_2$	0.686	SBT
	1333.(9)	9.30 +2	Kr XXII	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{1/2}$	0.99	
	1335.(18)	2.97 +3	Se XXIX	$2s^2\ 2p^2$	$^3P_1 - {}^3P_2$	3.03	
1340.7(4)	1340.09(20)	4.09 +2	Cr XVII	$2s^2\ 2p^4$	$^3P_1 - {}^1D_2$	1.19	FBM
	1341.(8)	2.42 +3	Rb XXIII	$3s^2\ 3p^3$	$^2P_{1/2} - {}^2P_{3/2}$	1.07	
	1343.(6)	1.48 +3	Ge XIX	$3s^2\ 3p^2$	$^3P_1 - {}^1D_2$	0.73	
1349.40(1)	1349.36(9)	1.73 +2	Fe XII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.33	SBT
1354.08(5)	1354.10(9)	6.49 +3	Fe XXI	$2s^2\ 2p^2$	$^3P_0 - {}^3P_1$	1.69	SBT
	1356.6(4)	1.69 +1	Na VI	$2s^2\ 2p^2$	$^3P_1 - {}^1S_0$	0.172	
	1357.9(1.0)	3.58 +3	Se XXII	$3s^2$ 3p	$^2P_{1/2} - {}^2P_{3/2}$	0.93	
	1358.0(4)	1.05 +3	Sc XV	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{1/2}$	0.93	
	Q 1359.(10)	1.47 +1	Sr XXV	$3s^2\ 3p^2$	$^1D_2 - {}^1S_0$	1.22	
	1359.(4)	8.17 +3	Mn XVIII	$2s^2\ 2p^4$	$^3P_2 - {}^3P_1$	1.32	
1359.57(2)	1359.58(9)	2.00 +2	Mn XI	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.29	SBT
	1360.(6)	1.18 +2*	Ge XVIII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{5/2}$	0.69	
	1364.(6)	1.63 +3	Ge XVII	$3s^2\ 3p^4$	$^3P_2 - {}^1D_2$	0.63	
	1365.(8)	2.62 +3	Ga XXV	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2D_{5/2}$	2.28	
	1365.1(6)	4.74 +0	Na V	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.138	
	1365.8(6)	1.96 +0	Na V	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.138	
	Q 1368.(7)	2.99 +1	Ge XVII	$3s^2\ 3p^4$	$^1D_2 - {}^1S_0$	0.64	
	1368.7(5)	1.62 +3	Co XII	$3s^2\ 3p^4$	$^3P_1 - {}^1S_0$	0.34	
T 1375.95(3)	1375.95(5)	8.10 +2	Ca XV	$2s^2\ 2p^2$	$^3P_2 - {}^1D_2$	0.89	SBT
	1386.9(1.0)	3.07 +2	V XVI	$2s^2\ 2p^4$	$^3P_1 - {}^1D_2$	1.06	
	1387.8(8)	1.28 +1	Sc X	3s 3p	$^3P_2 - {}^1P_1$	0.23	

Table 40. Wavelengths and transition probabilities ordered by wavelength - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
	1388.(10)	6.14 +3	Se XXXI	2s 2p	$^3P_0$ - $^3P_1$	3.42	
1392.12(1)	1392.1(1.0)	2.41 +2	Ar XI	$2s^2\ 2p^4$	$^3P_2$ - $^1D_2$	0.539	SBT
	1400.(17)	2.68 +3	As XXVIII	$2s^2\ 2p^2$	$^3P_1$ - $^3P_2$	2.83	
	Q 1400.8(2.8)	1.11 +1	Cl XII	$2s^2\ 2p^2$	$^1D_2$ - $^1S_0$	0.592	
	1402.4(2.0)	6.68 +0	Ca IX	3s 3p	$^3P_0$ - $^1P_1$	0.19	
	Q 1403.(10)	1.48 +1	Rb XXIV	$3s^2\ 3p^2$	$^1D_2$ - $^1S_0$	1.13	
1410.60(2)	1410.62(4)	6.39 +3	Cr XVI	$2s^2\ 2p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	1.10	PSS
	1416.(10)	4.66 +3	Br XXI	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	0.91	
	1416.(8)	3.13 +3	Se XXI	$3s^2\ 3p^2$	$^3P_2$ - $^1D_2$	0.88	
	Q 1420.6(1.4)	1.32 +1	Cl X	$2s^2\ 2p^4$	$^1D_2$ - $^1S_0$	0.456	
	1422.(10)	8.50 +2	Br XXI	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	0.91	
	1431.8(4)	7.25 +2	Ca XIV	$2s^2\ 2p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	0.82	
	1432.5(2.1)	4.70 +0	Ca IX	3s 3p	$^3P_1$ - $^1P_1$	0.19	
1440.2(8)	1440.05(22)	2.23 +2	Ti XV	$2s^2\ 2p^4$	$^3P_1$ - $^1D_2$	0.94	FBM
1440.50(1)	1440.497(10)	3.42 -2*	Si VIII	$2s^2\ 2p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	0.304	SBT
1440.01(2)	1440.8(2.1)	3.68 +2	Cr XI	$3s^2\ 3p^2$	$^3P_1$ - $^1S_0$	0.27	SBT
1445.75(1)	1445.753(10)	1.70 +0	Si VIII	$2s^2\ 2p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	0.304	SBT
	Q 1450.(12)	1.48 +1	Kr XXIII	$3s^2\ 3p^2$	$^1D_2$ - $^1S_0$	1.05	
1450.49(5)	1450.43(10)	1.02 +2	Mn XI	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	0.29	SBT
	1456.(7)	1.18 +3	Ge XVIII	$3s^2\ 3p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	0.69	
1457.6(9)	1458.(4)	2.89 +3	V XIX	$2s^2\ 2p$	$^2P_{1/2}$ - $^2P_{3/2}$	1.36	FBM
	1459.(9)	3.73 +3	Zn XXIII	$2s^2\ 2p^4$	$^3P_0$ - $^3P_1$	1.97	
1461.8(2)	1462.(10)	4.91 +3	Kr XXIII	$3s^2\ 3p^2$	$^3P_0$ - $^3P_1$	1.05	RPSKR
	1464.9(2.2)	7.49 +1	Cl XII	$2s^2\ 2p^2$	$^3P_1$ - $^1D_2$	0.592	
1467.06(1)	1467.4(1.1)	9.90 +2	Fe XI	$3s^2\ 3p^4$	$^3P_1$ - $^1S_0$	0.29	SBT
1473.7(1)	1474.(15)	2.39 +3	Ge XXVII	$2s^2\ 2p^2$	$^3P_1$ - $^3P_2$	2.64	H
	1476.(3)	4.01 +3	Br XXIV	3s 3p	$^3P_1$ - $^3P_2$	1.10	
	1476.(10)	5.93 +3	Br XX	$3s^2\ 3p^4$	$^3P_2$ - $^3P_1$	0.86	
	1477.4(9)	4.71 +2	K XIV	$2s^2\ 2p^2$	$^3P_2$ - $^1D_2$	0.79	
	1478.(6)	6.390+1*	Ga XVII	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	0.62	
	1480.8(5)	8.84 +2	K XIII	$2s^2\ 2p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	0.71	
1489.04(3)	1489.05(16)	1.21 +2	Cr X	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	0.24	SBT
	1501.2(9)	1.56 +2	Sc XIV	$2s^2\ 2p^4$	$^3P_1$ - $^1D_2$	0.83	
	Q 1502.(12)	1.49 +1	Br XXII	$3s^2\ 3p^2$	$^1D_2$ - $^1S_0$	0.96	
	1502.2(2.3)	6.80 +0	Ca IX	3s 3p	$^3P_2$ - $^1P_1$	0.19	
1503.7(3)	1503.(6)	9.15 +2	Ga XVIII	$3s^2\ 3p^2$	$^3P_1$ - $^1D_2$	0.66	RPSKR
	1503.1(5)	6.66 +2	Ca XIV	$2s^2\ 2p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	0.82	
1507.5(1.0)	1504.(5)	1.68 +3	Zn XVI	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	0.55	RPSKR
	Q 1506.(7)	2.28 +1	Ga XVI	$3s^2\ 3p^4$	$^1D_2$ - $^1S_0$	0.58	
	1507.(10)	4.85 +3	As XXX	2s 2p	$^3P_0$ - $^3P_1$	3.20	
	1507.(8)	2.02 +3	Zn XXIV	$2s^2\ 2p^3$	$^2D_{3/2}$ - $^2D_{5/2}$	2.10	
	Q 1520.2(7)	1.00 +1	S XI	$2s^2\ 2p^2$	$^1D_2$ - $^1S_0$	0.505	

Table 40. Wavelengths and transition probabilities ordered by wavelength - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
	1524.(9)	7.51 +2	Se XX	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{1/2}$	0.83	
	1526.(6)	1.05 +3	Ga XVI	$3s^2\ 3p^4$	$^3P_2 - {}^1D_2$	0.58	
1527.8(3)	1527.8(1.0)	5.03 +3	Se XVIII	$3s^2\ 3p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.74	DHSC
	1529.29(5)	9.48 +0	Na IV	$2s^2\ 2p^4$	$^3P_1 - {}^1S_0$	0.099	
	1542.7(1.2)	1.25 +2	Cl X	$2s^2\ 2p^4$	$^3P_2 - {}^1D_2$	0.456	
1545.9(2)	1545.(9)	3.01 +3	Se XX	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{3/2}$	0.83	DHST
	Q 1552.7(4)	1.17 +1	S IX	$2s^2\ 2p^4$	$^1D_2 - {}^1S_0$	0.379	
	1554.(5)	3.23 +0	K VIII	3s 3p	$^3P_0 - {}^1P_1$	0.15	
	Q 1558.(10)	1.49 +1	Se XXI	$3s^2\ 3p^2$	$^1D_2 - {}^1S_0$	0.88	
	1559.(14)	2.11 +3	Ga XXVI	$2s^2\ 2p^2$	$^3P_1 - {}^3P_2$	2.45	
1564.30(2)	1564.09(17)	5.89 +1	Cr X	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.24	SBT
1566.4(1)	1565.(5)	3.38 +3	Cr XXI	2s 2p	$^3P_1 - {}^3P_2$	1.63	Su
	1568.7(1.0)	1.05 +2	Ca XIII	$2s^2\ 2p^4$	$^3P_1 - {}^1D_2$	0.73	
	1572.(10)	1.53 +3	Kr XXII	$3s^2\ 3p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.99	
	1573.04(18)	2.11 +2	V X	$3s^2\ 3p^2$	$^3P_1 - {}^1S_0$	0.23	
1573.2(5)	1573.2(1.0)	2.30 +3	As XXI	$3s^2\ 3p$	$^2P_{1/2} - {}^2P_{3/2}$	0.85	RKSPR
	1574.2(7)	5.90 +2	Mn X	$3s^2\ 3p^4$	$^3P_1 - {}^1S_0$	0.25	
1574.82(5)	1574.60(13)	5.50 +0	Ne V	$2s^2\ 2p^2$	$^3P_1 - {}^1S_0$	0.126	ST
	1575.183(4)	1.09 -2	N IV	2s 2p	$^3P_0 - {}^1P_1$	0.077	
1572.9(1.0)	1576.(12)	1.92 +3	Y XXIV	$3s^2\ 3p^4$	$^3P_0 - {}^3P_1$	1.18	RPSKR
	1576.750(4)	8.33 -3	N IV	2s 2p	$^3P_1 - {}^1P_1$	0.077	
	1580.338(4)	1.35 -2	N IV	2s 2p	$^3P_2 - {}^1P_1$	0.077	
	1581.(5)	2.30 +0	K VIII	3s 3p	$^3P_1 - {}^1P_1$	0.15	
T 1582.56(1)	1584.3(1.6)	2.66 +2	Ar XIII	$2s^2\ 2p^2$	$^3P_2 - {}^1D_2$	0.686	SBT
	1585.5(1.1)	1.59 +3	Fe XX	$2s^2\ 2p^3$	$^2P_{1/2} - {}^2P_{3/2}$	1.58	
1601.5	1600.0(5)	1.41 +0	Ne IV	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.097	SBT
1601.7	1600.1(5)	5.90 -1	Ne IV	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.097	SBT
	1602.(6)	3.32 +1*	Zn XVI	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{5/2}$	0.55	
	1603.3(5)	4.23 +2	K XIII	$2s^2\ 2p^3$	$^2D_{5/2} - {}^2P_{3/2}$	0.71	
	1603.36(8)	1.22 -2*	Al VII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{5/2}$	0.241	
1604.80(4)	1604.80(5)	4.26 -1*	Al VII	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{3/2}$	0.241	ST
T 1600.3(2)	1606.(10)	2.03 +3	As XX	$3s^2\ 3p^2$	$^3P_2 - {}^1D_2$	0.81	RPSKR
1614.51(3)	1614.5(7)	3.62 +1	S XI	$2s^2\ 2p^2$	$^3P_1 - {}^1D_2$	0.505	SBT
	Q 1619.(11)	1.49 +0	As XX	$3s^2\ 3p^2$	$^1D_2 - {}^1S_0$	0.81	
	1633.3(5)	7.05 +1	V IX	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.21	
	1638.(7)	7.79 +2	Ga XVII	$3s^2\ 3p^3$	$^2D_{5/2} - {}^2P_{3/2}$	0.62	
	1642.(10)	6.39 +2	As XIX	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{1/2}$	0.76	
	1643.(5)	3.43 +0	K VIII	3s 3p	$^3P_2 - {}^1P_1$	0.15	
	1646.(9)	3.76 +3	Ge XXIX	2s 2p	$^3P_0 - {}^3P_1$	3.00	
	1647.4(1.2)	6.84 +1	K XII	$2s^2\ 2p^4$	$^3P_1 - {}^1D_2$	0.63	
	Q 1651.(7)	1.78 +1	Zn XV	$3s^2\ 3p^4$	$^1D_2 - {}^1S_0$	0.51	
1656.3(3)	1656.29(27)	4.58 +3	Cr XVII	$2s^2\ 2p^4$	$^3P_2 - {}^3P_1$	1.19	HSCS

Table 40. Wavelengths and transition probabilities ordered by wavelength - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
	1659.(12)	1.84 +3	Zn XXV	$2s^2\ 2p^2$	$^3P_1$ - $^3P_2$	2.27	
	Q 1659.2(8)	8.99 +0	P X	$2s^2\ 2p^2$	$^1D_2$ - $^1S_0$	0.424	
	1664.0(6)	4.07 +2	K XIII	$2s^2\ 2p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	0.71	
1660.4(2)	1668.(10)	1.93 +3	As XIX	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	0.76	RPSKR
	1678.(6)	3.46 +3	Mn XX	$2s^2\ 2p^2$	$^3P_0$ - $^3P_1$	1.54	
1676.9(2)	1680.(7)	5.56 +2	Zn XVII	$3s^2\ 3p^2$	$^3P_1$ - $^1D_2$	0.59	RPSKR
	1686.3(1.8)	4.76 +2	Ar XII	$2s^2\ 2p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	0.618	
	Q 1687.(9)	1.48 +1	Ge XIX	$3s^2\ 3p^2$	$^1D_2$ - $^1S_0$	0.73	
1691.0(3)	1690.(8)	1.49 +3	Cu XXIII	$2s^2\ 2p^3$	$^2D_{3/2}$ - $^2D_{5/2}$	1.94	H
	1693.9(6)	3.40 +2	Cr IX	$3s^2\ 3p^4$	$^3P_1$ - $^1S_0$	0.21	
	1694.1(6)	3.28 +1	V IX	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	0.21	
	1698.0(2.9)	1.46 +2	Cl XII	$2s^2\ 2p^2$	$^3P_2$ - $^1D_2$	0.592	
1702.8(2)	1706.(7)	6.67 +2	Zn XV	$3s^2\ 3p^4$	$^3P_2$ - $^1D_2$	0.51	RPSKR
	Q 1708.5(1.0)	1.03 +1	P VIII	$2s^2\ 2p^4$	$^1D_2$ - $^1S_0$	0.310	
1714.1(3)	1714.1(4)	2.58 +3	Se XXIII	3s 3p	$^3P_1$ - $^3P_2$	1.00	DHSC
1715.44(1)	1715.41(12)	6.18 +1	S IX	$2s^2\ 2p^4$	$^3P_2$ - $^1D_2$	0.379	SBT
	1718.(5)	1.01 +3	Cu XV	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	0.48	
1719.4(1.7)	1721.4(1.5)	3.52 +3	V XV	$2s^2\ 2p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	0.98	FBM
	1723.(15)	3.04 +3	Br XXII	$3s^2\ 3p^2$	$^3P_0$ - $^3P_1$	0.96	
	1724.7(4)	1.17 +2	Ti IX	$3s^2\ 3p^2$	$^3P_1$ - $^1S_0$	0.19	
1727.7(3)	1726.(12)	3.76 +3	Se XIX	$3s^2\ 3p^4$	$^3P_2$ - $^3P_1$	0.79	DHSC
	1731.(5)	1.68 +1*	Cu XV	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	0.48	
	1737.3(1.5)	1.46 +0	Ar VII	3s 3p	$^3P_0$ - $^1P_1$	0.124	
	1741.9(2.1)	4.21 +1	Ar XI	$2s^2\ 2p^4$	$^3P_1$ - $^1D_2$	0.539	
	Q 1762.(9)	9.73 +0	Ga XVIII	$3s^2\ 3p^2$	$^1D_2$ - $^1S_0$	0.66	
	1762.0(1.6)	1.05 +0	Ar VII	3s 3p	$^3P_1$ - $^1P_1$	0.124	
1776.0(3)	1777.(9)	1.57 +3	Cu XXIV	$2s^2\ 2p^2$	$^3P_1$ - $^3P_2$	2.09	HSCS
1778.1(1)	1778.09(10)	1.59 +3	Ti XVIII	$2s^2$ 2p	$^2P_{1/2}$ - $^2P_{3/2}$	1.22	SFH
T 1778.8(2)	1779.(10)	5.22 +2	Ge XVIII	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	0.69	DHST
1777.2(3)	1779.8(1.0)	3.18 +3	As XVII	$3s^2\ 3p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	0.67	RPSKR
T 1782.0(2)	1783.(10)	1.22 +3	Ge XVIII	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	0.69	DHST
	1785.8(9)	1.68 +1	P X	$2s^2\ 2p^2$	$^3P_1$ - $^1D_2$	0.424	
	1787.9(2.0)	2.40 +2	Ar XII	$2s^2\ 2p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	0.618	
	1797.5(6)	3.90 +1	Ti VIII	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	0.17	
	Q 1805.(7)	1.42 +1	Cu XIV	$3s^2\ 3p^4$	$^1D_2$ - $^1S_0$	0.44	
1805.94(1)	1805.94(7)	2.75 -2*	Mg VI	$2s^2\ 2p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	0.187	SBT
	1806.49(17)	4.58 -3*	Mg VI	$2s^2\ 2p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	0.187	
	1808.(9)	2.86 +3	Ga XXVIII	2s 2p	$^3P_0$ - $^3P_1$	2.79	
	1814.63(5)	2.76 +0	Ne III	$2s^2\ 2p^4$	$^3P_1$ - $^1S_0$	0.064	
	1815.8(1.7)	1.60 +0	Ar VII	3s 3p	$^3P_2$ - $^1P_1$	0.124	
1810.4(3)	1816.(10)	1.31 +3	Ge XIX	$3s^2\ 3p^2$	$^3P_2$ - $^1D_2$	0.73	H
	Q 1822.4(8)	8.01 +0	Si IX	$2s^2\ 2p^2$	$^1D_2$ - $^1S_0$	0.351	

Table 5. Wavelengths and transition probabilities ordered by wavelength - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
1826.21(2)	1826.2(9)	7.69 +1	S XI	$2s^2\ 2p^2$	$^3P_2 - {}^1D_2$	0.505	SBT
	1830.39(24)	1.89 +2	V VIII	$3s^2\ 3p^4$	$^3P_1 - {}^1S_0$	0.17	
1832.7(3)	1832.2(1.0)	1.46 +3	Ge XX	$3s^2\ 3p$	$^2P_{1/2} - {}^2P_{3/2}$	0.77	DHSC
	1836.2(2.2)	2.41 +2	Ar XII	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{1/2}$	0.618	
	1842.(8)	5.15 +2	Zn XVI	$3s^2\ 3p^3$	$^2D_{5/2} - {}^2P_{3/2}$	0.55	
	1845.4(7)	1.75 +1	Ti VIII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.17	
	Q 1846.(9)	1.46 +1	Zn XVII	$3s^2\ 3p^2$	$^1D_2 - {}^1S_0$	0.59	
	1852.4(1.8)	2.54 +1	Cl X	$2s^2\ 2p^4$	$^3P_1 - {}^1D_2$	0.456	
1866.75(1)	1866.751(17)	8.27 +0*	Ni XIV	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{5/2}$	0.43	SBT
	1871.(15)	9.27 +2	Br XXI	$3s^2\ 3p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.91	
1872.0(3)	1874.(6)	3.32 +2	Cu XVI	$3s^2\ 3p^2$	$^3P_1 - {}^1D_2$	0.52	H
	1875.73(7)	1.51 +0	F IV	$2s^2\ 2p^2$	$^3P_1 - {}^1S_0$	0.087	
	1890.(10)	7.64 +2	Ga XVII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{3/2}$	0.62	
	Q 1895.0(9)	9.01 +0	Si VII	$2s^2\ 2p^4$	$^1D_2 - {}^1S_0$	0.247	
	1901.41(26)	6.12 +1	Sc VIII	$3s^2\ 3p^2$	$^3P_1 - {}^1S_0$	0.16	
	1906.(7)	4.18 +2	Cu XIV	$3s^2\ 3p^4$	$^3P_2 - {}^1D_2$	0.44	
	1908.(5)	1.86 +3	V XX	$2s\ 2p$	$^3P_1 - {}^3P_2$	1.49	
	1913.1(8)	2.49 +2	Cl XI	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{3/2}$	0.529	
	1913.7(9)	2.90 +1	P VIII	$2s^2\ 2p^4$	$^3P_2 - {}^1D_2$	0.310	
1917.3(2)	1914.98(21)	1.32 +3	Ni XXIII	$2s^2\ 2p^2$	$^3P_1 - {}^3P_2$	2.01	H
1928.7(3)	1929.(6)	1.03 +3	Ni XXII	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2D_{5/2}$	1.89	H
	1934.(10)	4.11 +2	Ga XVII	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{1/2}$	0.62	
	1939.435(11)	3.52 -1	F III	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.063	
	1939.465(11)	1.44 -1	F III	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.063	
	Q 1940.(7)	1.39 +1	Cu XVI	$3s^2\ 3p^2$	$^1D_2 - {}^1S_0$	0.52	
	1945.(15)	1.47 +3	Sr XXIII	$3s^2\ 3p^4$	$^3P_0 - {}^3P_1$	1.10	
	1966.1(1.9)	5.97 +2	Ni XIV	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{3/2}$	0.43	
	1967.(4)	6.14 -1	Cl VI	$3s\ 3p$	$^3P_0 - {}^1P_1$	0.097	
	Q 1968.38(4)	1.16 +1	Ni XIII	$3s^2\ 3p^4$	$^1D_2 - {}^1S_0$	0.38	
	1974.5(1.1)	3.86 +1	P X	$2s^2\ 2p^2$	$^3P_2 - {}^1D_2$	0.424	
1984.88(2)	1984.88(3)	7.40 +0	Si IX	$2s^2\ 2p^2$	$^3P_1 - {}^1D_2$	0.351	SBT
	1985.(11)	1.55 +3	Cu XXII	$2s^2\ 2p^4$	$^3P_0 - {}^3P_1$	1.67	
	1987.7(6)	1.36 +1	S IX	$2s^2\ 2p^4$	$^3P_1 - {}^1D_2$	0.379	
	1988.0(8)	2.05 +1	Sc VII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.14	
	1989.(4)	4.46 -1	Cl VI	$3s\ 3p$	$^3P_1 - {}^1P_1$	0.097	
	1989.38(18)	1.01 +2	Ti VII	$3s^2\ 3p^4$	$^3P_1 - {}^1S_0$	0.14	
	1990.(5)	4.69 +2	Zn XVI	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{3/2}$	0.55	
	1990.8(8)	1.31 +2	Cl XI	$2s^2\ 2p^3$	$^2D_{5/2} - {}^2P_{3/2}$	0.529	
	1999.95(4)	1.22 -3	C III	$2s\ 2p$	$^3P_0 - {}^1P_1$	0.048	
	2000.(8)[a]	2.13 +3	Zn XXVII	$2s\ 2p$	$^3P_0 - {}^3P_1$	2.60	
	2000.7(2.8)	1.63 +3	As XXII	$3s\ 3p$	$^3P_1 - {}^3P_2$	0.90	
	2000.90(4)	1.04 -3	C III	$2s\ 2p$	$^3P_1 - {}^1P_1$	0.048	

Table 40. Wavelengths and transition probabilities ordered by wavelength - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
	2003.16(4)	1.52 -3	C III	2s 2p	$^3P_2$ - $^1P_1$	0.048	
	2011.8(8)	3.96 +0*	Co XIII	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	0.38	
	2015.(11)	7.98 +2	Mn XIX	$2s^2\ 2p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	1.44	
	Q 2018.(3)	7.09 +0	Al VIII	$2s^2\ 2p^2$	$^1D_2$ - $^1S_0$	0.285	
	2024.2(8)	8.93 +0	Sc VII	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	0.14	
2032.6(3)	2030.(14)	2.34 +3	As XVIII	$3s^2\ 3p^4$	$^3P_2$ - $^3P_1$	0.71	RPSKR
	2031.6(9)	1.35 +3	Cl XI	$2s^2\ 2p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	0.529	
	2035.(4)	6.93 -1	Cl VI	3s 3p	$^3P_2$ - $^1P_1$	0.097	
2042.7(8)	2042.8(8)	2.47 +3	V XVI	$2s^2\ 2p^4$	$^3P_2$ - $^3P_1$	1.06	FBM
2042.0(3)	2043.(15)	1.85 +3	Se XXI	$3s^2\ 3p^2$	$^3P_0$ - $^3P_1$	0.88	DHSC
	2046.(10)	8.33 +2	Ga XVIII	$3s^2\ 3p^2$	$^3P_2$ - $^1D_2$	0.66	
	Q 2046.5(2.1)	1.34 +1	Ni XV	$3s^2\ 3p^2$	$^1D_2$ - $^1S_0$	0.46	
	2066.9(1.4)	1.78 -2*	Na V	$2s^2\ 2p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	0.138	
	2068.(9)	3.33 +2*	Cu XV	$3s^2\ 3p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	0.48	
	2068.4(1.4)	1.73 -3*	Na V	$2s^2\ 2p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	0.138	
2085.1(1)	2085.1(1.0)	1.98 +3	Ge XVI	$3s^2\ 3p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	0.60	DHSC
2085.51(5)	2085.51(3)	1.94 +2	Ni XV	$3s^2\ 3p^2$	$^3P_1$ - $^1D_2$	0.46	SBT
2085.3(2)	2086.(9)	2.81 +2	Cu XV	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	0.48	DHST
2090.9(3)	2090.9(4)	1.81 +3	Cr XIX	$2s^2\ 2p^2$	$^3P_0$ - $^3P_1$	1.40	HSCS
	2104.(12)	1.05 +3	Co XXII	$2s^2\ 2p^2$	$^3P_1$ - $^3P_2$	1.85	
	2110.97(13)	3.04 +1	Ca VII	$3s^2\ 3p^2$	$^3P_1$ - $^1S_0$	0.13	
	2111.(10)	3.11 +2	Zn XVI	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	0.55	
2117.1(2)	2117.12(18)	1.89 +3	Ti XIV	$2s^2\ 2p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	0.86	SFH
	Q 2124.9(6)	7.79 +0	Al VI	$2s^2\ 2p^4$	$^1D_2$ - $^1S_0$	0.154	
2125.50(2)	2125.500(23)	2.58 +2	Ni XIII	$3s^2\ 3p^4$	$^3P_2$ - $^1D_2$	0.38	SBT
	Q 2137.9(1.3)	9.72 +0	Co XII	$3s^2\ 3p^4$	$^1D_2$ - $^1S_0$	0.34	
2146.64(4)	2146.64(5)	1.28 +1	Si VII	$2s^2\ 2p^4$	$^3P_2$ - $^1D_2$	0.247	SBT
	2146.9(1.0)	9.07 +2	Ga XIX	$3s^2\ 3p$	$^2P_{1/2}$ - $^2P_{3/2}$	0.70	
2149.26(5)	2149.31(3)	1.83 +1	Si IX	$2s^2\ 2p^2$	$^3P_2$ - $^1D_2$	0.351	SBT
	2150.0(1.6)	7.03 +0	P VIII	$2s^2\ 2p^4$	$^3P_1$ - $^1D_2$	0.310	
	2156.28(24)	1.25 +2	S X	$2s^2\ 2p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	0.447	
	Q 2166.(3)	1.27 +1	Co XIV	$3s^2\ 3p^2$	$^1D_2$ - $^1S_0$	0.41	
2169.08(2)	2169.69(24)	1.84 +0*	Fe XII	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	0.33	SBT
	2178.99(7)	5.09 +1	Sc VI	$3s^2\ 3p^4$	$^3P_1$ - $^1S_0$	0.11	
2184.26(5)	2184.250(24)	1.63 +2	Ni XIV	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	0.43	SBT
2190.5(2)	2190.52(19)	8.53 +2	Sc XVII	$2s^2\ 2p$	$^2P_{1/2}$ - $^2P_{3/2}$	1.09	SCCFH
	2211.26(25)	6.92 +1	S X	$2s^2\ 2p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	0.447	
	2214.5(1.0)	1.00 +1	Ca VI	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	0.11	
	2222.(3)	3.06 +0	Al VIII	$2s^2\ 2p^2$	$^3P_1$ - $^1D_2$	0.285	
	2228.(7)		Cu XXVI	2s 2p	$^3P_0$ - $^3P_1$	2.41	
	2242.1(1.0)	4.28 +0	Ca VI	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	0.11	
	2242.61(4)	4.93 -1	F II	$2s^2\ 2p^4$	$^3P_1$ - $^1S_0$	0.035	

Table 40. Wavelengths and transition probabilities ordered by wavelength - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
	2244.84(26)	7.20 +1	S X	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{1/2}$	0.447	
	2245.5(1.4)	3.49 +2	Co XIII	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{3/2}$	0.38	
	2246.(15)	5.48 +2	Se XX	$3s^2\ 3p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.83	
	2247.(14)	6.75 +2	Co XXI	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2D_{5/2}$	1.74	
	Q 2261.5(6)	6.16 +0	Mg VII	$2s^2\ 2p^2$	$^1D_2 - {}^1S_0$	0.225	
2285.4(1)	2264.(30)	5.01 +2	Mo XXVIII	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2D_{5/2}$	1.49	DHSC
	2265.5(8)	2.30 -1	S V	3s 3p	$^3P_0 - {}^1P_1$	0.073	
	2284.63(18)	1.68 -1	S V	3s 3p	$^3P_1 - {}^1P_1$	0.073	
	2290.2(1.0)	9.05 +1	Co XIII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{3/2}$	0.38	
2284.6(1)	2293.(10)	5.26 +2	Zn XVII	$3s^2\ 3p^2$	$^3P_2 - {}^1D_2$	0.59	BGBR
2298.0(3)	2298.0(5)	8.46 +2	Fe XXI	$2s^2\ 2p^2$	$^3P_1 - {}^3P_2$	1.69	HSCS
	Q 2301.3(5)	1.20 +1	Fe XIII	$3s^2\ 3p^2$	$^1D_2 - {}^1S_0$	0.36	
	2312.(10)	2.27 +2	Cu XV	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{1/2}$	0.48	
	2320.9510(16)	3.27 -1	O III	$2s^2\ 2p^2$	$^3P_1 - {}^1S_0$	0.055	
	Q 2321.0(2.7)	8.31 +0	Fe XI	$3s^2\ 3p^4$	$^1D_2 - {}^1S_0$	0.29	
	2321.6(2.7)	2.11 +2*	Ni XIV	$3s^2\ 3p^3$	$^2D_{5/2} - {}^2P_{3/2}$	0.43	
	2325.1(8)	2.65 -1	S V	3s 3p	$^3P_2 - {}^1P_1$	0.073	
	2331.(4)	1.09 +2	Co XIV	$3s^2\ 3p^2$	$^3P_1 - {}^1D_2$	0.41	
	2341.09(27)	8.33 -1*	Mn XI	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{5/2}$	0.20	
2344.6(2)	2344.5(2.3)	1.01 +3	Ti XIX	2s 2p	$^3P_1 - {}^3P_2$	1.35	PSS
	2350.02(18)	3.37 +0	Si VII	$2s^2\ 2p^4$	$^3P_1 - {}^1D_2$	0.247	
2350.2(3)	2350.2(4)	1.01 +3	Ge XXI	3s 3p	$^3P_1 - {}^3P_2$	0.80	DHSC
	2365.(3)	8.13 +0	Al VIII	$2s^2\ 2p^2$	$^3P_2 - {}^1D_2$	0.285	
	2367.52(8)	1.40 +1	K VI	$3s^2\ 3p^2$	$^3P_1 - {}^1S_0$	0.10	
2350.8(3)	2371.(30)	2.23 +2	Mo XXVII	$3s^2\ 3p^4$	$^3P_1 - {}^1D_2$	1.43	H
	2373.4(1.1)	1.56 +2	Co XII	$3s^2\ 3p^4$	$^3P_2 - {}^1D_2$	0.34	
	2386.(30)	4.39 +2	Nb XXVII	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2D_{5/2}$	1.41	
2406.9(3)	2404.(14)	1.43 +3	Ge XVII	$3s^2\ 3p^4$	$^3P_2 - {}^3P_1$	0.64	DHSC
2405.68(1)	2405.1(3)	4.81 +1	Fe XII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{3/2}$	0.33	SBT
	2412.9(1)	2.40 +1	Ca V	$3s^2\ 3p^4$	$^3P_1 - {}^1S_0$	0.08	
	Q 2417.5(3)	6.59 +0	Mg V	$2s^2\ 2p^4$	$^1D_2 - {}^1S_0$	0.141	
	2418.2(1.2)	2.65 -3*	Ne IV	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{3/2}$	0.097	
	2420.9(1.2)	6.03 -4*	Ne IV	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{5/2}$	0.097	
	2421.7(1.2)	6.11 +1	P IX	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{3/2}$	0.372	
	2428.4(6)	5.15 +0	Al VI	$2s^2\ 2p^4$	$^3P_2 - {}^1D_2$	0.154	
	2433.(30)	1.99 +2	Nb XXVI	$3s^2\ 3p^4$	$^3P_1 - {}^1D_2$	1.34	
2438.0(3)	2440.(16)	1.10 +3	As XX	$3s^2\ 3p^2$	$^3P_0 - {}^3P_1$	0.81	RPSKR
	2442.(20)	7.71 +2	Rb XXII	$3s^2\ 3p^4$	$^3P_0 - {}^3P_1$	1.02	
	Q 2456.(19)	1.12 +1	Mn XII	$3s^2\ 3p^2$	$^1D_2 - {}^1S_0$	0.31	
	2458.2(1.2)	3.54 +1*	P IX	$2s^2\ 2p^3$	$^2D_{5/2} - {}^2P_{3/2}$	0.372	
2456.3(3)	2459.7(1.0)	1.21 +3	Ga XV	$3s^2\ 3p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.54	RPSKR
	2467.(19)	1.23 +3	Ni XXV	2s 2p	$^3P_0 - {}^3P_1$	2.30	

Table 40. Wavelengths and transition probabilities ordered by wavelength - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
	2470.21(2)	2.38 -2	O II	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.035	
	2470.33(2)	5.95 -2	O II	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.035	
	2484.3(1.2)	3.72 +1*	P IX	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{1/2}$	0.372	
	2494.24(12)	4.56 +0	K V	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.08	
T 2476.	2497.(30)	1.76 +2	Zr XXV	$3s^2\ 3p^4$	$^3P_1 - {}^1D_2$	1.26	DHSC
	2509.2(7)	1.17 +0	Mg VII	$2s^2\ 2p^2$	$^3P_1 - {}^1D_2$	0.225	
	2514.45(13)	1.90 +0	K V	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.08	
	Q 2516.5(2.7)	7.24 +0	Mn X	$3s^2\ 3p^4$	$^1D_2 - {}^1S_0$	0.25	
2549.8(2)	2529.(30)	3.80 +2	Zr XXVI	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2D_{5/2}$	1.32	DHST
2532.0(1)	2531.5(1.0)	5.53 +2	Zn XVIII	$3s^2\ 3p$	$^2P_{1/2} - {}^2P_{3/2}$	0.63	BGBR
	2534.1(5)	3.67 -1*	Cr X	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{5/2}$	0.24	
	2538.3(3)	2.42 +1	Mn XI	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{3/2}$	0.29	
	2539.96(5)	1.59 +2	Ni XIV	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{1/2}$	0.43	
2544.8(1)	2544.54(19)	1.30 +3	Ti XV	$2s^2\ 2p^4$	$^3P_2 - {}^3P_1$	0.94	SFH
T 2539.7(3)	2555.(12)	3.28 +2	Cu XVI	$3s^2\ 3p^2$	$^3P_2 - {}^1D_2$	0.52	DHSC
	2559.(19)	6.43 +2	Mn XX	$2s^2\ 2p^2$	$^3P_1 - {}^3P_2$	1.54	
	2565.(30)	3.52 +1	Y XXIV	$3s^2\ 3p^4$	$^3P_1 - {}^1D_2$	1.18	
2565.93(6)	2566.7(5)	2.00 +2	Fe XII	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{3/2}$	0.33	SBT
	Q 2568.9(1.9)	5.27 +0	Na VI	$2s^2\ 2p^2$	$^1D_2 - {}^1S_0$	0.172	
2578.77(1)	2578.84(14)	4.57 +1	Fe XIII	$3s^2\ 3p^2$	$^3P_1 - {}^1D_2$	0.36	SBT
	2598.0(1.9)	1.33 +2*	Co XIII	$3s^2\ 3p^3$	$^2D_{5/2} - {}^2P_{3/2}$	0.38	
	2601.0(7)	1.48 +0	Al VI	$2s^2\ 2p^4$	$^3P_1 - {}^1D_2$	0.154	
2606.4(3)	2606.4(3)	3.80 +2	Cr XVIII	$2s^2\ 2p^3$	$^2P_{1/2} - {}^2P_{3/2}$	1.30	DH
	2629.1(8)	3.36 +0	Mg VII	$2s^2\ 2p^2$	$^3P_2 - {}^1D_2$	0.225	
	2633.6(1.4)	9.19 +2	V XVIII	$2s^2\ 2p^2$	$^3P_0 - {}^3P_1$	1.26	
	Q 2634.(7)	1.03 +1	Cr XI	$3s^2\ 3p^2$	$^1D_2 - {}^1S_0$	0.27	
	2636.(25)	1.36 +2	Sr XXIII	$3s^2\ 3p^4$	$^3P_1 - {}^1D_2$	1.10	
2637.2(2)	2637.18(21)	9.78 +2	Sc XIII	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.76	SCCFH
	2640.(25)	8.82 +2	Mo XXXI	$3s\ 3p$	$^3P_0 - {}^3P_1$	1.80	
2648.71(2)	2648.67(7)	9.23 +1	Fe XI	$3s^2\ 3p^4$	$^3P_2 - {}^1D_2$	0.29	SBT
2665.1(3)	2665.2(3.0)	4.17 +2	Fe XX	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2D_{5/2}$	1.58	SH(78)
	2682.154(10)	7.33 -2	P IV	$3s\ 3p$	$^3P_0 - {}^1P_1$	0.051	
	2691.04(19)	5.89 +0	Ar V	$3s^2\ 3p^2$	$^3P_1 - {}^1S_0$	0.075	
	2694.4(5)	1.14 +1	Cr X	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{3/2}$	0.24	
	2698.696(10)	5.40 -2	P IV	$3s\ 3p$	$^3P_1 - {}^1P_1$	0.051	
2717.8(3)	2700.(30)	7.87 +0	Y XXV	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2D_{5/2}$	1.24	RPSKR
	2710.(25)	1.18 +2	Rb XXII	$3s^2\ 3p^4$	$^3P_1 - {}^1D_2$	1.02	
	2711.07(10)	1.05 +1	K IV	$3s^2\ 3p^4$	$^3P_1 - {}^1S_0$	0.06	
	2722.4(4)	2.83 +1	Si VIII	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{3/2}$	0.304	
	2724.(20)	3.15 +2	As XIX	$3s^2\ 3p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.76	
	2733.280(11)	8.66 -2	P IV	$3s\ 3p$	$^3P_2 - {}^1P_1$	0.051	
	Q 2733.6(1.5)	6.41 +0	Cr IX	$3s^2\ 3p^4$	$^1D_2 - {}^1S_0$	0.21	

Table 40. Wavelengths and transition probabilities ordered by wavelength - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
	2737.(4)	4.37 +2	Ca XVI	$2s^2$ 2p	$^2P_{1/2}$ - $^2P_{3/2}$	0.97	
	2741.2(4)	1.69 +1*	Si VIII	$2s^2$ $2p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	0.304	
	2752.6(1.6)	1.57 -1*	V IX	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	0.21	
	2763.1(4)	1.79 +1*	Si VIII	$2s^2$ $2p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	0.304	
	2772.35(4)	8.52 -5	B II	2s 2p	$^3P_0$ - $^1P_1$	0.048	
	2772.78(4)	2.01 -1	B II	2s 2p	$^3P_1$ - $^1P_1$	0.048	
	2774.01(4)	1.07 -4	B II	2s 2p	$^3P_2$ - $^1P_1$	0.048	
	2780.(6)	6.13 +2	Ga XX	3s 3p	$^3P_1$ - $^3P_2$	0.70	
	2782.7(3)	1.86 +0	Mg V	$2s^2$ $2p^4$	$^3P_2$ - $^1D_2$	0.141	
	2788.(25)	1.02 +2	Kr XXI	$3s^2$ $3p^4$	$^3P_1$ - $^1D_2$	0.94	
	2791.7(2.2)	1.10 +2*	Co XIII	$3s^2$ $3p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	0.38	
	Q 2803.74(18)	5.43 +0	Na IV	$2s^2$ $2p^4$	$^1D_2$ - $^1S_0$	0.099	
	2809.(22)	8.48 +2	Co XXIV	2s 2p	$^3P_0$ - $^3P_1$	2.12	
2818.2(3)	2817.7(3)	5.72 +2	Ni XXI	$2s^2$ $2p^4$	$^3P_0$ - $^3P_1$	1.76	HSCS
	2818.01(6)	2.05 +2	Ni XV	$3s^2$ $3p^2$	$^3P_2$ - $^1D_2$	0.46	
2841.1(2)	2834.(40)	2.91 +2	Mo XXIX	$3s^2$ $3p^2$	$^3P_1$ - $^3P_2$	1.49	DHSC
	Q 2836.7(6)	9.45 +0	V X	$3s^2$ $3p^2$	$^1D_2$ - $^1S_0$	0.23	
	2839.(25)	7.16 +2	Nb XXX	3s 3p	$^3P_0$ - $^3P_1$	1.70	
	2853.654(24)	1.88 +0	Ar IV	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	0.060	
	2860.(12)	3.35 +1	Mn XII	$3s^2$ $3p^2$	$^3P_1$ - $^1D_2$	0.31	
	2868.(15)	8.54 +2	Ga XVI	$3s^2$ $3p^4$	$^3P_2$ - $^3P_1$	0.58	
	2868.15(5)	7.60 -1	Ar IV	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	0.060	
	2871.(30)	8.68 +1	Br XX	$3s^2$ $3p^4$	$^3P_1$ - $^1D_2$	0.86	
	2872.7(1.9)	4.06 -1	Na VI	$2s^2$ $2p^2$	$^3P_1$ - $^1D_2$	0.172	
	2880.3(1.7)	4.98 +0	V IX	$3s^2$ $3p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	0.21	
2885.4(3)	2885.4(1.2)	4.69 +2	Cr XIX	$2s^2$ $2p^2$	$^3P_1$ - $^3P_2$	1.40	HSCS
	2898.(30)	2.69 +2	Sr XXIV	$3s^2$ $3p^3$	$^2D_{3/2}$ - $^2D_{5/2}$	1.16	
	2902.8(6)	8.13 +1*	Fe XII	$3s^2$ $3p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	0.33	
2907.9(3)	2907.82(24)	5.29 +2	Sc XVIII	2s 2p	$^3P_1$ - $^3P_2$	1.21	SH(82)
2922.3(1)	2922.5(1.0)	7.20 +2	Zn XIV	$3s^2$ $3p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	0.47	BGBR
	2925.9(6)	1.13 +2	Mn XI	$3s^2$ $3p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	0.29	
	2928.0(4)	5.85 -1	Mg V	$2s^2$ $2p^4$	$^3P_1$ - $^1D_2$	0.141	
	2929.70(4)	3.63 -4*	F III	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	0.063	
	2932.78(4)	1.63 -4*	F III	$2s^2$ $2p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	0.063	
2933.7(2)	2938.(18)	6.39 +2	Ge XIX	$3s^2$ $3p^2$	$^3P_0$ - $^3P_1$	0.73	DHSC
	2956.0(2.6)	5.33 +1	Mn X	$3s^2$ $3p^4$	$^3P_2$ - $^1D_2$	0.25	
T 2935.8(3)	2958.(20)	7.31 +1	Se XIX	$3s^2$ $3p^4$	$^3P_1$ - $^1D_2$	0.78	DHSC
	2958.(40)	2.63 +2	Nb XXVIII	$3s^2$ $3p^2$	$^3P_1$ - $^3P_2$	1.50	
	2971.9(1.8)	1.27 +0	Na VI	$2s^2$ $2p^2$	$^3P_2$ - $^1D_2$	0.172	
2972.288(1)	2972.2864(13)	6.68 -2	O I	$2s^2$ $2p^4$	$^3P_1$ - $^1S_0$	0.014	E(65)
	Q 2972.8(5)	4.39 +0	Ne V	$2s^2$ $2p^2$	$^1D_2$ - $^1S_0$	0.126	
	Q 2978.1(6)	5.61 +0	V VIII	$3s^2$ $3p^4$	$^1D_2$ - $^1S_0$	0.17	

Table 40. Wavelengths and transition probabilities ordered by wavelength - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
	3006.1(1.8)	6.62 -2*	Ti VIII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{5/2}$	0.17	
3007.6(3)	3007.6(1.0)	3.30 +2	Cu XVII	$3s^2\ 3p$	$^2P_{1/2} - {}^2P_{3/2}$	0.55	HSCS
	3051.(20)	6.07 +1	As XVIII	$3s^2\ 3p^4$	$^3P_1 - {}^1D_2$	0.71	
	3062.838(13)	3.40 -2	N II	$2s^2\ 2p^2$	$^3P_1 - {}^1S_0$	0.030	
	3067.(30)	5.73 +2	Zr XXIX	$3s\ 3p$	$^3P_0 - {}^3P_1$	1.60	
	3070.7(3)	7.22 +0	Al VII	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{3/2}$	0.241	
	Q 3071.8(1.3)	8.58 +0	Ti IX	$3s^2\ 3p^2$	$^1D_2 - {}^1S_0$	0.19	
3072.0(4)	3072.0(7)	7.21 +1*	Fe XII	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{1/2}$	0.33	J
	3076.0(4)	1.27 +1*	Al VII	$2s^2\ 2p^3$	$^2D_{5/2} - {}^2P_{3/2}$	0.241	
3100.5(3)	3094.(40)	2.37 +2	Zr XXVII	$3s^2\ 3p^2$	$^3P_1 - {}^3P_2$	1.41	DHSC
	3096.0(3)	8.12 +0*	Al VII	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{1/2}$	0.241	
	3105.6(1.9)	2.00 +0	Ti VIII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{3/2}$	0.17	
3109.08(30)	3109.14(5)	4.09 +0	Ar III	$3s^2\ 3p^4$	$^3P_1 - {}^1S_0$	0.041	B(60)
	3110.(7)	1.24 +2	Co XIV	$3s^2\ 3p^2$	$^3P_2 - {}^1D_2$	0.41	
	3118.55(8)	2.19 +0	Cl IV	$3s^2\ 3p^2$	$^3P_1 - {}^1S_0$	0.053	
	3134.(30)	3.81 +2	Kr XXI	$3s^2\ 3p^4$	$^3P_0 - {}^3P_1$	0.94	
T 3131.3(3)	3150.(20)	4.97 +1	Ge XVII	$3s^2\ 3p^4$	$^3P_1 - {}^1D_2$	0.64	DHSC
	3152.(30)	2.17 +2	Rb XXIII	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2D_{5/2}$	1.07	
3178.	3177.9(7)	1.77 +1	Cr XI	$3s^2\ 3p^2$	$^3P_1 - {}^1D_2$	0.27	M
3206.1(3)	3206.36(21)	6.55 +2	Sc XIV	$2s^2\ 2p^4$	$^3P_2 - {}^3P_1$	0.83	SCCFH
	3230.(16)	5.70 +2	Fe XXIII	$2s\ 2p$	$^3P_0 - {}^3P_1$	1.96	
	3240.6(7)	4.73 +1*	Mn XI	$3s^2\ 3p^3$	$^2D_{5/2} - {}^2P_{3/2}$	0.29	
3241.68(10)	3241.63(15)	5.75 -1	Na IV	$2s^2\ 2p^4$	$^3P_2 - {}^1D_2$	0.099	B(60)
3254.8(1.0)	3250.(40)	2.44 +2	Y XXVI	$3s^2\ 3p^2$	$^3P_1 - {}^3P_2$	1.32	RPSKR
	3258.(20)	4.00 +1	Ga XVI	$3s^2\ 3p^4$	$^3P_1 - {}^1D_2$	0.58	
	3259.(30)	2.35 +2	Mn XIX	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2D_{5/2}$	1.44	
	Q 3259.5(6)	4.92 +0	Ti VII	$3s^2\ 3p^4$	$^1D_2 - {}^1S_0$	0.14	
	3301.1(5)	2.99 +1	Cr IX	$3s^2\ 3p^4$	$^3P_2 - {}^1D_2$	0.21	
3296.2(2)	3304.0(3)	3.67 +2	Zn XIX	$3s\ 3p$	$^3P_1 - {}^3P_2$	0.70	BGBR
	3305.9(2.2)	2.78 -2*	Sc VII	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{5/2}$	0.14	
	3307.(3)	3.24 +2	V XVIII	$2s^2\ 2p^2$	$^3P_1 - {}^3P_2$	1.26	
	3314.727(16)	1.85 -2	Si III	$3s\ 3p$	$^3P_0 - {}^1P_1$	0.033	
	3326.4(8)	6.22 +1	Cr X	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{3/2}$	0.24	
3327.5(4)	3327.8(6)	4.87 +2	Ca XII	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.66	J
	3328.921(16)	1.37 -2	Si III	$3s\ 3p$	$^3P_1 - {}^1P_1$	0.033	
	3330.(30)	4.52 +2	Y XXVIII	$3s\ 3p$	$^3P_0 - {}^3P_1$	1.50	
	3340.(20)	1.75 +2	Ge XVIII	$3s^2\ 3p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.69	
3342.5(3)	Q 3342.42(17)	4.28 +0	Ne III	$2s^2\ 2p^4$	$^1D_2 - {}^1S_0$	0.064	B(60)
3342.9(3)	3342.80(20)	6.91 -1	Cl III	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.040	B(60)
3345.84(2)	3345.83(16)	1.24 -1	Ne V	$2s^2\ 2p^2$	$^3P_1 - {}^1D_2$	0.126	B(55)
	Q 3350.5(8)	7.70 +0	Sc VIII	$3s^2\ 3p^2$	$^1D_2 - {}^1S_0$	0.16	
3353.33(10)	3353.17(22)	1.22 -1	Cl III	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.040	B(60)

Table 40. Wavelengths and transition probabilities ordered by wavelength - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
	3358.189(16)	2.22 -2	Si III	3s 3p	$^3P_2$ - $^1P_1$	0.033	
3362.20(10)	3362.24(16)	2.03 -1	Na IV	$2s^2\ 2p^4$	$^3P_1$ - $^1D_2$	0.099	B(60)
3370.8(2)	3370.80(23)	4.44 +2	Ti XVII	$2s^2\ 2p^2$	$^3P_0$ - $^3P_1$	1.13	SFH
	3374.(15)	3.15 +1	Zn XV	$3s^2\ 3p^4$	$^3P_1$ - $^1D_2$	0.51	
	3381.7(2.3)	7.32 -1	Sc VII	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	0.14	
	3381.9(8)	4.89 +1*	Mn XI	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	0.29	
3388.5(4)	3388.05(23)	5.75 +1	Fe XIII	$3s^2\ 3p^2$	$^3P_2$ - $^1D_2$	0.36	J
	3418.(40)	1.89 +2	Sr XXV	$3s^2\ 3p^2$	$^3P_1$ - $^3P_2$	1.22	
3425.87(2)	3425.87(17)	4.36 -1	Ne V	$2s^2\ 2p^2$	$^3P_2$ - $^1D_2$	0.126	B(55)
	3438.(3)	1.71 +2	V XVII	$2s^2\ 2p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	1.17	
	3446.(30)	1.72 +2	Kr XXII	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2D_{5/2}$	0.99	
	3448.(4)	2.19 +2	K XV	$2s^2\ 2p$	$^2P_{1/2}$ - $^2P_{3/2}$	0.86	
3450.4(2)	3449.(20)	4.98 +2	Zn XV	$3s^2\ 3p^4$	$^3P_2$ - $^3P_1$	0.51	BGBR
3466.4970(6)	3466.497(1)	6.18 -3	N I	$2s^2\ 2p^3$	$^4S_{3/2}$ - $^2P_{3/2}$	0.015	E(66)
3466.5434(12)	3466.543(1)	2.46 -3	N I	$2s^2\ 2p^3$	$^4S_{3/2}$ - $^2P_{1/2}$	0.015	E(66)
	3486.7(6)	3.33 +0*	Mg VI	$2s^2\ 2p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	0.187	
	3488.7(3)	5.06 +0*	Mg VI	$2s^2\ 2p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	0.187	
3500.4(3)	3500.4(1.0)	4.19 +2	Cu XIII	$3s^2\ 3p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	0.41	HSCS
	3502.(20)	2.43 +2	Cu XIV	$3s^2\ 3p^4$	$^3P_1$ - $^1D_2$	0.44	
	3502.0(3)	3.48 +0*	Mg VI	$2s^2\ 2p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	0.187	
	3528.9(9)	9.10 +0	V X	$3s^2\ 3p^2$	$^3P_1$ - $^1D_2$	0.23	
	Q 3532.17(25)	3.52 +0	F IV	$2s^2\ 2p^2$	$^1D_2$ - $^1S_0$	0.087	
	3566.(20)	3.62 +2	Ga XVIII	$3s^2\ 3p^2$	$^3P_0$ - $^3P_1$	0.66	
	Q 3592.01(18)	4.31 +0	Sc VI	$3s^2\ 3p^4$	$^1D_2$ - $^1S_0$	0.11	
3601.1(4)	3600.0(2.6)	1.93 +2	Ni XVI	$3s^2\ 3p$	$^2P_{1/2}$ - $^2P_{3/2}$	0.50	J
	3608.2(9)	2.86 +1*	Cr X	$3s^2\ 3p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	0.24	
	3611.(40)	1.67 +2	Rb XXIV	$3s^2\ 3p^2$	$^3P_1$ - $^3P_2$	1.13	
	3630.(30)	3.52 +2	Sr XXVII	3s 3p	$^3P_0$ - $^3P_1$	1.40	
	3636.50(9)	1.84 +1	Ni XIII	$3s^2\ 3p^4$	$^3P_1$ - $^1D_2$	0.38	
	3637.(4)	2.70 +2	Ca XVII	2s 2p	$^3P_1$ - $^3P_2$	1.16	
	3669.1(2.7)	1.17 -2*	Ca VI	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	0.11	
	3677.855(8)	1.37 +0	Cl II	$3s^2\ 3p^4$	$^3P_1$ - $^1S_0$	0.024	
3685.5(4)	3682.(19)	4.48 +1	Mn XII	$3s^2\ 3p^2$	$^3P_2$ - $^1D_2$	0.31	J
3688.2(2.5)	Q 3686.6(4)	6.81 +0	Ca VII	$3s^2\ 3p^2$	$^1D_2$ - $^1S_0$	0.13	
	3692.8(7)	1.62 +1	V VIII	$3s^2\ 3p^4$	$^3P_2$ - $^1D_2$	0.17	
3721.69(10)	3721.68(10)	6.83 -1	S III	$3s^2\ 3p^2$	$^3P_1$ - $^1S_0$	0.035	B(60)
	3725.4(2.8)	2.43 -1*	Ca VI	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	0.11	
	3725.8(1.0)	2.82 +1*	Cr X	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	0.24	
3726.04(2)	3726.03(2)	1.69 -4*	O II	$2s^2\ 2p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	0.035	B(55)
3728.80(2)	3728.82(3)	5.01 -5*	O II	$2s^2\ 2p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	0.035	B(55)
	3756.(36)	3.73 +2	Mn XXII	2s 2p	$^3P_0$ - $^3P_1$	1.79	
	3770.2(1.0)	3.34 +1	V IX	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	0.21	

Table 40. Wavelengths and transition probabilities ordered by wavelength - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
3801.2	3801.(4)	1.34 +1	Co XII	$3s^2\ 3p^4$	$^3P_1 - {}^1D_2$	0.34	P
	3825.(40)	1.30 +2	Br XXI	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2D_{5/2}$	0.91	
3840.9(3)	3832.(40)	1.46 +2	Kr XXIII	$3s^2\ 3p^2$	$^3P_1 - {}^3P_2$	1.05	RPSKR
3834.4(2)	3834.4(4)	2.15 +2	Ti XVII	$2s^2\ 2p^2$	$^3P_1 - {}^3P_2$	1.13	SFH
3868.76(2)	3868.752(15)	1.39 -1	Ne III	$2s^2\ 2p^4$	$^3P_2 - {}^1D_2$	0.064	B(55)
	3930.3(2.2)	4.52 -1	Ti IX	$3s^2\ 3p^2$	$^3P_1 - {}^1D_2$	0.19	
3941.6(3)	3941.6(2.2)	2.16 +2	Cu XVIII	3s 3p	$^3P_1 - {}^3P_2$	0.60	DHSC
3967.47(2)	3967.46(4)	5.95 -2	Ne III	$2s^2\ 2p^4$	$^3P_1 - {}^1D_2$	0.064	B(55)
	3975.(40)	2.70 +2	Rb XXVI	3s 3p	$^3P_0 - {}^3P_1$	1.30	
3986.8(4)	3986.80(22)	9.44 +0	Fe XI	$3s^2\ 3p^4$	$^3P_1 - {}^1D_2$	0.29	J
3996.8(4)	3996.6(1.1)	2.60 +1	Cr XI	$3s^2\ 3p^2$	$^3P_2 - {}^1D_2$	0.27	J
3997.37(10)	3997.37(9)	3.17 -2	F IV	$2s^2\ 2p^2$	$^3P_1 - {}^1D_2$	0.087	B(60)
	Q 3997.88(23)	3.73 +0	Ca V	$3s^2\ 3p^4$	$^1D_2 - {}^1S_0$	0.08	
	4010.9(2.3)	1.40 +0*	Na V	$2s^2\ 2p^3$	$^2D_{5/2} - {}^2P_{3/2}$	0.138	
	4014.1(1.1)	1.64 +1*	V IX	$3s^2\ 3p^3$	$^2D_{5/2} - {}^2P_{3/2}$	0.21	
	4016.7(2.3)	1.91 +0*	Na V	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{3/2}$	0.138	
	4022.7(2.3)	1.43 +0*	Na V	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{1/2}$	0.138	
4038.6(3)	4039.(7)	1.27 +2	Cr XVIII	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2D_{5/2}$	1.30	DH
4060.22(10)	4060.21(9)	1.39 -1	F IV	$2s^2\ 2p^2$	$^3P_2 - {}^1D_2$	0.087	B(60)
4068.60(2)	4068.60(3)	2.20 -1	S II	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.023	B(55)
4076.35(2)	4076.35(3)	7.44 -2	S II	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.023	B(55)
	4087.(40)	1.26 +2	Br XXII	$3s^2\ 3p^2$	$^3P_1 - {}^3P_2$	0.96	
4087.1(4)	4087.2(5)	3.19 +2	Ca XIII	$2s^2\ 2p^4$	$^3P_2 - {}^3P_1$	0.73	J
	Q 4100.40(24)	5.92 +0	K VI	$3s^2\ 3p^2$	$^1D_2 - {}^1S_0$	0.10	
	4110.7(1.2)	1.66 +1*	V IX	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{1/2}$	0.21	
4122.63(10)	4122.6(3)	4.96 -3*	K V	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{5/2}$	0.08	B(55)
	4130.(50)	1.74 +2	Br XX	$3s^2\ 3p^4$	$^3P_0 - {}^3P_1$	0.86	
	4143.1(7)	8.46 +0	Ti VII	$3s^2\ 3p^4$	$^3P_2 - {}^1D_2$	0.14	
	4150.(30)	9.37 +1	Ga XVII	$3s^2\ 3p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.62	
	Q 4157.75(12)	2.10 +0	F II	$2s^2\ 2p^4$	$^1D_2 - {}^1S_0$	0.035	
4163.30(10)	4163.3(3)	8.06 -2*	K V	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{3/2}$	0.08	B(55)
4183.4(3)	4181.(20)	2.83 +2	Cu XIV	$3s^2\ 3p^4$	$^3P_2 - {}^3P_1$	0.44	RPSKR
	4200.(5)	6.42 +0	Mn X	$3s^2\ 3p^4$	$^3P_1 - {}^1D_2$	0.25	
4231.2(4)	4230.9(1.8)	2.37 +2	Ni XII	$3s^2\ 3p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.35	J
T 4256.4	4249.(4)	2.34 +2	K XI	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.56	P
	4249.(50)	1.75 +2	Co XX	$2s^2\ 2p^4$	$^3P_0 - {}^3P_1$	1.60	
	4264.4(5)	1.77 +1*	Ti VIII	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{3/2}$	0.17	
4276.0(3)	4305.(40)	9.47 +1	Se XX	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2D_{5/2}$	0.83	DHSC
	4330.(40)	2.38 +2	Cr XXI	2s 2p	$^3P_0 - {}^3P_1$	1.63	
	4330.0(1.3)	1.47 +1	V X	$3s^2\ 3p^2$	$^3P_2 - {}^1D_2$	0.23	
4350.6	4352.(10)	1.09 +2	Co XV	$3s^2\ 3p$	$^2P_{1/2} - {}^2P_{3/2}$	0.44	P
4354.3(4)	4354.4(4)	2.08 +2	Sc XVI	$2s^2\ 2p^2$	$^3P_0 - {}^3P_1$	1.01	SCCFH

Table 5. Wavelengths and transition probabilities ordered by wavelength - Continued

Wavelength Observed		Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
4363.19(2)	Q	4363.209(8)	2.65 +0	O III	$2s^2\ 2p^2$	$^1D_2$ - $^1S_0$	0.055	B(55)
4355.0(3)		4365.(25)	2.00 +2	Zn XVII	$3s^2\ 3p^2$	$^3P_0$ - $^3P_1$	0.59	RPSKR
		4376.(50)	2.04 +2	Kr XXV	3s 3p	$^3P_0$ - $^3P_1$	1.22	
4396.5(3)[b]		4383.(50)	1.07 +2	Se XXI	$3s^2\ 3p^2$	$^3P_1$ - $^3P_2$	0.88	DHSC
		4393.4(1.4)	2.15 +0	Sc VIII	$3s^2\ 3p^2$	$^3P_1$ - $^1D_2$	0.16	
4412.4(2)		4416.(4)	1.04 +2	Ar XIV	$2s^2\ 2p$	$^2P_{1/2}$ - $^2P_{3/2}$	0.756	D
		4450.5(1.4)	4.19 +0	Cr IX	$3s^2\ 3p^4$	$^3P_1$ - $^1D_2$	0.21	
		4451.311(14)	3.07 -3	Al II	3s 3p	$^3P_0$ - $^1P_1$	0.019	
		4463.409(14)	2.31 -3	Al II	3s 3p	$^3P_1$ - $^1P_1$	0.019	
		4467.6(6)	9.10 +0*	Ti VIII	$3s^2\ 3p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	0.17	
		4488.233(14)	3.74 -3	Al II	3s 3p	$^3P_2$ - $^1P_1$	0.019	
4510.93(10)	Q	4510.92(29)	3.18 +0	K IV	$3s^2\ 3p^4$	$^1D_2$ - $^1S_0$	0.06	B(60)
4530.3(4)		4530.4(5)	1.34 +2	Sc XVI	$2s^2\ 2p^2$	$^3P_1$ - $^3P_2$	1.01	SCCFH
		4544.4(6)	9.44 +0*	Ti VIII	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	0.17	
4589.2606(5)		4589.2606(14)	3.5 -1	S I	$3s^2\ 3p^4$	$^3P_1$ - $^1S_0$	0.010	E(78)
4621.57(10)		4621.570(5)	2.60 -3	C I	$2s^2\ 2p^2$	$^3P_1$ - $^1S_0$	0.011	P
4625.54(10)	Q	4625.34(14)	5.18 +0	Ar V	$3s^2\ 3p^2$	$^1D_2$ - $^1S_0$	0.075	B(55)
		4635.(15)	1.31 +2	K XVI	2s 2p	$^3P_1$ - $^3P_2$	0.97	
4635.6(3)		4639.(5)	7.19 +1	Ti XVI	$2s^2\ 2p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	1.04	H
		4669.25(6)	1.62 -1	P II	$3s^2\ 3p^2$	$^3P_1$ - $^1S_0$	0.019	
		4673.12(22)	4.19 +0	Sc VI	$3s^2\ 3p^4$	$^3P_2$ - $^1D_2$	0.11	
		4700.(3)	8.05 +0	Ti IX	$3s^2\ 3p^2$	$^3P_2$ - $^1D_2$	0.19	
4711.33(2)		4711.339(11)	2.07 -3*	Ar IV	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2D_{5/2}$	0.060	B(55)
4714.25(4)		4714.22(6)	6.19 -1*	Ne IV	$2s^2\ 2p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	0.097	B(55)
4724.15(4)		4724.17(6)	6.41 -1*	Ne IV	$2s^2\ 2p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	0.097	B(55)
4725.62(4)		4725.60(6)	5.92 -1*	Ne IV	$2s^2\ 2p^3$	$^2D_{3/2}$ - $^2P_{1/2}$	0.097	B(55)
		4730.(50)	8.91 +1	As XX	$3s^2\ 3p^2$	$^3P_1$ - $^3P_2$	0.81	
4740.20(2)		4740.199(11)	1.72 -2*	Ar IV	$3s^2\ 3p^3$	$^4S_{3/2}$ - $^2D_{3/2}$	0.060	B(55)
		4746.1(1.6)	2.60 +0	V VIII	$3s^2\ 3p^4$	$^3P_1$ - $^1D_2$	0.17	
T 4744.		4756.(10)	1.23 +2	Ni XVII	3s 3p	$^3P_1$ - $^3P_2$	0.57	P
		4789.45(12)	3.83 -2	F II	$2s^2\ 2p^4$	$^3P_2$ - $^1D_2$	0.035	
		4820.6(7)	8.96 +0*	Sc VII	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2P_{3/2}$	0.14	
		4844.(60)	1.51 +2	Br XXIV	3s 3p	$^3P_0$ - $^3P_1$	1.10	
		4856.061(13)	9.58 -7	Be I	2s 2p	$^3P_0$ - $^1P_1$	0.009	
		4856.212(10)	9.19 -3	Be I	2s 2p	$^3P_1$ - $^1P_1$	0.009	
		4856.766(13)	1.19 -6	Be I	2s 2p	$^3P_2$ - $^1P_1$	0.009	
		4868.99(17)	1.21 -2	F II	$2s^2\ 2p^4$	$^3P_1$ - $^1D_2$	0.035	
		4920.(60)	6.56 +1	As XIX	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2D_{5/2}$	0.76	
4939.48(20)		4939.6(7)	9.74 -1	Ca VII	$3s^2\ 3p^2$	$^3P_1$ - $^1D_2$	0.13	T
4958.93(2)		4958.910(7)	6.37 -3	O III	$2s^2\ 2p^2$	$^3P_1$ - $^1D_2$	0.055	B(55)
		4983.4(7)	4.91 +0*	Sc VII	$3s^2\ 3p^3$	$^2D_{5/2}$ - $^2P_{3/2}$	0.14	
5006.86(2)		5006.843(8)	4.67 -2	O III	$2s^2\ 2p^2$	$^3P_2$ - $^1D_2$	0.055	B(55)

Table 40. Wavelengths and transition probabilities ordered by wavelength - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
	5042.8(7)	5.15 +0*	Sc VII	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{1/2}$	0.14	
	5101.7(1.2)	1.54 +0	Ti VII	$3s^2\ 3p^4$	$^3P_1 - {}^1D_2$	0.14	
5115.8(4)	5115.81(10)	1.57 +2	Ni XIII	$3s^2\ 3p^4$	$^3P_2 - {}^3P_1$	0.38	J
	5121.7(1.9)	4.25 +0	Sc VIII	$3s^2\ 3p^2$	$^3P_2 - {}^1D_2$	0.16	
	5127.(40)	1.46 +2	V XX	2s 2p	$^3P_0 - {}^3P_1$	1.49	
5170.3(3)	5150.(50)	7.24 +1	Ge XIX	$3s^2\ 3p^2$	$^3P_1 - {}^3P_2$	0.73	DHSC
T 5188.5	5168.(13)	1.30 +2	Co XI	$3s^2\ 3p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.31	P
	5172.(8)	6.21 +1	V XVII	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2D_{5/2}$	1.17	
5191.82(10)	Q 5191.79(14)	2.59 +0	Ar III	$3s^2\ 3p^4$	$^1D_2 - {}^1S_0$	0.041	B(55)
5197.94(10)	5197.901(14)	1.62 -5*	N I	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{3/2}$	0.015	B(55)
5200.41(10)	5200.257(14)	6.92 -6*	N I	$2s^2\ 2p^3$	$^4S_{3/2} - {}^2D_{5/2}$	0.015	B(55)
	5224.(30)	4.83 +1	Zn XVI	$3s^2\ 3p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.55	
	5274.(4)	1.50 +2	K XII	$2s^2\ 2p^4$	$^3P_2 - {}^3P_1$	0.63	
5302.86(6)	5302.9(6)	6.02 +1	Fe XIV	$3s^2\ 3p$	$^2P_{1/2} - {}^2P_{3/2}$	0.39	E
5309.18(10)	5309.11(28)	1.95 +0	Ca V	$3s^2\ 3p^4$	$^3P_2 - {}^1D_2$	0.08	B(55)
5323.29(10)	Q 5323.3(3)	4.14 +0	Cl IV	$3s^2\ 3p^2$	$^1D_2 - {}^1S_0$	0.053	B(55)
	5332.416(11)	1.08 -1	P I	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{3/2}$	0.010	
	5339.621(11)	4.26 -2	P I	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2P_{1/2}$	0.010	
5375.8(3)	5393.(30)	1.07 +2	Cu XVI	$3s^2\ 3p^2$	$^3P_0 - {}^3P_1$	0.52	DHSC
	5397.(60)	1.10 +2	Se XXIII	3s 3p	$^3P_0 - {}^3P_1$	1.00	
5446.0	5443.9(8)	7.90 +1	Ca XV	$2s^2\ 2p^2$	$^3P_1 - {}^3P_2$	0.89	P
5460.7	5460.7(8)	4.31 +0*	Ca VI	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{3/2}$	0.11	T
5517.66(10)	5517.71(6)	8.07 -4*	Cl III	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{5/2}$	0.040	B(55)
5533.4(4)	5533.39(21)	1.06 +2	Ar X	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.479	J
5537.6(3)	5537.88(6)	3.44 -3*	Cl III	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{3/2}$	0.040	B(55)
	5539.6(4)	8.49 -1	Sc VI	$3s^2\ 3p^4$	$^3P_1 - {}^1D_2$	0.11	
5577.34(10)	Q 5577.338(4)	1.34 +0	O I	$2s^2\ 2p^4$	$^1D_2 - {}^1S_0$	0.014	P
5586.3	5586.3(9)	2.58 +0*	Ca VI	$3s^2\ 3p^3$	$^2D_{5/2} - {}^2P_{3/2}$	0.11	T
	5602.4(4)	4.13 -1	K VI	$3s^2\ 3p^2$	$^3P_1 - {}^1D_2$	0.10	
5618.58(20)	5618.8(9)	2.15 +0	Ca VII	$3s^2\ 3p^2$	$^3P_2 - {}^1D_2$	0.13	T
T 5645.0(3)[b]	5620.(80)	7.22 +1	Se XIX	$3s^2\ 3p^4$	$^3P_0 - {}^3P_1$	0.79	DHSC
	5631.7(9)	2.70 +0*	Ca VI	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{1/2}$	0.11	
	5650.(60)	5.74 +1	Ga XVIII	$3s^2\ 3p^2$	$^3P_1 - {}^3P_2$	0.66	
5693.6(4)	5693.5(6)	9.40 +1	Ca XV	$2s^2\ 2p^2$	$^3P_0 - {}^3P_1$	0.89	J
	5721.20(19)	3.05 -1*	F III	$2s^2\ 2p^3$	$^2D_{5/2} - {}^2P_{3/2}$	0.063	
T 5702.4(2)	5730.(60)	4.28 +1	Ge XVIII	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2D_{5/2}$	0.69	DHST
	5732.95(19)	2.08 -1*	F III	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{3/2}$	0.063	
	5733.21(19)	2.74 -1*	F III	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{1/2}$	0.063	
5744.	5746.(19)	7.01 +1	Co XVI	3s 3p	$^3P_1 - {}^3P_2$	0.51	P
	5746.(20)	4.73 +1	Cl XIII	$2s^2\ 2p$	$^2P_{1/2} - {}^2P_{3/2}$	0.657	
5754.57(4)	Q 5754.64(5)	1.08 +0	N II	$2s^2\ 2p^2$	$^1D_2 - {}^1S_0$	0.030	B(55)
T 5926.	5944.(25)	6.20 +1	Ar XV	2s 2p	$^3P_1 - {}^3P_2$	0.855	P

Table 40. Wavelengths and transition probabilities ordered by wavelength - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
	6055.(70)	7.84 +1	As XXII	$3s\ 3p$	$^3P_0 - {}^3P_1$	0.90	
6086.92(10)	6086.4(5)	4.35 -1	Ca V	$3s^2\ 3p^4$	$^3P_1 - {}^1D_2$	0.08	B(55)
	6092.(16)	8.71 +1	Ti XIX	$2s\ 2p$	$^3P_0 - {}^3P_1$	1.35	
6101.83(10)	6101.8(4)	8.38 -1	K IV	$3s^2\ 3p^4$	$^3P_2 - {}^1D_2$	0.06	B(55)
	Q 6161.835(21)	2.06 +0	Cl II	$3s^2\ 3p^4$	$^1D_2 - {}^1S_0$	0.024	
	6221.9(1.1)	1.97 +0*	K V	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{3/2}$	0.08	
	6228.6(5)	1.03 +0	K VI	$3s^2\ 3p^2$	$^3P_2 - {}^1D_2$	0.10	
	6266.(50)	4.40 +1	Zn XVII	$3s^2\ 3p^2$	$^3P_1 - {}^3P_2$	0.59	
6300.304(2)	6300.304(6)	5.11 -3	O I	$2s^2\ 2p^4$	$^3P_2 - {}^1D_2$	0.014	E(65)
6312.06(4)	Q 6312.1(4)	3.22 +0	S III	$3s^2\ 3p^2$	$^1D_2 - {}^1S_0$	0.035	B(55)
	6315.1(1.1)	1.34 +0*	K V	$3s^2\ 3p^3$	$^2D_{5/2} - {}^2P_{3/2}$	0.08	
	6319.(8)	8.42 +1	Co XII	$3s^2\ 3p^4$	$^3P_2 - {}^3P_1$	0.34	
	6349.2(1.1)	1.37 +0*	K V	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{1/2}$	0.08	
6363.776(2)	6363.776(6)	1.65 -3	O I	$2s^2\ 2p^4$	$^3P_1 - {}^1D_2$	0.014	E(65)
6374.6(4)	6374.53(4)	6.94 +1	Fe X	$3s^2\ 3p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.26	J
	6404.(9)	2.82 +1	Sc XV	$2s^2\ 2p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.93	
6435.10(10)	6435.1(1.0)	1.61 -1	Ar V	$3s^2\ 3p^2$	$^3P_1 - {}^1D_2$	0.075	B(55)
	6526.781(3)	3.55 -2	Si I	$3s^2\ 3p^2$	$^3P_1 - {}^1S_0$	0.008	
6536.3(4)	6536.3(4)	3.22 +1	Mn XIII	$3s^2\ 3p$	$^2P_{1/2} - {}^2P_{3/2}$	0.34	J
6548.06(4)	6548.03(5)	1.04 -3	N II	$2s^2\ 2p^2$	$^3P_1 - {}^1D_2$	0.030	B(55)
6583.39(7)	6583.41(5)	3.02 -3	N II	$2s^2\ 2p^2$	$^3P_2 - {}^1D_2$	0.030	B(55)
	6669.(11)	4.37 +1	K XIV	$2s^2\ 2p^2$	$^3P_1 - {}^3P_2$	0.79	
	6683.(40)	2.37 +1	Cu XV	$3s^2\ 3p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.48	
6701.7(4)	6701.68(22)	5.65 +1	Ni XV	$3s^2\ 3p^2$	$^3P_0 - {}^3P_1$	0.46	J
6716.47(2)	6716.467(23)	2.65 -4*	S II	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{5/2}$	0.023	TMR
6730.85(2)	6730.847(23)	5.37 -4*	S II	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{3/2}$	0.023	TMR
	6790.(80)	2.65 +1	Ga XVII	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2D_{5/2}$	0.62	
	6795.0(7)	2.03 -1	K IV	$3s^2\ 3p^4$	$^3P_1 - {}^1D_2$	0.06	
	6806.(10)	2.80 +1	Ti XVI	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2D_{5/2}$	1.04	
	6840.(60)	5.46 +1	Ge XXI	$3s\ 3p$	$^3P_0 - {}^3P_1$	0.80	
T 6917.	6931.(24)	6.63 +1	Ar XI	$2s^2\ 2p^4$	$^3P_2 - {}^3P_1$	0.539	P
7005.67(10)	7005.7(1.2)	4.70 -1	Ar V	$3s^2\ 3p^2$	$^3P_2 - {}^1D_2$	0.075	B(55)
	7030.(50)	3.25 +1	Cu XVI	$3s^2\ 3p^2$	$^3P_1 - {}^3P_2$	0.52	
	7045.(20)	4.03 +1	Fe XIX	$2s^2\ 2p^4$	$^3P_0 - {}^3P_1$	1.47	
7058.6(4)	7060.(10)	3.74 +1	Fe XV	$3s\ 3p$	$^3P_1 - {}^3P_2$	0.46	J
7135.80(4)	7135.78(10)	3.24 -1	Ar III	$3s^2\ 3p^4$	$^3P_2 - {}^1D_2$	0.041	B(55)
7170.62(10)	7170.47(16)	8.40 -1*	Ar IV	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{3/2}$	0.060	B(55)
7237.26(30)	7237.54(16)	7.08 -1*	Ar IV	$3s^2\ 3p^3$	$^2D_{5/2} - {}^2P_{3/2}$	0.060	B(55)
7262.76(30)	7262.7(3)	6.96 -1*	Ar IV	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{1/2}$	0.060	B(55)
	7319.(11)	5.01 +1	Sc XVIII	$2s\ 2p$	$^3P_0 - {}^3P_1$	1.21	
7319.92(10)	7319.92(20)	1.15 -1*	O II	$2s^2\ 2p^3$	$^2D_{5/2} - {}^2P_{3/2}$	0.035	B(55)
7330.19(10)	7329.63(20)	1.01 -1*	O II	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{1/2}$	0.035	B(55)

Table 40. Wavelengths and transition probabilities ordered by wavelength - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
	7330.70(20)	6.14 -2*	O II	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{3/2}$	0.035	
	7334.(11)	4.55 +1	Cl IX	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.400	
7530.54(10)	7529.9(4)	5.57 -2	Cl IV	$3s^2\ 3p^2$	$^3P_1 - {}^1D_2$	0.053	B(55)
	7554.(11)	4.06 +1	K XIV	$2s^2\ 2p^2$	$^3P_0 - {}^3P_1$	0.79	
	7573.179(8)	1.95 -4	Mg I	3s 3p	$^3P_0 - {}^1P_1$	0.008	
	7584.704(8)	1.46 -4	Mg I	3s 3p	$^3P_1 - {}^1P_1$	0.008	
	7608.206(8)	2.40 -4	Mg I	3s 3p	$^3P_2 - {}^1P_1$	0.008	
7611.0(4)	7611.2(6)	2.04 +1	S XII	$2s^2\ 2p$	$^2P_{1/2} - {}^2P_{3/2}$	0.565	J
7725.0461(7)	Q 7725.046(4)	1.53 +0	S I	$3s^2\ 3p^4$	$^1D_2 - {}^1S_0$	0.010	E(78)
7751.06(10)	7751.12(11)	8.44 -2	Ar III	$3s^2\ 3p^4$	$^3P_1 - {}^1D_2$	0.041	B(55)
	7756.(40)	2.80 +1	Cl XIV	2s 2p	$^3P_1 - {}^3P_2$	0.750	
	7800.(100)	3.70 +1	Ga XX	3s 3p	$^3P_0 - {}^3P_1$	0.70	
	Q 7875.99(17)	2.24 +0	P II	$3s^2\ 3p^2$	$^1D_2 - {}^1S_0$	0.019	
7891.8(4)	7891.8(6)	4.37 +1	Fe XI	$3s^2\ 3p^4$	$^3P_2 - {}^3P_1$	0.29	J
	7968.5(1.3)	3.55 +1	Mn IX	$3s^2\ 3p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.22	
	7990.(100)	2.63 +1	As XVIII	$3s^2\ 3p^4$	$^3P_0 - {}^3P_1$	0.71	
8024.1(4)	8024.1(5)	2.27 +1	Ni XV	$3s^2\ 3p^2$	$^3P_1 - {}^3P_2$	0.46	J
8045.63(10)	8046.1(5)	2.08 -1	Cl IV	$3s^2\ 3p^2$	$^3P_2 - {}^1D_2$	0.053	B(55)
8153.8(4)	8153.7(7)	1.66 +1	Cr XII	$3s^2\ 3p$	$^2P_{1/2} - {}^2P_{3/2}$	0.30	J
	8206.(100)	1.54 +1	Zn XVI	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2D_{5/2}$	0.55	
	8303.(40)	2.29 +1	Ar XIII	$2s^2\ 2p^2$	$^3P_1 - {}^3P_2$	0.686	
	8310.(34)	2.99 +1	Co XIV	$3s^2\ 3p^2$	$^3P_0 - {}^3P_1$	0.41	
	8433.65(12)	3.39 -1*	Cl III	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{3/2}$	0.040	
	8480.85(12)	3.87 -1*	Cl III	$3s^2\ 3p^3$	$^2D_{5/2} - {}^2P_{3/2}$	0.040	
	8500.00(13)	3.60 -1*	Cl III	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{1/2}$	0.040	
	8578.697(29)	1.07 -1	Cl II	$3s^2\ 3p^4$	$^3P_2 - {}^1D_2$	0.024	
	8690.(40)	1.11 +1	Ni XIV	$3s^2\ 3p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.43	
8727.18(10)	Q 8727.141(22)	5.01 -1	C I	$2s^2\ 2p^2$	$^1D_2 - {}^1S_0$	0.011	Sw
	8770.(110)	1.97 +1	Mn XIV	3s 3p	$^3P_1 - {}^3P_2$	0.40	
	8787.54(3)	1.96 -4*	P I	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{5/2}$	0.010	
	8799.61(3)	2.97 -4*	P I	$3s^2\ 3p^3$	$^4S_{3/2} - {}^2D_{3/2}$	0.010	
	8950.(22)	2.77 +1	Ca XVII	2s 2p	$^3P_0 - {}^3P_1$	1.16	
	8952.(150)	2.46 +1	Zn XIX	3s 3p	$^3P_0 - {}^3P_1$	0.70	
	9068.9(7)	1.62 -2	S III	$3s^2\ 3p^2$	$^3P_1 - {}^1D_2$	0.035	
	9122.(18)	1.01 +1	Ca XIV	$2s^2\ 2p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.82	
	9123.60(5)	2.98 -2	Cl II	$3s^2\ 3p^4$	$^3P_1 - {}^1D_2$	0.024	
	9223.(18)	2.83 +1	Cl X	$2s^2\ 2p^4$	$^3P_2 - {}^3P_1$	0.456	
	9291.(18)	1.13 +1	Sc XV	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2D_{5/2}$	0.93	
	9300.(60)	1.50 +1	Co XIV	$3s^2\ 3p^2$	$^3P_1 - {}^3P_2$	0.41	
	9531.0(7)	9.40 -2	S III	$3s^2\ 3p^2$	$^3P_2 - {}^1D_2$	0.035	
	9824.109(22)	7.79 -5	C I	$2s^2\ 2p^2$	$^3P_1 - {}^1D_2$	0.011	
9850.28(10)	9850.243(22)	2.30 -4	C I	$2s^2\ 2p^2$	$^3P_2 - {}^1D_2$	0.011	Sw

Table 40. Wavelengths and transition probabilities ordered by wavelength - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
T 9911.(1)	9911.8(1.0)	1.84 +1	S VIII	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.329	J
	9978.(4)	2.18 +1	Mn X	$3s^2\ 3p^4$	$^3P_2 - {}^3P_1$	0.25	
	10106.4(2.0)	1.74 +1	Cr VIII	$3s^2\ 3p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.18	
	10130.(100)	8.43 +0	Cu XV	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2D_{5/2}$	0.48	
	10159.(40)	1.68 +1	Ar XIII	$2s^2\ 2p^2$	$^3P_0 - {}^3P_1$	0.686	
	10264.(30)	1.20 +1	S XIII	2s 2p	$^3P_1 - {}^3P_2$	0.652	
	10286.66(22)	1.32 -1*	S II	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{3/2}$	0.023	
	10308.(3)	8.20 +0	P XI	$2s^2\ 2p$	$^2P_{1/2} - {}^2P_{3/2}$	0.479	
	10311.(5)	8.19 +0	V XI	$3s^2\ 3p$	$^2P_{1/2} - {}^2P_{3/2}$	0.26	
	10320.42(22)	2.22 -1*	S II	$3s^2\ 3p^3$	$^2D_{5/2} - {}^2P_{3/2}$	0.023	
	10336.33(22)	1.95 -1*	S II	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{1/2}$	0.023	
10397.74(10)	10397.74(5)	5.48 -2*	N I	$2s^2\ 2p^3$	$^2D_{5/2} - {}^2P_{3/2}$	0.015	P
	10407.17(5)	2.47 -2*	N I	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{3/2}$	0.015	
	10407.59(6)	4.71 -2*	N I	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2P_{1/2}$	0.015	
	10436.(120)	1.59 +1	Cu XVIII	3s 3p	$^3P_0 - {}^3P_1$	0.60	
	10672.(24)	1.09 +1	Cl XII	$2s^2\ 2p^2$	$^3P_1 - {}^3P_2$	0.592	
10746.8(4)	10746.9(5)	1.40 +1	Fe XIII	$3s^2\ 3p^2$	$^3P_0 - {}^3P_1$	0.36	J
10797.9(4)	10797.9(7)	9.87 +0	Fe XIII	$3s^2\ 3p^2$	$^3P_1 - {}^3P_2$	0.36	J
10821.177(5)	10821.176(6)	2.75 -2	S I	$3s^2\ 3p^4$	$^3P_2 - {}^1D_2$	0.010	E(78)
	10878.(120)	1.03 +1	Cr XIII	3s 3p	$^3P_1 - {}^3P_2$	0.35	
10991.42(10)	Q 10991.413(9)	7.96 -1	Si I	$3s^2\ 3p^2$	$^1D_2 - {}^1S_0$	0.008	P
	11110.(90)	1.45 +1	K XVI	2s 2p	$^3P_0 - {}^3P_1$	0.97	
	11305.854(9)	8.0 -3	S I	$3s^2\ 3p^4$	$^3P_1 - {}^1D_2$	0.010	
	11468.2(4)	3.62 -3	P II	$3s^2\ 3p^2$	$^3P_1 - {}^1D_2$	0.019	
	11478.(40)	4.98 +0	Co XIII	$3s^2\ 3p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.38	
	11882.8(4)	5.13 -2	P II	$3s^2\ 3p^2$	$^3P_2 - {}^1D_2$	0.019	
	12060.(200)	7.99 +0	Ge XVII	$3s^2\ 3p^4$	$^3P_0 - {}^3P_1$	0.64	
	12150.(60)	1.00 +1	Ni XVII	3s 3p	$^3P_0 - {}^3P_1$	0.57	
	12520.(20)	1.14 +1	S IX	$2s^2\ 2p^4$	$^3P_2 - {}^3P_1$	0.379	
	12783.(8)	1.04 +1	Cr IX	$3s^2\ 3p^4$	$^3P_2 - {}^3P_1$	0.21	
	12815.0(1.2)	4.27 +0	Ni XIV	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2D_{5/2}$	0.43	
	12817.(230)	6.03 +0	Mn XII	$3s^2\ 3p^2$	$^3P_1 - {}^3P_2$	0.31	
	13038.(3)	8.11 +0	V VII	$3s^2\ 3p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.15	
	13070.(40)	4.19 +0	Ca XIV	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2D_{5/2}$	0.82	
	13254.(7)	3.66 +0	Ti X	$3s^2\ 3p$	$^2P_{1/2} - {}^2P_{3/2}$	0.22	
	13450.(40)	3.25 +0	K XIII	$2s^2\ 2p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.71	
	13533.61(10)	7.45 -2*	P I	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{3/2}$	0.010	
	13562.27(10)	1.13 -1*	P I	$3s^2\ 3p^3$	$^2D_{5/2} - {}^2P_{3/2}$	0.010	
	13580.12(10)	1.01 -1*	P I	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2P_{1/2}$	0.010	
	13745.(6)	6.92 +0	P VII	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.264	
	13774.(40)	6.78 +0	Cl XII	$2s^2\ 2p^2$	$^3P_0 - {}^3P_1$	0.592	
	13885.(190)	6.52 +0	Mn XII	$3s^2\ 3p^2$	$^3P_0 - {}^3P_1$	0.31	

Table 40. Wavelengths and transition probabilities ordered by wavelength - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
	13904.(140)	7.34 +0	Ar XV	$2s\ 2p$	$^3P_0 - {}^3P_1$	0.855	
	13924.(50)	4.94 +0	S XI	$2s^2\ 2p^2$	$^3P_1 - {}^3P_2$	0.505	
	13951.(40)	4.75 +0	P XII	$2s\ 2p$	$^3P_1 - {}^3P_2$	0.561	
	13963.(280)	4.82 +0	V XII	$3s\ 3p$	$^3P_1 - {}^3P_2$	0.31	
	14200.(600)	5.15 +0	Mn XVIII	$2s^2\ 2p^4$	$^3P_0 - {}^3P_1$	1.32	
	14300.(120)	6.17 +0	Co XVI	$3s\ 3p$	$^3P_0 - {}^3P_1$	0.51	
14305.(4)	14301.(4)	3.07 +0	Si X	$2s^2\ 2p$	$^2P_{1/2} - {}^2P_{3/2}$	0.401	MNM
	15514.(17)	3.46 +0	Cr XI	$3s^2\ 3p^2$	$^3P_1 - {}^3P_2$	0.27	
	15606.(17)	2.04 +0	Fe XII	$3s^2\ 3p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.33	
	16068.297(18)	9.75 -4	Si I	$3s^2\ 3p^2$	$^3P_1 - {}^1D_2$	0.008	
	16454.531(19)	2.71 -3	Si I	$3s^2\ 3p^2$	$^3P_2 - {}^1D_2$	0.008	
	16550.(70)	2.04 +0	Co XIII	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2D_{5/2}$	0.38	
	16640.(14)	4.76 +0	V VIII	$3s^2\ 3p^4$	$^3P_2 - {}^3P_1$	0.17	
	17150.(30)	3.56 +0	Ti VI	$3s^2\ 3p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.12	
	17350.(80)	4.28 +0	P VIII	$2s^2\ 2p^4$	$^3P_2 - {}^3P_1$	0.310	
	17353.(12)	1.72 +0	Sc IX	$3s^2\ 3p$	$^2P_{1/2} - {}^2P_{3/2}$	0.18	
	17390.(60)	3.58 +0	Fe XV	$3s\ 3p$	$^3P_0 - {}^3P_1$	0.46	
	17700.(220)	3.52 +0	Cl XIV	$2s\ 2p$	$^3P_0 - {}^3P_1$	0.750	
	17710.(40)	2.43 +0	Ti XI	$3s\ 3p$	$^3P_1 - {}^3P_2$	0.27	
	18059.(16)	2.98 +0	Cr XI	$3s^2\ 3p^2$	$^3P_0 - {}^3P_1$	0.27	
	18680.(100)	2.05 +0	P X	$2s^2\ 2p^2$	$^3P_1 - {}^3P_2$	0.424	
	19080.(30)	1.88 +0	V X	$3s^2\ 3p^2$	$^3P_1 - {}^3P_2$	0.23	
	19200.(70)	2.51 +0	S XI	$2s^2\ 2p^2$	$^3P_0 - {}^3P_1$	0.505	
	19320.(50)	1.80 +0	Si XI	$2s\ 2p$	$^3P_1 - {}^3P_2$	0.476	
	19380.(80)	1.32 +0	K XIII	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2D_{5/2}$	0.71	
19590.(70)	19641.(11)	2.37 +0	Si VI	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.205	GJ
	2.00(7) μm	1.82 +0	Ga XVI	$3s^2\ 3p^4$	$^3P_0 - {}^3P_1$	0.58	
2.040(7)	2.044(4) μm	1.05 +0	Al IX	$2s^2\ 2p$	$^2P_{1/2} - {}^2P_{3/2}$	0.330	GJ
	2.066(24) μm	9.24 -1	Ar XII	$2s^2\ 2p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.618	
	2.09(6) μm	2.03 +0	Mn XIV	$3s\ 3p$	$^3P_0 - {}^3P_1$	0.40	
	2.170(3) μm	7.80 -1	Mn XI	$3s^2\ 3p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.29	
	2.2050(10) μm	2.06 +0	Ti VII	$3s^2\ 3p^4$	$^3P_2 - {}^3P_1$	0.14	
	2.217(3) μm	8.68 -1	Fe XII	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2D_{5/2}$	0.33	
	2.258(15) μm	4.46 +0	Ca XIII	$2s^2\ 2p^4$	$^3P_1 - {}^3P_0$	0.73	
	2.3112(4) μm	1.46 +0	Sc V	$3s^2\ 3p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.09	
2.32(2)	2.3205(11) μm	7.20 -1	Ca VIII	$3s^2\ 3p$	$^2P_{1/2} - {}^2P_{3/2}$	0.15	GJ
	2.321(4) μm	1.09 +0	Sc X	$3s\ 3p$	$^3P_1 - {}^3P_2$	0.23	
	2.336(15) μm	1.58 +0	S XIII	$2s\ 2p$	$^3P_0 - {}^3P_1$	0.652	
	2.351(12) μm	4.01 +0	K XII	$2s^2\ 2p^4$	$^3P_1 - {}^3P_0$	0.63	
	2.392(3) μm	1.29 +0	V X	$3s^2\ 3p^2$	$^3P_0 - {}^3P_1$	0.23	
	2.396(12) μm	3.66 +0	Sc XIV	$2s^2\ 2p^4$	$^3P_1 - {}^3P_0$	0.83	
	2.401(8) μm	9.55 -1	Ti IX	$3s^2\ 3p^2$	$^3P_1 - {}^3P_2$	0.19	

Table 40. Wavelengths and transition probabilities ordered by wavelength - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
2.474(7)	2.4807(18)μm	1.47 +0	Si VII	$2s^2\ 2p^4$	$^3P_2 - {}^3P_1$	0.247	GJ
	2.54(6) μm	1.13 +0	Cr XIII	3s 3p	$^3P_0 - {}^3P_1$	0.35	
	2.5839(5) μm	7.79 -1	Si IX	$2s^2\ 2p^2$	$^3P_1 - {}^3P_2$	0.351	
	2.60(5) μm	3.00 +0	Ar XI	$2s^2\ 2p^4$	$^3P_1 - {}^3P_0$	0.539	
	2.708(21) μm	8.99 -1	P X	$2s^2\ 2p^2$	$^3P_0 - {}^3P_1$	0.424	
	2.753(20) μm	6.16 -1	Al X	2s 2p	$^3P_1 - {}^3P_2$	0.399	
2.879(14)	2.9045(17)μm	7.34 -1	Al V	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.154	GJ
	2.97(6) μm	3.77 -1	Ar XII	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2D_{5/2}$	0.618	
	2.9877(9) μm	8.29 -1	Sc VI	$3s^2\ 3p^4$	$^3P_2 - {}^3P_1$	0.11	
	3.013(6) μm	3.54 -1	Mn XI	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2D_{5/2}$	0.29	
3.0275(20)	3.0275(20)μm	3.24 -1	Mg VIII	$2s^2\ 2p$	$^2P_{1/2} - {}^2P_{3/2}$	0.266	MNM
	3.051(20) μm	1.87 +0	Cl X	$2s^2\ 2p^4$	$^3P_1 - {}^3P_0$	0.456	
	3.088(13) μm	4.54 -1	Ca IX	3s 3p	$^3P_1 - {}^3P_2$	0.19	
	3.090(7) μm	4.51 -1	Sc VIII	$3s^2\ 3p^2$	$^3P_1 - {}^3P_2$	0.16	
	3.103(7) μm	2.74 -1	Cr X	$3s^2\ 3p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.24	
	3.112(22) μm	6.80 -1	P XII	2s 2p	$^3P_0 - {}^3P_1$	0.561	
	3.1899(10)μm	2.77 -1	K VII	$3s^2\ 3p$	$^2P_{1/2} - {}^2P_{3/2}$	0.12	
	3.205(10) μm	5.39 -1	Ti IX	$3s^2\ 3p^2$	$^3P_0 - {}^3P_1$	0.19	
3.18(3)	3.2061(10)μm	5.46 -1	Ca IV	$3s^2\ 3p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.07	GJ
	3.24(15) μm	5.67 -1	V XII	3s 3p	$^3P_0 - {}^3P_1$	0.31	
	3.263(23) μm	2.40 -1	Cl XI	$2s^2\ 2p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.529	
	3.270(22) μm	1.41 +0	Ti XV	$2s^2\ 2p^4$	$^3P_1 - {}^3P_0$	0.94	
3.661(14)	3.6593(19)μm	4.58 -1	Al VI	$2s^2\ 2p^4$	$^3P_2 - {}^3P_1$	0.154	GJ
3.72(2)	3.689(3) μm	2.68 -1	Al VIII	$2s^2\ 2p^2$	$^3P_1 - {}^3P_2$	0.285	GJ
	3.75(3) μm	1.01 +0	S IX	$2s^2\ 2p^4$	$^3P_1 - {}^3P_0$	0.379	
	3.896(21) μm	3.00 -1	Ti XI	3s 3p	$^3P_0 - {}^3P_1$	0.27	
3.92(2)	3.928(11) μm	2.95 -1	Si IX	$2s^2\ 2p^2$	$^3P_0 - {}^3P_1$	0.351	GJ
	4.0(2) μm	2.39 -1	Zn XV	$3s^2\ 3p^4$	$^3P_0 - {}^3P_1$	0.51	
	4.06(4) μm	1.91 -1	Mg IX	2s 2p	$^3P_1 - {}^3P_2$	0.328	
	4.086(5) μm	1.96 -1	Ca VII	$3s^2\ 3p^2$	$^3P_1 - {}^3P_2$	0.13	
	4.1574(17)μm	3.09 -1	Ca V	$3s^2\ 3p^4$	$^3P_2 - {}^3P_1$	0.08	
	4.213(13) μm	1.79 -1	K VIII	3s 3p	$^3P_1 - {}^3P_2$	0.15	
	4.260(13) μm	1.28 -1	Cr X	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2D_{5/2}$	0.24	
	4.27(3) μm	2.59 -1	Si XI	2s 2p	$^3P_0 - {}^3P_1$	0.476	
	4.3(4) μm	1.93 -1	Cr XVII	$2s^2\ 2p^4$	$^3P_0 - {}^3P_1$	1.19	
	4.400(10) μm	2.09 -1	Sc VIII	$3s^2\ 3p^2$	$^3P_0 - {}^3P_1$	0.16	
	4.487(4) μm	1.99 -1	Mg IV	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.109	
	4.527(5) μm	9.69 -2	Ar VI	$3s^2\ 3p$	$^2P_{1/2} - {}^2P_{3/2}$	0.091	
	4.552(15) μm	8.87 -2	V IX	$3s^2\ 3p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.21	
	4.6153(21)μm	1.83 -1	K III	$3s^2\ 3p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.05	
	4.675(22) μm	8.80 -2	Na VII	$2s^2\ 2p$	$^2P_{1/2} - {}^2P_{3/2}$	0.209	
	4.85(8) μm	4.70 -1	P VIII	$2s^2\ 2p^4$	$^3P_1 - {}^3P_0$	0.310	

Table 40. Wavelengths and transition probabilities ordered by wavelength - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
	4.91(5) μm	8.53 -2	Cl XI	$2s^2\ 2p^3$	$^2D_{3/2}$ - $^2D_{5/2}$	0.529	
	4.984(18) μm	1.40 -1	Sc X	3s 3p	$^3P_0$ - $^3P_1$	0.23	
	5.467(21) μm	5.22 -2	S X	$2s^2\ 2p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	0.447	
	5.50(3) μm	8.09 -2	Mg VII	$2s^2\ 2p^2$	$^3P_1$ - $^3P_2$	0.225	
	5.575(4) μm	7.74 -2	K VI	$3s^2\ 3p^2$	$^3P_1$ - $^3P_2$	0.10	
5.60(2)	5.608(9) μm	1.27 -1	Mg V	$2s^2\ 2p^4$	$^3P_2$ - $^3P_1$	0.141	RSW
	5.624(18) μm	2.90 -1	Mn X	$3s^2\ 3p^4$	$^3P_1$ - $^3P_0$	0.25	
	5.787(24) μm	2.73 -1	Cr IX	$3s^2\ 3p^4$	$^3P_1$ - $^3P_0$	0.21	
	5.85(10) μm	8.96 -2	Al VIII	$2s^2\ 2p^2$	$^3P_0$ - $^3P_1$	0.285	
	5.95(5) μm	6.41 -2	Ar VII	3s 3p	$^3P_1$ - $^3P_2$	0.124	
	5.983(4) μm	1.04 -1	K IV	$3s^2\ 3p^4$	$^3P_2$ - $^3P_1$	0.06	
	6.06(12) μm	9.19 -2	Al X	2s 2p	$^3P_0$ - $^3P_1$	0.399	
	6.082(19) μm	2.23 -1	Fe XI	$3s^2\ 3p^4$	$^3P_1$ - $^3P_0$	0.29	
	6.154(8) μm	7.67 -2	Ca VII	$3s^2\ 3p^2$	$^3P_0$ - $^3P_1$	0.13	
	6.207(27) μm	4.23 -2	V IX	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2D_{5/2}$	0.21	
	6.23(3) μm	5.27 -2	Na VIII	2s 2p	$^3P_1$ - $^3P_2$	0.264	
	6.362(29) μm	2.08 -1	V VIII	$3s^2\ 3p^4$	$^3P_1$ - $^3P_0$	0.17	
	6.515(18) μm	1.94 -1	Si VII	$2s^2\ 2p^4$	$^3P_1$ - $^3P_0$	0.247	
	6.67(6) μm	6.16 -2	Ca IX	3s 3p	$^3P_0$ - $^3P_1$	0.19	
	6.704(9) μm	2.98 -2	Cl V	$3s^2$ 3p	$^2P_{1/2}$ - $^2P_{3/2}$	0.068	
	6.923(14) μm	2.57 -2	Ti VIII	$3s^2\ 3p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	0.17	
6.985274(3)	6.985274(3)μm	5.28 -2	Ar II	$3s^2\ 3p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	0.028	YKH
	7.319(5) μm	4.59 -2	Na III	$2s^2\ 2p^5$	$^2P_{3/2}$ - $^2P_{1/2}$	0.072	
	7.386(15) μm	1.34 -1	Ti VII	$3s^2\ 3p^4$	$^3P_1$ - $^3P_0$	0.14	
	7.642(6) μm	2.01 -2	Ne VI	$2s^2$ 2p	$^2P_{1/2}$ - $^2P_{3/2}$	0.158	
	7.904(22) μm	2.72 -2	Ar V	$3s^2\ 3p^2$	$^3P_1$ - $^3P_2$	0.075	
	8.00(18) μm	9.59 -2	Co XII	$3s^2\ 3p^4$	$^3P_1$ - $^3P_0$	0.34	
	8.58(5) μm	2.10 -2	Cl VI	3s 3p	$^3P_1$ - $^3P_2$	0.097	
	8.61(9) μm	2.11 -2	Na VI	$2s^2\ 2p^2$	$^3P_1$ - $^3P_2$	0.172	
	8.676(11) μm	1.58 -2	S X	$2s^2\ 2p^3$	$^2D_{3/2}$ - $^2D_{5/2}$	0.447	
	8.823(8) μm	2.61 -2	K VI	$3s^2\ 3p^2$	$^3P_0$ - $^3P_1$	0.10	
	8.87(17) μm	2.94 -2	Mg IX	2s 2p	$^3P_0$ - $^3P_1$	0.328	
	8.99(6) μm	2.52 -2	K VIII	3s 3p	$^3P_0$ - $^3P_1$	0.15	
8.9910(1)	8.9907(12)μm	3.06 -2	Ar III	$3s^2\ 3p^4$	$^3P_2$ - $^3P_1$	0.041	L
	9.001(11) μm	7.49 -2	Sc VI	$3s^2\ 3p^4$	$^3P_1$ - $^3P_0$	0.11	
	9.03(9) μm	2.44 -2	Mg VII	$2s^2\ 2p^2$	$^3P_0$ - $^3P_1$	0.225	
	9.039(12) μm	3.04 -2	Na IV	$2s^2\ 2p^4$	$^3P_2$ - $^3P_1$	0.099	
	9.116(6) μm	7.10 -2	Al VI	$2s^2\ 2p^4$	$^3P_1$ - $^3P_0$	0.154	
	9.382(25) μm	1.24 -2	Ti VIII	$3s^2\ 3p^3$	$^2D_{3/2}$ - $^2D_{5/2}$	0.17	
	9.62(26) μm	9.74 -3	P IX	$2s^2\ 2p^3$	$^2P_{1/2}$ - $^2P_{3/2}$	0.372	
	9.78(26) μm	5.10 -2	V XVI	$2s^2\ 2p^4$	$^3P_1$ - $^3P_0$	1.06	
	10.06(7) μm	1.25 -2	Ne VII	2s 2p	$^3P_1$ - $^3P_2$	0.207	

Table 40. Wavelengths and transition probabilities ordered by wavelength - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
10.5105(1)	10.5141(22)μm	7.73 -3	S IV	$3s^2\ 3p$	$^2P_{1/2} - {}^2P_{3/2}$	0.047	L
	10.94(3) μm	6.61 -3	Sc VII	$3s^2\ 3p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.14	
11.333347(15)	11.333347(15)μm	1.24 -2	Cl I	$3s^2\ 3p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.013	DJM
	11.482(19) μm	3.62 -2	Ca V	$3s^2\ 3p^4$	$^3P_1 - {}^3P_0$	0.08	
	11.741(7) μm	8.32 -3	Cl IV	$3s^2\ 3p^2$	$^3P_1 - {}^3P_2$	0.053	
	12.42(22) μm	9.36 -3	Ar VII	3s 3p	$^3P_0 - {}^3P_1$	0.124	
12.81355(2)	12.8134(4) μm	8.55 -3	Ne II	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.041	YKH
	13.07(7) μm	8.03 -3	Ar V	$3s^2\ 3p^2$	$^3P_0 - {}^3P_1$	0.075	
	13.12(26) μm	5.49 -3	S V	3s 3p	$^3P_1 - {}^3P_2$	0.073	
	13.432(9) μm	3.71 -3	F V	$2s^2\ 2p$	$^2P_{1/2} - {}^2P_{3/2}$	0.114	
	13.54(5) μm	2.17 -2	Mg V	$2s^2\ 2p^4$	$^3P_1 - {}^3P_0$	0.141	
	13.66(13) μm	8.27 -3	Na VIII	2s 2p	$^3P_0 - {}^3P_1$	0.264	
	13.9(4) μm	5.80 -3	Cu XIV	$3s^2\ 3p^4$	$^3P_0 - {}^3P_1$	0.44	
	14.3(3) μm	6.14 -3	Na VI	$2s^2\ 2p^2$	$^3P_0 - {}^3P_1$	0.172	
	14.32(3) μm	4.59 -3	Ne V	$2s^2\ 2p^2$	$^3P_1 - {}^3P_2$	0.126	
	14.3678(8) μm	7.50 -3	Cl II	$3s^2\ 3p^4$	$^3P_2 - {}^3P_1$	0.024	
	14.76(6) μm	2.99 -3	Sc VII	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2D_{5/2}$	0.14	
	15.39(3) μm	1.51 -2	K IV	$3s^2\ 3p^4$	$^3P_1 - {}^3P_0$	0.06	
	15.555(5) μm	5.87 -3	Ne III	$2s^2\ 2p^4$	$^3P_2 - {}^3P_1$	0.064	
	16.34(11) μm	2.39 -3	P IX	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2D_{5/2}$	0.372	
	17.36(21) μm	2.39 -3	F VI	2s 2p	$^3P_1 - {}^3P_2$	0.157	
	17.885(5) μm	1.57 -3	P III	$3s^2\ 3p$	$^2P_{1/2} - {}^2P_{3/2}$	0.030	
	17.99(9) μm	1.50 -3	Ca VI	$3s^2\ 3p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.11	
	18.08(23) μm	3.16 -3	Cl VI	3s 3p	$^3P_0 - {}^3P_1$	0.097	
	18.45(24) μm	1.40 -3	Si VIII	$2s^2\ 2p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.304	
18.7129(4)	18.7129(5) μm	2.06 -3	S III	$3s^2\ 3p^2$	$^3P_1 - {}^3P_2$	0.035	BBAMC
	19.3(4) μm	5.90 -3	Ni XIII	$3s^2\ 3p^4$	$^3P_1 - {}^3P_0$	0.38	
	20.354(21) μm	2.13 -3	Cl IV	$3s^2\ 3p^2$	$^3P_0 - {}^3P_1$	0.053	
	21.29(6) μm	5.58 -3	Na IV	$2s^2\ 2p^4$	$^3P_1 - {}^3P_0$	0.099	
	21.336(6) μm	1.38 -3	P IV	3s 3p	$^3P_1 - {}^3P_2$	0.051	
	21.842(6) μm	5.31 -3	Ar III	$3s^2\ 3p^4$	$^3P_1 - {}^3P_0$	0.041	
	22.0(3) μm	1.99 -3	Ne VII	2s 2p	$^3P_0 - {}^3P_1$	0.207	FMH
24.28(2)	24.21(19) μm	1.27 -3	Ne V	$2s^2\ 2p^2$	$^3P_0 - {}^3P_1$	0.126	
	24.30(17) μm	7.34 -4	Ca VI	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2D_{5/2}$	0.11	
24.7475(15)	24.740(12) μm	1.19 -3	F I	$2s^2\ 2p^5$	$^2P_{3/2} - {}^2P_{1/2}$	0.017	SK
	25.2490(3) μm	1.40 -3	S I	$3s^2\ 3p^4$	$^3P_2 - {}^3P_1$	0.010	
	25.83(4) μm	7.82 -4	F IV	$2s^2\ 2p^2$	$^3P_1 - {}^3P_2$	0.087	
25.87(2)	25.913(13) μm	5.17 -4	O IV	$2s^2\ 2p$	$^2P_{1/2} - {}^2P_{3/2}$	0.077	FMH
	27.1(1.1) μm	9.16 -4	S V	3s 3p	$^3P_0 - {}^3P_1$	0.073	
	29.33(4) μm	8.91 -4	F II	$2s^2\ 2p^4$	$^3P_2 - {}^3P_1$	0.035	
	31.1(3) μm	2.94 -4	K V	$3s^2\ 3p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.08	
	32.61(8) μm	3.55 -4	O V	2s 2p	$^3P_1 - {}^3P_2$	0.114	

Table 40. Wavelengths and transition probabilities ordered by wavelength - Continued

Wavelength Observed	Wavelength Calculated	A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
	32.87(3) μm	3.80 -4	P II	$3s^2\ 3p^2$	$^3P_1 - {}^3P_2$	0.019	
	33.281(8) μm	1.50 -3	Cl II	$3s^2\ 3p^4$	$^3P_1 - {}^3P_0$	0.024	
33.47(2)	33.47(2) μm	4.78 -4	S III	$3s^2\ 3p^2$	$^3P_0 - {}^3P_1$	0.035	HBGSH
	34.8141(18) μm	2.13 -4	Si II	$3s^2\ 3p$	$^2P_{1/2} - {}^2P_{3/2}$	0.016	
36.02(1)	36.02(4) μm	1.15 -3	Ne III	$2s^2\ 2p^4$	$^3P_1 - {}^3P_0$	0.064	SHG
	37.6(6) μm	1.67 -4	Al VII	$2s^2\ 2p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.241	
	38.207(21) μm	2.41 -4	Si III	3s 3p	$^3P_1 - {}^3P_2$	0.033	
	38.5(1.0) μm	3.87 -4	F VI	2s 2p	$^3P_0 - {}^3P_1$	0.157	
	39.62(11) μm	1.70 -4	Si VIII	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2D_{5/2}$	0.304	
	42.2(5) μm	1.41 -4	K V	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2D_{5/2}$	0.08	
	43.77(3) μm	2.18 -4	P IV	3s 3p	$^3P_0 - {}^3P_1$	0.051	
	44.07(21) μm	2.10 -4	F IV	$2s^2\ 2p^2$	$^3P_0 - {}^3P_1$	0.087	
51.8145(5)	51.815(1) μm	9.69 -5	O III	$2s^2\ 2p^2$	$^3P_1 - {}^3P_2$	0.055	MSFJK
	56.311(5) μm	3.02 -4	S I	$3s^2\ 3p^4$	$^3P_1 - {}^3P_0$	0.010	
	56.47(21) μm	4.94 -5	Ar IV	$3s^2\ 3p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.060	
57.330(3)	57.343(3) μm	4.77 -5	N III	$2s^2\ 2p$	$^2P_{1/2} - {}^2P_{3/2}$	0.047	MSFJK
	60.64(7) μm	8.05 -5	P II	$3s^2\ 3p^2$	$^3P_0 - {}^3P_1$	0.019	
63.18371(3)	63.185(6) μm	8.91 -5	O I	$2s^2\ 2p^4$	$^3P_2 - {}^3P_1$	0.014	E-pr
	67.2(3) μm	1.78 -4	F II	$2s^2\ 2p^4$	$^3P_1 - {}^3P_0$	0.035	
	68.473(3) μm	4.20 -5	Si I	$3s^2\ 3p^2$	$^3P_1 - {}^3P_2$	0.008	
	69.44(7) μm	3.63 -5	N IV	2s 2p	$^3P_1 - {}^3P_2$	0.077	
	73.5(4) μm	5.81 -5	O V	2s 2p	$^3P_0 - {}^3P_1$	0.114	
	77.41(4) μm	2.30 -5	Ar IV	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2D_{5/2}$	0.060	
	77.77(9) μm	3.86 -5	Si III	3s 3p	$^3P_0 - {}^3P_1$	0.033	
	80.72(5) μm	2.54 -5	Al II	3s 3p	$^3P_1 - {}^3P_2$	0.019	
88.356(2)	88.3564(22) μm	2.61 -5	O III	$2s^2\ 2p^2$	$^3P_0 - {}^3P_1$	0.055	MSFJK
	89.237(8) μm	1.25 -5	Al I	$3s^2\ 3p$	$^2P_{1/2} - {}^2P_{3/2}$	0.006	
	92.3(1.2) μm	1.13 -5	Mg VI	$2s^2\ 2p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.187	
	108.07(21) μm	7.08 -6	Cl III	$3s^2\ 3p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.040	
121.88887(12)	121.88887(21) μm	7.47 -6	N II	$2s^2\ 2p^2$	$^3P_1 - {}^3P_2$	0.030	CS
129.68173(4)	129.676(16) μm	8.25 -6	Si I	$3s^2\ 3p^2$	$^3P_0 - {}^3P_1$	0.008	IEBL
145.52548(8)	145.53(13) μm	1.75 -5	O I	$2s^2\ 2p^4$	$^3P_1 - {}^3P_0$	0.014	DHLS
	151.6(4) μm	3.08 -6	Cl III	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2D_{5/2}$	0.040	
157.74084(21)	157.74084(21) μm	2.29 -6	C II	$2s^2\ 2p$	$^2P_{1/2} - {}^2P_{3/2}$	0.024	CBS
	158.5(4) μm	6.00 -6	N IV	2s 2p	$^3P_0 - {}^3P_1$	0.077	
	164.26(20) μm	4.10 -6	Al II	3s 3p	$^3P_0 - {}^3P_1$	0.019	
	177.4(9) μm	2.10 -6	C III	2s 2p	$^3P_1 - {}^3P_2$	0.048	
	179.(11) μm	1.86 -6	Al VII	$2s^2\ 2p^3$	$^2D_{3/2} - {}^2D_{5/2}$	0.241	
	205.5(4) μm	2.07 -6	N II	$2s^2\ 2p^2$	$^3P_0 - {}^3P_1$	0.030	
	214.1(1.3) μm	9.13 -7	S II	$3s^2\ 3p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.023	
	223.7(1.4) μm	1.44 -6	Ne IV	$2s^2\ 2p^3$	$^2D_{5/2} - {}^2D_{3/2}$	0.097	
245.6157(7)	245.62(9) μm	9.00 -7	Mg I	3s 3p	$^3P_1 - {}^3P_2$	0.008	ILME

Table 40. Wavelengths and transition probabilities ordered by wavelength - Continued

Wavelength Observed	Wavelength Calculated		A (s^{-1})	Spectrum	Config.	Classification	I.E. (keV)	Ref. (Obs. λ)
	270.(100)	μm	4.55 -7	Na V	$2s^2\ 2p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.138	
	278.(110)	μm	7.50 -7	Na V	$2s^2\ 2p^3$	$^2D_{5/2} - {}^2D_{3/2}$	0.138	
	279.(6)	μm	7.45 -7	F III	$2s^2\ 2p^3$	$^2D_{5/2} - {}^2D_{3/2}$	0.063	
	314.5(7)	μm	3.46 -7	S II	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2D_{5/2}$	0.023	
370.4140(15)	370.37(19)	μm	2.65 -7	C I	$2s^2\ 2p^2$	$^3P_1 - {}^3P_2$	0.011	SE(80)
	395.3(9)	μm	1.45 -7	P I	$3s^2\ 3p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.010	
	422.(4)	μm	3.00 -7	C III	2s 2p	$^3P_0 - {}^3P_1$	0.048	
	497.3(1.7)	μm	1.25 -7	O II	$2s^2\ 2p^3$	$^2D_{5/2} - {}^2D_{3/2}$	0.035	
498.592792(3)	498.5(4)	μm	1.00 -7	Mg I	3s 3p	$^3P_0 - {}^3P_1$	0.008	BDGRG
	595.(190)	μm	7.63 -8	Mg VI	$2s^2\ 2p^3$	$^2D_{5/2} - {}^2D_{3/2}$	0.187	
609.1333(8)	609.4(4)	μm	7.95 -8	C I	$2s^2\ 2p^2$	$^3P_0 - {}^3P_1$	0.011	SE(80)
	625.(17)	μm	5.52 -8	B II	2s 2p	$^3P_1 - {}^3P_2$	0.048	
	640.6(2.3)	μm	4.10 -8	P I	$3s^2\ 3p^3$	$^2D_{3/2} - {}^2D_{5/2}$	0.010	
	655.6(7)	μm	3.19 -8	B I	$2s^2$ 2p	$^2P_{1/2} - {}^2P_{3/2}$	0.008	
	1.148(9)	mm	1.07 -8	N I	$2s^2\ 2p^3$	$^2D_{5/2} - {}^2D_{3/2}$	0.015	
	1.56(7)	mm	2.36 -9	Ne IV	$2s^2\ 2p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.097	
	1.79(14)	mm	3.14 -9	B II	2s 2p	$^3P_0 - {}^3P_1$	0.048	
	4.25(8)	mm	1.76 -10	Be I	2s 2p	$^3P_1 - {}^3P_2$	0.009	
	5.00(6)	mm	4.39 -12	O II	$2s^2\ 2p^3$	$^2P_{3/2} - {}^2P_{1/2}$	0.035	
	12.(7)	mm	5.20 -12	F III	$2s^2\ 2p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.063	
	15.6(1.0)	mm	4.74 -12	Be I	2s 2p	$^3P_0 - {}^3P_1$	0.009	
	25.9(8)	mm	5.17 -13	N I	$2s^2\ 2p^3$	$^2P_{1/2} - {}^2P_{3/2}$	0.015	

[a]This is a wavelength in vacuum.

[b]Alternate wavelengths for these transitions were given by reference BGBR. They are 4424.1(2) and 5593.9(6) Å for Se XXI and Se XIX, respectively.