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T. Shirai, J. Reader, A. E. Kramida, and J. Sugar

Spectral Data for Gallium: Ga I through Ga XXXI

T. Shirai[a)]
Naka Fusion Research Establishment, Japan Atomic Energy Research Institute, 801-01 Mukoyama, Naka-machi, Naka-gun, Ibaraki-ken, 311-0193 Japan

J. Reader, A. E. Kramida,[b)] **and J. Sugar**
National Institute of Standards and Technology, Gaithersburg, Maryland 20899-8422

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The energy levels and spectral lines of gallium atom in all stages of ionization have been compiled. Experimental data on spectral lines and energy levels exist for spectra Ga I through Ga VII, Ga XIII through Ga XXVI, and Ga XXX. For Li-like Ga XXIX through H-like Ga XXXI, theoretical data on energy levels and line wavelengths are compiled. For Ga I, Ga II, and Ga III we include radiative probabilities of electric-dipole transitions where available. For Ga XV through Ga XX, Ga XXIII through Ga XXVI, and Ga XXX, radiative probabilities of magnetic-dipole and electric-quadrupole transitions are included. The ground state configuration and term and a value of ionization energy are included for each ion. © *2007 by the U.S. Secretary of Commerce on behalf of the United States. All rights reserved.* [DOI: 10.1063/1.2207144]

Key words: compilation; critically evaluated data; energy levels; observed spectral lines; emission spectra; Ga; gallium ions; ground states; ionization potentials; multiply charged ions; transition probabilities.

CONTENTS

[a)]Deceased.
[b)]Author to whom correspondence should be addressed; electronic mail: Alexander.Kramida@nist.gov

List of Tables

1. Introduction

The present compilation presents the first critically evaluated data set on observed spectral lines and energy levels of gallium in all stages of ionization, Ga I through Ga XXXI. The compiled experimental data were obtained by analyzing emission of arcs, vacuum sparks, hollow cathode discharges, laser-produced plasmas, and tokamaks as light sources. For neutral and singly ionized gallium, photoabsorption spectra were studied using synchrotron radiation and laser-produced plasmas. Data on highly excited Rydberg levels of Ga I were obtained using laser spectroscopic techniques. As a result of all these studies, there are at least some experimental data available for 23 stages of ionization of gallium. For Li-, He-, and H-like gallium spectra, which are important for high-temperature plasma diagnostics and for fundamental research, there exist accurate semiempirical or theoretical data.

The present compilation accounts for published work through December 2004. References to the data sources are given at the end of the article on each spectrum in Sec. 2.

The entire set of references, in chronological order, is given at the end of this article. References which appear with each section are denoted with the same superscript number as given in Sec. 5. Thus, for each section, the references will not be sequential. The complete list of references is given in Sec. 5. (Editor's comment)

Generally, only experimentally derived energy levels are used. These include semiempirical results obtained using interpolations and extrapolations along isoelectronic sequences. An exception is made for Li-like Ga XXIX, He-like Ga XXX, and H-like Ga XXXI where good theoretical results exist. The use of calculated values is indicated by enclosing the energy value in square brackets for these ions and for very few levels in other ionization stages.

For all given numerical data, except the relative observed line intensities, we include only those results that we evaluated as the best available ones. We do not do any averaging of the original data, whether it is experimental or theoretical.

The observed line intensities provide a qualitatively consistent comparison of line intensities within each spectrum. The values of intensities are in most cases visual estimates of observed line strengths. They do not take into account different excitation conditions in the light sources and variations of the detector sensitivities.

For the ionization potentials (IPs) of Ga V through Ga XIII, where there are no experimental or semiempirical data available, we calculated the IPs by an analysis of quantum defects (as in the case of Ga V) or by means of Cowan's codes[33] implementing the Hartree-Fock approximation with relativistic corrections.

All energy levels in the tables are given in units of cm^{-1}, and all wavelengths in Å (0.1 nm). The customary unit cm^{-1} for ionization energies, used here, is related to the SI unit for energy (joule) by $1\ cm^{-1} = 1.986\,445\,61(34) \times 10^{-23}$ J (Mohr and Taylor[81]). Ionization energies are provided in both cm^{-1} and eV. We use the conversion factor $8065.544\,45 \pm 0.000\,69\ cm^{-1}/eV$, as recommended by 2002 CODATA. The wavelengths for lines having wave numbers greater than $50\,000\ cm^{-1}$ are given in vacuum, and those with wave numbers lower than $50\,000\ cm^{-1}$ are given in air. Conversion from air to vacuum was done by using the five-parameter formula of Peck and Reeder.[15]

Although it is often difficult to determine, the uncertainties in the given values of energy levels and wavelengths are likely to be 1σ values. In all cases the primary experimental quantities were the observed wavelengths or wave numbers; thus the uncertainties of the energy levels are directly related to the observed wavelength uncertainties.

1.1. Acknowledgments

The authors are grateful to Dr. L. I. Podobedova for additional work she made especially for this compilation on the analysis of the Ga VI spectrum. They are also thankful to Dr. A. N. Ryabtsev for helpful communication regarding misprints in the published data on Ga III, Ga IV, and Ga V, and to Professor K. T. Cheng for additional calculations on the Ga XXX spectrum. They wish to thank Dr. Yu. Ralchenko, Dr. E. B. Saloman, and Dr. W. C. Martin for helpful discussions. Assistance of Dr. Suzuki with transferring the data preliminarily assembled by Dr. T. Shirai to NIST is greatly acknowledged. This work was supported in part by the Office of Fusion Energy Sciences of the U. S. Department of Energy.

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2. Brief Comments for Each Gallium Ion

2.1. Ga I

Ground state $1s^22s^22p^63s^23p^63d^{10}4s^24p\ ^2P^\circ_{1/2}$
Ionization energy $48\,387.634 \pm 0.010\ cm^{-1}$ ($5.999\,301\,6 \pm 0.000\,001\,2$ eV)

The $4s^2nl$ levels for Ga I given in *Atomic Energy Levels* (AEL)[13] were derived from the line list of Meggers and Murphy,[7] which included their own measurements as well as those of previous observers. Two terms lying above the first ionization limit, $4s4p^2\ ^2S$ and ^2P, were taken from absorption observations of Garton.[6] Since then, measurements in the range 2874–22 568 Å were reported by Johansson and Litzén.[9] Their results form the basis for the $4s^2nl$ levels in the present compilation. By using laser spectroscopic techniques Neijzen and Dönszelmann[35] measured the wavelength of the $4p\ ^2P^\circ_{1/2}-5s\ ^2S_{1/2}$ resonance transition as 4032.984 ± 0.001 Å; we adopt this wavelength for the present compilation. These authors[35] also used stepwise excitation with two pulsed dye lasers to measure wavelengths of the $5s\ ^2S_{1/2}-np\ ^2P^\circ_{1/2,3/2}$ transitions in the region between $n=20$ and $n=56$ with an uncertainty of ±0.002 Å. Neijzen and Dönszelmann[36] also measured the parity-forbidden transitions $5s\ ^2S_{1/2}-nd\ ^2D_{3/2,5/2}$ from $n=19-34$. Besides that, they predicted the autoionizing $4s4p^2\ ^2D_{1/2,3/2}$ levels and ascribed a broad but weak absorption line of Kozlov and Startsev[11] with a maximum at 1860 Å to the $4s^24p\ ^2P^\circ-4s4p^2\ ^2D$ transitions.

In a similar experiment with two-step excitation, Tursunov and Eshkobilov[48] extended measurements for the $4s^2np\ ^2P^\circ_{1/2,3/2}$ levels to $n=41-70$. They estimated their wavelength uncertainty as ±0.088 Å. The center-of-gravity of the $4s^2np\ ^2P^\circ_{1/2,3/2}$ levels determined by their measurements was estimated to be accurate to $\pm 0.4\ cm^{-1}$. We give their values for these levels, except for those in the range of $n=54-56$, which are taken from Neijzen and Dönszelmann.[36] Following the early absorption observations of Garton,[6] 61 absorption lines in the range 2073–2215 Å for the Rydberg series $4p-ns$ ($n=10-28$) and $4p-nd$ ($n=8-27$) were observed by Penkin and Shabanova[8] with an estimated uncertainty of ±0.03 Å.

The five intercombination lines of the $4s^24p\ ^2P^\circ-4s4p^2\ ^4P$ transition array in the region 2607–2691 Å, first identified by Sawyer and Lang,[5] were re-measured by Karlsson and Litzén[80] using Fourier transform spectroscopy. Their center-of-gravity wave numbers were determined by fitting complex hyperfine and isotope structures with uncertainties of a few $10^{-3}\ cm^{-1}$, which corresponds to the wavelength uncertainty of a few tenths of mÅ. The widths of the hyperfine structures of these lines are as high as 0.03 Å, and the shifts between the lines of the ^{69}Ga and ^{71}Ga isotopes are about 0.002 Å.[80]

From the measurements of Karlsson and Litzén,[80] the ground term splitting is determined to be $826.190 \pm 0.002\ cm^{-1}$. The values of the $4s4p^2\ ^4P_{1/2,3/2,5/2}$ levels are also taken from their paper.[80]

The absorption spectrum due to the excitation of a $3d$ electron was observed by Connerade[20] using synchrotron radiation. He classified 19 lines of the $3d^{10}4s^24p$–$3d^94s^24p^2$ transitions in the range of 571–660 Å. The uncertainty of the wavelengths was estimated to be ±0.2 Å. However, the splitting between the levels of the lower $4s^24p\ ^2\mathrm{P}^\circ_{1/2,3/2}$ term, as determined from the lines listed in Connerade,[20] deviates from 826.19 cm^{-1} by ±220 cm^{-1} on average. The corresponding deviation of the wavelength differences is approximately ±0.9 Å. This indicates that the measurement uncertainty was greatly underestimated in Connerade.[20] We determined the levels of the $3d^94s^24p^2$ configuration as arithmetic means of the level values derived from the respective observed wavelengths of transitions to the two $3d^{10}4s^24p\ ^2\mathrm{P}^\circ_{1/2,3/2}$ levels.

Photoabsorption spectra from the ground state to the excited states $4s4p(^3\mathrm{P}^\circ_0)np$, n=5–12 and 15–17, $4s4p(^3\mathrm{P}^\circ_1)np$, n=5–16, and $4s4p(^3\mathrm{P}^\circ_2)np$, n=5–11 were observed by Baig *et al.*[67] with an estimated wavelength uncertainty of ±0.03 Å using synchrotron radiation. They also tentatively identified the Rydberg series $4s^24p\ ^2\mathrm{P}^\circ_{1/2,3/2}$ $-4s4p(^1\mathrm{P}^\circ_1)np$ with n=5–13. However, the splitting between the levels of the lower $^2\mathrm{P}^\circ_{1/2,3/2}$ term determined from the lines assigned to this series is about 140 cm^{-1} smaller than 826.19 cm^{-1} for n=6. The corresponding deviations are 30 and 40 cm^{-1} for the n=7 and 10 levels, respectively, and they seem to be larger than the experimental uncertainty. Moreover, the upper energies given in Table 4 of Baig *et al.*[67] are not assigned to specific levels. Only groups of possible level designations are indicated. Therefore, we omitted this series, except for the n=5 level which is unambiguously specified as $4s4p(^1\mathrm{P}^\circ_1)5p\ ^2[1]_{3/2,5/2}$ in Table 5 of Baig *et al.*[67] We determined the unresolved $4s4p(^1\mathrm{P}^\circ_1)5p\ ^2[1]_{1/2,3/2}$ levels as an arithmetic mean of the level values derived from the respective observed wavelengths for these two transitions.

Landé g-factors for the two levels of the $4s^24p\ ^2\mathrm{P}^\circ$ ground term were measured in a high-precision atomic beam experiment by Fowler.[12]

In Table 1 we list all experimentally known energy levels of Ga I. Following Baig *et al.*,[67] we give the pair-coupling designations for the autoionizing $4s4pnp$ ($n \geqslant 5$) levels. All other levels are designated in the LS coupling scheme.

In Table 2, along with the complete compiled set of observed lines of Ga I, we list transition probabilities for the $4p\ ^2\mathrm{P}^\circ$–$ns\ ^2\mathrm{S}$ (n=5–10) and $4p\ ^2\mathrm{P}^\circ$–$nd\ ^2\mathrm{D}$ (n=4–6 and 8) doublets, as recently compiled by Morton.[82] The transition probability of the $4p\ ^2\mathrm{P}^\circ_{3/2}$–$7d\ ^2\mathrm{D}_{5/2}$ line is cited from Wiese and Martin.[32] All given values of transition probabilities are expected to be accurate within ±25%. For the $5s\ ^2\mathrm{S}_{1/2}$ $-nd\ ^2\mathrm{D}_{3/2,5/2}$ electric-quadrupole transitions with n=19–34, we list wavelengths calculated from the level values determined by Neijzen and Dönszelmann.[36]

The ionization energy is from Neijzen and Dönszelmann.[35]

2.1.1. References for Ga I

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2.2. Ga II

Zn isoelectronic sequence

Ground state $1s^22s^22p^63s^23p^63d^{10}4s^2\,^1\mathrm{S}_0$

Ionization energy 165 465.8±1.0 cm^{-1} (20.515 15±0.000 12 eV)

Lang[1] classified 16 lines comprising the $4s4p$–$4p^2$, $4s4p$–$4s4d$, and $4s4p$–$4s5s$ triplets and the singlet resonance transition $4s^2\ ^1\mathrm{S}_0$–$4s4p\ ^1\mathrm{P}^\circ_1$ in vacuum-spark spectra. This analysis was extended by Sawyer and Lang[5] who classified 89 lines in the range of 829–7793 Å in a hollow cathode discharge. The levels given in AEL[13] are taken from this article.

In 1979 Denne *et al.*[24] observed the spectrum with a sliding spark and found four new lines that established the $4p^2\ ^1\mathrm{S}_0$, $^1\mathrm{D}_2$, and $4s6s\ ^1\mathrm{S}_0$ levels. They also measured lifetimes for the $4p^2\ ^1\mathrm{D}_2$ and $4s4d\ ^1\mathrm{D}_2$ levels.

Isberg and Litzén[44] used a hollow cathode discharge to observe the spectrum in the range 829–9706 Å. They obtained wavelengths with uncertainties varying from ±0.01 Å at the longest wavelengths to ±0.002 Å in the vacuum ultraviolet. They classified 172 lines and determined the energy levels of the $4sns$ (n=5–8), $4snp$ (n=4,5), $4snd$ (n=4–8), $4snf$ (n=4–7), $4sng$ (n=5–8), and $4p^2$ configurations.

Karlsson and Litzén[80] re-measured 56 of these lines using Fourier transform spectroscopy with a hollow cathode discharge. For a number of lines, they measured individual components of the complex hyperfine and isotope structure (HFS/IS) and accurately determined the centers of gravity of these structures. Since the wavelengths obtained by Karlsson and Litzén[80] differed from those of Isberg and Litzén[44] by as much as 0.06 Å, the energy levels determined by Isberg and Litzén[44] had to be re-optimized. For this level optimization, we needed more precise values of wavelength uncertainties than the general estimates given in Isberg and Litzén[44] and Karlsson and Litzén.[80]

For the lines measured by Isberg and Litzén,[44] we estimated the uncertainties by comparing the observed and Ritz wavelengths. This comparison was done separately for the lines given in Isberg and Litzén[44] with three digits after the decimal point and those given with two digits after the decimal point. For the former category of lines, we estimated that the lines with intensities greater than 6 have uncertainties of ±0.002 Å, whereas less intense lines have greater uncertainties, up to ±0.009 Å for the lines with zero intensity value. For the lines given with two digits after the decimal point, which prevail in the longer-wavelength region, the lines with intensities greater than 6 have uncertainties of ±0.01 Å, whereas the uncertainty for the less intense lines is ±0.03 Å. The lines noted as having partially resolved HFS/IS have uncertainties of ±0.02 Å on average.

Karlsson and Litzén[80] obtained the wavelength values using three different methods. For the lines with well-resolved HFS/IS (denoted as type b in their line list), the center-of-gravity wavelengths were obtained by fitting the individual components of the structure. Each HFS component had a Doppler profile with the full-width at half-maximum (FWHM) of 0.06 cm^{-1} at the wave number of 15 500 cm^{-1} (as determined from Fig. 1 of Karlsson and Litzén[80]). Assuming that the uncertainty of the fit for the center of gravity of the line structure is the same as for the HFS/IS components, we determined the statistical uncertainty by dividing the full width of the line component by twice the square root of the signal-to-noise ratio given in the intensity column of Karlsson and Litzén[80] and combined the obtained value with the estimated calibration uncertainty of ±0.002 cm^{-1} (Karlsson and Litzén[80]) as the square root of the sum of squares. For symmetric lines with no resolved HFS/IS (noted as "type a" in Karlsson and Litzén),[80] we used the same method as for the lines of type b. For the "type c" lines, the HFS/IS structure was partially resolved, but individual HFS/IS components could not be fitted. The center-of-gravity wavelengths of these lines were obtained in Karlsson and Litzén[80] from a least-squares fit of the entire observed line profile, using a line-fitting computer code. For these lines, we assumed a FWHM of 1 cm^{-1}, which corresponds to the measured widths of the resolved HFS/IS structures of the type-b lines. Using this value of FWHM, we estimated the uncertainties using the same method as for the lines of types a and b.

The $4s4d\ ^3D-4s6f\ ^3F^\circ$, $4s4p\ ^3P^\circ_0-4s7s\ ^3S_1$, and $4s4p\ ^3P^\circ-4s8s\ ^3S$ transitions were not reported by Isberg and Litzén[44] and are taken from Sawyer and Lang.[5] Their wavelengths are consistent with the levels of Isberg and Litzén[44] within an uncertainty of ±0.05 Å.

Having determined the wavelength uncertainties, we found the optimized level values by means of the least-squares level-optimization code LOPT.[84] These new level values are given in Table 3. The uncertainty of the levels given with two or three digits after the decimal point is 0.03 to 0.10 cm^{-1}, except for $4s4p\ ^3P^\circ_1$, which has an uncertainty of ±0.002 cm^{-1}. A third digit after the decimal point was necessary for many of the levels in order to reproduce the measured wavelengths of Karlsson and Litzén.[80] The uncertainty of the rest of the level values is between 1 and 10 units of the last decimal place. We have denoted the $4sng$ levels in the table in jj-coupling.

There is considerable configuration interaction in the level system of Ga II. Due to this it is difficult to assign the $4p^2\ ^1D_2$ and $4s4d\ ^1D_2$ levels to a single configuration. The percentage compositions for these levels in Table 3 are from Froese Fischer and Hansen.[26] The percentages for the levels of the $2s4f$ configuration are from Isberg and Litzén.[44]

Lines from Isberg and Litzén[44] and Karlsson and Litzén[80] in Table 4 noted with *hfs* have a partially resolved HFS/IS structure. Their observed widths can be greater than those of the other lines. For the lines quoted from Karlsson and Litzén,[80] we retained the logarithmic intensity values from Isberg and Litzén.[44]

Dunne *et al.*[72] identified the $3d^{10}4s^2-3d^94s^2np$ ($n=5-11$) and nf ($n=4-8$) transitions in the range 344–405 Å with an uncertainty of ±0.015 Å in photoabsorption spectra of laser-produced plasmas. The percentage compositions for these levels lying above the limit are from their article.[72]

In Table 4 we list transition probabilities for the $4s^2\ ^1S_0-4s4p\ ^{1,3}P^\circ_1$ transitions quoted from Morton[82] and those for several transitions of the $4s4p-4s4d$ array calculated by Curtis.[79] These values should be accurate within ±25%. The transition probability of $4s^2\ ^1S_0-4s5p\ ^1P^\circ_1$ is taken from Wiese *et al.*[32] Its quoted uncertainty is ±50%.

The ionization energy is from Isberg and Litzén.[44]

2.2.1. References for Ga II

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2.3. Ga III

Cu isoelectronic sequence

Ground state $1s^22s^22p^63s^23p^63d^{10}4s\ ^2S_{1/2}$

Ionization energy 247 820±2 cm^{-1} (30.7258±0.0002 eV)

Lang[1] identified the $4snp$ (n=4,5), $4p4d$, $4d4f$, $4p5s$, and $4f5g$ transitions. Rao[2] added the $5s5p$, $5p5d$, and $5p6s$ transitions. More accurate observations in the range 452–5994 Å were made by Isberg and Litzén[50] using hollow cathode and sliding spark discharges. They identified 69 transitions among the levels of the ns (n=4–7), np (n=4,5), nd (n=4–6), nf (n=4,5), ng (n=5–7), $3d^94s^2$, $3d^9(^2D)4s4p(^3P^\circ)$, and $3d^9(^2D)4s4p(^1P^\circ)$ configurations. Their wavelength uncertainty is estimated to be ±0.02 Å at the longest wavelengths and ±0.002 Å in the vacuum ultraviolet.

Ryabtsev and Wyart[55] observed 45 lines in the range 434–1925 Å with a spark discharge. They gave identifications for $4snp$ (n=6–9), $3d^{10}4s$–$3d^94s4p$, $3d^{10}4p$–$3d^94p^2$, $4dnp$ (n=6,8), $3d^{10}4d$–$3d^94s4p$, $3d^94s^2$–$3d^94s4p$, $3d^94s^2$–$3d^{10}np$ (n=6–8), $5s$–$6p$, and $3d^{10}5s$–$3d^94s4p$ transitions. They re-determined the $3d^9(^2D)4s4p(^3P^\circ)$ levels. We have adopted the $3d^{10}4s\ ^2S_{1/2}$–$3d^9(^2D)4s4p(^3P^\circ)^2P^\circ_{1/2}$ transition at 511.132 Å from their identifications.

It is noted that, according to the level scheme adopted here, the $3d^{10}4s\ ^2S_{1/2}$–$3d^9(^2D)4s4p(^3P^\circ)^2P^\circ_{3/2}$ line at 509.743 Å in Isberg and Litzén[50] has been assigned as the $3d^{10}4s\ ^2S_{1/2}$–$3d^{10}6p\ ^2P^\circ_{3/2}$ line.

Percentage compositions for the $3d^94s4p$ and $3d^94p^2$ levels are taken from Ryabtsev and Wyart.[55] For the latter configuration, only the percentage of the first leading component is given therein. We have designated the levels of these configurations according to these percentages. To avoid duplication of some names, we have designated the level at 197 026.7 cm^{-1} as $3d^9(^2D)4s4p(^3P^\circ)^4D_{1/2}$, although as shown in Table 5 the percentage for this component is only 27%. The level at 276 960 cm^{-1} is designated as $3d^9(^2D)4p^2(^3P)^2D_{3/2}$, although the corresponding percentage was not given. As shown in Table 5, the leading component for this level is actually 47% $3d^9(^2D)4p^2(^3P)^4F_{3/2}$.

In Table 6, along with the complete list of observed lines of Ga III, we list transition probabilities for the $4s$–$4p$ resonance doublet quoted from the compilation of Morton.[82]

The ionization energy is from Isberg and Litzén.[50]

2.3.1. References for Ga III

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2.4. Ga IV

Ni isoelectronic sequence

Ground state $1s^22s^22p^63s^23p^63d^{10}\ ^1S_0$

Ionization energy 510 070±70 cm^{-1} (63.241±0.009 eV)

The early observations for the $3d^{10}$–$3d^94p$ and $3d^94s$–$3d^94p$ transitions were reported by Mack *et al.*,[3] who identified 3 lines in the range 422–441 Å for the former and 36 lines in the range 1137–1466 Å for the latter in vacuum-spark discharges. This established all levels of the $3d^{10}$, $3d^94s$, and $3d^94p$ configurations as summarized in AEL.[13]

Ryabtsev[19] re-observed all the lines and identified the $4p$–$4d$ and $4p$–$5s$ transitions in the range 840–1043 Å, thus adding levels of the $3d^94d$ and $3d^95s$ configurations.

The analysis was extended by Ryabtsev and Churilov,[69] who identified 478 transitions among the levels of the $3d^{10}$, $3d^9ns$, np, nd with n=4–6, and $3d^94f$ configurations in the range 233–1678 Å. Their wavelength uncertainty is ±0.005 Å below 1200 Å and ±0.010 Å above. There are a number of misprints in their classifications; we have corrected them so as to get better agreement between measured wavelengths and values calculated from their levels. In this way we revised the value of the $3d^95d\ ^3D_1$ level from 413 070 to 413 010 cm^{-1} and the value of the $3d^94d\ ^1S_0$ level from 355 277.0 to 355 227.3 cm^{-1}. The line at 363.355 Å has been classified as a blend of three unresolved transitions $3d^94s\ ^3D_2$–$3d^96p(5/2,3/2)^\circ_2$, $3d^94s\ ^3D_2$–$3d^96p(5/2,3/2)^\circ_3$, and $3d^94s\ ^1D_2$–$3d^84s(^2D)4p\ ^3D^\circ_2$. Assignment of the line at 361.451 Å has been corrected to $3d^94s\ ^3D_3$–$3d^96p(5/2,3/2)^\circ_3$. The misprinted wavelengths 556.769, 582.568, and 961.725 Å have been corrected to 556.759, 582.990, and 963.597 Å, correspondingly. The misprinted identification of the line at 528.277 Å has been changed to $3d^94p\ ^3F^\circ_3$–$3d^96s(3/2,1/2)_2$. A third classification, $3d^94p\ ^1D^\circ_2$–$3d^95d\ ^3F_2$, was added to the multiply assigned line at 555.329 Å. This line is affected by a very strong O IV line at 555.261 Å, which significantly increases its wavelength uncertainty. Identification of the line at 1477.896 Å has been corrected. It is a blend of the $3d^94d\ ^3G_3$–$3d^94f(3/2,5/2)^\circ_4$ and $3d^94d\ ^1G_4$–$3d^94f(3/2,7/2)^\circ_5$ transitions. The classification of the line at 1559.457 Å has been corrected to $3d^94d\ ^3F_2$–$3d^94f(3/2,5/2)^\circ_3$. In Table 7 we quote the level values from Ryabtsev and Churilov[69] for the $3d^{10}$, $3d^94s$, $4p$, $4d$, $4f$, $5s$, $5p$, $5d$, $6s$, $6p$, and $6d$ levels. Their percentage compositions for the $3d^94s$, $4p$, and $4d$ levels are also given in Table 7. We have calculated the percentages for the remaining $3d^9nl$ configurations shown in Table 7. The $3d^96s$, $6p$, and $4f$ levels are noted in jj-coupling. The $3d^96p(5/2,3/2)^\circ_2$ level is defined by only one multiply classified line at 363.355 Å. Therefore, we have noted it as questionable.

The $3d^94s$–$3d^84s4p$ transition array was observed by Ramonas and Ryabtsev[65] in the range 300–400 Å with a wavelength uncertainty of ±0.005 Å. They determined most of the levels of the $3d^8 4s4p$ configuration. We quote their percentages for these levels in Table 7.

The list of all compiled lines is given in Table 8.

The ionization energy is from Ryabtsev and Churilov.[69]

2.4.1. References for Ga IV

[3]J. E. Mack, O. Laporte, and R. J. Lang, Phys. Rev. **31**, 748 (1928).

[13]C. E. Moore, *Atomic Energy Levels*, Natl. Stand. Ref. Data Ser., Natl. Bur. Stand. (U.S.) 35/Vol. II (1971); reprint of Natl. Bur. Stand. (U.S.) Circ. 467, Vol. II (1952).

[19]A. N. Ryabtsev, Opt. Spectrosc. **39**, 239 (1975).

[65]A. Ramonas and A. Ryabtsev, Lith. Phys. J. **30**, 37 (1990).

[69]A. N. Ryabtsev and S. S. Churilov, in *Spectroscopy of Multicharged Ions in Hot Plasmas*, edited by U.I. Safronova (Akad. Nauk SSSR, Inst. Spektrosk., Moscow, 1991), p. 76; A. N. Ryabtsev (private communication for misprints in Table 2).

2.5. Ga V

Co isoelectronic sequence

Ground state $1s^2 2s^2 2p^6 3s^2 3p^6 3d^9\ ^2D_{5/2}$

Ionization energy 693 700±1000 cm^{-1} (86.01±0.12 eV)

Thirty-three lines in the range 296–329 Å were first identified by Kononov[10] as the $3d^9$–$3d^8 4p$ transitions. Dick[17] re-observed the spectrum and extended the above array to 49 lines in the range 290–338 Å. Joshi *et al.*[14] identified 29 lines in the range 960–1206 Å as the $3d^8 4s\ ^4F$–$3d^8 4p\ ^4P^\circ$, $^4D^\circ$, $^4F^\circ$, and $^4G^\circ$ transitions. These two transition arrays were observed more fully by Aksenov and Ryabtsev[16] in a vacuum spark with a measurement uncertainty of ±0.004 Å for the $3d^9$–$3d^8 4p$ transitions and ±0.02 Å for the $3d^8 4s$–$3d^8 4p$ transitions. All levels but those based on the $3d^8\ ^1S$ core state were established. We quote their results in Table 9.

Dick's level scheme is consistent with that of Aksenov and Ryabtsev,[16] except for the $3d^8(^3F)4p\ ^4D^\circ_{7/2}$, $^4G^\circ_{7/2}$, and $^4G^\circ_{5/2}$ levels, and the interchange of designations of the $3d^8(^3P)4p\ ^2D^\circ_{3/2}$ and $^2P^\circ_{3/2}$ levels. Nine lines in Dick's experiment[17] are included in Table 10.

The $3d^9$, $3d^8 4s$, and $3d^8 4p$ levels in Table 9 are taken from Aksenov and Ryabtsev.[16] We calculated the percentage compositions for $3d^8 4s$ and $3d^8 4p$.

Ryabtsev and Ramonas[47] identified 36 lines of the $3d^9$–$3d^8 4f$ array in the range 167–193 Å with an estimated uncertainty of ±0.005 Å. This established positions of 28 levels of the $3d^8 4f$ configuration. We have adjusted those levels that were determined from only one observed line so as to get exact agreement between measured wavelengths and values calculated from the level energies. The value of the uppermost level with $J=1/2$ of the $3d^8 4f$ configuration was misprinted in Ryabtsev and Ramonas[47] as 552 222 cm^{-1}. The correct value is 552 156 cm^{-1}. The upper levels of the lines at 184.208, 191.100, and 192.536 Å, designated in the LS coupling scheme as $3d^8(^3P)4f\ ^2D_{3/2}$, $3d^8(^3F)4f\ ^4G_{7/2}$, and $3d^8(^3F)4f\ ^4F_{3/2}$, respectively, were not included in the level list of Ryabtsev and Ramonas.[47] These levels are determined by a single blended or doubly classified line each. We have determined the level values from the observed wavelengths and included these levels as questionable. We calculated the percentage compositions for this configuration in jj-coupling.

Due to the strong mixing between the electronic states, the names we assigned to the energy levels do not fully represent their physical nature. The percentage compositions given in Table 9 help to better understand the properties of the levels.

We determined the ionization energy from the fitted center of gravity of the $3d^8 4f$ configuration. The term value of the center of gravity of this configuration was found by interpolation between the center-of-gravity values of the $3p^6 4f$ configuration of vanadium V given by Van Deurzen[23] and the $3d^{10} 4f$ configuration of As V given by Sawyer and Humphreys.[4]

2.5.1. References for Ga V

[4]R. A. Sawyer and C. J. Humphreys, Phys. Rev. **32**, 583 (1928).

[10]E. Ya. Kononov, Opt. Spectrosc. **23**, 90 (1967).

[14]Y. N. Joshi, K. S. Bhatia, and W. E. Jones, Sci. Light **21**, 113 (1972).

[16]V. P. Aksenov and A. N. Ryabtsev, Opt. Spectrosc. **37**, 492 (1974).

[17]K. A. Dick, J. Opt. Soc. Am. **64**, 702 (1974).

[23]C. H. H. Van Deurzen, J. Opt. Soc. Am. **67**, 476 (1977).

[47]A. N. Ryabtsev and A. A. Ramonas, Sov. Phys. Collect. **25**, 77 (1985); A. N. Ryabtsev (private communication regarding the missing levels and misprint in Table 4).

2.6. Ga VI

Fe isoelectronic sequence

Ground state $1s^2 2s^2 2p^6 3s^2 3p^6 3d^8\ ^3F_4$

Ionization energy 909 000±9000 cm^{-1} (112.7±1.1 eV)

The $3d^8$–$3d^7 4p$ transitions were observed by Podobedova *et al.*[38] in the range 200–274 Å with a three-electrode vacuum spark. The wavelength accuracy of all but the weakest lines observed was ±0.003 Å. They identified 270 transitions and determined all levels of the $3d^8$ configuration and most levels of the $3d^7 4p$ configuration.

Transitions between excited states $3d^7 4s$–$3d^7 4p$ were analyzed by Podobedova *et al.*[46] They identified 194 lines in the range 764–1150 Å with an uncertainty of ±0.005 Å. The levels of the $3d^7 4p$ configuration were refined and supplemented, and all levels in the $3d^7 4s$ configuration were determined.

Recently, Podovedova[77] re-examined the experimental material and carried out a new optimization of the level values and new calculations of the eigenvector compositions. She provided us with more refined values for the levels as well as revised designations for some of the $3d^7 4p$ levels. The interchange of designations between $^5D^{\circ}_4$ and $^5F^{\circ}_4$ and between $^5D^{\circ}_2$ and $^5G^{\circ}_2$ in the $3d^7(^4F)4p$ configuration was made according to the leading percentage compositions. In addition, the $3d^7(^4P)4p$ $^5S^{\circ}_2$ and $(^4F)^3D^{\circ}_2$ levels were interchanged. Four lines at 978.897, 1016.990, 1017.103, and 1042.418 Å were reclassified, and five additional transitions were ascribed to the lines at 238.137, 967.811, 981.830, 1011.695, and 1015.806 Å as second classifications. The lines at 978.897 and 981.830 Å were used to determine the levels $3d^7(^4P)4p$ $^5D^{\circ}_0$ (419 644.6 cm^{-1}) and $3d^7(^4F)4p$ $^5D^{\circ}_0$ (398 323.3 cm^{-1}), respectively. The doubly classified lines at 247.891 and 964.924 Å in the earlier work were identified as the $3d^8$ $^3F_4$–$3d^7(^4F)4p$ $^3F^{\circ}_3$ and $3d^7(^2D)4s$ $^1D_2$–$3d^7(^2D)4p$ $^1F^{\circ}_3$ transitions, respectively. We quoted her results in Tables 11 and 12. As seen from the percentage compositions given in Table 11, there is strong mixing between the states. In many cases, the level names we have chosen do not fully represent the physical nature of the levels.

We calculated the ionization energy with the Cowan relativistic Hartree-Fock code (HFR).[33]

2.6.1. References for Ga VI

[33]R. D. Cowan, *The Theory of Atomic Structure and Spectra* (University of California Press, Berkeley, CA, 1981).
[38]L. Podobedova, A. Ramonas, and A. Ryabtsev, Sov. Phys. Collect. **23**, 10 (1983).
[46]L. I. Podobedova, A. A. Ramonas, and A. N. Ryabtsev, Sov. Phys. Collect. **25**, 66 (1985).
[77]L. I. Podobedova (private communication, 1996).

2.7. Ga VII

Mn isoelectronic sequence
Ground state $1s^2 2s^2 2p^6 3s^2 3p^6 3d^7$ $^4F_{9/2}$
Ionization energy 1 136 000±11 000 cm^{-1}
(140.9±1.4 eV)

This spectrum was observed in the region below 170 Å with a sliding spark by Dick.[17] Although he did not publish any of his measurements, he reported four levels of the $3d^7$ ^4F ground term, and we quote them here in Table 13.

We calculated the ionization energy with the Cowan HFR code.[33]

Note: Additional materials and revised level and wavelength tables of Ga VII were compiled when this manuscript was in preparation for publication. See *Note Added in Proof* on p. 93 and Tables 48 and 49.

2.7.1. References for Ga VII

[17]K. A. Dick, J. Opt. Soc. Am. **64**, 702 (1974).
[33]R. D. Cowan, *The Theory of Atomic Structure and Spectra* (University of California Press, Berkeley, CA, 1981).

2.8. Ga VIII

Cr isoelectronic sequence
Ground state $1s^2 2s^2 2p^6 3s^2 3p^6 3d^6$ $^5D_4$
Ionization energy 1 370 000±14 000 cm^{-1}
(169.9±1.7 eV)

No wavelengths have been reported for this ion. We calculated the ionization energy with the Cowan HFR code.[33]

2.8.1. References for Ga VIII

[33]R. D. Cowan, *The Theory of Atomic Structure and Spectra* (University of California Press, Berkeley, CA, 1981).

2.9. Ga IX

V isoelectronic sequence
Ground state $1s^2 2s^2 2p^6 3s^2 3p^6 3d^5$ $^6S_{5/2}$
Ionization energy 1 700 000±17 000 cm^{-1}
(210.8±2.1 eV)

No wavelengths have been reported for this ion. We calculated the ionization energy with the Cowan HFR code.[33]

2.9.1. References for Ga IX

[33]R. D. Cowan, *The Theory of Atomic Structure and Spectra* (University of California Press, Berkeley, CA, 1981).

2.10. Ga X

Ti isoelectronic sequence
Ground state $1s^2 2s^2 2p^6 3s^2 3p^6 3d^4$ $^5D_0$
Ionization energy 1 968 000±20 000 cm^{-1}
(244.0±2.5 eV)

No wavelengths have been reported for this ion. We calculated the ionization energy with the Cowan HFR code.[33]

2.10.1. References for Ga X

[33]R. D. Cowan, *The Theory of Atomic Structure and Spectra* (University of California Press, Berkeley, CA, 1981).

2.11. Ga XI

Sc isoelectronic sequence
Ground state $1s^2 2s^2 2p^6 3s^2 3p^6 3d^3$ $^4F_{3/2}$
Ionization energy 2 264 000±23 000 cm^{-1}
(280.7±2.9 eV)

No wavelengths have been reported for this ion. We calculated the ionization energy with the Cowan HFR code.[33]

2.11.1. References for Ga XI

[33]R. D. Cowan, *The Theory of Atomic Structure and Spectra* (University of California Press, Berkeley, CA, 1981).

2.12. Ga XII

Ca isoelectronic sequence

Ground state $1s^22s^22p^63s^23p^63d^2\ {}^3F_2$

Ionization energy 2 575 000±26 000 cm^{-1} (319.2±3.2 eV)

A line at 64.69±0.05 Å was observed by Fawcett and Hayes[18] in a laser-produced plasma and identified as a $3d^2\ {}^3F-3d4f\ {}^3G^\circ$ transition. No J-values were given, and thus no energy levels are available.

We calculated the ionization energy with the Cowan HFR code.[33]

2.12.1. References for Ga XII

[18]B. C. Fawcett and R. W. Hayes, J. Opt. Soc. Am. **65**, 623 (1975).

[33]R. D. Cowan, *The Theory of Atomic Structure and Spectra* (University of California Press, Berkeley, CA, 1981).

2.13. Ga XIII

K isoelectronic sequence

Ground state $1s^22s^22p^63s^23p^63d\ {}^2D_{3/2}$

Ionization energy 2 881 000±29 000 cm^{-1} (357.2±3.6 eV)

Fawcett and Hayes[18] observed three $3p^63d-3p^53d^2$ transitions at about 120 Å and two $3p^63d-3p^64f$ transitions at about 60 Å in a laser-produced plasma. Their measurement uncertainty was ±0.03 Å.

Kaufman *et al.*[60] re-measured the $3p^63d-3p^53d^2$ transitions in a tokamak plasma and added two more lines of this array. Their uncertainty was ±0.005 Å.

The energy levels given in Table 14 are from Kaufman *et al.*[60] Their value for the $3p^63d\ {}^2D$ ground term interval is based on an isoelectronically interpolated value of 119.344 Å for the $3p^63d\ {}^2D_{3/2}-3p^5({}^2P)3d^2\ {}^2P^\circ_{3/2}$ transition, which is estimated to be accurate to ±10 cm^{-1}. Their value for the $({}^2P){}^2P^\circ{}_{1/2}$ level is based on an isoelectronically interpolated value of 120.581 Å for the ${}^2D_{3/2}-({}^2P){}^2P^\circ{}_{1/2}$ transition.

All observed lines of Ga XIII are listed in Table 15.

We calculated the ionization energy with the Cowan HFR code.[33]

2.13.1. References for Ga XIII

[18]B. C. Fawcett and R. W. Hayes, J. Opt. Soc. Am. **65**, 623 (1975).

[33]R. D. Cowan, *The Theory of Atomic Structure and Spectra* (University of California Press, Berkeley, CA, 1981).

[60]V. Kaufman, J. Sugar, and W. L. Rowan, J. Opt. Soc. Am. B **6**, 142 (1989).

2.14. Ga XIV

Ar isoelectronic sequence

Ground state $1s^22s^22p^63s^23p^6\ {}^1S_0$

Ionization energy 3 800 600±11 500 cm^{-1} (471.2±1.4 eV)

The $3p^6\ {}^1S_0-3p^53d\ {}^1P^\circ{}_1$ resonance line and the $3p^53d\ {}^3F_4-3p^54f\ {}^5G^\circ{}_5$ intercombination transition were identified by Fawcett and Hayes[18] at 123.80±0.03 and 55.72±0.03 Å in a laser-produced plasma. Sugar *et al.*[56] observed the $3p^6\ {}^1S_0-3p^53d\ {}^1P^\circ{}_1$ and ${}^3D^\circ{}_1$ transitions for several ions in the Ar isoelectronic sequence from Cu to Mo in a tokamak plasma with an uncertainty of ±0.005 Å. They measured a wavelength of 123.782 Å for the $3p^6\ {}^1S_0-3p^53d\ {}^1P^\circ{}_1$ resonance line. Their fitted wavelength was 123.776 Å. They obtained an isoelectronically fitted value of 154.416 Å for the $3p^6\ {}^1S_0-3p^53d\ {}^3D^\circ{}_1$ transition, which was not actually observed for this ion. Their fitted results are adopted.

The energy levels given in Table 16 are quoted from Sugar *et al.*[56] Their uncertainty is ±50 cm^{-1}. All observed lines of Ga XIV are listed in Table 17.

Biémont *et al.*[78] systematically investigated the behavior of the differences between experimental values of ionization energies and those calculated *ab initio* by means of multiconfigurational Dirac-Fock approach along isoelectronic sequences. We adopted their interpolated value for Ga XIV.

2.14.1. References for Ga XIV

[18]B. C. Fawcett and R. W. Hayes, J. Opt. Soc. Am. **65**, 623 (1975).

[56]J. Sugar, V. Kaufman, and W. L. Rowan, J. Opt. Soc. Am. B **4**, 1927 (1987).

[78]E. Biémont, Y. Frémat, and P. Quinet, At. Data Nucl. Data Tables **71**, 117 (1999).

2.15. Ga XV

Cl isoelectronic sequence

Ground state $1s^22s^22p^63s^23p^5\ {}^2P^\circ{}_{3/2}$

Ionization energy 4 103 900 ±3500 cm^{-1} (508.8±0.4 eV)

Fawcett and Hayes[18] identified the $3p^5\ {}^2P^\circ{}_{1/2,3/2}-3p^43d\ {}^2D_{3/2,5/2}$ lines at 128.31 and 127.48 Å with an uncertainty of ±0.03 Å in a laser-produced plasma. More accurate measurements with an uncertainty of ±0.005 Å were reported by Kaufman *et al.*[61] for these two lines and three additional lines in the range 127–134 Å from observations with a tokamak plasma. A revised wavelength for the $3p^5\ {}^2P^\circ{}_{1/2}-3p^4({}^3P)3d\ {}^2P_{1/2}$ transition was given by Kaufman *et al.*[64]

Fawcett and Hayes[18] also observed the $3p^4({}^3P)3d\ {}^4D_{7/2}-3p^4({}^3P)4f\ {}^4F^\circ{}_{9/2}$ and $3p^4({}^3P){}^4F_{9/2}-3p^4({}^3P){}^4G^\circ{}_{11/2}$ lines at 51.57±0.05 and 52.27±0.05 Å.

The magnetic dipole transition $3p^5\ {}^2P^\circ{}_{3/2}-{}^2P^\circ{}_{1/2}$ at 2456.4±0.3 Å was tentatively identified by Roberts *et al.*[54] in a tokamak plasma. The value for the interval implied by this identification was adopted for determining the level values given in Table 18.

The list of observed lines of Ga XV is given in Table 19.

The transition probability of $3p^5\ ^2P^\circ_{3/2}-^2P^\circ_{1/2}$ is quoted from Kaufman and Sugar.[51] Its uncertainty is estimated to be ±25%.

The ionization energy was determined by Biémont *et al.*[78] by means of an isoelectronic interpolation of the differences between experimental values of ionization energies and those calculated *ab initio* with a multiconfigurational Dirac-Fock computer code.

2.15.1. References for Ga XV

[18]B. C. Fawcett and R. W. Hayes, J. Opt. Soc. Am. **65**, 623 (1975).
[51]V. Kaufman and J. Sugar, J. Phys. Chem. Ref. Data **15**, 321 (1986).
[54]J. R. Roberts, T. L. Pittman, J. Sugar, V. Kaufman, and W. L. Rowan, Phys. Rev. A **35**, 2591 (1987).
[61]V. Kaufman, J. Sugar, and W. L. Rowan, J. Opt. Soc. Am. B **6**, 1444 (1989).
[64]V. Kaufman, J. Sugar, and W. L. Rowan, J. Opt. Soc. Am. B **7**, 1169 (1990).
[78]E. Biémont, Y. Frémat, and P. Quinet, At. Data Nucl. Data Tables **71**, 117 (1999).

2.16. Ga XVI

S isoelectronic sequence

Ground state $1s^22s^22p^63s^23p^4\ ^3P_2$

Ionization energy 4 422 400±5 900 cm^{-1} (548.3±0.7 eV)

The magnetic dipole line $3p^4\ ^3P_2-^1D_2$ was observed at 1529.8 Å by Roberts *et al.*[39] in a tokamak plasma. Kaufman *et al.*[64] gave a fitted value of 1522.8 Å from an interpolation of the difference between observed and calculated values along the isoelectronic sequence Cu^{13+} through Mo^{26+}. We adopt their results.

Fawcett and Hayes[18] identified the $3p^4\ ^3P_2-3p^3(^4S^\circ)3d\ ^3D^\circ_3$ line at 132.19 Å and the $3p^4\ ^1D_2-3p^3(^2D^\circ)^1F^\circ_3$ line at 132.69 Å with an uncertainty of ±0.03 Å in a laser-produced plasma. In addition to the former line, a blended line of the $3p^4\ ^1S_0-3p^3(^2P^\circ)^1P^\circ_1$ and $3p^4\ ^3P_2-3p^3(^2D^\circ)^3P^\circ_2$ transitions was observed by Kaufman *et al.*[64] in a tokamak plasma. Their wavelength uncertainty is ±0.005 Å. Fawcett and Hayes[18] also observed two $3p^33d-3p^34f$ transitions at 48.69 and 49.19 Å with an uncertainty of ±0.05 Å.

The list of energy levels of Ga XVI is given in Table 20. The $^3P_{1,2}$, $^1D_2$, and $^1S_0$ energy levels of the $3p^4$ ground configuration were derived by Kaufman *et al.*[64] from smoothed energies of M1 transitions within this configuration for the S I isoelectronic sequence. The uncertainty of these levels is ±10 cm^{-1}, except for $^1S_0$, which has an uncertainty of ±70 cm^{-1}. The energy of the $3p^4\ ^3P_0$ level was derived in Kaufman *et al.*[64] from a least-squares fit of the $3p^4$ configuration in Ga XVI. Its uncertainty is ±100 cm^{-1}. The energies of the levels of the $2p^33d$ configuration were derived from the $2p^4-2p^33d$ transition energies smoothed along the S I isoelectronic sequence. Their uncertainty is ±100 cm^{-1}, except for the $3p^3(^2D^\circ)3d\ ^1F^\circ_3$ and $^3P^\circ_2$ levels that are based on observed lines and have a smaller uncertainty of ±30 cm^{-1}. We note that the energy of the $3p^4\ ^3P_1$ level (34 825 cm^{-1}) was misprinted in Kaufman *et al.*[64] as 38 425 cm^{-1}, and the predicted air wavelength of the $3p^4\ ^3P_0-^3P_1$ M1 transition (2.014±0.040 μm) was misprinted therein as 2.040 ±0.010 μm. The percentage compositions given in Table 19 are from Kaufman *et al.*[64]

In the line list presented in Table 21 we include transition probabilities of the M1 transitions between the levels of the ground configuration calculated by Saloman and Kim.[62] Their values were adjusted using experimental transition wave numbers. The uncertainty of these transition probability values is estimated as ±10%.

The ionization energy was determined by Biémont *et al.*[78] by means of an isoelectronic interpolation of the differences between experimental values of ionization energies and those calculated *ab initio* with a multiconfigurational Dirac-Fock computer code.

2.16.1. References for Ga XVI

[18]B. C. Fawcett and R. W. Hayes, J. Opt. Soc. Am. **65**, 623 (1975).
[39]J. R. Roberts, J. Sugar, V. Kaufman, T. L. Pittman, and W. L. Rowan, Phys. Rev. A **27**, 1721 (1983).
[62]E. B. Saloman and Y.-K. Kim, At. Data Nucl. Data Tables **41**, 339 (1989).
[64]V. Kaufman, J. Sugar, and W. L. Rowan, J. Opt. Soc. Am. B **7**, 1169 (1990).
[78]E. Biémont, Y. Frémat, and P. Quinet, At. Data Nucl. Data Tables **71**, 117 (1999).

2.17. Ga XVII

P isoelectronic sequence

Ground state $1s^22s^22p^63s^23p^3\ ^4S^\circ_{3/2}$

Ionization energy 4 838 000±11 000 cm^{-1} (599.8±1.4 eV)

The magnetic dipole line $3p^3\ ^2D^\circ_{3/2}-^2P^\circ_{3/2}$ was observed at 1319.1 Å by Roberts *et al.*[54] in a tokamak plasma. Sugar *et al.*[70] gave a fitted value of 1321.7±0.4 Å from an interpolation of the difference between observed and calculated values along the isoelectronic sequence Fe^{11+} through Mo^{27+}. We adopt their result.

Fawcett and Hayes[18] identified the $3p^3\ ^2D^\circ_{5/2}-3p^2(^3P)3d\ ^2F_{7/2}$ line at 138.54 Å and $3p^3\ ^4S^\circ_{3/2}-3p^2(^3P)3d\ ^4P_{5/2}$ at 144.23 Å with an uncertainty of ±0.03 Å in a laser-produced plasma. Sugar *et al.*[70] reobserved the spectrum in a tokamak plasma and identified a line at 142.397±0.005 Å as the $3p^3\ ^2D^\circ_{3/2}-3p^2(^1D)3d\ ^2D_{3/2}$ transition. In addition they obtained a more accurate wavelength of 144.213±0.005 Å for the $3p^3\ ^4S^\circ_{3/2}-3p^2(^3P)3d\ ^4P_{5/2}$ transition. The line at 138.54 Å in Sugar *et al.*[70] was masked, but an interpolated value of 138.491 Å was given by them. We adopt their results.

Fawcett and Hayes[18] also identified blended lines at 45.96 Å and 46.3 Å observed with an uncertainty of 0.1 Å as the $3p^23d-3p^24f$ transitions.

The list of known energy levels of Ga XVII is given in Table 22. The levels of the $3p^3$ ground configuration were derived by Sugar *et al.*[70] from fitted energies of M1 transitions within this configuration for the P I isoelectronic sequence. The uncertainty of these levels is ±20 cm^{-1}. We calculated percentage compositions for the $3s^23p^3$ levels by making a least-squares fit of this configuration using the Cowan code suite.[33] The energies of the levels of the $2p^23d$ configuration were derived by Sugar *et al.*[70] from the $2p^3-2p^23d$ transition energies smoothed along the P I isoelectronic sequence. Their uncertainty is ±100 cm^{-1}, except for the $3p^2(^1D)3d\ ^2D_{3/2}$ and $(^3P)^4P_{5/2}$ levels, which are based on observed lines and have a smaller uncertainty of ±30 cm^{-1}.

In the line list presented in Table 23 we include transition probabilities of the M1 transitions between the levels of the ground configuration quoted from Kaufman and Sugar.[51] Their uncertainty is estimated to be ±25%.

The ionization energy was determined by Biémont *et al.*[78] by means of an isoelectronic interpolation of the differences between experimental values of ionization energies and those calculated *ab initio* with a multiconfigurational Dirac-Fock computer code.

2.17.1. References for Ga XVII

[18]B. C. Fawcett and R. W. Hayes, J. Opt. Soc. Am. **65**, 623 (1975).

[33]R. D. Cowan, *The Theory of Atomic Structure and Spectra* (University of California Press, Berkeley, CA, 1981).

[51]V. Kaufman and J. Sugar, J. Phys. Chem. Ref. Data **15**, 321 (1986).

[54]J. R. Roberts, T. L. Pittman, J. Sugar, V. Kaufman, and W. L. Rowan, Phys. Rev. A **35**, 2591 (1987).

[70]J. Sugar, V. Kaufman, and W. L. Rowan, J. Opt. Soc. Am. B **8**, 22 (1991).

[78]E. Biémont, Y. Frémat, and P. Quinet, At. Data Nucl. Data Tables **71**, 117 (1999).

2.18. Ga XVIII

Si isoelectronic sequence

Ground state $1s^22s^22p^63s^23p^2\ ^3P_0$

Ionization energy 5 162 000±12 000 cm^{-1} (640.0±1.5 eV)

The magnetic dipole transition, $3p^2\ ^3P_1-^1D_2$, was tentatively identified at 1503.7 Å by Roberts *et al.*[54] in a tokamak plasma. Sugar *et al.*,[66] however, obtained a fitted value of 1500.0±0.4 Å from an interpolation of the difference between observed and calculated values for M1 lines along the isoelectronic sequence Fe^{12+} through Mo^{28+}. We adopt their result.

Fawcett and Hayes[18] identified the $3p^2\ ^3P_2-3p3d\ ^3D^\circ_3$ line at 150.86±0.03 Å in a laser-produced plasma. Sugar *et al.*[66] observed the spectrum in the range 148–167 Å with an uncertainty of 0.005 Å in a tokamak plasma. They identified 5 new lines of this array in addition to the line previously observed by Fawcett and Hayes.[18]

The energy levels of the $3s^23p^2$ ground configuration were derived by Sugar *et al.*[66] from fitted energies of M1 transitions within this configuration for the Si I isoelectronic sequence. The uncertainty of these levels is ±20 cm^{-1}. The $3s^23p3d\ ^3P^\circ_2$, $^3D^\circ_{1,3}$, $^1D^\circ_2$, $^1F^\circ_3$, and $^1P^\circ_1$ levels were derived in Sugar *et al.*[66] from observed wavelengths. Their uncertainty is ±30 cm^{-1}. The other levels of this configuration given in Table 24 in square brackets, as well as the levels of the $3s3p^3$ configuration, were derived in Sugar *et al.*[66] from wave numbers of transitions from these levels to the levels of the ground configuration fitted along the Si I isoelectronic sequence. Their uncertainty is ±100 cm^{-1}. The percentage compositions given in Table 24 are from Sugar *et al.*[66]

The list of observed lines of Ga XVIII is given in Table 25. We include predicted lines from Sugar *et al.*[66] with wavelengths slightly adjusted in order to better agree with the values of energy levels. Their uncertainty is ±0.020 Å. We also include transition probabilities of the M1 transitions between the levels of the ground configuration quoted from Kaufman and Sugar.[51] Their uncertainty is estimated to be ±25%.

The ionization energy was determined by Biémont *et al.*[78] by means of an isoelectronic interpolation of the differences between experimental values of ionization energies and those calculated *ab initio* with a multiconfigurational Dirac-Fock computer code.

2.18.1. References for Ga XVIII

[18]B. C. Fawcett and R. W. Hayes, J. Opt. Soc. Am. **65**, 623 (1975).

[51]V. Kaufman and J. Sugar, J. Phys. Chem. Ref. Data **15**, 321 (1986).

[54]J. R. Roberts, T. L. Pittman, J. Sugar, V. Kaufman, and W. L. Rowan, Phys. Rev. A **35**, 2591 (1987).

[66]J. Sugar, V. Kaufman, and W. L. Rowan, J. Opt. Soc. Am. B **7**, 152 (1990).

[78]E. Biémont, Y. Frémat, and P. Quinet, At. Data Nucl. Data Tables **71**, 117 (1999).

2.19. Ga XIX

Al isoelectronic sequence

Ground state $1s^22s^22p^63s^23p\ ^2P^\circ_{1/2}$

Ionization energy 5 459 500±23 000 cm^{-1} (676.9±2.9 eV)

Fawcett and Hayes[18] identified the $3p\ ^2P^\circ-3d\ ^2D$ doublet at 155.01 and 165.35 Å and one line of the $3s^23p-3s3p^2$ array at 194.83 Å with an uncertainty of 0.03 Å in a laser-produced plasma. Sugar *et al.*[58] re-observed lines in the range of 154–200 Å with an uncertainty of ±0.01 Å in a tokamak plasma. They identified 8 lines of these arrays including the lines observed by Fawcett and Hayes[18] and gave smoothed wavelengths with respect to multiconfiguration Dirac-Fock calculations.

The energy levels of the $3s^23p$, $3s3p^2$, and $3s^23d$ configurations listed in Table 26 were determined by Sugar *et al.*[58] from the wave numbers of observed lines smoothed along the Al I isoelectronic sequence. Their uncertainty is $\pm 40\ \mathrm{cm}^{-1}$, except for the $3s3p^2\ {}^2\mathrm{D}$ levels from which no lines were observed in Ga XIX. The uncertainty of these interpolated levels is $\pm 100\ \mathrm{cm}^{-1}$.

In Table 27 we include all observed lines of Ga XIX along with the predicted $3s^23p\ {}^2\mathrm{P}-3s3p^2\ {}^2\mathrm{D}$ doublet quoted from Sugar *et al.*[58] We also include the transition probability of the $3s^23p\ {}^2\mathrm{P}_{1/2}-3s^23p\ {}^2\mathrm{P}_{3/2}$ M1 transition quoted from Kaufman and Sugar.[51] Its uncertainty is estimated to be ±25%.

The ionization energy was determined by Biémont *et al.*[78] by means of an isoelectronic interpolation of the differences between experimental values of ionization energies and those calculated *ab initio* with a multiconfigurational Dirac-Fock computer code.

2.19.1. References for Ga XIX

[18]B. C. Fawcett and R. W. Hayes, J. Opt. Soc. Am. **65**, 623 (1975).
[51]V. Kaufman and J. Sugar, J. Phys. Chem. Ref. Data **15**, 321 (1986).
[58]J. Sugar, V. Kaufman, and W. L. Rowan, J. Opt. Soc. Am. B **5**, 2183 (1988).
[78]E. Biémont, Y. Frémat, and P. Quinet, At. Data Nucl. Data Tables **71**, 117 (1999).

2.20. Ga XX

Mg isoelectronic sequence
Ground state $1s^22s^22p^63s^2\ {}^1\mathrm{S}_0$
Ionization energy $6\,176\,000 \pm 6900\ \mathrm{cm}^{-1}$ (765.7 ± 0.9 eV)

Fawcett and Hayes[18] observed the resonance line $3s^2\ {}^1\mathrm{S}_0-3s3p\ {}^1\mathrm{P}^\circ_1$ at 208.11 Å and 3 lines of the $3s3p-3s3d$ array in the range 167–184 Å in a laser-produced plasma. The $3s3d\ {}^3\mathrm{D}-3p3d\ {}^3\mathrm{F}^\circ$ triplet was identified by Litzén and Redfors[52] in the range 263–301 Å with an uncertainty of ±0.02 Å in a similar light source. Accurate measurements with an uncertainty of ±0.005 Å in the range 100–300 Å were made by Sugar *et al.*[63] in a tokamak plasma. They classified 28 lines as transitions among the $3s^2$, $3p^2$, $3d^2$, $3s3p$, $3s3d$, and $3p3d$ configurations. It should be noted that the $3s3d\ {}^3\mathrm{D}-3p3d\ {}^3\mathrm{F}^\circ$ triplet observed in Litzén and Redfors[52] did not appear in their measurement. Later Sugar removed the $3p^2\ {}^3\mathrm{P}_2-3p3d\ {}^1\mathrm{D}^\circ_2$ line at 209.715 Å and added the $3p^2\ {}^1\mathrm{D}_2-3p3d\ {}^1\mathrm{D}^\circ_2$ line at 190.425 Å in accord with the analysis of Ekberg *et al.*[59]

Fawcett and Hayes[18] also identified 11 lines of the $3s3p-3s4d$, $3s3d-3s4f$, $5f$, $3p3d-3p4f$, $3s^2-3s4p$, $3s3p-3p4p$, and $3p^2-3s4f$ transition arrays in the range 28–42 Å with an uncertainty of ±0.01 Å.

The $3l3l'$ levels given in Table 28 were derived by Sugar *et al.*[63] from observed wavelengths. The uncertainty of the $3s3p\ {}^1\mathrm{P}^\circ_1$ level is $\pm 12\ \mathrm{cm}^{-1}$. All other $3l3l'$ levels have an uncertainty of $\pm 20\ \mathrm{cm}^{-1}$ on average. The $3lnl'$ levels with $n \geqslant 4$ were derived from the measurements of Fawcett and Hayes[18] and have an uncertainty of $\pm 800\ \mathrm{cm}^{-1}$ on average, except for the $3s5f\ {}^3\mathrm{F}^\circ_4$ level, which has an uncertainty of $\pm 2000\ \mathrm{cm}^{-1}$.

In Table 29, along with a complete list of observed lines of Ga XX, we include transition probabilities of the M1 transitions between the levels of the ground configuration quoted from Kaufman and Sugar.[51] Their uncertainty is estimated to be ±25%.

The ionization energy was determined by Biémont *et al.*[78] by means of an isoelectronic interpolation of the differences between experimental values of ionization energies and those calculated *ab initio* with a multiconfigurational Dirac-Fock computer code.

2.20.1. References for Ga XX

[18]B. C. Fawcett and R. W. Hayes, J. Opt. Soc. Am. **65**, 623 (1975).
[51]V. Kaufman and J. Sugar, J. Phys. Chem. Ref. Data **15**, 321 (1986).
[52]U. Litzén and A. Redfors, Phys. Scr. **36**, 895 (1987).
[59]J. O. Ekberg, U. Feldman, J. F. Seely, and C. M. Brown, Phys. Scr. **40**, 643 (1989).
[63]J. Sugar, V. Kaufman, P. Indelicato, and W. L. Rowan, J. Opt. Soc. Am. B **6**, 1437 (1989); J. Sugar (private communication regarding the line at 190.425 Å).
[78]E. Biémont, Y. Frémat, and P. Quinet, At. Data Nucl. Data Tables **71**, 117 (1999).

2.21. Ga XXI

Na isoelectronic sequence
Ground state $1s^22s^22p^63s\ {}^2\mathrm{S}_{1/2}$
Ionization energy $6\,511\,380 \pm 200\ \mathrm{cm}^{-1}$
(807.308 ± 0.025 eV)

The $3s-3p$ and $3p-3d$ lines in the region 184–241 Å were identified in laser-produced plasmas by Fawcett and Hayes[18] with wavelength uncertainty of ±0.03 Å. Kononov *et al.*[22] identified the $4f-5g$ doublet at 91 Å with a similar light source. Their wavelength uncertainty was ±0.01 Å. The $3s-np$ ($n=4,5$), $3p-4s$, $3p-nd$ ($n=4,5$), $3d-4p$, and $3d-nf$ ($n=4-6$) doublets were identified by Fawcett and Hayes[18] in the range 22–44 Å. Kononov *et al.*[27] extended the series transitions to $n=7$ in the range 20–44 Å using a laser-produced plasma. Their measurement uncertainty varied from ±0.01 Å for lines given to three decimal places to ±0.02 Å for lines given to two decimal places.

Using a similar light source, Reader *et al.*[53] remeasured the $3s-3p$, $3p-3d$, and $3d-4f$ doublets in several Na-like ions and, by using an isoelectronic comparison with Dirac-Fock calculations, obtained smoothed values with an estimated uncertainty of ±0.007 Å for these transitions. The energy levels of the $3p$, $3d$, and $4f$ doublet terms given in Table 30 are derived from these smoothed wavelengths. Their uncertainty is ±10, ±20, and ±500 cm^{-1}, respectively.

In Table 31, besides the transitions from the levels of excited valence-shell configurations, we include the inner-shell transitions $2p^63s-2p^53s3d$, $2p^63p-2p^53p3d$, and $2p^63d-2p^53d^2$. They were observed by Gordon *et al.*[28] in the range 9.6–10.0 Å with an uncertainty of ±0.005 Å in a laser-produced plasma. Our designations for the upper levels of these transitions are taken from Table 2 of their article. We note that the $3d\ ^2$D term splitting given by the lines at 9.920 and 9.939 Å does not fit well with the $3d\ ^2$D splitting given by the $nl-nl'$ transitions at longer wavelength.

The energies of the $2p^6nl$ (n=4–7) levels listed in Table 30 are derived from the wavelengths measured by Kononov *et al.*[27] The uncertainty of the levels with n=4 and 5 is ±600 cm^{-1}, except for the $5p\ ^2P^\circ_{1/2}$ level, which has an uncertainty of ±2000 cm^{-1}. The $6d$, $6f$, and $7f$ levels, from which only the short-wavelength transitions to the ground state were observed, have an uncertainty of ±2000 cm^{-1}.

Kononov *et al.*[27] obtained the ionization energy 6 511 600±350 cm^{-1} by applying a polarization formula to the $5g\ ^2$G term. In good agreement with their result, Biémont *et al.*[78] derived a more accurate value by means of an isoelectronic interpolation of the differences between experimental values of ionization energies and those calculated *ab initio* with a multiconfigurational Dirac-Fock computer code. We quote the result of Biémont *et al.*[78]

2.21.1. References for Ga XXI

[18]B. C. Fawcett and R. W. Hayes, J. Opt. Soc. Am. **65**, 623 (1975).
[22]E. Ya. Kononov, V. I. Kovalev, A. N. Ryabtsev, and S. S. Churilov, Sov. J. Quantum Electron. **7**, 111 (1977).
[27]E. Ya. Kononov, A. N. Ryabtsev, and S. S. Churilov, Phys. Scr. **19**, 328 (1979).
[28]H. Gordon, M. G. Hobby, and N. J. Peacock, J. Phys. B **13**, 1985 (1980).
[53]J. Reader, V. Kaufman, J. Sugar, J. O. Ekberg, U. Feldman, C. M. Brown, J. F. Seely, and W. L. Rowan, J. Opt. Soc. Am. B **4**, 1821 (1987).
[78]E. Biémont, Y. Frémat, and P. Quinet, At. Data Nucl. Data Tables **71**, 117 (1999).

2.22. Ga XXII

Ne isoelectronic sequence
Ground state $1s^22s^22p^6\ ^1S_0$
Ionization energy 16 211 900±8700 cm^{-1}
(2 010.0±1.1 eV)

The transitions from the $2s^22p^53s$, $4s$, nd (n=3–6), $2s2p^63p$, and $4p$ levels to the ground level were identified by Gordon *et al.*[28] in a laser-produced plasma. Their measurement uncertainty was ±0.005 Å. A similar analysis was made independently by Hutcheon *et al.*[31] with an uncertainty of ±0.002 Å. Their measurements generally agree within a few mÅ. We adopted the wavelengths of Gordon *et al.*,[28] because their identifications are somewhat more complete.

The energy levels listed in Table 32 are derived from the measurements of Gordon *et al.*[28] The uncertainty of the n=3 levels is about ±5000 cm^{-1}. The uncertainty of the levels of the $2s^22p^54s$ and $4d$ configurations is ±8000 cm^{-1}, and for the $2s^22p^55d$, $6d$, and $2s2p^64p$ configurations it is ±10 000 cm^{-1}.

Two $2p^53s-2p^53p$ lasing transitions were identified by McLean *et al.*[71] at 246.70±0.06 and 251.11±0.06 Å in a laser-produced plasma. Smoothed values for these lines of 246.72±0.10 and 251.17±0.10 Å were later given by Nilsen and Scofield.[74] In Table 33 we include the wavelengths from McLean *et al.*,[71] as they have a smaller uncertainty.

Hutcheon[29] derived the ionization energy 16 205 000 ±16 000 cm^{-1} from the $2p^5nd$ (n=3–6) series. In good agreement with his result, Biémont *et al.*[78] derived a more accurate value by means of an isoelectronic interpolation of the differences between experimental values of ionization energies and those calculated *ab initio* with a multiconfigurational Dirac-Fock computer code. We quote the result of Biémont *et al.*[78]

2.22.1. References for Ga XXII

[28]H. Gordon, M. G. Hobby, and N. J. Peacock, J. Phys. B **13**, 1985 (1980).
[29]R. J. Hutcheon, Phys. Scr. **21**, 98 (1980).
[31]R. J. Hutcheon, L. Cooke, M. H. Key, C. L. S. Lewis, and G. E. Bromage, Phys. Scr. **21**, 89 (1980).
[71]E. A. McLean, T. N. Lee, J. A. Stamper, C. K. Manka, and H. R. Griem, J. Opt. Soc. Am. B **9**, 350 (1992).
[74]J. Nilsen and J. Scofield, Phys. Scr. **49**, 588 (1994).
[78]E. Biémont, Y. Frémat, and P. Quinet, At. Data Nucl. Data Tables **71**, 117 (1999).

2.23. Ga XXIII

F isoelectronic sequence
Ground state $1s^22s^22p^5\ ^2P^\circ_{3/2}$
Ionization energy 17 172 000±30 000 cm^{-1}
(2129.1±3.7 eV)

Kononov *et al.*[22] identified the $2s^22p^5\ ^2P^\circ_{1/2,3/2}-2s2p^6\ ^2S_{1/2}$ doublet at 83.024 and 69.791 Å in a laser-produced plasma. Their measurement uncertainty was ±0.01 Å. Behring *et al.*[41] re-observed these two lines with an uncertainty of ±0.005 Å in a similar light source. We adopt their result.

The $2p-3s$ and $2p-3d$ transitions were measured by Hutcheon *et al.*[31] and Gordon *et al.*[28] in a laser-produced plasma with uncertainties of ±0.002 and ±0.005 Å, respectively. We adopt the results of Gordon *et al.*[28] and additional lines from Hutcheon *et al.*,[31] five of which are blended. Gordon *et al.*[28] also identified the lines belonging to the $2s^22p^5-2s2p^53p$ and $2s^22p^5-2s^22p^44d$ transition arrays in the ranges 8.4–9.0 Å and 7.2–7.5 Å, respectively. The latter transition array was also observed by Hutcheon *et al.*[30] Almost all lines are identified as blends of emission lines.

The energy levels listed in Table 34 are derived from the observed lines. The splitting of the ground $^2P^\circ$ term and the value of the $2s2p^6\ ^2S_{1/2}$ level are based on the measurement of Behring *et al.*[41] Their uncertainty is ±100 cm^{-1}. The uncertainties of the $n=3$ and $n=4$ levels are 6000 and 9000 cm^{-1}, respectively.

In Table 35, along with a complete list of observed lines of Ga XXIII, we include the transition probability of the M1 transition between the levels of the ground term quoted from Kaufman and Sugar.[51] Its uncertainty is estimated to be ±25%.

The ionization energy was determined by Biémont *et al.*[78] by means of an isoelectronic interpolation of the differences between experimental values of ionization energies and those calculated *ab initio* with a multiconfigurational Dirac-Fock computer code.

2.23.1. References for Ga XXIII

[22]E. Ya. Kononov, V. I. Kovalev, A. N. Ryabtsev, and S. S. Churilov, Sov. J. Quantum Electron. **7**, 111 (1977).
[28]H. Gordon, M. G. Hobby, and N. J. Peacock, J. Phys. B **13**, 1985 (1980).
[30]R. J. Hutcheon, G. E. Bromage, R. L. Cooke, M. H. Key, and C. S. L. Lewis, J. Phys. B **13**, 673 (1980).
[31]R. J. Hutcheon, L. Cooke, M. H. Key, C. L. S. Lewis, and G. E. Bromage, Phys. Scr. **21**, 89 (1980).
[41]W. E. Behring, J. F. Seely, S. Goldsmith, L. Cohen, M. Richardson, and U. Feldman, J. Opt. Soc. Am. B **2**, 886 (1985).
[51]V. Kaufman and J. Sugar, J. Phys. Chem. Ref. Data **15**, 321 (1986).
[78]E. Biémont, Y. Frémat, and P. Quinet, At. Data Nucl. Data Tables **71**, 117 (1999).

2.24. Ga XXIV

O isoelectronic sequence
Ground state $1s^22s^22p^4\ ^3P_2$
Ionization energy 18 215 000±40 000 cm^{-1}
(2258±5 eV)

The $2s^22p^4-2s2p^5$ and $2s2p^5\ ^1P^\circ_1-2p^6\ ^1S_0$ transitions were observed by Behring *et al.*[41] in the range 57–97 Å in a laser-produced plasma. Their measurement uncertainty was ±0.005 Å.

Gordon *et al.*[28] identified the $2p^4-2p^33s$ and $2p^4-2p^33d$ transitions in the range 8.8–10.0 Å. Their wavelength uncertainty was ±0.005 Å. Almost all lines for the latter transition array are identified as blends of emission lines. Identifications of the lines at 8.864 and 9.081 Å originating from the same upper level $2s^22p^3(^2D^\circ)3d\ ^3P^\circ_2$ are questionable because of an inconsistency of ±0.05 Å between the observed wavelengths and those calculated from the level values.

The energy levels listed in Table 36 are derived from the observed wavelengths. The $n=2$ levels are based on the measurements of Behring *et al.*[41] Their uncertainties are ±70 cm^{-1}. The uncertainties of the $2p^33s$ and $3d$ levels are ±5000 and ±6000 cm^{-1}, respectively.

In the line list presented in Table 37 we include the transition probabilities of the M1 transitions between the levels of the ground configuration quoted from Kaufman and Sugar.[51] Their uncertainty is estimated to be ±25%.

The ionization energy was determined by Biémont *et al.*[78] by means of an isoelectronic interpolation of the differences between experimental values of ionization energies and those calculated *ab initio* with a multiconfigurational Dirac-Fock computer code.

2.24.1. References for Ga XXIV

[28]H. Gordon, M. G. Hobby, and N. J. Peacock, J. Phys. B **13**, 1985 (1980).
[41]W. E. Behring, J. F. Seely, S. Goldsmith, L. Cohen, M. Richardson, and U. Feldman, J. Opt. Soc. Am. B **2**, 886 (1985).
[51]V. Kaufman and J. Sugar, J. Phys. Chem. Ref. Data **15**, 321 (1986).
[78]E. Biémont, Y. Frémat, and P. Quinet, At. Data Nucl. Data Tables **71**, 117 (1999).

2.25. Ga XXV

N isoelectronic sequence
Ground state $1s^22s^22p^3\ ^4S^\circ_{3/2}$
Ionization energy 19 287 000±140 000 cm^{-1}
(2391±18 eV)

Ten lines of the $2s^22p^3-2s2p^4$ array and the $2s2p^4\ ^2D-2p^5\ ^2P^\circ$ doublet were identified by Behring *et al.*[41] in the range 68–99 Å. They were observed in a laser-produced plasma with an uncertainty of ±0.005 Å. No intercombination lines were observed.

To determine the level values, Behring *et al.*[41] used the interpolated values for the $2s^22p^3\ ^2D^\circ_{5/2}$ and $^2P^\circ_{3/2}$ levels from Edlén's article.[34] In a subsequent publication Edlén[40] improved his interpolation procedure. We redetermined the energy levels using the wavelengths measured by Behring *et al.*[41] and Edlén's recommended values for the $2s^22p^3\ ^2D^\circ_{5/2}$ and $^2P^\circ_{3/2}$ levels from Edlén.[40] In Table 38 the quantities "x" and "y" represent the uncertainties of these interpolated values. The value of x should not exceed ±50 cm^{-1}, which represents the uncertainty of the $2s^22p^3\ ^2D^\circ_{5/2}$ level. As shown by isoelectronic plots presented in Edlén,[40] the behavior of experimental values of the $2s^22p^3\ ^2D^\circ_{5/2}-^2P^\circ_{3/2}$ and $^2P^\circ_{1/2}-^2P^\circ_{3/2}$ intervals along the N I sequence is irregular for $Z>26$. Therefore, the value of y in Table 38 can be as large as ±500 cm^{-1}. Uncertainties of the energies of excited levels, except for $2s^22p^3\ ^2D^\circ_{5/2}$, can be determined by combining ±70 cm^{-1} with the values of x and y.

In Table 39, along with the observed lines of Ga XXV from Behring *et al.*,[41] we include the predicted wavelengths for the $2s^22p^3\ ^4S^\circ_{3/2}-2s2p^4\ ^2P_{3/2}$ and $2s^22p^3\ ^2D^\circ_{3/2}-2s2p^4\ ^2D_{3/2}$ transitions that were observed by Behring *et* *al.*[41] for other members of the isoelectronic sequence. We also include the transition probabilities of the M1 transitions between the levels of the ground configuration quoted from Kaufman and Sugar.[51] Their uncertainty is estimated to be ±25%.

The ionization energy was determined by Biémont *et al.*[78] by means of an isoelectronic interpolation of the differences between experimental values of ionization energies and those calculated *ab initio* with a multiconfigurational Dirac-Fock computer code.

2.25.1. References for Ga XXV

[34]B. Edlén, Phys. Scr. **26**, 71 (1982).
[40]B. Edlén, Phys. Scr. **30**, 135 (1984).
[41]W. E. Behring, J. F. Seely, S. Goldsmith, L. Cohen, M. Richardson, and U. Feldman, J. Opt. Soc. Am. B **2**, 886 (1985).
[51]V. Kaufman and J. Sugar, J. Phys. Chem. Ref. Data **15**, 321 (1986).
[78]E. Biémont, Y. Frémat, and P. Quinet, At. Data Nucl. Data Tables **71**, 117 (1999).

2.26. Ga XXVI

C isoelectronic sequence
Ground state $1s^2 2s^2 2p^2\ {}^3P_0$
Ionization energy 20 518 000±16 000 cm^{-1}
(2543.9±2.0 eV)

Four lines of the $2s^2 2p^2 - 2s2p^3$ transitions were identified by Behring *et al.*[41] in the range 74–92 Å. They were observed in a laser-produced plasma with an uncertainty of ±0.005 Å. No intercombination line was observed.

To determine the $2s^2 2p^2\ {}^3P_2$, $2s2p^3\ {}^3P^\circ_2$, and $2s2p^3\ {}^3S^\circ_1$ level values, Behring *et al.*[41] used the interpolated value 186 880 cm^{-1} for the $2s^2 2p^2\ {}^3P_1$ level given by Edlén.[43] In a subsequent publication Edlén[43] improved his interpolation procedure and gave the recommended value of 186 890 cm^{-1} for this level. Therefore, in the level list given in Table 40 these levels are raised by 10 cm^{-1} compared to the values given by Behring *et al.*[41] For the $2s2p^3\ {}^3D^\circ_1$ level, we adopted the value given by Behring *et al.*[41] Its uncertainty is ±60 cm^{-1}. The uncertainty of the $2s^2 2p^2\ {}^3P_1$ level is ±100 cm^{-1}. This defines the limits for the additive quantity "x" in Tables 40 and 41. The uncertainties of the $2s2p^3\ {}^3P^\circ_2$ and $2s2p^3\ {}^3S^\circ_1$ levels can be estimated by combining ±70 cm^{-1} with the value of x.

In the line list presented in Table 41 we include the transition probabilities of the M1 transitions between the levels of the ground configuration quoted from Kaufman and Sugar.[51] Their uncertainty is estimated to be ±25%.

The ionization energy was determined by Biémont *et al.*[78] by means of an isoelectronic interpolation of the differences between experimental values of ionization energies and those calculated *ab initio* with a multiconfigurational Dirac-Fock computer code.

2.26.1. References for Ga XXVI

[34]B. Edlén, Phys. Scr. **26**, 71 (1982).
[41]W. E. Behring, J. F. Seely, S. Goldsmith, L. Cohen, M. Richardson, and U. Feldman, J. Opt. Soc. Am. B **2**, 886 (1985).
[43]B. Edlén, Phys. Scr. **31**, 345 (1985).
[51]V. Kaufman and J. Sugar, J. Phys. Chem. Ref. Data **15**, 321 (1986).
[78]E. Biémont, Y. Frémat, and P. Quinet, At. Data Nucl. Data Tables **71**, 117 (1999).

2.27. Ga XXVII

B isoelectronic sequence
Ground state $1s^2 2s^2 2p\ {}^2P^\circ_{1/2}$
Ionization energy 21 640 000±11 000 cm^{-1}
(2683.0±1.4 eV)

No wavelengths have been reported for this ion. The ionization energy was determined by Biémont *et al.*[78] by means of an isoelectronic interpolation of the differences between experimental values of ionization energies and those calculated *ab initio* with a multiconfigurational Dirac-Fock computer code.

2.27.1. References for Ga XXVII

[78]E. Biémont, Y. Frémat, and P. Quinet, At. Data Nucl. Data Tables **71**, 117 (1999).

2.28. Ga XXVIII

Be isoelectronic sequence
Ground state $1s^2 2s^2\ {}^1S_0$
Ionization energy 23 132 400±22 400 cm^{-1}
(2868.1±2.8 eV)

No wavelengths have been reported for this ion. The ionization energy was determined by Biémont *et al.*[78] by means of an isoelectronic interpolation of the differences between experimental values of ionization energies and those calculated *ab initio* with a multiconfigurational Dirac-Fock computer code.

2.28.1. References for Ga XXVIII

[78]E. Biémont, Y. Frémat, and P. Quinet, At. Data Nucl. Data Tables **71**, 117 (1999).

2.29. Ga XXIX

Li isoelectronic sequence
Ground state $1s^2 2s\ {}^2S_{1/2}$
Ionization energy 24 068 300±4100 cm^{-1}
(2984.1±0.5 eV)

No observed spectral lines have been reported for this ion.

The resonance transitions $1s^2 2s\ {}^2S_{1/2} - 1s^2 2p\ {}^2P^\circ_{1/2,3/2}$ at 207.917 and 132.219 Å are taken from Kim *et al.*,[68] who predicted these transition energies by taking into account electron-correlation, relativistic, and quantum-electrodynamic corrections. The differences between thus calculated theoretical energies and experimental values were used in Kim *et al.*[68] to derive the wave numbers smoothed along the isoelectronic sequence. The uncertainties of these smoothed wave numbers are ±20 and ±40 cm^{-1}, respectively.

The ionization energy was determined by Biémont *et al.*[78] by means of an isoelectronic interpolation of the differences between experimental values of ionization energies and those calculated *ab initio* with a multiconfigurational Dirac-Fock computer code.

Vainshtein and Safronova[49] calculated the energy levels of the $1s^2nl$ configurations ($n=2-5$, $l=0-2$) and wavelengths of the $1s^22s-1s2s2p$, $1s^22p-1s2p^2$, and $1s^22p-1s2s^2$ transitions. We have compiled their results. Edlén[25] derived accurate semiempirical formulas for calculating the $1s2nl$ levels of Li-like ions. Substituting the ionization energy from Biémont *et al.*[78] and energies of the $1s^22p\ ^2P^\circ_{1/2}$ and $^2P^\circ_{3/2}$ levels from Kim *et al.*,[68] we used these formulas to derive all other singly-excited energy levels. The resulting values agree with the calculations of Vainshtein and Safronova[49] with an average deviation of $-120\ cm^{-1}$ and rms deviation of $3000\ cm^{-1}$. This latter value can be used as an estimate of the uncertainty of the $1s^2nl$ levels and transitions between them included in Tables 42 and 43.

2.29.1. References for Ga XXIX

[25]B. Edlén, Phys. Scr. **19**, 255 (1979).
[49]L. A. Vainshtein and U. I. Safronova, Preprint No. 2, Acad. Nauk USSR, Inst. Spectrosc. Moscow (1985).
[68]Y.-K. Kim, D. H. Baik, P. Indelicato, and J. P. Desclaux, Phys. Rev. A **44**, 148 (1991).
[78]E. Biémont, Y. Frémat, and P. Quinet, At. Data Nucl. Data Tables **71**, 117 (1999).

2.30. Ga XXX

He isoelectronic sequence
Ground state $1s^2\ ^1S_0$
Ionization energy 102 405 030 cm^{-1} (12 696.605 eV)

Aglitsky *et al.*[57] observed the resonance line $1s^2\ ^1S_0-1s2p\ ^1P^\circ_1$ at 1.287 82±0.000 10 Å.

Cheng *et al.*[73] give calculated total energies for the ground and $n=2$ singlet states of selected He-like ions. We use a later calculation of both singlet and triplet states by Cheng[76] for the $n=1$ and $n=2$ configurations. With these data and the binding energy of the H-like ions of Johnson and Soff[45] we obtain the value for ionization energy. At this time it is not possible to assign an uncertainty to this value. For the $1s3l$ states we use the level values from Drake.[42]

The levels $1s4l$ and $5l$ calculated by Vainshtein and Safronova[49] have been tabulated in Table 44 after increasing them by 1700 cm^{-1} to correspond with the values for lower n by Drake.[42] All wavelengths listed in Table 45 have been derived from differences of the adopted energy levels.

Vainshtein and Safronova[49] also calculated wavelengths for the $1s2s-2s2p$, $1s2p-2s^2$, and $1s2p-2p^2$ transitions. We have compiled them without modification.

We include in Table 45 the transition rate of the $1s^2\ ^1S_0-1s2s\ ^3S_1$ M1 transition calculated by Johnson *et al.*[75] Its uncertainty is less than 2%.

2.30.1. References for Ga XXX

[42]G. W. F. Drake (unpublished, 1985).
[45]W. R. Johnson and G. Soff, At. Data Nucl. Data Tables **33**, 405 (1985).
[49]L. A. Vainshtein and U. I. Safronova, Preprint No. 2, Acad. Nauk USSR, Inst. Spectrosc. Moscow (1985).
[57]E. V. Aglitsky, P. S. Antsiferov, S. L. Mandelstam, A. M. Panin, U. I. Safronova, S. A. Ulitin, and L. A. Vainshtein, Phys. Scr. **38**, 136 (1988).
[73]K. T. Cheng, M. H. Chen, W. R. Johnson, and J. Sapirstein, Phys. Rev. A **50**, 247 (1994).
[75]W. R. Johnson, D. R. Plante, and J. Sapirstein, Adv. At., Mol., Opt. Phys. **35**, 255 (1995).
[76]K. T. Cheng (private communication, 1996).

2.31. Ga XXXI

H isoelectronic sequence
Ground state $1s\ ^2S_{1/2}$
Ionization energy 106 783 680±50 cm^{-1}
(13 239.488±0.006 eV)

No observations of this spectrum have been reported.

Johnson and Soff[45] calculated the binding energies of the $n=1$ and $n=2$ levels for the isotope ^{69}Ga. We adjusted their tabulated values in order to account for the revised value of the Rydberg constant [109 737.315 685 25 cm^{-1} (Mohr and Taylor[81])] and for the slightly different atomic weight of ^{69}Ga [68.925 581 (Lide[83])], compared to the values used by Johnson and Soff[45] (109 737.315 21 cm^{-1} and 68.909, respectively). This adjustment resulted in the change of the ionization energy of the ground state by less than 1 cm^{-1}. It should be noted that natural gallium consists of approximately 60% of ^{69}Ga and 40% of ^{71}Ga (Lide[83]). According to our estimates, the greater atomic weight of ^{71}Ga results in an increase of the ionization energy by approximately 40 cm^{-1} for this isotope.

The estimated uncertainty of the excitation energies of the $n=2$ levels given in Table 46 is ±50 cm^{-1}. They are in close agreement with the values calculated by Mohr.[37]

The binding energies of the levels with $n=3-5$ have been calculated by Erickson[21] for the same isotope ^{69}Ga. We adjusted his tabulated values in the same way as described above. Erickson's adjusted values for the binding energies were subtracted from the ground state binding energy given above to obtain the excitation energies of these levels and predicted wavelengths included in Tables 46 and 47. Although the uncertainty of the energy levels relative to the ground state is ±50 cm^{-1}, the separations between excited levels are known with much smaller uncertainties. The extra digits were required in the level energies in order to reproduce the level separations with sufficient accuracy. Uncertainties of the transition wavelengths listed in Table 47 are in the range 2–18 units of the last given decimal place. The wavelengths for the ^{71}Ga isotope may differ in the last two digits.

2.31.1. References for Ga XXXI

[21]G. W. Erickson, J. Phys. Chem. Ref. Data **6**, 831 (1977).
[37]P. J. Mohr, At. Data Nucl. Data Tables **29**, 453 (1983).
[45]W. R. Johnson and G. Soff, At. Data Nucl. Data Tables **33**, 405 (1985).
[81]P. J. Mohr and B. N. Taylor, *The 2002 CODATA Recommended Values of the Fundamental Physical Constants, Web Version 4.0*, available at physics.nist.gov/constants; Rev. Mod. Phys. **77**, 1 (2005).
[83]*CRC Handbook of Chemistry and Physics*, 85th ed., edited by D. R. Lide (CRC Press, Boca Raton, FL, 2004).

3. Explanation of Tables of Compiled Levels and Lines

In the energy level tables, the first two columns provide the configuration and term labels that are used in the line tables. The levels are grouped by these configuration and term labels. The energies of the odd-parity levels are given in italics. In most cases, the values of energies, wave numbers, and wavelengths are rounded using the "rule of 20," i.e., an uncertainty of 20 or more in the least significant digit serves as the criterion for dropping that digit. In a few cases extra digits were necessary in order to reproduce the precisely known separations between the energy levels. For most of the energy levels, we provide the first two leading components of the percentage composition. If the second component is smaller than 5%, it is omitted. It should be emphasized that the configuration and term labels often do not fully describe the physical nature of the energy levels. The sole purpose of these labels is to provide a cross reference with the line tables. The user should always consult with the percentage composition given in the level tables.

Some of the level values are followed by symbols "$+x$," "$+y$," etc. These symbols indicate that the level is not connected to the rest of the given level system by an observed transition. Therefore, this level and those having the same additive constant may incorporate the same unknown systematic shift with regard to the ground level. The level values enclosed in square brackets are obtained by theoretical or semi-empirical calculations. The uncertainties of the given energy values are specified in the text for each spectrum in Sec. 2.

In the line tables, wavelengths of the lines with wave numbers greater than 50 000 cm^{-1} are given in vacuum. All other wavelengths are given in air. Conversion from air to vacuum and vice versa was done using the five-parameter formula for the refractive index of standard air by Peck and Reeder.[15] All wavelengths are given in angstroms (1 Å$=10^{-10}$ m). Some of the wavelengths are supplemented with superscript symbols "S," "L," "P," or "C." The meaning of these symbols is as follows.

- S: The given wavelength was obtained by smoothing the data along the corresponding isoelectronic sequence.
- L: The given wavelength was obtained by smoothing the data along the corresponding isoelectronic sequence. The transition was identified using an isoelectronic comparison. Neither the upper nor lower level are connected to the known levels by observed transitions. Therefore, the level values are unknown.
- P: The line was not observed experimentally. However, it was predicted to occur at certain experimental conditions. The given wavelength is derived from the corresponding energy levels.
- C: The given wavelength is derived from the corresponding energy levels.

The identification of the lines is provided by the configuration, term, and J values of the lower and upper levels of the transition. These labels correspond to those used in the level tables. The odd-parity levels are indicated by the degree sign given after the level label. The uncertainties of the given wavelengths are given in the text for each spectrum. For highly ionized spectra, most of the levels were derived from only one observed line. The uncertainties of these lines directly correspond to the level uncertainties. The observed relative intensities of the lines are given in arbitrary units in the column entitled "Int." Besides the numerical estimate of the relative intensity, the values given in this column also include the character of the observed line according to the following notation:

bl = blended with another line;
d = wide or diffuse line;
m = masked by another line (the Ritz wavelength is given); and
a = observed in absorption.

A question mark after the upper level designation indicates that the identification of this line is uncertain. An explanation is provided in the text for this spectrum. For multiply classified lines, the observed wavelength and intensity are given only for the first given classification.

For several spectra, where reliable values of the transition probability are available for some of the lines, we give the A-values in units of s^{-1}. To save space, we use a condensed notation for the powers of ten. For example, the value "8.05+8" means 8.05×10^8. Uncertainties of the A-values are specified in the text for the corresponding ion.

The column titled "Type" specifies the types for parity-forbidden transitions. M1 means magnetic-dipole transition, and E2 means electric-quadrupole transition. This column is empty for electric-dipole (E1) transitions.

The last column identifies the sources where the line was observed. The references are given in the end of the text for each ion. References followed by a degree symbol indicate the source of the given wavelength of the line. References followed by a star symbol indicate the source of the given A-value.

4. Tables of Energy Levels and Spectral Lines

Tables 1–49 are presented in this section.

TABLE 1. Energy levels of Ga I

Configuration	Term	J	Level (cm^{-1})	Landé-g
$3d^{10}4s^24p$	$^2P^\circ$	1/2	*0*	0.665 791 7
		3/2	*826.190*	1.334 057 3
$4s^25s$	^2S	1/2	24 788.530	
$4s^25p$	$^2P^\circ$	1/2	*33 044.05*	
		3/2	*33 155.07*	
$4s^24d$	^2D	3/2	34 781.66	
		5/2	34 787.85	
$4s^26s$	^2S	1/2	37 584.77	
$4s4p^2$	^4P	1/2	37 975.768	
		3/2	38 341.722	
		5/2	38 914.786	
$4s^26p$	$^2P^\circ$	1/2	*40 376.45*	
		3/2	*40 417.62*	
$4s^25d$	^2D	3/2	40 802.86	
		5/2	40 811.41	
$4s^24f$	$^2F^\circ$	5/2,7/2	*41 454.18*	
$4s^27s$	^2S	1/2	42 158.77	
$4s^27p$	$^2P^\circ$	1/2	*43 442.83*	
		3/2	*43 462.74*	
$4s^26d$	^2D	3/2	43 575.11	
		5/2	43 580.44	
$4s^25f$	$^2F^\circ$	5/2,7/2	*43 955.06*	
$4s^28s$	^2S	1/2	44 332.27	
$4s^27d$	^2D	3/2	45 071.75	
		5/2	45 075.73	
$4s^26f$	$^2F^\circ$	5/2,7/2	*45 312.94*	
$4s^29s$	^2S	1/2	45 536.66	
$4s^28d$	^2D	3/2	45 969.2	
		5/2	45 972.0	
$4s^27f$	$^2F^\circ$	5/2,7/2	*46 130.89*	
$4s^210s$	^2S	1/2	46 274.4	
$4s^29d$	^2D	3/2	46 547.9	
		5/2	46 549.0	
$4s^28f$	$^2F^\circ$	5/2,7/2	*46 661.21*	
$4s^211s$	^2S	1/2	46 758.6	
$4s^210d$	^2D	3/2,5/2	46 943.6	
$4s^212s$	^2S	1/2	47 093.3	
$4s^211d$	^2D	3/2,5/2	47 222.1	
$4s^213s$	^2S	1/2	47 334.4	
$4s^212d$	^2D	3/2	47 428.7	
$4s^214s$	^2S	1/2	47 514.0	
$4s^213d$	^2D	3/2	47 585.1	
		5/2	47 585.9	
$4s^215s$	^2S	1/2	47 651.4	
$4s^214d$	^2D	3/2	47 706.2	
		5/2	47 707.1	
$4s^216s$	^2S	1/2	47 758.6	
$4s^215d$	^2D	3/2	47 802.0	
		5/2	47 802.5	
$4s^217s$	^2S	1/2	47 844.1	
$4s^216d$	^2D	3/2	47 878.7	
		5/2	47 879.0	
$4s^218s$	^2S	1/2	47 913.0	
$4s^217d$	^2D	3/2	47 941.3	
		5/2	47 941.5	
$4s^219s$	^2S	1/2	47 970.0	
$4s^218d$	^2D	3/2,5/2	47 993.2	
$4s^220s$	^2S	1/2	48 017.0	
$4s^219d$	^2D	3/2	48 036.400	
		5/2	48 036.706	
$4s^220p$	$^2P^\circ$	1/2	*48 038.305*	
		3/2	*48 038.680*	
$4s^221s$	^2S	1/2	48 056.4	
$4s^220d$	^2D	3/2	48 072.962	
		5/2	48 073.225	
$4s^222s$	^2S	1/2	48 090.2	
$4s^221d$	^2D	3/2	48 104.096	
		5/2	48 104.327	
$4s^222p$	$^2P^\circ$	1/2	*48 105.564*	
		3/2	*48 105.838*	
$4s^223s$	^2S	1/2	48 118.5	
$4s^222d$	^2D	3/2,5/2	48 130.8	

TABLE 1. Energy levels of Ga I—Continued

Configuration	Term	J	Level (cm^{-1})	Landé-g
$4s^2 24s$	^{2}S	1/2	48 143.4	
$4s^2 23d$	^{2}D	3/2	48 153.970	
		5/2	48 154.145	
$4s^2 24p$	^{2}P°	1/2	*48 155.116*	
		3/2	*48 155.314*	
$4s^2 25s$	^{2}S	1/2	48 164.6	
$4s^2 24d$	^{2}D	3/2,5/2	48 173.7	
$4s^2 26s$	^{2}S	1/2	48 183.7	
$4s^2 25d$	^{2}D	3/2	48 191.759	
		5/2	48 191.895	
$4s^2 26p$	^{2}P°	1/2	*48 192.664*	
		3/2	*48 192.820*	
$4s^2 27s$	^{2}S	1/2	48 199.9	
$4s^2 26d$	^{2}D	5/2	48 207.2	
$4s^2 28s$	^{2}S	1/2	48 214.6	
$4s^2 27d$	^{2}D	3/2	48 221.079	
		5/2	48 221.186	
$4s^2 28p$	^{2}P°	1/2	*48 221.808*	
		3/2	*48 221.925*	
$4s^2 30d$	^{2}D	3/2	48 254.091	
		5/2	48 254.176	
$4s^2 34d$	^{2}D	3/2	48 284.786	
		5/2	48 284.842	
$4s^2 35p$	^{2}P°	1/2	*48 285.164*	
		3/2	*48 285.221*	
$4s^2 41p$	^{2}P°	1/2,3/2	*48 314.64*	
$4s^2 42p$	^{2}P°	1/2,3/2	*48 318.28*	
$4s^2 43p$	^{2}P°	1/2,3/2	*48 321.60*	
$4s^2 44p$	^{2}P°	1/2,3/2	*48 324.78*	
$4s^2 45p$	^{2}P°	1/2,3/2	*48 327.68*	
$4s^2 46p$	^{2}P°	1/2,3/2	*48 330.36*	
$4s^2 47p$	^{2}P°	1/2,3/2	*48 332.86*	
$4s^2 48p$	^{2}P°	1/2,3/2	*48 335.28*	
$4s^2 49p$	^{2}P°	1/2,3/2	*48 337.58*	
$4s^2 50p$	^{2}P°	1/2,3/2	*48 339.66*	
$4s^2 51p$	^{2}P°	1/2,3/2	*48 341.63*	
$4s^2 52p$	^{2}P°	1/2,3/2	*48 343.44*	
$4s^2 53p$	^{2}P°	1/2,3/2	*48 345.20*	
$4s^2 54p$	^{2}P°	1/2,3/2	*48 346.630*	

TABLE 1. Energy levels of Ga I—Continued

Configuration	Term	J	Level (cm^{-1})	Landé-g
$4s^2 55p$	^{2}P°	1/2,3/2	*48 348.173*	
$4s^2 56p$	^{2}P°	1/2,3/2	*48 349.627*	
$4s^2 57p$	^{2}P°	1/2,3/2	*48 351.09*	
$4s^2 58p$	^{2}P°	1/2,3/2	*48 352.45*	
$4s^2 59p$	^{2}P°	1/2,3/2	*48 353.64*	
$4s^2 60p$	^{2}P°	1/2,3/2	*48 354.81*	
$4s^2 61p$	^{2}P°	1/2,3/2	*48 355.97*	
$4s^2 62p$	^{2}P°	1/2,3/2	*48 357.01*	
$4s^2 63p$	^{2}P°	1/2,3/2	*48 357.97*	
$4s^2 64p$	^{2}P°	1/2,3/2	*48 358.98*	
$4s^2 65p$	^{2}P°	1/2,3/2	*48 359.81*	
$4s^2 66p$	^{2}P°	1/2,3/2	*48 360.69*	
$4s^2 67p$	^{2}P°	1/2,3/2	*48 361.66*	
$4s^2 68p$	^{2}P°	1/2,3/2	*48 362.35*	
$4s^2 69p$	^{2}P°	1/2,3/2	*48 363.18*	
$4s^2 70p$	^{2}P°	1/2,3/2	*48 363.88*	
Ga II ($^1S_0$)	**Limit**	**—**	**48 387.634**	
$4s4p^2$	^{2}D	3/2,5/2	53 800	
$4s4p^2$	^{2}S	1/2	62 108	
$4s4p^2$	^{2}P	1/2	65 805	
		3/2	66 426	
$4s4p(^3P^\circ_0)5p$	^{2}[1]	1/2	78 568.2	
		3/2	78 965.9	
$4s4p(^3P^\circ_1)5p$	^{2}[1]	1/2	80 433.7	
		3/2	80 755.9	
$4s4p(^3P^\circ_1)5p$	^{2}[2]	3/2	81 251.3	
$4s4p(^3P^\circ_2)5p$	^{2}[2]	3/2	81 413.5	
		5/2	83 178	
$4s4p(^3P^\circ_1)5p$	^{2}[0]	1/2	81 580.7	
$4s4p(^3P^\circ_2)5p$	^{2}[1]	1/2	81 934	
		3/2	82 183	
$4s4p(^1P^\circ_1)5p$	^{2}[1]	1/2,3/2	83 914.4	
$4s4p(^3P^\circ_0)6p$	^{2}[1]	1/2	87 095.9	
		3/2	87 566.4	
$4s4p(^3P^\circ_1)6p$	^{2}[1]	1/2	87 956.2	
		3/2	88 165.5	
$4s4p(^3P^\circ_1)6p$	^{2}[2]	3/2	88 280.0	
$4s4p(^3P^\circ_1)6p$	^{2}[0]	1/2	88 387.6	

TABLE 1. Energy levels of Ga I—Continued

Configuration	Term	J	Level (cm^{-1})	Landé-g
$4s4p(^3P^\circ_2)6p$	$^2[2]$	3/2	88 575.5	
$4s4p(^3P^\circ_2)6p$	$^2[1]$	1/2	88 926.0	
		3/2	89 086.1	
$4s4p(^3P^\circ_0)7p$	$^2[1]$	1/2	90 300.0	
		3/2	90 767.2	
$4s4p(^3P^\circ_1)7p$	$^2[1]$	1/2	91 119.5	
		3/2	91 287.5	
$4s4p(^3P^\circ_1)7p$	$^2[2]$	3/2	91 345.9	
$4s4p(^3P^\circ_1)7p$	$^2[0]$	1/2	91 474.6	
$4s4p(^3P^\circ_2)7p$	$^2[2]$	3/2	91 966.7	
$4s4p(^3P^\circ_2)7p$	$^2[1]$	1/2	92 082.7	
		3/2	92 294.3	
$4s4p(^3P^\circ_0)8p$	$^2[1]$	1/2	92 294.3	
		3/2	92 383.9	
$4s4p(^3P^\circ_1)8p$	$^2[1]$	1/2	92 784.2	
		3/2	92 893.6	
$4s4p(^3P^\circ_1)8p$	$^2[2]$	3/2	92 979.1	
$4s4p(^3P^\circ_1)8p$	$^2[0]$	1/2	93 037.1	
$4s4p(^3P^\circ_0)9p$	$^2[1]$	1/2,3/2	93 321.0	
$4s4p(^3P^\circ_1)9p$	$^2[1]$	1/2	93 716.3	
		3/2	93 798.1	
$4s4p(^3P^\circ_2)8p$	$^2[2]$	3/2	93 846.5	
$4s4p(^3P^\circ_1)9p$	$^2[2]$	3/2	93 846.5	
$4s4p(^3P^\circ_2)8p$	$^2[1]$	1/2,3/2	93 954.1	
$4s4p(^3P^\circ_0)10p$	$^2[1]$	1/2,3/2	93 954.1	
$4s4p(^3P^\circ_1)10p$	$^2[1]$	1/2,3/2	94 380.6	
$4s4p(^3P^\circ_0)11p$	$^2[1]$	1/2,3/2	94 380.6	
$4s4p(^3P^\circ_1)10p$	$^2[2]$	3/2	94 457.2	
$4s4p(^3P^\circ_0)12p$	$^2[1]$	1/2,3/2	94 594.8	
$4s4p(^3P^\circ_2)9p$	$^2[2]$	3/2	94 888.4	

TABLE 1. Energy levels of Ga I—Continued

Configuration	Term	J	Level (cm^{-1})	Landé-g
$4s4p(^3P^\circ_1)11p$	$^2[1]$	1/2,3/2	94 888.4	
$4s4p(^3P^\circ_0)15p$	$^2[1]$	1/2,3/2	95 085.1	
$4s4p(^3P^\circ_1)12p$	$^2[1]$	1/2,3/2	95 085.1	
$4s4p(^3P^\circ_0)16p$	$^2[1]$	1/2,3/2	95 175	
$4s4p(^3P^\circ_1)13p$	$^2[1]$	1/2,3/2	95 244.4	
$4s4p(^3P^\circ_0)17p$	$^2[1]$	1/2,3/2	95 247	
$4s4p(^3P^\circ_2)10p$	$^2[2]$	3/2	95 366.2	
$4s4p(^3P^\circ_1)14p$	$^2[1]$	1/2,3/2	95 422.6	
$4s4p(^3P^\circ_1)15p$	$^2[1]$	1/2,3/2	95 529	
$4s4p(^3P^\circ_1)16p$	$^2[1]$	1/2,3/2	95 629	
$4s4p(^3P^\circ_2)11p$	$^2[2]$	3/2	95 712	
Ga II 4s4p($^3P^\circ_0$)	**Limit**	**—**	**95 755.14**	
Ga II 4s4p($^3P^\circ_1$)	**Limit**	**—**	**96 201.68**	
Ga II 4s4p($^3P^\circ_2$)	**Limit**	**—**	**97 137.37**	
Ga II 4s4p($^1P^\circ_1$)	**Limit**	**—**	**119 088.90**	
$3d^9(^2D)4s^24p^2(^3P)$	^2D	3/2	152 420	
		5/2	154 300	
$3d^9(^2D)4s^24p^2(^3P)$	^2P	1/2	157 330	
		3/2	157 990	
$3d^9(^2D)4s^24p^2(^1D)$	^2S	1/2	159 110	
$3d^9(^2D)4s^24p^2(^1D)$	^2P	3/2	161 580	
		1/2	163 930	
$3d^9(^2D)4s^24p^2(^1D)$	^2D	5/2	163 140	
		3/2	166 050	
$3d^9(^2D)4s^24p^2(^1S)$	^2D	5/2	171 790	
		3/2	175 010	

TABLE 2. Spectral lines of Ga I

Wavelength (Å)	Classification: Lower		Classification: Upper		Energy levels (cm^{-1})		Int.	Type	A (s^{-1})	References
571.3	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$3d^9(^2D)4s^24p^2(^1S)$	$^2D_{3/2}$	0	175 010	2a			20
574.2	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$3d^9(^2D)4s^24p^2(^1S)$	$^2D_{3/2}$	826.19	175 010	0a			20
584.9	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$3d^9(^2D)4s^24p^2(^1S)$	$^2D_{5/2}$	826.19	171 790	3a			20
601.3	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$3d^9(^2D)4s^24p^2(^1D)$	$^2D_{3/2}$	0	166 050	7a			20
606.1	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$3d^9(^2D)4s^24p^2(^1D)$	$^2D_{3/2}$	826.19	166 050	14a			20
609.8	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$3d^9(^2D)4s^24p^2(^1D)$	$^2P_{1/2}$	0	163 930	15a			20
613.3	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$3d^9(^2D)4s^24p^2(^1D)$	$^2P_{1/2}$	826.19	163 930	13a			20
616.1	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$3d^9(^2D)4s^24p^2(^1D)$	$^2D_{5/2}$	826.19	163 140	7a			20
618.6	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$3d^9(^2D)4s^24p^2(^1D)$	$^2P_{3/2}$	0	161 580	4a			20
622.4	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$3d^9(^2D)4s^24p^2(^1D)$	$^2P_{3/2}$	826.19	161 580	7a			20
628.1	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$3d^9(^2D)4s^24p^2(^1D)$	$^2S_{1/2}$	0	159 110	9a			20
632.2	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$3d^9(^2D)4s^24p^2(^1D)$	$^2S_{1/2}$	826.19	159 110	11a			20
633.3	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$3d^9(^2D)4s^24p^2(^3P)$	$^2P_{3/2}$	0	157 990	8a			20
635.4	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$3d^9(^2D)4s^24p^2(^3P)$	$^2P_{1/2}$	0	157 210	6a			20
636.3	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$3d^9(^2D)4s^24p^2(^3P)$	$^2P_{3/2}$	826.19	157 990	5a			20
639.2	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$3d^9(^2D)4s^24p^2(^3P)$	$^2P_{1/2}$	826.19	157 210	6a			20
651.6	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$3d^9(^2D)4s^24p^2(^3P)$	$^2D_{5/2}$	826.19	154 300	4a			20
656.6	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$3d^9(^2D)4s^24p^2(^3P)$	$^2D_{3/2}$	0	152 420	0a			20
659.2	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$3d^9(^2D)4s^24p^2(^3P)$	$^2D_{3/2}$	826.19	152 420	2a			20
1044.8	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_2)11p$	$^2[2]_{3/2}$	0	95 712	a			67
1045.7	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_1)16p$	$^2[1]_{1/2,3/2}$	0	95 629	a			67
1046.8	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_1)15p$	$^2[1]_{1/2,3/2}$	0	95 529	a			67
1047.97	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_1)14p$	$^2[1]_{1/2,3/2}$	0	95 422.6	a			67
1048.59	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_2)10p$	$^2[2]_{3/2}$	0	95 366.2	a			67
1049.9	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_0)17p$	$^2[1]_{1/2,3/2}$	0	95 247	a			67
1049.93	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_1)13p$	$^2[1]_{1/2,3/2}$	0	95 244.4	a			67
1050.7	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_0)16p$	$^2[1]_{1/2,3/2}$	0	95 175	a			67
1051.69	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_1)12p$	$^2[1]_{1/2,3/2}$	0	95 085.1	a			67
	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_0)15p$	$^2[1]_{1/2,3/2}$	0	95 085.1	a			67
1053.87	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_2)9p$	$^2[2]_{3/2}$	0	94 888.4	a			67
	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_1)11p$	$^2[1]_{1/2,3/2}$	0	94 888.4	a			67
1057.14	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_0)12p$	$^2[1]_{1/2,3/2}$	0	94 594.8	a			67
1058.68	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_1)10p$	$^2[2]_{3/2}$	0	94 457.2	a			67
1059.54	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_1)10p$	$^2[1]_{1/2,3/2}$	0	94 380.6	a			67
	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_0)11p$	$^2[1]_{1/2,3/2}$	0	94 380.6	a			67
1064.35	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_2)8p$	$^2[1]_{1/2,3/2}$	0	93 954.1	a			67
	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_0)10p$	$^2[1]_{1/2,3/2}$	0	93 954.1	a			67
1065.57	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_2)8p$	$^2[2]_{3/2}$	0	93 846.5	a			67
	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_1)9p$	$^2[2]_{3/2}$	0	93 846.5	a			67
1066.12	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_1)9p$	$^2[1]_{3/2}$	0	93 798.1	a			67
1067.05	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_1)9p$	$^2[1]_{1/2}$	0	93 716.3	a			67
1071.57	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_0)9p$	$^2[1]_{1/2,3/2}$	0	93 321.0	a			67
1074.84	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_1)8p$	$^2[0]_{1/2}$	0	93 037.1	a			67
1075.51	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_1)8p$	$^2[2]_{3/2}$	0	92 979.1	a			67
1076.50	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_1)8p$	$^2[1]_{3/2}$	0	92 893.6	a			67
1077.77	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_1)8p$	$^2[1]_{1/2}$	0	92 784.2	a			67
1082.44	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_0)8p$	$^2[1]_{3/2}$	0	92 383.9	a			67
1083.49	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_0)8p$	$^2[1]_{1/2}$	0	92 294.3	a			67
	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_2)7p$	$^2[1]_{3/2}$	0	92 294.3	a			67
1085.98	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_2)7p$	$^2[1]_{1/2}$	0	92 082.7	a			67

TABLE 2. Spectral lines of Ga I—Continued

Wavelength (Å)	Classification Lower		Upper		Energy levels (cm^{-1})		Int.	Type	A (s^{-1})	References
1087.35	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_2)7p$	$^2[2]_{3/2}$	0	91 966.7	a			67
1093.20	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_1)7p$	$^2[0]_{1/2}$	0	91 474.6	a			67
1094.74	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_1)7p$	$^2[2]_{3/2}$	0	91 345.9	a			67
1095.44	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_1)7p$	$^2[1]_{3/2}$	0	91 287.5	a			67
1097.46	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_1)7p$	$^2[1]_{1/2}$	0	91 119.5	a			67
1101.72	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_0)7p$	$^2[1]_{3/2}$	0	90 767.2	a			67
1107.42	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_0)7p$	$^2[1]_{1/2}$	0	90 300.0	a			67
1122.51	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_2)6p$	$^2[1]_{3/2}$	0	89 086.1	a			67
1124.53	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_2)6p$	$^2[1]_{1/2}$	0	88 926.0	a			67
1128.98	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_2)6p$	$^2[2]_{3/2}$	0	88 575.5	a			67
1131.38	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_1)6p$	$^2[0]_{1/2}$	0	88 387.6	a			67
1132.76	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_1)6p$	$^2[2]_{3/2}$	0	88 280.0	a			67
1134.23	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_1)6p$	$^2[1]_{3/2}$	0	88 165.5	a			67
1136.93	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_1)6p$	$^2[1]_{1/2}$	0	87 956.2	a			67
1141.99	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_0)6p$	$^2[1]_{3/2}$	0	87 566.4	a			67
1148.16	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_0)6p$	$^2[1]_{1/2}$	0	87 095.9	a			67
1191.68	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^1P^\circ_1)5p$	$^2[1]_{1/2,3/2}$	0	83 914.4	a			67
1203.55	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s4p(^1P^\circ_1)5p$	$^2[1]_{1/2,3/2}$	826.19	83 914.4	a			67
1214.3	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s4p(^3P^\circ_2)5p$	$^2[2]_{5/2}$	826.19	83 178	a			67
1216.8	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_2)5p$	$^2[1]_{3/2}$	0	82 183	a			67
1220.5	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_2)5p$	$^2[1]_{1/2}$	0	81 934	a			67
1225.78	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_1)5p$	$^2[0]_{1/2}$	0	81 580.7	a			67
1228.2	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_2)5p$	$^2[2]_{3/2}$	0	81 413.5	a			67
1230.75	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_1)5p$	$^2[2]_{3/2}$	0	81 251.3	a			67
1238.30	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_1)5p$	$^2[1]_{3/2}$	0	80 755.9	a			67
1240.89	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s4p(^3P^\circ_2)5p$	$^2[2]_{3/2}$	826.19	81 413.5	a			67
1243.26	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_1)5p$	$^2[1]_{1/2}$	0	80 433.7	a			67
1256.18	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s4p(^3P^\circ_1)5p$	$^2[1]_{1/2}$	826.19	80 433.7	a			67
1266.37	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_0)5p$	$^2[1]_{3/2}$	0	78 965.9	a			67
1272.78	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p(^3P^\circ_0)5p$	$^2[1]_{1/2}$	0	78 568.2	a			67
1505.6	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p^2$	$^2P_{3/2}$	0	66 426				6
1519.8	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p^2$	$^2P_{1/2}$	0	65 805				6
1524.6	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s4p^2$	$^2P_{3/2}$	826.19	66 426				6
1539.1	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s4p^2$	$^2P_{1/2}$	826.19	65 805				6
1610.3	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p^2$	$^2S_{1/2}$	0	62 108				6
1632.0	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s4p^2$	$^2S_{1/2}$	826.19	62 108				6
1860.	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p^2$	$^2D_{3/2,5/2}$	0	53 800	a			36,11°
2073.40	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^28s$	$^2S_{1/2}$	0	48 214.6	a			8
2074.03	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^27s$	$^2S_{1/2}$	0	48 199.9	a			8
2074.38	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^25d$	$^2D_{3/2}$	0	48 191.759	a			8
2074.73	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^26s$	$^2S_{1/2}$	0	48 183.7	a			8
2075.16	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^24d$	$^2D_{3/2}$	0	48 173.7	a			8
2075.55	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^25s$	$^2S_{1/2}$	0	48 164.6	a			8
2076.01	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^23d$	$^2D_{3/2}$	0	48 153.970	a			8
2076.46	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^24s$	$^2S_{1/2}$	0	48 143.4	a			8
2077.01	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^22d$	$^2D_{3/2}$	0	48 130.8	a			8
2077.54	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^23s$	$^2S_{1/2}$	0	48 118.5	a			8
2078.16	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^21d$	$^2D_{3/2}$	0	48 104.096	a			8
2078.76	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^22s$	$^2S_{1/2}$	0	48 090.2	a			8
2079.50	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^20d$	$^2D_{3/2}$	0	48 072.962	a			8

TABLE 2. Spectral lines of Ga I—Continued

Wavelength (Å)	Classification Lower		Upper		Energy levels (cm^{-1})		Int.	Type	A (s^{-1})	References
2080.23	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^221s$	$^2S_{1/2}$	0	48 056.4	a			8
2081.09	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^219d$	$^2D_{3/2}$	0	48 036.400	a			8
2081.93	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^220s$	$^2S_{1/2}$	0	48 017.0	a			8
2082.96	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^218d$	$^2D_{3/2}$	0	47 993.2	a			8
2083.97	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^219s$	$^2S_{1/2}$	0	47 970.0	a			8
2085.22	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^217d$	$^2D_{3/2}$	0	47 941.3	a			8
2086.45	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^218s$	$^2S_{1/2}$	0	47 913.0	a			8
2087.95	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^216d$	$^2D_{3/2}$	0	47 878.7	a			8
2089.46	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^217s$	$^2S_{1/2}$	0	47 844.1	a			8
2091.30	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^215d$	$^2D_{3/2}$	0	47 802.0	a			8
2093.20	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^216s$	$^2S_{1/2}$	0	47 758.6	a			8
2095.50	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^214d$	$^2D_{3/2}$	0	47 706.2	a			8
2097.91	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^215s$	$^2S_{1/2}$	0	47 651.4	a			8
2100.82	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^213d$	$^2D_{3/2}$	0	47 585.1	a			8
2103.98	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^214s$	$^2S_{1/2}$	0	47 514.0	a			8
2107.76	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^212d$	$^2D_{3/2}$	0	47 428.7	a			8
2109.27	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^227d$	$^2D_{5/2}$	826.19	48 221.186	a			8
2109.55	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^228s$	$^2S_{1/2}$	826.19	48 214.6	a			8
2109.88	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^226d$	$^2D_{5/2}$	826.19	48 207.2	a			8
2110.21	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^227s$	$^2S_{1/2}$	826.19	48 199.9	a			8
2110.57	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^225d$	$^2D_{5/2}$	826.19	48 191.895	a			8
2110.93	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^226s$	$^2S_{1/2}$	826.19	48 183.7	a			8
2111.37	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^224d$	$^2D_{5/2}$	826.19	48 173.7	a			8
2111.78	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^225s$	$^2S_{1/2}$	826.19	48 164.6	a			8
2111.96	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^213s$	$^2S_{1/2}$	0	47 334.4	a			8
2112.26	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^223d$	$^2D_{5/2}$	826.19	48 154.145	a			8
2112.73	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^224s$	$^2S_{1/2}$	826.19	48 143.4	a			8
2113.29	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^222d$	$^2D_{5/2}$	826.19	48 130.8	a			8
2113.84	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^223s$	$^2S_{1/2}$	826.19	48 118.5	a			8
2114.47	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^221d$	$^2D_{5/2}$	826.19	48 104.327	a			8
2115.12	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^222s$	$^2S_{1/2}$	826.19	48 090.2	a			8
2115.87	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^220d$	$^2D_{5/2}$	826.19	48 073.225	a			8
2116.62	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^221s$	$^2S_{1/2}$	826.19	48 056.4	a			8
2116.98	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^211d$	$^2D_{3/2}$	0	47 222.1	a			8
2117.52	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^219d$	$^2D_{5/2}$	826.19	48 036.706	a			8
2118.39	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^220s$	$^2S_{1/2}$	826.19	48 017.0	a			8
2119.46	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^218d$	$^2D_{5/2}$	826.19	47 993.2	a			8
2120.50	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^219s$	$^2S_{1/2}$	826.19	47 970.0	a			8
2121.78	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^217d$	$^2D_{5/2}$	826.19	47 941.5	a			8
2122.77	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^212s$	$^2S_{1/2}$	0	47 093.3	a			8
2123.07	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^218s$	$^2S_{1/2}$	826.19	47 913.0	a			8
2124.60	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^216d$	$^2D_{5/2}$	826.19	47 879.0	a			8
2126.18	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^217s$	$^2S_{1/2}$	826.19	47 844.1	a			8
2128.06	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^215d$	$^2D_{5/2}$	826.19	47 802.5	a			8
2130.05	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^216s$	$^2S_{1/2}$	826.19	47 758.6	a			8
2132.39	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^214d$	$^2D_{5/2}$	826.19	47 707.1	a			8
2134.93	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^215s$	$^2S_{1/2}$	826.19	47 651.4	a			8
2137.93	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^213d$	$^2D_{5/2}$	826.19	47 585.9	a			8
2137.97	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^211s$	$^2S_{1/2}$	0	46 758.6	a			8
2141.21	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^214s$	$^2S_{1/2}$	826.19	47 514.0	a			8

TABLE 2. Spectral lines of Ga I—Continued

Wavelength (Å)	Classification Lower		Upper		Energy levels (cm^{-1})		Int.	Type	A (s^{-1})	References
2147.65	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^29d$	$^2D_{3/2}$	0	46 547.9	a			8
2149.49	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^213s$	$^2S_{1/2}$	826.19	47 334.4	a			8
2160.34	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^210s$	$^2S_{1/2}$	0	46 274.4	a			8
2160.69	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^212s$	$^2S_{1/2}$	826.19	47 093.3	a			8
2167.70	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^210d$	$^2D_{5/2}$	826.19	46 943.6	a			8
2174.69	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^28d$	$^2D_{3/2}$	0	45 969.2	a			8
2176.43	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^211s$	$^2S_{1/2}$	826.19	46 758.6	a			8
2186.41	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^29d$	$^2D_{5/2}$	826.19	46 549.0	a			8
2195.34[P]	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^29s$	$^2S_{1/2}$	0	45 536.67			1.94+6	82*
2199.62	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^210s$	$^2S_{1/2}$	826.19	46 274.4	a		3.11+6	8°,82*
2214.36	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^28d$	$^2D_{5/2}$	826.19	45 972.0	a		3.17+6	8°,82*
2214.49[P]	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^28d$	$^2D_{3/2}$	826.19	45 969.2			5.30+5	82*
2218.039	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^27d$	$^2D_{3/2}$	0	45 071.75	1			7
2235.92[P]	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^29s$	$^2S_{1/2}$	826.19	45 536.67			4.00+6	82*
2255.034	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^28s$	$^2S_{1/2}$	0	44 332.27	1		3.15+6	7°,82*
2259.227	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^27d$	$^2D_{5/2}$	826.19	45 075.73	1		3.1+6	7°,32*
2294.19	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^26d$	$^2D_{3/2}$	0	43 575.11	2		6.97+6	7°,82*
2297.869	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^28s$	$^2S_{1/2}$	826.19	44 332.27	1		5.56+6	7°,82*
2338.24	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^26d$	$^2D_{5/2}$	826.19	43 580.44	3		9.75+6	7°,82*
2338.596	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^26d$	$^2D_{3/2}$	826.19	43 575.11	1		1.58+6	7°,82*
2371.29	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^27s$	$^2S_{1/2}$	0	42 158.77	3		5.57+6	7°,82*
2418.69	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^27s$	$^2S_{1/2}$	826.19	42 158.77	4		1.00+7	7°,82*
2450.078	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^25d$	$^2D_{3/2}$	0	40 802.86			2.78+7	7°,82*
2500.187	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^25d$	$^2D_{5/2}$	826.19	40 811.41			3.34+7	7°,82*
2500.714	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^25d$	$^2D_{3/2}$	826.19	40 802.86			5.54+6	7°,82*
2607.3460	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p^2$	$^4P_{3/2}$	0	38 341.722				5,80°
2624.6748	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s4p^2$	$^4P_{5/2}$	826.19	38 914.786				5,80°
2632.4733	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s4p^2$	$^4P_{1/2}$	0	37 975.768				5,80°
2659.873	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^26s$	$^2S_{1/2}$	0	37 584.77			1.22+7	7°,82*
2664.7701	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s4p^2$	$^4P_{3/2}$	826.19	38 341.722				5,80°
2691.0218	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s4p^2$	$^4P_{1/2}$	826.19	37 975.768				5,80°
2719.664	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^26s$	$^2S_{1/2}$	826.19	37 584.77	3		2.34+7	7°,82*
2874.235	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^24d$	$^2D_{3/2}$	0	34 781.66	3		1.17+8	7,9°,82*
2943.636	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^24d$	$^2D_{5/2}$	826.19	34 787.85	3		1.34+8	7,9°,82*
2944.173	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^24d$	$^2D_{3/2}$	826.19	34 781.66	1		2.61+7	7,9°,82*
4032.984	$3d^{10}4s^24p$	$^2P^\circ_{1/2}$	$4s^25s$	$^2S_{1/2}$	0	24 788.530	4		4.85+7	7,9,35°,82*
4172.042	$3d^{10}4s^24p$	$^2P^\circ_{3/2}$	$4s^25s$	$^2S_{1/2}$	826.19	24 788.530	5		9.45+7	7,9°, 82*
4240.525[C]	$4s^25s$	$^2S_{1/2}$	$4s^270p$	$^2P^\circ_{1/2,3/2}$	24 788.530	48 363.88				48
4240.651[C]	$4s^25s$	$^2S_{1/2}$	$4s^269p$	$^2P^\circ_{1/2,3/2}$	24 788.530	48 363.18				48
4240.800[C]	$4s^25s$	$^2S_{1/2}$	$4s^268p$	$^2P^\circ_{1/2,3/2}$	24 788.530	48 362.35				48
4240.924[C]	$4s^25s$	$^2S_{1/2}$	$4s^267p$	$^2P^\circ_{1/2,3/2}$	24 788.530	48 361.66				48
4241.098[C]	$4s^25s$	$^2S_{1/2}$	$4s^266p$	$^2P^\circ_{1/2,3/2}$	24 788.530	48 360.69				48
4241.257[C]	$4s^25s$	$^2S_{1/2}$	$4s^265p$	$^2P^\circ_{1/2,3/2}$	24 788.530	48 359.81				48
4241.406[C]	$4s^25s$	$^2S_{1/2}$	$4s^264p$	$^2P^\circ_{1/2,3/2}$	24 788.530	48 358.98				48
4241.588[C]	$4s^25s$	$^2S_{1/2}$	$4s^263p$	$^2P^\circ_{1/2,3/2}$	24 788.530	48 357.97				48
4241.761[C]	$4s^25s$	$^2S_{1/2}$	$4s^262p$	$^2P^\circ_{1/2,3/2}$	24 788.530	48 357.01				48
4241.948[C]	$4s^25s$	$^2S_{1/2}$	$4s^261p$	$^2P^\circ_{1/2,3/2}$	24 788.530	48 355.97				48
4242.157[C]	$4s^25s$	$^2S_{1/2}$	$4s^260p$	$^2P^\circ_{1/2,3/2}$	24 788.530	48 354.81				48
4242.367[C]	$4s^25s$	$^2S_{1/2}$	$4s^259p$	$^2P^\circ_{1/2,3/2}$	24 788.530	48 353.64				48
4242.582[C]	$4s^25s$	$^2S_{1/2}$	$4s^258p$	$^2P^\circ_{1/2,3/2}$	24 788.530	48 352.45				48

TABLE 2. Spectral lines of Ga I—Continued

Wavelength (Å)	Classification: Lower		Upper		Energy levels (cm^{-1})		Int.	Type	A (s^{-1})	References
4242.826[C]	$4s^25s$	$^2S_{1/2}$	$4s^257p$	$^2P^\circ_{1/2,3/2}$	24 788.530	48 351.09				48
4243.090	$4s^25s$	$^2S_{1/2}$	$4s^256p$	$^2P^\circ_{1/2,3/2}$	24 788.530	48 349.627				35°,48
4243.352	$4s^25s$	$^2S_{1/2}$	$4s^255p$	$^2P^\circ_{1/2,3/2}$	24 788.530	48 348.173				35°,48
4243.630	$4s^25s$	$^2S_{1/2}$	$4s^254p$	$^2P^\circ_{1/2,3/2}$	24 788.530	48 346.630				35°,48
4243.887[C]	$4s^25s$	$^2S_{1/2}$	$4s^253p$	$^2P^\circ_{1/2,3/2}$	24 788.530	48 345.20				48
4244.204[C]	$4s^25s$	$^2S_{1/2}$	$4s^252p$	$^2P^\circ_{1/2,3/2}$	24 788.530	48 343.44				48
4244.531[C]	$4s^25s$	$^2S_{1/2}$	$4s^251p$	$^2P^\circ_{1/2,3/2}$	24 788.530	48 341.63				48
4244.886[C]	$4s^25s$	$^2S_{1/2}$	$4s^250p$	$^2P^\circ_{1/2,3/2}$	24 788.530	48 339.66				48
4245.261[C]	$4s^25s$	$^2S_{1/2}$	$4s^249p$	$^2P^\circ_{1/2,3/2}$	24 788.530	48 337.58				48
4245.675[C]	$4s^25s$	$^2S_{1/2}$	$4s^248p$	$^2P^\circ_{1/2,3/2}$	24 788.530	48 335.28				48
4246.112[C]	$4s^25s$	$^2S_{1/2}$	$4s^247p$	$^2P^\circ_{1/2,3/2}$	24 788.530	48 332.86				48
4246.563[C]	$4s^25s$	$^2S_{1/2}$	$4s^246p$	$^2P^\circ_{1/2,3/2}$	24 788.530	48 330.36				48
4247.046[C]	$4s^25s$	$^2S_{1/2}$	$4s^245p$	$^2P^\circ_{1/2,3/2}$	24 788.530	48 327.68				48
4247.569[C]	$4s^25s$	$^2S_{1/2}$	$4s^244p$	$^2P^\circ_{1/2,3/2}$	24 788.530	48 324.78				48
4248.143[C]	$4s^25s$	$^2S_{1/2}$	$4s^243p$	$^2P^\circ_{1/2,3/2}$	24 788.530	48 321.60				48
4248.743[C]	$4s^25s$	$^2S_{1/2}$	$4s^242p$	$^2P^\circ_{1/2,3/2}$	24 788.530	48 318.28				48
4249.400[C]	$4s^25s$	$^2S_{1/2}$	$4s^241p$	$^2P^\circ_{1/2,3/2}$	24 788.530	48 314.64				48
4254.721	$4s^25s$	$^2S_{1/2}$	$4s^235p$	$^2P^\circ_{3/2}$	24 788.530	48 285.221				35
4254.731	$4s^25s$	$^2S_{1/2}$	$4s^235p$	$^2P^\circ_{1/2}$	24 788.530	48 285.164				35
4254.789[C]	$4s^25s$	$^2S_{1/2}$	$4s^234d$	$^2D_{5/2}$	24 788.530	48 284.842		E2		36
4254.799[C]	$4s^25s$	$^2S_{1/2}$	$4s^234d$	$^2D_{3/2}$	24 788.530	48 284.786		E2		36
4260.350[C]	$4s^25s$	$^2S_{1/2}$	$4s^230d$	$^2D_{5/2}$	24 788.530	48 254.176		E2		36
4260.365[C]	$4s^25s$	$^2S_{1/2}$	$4s^230d$	$^2D_{3/2}$	24 788.530	48 254.091		E2		36
4266.213	$4s^25s$	$^2S_{1/2}$	$4s^228p$	$^2P^\circ_{3/2}$	24 788.530	48 221.925				35
4266.235	$4s^25s$	$^2S_{1/2}$	$4s^228p$	$^2P^\circ_{1/2}$	24 788.530	48 221.808				35
4266.348[C]	$4s^25s$	$^2S_{1/2}$	$4s^227d$	$^2D_{5/2}$	24 788.530	48 221.186		E2		36
4266.367[C]	$4s^25s$	$^2S_{1/2}$	$4s^227d$	$^2D_{3/2}$	24 788.530	48 221.079		E2		36
4271.519	$4s^25s$	$^2S_{1/2}$	$4s^226p$	$^2P^\circ_{3/2}$	24 788.530	48 192.820				35
4271.547	$4s^25s$	$^2S_{1/2}$	$4s^226p$	$^2P^\circ_{1/2}$	24 788.530	48 192.664				35
4271.688[C]	$4s^25s$	$^2S_{1/2}$	$4s^225d$	$^2D_{5/2}$	24 788.530	48 191.895		E2		36
4271.712[C]	$4s^25s$	$^2S_{1/2}$	$4s^225d$	$^2D_{3/2}$	24 788.530	48 191.759		E2		36
4278.375	$4s^25s$	$^2S_{1/2}$	$4s^224p$	$^2P^\circ_{3/2}$	24 788.530	48 155.314				35
4278.411	$4s^25s$	$^2S_{1/2}$	$4s^224p$	$^2P^\circ_{1/2}$	24 788.530	48 155.116				35
4278.589[C]	$4s^25s$	$^2S_{1/2}$	$4s^223d$	$^2D_{5/2}$	24 788.530	48 154.145		E2		36
4278.621[C]	$4s^25s$	$^2S_{1/2}$	$4s^223d$	$^2D_{3/2}$	24 788.530	48 153.970		E2		36
4287.453	$4s^25s$	$^2S_{1/2}$	$4s^222p$	$^2P^\circ_{3/2}$	24 788.530	48 105.838				35
4287.504	$4s^25s$	$^2S_{1/2}$	$4s^222p$	$^2P^\circ_{1/2}$	24 788.530	48 105.564				35
4287.731[C]	$4s^25s$	$^2S_{1/2}$	$4s^221d$	$^2D_{5/2}$	24 788.530	48 104.327		E2		36
4287.774[C]	$4s^25s$	$^2S_{1/2}$	$4s^221d$	$^2D_{3/2}$	24 788.530	48 104.096		E2		36
4293.459[C]	$4s^25s$	$^2S_{1/2}$	$4s^220d$	$^2D_{5/2}$	24 788.530	48 073.225		E2		36
4293.507[C]	$4s^25s$	$^2S_{1/2}$	$4s^220d$	$^2D_{3/2}$	24 788.530	48 072.962		E2		36
4299.838	$4s^25s$	$^2S_{1/2}$	$4s^220p$	$^2P^\circ_{3/2}$	24 788.530	48 038.680				35
4299.907	$4s^25s$	$^2S_{1/2}$	$4s^220p$	$^2P^\circ_{1/2}$	24 788.530	48 038.305				35
4300.203[C]	$4s^25s$	$^2S_{1/2}$	$4s^219d$	$^2D_{5/2}$	24 788.530	48 036.706		E2		36
4300.260[C]	$4s^25s$	$^2S_{1/2}$	$4s^219d$	$^2D_{3/2}$	24 788.530	48 036.400		E2		36
5353.490	$4s^25s$	$^2S_{1/2}$	$4s^27p$	$^2P^\circ_{3/2}$	24 788.530	43 462.74	7			7,9°
5359.205	$4s^25s$	$^2S_{1/2}$	$4s^27p$	$^2P^\circ_{1/2}$	24 788.530	43 442.83	6			7,9°
6396.561	$4s^25s$	$^2S_{1/2}$	$4s^26p$	$^2P^\circ_{3/2}$	24 788.530	40 417.62	9			7,9°
6413.447	$4s^25s$	$^2S_{1/2}$	$4s^26p$	$^2P^\circ_{1/2}$	24 788.530	40 376.45	7			7,9°
7051.24	$4s^25p$	$^2P^\circ_{1/2}$	$4s^211d$	$^2D_{3/2}$	33 044.05	47 222.1	3			7

TABLE 2. Spectral lines of Ga I—Continued

Wavelength (Å)	Classification				Energy levels (cm^{-1})		Int.	Type	A (s^{-1})	References
	Lower		Upper							
7106.82	$4s^25p$	$^2P^\circ_{3/2}$	$4s^211d$	$^2D_{5/2}$	33 155.07	47 222.1	5			7
7116.3	$4s^25p$	$^2P^\circ_{1/2}$	$4s^212s$	$^2S_{1/2}$	33 044.05	47 093.3	1			7
7172.9	$4s^25p$	$^2P^\circ_{3/2}$	$4s^212s$	$^2S_{1/2}$	33 155.07	47 093.3	2			7
7193.6	$4s^25p$	$^2P^\circ_{1/2}$	$4s^210d$	$^2D_{3/2}$	33 044.05	46 943.6	5			7
7251.4	$4s^25p$	$^2P^\circ_{3/2}$	$4s^210d$	$^2D_{5/2}$	33 155.07	46 943.6	10			7
7289.6	$4s^25p$	$^2P^\circ_{1/2}$	$4s^211s$	$^2S_{1/2}$	33 044.05	46 758.6	3			7
7349.3	$4s^25p$	$^2P^\circ_{3/2}$	$4s^211s$	$^2S_{1/2}$	33 155.07	46 758.6	5			7
7403.0	$4s^25p$	$^2P^\circ_{1/2}$	$4s^29d$	$^2D_{3/2}$	33 044.05	46 547.9	20			7
7464.0	$4s^25p$	$^2P^\circ_{3/2}$	$4s^29d$	$^2D_{5/2}$	33 155.07	46 549.0	30			7
7556.6	$4s^25p$	$^2P^\circ_{1/2}$	$4s^210s$	$^2S_{1/2}$	33 044.05	46 274.4	6			7
7620.5	$4s^25p$	$^2P^\circ_{3/2}$	$4s^210s$	$^2S_{1/2}$	33 155.07	46 274.4	10			7
7734.77	$4s^25p$	$^2P^\circ_{1/2}$	$4s^28d$	$^2D_{3/2}$	33 044.05	45 969.2	50			7
7800.01	$4s^25p$	$^2P^\circ_{3/2}$	$4s^28d$	$^2D_{5/2}$	33 155.07	45 972.0	100			7
7801.6	$4s^25p$	$^2P^\circ_{3/2}$	$4s^28d$	$^2D_{3/2}$	33 155.07	45 969.2	4			7
8002.55	$4s^25p$	$^2P^\circ_{1/2}$	$4s^29s$	$^2S_{1/2}$	33 044.05	45 536.67	15			7
8074.25	$4s^25p$	$^2P^\circ_{3/2}$	$4s^29s$	$^2S_{1/2}$	33 155.07	45 536.67	20			7
8311.86	$4s^25p$	$^2P^\circ_{1/2}$	$4s^27d$	$^2D_{3/2}$	33 044.05	45 071.75	6			7,9°
8386.49	$4s^25p$	$^2P^\circ_{3/2}$	$4s^27d$	$^2D_{5/2}$	33 155.07	45 075.73	7			7,9°
8389.30	$4s^25p$	$^2P^\circ_{3/2}$	$4s^27d$	$^2D_{3/2}$	33 155.07	45 071.75	4			7,9°
8415.51	$4s^24d$	$^2D_{3/2}$	$4s^28f$	$^2F^\circ_{5/2}$	34 781.66	46 661.21	2			9
8419.91	$4s^24d$	$^2D_{5/2}$	$4s^28f$	$^2F^\circ_{7/2}$	34 787.85	46 661.21	3			9
8808.75	$4s^24d$	$^2D_{3/2}$	$4s^27f$	$^2F^\circ_{5/2}$	34 781.66	46 130.89	3			9
8813.56	$4s^24d$	$^2D_{5/2}$	$4s^27f$	$^2F^\circ_{7/2}$	34 787.85	46 130.89	5			9
8856.37	$4s^25p$	$^2P^\circ_{1/2}$	$4s^28s$	$^2S_{1/2}$	33 044.05	44 332.27	3			7,9°
8944.33	$4s^25p$	$^2P^\circ_{3/2}$	$4s^28s$	$^2S_{1/2}$	33 155.07	44 332.27	4			7,9°
9492.92	$4s^24d$	$^2D_{3/2}$	$4s^26f$	$^2F^\circ_{5/2}$	34 781.66	45 312.94	1			9
9493.12	$4s^25p$	$^2P^\circ_{1/2}$	$4s^26d$	$^2D_{3/2}$	33 044.05	43 575.11	2			7,9°
9498.50	$4s^24d$	$^2D_{5/2}$	$4s^26f$	$^2F^\circ_{7/2}$	34 787.85	45 312.94	2			9
9589.36	$4s^25p$	$^2P^\circ_{3/2}$	$4s^26d$	$^2D_{5/2}$	33 155.07	43 580.44	5			7,9°
9594.25	$4s^25p$	$^2P^\circ_{3/2}$	$4s^26d$	$^2D_{3/2}$	33 155.07	43 575.11	1			7,9°
10898.10	$4s^24d$	$^2D_{3/2}$	$4s^25f$	$^2F^\circ_{5/2}$	34 781.66	43 955.06	4			9
10905.47	$4s^24d$	$^2D_{5/2}$	$4s^25f$	$^2F^\circ_{7/2}$	34 787.85	43 955.06	5			9
10968.27	$4s^25p$	$^2P^\circ_{1/2}$	$4s^27s$	$^2S_{1/2}$	33 044.05	42 158.77	1			7,9°
11103.51	$4s^25p$	$^2P^\circ_{3/2}$	$4s^27s$	$^2S_{1/2}$	33 155.07	42 158.77	3			7,9°
11949.12	$4s^25s$	$^2S_{1/2}$	$4s^25p$	$^2P^\circ_{3/2}$	24 788.530	33 155.07	10			7,9°
12109.78	$4s^25s$	$^2S_{1/2}$	$4s^25p$	$^2P^\circ_{1/2}$	24 788.530	33 044.05	9			7,9°
12885.05	$4s^25p$	$^2P^\circ_{1/2}$	$4s^25d$	$^2D_{3/2}$	33 044.05	40 802.86	4			9
13057.50	$4s^25p$	$^2P^\circ_{3/2}$	$4s^25d$	$^2D_{5/2}$	33 155.07	40 811.41	5			9
14982.75	$4s^24d$	$^2D_{3/2}$	$4s^24f$	$^2F^\circ_{5/2}$	34 781.66	41 454.18	5			9
14996.64	$4s^24d$	$^2D_{5/2}$	$4s^24f$	$^2F^\circ_{7/2}$	34 787.85	41 454.18	6			9
17757.91	$4s^24d$	$^2D_{5/2}$	$4s^26p$	$^2P^\circ_{3/2}$	34 787.85	40 417.62	2			9
17868.96	$4s^24d$	$^2D_{3/2}$	$4s^26p$	$^2P^\circ_{1/2}$	34 781.66	40 376.45	1			9
22016.81	$4s^25p$	$^2P^\circ_{1/2}$	$4s^26s$	$^2S_{1/2}$	33 044.05	37 584.77	6			9
22568.71	$4s^25p$	$^2P^\circ_{3/2}$	$4s^26s$	$^2S_{1/2}$	33 155.07	37 584.77	7			9

TABLE 3. Energy levels of Ga II

Configuration	Term	J	Level (cm^{-1})	Leading Percentages			
$3d^{10}4s^2$	^{1}S	0	0.000				
$4s4p$	^{3}P°	0	*47 367.55*				
		1	*47 814.114*				
		2	*48 749.85*				
$4s4p$	^{1}P°	1	*70 701.427*				
$4s5s$	^{3}S	1	102 944.595				
$4s5s$	^{1}S	0	106 662.379				
$4p^2$	^{1}D	2	107 720.716	55	+44	$4s4d$	^{1}D
$4s4d$	^{3}D	1	113 815.885				
		2	113 842.301				
		3	113 883.193				
$4p^2$	^{3}P	0	114 695.47				
		1	115 224.47				
		2	116 139.90				
$4s5p$	^{3}P°	0	*118 429.967*				
		1	*118 518.461*				
		2	*118 727.870*				
$4s5p$	^{1}P°	1	*120 550.431*				
$4s4d$	^{1}D	2	126 187.61	43	+45	$4p^2$	^{1}D
$4s6s$	^{3}S	1	133 010.30				
$4s6s$	^{1}S	0	133 741.20				
$4p^2$	^{1}S	0	135 639.40				
$4s5d$	^{3}D	1	137 157.524				
		2	137 168.592				
		3	137 185.466				
$4s4f$	^{3}F°	2	*137 332.285*	99			
		3	*137 333.474*	84	+15		^{1}F°
		4	*137 339.674*	99			
$4s4f$	^{1}F°	3	*137 342.570*	84	+15		^{3}F°
$4s5d$	^{1}D	2	139 703.442				
$4s7s$	^{3}S	1	145 494.205				
$4s7s$	^{1}S	0	146 023.600				
$4s5f$	^{3}F°	2	*147 484.34*				
		3	*147 485.466*				
		4	*147 491.193*				
$4s5f$	^{1}F°	3	*147 493.327*				
$4s6d$	^{3}D	1	147 520.34				
		2	147 526.09				
		3	147 534.881				
$4s5g$	(1/2,7/2)	3	147 817.61				
		4	147 817.65				
$4s5g$	(1/2,9/2)	5	147 818.60				

TABLE 3. Energy levels of Ga II—Continued

Configuration	Term	J	Level (cm^{-1})	Leading Percentages		
		4	147 818.74			
$4s6d$	^{1}D	2	148 446.729			
$4s8s$	^{3}S	1	151 923.93			
$4s8s$	^{1}S	0	152 200.866			
$4s6f$	^{3}F°	2	*153 000.078*			
		3	*153 001.63*			
		4	*153 005.977*			
$4s6f$	^{1}F°	3	*153 009.57*			
$4s7d$	^{3}D	1	153 064.92			
		2	153 068.30			
		3	153 073.50			
$4s6g$	(1/2,7/2)	3	153 214.7			
		4	153 214.81			
$4s6g$	(1/2,9/2)	5	153 215.62			
		4	153 215.74			
$4s7d$	^{1}D	2	153 515.707			
$4s7f$	^{3}F°	2	*156 322.3*			
		3	*156 323.8*			
		4	*156 327.39*			
$4s7f$	^{1}F°	3	*156 331.2*			
$4s8d$	^{3}D	3	156 386.7			
$4s7g$	(1/2,7/2)	3	156 468.8			
		4	156 468.9			
$4s7g$	(1/2,9/2)	5	156 469.5			
		4	156 469.75			
$4s8g$	(1/2,7/2)	3	158 579.5			
		4	158 579.5			
$4s8g$	(1/2,9/2)	4	158 580.7			
		5	158 580.9			
Ga III ($^2S_{1/2}$)	**Limit**	—	**165 465.8**			
$3d^94s^25p$	(5/2,3/2)°	1	*247 304*	95		
$3d^94s^25p$	(3/2,3/2)°	1	*250 501*	59	+36	(3/2,1/2)°
$3d^94s^25p$	(3/2,1/2)°	1	*250 960*	63	+37	(3/2,3/2)°
$3d^94s^24f$	(5/2,7/2)°	1	*267 550*	60	+40	(5/2,5/2)°
$3d^94s^26p$	(5/2,3/2)°	1	*268 870*	99		
$3d^94s^24f$	(3/2,5/2)°	1	*271 050*	100		
$3d^94s^26p$	(3/2,3/2)°	1	*272 140*	63	+36	(3/2,1/2)°
$3d^94s^26p$	(3/2,1/2)°	1	*272 410*	64	+36	(3/2,3/2)°
$3d^94s^25f$	(5/2,7/2)°	1	*277 780*	52	+48	(5/2,5/2)°
$3d^94s^27p$	(5/2,3/2)°	1	*278 560*	100		

TABLE 3. Energy levels of Ga II—Continued

Configuration	Term	J	Level (cm^{-1})	Leading Percentages			
$3d^94s^25f$	$(3/2,5/2)°$	1	*281 250*	100			
$3d^94s^27p$	$(3/2,3/2)°$	1	*281 910*	64	+36		$(3/2,1/2)°$
$3d^94s^27p$	$(3/2,1/2)°$	1	*282 110*	64	+36		$(3/2,3/2)°$
$3d^94s^28p$	$(5/2,3/2)°$	1	*283 740*	100			
$3d^94s^26f$	$(5/2,7/2)°$	1	*284 090*	52	+48		$(5/2,5/2)°$
$3d^94s^27f$	$(5/2,7/2)°$	1	*286 660*	56	+44		$(5/2,5/2)°$
$3d^94s^26f$	$(3/2,5/2)°$	1	*286 810*	99			
$3d^94s^29p$	$(5/2,3/2)°$	1	*286 880*	96			
$3d^94s^28p$	$(3/2,1/2)°$	1	*287 220*	64	+36		$(3/2,3/2)°$
$3d^94s^28f$	$(5/2,7/2)°$	1	*288 740*	56	+44		$(5/2,5/2)°$
$3d^94s^210p$	$(5/2,3/2)°$	1	*288 930*	100			
$3d^94s^29f$	$(5/2,7/2)°$	1	*290 080*	55	+45		$(5/2,5/2)°$
$3d^94s^27f$	$(3/2,5/2)°$	1	*290 230*	100			
$3d^94s^211p$	$(5/2,3/2)°$	1	*290 330*	54	+30	$3d^94s^29p$	$(3/2,3/2)°$

TABLE 4. Spectral lines of Ga II

Wavelength (Å)	Classification				Energy levels (cm^{-1})		Int.	A (s^{-1})	References
	Lower		Upper						
344.43	$3d^{10}4s^2$	$^1S_0$	$3d^94s^211p$	$(5/2,3/2)^°_1$	0.000	290 330	*a*		72
344.55	$3d^{10}4s^2$	$^1S_0$	$3d^94s^27f$	$(3/2,5/2)^°_1$	0.000	290 230	*a*		72
344.73	$3d^{10}4s^2$	$^1S_0$	$3d^94s^29f$	$(5/2,7/2)^°_1$	0.000	290 080	*a*		72
346.10	$3d^{10}4s^2$	$^1S_0$	$3d^94s^210p$	$(5/2,3/2)^°_1$	0.000	288 930	*a*		72
346.33	$3d^{10}4s^2$	$^1S_0$	$3d^94s^28f$	$(5/2,7/2)^°_1$	0.000	288 740	*a*		72
348.16	$3d^{10}4s^2$	$^1S_0$	$3d^94s^28p$	$(3/2,1/2)^°_1$	0.000	287 220	*a*		72
348.58	$3d^{10}4s^2$	$^1S_0$	$3d^94s^29p$	$(5/2,3/2)^°_1$	0.000	286 880	*a*		72
348.66	$3d^{10}4s^2$	$^1S_0$	$3d^94s^26f$	$(3/2,5/2)^°_1$	0.000	286 810	*a*		72
348.85	$3d^{10}4s^2$	$^1S_0$	$3d^94s^27f$	$(5/2,7/2)^°_1$	0.000	286 660	*a*		72
352.00	$3d^{10}4s^2$	$^1S_0$	$3d^94s^26f$	$(5/2,7/2)^°_1$	0.000	284 090	*a*		72
352.43	$3d^{10}4s^2$	$^1S_0$	$3d^94s^28p$	$(5/2,3/2)^°_1$	0.000	283 740	*a*		72
354.47	$3d^{10}4s^2$	$^1S_0$	$3d^94s^27p$	$(3/2,1/2)^°_1$	0.000	282 110	*a*		72
354.72	$3d^{10}4s^2$	$^1S_0$	$3d^94s^27p$	$(3/2,3/2)^°_1$	0.000	281 910	*a*		72
355.56	$3d^{10}4s^2$	$^1S_0$	$3d^94s^25f$	$(3/2,5/2)^°_1$	0.000	281 250	*a*		72
358.99	$3d^{10}4s^2$	$^1S_0$	$3d^94s^27p$	$(5/2,3/2)^°_1$	0.000	278 560	*a*		72
360.00	$3d^{10}4s^2$	$^1S_0$	$3d^94s^25f$	$(5/2,7/2)^°_1$	0.000	277 780	*a*		72
367.09	$3d^{10}4s^2$	$^1S_0$	$3d^94s^26p$	$(3/2,1/2)^°_1$	0.000	272 410	*a*		72
367.45	$3d^{10}4s^2$	$^1S_0$	$3d^94s^26p$	$(3/2,3/2)^°_1$	0.000	272 140	*a*		72
368.94	$3d^{10}4s^2$	$^1S_0$	$3d^94s^24f$	$(3/2,5/2)^°_1$	0.000	271 050	*a*		72
371.93	$3d^{10}4s^2$	$^1S_0$	$3d^94s^26p$	$(5/2,3/2)^°_1$	0.000	268 870	*a*		72
373.76	$3d^{10}4s^2$	$^1S_0$	$3d^94s^24f$	$(5/2,7/2)^°_1$	0.000	267 550	*a*		72
398.47	$3d^{10}4s^2$	$^1S_0$	$3d^94s^25p$	$(3/2,1/2)^°_1$	0.000	250 960	*a*		72
399.20	$3d^{10}4s^2$	$^1S_0$	$3d^94s^25p$	$(3/2,3/2)^°_1$	0.000	250 501	*a*		72

TABLE 4. Spectral lines of Ga II—Continued

Wavelength (Å)	Classification				Energy levels (cm^{-1})		Int.	A (s^{-1})	References
	Lower		Upper						
404.36	$3d^{10}4s^2$	$^1S_0$	$3d^94s^25p$	$(5/2,3/2)^\circ_1$	0.000	247 304	*a*		72
829.529	$3d^{10}4s^2$	$^1S_0$	$4s5p$	$^1P^\circ_1$	0.000	120 550.431	3	2.2+7	5,44°, 32*
843.752	$3d^{10}4s^2$	$^1S_0$	$4s5p$	$^3P^\circ_1$	0.000	118 518.461	0		44
929.050	$4s4p$	$^3P^\circ_2$	$4s8d$	$^3D_3$	48 749.85	156 386.7	0		44
958.545	$4s4p$	$^3P^\circ_2$	$4s7d$	$^3D_3$	48 749.85	153 073.50	1		5,44°
960.57	$4s4p$	$^3P^\circ_1$	$4s8s$	$^3S_1$	47 814.114	151 923.93	0		5
969.19	$4s4p$	$^3P^\circ_2$	$4s8s$	$^3S_1$	48 749.85	151 923.93	2		5
998.467	$4s4p$	$^3P^\circ_0$	$4s6d$	$^3D_1$	47 367.55	147 520.34	1		5,44°
1002.895	$4s4p$	$^3P^\circ_1$	$4s6d$	$^3D_2$	47 814.114	147 526.09	2		5,44°
1012.299	$4s4p$	$^3P^\circ_2$	$4s6d$	$^3D_3$	48 749.85	147 534.881	2		5,44°
1019.10	$4s4p$	$^3P^\circ_0$	$4s7s$	$^3S_1$	47 367.55	145 494.205	3		5
1023.735	$4s4p$	$^3P^\circ_1$	$4s7s$	$^3S_1$	47 814.114	145 494.205	0		5,44°
1033.663	$4s4p$	$^3P^\circ_2$	$4s7s$	$^3S_1$	48 749.85	145 494.205	0		5,44°
1113.708	$4s4p$	$^3P^\circ_0$	$4s5d$	$^3D_1$	47 367.55	137 157.524	4		5,44°
1119.133	$4s4p$	$^3P^\circ_1$	$4s5d$	$^3D_2$	47 814.114	137 168.592	4		44
1119.270	$4s4p$	$^3P^\circ_1$	$4s5d$	$^3D_1$	47 814.114	137 157.524	2		5,44°
1130.760	$4s4p$	$^3P^\circ_2$	$4s5d$	$^3D_3$	48 749.85	137 185.466	6		5,44°
1130.979	$4s4p$	$^3P^\circ_2$	$4s5d$	$^3D_2$	48 749.85	137 168.592	3		44
1167.639	$4s4p$	$^3P^\circ_0$	$4s6s$	$^3S_1$	47 367.55	133 010.30	3		5,44°
1173.761	$4s4p$	$^3P^\circ_1$	$4s6s$	$^3S_1$	47 814.114	133 010.30	6		5,44°
1186.795	$4s4p$	$^3P^\circ_2$	$4s6s$	$^3S_1$	48 749.85	133 010.30	6		5,44°
1207.521	$4s4p$	$^1P^\circ_1$	$4s7d$	$^1D_2$	70 701.427	153 515.707	2		44
1227.022	$4s4p$	$^1P^\circ_1$	$4s8s$	$^1S_0$	70 701.427	152 200.866	0		5,44°
1286.256	$4s4p$	$^1P^\circ_1$	$4s6d$	$^1D_2$	70 701.427	148 446.729	6		44
1291.362	$4s4p$	$^3P^\circ_2$	$4s4d$	$^1D_2$	48 749.85	126 187.61	2		24,44°
1327.635	$4s4p$	$^1P^\circ_1$	$4s7s$	$^1S_0$	70 701.427	146 023.600	1		5,44°
1414.401	$3d^{10}4s^2$	$^1S_0$	$4s4p$	$^1P^\circ_1$	0.000	70 701.427	21	1.97+9	1,5,44°,82*
1449.234	$4s4p$	$^1P^\circ_1$	$4s5d$	$^1D_2$	70 701.427	139 703.442	11		44
1463.578	$4s4p$	$^3P^\circ_1$	$4p^2$	$^3P_2$	47 814.114	116 139.90	15		1,5,44°
1473.690	$4s4p$	$^3P^\circ_0$	$4p^2$	$^3P_1$	47 367.55	115 224.47	14		1,5,44°
1483.453	$4s4p$	$^3P^\circ_1$	$4p^2$	$^3P_1$	47 814.114	115 224.47	14		1,5,44°
1483.903	$4s4p$	$^3P^\circ_2$	$4p2$	$^3P_2$	48 749.85	116 139.90	16		1,5,44°
1495.185	$4s4p$	$^3P^\circ_1$	$4p^2$	$^3P_0$	47 814.114	114 695.47	12		1,5,44°
1504.331	$4s4p$	$^3P^\circ_2$	$4p^2$	$^3P_1$	48 749.85	115 224.47	14		1,5,44°
1504.926	$4s4p$	$^3P^\circ_0$	$4s4d$	$^3D_1$	47 367.55	113 815.885	15	8.54+8	1,5,44°,79*
1514.504	$4s4p$	$^3P^\circ_1$	$4s4d$	$^3D_2$	47 814.114	113 842.301	16	1.13+9	1,5,44°,79*
1515.106	$4s4p$	$^3P^\circ_1$	$4s4d$	$^3D_1$	47 814.114	113 815.885	14	6.27+8	1,5,44°,79*
1535.309	$4s4p$	$^3P^\circ_2$	$4s4d$	$^3D_3$	48 749.85	113 883.193	17	1.45+9	1,5,44°,79*
1536.276	$4s4p$	$^3P^\circ_2$	$4s4d$	$^3D_2$	48 749.85	113 842.301	15	3.61+8	1,5,44°,79*
1536.898	$4s4p$	$^3P^\circ_2$	$4s4d$	$^3D_1$	48 749.85	113 815.885	11	4.0+7	1,5,44°,79*
1539.930	$4s4p$	$^1P^\circ_1$	$4p^2$	$^1S_0$	70 701.427	135 639.40	11		24,44°
1586.298	$4s4p$	$^1P^\circ_1$	$4s6s$	$^1S_0$	70 701.427	133 741.20	7		24,44°
1669.268	$4s4p$	$^3P^\circ_1$	$4p^2$	$^1D_2$	47 814.114	107 720.716	6		44
1695.756	$4s4p$	$^3P^\circ_2$	$4p^2$	$^1D_2$	48 749.85	107 720.716	8		44
1699.295	$4s4p$	$^3P^\circ_1$	$4s5s$	$^1S_0$	47 814.114	106 662.379	2		44
1799.306	$4s4p$	$^3P^\circ_0$	$4s5s$	$^3S_1$	47 367.55	102 944.595	13		1,44°
1802.251	$4s4p$	$^1P^\circ_1$	$4s4d$	$^1D_2$	70 701.427	126 187.61	15	1.46+9	24,44°, 79*
1813.878	$4s4p$	$^3P^\circ_1$	$4s5s$	$^3S_1$	47 814.114	102 944.595	16		1,5,44°
1845.199	$4s4p$	$^3P^\circ_2$	$4s5s$	$^3S_1$	48 749.85	102 944.595	18		1,44°
2056.509	$4p^2$	$^1D_2$	$4s7f$	$^1F^\circ_3$	107 720.716	156 331.2	0		44

TABLE 4. Spectral lines of Ga II—Continued

Wavelength (Å)	Classification				Energy levels (cm^{-1})		Int.	A (s^{-1})	References
	Lower		Upper						
2090.7679	$3d^{10}4s^2$	$^1S_0$	$4s4p$	$^3P^\circ_1$	0.000	47 814.114	20hfs	4.09+5	5,44,80°,82*
2200.085	$4s4p$	$^1P^\circ_1$	$4p^2$	$^3P_2$	70 701.427	116 139.90	5		44
2207.360	$4p^2$	$^1D_2$	$4s6f$	$^1F^\circ_3$	107 720.716	153 009.57	2hfs		44,80°
2207.745	$4p^2$	$^1D_2$	$4s6f$	$^3F^\circ_3$	107 720.716	153 001.63	0hfs		44,80°
2317.271	$4s4p$	$^1P^\circ_1$	$4s4d$	$^3D_2$	70 701.427	113 842.301	0		44
2318.693	$4s4p$	$^1P^\circ_1$	$4s4d$	$^3D_1$	70 701.427	113 815.885	0		44
2355.323	$4s4d$	$^3D_3$	$4s7f$	$^3F^\circ_4$	113 883.193	156 327.39	0		44
2513.5362	$4p^2$	$^1D_2$	$4s5f$	$^1F^\circ_3$	107 720.716	147 493.327	3hfs		44,80°
2514.0335	$4p^2$	$^1D_2$	$4s5f$	$^3F^\circ_3$	107 720.716	147 485.466	2hfs		44,80°
2551.26	$4s4d$	$^3D_1$	$4s6f$	$^3F^\circ_2$	113 815.885	153 000.078	2		5
2552.87	$4s4d$	$^3D_2$	$4s6f$	$^3F^\circ_3$	113 842.301	153 001.63	3		5
2555.28	$4s4d$	$^3D_3$	$4s6f$	$^3F^\circ_4$	113 883.193	153 005.977	4		5
2700.4934	$4s4p$	$^1P^\circ_1$	$4p^2$	$^1D_2$	70 701.427	107 720.716	7		5,44,80°
2779.9736	$4s4p$	$^1P^\circ_1$	$4s5s$	$^1S_0$	70 701.427	106 662.379	6		5,44,80°
2886.410	$4s5p$	$^3P^\circ_0$	$4s7d$	$^3D_1$	118 429.967	153 064.92	1hfs		5,44,80°
2893.522	$4s5p$	$^3P^\circ_1$	$4s7d$	$^3D_2$	118 518.461	153 068.30	1hfs		44,80°
2893.805	$4s5p$	$^3P^\circ_1$	$4s7d$	$^3D_1$	118 518.461	153 064.92	0		5,44°
2910.727	$4s5p$	$^3P^\circ_2$	$4s7d$	$^3D_3$	118 727.870	153 073.50	3hfs		5,44,80°
2911.168	$4s5p$	$^3P^\circ_2$	$4s7d$	$^3D_2$	118 727.870	153 068.30	0		44
2969.2715	$4s4d$	$^3D_1$	$4s5f$	$^3F^\circ_2$	113 815.885	147 484.34	6hfs		5,44,80°
2970.810	$4s4d$	$^3D_2$	$4s5f$	$^1F^\circ_3$	113 842.301	147 493.327	4hfs		5,44,80°
2971.505	$4s4d$	$^3D_2$	$4s5f$	$^3F^\circ_3$	113 842.301	147 485.466	5hfs		44,80°
2971.600	$4s4d$	$^3D_2$	$4s5f$	$^3F^\circ_2$	113 842.301	147 484.34	3hfs		5,44,80°
2974.418	$4s4d$	$^3D_3$	$4s5f$	$^1F^\circ_3$	113 883.193	147 493.327	2hfs		44,80°
2974.6142	$4s4d$	$^3D_3$	$4s5f$	$^3F^\circ_4$	113 883.193	147 491.193	6hfs		5,44,80°
2975.118	$4s4d$	$^3D_3$	$4s5f$	$^3F^\circ_3$	113 883.193	147 485.466	2hfs		44,80°
2984.770	$4s5p$	$^3P^\circ_0$	$4s8s$	$^3S_1$	118 429.967	151 923.93	0		5,44°
2992.654	$4s5p$	$^3P^\circ_1$	$4s8s$	$^3S_1$	118 518.461	151 923.93	0		5,44°
3011.519	$4s5p$	$^3P^\circ_2$	$4s8s$	$^3S_1$	118 727.870	151 923.93	2hfs		5,44,80°
3032.6122	$4s5p$	$^1P^\circ_1$	$4s7d$	$^1D_2$	120 550.431	153 515.707	3		44,80°
3158.5998	$4s5p$	$^1P^\circ_1$	$4s8s$	$^1S_0$	120 550.431	152 200.866	2		5,44,80°
3374.9172	$4p^2$	$^1D_2$	$4s4f$	$^1F^\circ_3$	107 720.716	137 342.570	13hfs		44,80°
3375.954	$4p^2$	$^1D_2$	$4s4f$	$^3F^\circ_3$	107 720.716	137 333.474	11hfs		44,80°
3436.579	$4s5p$	$^3P^\circ_0$	$4s6d$	$^3D_1$	118 429.967	147 520.34	5hfs		5,44,80°
3446.382	$4s5p$	$^3P^\circ_1$	$4s6d$	$^3D_2$	118 518.461	147 526.09	7hfs		5,44,80°
3447.062	$4s5p$	$^3P^\circ_1$	$4s6d$	$^3D_1$	118 518.461	147 520.34	4hfs		5,44,80°
3470.3834	$4s5p$	$^3P^\circ_2$	$4s6d$	$^3D_3$	118 727.870	147 534.881	10hfs		5,44,80°
3471.440	$4s5p$	$^3P^\circ_2$	$4s6d$	$^3D_2$	118 727.870	147 526.09	3hfs		5,44,80°
3472.08	$4s5p$	$^3P^\circ_2$	$4s6d$	$^3D_1$	118 727.870	147 520.34	0		5,44°
3583.6822	$4s5p$	$^1P^\circ_1$	$4s6d$	$^1D_2$	120 550.431	148 446.729	7hfs		44,80°
3693.8613	$4s5p$	$^3P^\circ_0$	$4s7s$	$^3S_1$	118 429.967	145 494.205	2hfs		5,44,80°
3705.9795	$4s5p$	$^3P^\circ_1$	$4s7s$	$^3S_1$	118 518.461	145 494.205	4hfs		5,44,80°
3734.9744	$4s5p$	$^3P^\circ_2$	$4s7s$	$^3S_1$	118 727.870	145 494.205	6hfs		5,44,80°
3924.5879	$4s5p$	$^1P^\circ_1$	$4s7s$	$^1S_0$	120 550.431	146 023.600	3		5,44,80°
4251.1546	$4s4d$	$^3D_1$	$4s4f$	$^3F^\circ_2$	113 815.885	137 332.285	4hfs		5,44,80°
4254.073	$4s4d$	$^3D_2$	$4s4f$	$^1F^\circ_3$	113 842.301	137 342.570	2hfs		5,44,80°
4255.720	$4s4d$	$^3D_2$	$4s4f$	$^3F^\circ_3$	113 842.301	137 333.474	4hfs		5,44,80°
4255.937	$4s4d$	$^3D_2$	$4s4f$	$^3F^\circ_2$	113 842.301	137 332.285	1hfs		44,80°
4261.478	$4s4d$	$^3D_3$	$4s4f$	$^1F^\circ_3$	113 883.193	137 342.570	1hfs		44,80°

TABLE 4. Spectral lines of Ga II—Continued

Wavelength (Å)	Classification Lower		Upper		Energy levels (cm^{-1})		Int.	A (s^{-1})	References
4262.0144	4s4d	$^3D_3$	4s4f	$^3F^\circ_4$	113 883.193	137 339.674	6hfs		5,44,80°
4263.136	4s4d	$^3D_3$	4s4f	$^3F^\circ_3$	113 883.193	137 333.474	1hfs		44,80°
4705.17	4s4f	$^3F^\circ_2$	4s8g	$(1/2,7/2)_3$	137 332.285	158 579.5	0		44
	4s4f	$^3F^\circ_3$	4s8g	$(1/2,9/2)_4$	137 333.474	158 580.7			44
4706.52	4s4f	$^3F^\circ_4$	4s8g	$(1/2,9/2)_5$	137 339.674	158 580.9	0		44
4707.19	4s4f	$^1F^\circ_3$	4s8g	$(1/2,9/2)_4$	137 342.570	158 580.7	0		44
4719.07	4s5p	$^3P^\circ_1$	4s5d	$^1D_2$	118 518.461	139 703.442	0		44
5216.46	4s5d	$^3D_1$	4s7f	$^3F^\circ_2$	137 157.524	156 322.3	0		44
5219.07	4s5d	$^3D_2$	4s7f	$^3F^\circ_3$	137 168.592	156 323.8	1		44
5219.6579	4s5p	$^1P^\circ_1$	4s5d	$^1D_2$	120 550.431	139 703.442	10		44,80°
5222.682	4s5d	$^3D_3$	4s7f	$^3F^\circ_4$	137 185.466	156 327.39	1		44,80°
5224.16	4s4f	$^3F^\circ_2$	4s7g	$(1/2,7/2)_3$	137 332.285	156 468.8	1		44
	4s4f	$^3F^\circ_3$	4s7g	$(1/2,9/2)_4$	137 333.474	156 469.75			44
5224.44	4s4f	$^3F^\circ_3$	4s7g	$(1/2,7/2)_4$	137 333.474	156 468.9	1		44
5225.99	4s4f	$^3F^\circ_4$	4s7g	$(1/2,9/2)_5$	137 339.674	156 469.5	1		44
5226.74	4s4f	$^1F^\circ_3$	4s7g	$(1/2,9/2)_4$	137 342.570	156 469.75	1		44
5338.240	4s5p	$^3P^\circ_0$	4s5d	$^3D_1$	118 429.967	137 157.524	7hfs		5,44,80°
5360.4022	4s5p	$^3P^\circ_1$	4s5d	$^3D_2$	118 518.461	137 168.592	8hfs		5,44,80°
5363.585	4s5p	$^3P^\circ_1$	4s5d	$^3D_1$	118 518.461	137 157.524	5hfs		5,44,80°
5416.3179	4s5p	$^3P^\circ_2$	4s5d	$^3D_3$	118 727.870	137 185.466	10hfs		5,44,80°
5421.275	4s5p	$^3P^\circ_2$	4s5d	$^3D_2$	118 727.870	137 168.592	5hfs		5,44,80°
5424.54	4s5p	$^3P^\circ_2$	4s5d	$^3D_1$	118 727.870	137 157.524	1hfs		5,44°
6294.51	4s4f	$^3F^\circ_2$	4s6g	$(1/2,7/2)_3$	137 332.285	153 214.7	4		44
	4s4f	$^3F^\circ_3$	4s6g	$(1/2,9/2)_4$	137 333.474	153 215.74			44
6294.96	4s4f	$^3F^\circ_3$	4s6g	$(1/2,7/2)_4$	137 333.474	153 214.81	3		44
6297.097	4s4f	$^3F^\circ_4$	4s6g	$(1/2,9/2)_5$	137 339.674	153 215.62	7hfs		44,80°
6298.199	4s4f	$^1F^\circ_3$	4s6g	$(1/2,9/2)_4$	137 342.570	153 215.74	5hfs		44,80°
6310.368	4s5d	$^3D_1$	4s6f	$^3F^\circ_2$	137 157.524	153 000.078	4		44,80°
6314.20	4s5d	$^3D_2$	4s6f	$^3F^\circ_3$	137 168.592	153 001.63	5		44
6319.161	4s5d	$^3D_3$	4s6f	$^3F^\circ_4$	137 185.466	153 005.977	7		44,80°
6334.0688	4s5s	$^3S_1$	4s5p	$^3P^\circ_2$	102 944.595	118 727.870	21hfs		5,44,80°
6353.98	4s4f	$^3F^\circ_4$	4s7d	$^3D_3$	137 339.674	153 073.50	0		44
6357.24	4s4f	$^1F^\circ_3$	4s7d	$^3D_2$	137 342.570	153 068.30	0		44
6419.239	4s5s	$^3S_1$	4s5p	$^3P^\circ_1$	102 944.595	118 518.461	19hfs		5,44,80°
6455.923	4s5s	$^3S_1$	4s5p	$^3P^\circ_0$	102 944.595	118 429.967	17hfs		5,44,80°
6625.53	4s5p	$^1P^\circ_1$	$4p^2$	$^1S_0$	120 550.431	135 639.40	9		44
6856.71	4s5p	$^3P^\circ_0$	4s6s	$^3S_1$	118 429.967	133 010.30	5hfs		44
6898.56	4s5p	$^3P^\circ_1$	4s6s	$^3S_1$	118 518.461	133 010.30	6hfs		44
6999.668	4s5p	$^3P^\circ_2$	4s6s	$^3S_1$	118 727.870	133 010.30	8hfs		5,44,80°
7198.450	4s5s	$^1S_0$	4s5p	$^1P^\circ_1$	106 662.379	120 550.431	16		5,44,80°
7578.98	4s5p	$^1P^\circ_1$	4s6s	$^1S_0$	120 550.431	133 741.20	3hfs		44,80°
7792.26	$4p^2$	$^1D_2$	4s5p	$^1P^\circ_1$	107 720.716	120 550.431	16		44
8962.15	4s4d	$^1D_2$	4s4f	$^1F^\circ_3$	126 187.61	137 342.570	5		44
8969.49	4s4d	$^1D_2$	4s4f	$^3F^\circ_3$	126 187.61	137 333.474	2		44
9534.52	4s4f	$^3F^\circ_2$	4s5g	$(1/2,7/2)_3$	137 332.285	147 817.61	5		44
	4s4f	$^3F^\circ_3$	4s5g	$(1/2,9/2)_4$	137 333.474	147 818.74			44
9535.57	4s4f	$^3F^\circ_3$	4s5g	$(1/2,7/2)_4$	137 333.474	147 817.65	7		44
9540.35	4s4f	$^3F^\circ_4$	4s5g	$(1/2,9/2)_5$	137 339.674	147 818.60	8		44
9542.86	4s4f	$^1F^\circ_3$	4s5g	$(1/2,9/2)_4$	137 342.570	147 818.74	8		44

TABLE 4. Spectral lines of Ga II—Continued

Wavelength (Å)	Classification				Energy levels (cm^{-1})		Int.	A (s^{-1})	References
	Lower		Upper						
9680.93	$4s5d$	$^3D_1$	$4s5f$	$^3F^\circ_2$	137 157.524	147 484.34	4		44
9682.86	$4s5d$	$^3D_2$	$4s5f$	$^1F^\circ_3$	137 168.592	147 493.327	1		44
9690.20	$4s5d$	$^3D_2$	$4s5f$	$^3F^\circ_3$	137 168.592	147 485.466	4*hfs*		44
9700.67	$4s5d$	$^3D_3$	$4s5f$	$^3F^\circ_4$	137 185.466	147 491.193	7		44
9706.05	$4s5d$	$^3D_3$	$4s5f$	$^3F^\circ_3$	137 185.466	147 485.466	0		44

TABLE 5. Energy levels of Ga III

Configuration	Term	J	Level (cm^{-1})	Leading percentages			
$3d^{10}4s$	^2S	1/2	0				
$3d^{10}4p$	$^2P^\circ$	1/2	*65 169.40*				
		3/2	*66 887.63*				
$3d^94s^2$	^2D	5/2	130 395.56				
		3/2	133 902.00				
$3d^{10}5s$	^2S	1/2	140 746.84				
$3d^{10}4d$	^2D	3/2	144 086.46				
		5/2	144 200.28				
$3d^{10}5p$	$^2P^\circ$	1/2	*160 765.56*	100			
		3/2	*161 304.40*	100			
$3d^{10}4f$	$^2F^\circ$	5/2	*185 432.59*				
		7/2	*185 439.09*				
$3d^9(^2D)4s4p(^3P^\circ)$	$^3P^\circ$	3/2	*186 605*	96			
		1/2	*188 293*	98			
$3d^{10}6s$	^2S	1/2	187 566.51				
$3d^{10}5d$	^2D	3/2	189 187.72				
		5/2	189 250.59				
$3d^9(^2D)4s4p(^3P^\circ)$	$^4F^\circ$	3/2	*190 230.3*	97			
$3d^9(^2D)4s4p(^3P^\circ)$	$^4D^\circ$	3/2	*195 053.1*	60	+28		$^2D^\circ$
		1/2	*197 026.7*	27	+45		$^2P^\circ$
$3d^9(^2D)4s4p(^3P^\circ)$	$^2P^\circ$	1/2	*195 644*	52	+32		$^4D^\circ$
		3/2	*196 989.4*	50	+46	$3d^{10}6p$	$^2P^\circ$
$3d^{10}6p$	$^2P^\circ$	3/2	*196 173.7*	54	+40	$3d^9(^2D)4s4p(^3P^\circ)$	$^2P^\circ$
		1/2	*196 324.6*	58	+40	$3d^9(^2D)4s4p(^3P^\circ)$	$^4D^\circ$
$3d^9(^2D)4s4p(^3P^\circ)$	$^2D^\circ$	3/2	*197 780*	70	+28		$^4D^\circ$
$3d^{10}5f$	$^2F^\circ$	7/2	*207 908.49*				
		5/2	*207 918.82*				
$3d^{10}5g$	^2G	7/2	208 253.98				
		9/2	208 254.14				
$3d^{10}7s$	^2S	1/2	209 148.01				

TABLE 5. Energy levels of Ga III—Continued

Configuration	Term	J	Level (cm^{-1})	Leading percentages		
$3d^{10}6d$	^2D	3/2	210 020.13			
		5/2	210 053.67			
$3d^{10}7p$	$^2P^\circ$	1/2	*213 736*	100		
		3/2	*213 760.0*	99		
$3d^9(^2D)4s4p(^1P^\circ)$	$^2F^\circ$	7/2	*217 679.42*	100		
		5/2	*219 834.69*	85	+15	$^2D^\circ$
$3d^9(^2D)4s4p(^1P^\circ)$	$^2P^\circ$	3/2	*217 790.54*	88	+11	$^2D^\circ$
		1/2	*220 859.55*	100		
$3d^{10}6g$	^2G	7/2	220 346.65			
		9/2	220 346.75			
$3d^9(^2D)4s4p(^1P^\circ)$	$^2D^\circ$	5/2	*220 437.42*	85	+15	$^2F^\circ$
		3/2	*222 095.15*	89	+11	$^2P^\circ$
$3d^{10}8p$	$^2P^\circ$	3/2	*224 309.0*	100		
$3d^{10}7g$	^2G	7/2	227 637.2			
		9/2	227 637.2			
$3d^{10}9p$	$^2P^\circ$	3/2	*230 249*	100		
Ga IV ($^1S_0$)	**Limit**	—	**247 820**			
$3d^9(^2D)4p^2(^1D)$	^2S	1/2	265 811	49		
$3d^9(^2D)4p^2(^1D)$	^2P	3/2	266 857	53		
		1/2	269 584	44		
$3d^9(^2D)4p^2(^3P)$	^4D	5/2	269 988	62		
		3/2	270 552	67		
$3d^9(^2D)4p^2(^3P)$	^4P	5/2	276 056	86		
		3/2	278 158	75		
		1/2	279 447	68		
$3d^9(^2D)4p^2(^3P)$	^2D	3/2	276 960	47 ^4F		
		5/2	278 680	65		
$3d^9(^2D)4p^2(^3P)$	^4F	3/2	277 270	50		
$3d^9(^2D)4p^2(^3P)$	^2P	1/2	281 099	66		
		3/2	281 650	76		
$3d^9(^2D)4p^2(^1S)$	^2D	5/2	297 271 ?	90		

TABLE 6. Spectral lines of Ga III

	Classification								
Wavelength	Lower		Upper		Energy levels (cm^{-1})		Int.	$A(s^{-1})$	References
434.06	$3d^{10}4p$	$^2P^\circ_{3/2}$	$3d^9(^2D)4p^2(^1S)$	$^2D_{5/2}$	66 887.63	297 271 ?	1		55
434.313	$3d^{10}4s$	$^2S_{1/2}$	$3d^{10}9p$	$^2P^\circ_{3/2}$	0	230 249	5		55
445.816	$3d^{10}4s$	$^2S_{1/2}$	$3d^{10}8p$	$^2P^\circ_{3/2}$	0	224 309.0	15		55
452.772	$3d^{10}4s$	$^2S_{1/2}$	$3d^9(^2D)4s4p(^1P^\circ)$	$^2P^\circ_{1/2}$	0	220 859.55	1		50
459.159	$3d^{10}4s$	$^2S_{1/2}$	$3d^9(^2D)4s4p(^1P^\circ)$	$^2P^\circ_{3/2}$	0	217 790.54	2		50
461.937	$3d^{10}4p$	$^2P^\circ_{1/2}$	$3d^9(^2D)4p^2(^3P)$	$^2P_{3/2}$	65 169.40	281 650	9		55
463.115	$3d^{10}4p$	$^2P^\circ_{1/2}$	$3d^9(^2D)4p^2(^3P)$	$^2P_{1/2}$	65 169.40	281 099	27		55

TABLE 6. Spectral lines of Ga III—Continued

Wavelength	Classification Lower		Upper		Energy levels (cm^{-1})		Int.	$A(s^{-1})$	References
465.634	$3d^{10}4p$	$^2P^\circ_{3/2}$	$3d^9(^2D)4p^2(^3P)$	$^2P_{3/2}$	66 887.63	281 650	60		55
466.686	$3d^{10}4p$	$^2P^\circ_{1/2}$	$3d^9(^2D)4p^2(^3P)$	$^4P_{1/2}$	65 169.40	279 447	7		55
466.830	$3d^{10}4p$	$^2P^\circ_{3/2}$	$3d^9(^2D)4p^2(^3P)$	$^2P_{1/2}$	66 887.63	281 099	13		55
467.817	$3d^{10}4s$	$^2S_{1/2}$	$3d^{10}7p$	$^2P^\circ_{3/2}$	0	213 760.0	50		55
467.867	$3d^{10}4s$	$^2S_{1/2}$	$3d^{10}7p$	$^2P^\circ_{1/2}$	0	213 736	40		55
469.510	$3d^{10}4p$	$^2P^\circ_{1/2}$	$3d^9(^2D)4p^2(^3P)$	$^4P_{3/2}$	65 169.40	278 158	4		55
470.451	$3d^{10}4p$	$^2P^\circ_{3/2}$	$3d^9(^2D)4p^2(^3P)$	$^4P_{1/2}$	66 887.63	279 447	30*bl*		55
471.47	$3d^{10}4p$	$^2P^\circ_{1/2}$	$3d^9(^2D)4p^2(^3P)$	$^4F_{3/2}$	65 169.40	277 270	6		55
472.16	$3d^{10}4p$	$^2P^\circ_{3/2}$	$3d^9(^2D)4p^2(^3P)$	$^2D_{5/2}$	66 887.63	278 680	9		55
	$3d^{10}4p$	$^2P^\circ_{1/2}$	$3d^9(^2D)4p^2(^3P)$	$^2D_{3/2}$	65 169.40	276 960			55
473.328	$3d^{10}4p$	$^2P^\circ_{3/2}$	$3d^9(^2D)4p^2(^3P)$	$^4P_{3/2}$	66 887.63	278 158	10		55
478.084	$3d^{10}4p$	$^2P^\circ_{3/2}$	$3d^9(^2D)4p^2(^3P)$	$^4P_{5/2}$	66 887.63	276 056	6		55
486.894	$3d^{10}4p$	$^2P^\circ_{1/2}$	$3d^9(^2D)4p^2(^3P)$	$^4D_{3/2}$	65 169.40	270 552	3		55
489.200	$3d^{10}4p$	$^2P^\circ_{1/2}$	$3d^9(^2D)4p^2(^1D)$	$^2P_{1/2}$	65 169.40	269 584	1		55
492.367	$3d^{10}4p$	$^2P^\circ_{3/2}$	$3d^9(^2D)4p^2(^3P)$	$^4D_{5/2}$	66 887.63	269 988	3		55
493.355	$3d^{10}4p$	$^2P^\circ_{3/2}$	$3d^9(^2D)4p^2(^1D)$	$^2P_{1/2}$	66 887.63	269 584	30		55
495.819	$3d^{10}4p$	$^2P^\circ_{1/2}$	$3d^9(^2D)4p^2(^1D)$	$^2P_{3/2}$	65 169.40	266 857	22		55
498.400	$3d^{10}4p$	$^2P^\circ_{1/2}$	$3d^9(^2D)4p^2(^1D)$	$^2S_{1/2}$	65 169.40	265 811	12		55
500.079	$3d^{10}4p$	$^2P^\circ_{3/2}$	$3d^9(^2D)4p^2(^1D)$	$^2P_{3/2}$	66 887.63	266 857	40		55
502.712	$3d^{10}4p$	$^2P^\circ_{3/2}$	$3d^9(^2D)4p^2(^1D)$	$^2S_{1/2}$	66 887.63	265 811	4		55
505.610	$3d^{10}4s$	$^2S_{1/2}$	$3d^9(^2D)4s4p(^3P^\circ)$	$^2D^\circ_{3/2}$	0	197 780	1		50
507.553	$3d^{10}4s$	$^2S_{1/2}$	$3d^9(^2D)4s4p(^3P^\circ)$	$^4D^\circ_{1/2}$	0	197 026.7	2		50
509.364	$3d^{10}4s$	$^2S_{1/2}$	$3d^{10}6p$	$^2P^\circ_{1/2}$	0	196 324.6	20		55
511.132	$3d^{10}4s$	$^2S_{1/2}$	$3d^9(^2D)4s4p(^3P^\circ)$	$^2P^\circ_{1/2}$	0	195 644	170		55
512.671	$3d^{10}4s$	$^2S_{1/2}$	$3d^9(^2D)4s4p(^3P^\circ)$	$^4D^\circ_{3/2}$	0	195 053.1	1		50
531.087	$3d^{10}4s$	$^2S_{1/2}$	$3d^9(^2D)4s4p(^3P^\circ)$	$^4P^\circ_{1/2}$	0	188 293	30		55
535.890	$3d^{10}4s$	$^2S_{1/2}$	$3d^9(^2D)4s4p(^3P^\circ)$	$^4P^\circ_{3/2}$	0	186 605	80		55
619.940	$3d^{10}4s$	$^2S_{1/2}$	$3d^{10}5p$	$^2P^\circ_{3/2}$	0	161 304.40	3		1,50°
622.024	$3d^{10}4s$	$^2S_{1/2}$	$3d^{10}5p$	$^2P^\circ_{1/2}$	0	160 765.56	3		1,50°
690.372	$3d^{10}4p$	$^2P^\circ_{1/2}$	$3d^{10}6d$	$^2D_{3/2}$	65 169.40	210 020.13	0		50
694.548	$3d^{10}4p$	$^2P^\circ_{1/2}$	$3d^{10}7s$	$^2S_{1/2}$	65 169.40	209 148.01	0		50
698.485	$3d^{10}4p$	$^2P^\circ_{3/2}$	$3d^{10}6d$	$^2D_{5/2}$	66 887.63	210 053.67	1		50
806.328	$3d^{10}4p$	$^2P^\circ_{1/2}$	$3d^{10}5d$	$^2D_{3/2}$	65 169.40	189 187.72	3		50
817.018	$3d^{10}4p$	$^2P^\circ_{1/2}$	$3d^{10}6s$	$^2S_{1/2}$	65 169.40	187 566.51	2		50
817.239	$3d^{10}4p$	$^2P^\circ_{3/2}$	$3d^{10}5d$	$^2D_{5/2}$	66 887.63	189 250.59	3		50
817.659	$3d^{10}4p$	$^2P^\circ_{3/2}$	$3d^{10}5d$	$^2D_{3/2}$	66 887.63	189 187.72	2		50
828.651	$3d^{10}4p$	$^2P^\circ_{3/2}$	$3d^{10}6s$	$^2S_{1/2}$	66 887.63	187 566.51	2		50
1064.811	$3d^94s^2$	$^2D_{5/2}$	$3d^{10}8p$	$^2P^\circ_{3/2}$	130 395.56	224 309.0	5		55
1090.514	$3d^94s^2$	$^2D_{5/2}$	$3d^9(^2D)4s4p(^1P^\circ)$	$^2D^\circ_{3/2}$	130 395.56	222 095.15	3		50
1106.106	$3d^94s^2$	$^2D_{3/2}$	$3d^{10}8p$	$^2P^\circ_{3/2}$	133 902.00	224 309.0	90		55
1110.590	$3d^94s^2$	$^2D_{5/2}$	$3d^9(^2D)4s4p(^1P^\circ)$	$^2D^\circ_{5/2}$	130 395.56	220 437.42	3		50
1118.079	$3d^94s^2$	$^2D_{5/2}$	$3d^9(^2D)4s4p(^1P^\circ)$	$^2F^\circ_{5/2}$	130 395.56	219 834.69	2		50
1133.878	$3d^94s^2$	$^2D_{3/2}$	$3d^9(^2D)4s4p(^1P^\circ)$	$^2D^\circ_{3/2}$	133 902.00	222 095.15	4		50
1144.219	$3d^94s^2$	$^2D_{5/2}$	$3d^9(^2D)4s4p(^1P^\circ)$	$^2P^\circ_{3/2}$	130 395.56	217 790.54	5		50
1145.687	$3d^94s^2$	$^2D_{5/2}$	$3d^9(^2D)4s4p(^1P^\circ)$	$^2F^\circ_{7/2}$	130 395.56	217 679.42	4		50
1149.987	$3d^94s^2$	$^2D_{3/2}$	$3d^9(^2D)4s4p(^1P^\circ)$	$^2P^\circ_{1/2}$	133 902.00	220 859.55	3		50
1155.600	$3d^94s^2$	$^2D_{3/2}$	$3d^9(^2D)4s4p(^1P^\circ)$	$^2D^\circ_{5/2}$	133 902.00	220 437.42	2		50
1163.701	$3d^94s^2$	$^2D_{3/2}$	$3d^9(^2D)4s4p(^1P^\circ)$	$^2F^\circ_{5/2}$	133 902.00	219 834.69	4		50
1192.068	$3d^94s^2$	$^2D_{3/2}$	$3d^9(^2D)4s4p(^1P^\circ)$	$^2P^\circ_{3/2}$	133 902.00	217 790.54	2		50

TABLE 6. Spectral lines of Ga III—Continued

Wavelength	Classification: Lower		Upper		Energy levels (cm^{-1})		Int.	A(s^{-1})	References
1199.552	$3d^94s^2$	$^2D_{5/2}$	$3d^{10}7p$	$^2P^\circ_{3/2}$	130 395.56	213 760.0	35		55
1246.535	$3d^{10}4d$	$^2D_{3/2}$	$3d^{10}8p$	$^2P^\circ_{3/2}$	144 086.46	224 309.0	15		55
1267.151	$3d^{10}4p$	$^2P^\circ_{1/2}$	$3d^{10}4d$	$^2D_{3/2}$	65 169.40	144 086.46	14		1,50°
1290.110	$3d^94s^2$	$^2D_{5/2}$	$3d^{10}5f$	$^2F^\circ_{7/2}$	130 395.56	207 908.49	2		50
1293.446	$3d^{10}4p$	$^2P^\circ_{3/2}$	$3d^{10}4d$	$^2D_{5/2}$	66 887.63	144 200.28	15		1,50°
1295.357	$3d^{10}4p$	$^2P^\circ_{3/2}$	$3d^{10}4d$	$^2D_{3/2}$	66 887.63	144 086.46	12		1,50°
1297.944	$3d^{10}5s$	$^2S_{1/2}$	$3d^9(^2D)4s4p(^1P^\circ)$	$^2P^\circ_{3/2}$	140 746.84	217 790.54	10		55
1323.147	$3d^{10}4p$	$^2P^\circ_{1/2}$	$3d^{10}5s$	$^2S_{1/2}$	65 169.40	140 746.84	12		1,50°
1353.928	$3d^{10}4p$	$^2P^\circ_{3/2}$	$3d^{10}5s$	$^2S_{1/2}$	66 887.63	140 746.84	13		1,50°
1454.914	$3d^{10}4p$	$^2P^\circ_{1/2}$	$3d^94s^2$	$^2D_{3/2}$	65 169.40	133 902.00	10		50
1492.220	$3d^{10}4p$	$^2P^\circ_{3/2}$	$3d^94s^2$	$^2D_{3/2}$	66 887.63	133 902.00	8		50
1495.045	$3d^{10}4s$	$^2S_{1/2}$	$3d^{10}4p$	$^2P^\circ_{3/2}$	0	66 887.63	20	8.05+8	1,50°,82*
1501.641	$3d^94s^2$	$^2D_{5/2}$	$3d^9(^2D)4s4p(^3P^\circ)$	$^2P^\circ_{3/2}$	130 395.56	196 989.4	260		55
1520.262	$3d^94s^2$	$^2D_{5/2}$	$3d^{10}6p$	$^2P^\circ_{3/2}$	130 395.56	196 173.7	30		55
1534.462	$3d^{10}4s$	$^2S_{1/2}$	$3d^{10}4p$	$^2P^\circ_{1/2}$	0	65 169.40	18	7.42+8	1,50°,82*
1565.482	$3d^94s^2$	$^2D_{3/2}$	$3d^9(^2D)4s4p(^3P^\circ)$	$^2D^\circ_{3/2}$	133 902.00	197 780	190		55
1566.611	$3d^{10}4d$	$^2D_{3/2}$	$3d^{10}5f$	$^2F^\circ_{5/2}$	144 086.46	207 918.82	5		50
1569.650	$3d^{10}4d$	$^2D_{5/2}$	$3d^{10}5f$	$^2F^\circ_{7/2}$	144 200.28	207 908.49	6		50
1574.611	$3d^{10}4p$	$^2P^\circ_{3/2}$	$3d^94s^2$	$^2D_{5/2}$	66 887.63	130 395.56	12		50
1584.164	$3d^94s^2$	$^2D_{3/2}$	$3d^9(^2D)4s4p(^3P^\circ)$	$^4D^\circ_{1/2}$	133 902.00	197 026.7	20		55
1635.293	$3d^94s^2$	$^2D_{3/2}$	$3d^9(^2D)4s4p(^3P^\circ)$	$^4D^\circ_{3/2}$	133 902.00	195 053.1	130		55
1775.304	$3d^94s^2$	$^2D_{3/2}$	$3d^9(^2D)4s4p(^3P^\circ)$	$^4F^\circ_{3/2}$	133 902.00	190 230.3	20		55
1804.179	$3d^{10}5s$	$^2S_{1/2}$	$3d^{10}6p$	$^2P^\circ_{3/2}$	140 746.84	196 173.7	100		55
1816.753	$3d^94s^2$	$^2D_{5/2}$	$3d^{10}4f$	$^2F^\circ_{7/2}$	130 395.56	185 439.09	4		50
1888.912	$3d^{10}4d$	$^2D_{3/2}$	$3d^9(^2D)4s4p(^3P^\circ)$	$^4D^\circ_{1/2}$	144 086.46	197 026.7	140		55
1894.330C	$3d^{10}4d$	$^2D_{5/2}$	$3d^9(^2D)4s4p(^3P^\circ)$	$^2P^\circ_{3/2}$	144 200.28	196 989.4	*m*		55
1914.311	$3d^{10}4d$	$^2D_{3/2}$	$3d^{10}6p$	$^2P^\circ_{1/2}$	144 086.46	196 324.6	160		55
1919.840	$3d^{10}4d$	$^2D_{3/2}$	$3d^{10}6p$	$^2P^\circ_{3/2}$	144 086.46	196 173.7	30		55
1924.058	$3d^{10}4d$	$^2D_{5/2}$	$3d^{10}6p$	$^2P^\circ_{3/2}$	144 200.28	196 173.7	240		55
1940.596	$3d^94s^2$	$^2D_{3/2}$	$3d^{10}4f$	$^2F^\circ_{5/2}$	133 902.00	185 432.59	4		50
2029.613	$3d^{10}5p$	$^2P^\circ_{1/2}$	$3d^{10}6d$	$^2D_{3/2}$	160 765.56	210 020.13	3		50
2050.656	$3d^{10}5p$	$^2P^\circ_{3/2}$	$3d^{10}6d$	$^2D_{5/2}$	161 304.40	210 053.67	4		50
2052.070	$3d^{10}5p$	$^2P^\circ_{3/2}$	$3d^{10}6d$	$^2D_{3/2}$	161 304.40	210 020.13	1		50
2066.202	$3d^{10}5p$	$^2P^\circ_{1/2}$	$3d^{10}7s$	$^2S_{1/2}$	160 765.56	209 148.01	1		50
2089.481	$3d^{10}5p$	$^2P^\circ_{3/2}$	$3d^{10}7s$	$^2S_{1/2}$	161 304.40	209 148.01	2		50
2368.66	$3d^{10}4f$	$^2F^\circ_{5/2}$	$3d^{10}7g$	$^2G_{7/2}$	185 432.59	227 637.2	0*d*		50
2369.08	$3d^{10}4f$	$^2F^\circ_{7/2}$	$3d^{10}7g$	$^2G_{9/2}$	185 439.09	227 637.2	0*d*		50
2417.872	$3d^{10}4d$	$^2D_{3/2}$	$3d^{10}4f$	$^2F^\circ_{5/2}$	144 086.46	185 432.59	13		1,50°
2424.163	$3d^{10}4d$	$^2D_{5/2}$	$3d^{10}4f$	$^2F^\circ_{7/2}$	144 200.28	185 439.09	14		1,50°
2424.540	$3d^{10}4d$	$^2D_{5/2}$	$3d^{10}4f$	$^2F^\circ_{5/2}$	144 200.28	185 432.59	6		50
2863.334	$3d^{10}4f$	$^2F^\circ_{5/2}$	$3d^{10}6g$	$^2G_{7/2}$	185 432.59	220 346.65	3*d*		50
2863.860	$3d^{10}4f$	$^2F^\circ_{7/2}$	$3d^{10}6g$	$^2G_{9/2}$	185 439.09	220 346.75	4*d*		50
3517.374	$3d^{10}5p$	$^2P^\circ_{1/2}$	$3d^{10}5d$	$^2D_{3/2}$	160 765.56	189 187.72	13		2,50°
3577.283	$3d^{10}5p$	$^2P^\circ_{3/2}$	$3d^{10}5d$	$^2D_{5/2}$	161 304.40	189 250.59	12		2,50°
3585.354	$3d^{10}5p$	$^2P^\circ_{3/2}$	$3d^{10}5d$	$^2D_{3/2}$	161 304.40	189 187.72	7		2,50°
3730.158	$3d^{10}5p$	$^2P^\circ_{1/2}$	$3d^{10}6s$	$^2S_{1/2}$	160 765.56	187 566.51	7		2,50°
3806.678	$3d^{10}5p$	$^2P^\circ_{3/2}$	$3d^{10}6s$	$^2S_{1/2}$	161 304.40	187 566.51	9		2,50°
4380.62	$3d^{10}4f$	$^2F^\circ_{5/2}$	$3d^{10}5g$	$^2G_{7/2}$	185 432.59	208 253.98	7		2,50°
4381.84	$3d^{10}4f$	$^2F^\circ_{7/2}$	$3d^{10}5g$	$^2G_{9/2}$	185 439.09	208 254.14	8		2,50°

TABLE 6. Spectral lines of Ga III—Continued

Wavelength	Classification: Lower		Classification: Upper		Energy levels (cm^{-1})		Int.	$A(s^{-1})$	References
4863.03	$3d^{10}5s$	$^2S_{1/2}$	$3d^{10}5p$	$^2P^{\circ}_{3/2}$	140 746.84	161 304.40	13		2,50°
4993.93	$3d^{10}5s$	$^2S_{1/2}$	$3d^{10}5p$	$^2P^{\circ}_{1/2}$	140 746.84	160 765.56	11		2,50°
5337.22	$3d^{10}5d$	$^2D_{3/2}$	$3d^{10}5f$	$^2F^{\circ}_{5/2}$	189 187.72	207 918.82	7		50
5355.20	$3d^{10}5d$	$^2D_{5/2}$	$3d^{10}5f$	$^2F^{\circ}_{5/2}$	189 250.59	207 918.82	1		50
5358.16	$3d^{10}5d$	$^2D_{5/2}$	$3d^{10}5f$	$^2F^{\circ}_{7/2}$	189 250.59	207 908.49	8		50
5806.27	$3d^{10}4d$	$^2D_{3/2}$	$3d^{10}5p$	$^2P^{\circ}_{3/2}$	144 086.46	161 304.40	5		50
5844.93	$3d^{10}4d$	$^2D_{5/2}$	$3d^{10}5p$	$^2P^{\circ}_{3/2}$	144 200.28	161 304.40	12		50
5993.87	$3d^{10}4d$	$^2D_{3/2}$	$3d^{10}5p$	$^2P^{\circ}_{1/2}$	144 086.46	160 765.56	11		50

TABLE 7. Energy levels of Ga IV

Configuration	Term	J	Level (cm^{-1})	Leading percentages		
$3d^{10}$	^1S	0	0			
$3d^94s$	^3D	3	149 512.1	100		
		2	150 967.0	86	+14	^1D
		1	153 085.9	100		
$3d^94s$	^1D	2	156 024.7	86	+14	^3D
$3d^94p$	$^3P^{\circ}$	2	*224 243.3*	97		
		1	*227 320.4*	97		
		0	*229 140.3*	100		
$3d^94p$	$^3F^{\circ}$	3	*227 681.2*	70	+27	$^1F^{\circ}$
		4	*228 952.8*	100		
		2	*230 040.0*	97		
$3d^94p$	$^1F^{\circ}$	3	*233 192.3*	64	+21	$^3D^{\circ}$
$3d^94p$	$^1D^{\circ}$	2	*233 824.7*	63	+33	$^3D^{\circ}$
$3d^94p$	$^3D^{\circ}$	3	*234 939.5*	75	+15	$^3F^{\circ}$
		1	*236 906.5*	70	+27	$^1P^{\circ}$
		2	*237 458.0*	75	+15	$^3F^{\circ}$
$3d^94p$	$^1P^{\circ}$	1	*236 311.9*	72	+28	$^3D^{\circ}$
$3d^94d$	^3S	1	328 763.7	92		
$3d^94d$	^3G	5	332 554.3	100		
		4	332 730.5	56	+44	^1G
		3	334 532.0	62	+21	^1F
$3d^94d$	^3P	2	332 757.5	77	+22	^3D
		0	334 403.3	99		
		1	335 199.3	53	+27	^1P
$3d^94d$	^1P	1	332 826.8	53	+27	^3P
$3d^94d$	^3D	3	333 964.2	90		
		2	334 851.3	49	+27	^1D
		1	336 933.8	80		
$3d^94d$	^1G	4	334 527.6	33	+45	^3F

TABLE 7. Energy levels of Ga IV—Continued

Configuration	Term	J	Level (cm^{-1})	Leading percentages		
$3d^94d$	^{1}F	3	336 581.6	38	+37	^{3}G
$3d^94d$	^{3}F	4	336 790.0	55	+23	^{1}G
		3	338 504.4	53	+38	^{1}F
		2	338 719.6	69	+30	^{1}D
$3d^94d$	^{1}D	2	337 833.8	42	+29	^{3}D
$3d^95s$	^{3}D	3	343 319.9	100		
		2	343 912.7	55	+45	^{1}D
		1	346 887.6	100		
$3d^95s$	^{1}D	2	347 402.8	55	+45	^{3}D
$3d^94d$	^{1}S	0	355 225.3 ?	99		
$3d^95p$	^{3}P°	2	*368 684*	94	+6	^{3}D°
		1	*370 458*	72	+22	^{1}P°
		0	*372 649*	100		
$3d^95p$	^{3}F°	3	*369 718*	57	+38	^{1}F°
		4	*370 123*	100		
		2	*373 171*	74	+23	^{1}D°
$3d^95p$	^{1}D°	2	*371 295*	44	+30	^{3}D°
$3d^95p$	^{3}D°	3	*371 636*	81	+18	^{1}F°
		1	*374 883*	94		
		2	*375 134*	61	+33	^{1}D°
$3d^95p$	^{1}P°	1	*373 824*	76	+24	^{3}P°
$3d^95p$	^{1}F°	3	*374 167*	44	+42	^{3}F°
$3d^94f$	(5/2,5/2)°	0	*397 883.9*	100		
		1	*398 043.0*	73	+26	(5/2,7/2)°
		5	*398 489.8*	94	+6	(5/2,7/2)°
		2	*398 851.5*	77	+23	(5/2,7/2)°
		4	*399 181.0*	85	+14	(5/2,7/2)°
		3	*399 205.0*	74	+26	(5/2,7/2)°
$3d^94f$	(5/2,7/2)°	2	*398 319.7*	76	+23	(5/2,5/2)°
		6	*398 486.2*	74	+26	(5/2,5/2)°
		3	*398 866.0*	85	+15	(5/2,5/2)°
		1	*398 927.7*	72	+27	(5/2,5/2)°
		4	*399 165.8*	94	+5	(5/2,5/2)°
		5	*399 175.9*	100		
$3d^94f$	(3/2,7/2)°	2	*401 836.6*	90	+8	(3/2,5/2)°
		5	*402 191.0*	99		
		3	*402 567.4*	95	+5	(3/2,5/2)°
		4	*402 838.6*	95	+5	(3/2,5/2)°
$3d^94f$	(3/2,5/2)°	4	*402 196.0*	94		
		1	*402 353.4*	99		
		2	*402 546.1*	99		
		3	*402 844.6*	95		
$3d^84s(^4F)4p$	^{5}D°	4	*403 072*	90		
		3	*405 366*	87		
		2	*407 383*	87		
$3d^95d$	^{3}S	1	407 846	80	+14	^{3}P
$3d^84s(^4F)4p$	^{5}G°	4	*408 135*	77	+12	^{5}F°

TABLE 7. Energy levels of Ga IV—Continued

Configuration	Term	J	Level (cm^{-1})	Leading percentages			
$3d^9 5d$	^3G	5	409 158	100			
		4	409 280	56	+43		^1G
		3	412 803	79	+12		^1F
$3d^9 5d$	^1P	1	409 303	50	+26		^3D
$3d^9 5d$	^3P	2	409 319	69	+29		^3D
		0	411 044	96			
		1	412 243	52	+28		^1P
$3d^9 5d$	^3D	3	409 716	86	+10		^3F
		1	413 010	74	+16		^1P
		2	413 198	44	+26		^1D
$3d^9 5d$	^1F	3	410 107	47	+32		^3F
$3d^9 5d$	^3F	4	410 220	82	+14		^1G
		3	413 832	50	+36		^1F
		2	413 902	73	+25		^1D
$3d^9 5d$	^1D	2	410 264	48	+27		^3D
$3d^8 4s(^4F)4p$	$^5F°$	4	*412 166*	78	+10		$^5G°$
		3	*413 211*	80			
		2	*413 850*	87			
		1	*414 099*	92			
$3d^9 5d$	^1G	4	413 074	43	+40		^3G
$3d^9 6s$	(5/2,1/2)	3	413 187	100			
		2	413 661	99			
$3d^8 4s(^2F)4p$	$^3G°$	4	*414 379*	40	+25		$^1G°$
		3	*416 606*	57	+28	$3d^8 4s(^4F)4p$	$^3G°$
$3d^8 4s(^2F)4p$	$^3D°$	3	*415 296*	53	+17	$3d^8 4s(^4F)4p$	$^3D°$
		2	*416 647*	51	+20	$3d^8 4s(^4F)4p$	$^3D°$
		1	*418 395*	57	+24	$3d^8 4s(^4F)4p$	$^3D°$
$3d^9 6s$	(3/2,1/2)	1	416 796	100			
		2	416 982	99			
$3d^8 4s(^2F)4p$	$^3F°$	4	*418 405*	55	+33	$3d^8 4s(^4F)4p$	$^3F°$
		3	*419 057*	36	+21	$3d^8 4s(^4F)4p$	$^3F°$
		2	*420 572*	51	+28	$3d^8 4s(^4F)4p$	$^3F°$
$3d^9 5d$	^1S	0	419 737	96			
$3d^8 4s(^2F)4p$	$^1G°$	4	*420 623*	69	+16		$^3G°$
$3d^8 4s(^2F)4p$	$^1D°$	2	*423 151*	84			
$3d^8 4s(^2F)4p$	$^1F°$	3	*423 434*	71			
$3d^9 6p$	(5/2,1/2)°	2	*424 901*	69	+30		(5/2,3/2)°
		3	*425 368*	94	+6		(5/2,3/2)°
$3d^8 4s(^4P)4p$	$^5P°$	2	*425 253*	83			
		3	*425 604*	84			
		1	*425 702*	93			
$3d^9 6p$	(5/2,3/2)°	4	*425 552*	100			
		1	*425 853*	97			
		3	*426 175*	94	+6		(5/2,1/2)°
		2	*426 180* ?	69	+30		(5/2,1/2)°

TABLE 7. Energy levels of Ga IV—Continued

Configuration	Term	J	Level (cm^{-1})	Leading percentages			
$3d^96p$	$(3/2,3/2)^\circ$	0	*428 648*	100			
		3	*429 305*	100			
		1	*429 594*	52	+48		$(3/2,1/2)^\circ$
		2	*429 685*	91	+8		$(3/2,1/2)^\circ$
$3d^96p$	$(3/2,1/2)^\circ$	2	*428 828*	91	+8		$(3/2,3/2)^\circ$
		1	*429 003*	50	+47		$(3/2,3/2)^\circ$
$3d^84s(^2D)4p$	$^3F^\circ$	2	*429 866*	77			
		3	*430 492*	70			
		4	*431 353*	64	+23	$3d^84s(^4P)4p$	$^5D^\circ$
$3d^84s(^2D)4p$	$^3D^\circ$	1	*430 682*	51	+15		$^3P^\circ$
		2	*431 242*	58			
		3	*431 957*	71			
$3d^84s(^2D)4p$	$^3P^\circ$	1	*432 846*	45	+29		$^3D^\circ$
		2	*433 778*	68	+14		$^3D^\circ$
$3d^84s(^4P)4p$	$^5D^\circ$	2	*434 722*	84			
		3	*434 846*	79			
		4	*435 419*	68	+15	$3d^84s(^2D)4p$	$^3F^\circ$
$3d^84s(^2P)4p$	$^3P^\circ$	2	*437 787*	48	+15	$3d^84s(^4P)4p$	$^3P^\circ$
		1	*439 390*	32	+22	$3d^84s(^4P)4p$	$^3D^\circ$
		0	*440 723*	48	+37	$3d^84s(^2D)4p$	$^3P^\circ$
$3d^84s(^2P)4p$	$^3D^\circ$	2	*440 111*	34	+17	$3d^84s(^4P)4p$	$^3D^\circ$
		3	*440 188*	42	+21	$3d^84s(^4P)4p$	$^3D^\circ$
		1	*440 229*	38	+17	$3d^84s(^4P)4p$	$^3D^\circ$
$3d^84s(^2G)4p$	$^3F^\circ$	4	*441 367*	55	+15	$3d^84s(^2D)4p$	$^3F^\circ$
		3	*442 220*	59	+11	$3d^84s(^2D)4p$	$^3F^\circ$
		2	*443 322*	71			
$3d^84s(^4P)4p$	$^5S^\circ$	2	*442 837*	95			
$3d^84s(^2P)4p$	$^1P^\circ$	1	*443 344*	78			
$3d^84s(^4F)4p$	$^3D^\circ$	3	*444 074*	55	+20	$3d^84s(^2F)4p$	$^3D^\circ$
		2	*446 917*	58	+22	$3d^84s(^2F)4p$	$^3D^\circ$
		1	*448 614*	61	+24		
$3d^96d$	$(5/2,3/2)$	1	444 089	58	+41		$(5/2,5/2)$
		4	444 767	96			
		2	444 783	68	+32		$(5/2,5/2)$
		3	445 193	64	+36		$(5/2,5/2)$
$3d^84s(^2P)4p$	$^1D^\circ$	2	*444 348*	81			
$3d^96d$	$(5/2,5/2)$	5	444 706	100			
		1	444 765	58	+42		$(5/2,3/2)$
		3	444 979	64	+36		$(5/2,3/2)$
		2	445 234	67	+32		$(5/2,3/2)$
		4	445 236	96			
		0	446 071	80	+20		$(3/2,3/2)$
$3d^84s(^4F)4p$	$^3G^\circ$	4	*444 968*	50	+29	$3d^84s(^2F)4p$	$^3G^\circ$
		3	*447 014*	58	+29	$3d^84s(^2F)4p$	$^3G^\circ$
$3d^84s(^4F)4p$	$^3F^\circ$	4	*446 456*	45	+21	$3d^84s(^2F)4p$	$^3F^\circ$
		3	*448 773*	53	+25	$3d^84s(^2F)4p$	$^3F^\circ$
		2	*450 162*	58	+26	$3d^84s(^2F)4p$	$^3F^\circ$

TABLE 7. Energy levels of Ga IV—Continued

Configuration	Term	J	Level (cm^{-1})		Leading percentages			
$3d^9 7s$	(5/2,1/2)	3	446 732		100			
		2	446 852		99			
$3d^9 6d$	(3/2,5/2)	1	448 059		74	+25		(3/2,3/2)
		4	448 527		100			
		2	448 734		98			
		3	448 913		93	+7		(3/2,3/2)
$3d^9 6d$	(3/2,3/2)	3	448 347		93	+7		(3/2,5/2)
		1	448 482		75	+25		(3/2,5/2)
		2	448 964		99			
		0	450 795	?	80	+20		(5/2,5/2)
$3d^9 7s$	(3/2,1/2)	1	450 316		100			
		2	450 405		99			
$3d^8 4s(^2D)4p$	$^1D^\circ$	2	*462 491*		50	+31	$3d^8 4s(^4P)4p$	$^3P^\circ$
$3d^8 4s(^2D)4p$	$^1F^\circ$	3	*463 246*		77			
$3d^8 4s(^4P)4p$	$^3P^\circ$	1	*464 221*		49	+28	$3d^8 4s(^2D)4p$	$^1P^\circ$
		0	*465 833*		73	+23	$3d^8 4s(^2P)4p$	$^3P^\circ$
		2	*466 359*		39	+41	$3d^8 4s(^2D)4p$	$^1D^\circ$
$3d^9 8s$	(5/2,1/2)	3	465 423		100			
		2	465 497		99			
$3d^8 4s(^2D)4p$	$^1P^\circ$	1	*467 778*		61	+24	$3d^8 4s(^4P)4p$	$^3P^\circ$
$3d^9 8s$	(3/2,1/2)	1	469 005		100			
		2	469 058		99			
$3d^8 4s(^2G)4p$	$^1F^\circ$	3	*475 514*		89			
Ga V ($^2D_{5/2}$)	**Limit**	—	**510 070**					

TABLE 8. Spectral lines of Ga IV

Wavelength (Å)	Classification: Lower		Upper		Energy levels (cm^{-1})		Int.	References
233.102	$3d^{10}$	$^1S_0$	$3d^9 6p$	$(3/2,1/2)^\circ_1$	0	429 003	6	69
234.824	$3d^{10}$	$^1S_0$	$3d^9 6p$	$(5/2,3/2)^\circ_1$	0	425 853	4	69
248.536	$3d^{10}$	$^1S_0$	$3d^9 4f$	$(3/2,5/2)^\circ_1$	0	402 353.4	40	69
250.672	$3d^{10}$	$^1S_0$	$3d^9 4f$	$(5/2,7/2)^\circ_1$	0	398 927.7	30	69
251.229	$3d^{10}$	$^1S_0$	$3d^9 4f$	$(5/2,5/2)^\circ_1$	0	398 043.0	10	69
266.749	$3d^{10}$	$^1S_0$	$3d^9 5p$	$^3D^\circ_1$	0	374 883	6	69
267.506	$3d^{10}$	$^1S_0$	$3d^9 5p$	$^1P^\circ_1$	0	373 824	60	69
269.936	$3d^{10}$	$^1S_0$	$3d^9 5p$	$^3P^\circ_1$	0	370 458	40	69
308.123	$3d^9 4s$	$^3D_2$	$3d^8 4s(^2G)4p$	$^1F^\circ_3$	150 967.0	475 514	2	65
312.999	$3d^9 4s$	$^1D_2$	$3d^8 4s(^2G)4p$	$^1F^\circ_3$	156 024.7	475 514	14	65
315.612	$3d^9 4s$	$^3D_3$	$3d^8 4s(^4P)4p$	$^3P^\circ_2$	149 512.1	466 359	8	65
319.232	$3d^9 4s$	$^3D_2$	$3d^8 4s(^4P)4p$	$^3P^\circ_1$	150 967.0	464 221	9	65
319.749	$3d^9 4s$	$^3D_1$	$3d^8 4s(^4P)4p$	$^3P^\circ_0$	153 085.9	465 833	2	65
320.769	$3d^9 4s$	$^1D_2$	$3d^8 4s(^2D)4p$	$^1P^\circ_1$	156 024.7	467 778	8	65
321.403	$3d^9 4s$	$^3D_1$	$3d^8 4s(^4P)4p$	$^3P^\circ_1$	153 085.9	464 221	2	65

TABLE 8. Spectral lines of Ga IV—Continued

Wavelength (Å)	Classification				Energy levels (cm^{-1})		Int.	References
	Lower		Upper					
322.235	$3d^94s$	$^1D_2$	$3d^84s(^4P)4p$	$^3P^\circ_2$	156 024.7	466 359	10	65
324.465	$3d^94s$	$^1D_2$	$3d^84s(^4P)4p$	$^3P^\circ_1$	156 024.7	464 221	3	65
325.500	$3d^94s$	$^1D_2$	$3d^84s(^2D)4p$	$^1F^\circ_3$	156 024.7	463 246	2	65
326.302	$3d^94s$	$^1D_2$	$3d^84s(^2D)4p$	$^1D^\circ_2$	156 024.7	462 491	7	65
334.160	$3d^94s$	$^3D_3$	$3d^84s(^4F)4p$	$^3F^\circ_3$	149 512.1	448 773	6	65
334.233	$3d^94s$	$^3D_2$	$3d^84s(^4F)4p$	$^3F^\circ_2$	150 967.0	450 162	6	65
335.792	$3d^94s$	$^3D_2$	$3d^84s(^4F)4p$	$^3F^\circ_3$	150 967.0	448 773	13	65
335.969	$3d^94s$	$^3D_2$	$3d^84s(^4F)4p$	$^3D^\circ_1$	150 967.0	448 614	7	65
336.135	$3d^94s$	$^3D_3$	$3d^84s(^4F)4p$	$^3G^\circ_3$	149 512.1	447 014	1	65
336.245	$3d^94s$	$^3D_3$	$3d^84s(^4F)4p$	$^3D^\circ_2$	149 512.1	446 917	5	65
336.616	$3d^94s$	$^3D_1$	$3d^84s(^4F)4p$	$^3F^\circ_2$	153 085.9	450 162	12	65
336.766	$3d^94s$	$^3D_3$	$3d^84s(^4F)4p$	$^3F^\circ_4$	149 512.1	446 456	19	65
337.786	$3d^94s$	$^3D_2$	$3d^84s(^4F)4p$	$^3G^\circ_3$	150 967.0	447 014	3	65
337.897	$3d^94s$	$^3D_2$	$3d^84s(^4F)4p$	$^3D^\circ_2$	150 967.0	446 917	14	65
338.379	$3d^94s$	$^3D_1$	$3d^84s(^4F)4p$	$^3D^\circ_1$	153 085.9	448 614	15	65
338.462	$3d^94s$	$^3D_3$	$3d^84s(^4F)4p$	$^3G^\circ_4$	149 512.1	444 968	19	65
339.490	$3d^94s$	$^3D_3$	$3d^84s(^4F)4p$	$^3D^\circ_3$	149 512.1	444 074	19	65
340.334	$3d^94s$	$^3D_1$	$3d^84s(^4F)4p$	$^3D^\circ_2$	153 085.9	446 917	11	65
340.852	$3d^94s$	$^3D_2$	$3d^84s(^2P)4p$	$^1D^\circ_2$	150 967.0	444 348	3	65
340.922	$3d^94s$	$^3D_3$	$3d^84s(^4P)4p$	$^5S^\circ_2$	149 512.1	442 837	4	65
341.175	$3d^94s$	$^3D_2$	$3d^84s(^4F)4p$	$^3D^\circ_3$	150 967.0	444 074	16	65
341.593	$3d^94s$	$^1D_2$	$3d^84s(^4F)4p$	$^3F^\circ_3$	156 024.7	448 773	1	65
341.637	$3d^94s$	$^3D_3$	$3d^84s(^2G)4p$	$^3F^\circ_3$	149 512.1	442 220	2	65
342.049	$3d^94s$	$^3D_2$	$3d^84s(^2G)4p$	$^3F^\circ_2$	150 967.0	443 322	1	65
342.638	$3d^94s$	$^3D_3$	$3d^84s(^2G)4p$	$^3F^\circ_4$	149 512.1	441 367	19	65
343.347	$3d^94s$	$^3D_1$	$3d^84s(^2P)4p$	$^1D^\circ_2$	153 085.9	444 348	9	65
	$3d^94s$	$^3D_2$	$3d^84s(^2G)4p$	$^3F^\circ_3$	150 967.0	442 220		65
343.645	$3d^94s$	$^1D_2$	$3d^84s(^4F)4p$	$^3G^\circ_3$	156 024.7	447 014	1	65
343.770	$3d^94s$	$^1D_2$	$3d^84s(^4F)4p$	$^3D^\circ_2$	156 024.7	446 917	4	65
344.027	$3d^94s$	$^3D_3$	$3d^84s(^2P)4p$	$^3D^\circ_3$	149 512.1	440 188	4	65
344.119	$3d^94s$	$^3D_3$	$3d^84s(^2P)4p$	$^3D^\circ_2$	149 512.1	440 111	11	65
344.549	$3d^94s$	$^3D_1$	$3d^84s(^2G)4p$	$^3F^\circ_2$	153 085.9	443 322	16	65
345.709	$3d^94s$	$^3D_2$	$3d^84s(^2P)4p$	$^3D^\circ_1$	150 967.0	440 229	12	65
345.755	$3d^94s$	$^3D_2$	$3d^84s(^2P)4p$	$^3D^\circ_3$	150 967.0	440 188	5	65
345.849	$3d^94s$	$^3D_2$	$3d^84s(^2P)4p$	$^3D^\circ_2$	150 967.0	440 111	4	65
346.715	$3d^94s$	$^3D_2$	$3d^84s(^2P)4p$	$^3P^\circ_1$	150 967.0	439 390	13	65
346.894	$3d^94s$	$^3D_3$	$3d^84s(^2P)4p$	$^3P^\circ_2$	149 512.1	437 787	20	65
347.161	$3d^94s$	$^1D_2$	$3d^84s(^4F)4p$	$^3D^\circ_3$	156 024.7	444 074	1	65
347.663	$3d^94s$	$^3D_1$	$3d^84s(^2P)4p$	$^3P^\circ_0$	153 085.9	440 723	10	65
348.048	$3d^94s$	$^1D_2$	$3d^84s(^2P)4p$	$^1P^\circ_1$	156 024.7	443 344	21	65
348.257	$3d^94s$	$^3D_1$	$3d^84s(^2P)4p$	$^3D^\circ_1$	153 085.9	440 229	4	65
348.656	$3d^94s$	$^3D_2$	$3d^84s(^2P)4p$	$^3P^\circ_2$	150 967.0	437 787	7	65
349.282	$3d^94s$	$^3D_1$	$3d^84s(^2P)4p$	$^3P^\circ_1$	153 085.9	439 390	6	65
349.408	$3d^94s$	$^1D_2$	$3d^84s(^2G)4p$	$^3F^\circ_3$	156 024.7	442 220	1	65
349.767	$3d^94s$	$^3D_3$	$3d^84s(^4P)4p$	$^5D^\circ_4$	149 512.1	435 419	14	65
350.618	$3d^94s$	$^3D_3$	$3d^84s(^4P)4p$	$^5D^\circ_2$	149 512.1	434 722	1	65
351.248	$3d^94s$	$^3D_1$	$3d^84s(^2P)4p$	$^3P^\circ_2$	153 085.9	437 787	1	65
351.785	$3d^94s$	$^3D_3$	$3d^84s(^2D)4p$	$^3P^\circ_2$	149 512.1	433 778	5	65
351.859	$3d^94s$	$^1D_2$	$3d^84s(^2P)4p$	$^3D^\circ_1$	156 024.7	440 229	1	65
352.005	$3d^94s$	$^1D_2$	$3d^84s(^2P)4p$	$^3D^\circ_2$	156 024.7	440 111	4	65
352.266	$3d^94s$	$^3D_2$	$3d^84s(^4P)4p$	$^5D^\circ_3$	150 967.0	434 846	6	65

TABLE 8. Spectral lines of Ga IV—Continued

Wavelength (Å)	Classification				Energy levels (cm^{-1})		Int.	References
	Lower		Upper					
353.597	$3d^94s$	$^3D_2$	$3d^84s(^2D)4p$	$^3P^\circ_2$	150 967.0	433 778	1	65
354.054	$3d^94s$	$^3D_3$	$3d^84s(^2D)4p$	$^3D^\circ_3$	149 512.1	431 957	23	65
354.756	$3d^94s$	$^3D_2$	$3d^84s(^2D)4p$	$^3P^\circ_1$	150 967.0	432 846	4	65
354.812	$3d^94s$	$^3D_3$	$3d^84s(^2D)4p$	$^3F^\circ_4$	149 512.1	431 353	23	65
354.955	$3d^94s$	$^3D_3$	$3d^84s(^2D)4p$	$^3D^\circ_2$	149 512.1	431 242	13	65
355.074	$3d^94s$	$^3D_1$	$3d^84s(^4P)4p$	$^5D^\circ_2$	153 085.9	434 722	2	65
356.704	$3d^94s$	$^3D_3$	$3d^84s(^2D)4p$	$^3F^\circ_2$	149 512.1	429 866	4	65
356.795	$3d^94s$	$^3D_2$	$3d^84s(^2D)4p$	$^3D^\circ_2$	150 967.0	431 242	19	65
357.461	$3d^94s$	$^3D_1$	$3d^84s(^2D)4p$	$^3P^\circ_1$	153 085.9	432 846	4	65
357.509	$3d^94s$	$^3D_2$	$3d^84s(^2D)4p$	$^3D^\circ_1$	150 967.0	430 682	17	65
357.752	$3d^94s$	$^3D_2$	$3d^84s(^2D)4p$	$^3F^\circ_3$	150 967.0	430 492	15	65
358.656	$3d^94s$	$^1D_2$	$3d^84s(^4P)4p$	$^5D^\circ_3$	156 024.7	434 846	1	65
358.787	$3d^94s$	$^3D_2$	$3d^96p$	$(3/2,3/2)^\circ_2$	150 967.0	429 685	3	69
359.266	$3d^94s$	$^3D_2$	$3d^96p$	$(3/2,3/2)^\circ_3$	150 967.0	429 305	4	69
359.514	$3d^94s$	$^3D_1$	$3d^84s(^2D)4p$	$^3D^\circ_2$	153 085.9	431 242	1	65
360.039	$3d^94s$	$^1D_2$	$3d^84s(^2D)4p$	$^3P^\circ_2$	156 024.7	433 778	1	65
360.239	$3d^94s$	$^3D_1$	$3d^84s(^2D)4p$	$^3D^\circ_1$	153 085.9	430 682	17	65
361.300	$3d^94s$	$^3D_1$	$3d^84s(^2D)4p$	$^3F^\circ_2$	153 085.9	429 866	13	69°, 65
361.451	$3d^94s$	$^3D_3$	$3d^96p$	$(5/2,3/2)^\circ_3$	149 512.1	426 175	8	69
362.201	$3d^94s$	$^3D_3$	$3d^84s(^4P)4p$	$^5P^\circ_3$	149 512.1	425 604	5	65
362.266	$3d^94s$	$^3D_3$	$3d^96p$	$(5/2,3/2)^\circ_4$	149 512.1	425 552	13	69
362.412	$3d^94s$	$^1D_2$	$3d^84s(^2D)4p$	$^3D^\circ_3$	156 024.7	431 957	2	65
362.505	$3d^94s$	$^3D_3$	$3d^96p$	$(5/2,1/2)^\circ_3$	149 512.1	425 368	2	69
362.658	$3d^94s$	$^3D_1$	$3d^96p$	$(3/2,1/2)^\circ_2$	153 085.9	428 828	8	69
362.894	$3d^94s$	$^3D_1$	$3d^96p$	$(3/2,3/2)^\circ_0$	153 085.9	428 648	1	69
363.123	$3d^94s$	$^3D_3$	$3d^96p$	$(5/2,1/2)^\circ_2$	149 512.1	424 901	13	69
363.355	$3d^94s$	$^1D_2$	$3d^84s(^2D)4p$	$^3D^\circ_2$	156 024.7	431 242	14	69
	$3d^94s$	$^3D_2$	$3d^96p$	$(5/2,3/2)^\circ_2$	150 967.0	426 180 ?		69
	$3d^94s$	$^3D_2$	$3d^96p$	$(5/2,3/2)^\circ_3$	150 967.0	426 175		69
363.787	$3d^94s$	$^3D_2$	$3d^96p$	$(5/2,3/2)^\circ_1$	150 967.0	425 853	5	69
363.986	$3d^94s$	$^3D_2$	$3d^84s(^4P)4p$	$^5P^\circ_1$	150 967.0	425 702	1	65
364.102	$3d^94s$	$^3D_2$	$3d^84s(^4P)4p$	$^5P^\circ_3$	150 967.0	425 604	1	65
364.346	$3d^94s$	$^1D_2$	$3d^84s(^2D)4p$	$^3F^\circ_3$	156 024.7	430 492	8	65
364.430	$3d^94s$	$^3D_2$	$3d^96p$	$(5/2,1/2)^\circ_3$	150 967.0	425 368	6	69
365.070	$3d^94s$	$^3D_3$	$3d^84s(^2F)4p$	$^1F^\circ_3$	149 512.1	423 434	14	65
365.418	$3d^94s$	$^1D_2$	$3d^96p$	$(3/2,3/2)^\circ_2$	156 024.7	429 685	3	69
365.538	$3d^94s$	$^1D_2$	$3d^96p$	$(3/2,3/2)^\circ_1$	156 024.7	429 594	2	69
365.925	$3d^94s$	$^1D_2$	$3d^96p$	$(3/2,3/2)^\circ_3$	156 024.7	429 305	7	69
366.330	$3d^94s$	$^1D_2$	$3d^96p$	$(3/2,1/2)^\circ_1$	156 024.7	429 003	3	69
366.565	$3d^94s$	$^1D_2$	$3d^96p$	$(3/2,1/2)^\circ_2$	156 024.7	428 828	1	69
366.825	$3d^94s$	$^3D_1$	$3d^84s(^4P)4p$	$^5P^\circ_1$	153 085.9	425 702	1	65
367.020	$3d^94s$	$^3D_2$	$3d^84s(^2F)4p$	$^1F^\circ_3$	150 967.0	423 434	3	65
367.402	$3d^94s$	$^3D_2$	$3d^84s(^2F)4p$	$^1D^\circ_2$	150 967.0	423 151	19	65
368.856	$3d^94s$	$^3D_3$	$3d^84s(^2F)4p$	$^1G^\circ_4$	149 512.1	420 623	2	65
368.924	$3d^94s$	$^3D_3$	$3d^84s(^2F)4p$	$^3F^\circ_2$	149 512.1	420 572	8	65
370.925	$3d^94s$	$^3D_2$	$3d^84s(^2F)4p$	$^3F^\circ_2$	150 967.0	420 572	30	65
370.991	$3d^94s$	$^3D_3$	$3d^84s(^2F)4p$	$^3F^\circ_3$	149 512.1	419 057	30	65
371.274	$3d^94s$	$^1D_2$	$3d^96p$	$(5/2,1/2)^\circ_3$	156 024.7	425 368	2	69
371.435	$3d^94s$	$^1D_2$	$3d^84s(^4P)4p$	$^5P^\circ_2$	156 024.7	425 253	16	65
371.897	$3d^94s$	$^3D_3$	$3d^84s(^2F)4p$	$^3F^\circ_4$	149 512.1	418 405	28	65
373.012	$3d^94s$	$^3D_2$	$3d^84s(^2F)4p$	$^3F^\circ_3$	150 967.0	419 057	23	65

TABLE 8. Spectral lines of Ga IV—Continued

Wavelength (Å)	Classification				Energy levels (cm^{-1})		Int.	References
	Lower		Upper					
373.843	$3d^94s$	$^3D_1$	$3d^84s(^2F)4p$	$^3F^\circ_2$	153 085.9	420 572	32	65
373.975	$3d^94s$	$^3D_2$	$3d^84s(^2F)4p$	$^3D^\circ_1$	150 967.0	418 395	46	65
	$3d^94s$	$^1D_2$	$3d^84s(^2F)4p$	$^1F^\circ_3$	156 024.7	423 434		65
376.248	$3d^94s$	$^3D_3$	$3d^84s(^2F)4p$	$^3D^\circ_3$	149 512.1	415 296	29	65
376.395	$3d^94s$	$^3D_2$	$3d^84s(^2F)4p$	$^3D^\circ_2$	150 967.0	416 647	28	65
376.453	$3d^94s$	$^3D_2$	$3d^84s(^2F)4p$	$^3G^\circ_3$	150 967.0	416 606	3	65
376.922	$3d^94s$	$^3D_1$	$3d^84s(^2F)4p$	$^3D^\circ_1$	153 085.9	418 395	23	65
377.551	$3d^94s$	$^3D_3$	$3d^84s(^2F)4p$	$^3G^\circ_4$	149 512.1	414 379	5	65
378.320	$3d^94s$	$^3D_2$	$3d^84s(^2F)4p$	$^3D^\circ_3$	150 967.0	415 296	22	65
379.218	$3d^94s$	$^3D_3$	$3d^84s(^4F)4p$	$^5F^\circ_3$	149 512.1	413 211	1	65
379.423	$3d^94s$	$^3D_1$	$3d^84s(^2F)4p$	$^3D^\circ_2$	153 085.9	416 647	22	65
380.186	$3d^94s$	$^1D_2$	$3d^84s(^2F)4p$	$^3F^\circ_3$	156 024.7	419 057	13	65
380.400	$3d^94s$	$^3D_2$	$3d^84s(^4F)4p$	$^5F^\circ_2$	150 967.0	413 850	3	65
380.732	$3d^94s$	$^3D_3$	$3d^84s(^4F)4p$	$^5F^\circ_4$	149 512.1	412 166	9	65
381.144	$3d^94s$	$^1D_2$	$3d^84s(^2F)4p$	$^3D^\circ_1$	156 024.7	418 395	4	65
381.327	$3d^94s$	$^3D_2$	$3d^84s(^4F)4p$	$^5F^\circ_3$	150 967.0	413 211	7	65
383.125	$3d^94s$	$^3D_1$	$3d^84s(^4F)4p$	$^5F^\circ_1$	153 085.9	414 099	2	65
385.700	$3d^94s$	$^1D_2$	$3d^84s(^2F)4p$	$^3D^\circ_3$	156 024.7	415 296	2	65
386.666	$3d^94s$	$^3D_3$	$3d^84s(^4F)4p$	$^5G^\circ_4$	149 512.1	408 135	1	65
389.994	$3d^94s$	$^3D_2$	$3d^84s(^4F)4p$	$^5D^\circ_2$	150 967.0	407 383	1	65
390.851	$3d^94s$	$^3D_3$	$3d^84s(^4F)4p$	$^5D^\circ_3$	149 512.1	405 366	4	65
393.078	$3d^94s$	$^3D_2$	$3d^84s(^4F)4p$	$^5D^\circ_3$	150 967.0	405 366	1	65
393.245	$3d^94s$	$^3D_1$	$3d^84s(^4F)4p$	$^5D^\circ_2$	153 085.9	407 383	1	65
394.387	$3d^94s$	$^3D_3$	$3d^84s(^4F)4p$	$^5D^\circ_4$	149 512.1	403 072	1	65
414.625	$3d^94p$	$^3P^\circ_2$	$3d^98s$	$(5/2,1/2)_3$	224 243.3	465 423	1	69
418.364	$3d^94p$	$^3F^\circ_2$	$3d^98s$	$(3/2,1/2)_2$	230 040.0	469 058	1	69
418.468	$3d^94p$	$^3F^\circ_2$	$3d^98s$	$(3/2,1/2)_1$	230 040.0	469 005	2	69
419.855	$3d^94p$	$^3P^\circ_1$	$3d^98s$	$(5/2,1/2)_2$	227 320.4	465 497	1	69
420.497	$3d^94p$	$^3F^\circ_3$	$3d^98s$	$(5/2,1/2)_2$	227 681.2	465 497	3	69
420.621	$3d^94p$	$^3F^\circ_3$	$3d^98s$	$(5/2,1/2)_3$	227 681.2	465 423	1	69
422.108	$3d^{10}$	$^1S_0$	$3d^94p$	$^3D^\circ_1$	0	236 906.5	600	69
422.888	$3d^94p$	$^3F^\circ_4$	$3d^98s$	$(5/2,1/2)_3$	228 952.8	465 423	10	69
423.170	$3d^{10}$	$^1S_0$	$3d^94p$	$^1P^\circ_1$	0	236 311.9	1000	69
423.965	$3d^94p$	$^1F^\circ_3$	$3d^98s$	$(3/2,1/2)_2$	233 192.3	469 058	5	69
425.208	$3d^94p$	$^1D^\circ_2$	$3d^98s$	$(3/2,1/2)_1$	233 824.7	469 005	2	69
427.131	$3d^94p$	$^3D^\circ_3$	$3d^98s$	$(3/2,1/2)_2$	234 939.5	469 058	1	69
430.459	$3d^94p$	$^1F^\circ_3$	$3d^98s$	$(5/2,1/2)_2$	233 192.3	465 497	1	69
430.586	$3d^94p$	$^1F^\circ_3$	$3d^98s$	$(5/2,1/2)_3$	233 192.3	465 423	2	69
430.837	$3d^94p$	$^3D^\circ_1$	$3d^98s$	$(3/2,1/2)_1$	236 906.5	469 005	1	69
431.636	$3d^94p$	$^1D^\circ_2$	$3d^98s$	$(5/2,1/2)_2$	233 824.7	465 497	2	69
431.782	$3d^94p$	$^3D^\circ_2$	$3d^98s$	$(3/2,1/2)_2$	237 458.0	469 058	1	69
433.861	$3d^94p$	$^3D^\circ_3$	$3d^98s$	$(5/2,1/2)_3$	234 939.5	465 423	2	69
439.906	$3d^{10}$	$^1S_0$	$3d^94p$	$^3P^\circ_1$	0	227 320.4	300	69
443.219	$3d^94s$	$^3D_3$	$3d^95p$	$^3D^\circ_2$	149 512.1	375 134	1	69
445.129	$3d^94s$	$^3D_3$	$3d^95p$	$^1F^\circ_3$	149 512.1	374 167	1	69
446.099	$3d^94s$	$^3D_2$	$3d^95p$	$^3D^\circ_2$	150 967.0	375 134	15	69
446.595	$3d^94s$	$^3D_2$	$3d^95p$	$^3D^\circ_1$	150 967.0	374 883	3	69
448.033	$3d^94s$	$^3D_2$	$3d^95p$	$^1F^\circ_3$	150 967.0	374 167	20	69
448.257	$3d^94p$	$^3P^\circ_1$	$3d^97s$	$(3/2,1/2)_2$	227 320.4	450 405	1	69
448.425	$3d^94p$	$^3P^\circ_1$	$3d^97s$	$(3/2,1/2)_1$	227 320.4	450 316	1	69
448.730	$3d^94s$	$^3D_2$	$3d^95p$	$^1P^\circ_1$	150 967.0	373 824	3	69

TABLE 8. Spectral lines of Ga IV—Continued

Wavelength (Å)	Classification: Lower		Classification: Upper		Energy levels (cm^{-1})		Int.	References
449.458	$3d^94p$	$^3P^\circ_2$	$3d^97s$	$(5/2,1/2)_3$	224 243.3	446 732	12	69
450.040	$3d^94s$	$^3D_2$	$3d^95p$	$^3F^\circ_2$	150 967.0	373 171	1	69
450.201	$3d^94s$	$^3D_3$	$3d^95p$	$^3D^\circ_3$	149 512.1	371 636	30	69
450.356	$3d^94s$	$^3D_1$	$3d^95p$	$^3D^\circ_2$	153 085.9	375 134	20	69
450.862	$3d^94s$	$^3D_1$	$3d^95p$	$^3D^\circ_1$	153 085.9	374 883	30	69
452.126	$3d^94p$	$^3P^\circ_0$	$3d^97s$	$(3/2,1/2)_1$	229 140.3	450 316	1	69
453.029	$3d^94s$	$^3D_1$	$3d^95p$	$^1P^\circ_1$	153 085.9	373 824	15	69
453.171	$3d^94s$	$^3D_2$	$3d^95p$	$^3D^\circ_3$	150 967.0	371 636	30	69
453.289	$3d^94s$	$^3D_3$	$3d^95p$	$^3F^\circ_4$	149 512.1	370 123	45	69
453.435	$3d^94p$	$^3P^\circ_2$	$3d^96d$	$(5/2,3/2)_2$	224 243.3	444 783	4	69
453.789	$3d^94p$	$^3F^\circ_2$	$3d^97s$	$(3/2,1/2)_2$	230 040.0	450 405	3	69
453.873	$3d^94s$	$^3D_2$	$3d^95p$	$^1D^\circ_2$	150 967.0	371 295	40	69
453.972	$3d^94p$	$^3F^\circ_2$	$3d^97s$	$(3/2,1/2)_1$	230 040.0	450 316	10	69
454.370	$3d^94s$	$^3D_1$	$3d^95p$	$^3F^\circ_2$	153 085.9	373 171	30	69
454.867	$3d^94p$	$^3P^\circ_2$	$3d^96d$	$(5/2,3/2)_1$	224 243.3	444 089	1	69
455.457	$3d^94s$	$^3D_1$	$3d^95p$	$^3P^\circ_0$	153 085.9	372 649	30	69
455.512	$3d^94p$	$^3P^\circ_1$	$3d^97s$	$(5/2,1/2)_2$	227 320.4	446 852	6	69
455.603	$3d^94s$	$^3D_2$	$3d^95p$	$^3P^\circ_1$	150 967.0	370 458	35	69
455.911	$3d^94p$	$^3P^\circ_0$	$3d^96d$	$(3/2,3/2)_1$	229 140.3	448 482	1	69
456.267	$3d^94s$	$^3D_3$	$3d^95p$	$^3P^\circ_2$	149 512.1	368 684	40	69
	$3d^94p$	$^3F^\circ_3$	$3d^97s$	$(5/2,1/2)_2$	227 681.2	446 852		69
456.394	$3d^94s$	$^1D_2$	$3d^95p$	$^3D^\circ_2$	156 024.7	375 134	40	69
456.506	$3d^94p$	$^3F^\circ_3$	$3d^97s$	$(5/2,1/2)_3$	227 681.2	446 732	4	69
456.919	$3d^94s$	$^1D_2$	$3d^95p$	$^3D^\circ_1$	156 024.7	374 883	9	69
457.145	$3d^94s$	$^3D_2$	$3d^95p$	$^3F^\circ_3$	150 967.0	369 718	40	69
	$3d^94p$	$^3P^\circ_1$	$3d^96d$	$(5/2,5/2)_0$	227 320.4	446 071		69
458.070	$3d^94p$	$^3F^\circ_2$	$3d^96d$	$(3/2,3/2)_3$	230 040.0	448 347	5	69
458.267	$3d^94s$	$^3D_1$	$3d^95p$	$^1D^\circ_2$	153 085.9	371 295	25	69
458.420	$3d^94s$	$^1D_2$	$3d^95p$	$^1F^\circ_3$	156 024.7	374 167	50	69
458.914	$3d^94p$	$^3P^\circ_1$	$3d^96d$	$(5/2,5/2)_2$	227 320.4	445 234	2	69
459.159	$3d^94s$	$^1D_2$	$3d^95p$	$^1P^\circ_1$	156 024.7	373 824	60	69
	$3d^94p$	$^3F^\circ_4$	$3d^97s$	$(5/2,1/2)_3$	228 952.8	446 732		69
459.308	$3d^94s$	$^3D_2$	$3d^95p$	$^3P^\circ_2$	150 967.0	368 684	18	69
459.745	$3d^94p$	$^3F^\circ_3$	$3d^96d$	$(5/2,3/2)_3$	227 681.2	445 193	3	69
459.890	$3d^94p$	$^3P^\circ_1$	$3d^96d$	$(5/2,5/2)_1$	227 320.4	444 765	3	69
460.377	$3d^94p$	$^1F^\circ_3$	$3d^97s$	$(3/2,1/2)_2$	233 192.3	450 405	8	69
460.519	$3d^94s$	$^1D_2$	$3d^95p$	$^3F^\circ_2$	156 024.7	373 171	30	69
460.650	$3d^94p$	$^3F^\circ_3$	$3d^96d$	$(5/2,3/2)_4$	227 681.2	444 767	6	69
461.223	$3d^94p$	$^3F^\circ_2$	$3d^97s$	$(5/2,1/2)_2$	230 040.0	446 852	1	69
462.354	$3d^94p$	$^3F^\circ_4$	$3d^96d$	$(5/2,5/2)_4$	228 952.8	445 236	1	69
463.491	$3d^94p$	$^3F^\circ_4$	$3d^96d$	$(5/2,5/2)_5$	228 952.8	444 706	7	69
463.800	$3d^94s$	$^1D_2$	$3d^95p$	$^3D^\circ_3$	156 024.7	371 636	25	69
464.114	$3d^94p$	$^3D^\circ_3$	$3d^97s$	$(3/2,1/2)_2$	234 939.5	450 405	10	69
464.394	$3d^94p$	$^1F^\circ_3$	$3d^96d$	$(3/2,5/2)_4$	233 192.3	448 527	3	69
464.539	$3d^94s$	$^1D_2$	$3d^95p$	$^1D^\circ_2$	156 024.7	371 295	20	69
466.237	$3d^94p$	$^1P^\circ_1$	$3d^96d$	$(3/2,3/2)_0$	236 311.9	450 795 ?	1	69
467.085	$3d^94p$	$^1P^\circ_1$	$3d^97s$	$(3/2,1/2)_2$	236 311.9	450 405	3	69
467.275	$3d^94p$	$^1P^\circ_1$	$3d^97s$	$(3/2,1/2)_1$	236 311.9	450 316	1	69
468.019	$3d^94p$	$^1F^\circ_3$	$3d^97s$	$(5/2,1/2)_2$	233 192.3	446 852	8	69
468.187	$3d^94p$	$^3D^\circ_3$	$3d^96d$	$(3/2,5/2)_4$	234 939.5	448 527	1	69
468.290	$3d^94p$	$^1F^\circ_3$	$3d^97s$	$(5/2,1/2)_3$	233 192.3	446 732	6	69

TABLE 8. Spectral lines of Ga IV—Continued

Wavelength (Å)	Classification				Energy levels (cm^{-1})		Int.	References
	Lower		Upper					
468.380	$3d^94p$	$^3D^\circ_1$	$3d^97s$	$(3/2,1/2)_2$	236 906.5	450 405	7	69
468.580	$3d^94p$	$^3D^\circ_1$	$3d^97s$	$(3/2,1/2)_1$	236 906.5	450 316	4	69
469.421	$3d^94p$	$^1D^\circ_2$	$3d^97s$	$(5/2,1/2)_2$	233 824.7	446 852	12	69
469.596	$3d^94p$	$^3D^\circ_2$	$3d^97s$	$(3/2,1/2)_2$	237 458.0	450 405	11	69
469.794	$3d^94p$	$^3D^\circ_2$	$3d^97s$	$(3/2,1/2)_1$	237 458.0	450 316	2	69
470.241	$3d^94s$	$^1D_2$	$3d^95p$	$^3P^\circ_2$	156 024.7	368 684	5	69
471.590	$3d^94p$	$^1F^\circ_3$	$3d^96d$	$(5/2,5/2)_4$	233 192.3	445 236	25	69
472.082	$3d^94p$	$^3D^\circ_1$	$3d^96d$	$(3/2,5/2)_2$	236 906.5	448 734	40	69
472.156	$3d^94p$	$^3D^\circ_3$	$3d^97s$	$(5/2,1/2)_3$	234 939.5	446 732	45	69
472.649	$3d^94p$	$^3D^\circ_1$	$3d^96d$	$(3/2,3/2)_1$	236 906.5	448 482	30	69
	$3d^94p$	$^1F^\circ_3$	$3d^96d$	$(5/2,3/2)_4$	233 192.3	444 767		69
472.801	$3d^94p$	$^3D^\circ_2$	$3d^96d$	$(3/2,3/2)_2$	237 458.0	448 964	10	69
472.913	$3d^94p$	$^3D^\circ_2$	$3d^96d$	$(3/2,5/2)_3$	237 458.0	448 913	13	69
473.003	$3d^94p$	$^1D^\circ_2$	$3d^96d$	$(5/2,5/2)_2$	233 824.7	445 234	9	69
473.128	$3d^94p$	$^1D^\circ_2$	$3d^96d$	$(5/2,3/2)_3$	233 824.7	445 193	10	69
473.593	$3d^94p$	$^3D^\circ_1$	$3d^96d$	$(3/2,5/2)_1$	236 906.5	448 059	2	69
474.961	$3d^94p$	$^1P^\circ_1$	$3d^97s$	$(5/2,1/2)_2$	236 311.9	446 852	3	69
475.521	$3d^94p$	$^3D^\circ_3$	$3d^96d$	$(5/2,5/2)_4$	234 939.5	445 236	4	69
476.101	$3d^94p$	$^3D^\circ_3$	$3d^96d$	$(5/2,5/2)_3$	234 939.5	444 979	1	69
476.307	$3d^94p$	$^3D^\circ_1$	$3d^97s$	$(5/2,1/2)_2$	236 906.5	446 852	1	69
477.832	$3d^94p$	$^3D^\circ_2$	$3d^97s$	$(5/2,1/2)_3$	237 458.0	446 732	1	69
478.642	$3d^94p$	$^1P^\circ_1$	$3d^96d$	$(5/2,5/2)_2$	236 311.9	445 234	1	69
518.832	$3d^94p$	$^3P^\circ_2$	$3d^96s$	$(3/2,1/2)_2$	224 243.3	416 982	7	69
519.328	$3d^94p$	$^3P^\circ_2$	$3d^96s$	$(3/2,1/2)_1$	224 243.3	416 796	1	69
527.252	$3d^94p$	$^3P^\circ_1$	$3d^96s$	$(3/2,1/2)_2$	227 320.4	416 982	30	69
527.459	$3d^94p$	$^3P^\circ_2$	$3d^95d$	$^3F_3$	224 243.3	413 832	25	69
527.766	$3d^94p$	$^3P^\circ_1$	$3d^96s$	$(3/2,1/2)_1$	227 320.4	416 796	18	69
527.936	$3d^94p$	$^3P^\circ_2$	$3d^96s$	$(5/2,1/2)_2$	224 243.3	413 661	2	69
528.277	$3d^94p$	$^3F^\circ_3$	$3d^96s$	$(3/2,1/2)_2$	227 681.2	416 982	20	69
529.265	$3d^94p$	$^3P^\circ_2$	$3d^96s$	$(5/2,1/2)_3$	224 243.3	413 187	40	69
531.919	$3d^94p$	$^3P^\circ_2$	$3d^95d$	$^3P_1$	224 243.3	412 243	1	69
532.884	$3d^94p$	$^3P^\circ_0$	$3d^96s$	$(3/2,1/2)_1$	229 140.3	416 796	25	69
534.919	$3d^94p$	$^3F^\circ_2$	$3d^96s$	$(3/2,1/2)_2$	230 040.0	416 982	25	69
535.452	$3d^94p$	$^3F^\circ_2$	$3d^96s$	$(3/2,1/2)_1$	230 040.0	416 796	40	69
535.949	$3d^94p$	$^3P^\circ_1$	$3d^95d$	$^3F_2$	227 320.4	413 902	25	69
536.647	$3d^94p$	$^3P^\circ_1$	$3d^96s$	$(5/2,1/2)_2$	227 320.4	413 661	35	69
537.002	$3d^94p$	$^3F^\circ_3$	$3d^95d$	$^3F_2$	227 681.2	413 902	20	69
537.200	$3d^94p$	$^3F^\circ_3$	$3d^95d$	$^3F_3$	227 681.2	413 832	20	69
537.691	$3d^94p$	$^3F^\circ_3$	$3d^96s$	$(5/2,1/2)_2$	227 681.2	413 661	30	69
538.033	$3d^94p$	$^3P^\circ_2$	$3d^95d$	$^1F_3$	224 243.3	410 107	20	69
538.534	$3d^94p$	$^3P^\circ_1$	$3d^95d$	$^3D_1$	227 320.4	413 010	10	69
539.160	$3d^94p$	$^3P^\circ_2$	$3d^95d$	$^3D_3$	224 243.3	409 716	20	69
539.407	$3d^94p$	$^3F^\circ_3$	$3d^95d$	$^1G_4$	227 681.2	413 074	20	69
540.321	$3d^94p$	$^3P^\circ_2$	$3d^95d$	$^3P_2$	224 243.3	409 319	45	69
540.360	$3d^94p$	$^3P^\circ_2$	$3d^95d$	$^1P_1$	224 243.3	409 303	35	69
540.770	$3d^94p$	$^3P^\circ_1$	$3d^95d$	$^3P_1$	227 320.4	412 243	25	69
540.894	$3d^94p$	$^3F^\circ_4$	$3d^95d$	$^3F_3$	228 952.8	413 832	20	69
542.795	$3d^94p$	$^3F^\circ_4$	$3d^96s$	$(5/2,1/2)_3$	228 952.8	413 187	50	69
543.878	$3d^94p$	$^3P^\circ_0$	$3d^95d$	$^3D_1$	229 140.3	413 010	35	69
	$3d^94p$	$^3F^\circ_2$	$3d^95d$	$^3F_2$	230 040.0	413 902		69
544.094	$3d^94p$	$^1F^\circ_3$	$3d^96s$	$(3/2,1/2)_2$	233 192.3	416 982	40	69

TABLE 8. Spectral lines of Ga IV—Continued

Wavelength (Å)	Classification: Lower		Classification: Upper		Energy levels (cm^{-1})		Int.	References
544.299	$3d^94p$	$^3P^\circ_1$	$3d^95d$	$^3P_0$	227 320.4	411 044	25	69
544.602	$3d^94p$	$^3F^\circ_2$	$3d^96s$	$(5/2,1/2)_2$	230 040.0	413 661	40	69
544.656	$3d^94p$	$^3P^\circ_2$	$3d^95d$	$^3S_1$	224 243.3	407 846	40	69
545.181	$3d^94p$	$^1P^\circ_1$	$3d^95d$	$^1S_0$	236 311.9	419 737	15	69
545.980	$3d^94p$	$^3F^\circ_2$	$3d^95d$	$^3D_2$	230 040.0	413 198	20	69
546.143	$3d^94p$	$^3P^\circ_0$	$3d^95d$	$^3P_1$	229 140.3	412 243	20	69
546.528	$3d^94p$	$^1D^\circ_2$	$3d^96s$	$(3/2,1/2)_1$	233 824.7	416 796	30	69
	$3d^94p$	$^3F^\circ_2$	$3d^95d$	$^3D_1$	230 040.0	413 010		69
546.618	$3d^94p$	$^3P^\circ_1$	$3d^95d$	$^1D_2$	227 320.4	410 264	30	69
546.944	$3d^94p$	$^3D^\circ_1$	$3d^95d$	$^1S_0$	236 906.5	419 737	4	69
547.156	$3d^94p$	$^3F^\circ_2$	$3d^95d$	$^3G_3$	230 040.0	412 803	40	69
547.700	$3d^94p$	$^3F^\circ_3$	$3d^95d$	$^1D_2$	227 681.2	410 264	15	69
548.169	$3d^94p$	$^3F^\circ_3$	$3d^95d$	$^1F_3$	227 681.2	410 107	35	69
549.323	$3d^94p$	$^3D^\circ_3$	$3d^96s$	$(3/2,1/2)_2$	234 939.5	416 982	45	69
550.551	$3d^94p$	$^3F^\circ_3$	$3d^95d$	$^3P_2$	227 681.2	409 319	10	69
550.668	$3d^94p$	$^3F^\circ_3$	$3d^95d$	$^3G_4$	227 681.2	409 280	45	69
551.670	$3d^94p$	$^3F^\circ_4$	$3d^95d$	$^3F_4$	228 952.8	410 220	35	69
552.014	$3d^94p$	$^3F^\circ_4$	$3d^95d$	$^1F_3$	228 952.8	410 107	10	69
553.219	$3d^94p$	$^3F^\circ_4$	$3d^95d$	$^3D_3$	228 952.8	409 716	35	69
553.485	$3d^94p$	$^1P^\circ_1$	$3d^96s$	$(3/2,1/2)_2$	236 311.9	416 982	40	69
553.588	$3d^94p$	$^1F^\circ_3$	$3d^95d$	$^3F_3$	233 192.3	413 832	40	69
554.878	$3d^94p$	$^3F^\circ_2$	$3d^95d$	$^1D_2$	230 040.0	410 264	30	69
554.920	$3d^94p$	$^3F^\circ_4$	$3d^95d$	$^3G_5$	228 952.8	409 158	100	69
555.329	$3d^94p$	$^1D^\circ_2$	$3d^95d$	$^3F_2$	233 824.7	413 902	100*bl*	69
	$3d^94p$	$^3D^\circ_1$	$3d^96s$	$(3/2,1/2)_2$	236 906.5	416 982		69
	$3d^94p$	$^3F^\circ_2$	$3d^95d$	$^1F_3$	230 040.0	410 107		69
555.563	$3d^94p$	$^1D^\circ_2$	$3d^95d$	$^3F_3$	233 824.7	413 832	40*d*	69
	$3d^94p$	$^1F^\circ_3$	$3d^96s$	$(5/2,1/2)_3$	233 192.3	413 187		69
555.910	$3d^94p$	$^3D^\circ_1$	$3d^96s$	$(3/2,1/2)_1$	236 906.5	416 796	50	69
	$3d^94p$	$^1F^\circ_3$	$3d^95d$	$^1G_4$	233 192.3	413 074		69
556.055	$3d^94p$	$^1D^\circ_2$	$3d^96s$	$(5/2,1/2)_2$	233 824.7	413 661	30	69
556.759	$3d^94p$	$^1F^\circ_3$	$3d^95d$	$^3G_3$	233 192.3	412 803	10	69
557.021	$3d^94p$	$^3D^\circ_2$	$3d^96s$	$(3/2,1/2)_2$	237 458.0	416 982	50	69
557.509	$3d^94p$	$^1D^\circ_2$	$3d^96s$	$(5/2,1/2)_3$	233 824.7	413 187	40	69
557.593	$3d^94p$	$^3D^\circ_2$	$3d^96s$	$(3/2,1/2)_1$	237 458.0	416 796	40	69
557.849	$3d^94p$	$^3F^\circ_2$	$3d^95d$	$^1P_1$	230 040.0	409 303	5	69
558.730	$3d^94p$	$^1D^\circ_2$	$3d^95d$	$^3G_3$	233 824.7	412 803	35	69
558.768	$3d^94p$	$^3D^\circ_3$	$3d^95d$	$^3F_2$	234 939.5	413 902	20	69
558.994	$3d^94p$	$^3D^\circ_3$	$3d^95d$	$^3F_3$	234 939.5	413 832	4	69
561.376	$3d^94p$	$^3D^\circ_3$	$3d^95d$	$^1G_4$	234 939.5	413 074	45	69
562.238	$3d^94p$	$^3D^\circ_3$	$3d^95d$	$^3G_3$	234 939.5	412 803	10	69
563.099	$3d^94p$	$^1P^\circ_1$	$3d^95d$	$^3F_2$	236 311.9	413 902	30	69
563.854	$3d^94p$	$^1P^\circ_1$	$3d^96s$	$(5/2,1/2)_2$	236 311.9	413 661	30	69
564.745	$3d^94p$	$^1F^\circ_3$	$3d^95d$	$^1D_2$	233 192.3	410 264	5	69
564.882	$3d^94p$	$^1F^\circ_3$	$3d^95d$	$^3F_4$	233 192.3	410 220	50	69
564.989	$3d^94p$	$^3D^\circ_1$	$3d^95d$	$^3F_2$	236 906.5	413 902	35	69
565.336	$3d^94p$	$^1P^\circ_1$	$3d^95d$	$^3D_2$	236 311.9	413 198	30	69
565.937	$3d^94p$	$^1P^\circ_1$	$3d^95d$	$^3D_1$	236 311.9	413 010	35	69
566.500	$3d^94p$	$^1F^\circ_3$	$3d^95d$	$^3D_3$	233 192.3	409 716	30	69
566.763	$3d^94p$	$^3D^\circ_2$	$3d^95d$	$^3F_2$	237 458.0	413 902	40	69
	$3d^94p$	$^1D^\circ_2$	$3d^95d$	$^1D_2$	233 824.7	410 264		69

TABLE 8. Spectral lines of Ga IV—Continued

Wavelength (Å)	Classification: Lower		Classification: Upper		Energy levels (cm^{-1})		Int.	References
566.975	$3d^94p$	$^3D^\circ_2$	$3d^95d$	$^3F_3$	237 458.0	413 832	50	69
567.265	$3d^94p$	$^3D^\circ_1$	$3d^95d$	$^3D_2$	236 906.5	413 198	70	69
	$3d^94p$	$^1D^\circ_2$	$3d^95d$	$^1F_3$	233 824.7	410 107		69
567.520	$3d^94p$	$^3D^\circ_2$	$3d^96s$	$(5/2,1/2)_2$	237 458.0	413 661	30	69
567.764	$3d^94p$	$^1F^\circ_3$	$3d^95d$	$^3P_2$	233 192.3	409 319	45	69
567.856	$3d^94p$	$^3D^\circ_1$	$3d^95d$	$^3D_1$	236 906.5	413 010	40	69
568.405	$3d^94p$	$^1P^\circ_1$	$3d^95d$	$^3P_1$	236 311.9	412 243	15	69
569.050	$3d^94p$	$^3D^\circ_2$	$3d^95d$	$^3D_2$	237 458.0	413 198	40	69
	$3d^94p$	$^3D^\circ_2$	$3d^96s$	$(5/2,1/2)_3$	237 458.0	413 187		69
569.634	$3d^94p$	$^3D^\circ_2$	$3d^95d$	$^3D_1$	237 458.0	413 010	10	69
569.872	$3d^94p$	$^1D^\circ_2$	$3d^95d$	$^1P_1$	233 824.7	409 303	20	69
570.324	$3d^94p$	$^3D^\circ_1$	$3d^95d$	$^3P_1$	236 906.5	412 243	25	69
570.512	$3d^94p$	$^3D^\circ_3$	$3d^95d$	$^3F_4$	234 939.5	410 220	40	69
572.154	$3d^94p$	$^3D^\circ_3$	$3d^95d$	$^3D_3$	234 939.5	409 716	35	69
573.460	$3d^94p$	$^3D^\circ_3$	$3d^95d$	$^3P_2$	234 939.5	409 319	20	69
574.646	$3d^94p$	$^1D^\circ_2$	$3d^95d$	$^3S_1$	233 824.7	407 846	2	69
574.869	$3d^94p$	$^1P^\circ_1$	$3d^95d$	$^1D_2$	236 311.9	410 264	30	69
576.843	$3d^94p$	$^3D^\circ_1$	$3d^95d$	$^1D_2$	236 906.5	410 264	10	69
577.986	$3d^94p$	$^1P^\circ_1$	$3d^95d$	$^3P_2$	236 311.9	409 319	1	69
578.066	$3d^94p$	$^1P^\circ_1$	$3d^95d$	$^1P_1$	236 311.9	409 303	15	69
578.683	$3d^94p$	$^3D^\circ_2$	$3d^95d$	$^1D_2$	237 458.0	410 264	1	69
580.062	$3d^94p$	$^3D^\circ_1$	$3d^95d$	$^1P_1$	236 906.5	409 303	20	69
581.862	$3d^94p$	$^3D^\circ_2$	$3d^95d$	$^3P_2$	237 458.0	409 319	2	69
582.990	$3d^94p$	$^1P^\circ_1$	$3d^95d$	$^3S_1$	236 311.9	407 846	1	69
585.010	$3d^94p$	$^3D^\circ_1$	$3d^95d$	$^3S_1$	236 906.5	407 846	1	69
811.949	$3d^94p$	$^3P^\circ_2$	$3d^95s$	$^1D_2$	224 243.3	347 402.8	50	69
815.360	$3d^94p$	$^3P^\circ_2$	$3d^95s$	$^3D_1$	224 243.3	346 887.6	60	69
835.633	$3d^94p$	$^3P^\circ_2$	$3d^95s$	$^3D_2$	224 243.3	343 912.7	80	69
836.349	$3d^94p$	$^3P^\circ_1$	$3d^95s$	$^3D_1$	227 320.4	346 887.6	100	69
839.793	$3d^94p$	$^3P^\circ_2$	$3d^95s$	$^3D_3$	224 243.3	343 319.9	200	69
840.949	$3d^94p$	$^1P^\circ_1$	$3d^94d$	$^1S_0$	236 311.9	355 225.3 ?	180	69
845.174	$3d^94p$	$^3D^\circ_1$	$3d^94d$	$^1S_0$	236 906.5	355 225.3 ?	80	69
849.274	$3d^94p$	$^3P^\circ_0$	$3d^95s$	$^3D_1$	229 140.3	346 887.6	130	69
852.059	$3d^94p$	$^3F^\circ_2$	$3d^95s$	$^1D_2$	230 040.0	347 402.8	80	69
855.813	$3d^94p$	$^3F^\circ_2$	$3d^95s$	$^3D_1$	230 040.0	346 887.6	160	69
857.686	$3d^94p$	$^3P^\circ_1$	$3d^95s$	$^3D_2$	227 320.4	343 912.7	130	69
864.762	$3d^94p$	$^3F^\circ_3$	$3d^95s$	$^3D_3$	227 681.2	343 319.9	120	69
873.541	$3d^94p$	$^3P^\circ_2$	$3d^94d$	$^3F_2$	224 243.3	338 719.6	10	69
874.378	$3d^94p$	$^3F^\circ_4$	$3d^95s$	$^3D_3$	228 952.8	343 319.9	160	69
875.186	$3d^94p$	$^3P^\circ_2$	$3d^94d$	$^3F_3$	224 243.3	338 504.4	50	69
875.576	$3d^94p$	$^1F^\circ_3$	$3d^95s$	$^1D_2$	233 192.3	347 402.8	130	69
878.165	$3d^94p$	$^3F^\circ_2$	$3d^95s$	$^3D_2$	230 040.0	343 912.7	110	69
880.451	$3d^94p$	$^1D^\circ_2$	$3d^95s$	$^1D_2$	233 824.7	347 402.8	80	69
882.769	$3d^94p$	$^3F^\circ_2$	$3d^95s$	$^3D_3$	230 040.0	343 319.9	1	69
884.464	$3d^94p$	$^1D^\circ_2$	$3d^95s$	$^3D_1$	233 824.7	346 887.6	70	69
889.180	$3d^94p$	$^3D^\circ_3$	$3d^95s$	$^1D_2$	234 939.5	347 402.8	110	69
897.673	$3d^94p$	$^3P^\circ_1$	$3d^94d$	$^3F_2$	227 320.4	338 719.6	50	69
900.166	$3d^94p$	$^1P^\circ_1$	$3d^95s$	$^1D_2$	236 311.9	347 402.8	100	69
901.261	$3d^94p$	$^3P^\circ_2$	$3d^94d$	$^3P_1$	224 243.3	335 199.3	80	69
903.179	$3d^94p$	$^1F^\circ_3$	$3d^95s$	$^3D_2$	233 192.3	343 912.7	70	69
904.361	$3d^94p$	$^1P^\circ_1$	$3d^95s$	$^3D_1$	236 311.9	346 887.6	50	69

TABLE 8. Spectral lines of Ga IV—Continued

Wavelength (Å)	Classification: Lower		Classification: Upper		Energy levels (cm^{-1})		Int.	References
904.870	$3d^94p$	$^3P^\circ_1$	$3d^94d$	$^1D_2$	227 320.4	337 833.8	110	69
905.012	$3d^94p$	$^3D^\circ_1$	$3d^95s$	$^1D_2$	236 906.5	347 402.8	15	69
906.715	$3d^94p$	$^3P^\circ_2$	$3d^94d$	$^3G_3$	224 243.3	334 532.0	8	69
907.834	$3d^94p$	$^3F^\circ_3$	$3d^94d$	$^1D_2$	227 681.2	337 833.8	30	69
908.039	$3d^94p$	$^1F^\circ_3$	$3d^95s$	$^3D_3$	233 192.3	343 319.9	130	69
908.367	$3d^94p$	$^1D^\circ_2$	$3d^95s$	$^3D_2$	233 824.7	343 912.7	150	69
909.250	$3d^94p$	$^3D^\circ_1$	$3d^95s$	$^3D_1$	236 906.5	346 887.6	100	69
909.549	$3d^94p$	$^3D^\circ_2$	$3d^95s$	$^1D_2$	237 458.0	347 402.8	130	69
911.406	$3d^94p$	$^3P^\circ_2$	$3d^94d$	$^3D_3$	224 243.3	333 964.2	150	69
912.302	$3d^94p$	$^3P^\circ_1$	$3d^94d$	$^3D_1$	227 320.4	336 933.8	90	69
912.809	$3d^94p$	$^3F^\circ_4$	$3d^94d$	$^3F_3$	228 952.8	338 504.4	25	69
913.280	$3d^94p$	$^1D^\circ_2$	$3d^95s$	$^3D_3$	233 824.7	343 319.9	3	69
913.834	$3d^94p$	$^3D^\circ_2$	$3d^95s$	$^3D_1$	237 458.0	346 887.6	70	69
916.516	$3d^94p$	$^3F^\circ_3$	$3d^94d$	$^3F_4$	227 681.2	336 790.0	60	69
917.658	$3d^94p$	$^3D^\circ_3$	$3d^95s$	$^3D_2$	234 939.5	343 912.7	70	69
918.281	$3d^94p$	$^3F^\circ_3$	$3d^94d$	$^1F_3$	227 681.2	336 581.6	100	69
920.138	$3d^94p$	$^3F^\circ_2$	$3d^94d$	$^3F_2$	230 040.0	338 719.6	110	69
920.953	$3d^94p$	$^3P^\circ_2$	$3d^94d$	$^1P_1$	224 243.3	332 826.8	120	69
921.546	$3d^94p$	$^3P^\circ_2$	$3d^94d$	$^3P_2$	224 243.3	332 757.5	150	69
921.973	$3d^94p$	$^3F^\circ_2$	$3d^94d$	$^3F_3$	230 040.0	338 504.4	7	69
922.676	$3d^94p$	$^3D^\circ_3$	$3d^95s$	$^3D_3$	234 939.5	343 319.9	110	69
926.970	$3d^94p$	$^3P^\circ_1$	$3d^94d$	$^3P_1$	227 320.4	335 199.3	100	69
927.328	$3d^94p$	$^3F^\circ_4$	$3d^94d$	$^3F_4$	228 952.8	336 790.0	70	69
927.702	$3d^94p$	$^3F^\circ_2$	$3d^94d$	$^1D_2$	230 040.0	337 833.8	110	69
	$3d^94p$	$^3P^\circ_0$	$3d^94d$	$^3D_1$	229 140.3	336 933.8		69
929.120	$3d^94p$	$^3F^\circ_4$	$3d^94d$	$^1F_3$	228 952.8	336 581.6	10	69
929.366	$3d^94p$	$^1P^\circ_1$	$3d^95s$	$^3D_2$	236 311.9	343 912.7	40	69
929.965	$3d^94p$	$^3P^\circ_1$	$3d^94d$	$^3D_2$	227 320.4	334 851.3	120	69
933.099	$3d^94p$	$^3F^\circ_3$	$3d^94d$	$^3D_2$	227 681.2	334 851.3	90	69
933.862	$3d^94p$	$^3P^\circ_1$	$3d^94d$	$^3P_0$	227 320.4	334 403.3	100	69
934.529	$3d^94p$	$^3D^\circ_1$	$3d^95s$	$^3D_2$	236 906.5	343 912.7	50	69
935.513	$3d^94p$	$^3F^\circ_2$	$3d^94d$	$^3D_1$	230 040.0	336 933.8	90	69
935.888	$3d^94p$	$^3F^\circ_3$	$3d^94d$	$^3G_3$	227 681.2	334 532.0	120	69
	$3d^94p$	$^3F^\circ_3$	$3d^94d$	$^1G_4$	227 681.2	334 527.6		69
938.602	$3d^94p$	$^3F^\circ_2$	$3d^94d$	$^1F_3$	230 040.0	336 581.6	130	69
940.888	$3d^94p$	$^3F^\circ_3$	$3d^94d$	$^3D_3$	227 681.2	333 964.2	110	69
942.877	$3d^94p$	$^3P^\circ_0$	$3d^94d$	$^3P_1$	229 140.3	335 199.3	100	69
944.629	$3d^94p$	$^3D^\circ_2$	$3d^95s$	$^3D_3$	237 458.0	343 319.9	10	69
947.202	$3d^94p$	$^3F^\circ_4$	$3d^94d$	$^3G_3$	228 952.8	334 532.0	130	69
	$3d^94p$	$^3F^\circ_4$	$3d^94d$	$^1G_4$	228 952.8	334 527.6		69
947.621	$3d^94p$	$^1F^\circ_3$	$3d^94d$	$^3F_2$	233 192.3	338 719.6	90	69
947.821	$3d^94p$	$^3P^\circ_1$	$3d^94d$	$^1P_1$	227 320.4	332 826.8	120	69
948.438	$3d^94p$	$^3P^\circ_1$	$3d^94d$	$^3P_2$	227 320.4	332 757.5	80	69
949.558	$3d^94p$	$^1F^\circ_3$	$3d^94d$	$^3F_3$	233 192.3	338 504.4	120	69
950.946	$3d^94p$	$^3F^\circ_2$	$3d^94d$	$^3P_1$	230 040.0	335 199.3	1	69
951.696	$3d^94p$	$^3F^\circ_3$	$3d^94d$	$^3P_2$	227 681.2	332 757.5	90	69
951.935	$3d^94p$	$^3F^\circ_3$	$3d^94d$	$^3G_4$	227 681.2	332 730.5	200	69
952.283	$3d^94p$	$^3F^\circ_4$	$3d^94d$	$^3D_3$	228 952.8	333 964.2	120	69
953.335	$3d^94p$	$^1D^\circ_2$	$3d^94d$	$^3F_2$	233 824.7	338 719.6	90	69
954.089	$3d^94p$	$^3F^\circ_2$	$3d^94d$	$^3D_2$	230 040.0	334 851.3	110	69
955.293	$3d^94p$	$^1D^\circ_2$	$3d^94d$	$^3F_3$	233 824.7	338 504.4	50	69

TABLE 8. Spectral lines of Ga IV—Continued

Wavelength (Å)	Classification				Energy levels (cm^{-1})		Int.	References
	Lower		Upper					
955.643	$3d^94p$	$^1F^\circ_3$	$3d^94d$	$^1D_2$	233 192.3	337 833.8	40	69
956.755	$3d^94p$	$^3P^\circ_2$	$3d^94d$	$^3S_1$	224 243.3	328 763.7	160	69
957.012	$3d^94p$	$^3F^\circ_2$	$3d^94d$	$^3G_3$	230 040.0	334 532.0	150	69
961.462	$3d^94p$	$^1D^\circ_2$	$3d^94d$	$^1D_2$	233 824.7	337 833.8	5	69
962.236	$3d^94p$	$^3F^\circ_2$	$3d^94d$	$^3D_3$	230 040.0	333 964.2	30	69
963.597	$3d^94p$	$^3F^\circ_4$	$3d^94d$	$^3G_4$	228 952.8	332 730.5	100	69
964.446	$3d^94p$	$^3P^\circ_0$	$3d^94d$	$^1P_1$	229 140.3	332 826.8	30	69
965.237	$3d^94p$	$^3F^\circ_4$	$3d^94d$	$^3G_5$	228 952.8	332 554.3	200	69
965.574	$3d^94p$	$^3D^\circ_3$	$3d^94d$	$^3F_3$	234 939.5	338 504.4	120	69
967.216	$3d^94p$	$^1F^\circ_3$	$3d^94d$	$^1F_3$	233 192.3	336 581.6	80	69
972.891	$3d^94p$	$^3F^\circ_2$	$3d^94d$	$^1P_1$	230 040.0	332 826.8	70	69
973.164	$3d^94p$	$^1D^\circ_2$	$3d^94d$	$^1F_3$	233 824.7	336 581.6	130	69
973.563	$3d^94p$	$^3F^\circ_2$	$3d^94d$	$^3P_2$	230 040.0	332 757.5	10	69
976.486	$3d^94p$	$^1P^\circ_1$	$3d^94d$	$^3F_2$	236 311.9	338 719.6	120	69
981.820	$3d^94p$	$^3D^\circ_3$	$3d^94d$	$^3F_4$	234 939.5	336 790.0	150	69
982.189	$3d^94p$	$^3D^\circ_1$	$3d^94d$	$^3F_2$	236 906.5	338 719.6	70	69
983.838	$3d^94p$	$^3D^\circ_3$	$3d^94d$	$^1F_3$	234 939.5	336 581.6	60	69
985.003	$3d^94p$	$^1P^\circ_1$	$3d^94d$	$^1D_2$	236 311.9	337 833.8	7	69
985.773	$3d^94p$	$^3P^\circ_1$	$3d^94d$	$^3S_1$	227 320.4	328 763.7	110	69
986.436	$3d^94p$	$^1D^\circ_2$	$3d^94d$	$^3P_1$	233 824.7	335 199.3	10	69
986.817	$3d^94p$	$^1F^\circ_3$	$3d^94d$	$^3G_3$	233 192.3	334 532.0	140	69
	$3d^94p$	$^1F^\circ_3$	$3d^94d$	$^1G_4$	233 192.3	334 527.6		69
987.529	$3d^94p$	$^3D^\circ_2$	$3d^94d$	$^3F_2$	237 458.0	338 719.6	120	69
989.635	$3d^94p$	$^3D^\circ_2$	$3d^94d$	$^3F_3$	237 458.0	338 504.4	160	69
989.833	$3d^94p$	$^1D^\circ_2$	$3d^94d$	$^3D_2$	233 824.7	334 851.3	160	69
990.805	$3d^94p$	$^3D^\circ_1$	$3d^94d$	$^1D_2$	236 906.5	337 833.8	140	69
992.338	$3d^94p$	$^1F^\circ_3$	$3d^94d$	$^3D_3$	233 192.3	333 964.2	130	69
992.970	$3d^94p$	$^1D^\circ_2$	$3d^94d$	$^3G_3$	233 824.7	334 532.0	150	69
993.813	$3d^94p$	$^1P^\circ_1$	$3d^94d$	$^3D_1$	236 311.9	336 933.8	120	69
996.249	$3d^94p$	$^3D^\circ_2$	$3d^94d$	$^1D_2$	237 458.0	337 833.8	110	69
998.606	$3d^94p$	$^1D^\circ_2$	$3d^94d$	$^3D_3$	233 824.7	333 964.2	30	69
999.723	$3d^94p$	$^3D^\circ_1$	$3d^94d$	$^3D_1$	236 906.5	336 933.8	90	69
1003.759	$3d^94p$	$^3P^\circ_0$	$3d^94d$	$^3S_1$	229 140.3	328 763.7	90	69
1004.125	$3d^94p$	$^3D^\circ_3$	$3d^94d$	$^3G_3$	234 939.5	334 532.0	130	69
	$3d^94p$	$^3D^\circ_3$	$3d^94d$	$^1G_4$	234 939.5	334 527.6		69
1004.365	$3d^94p$	$^1F^\circ_3$	$3d^94d$	$^3P_2$	233 192.3	332 757.5	120	69
1004.639	$3d^94p$	$^1F^\circ_3$	$3d^94d$	$^3G_4$	233 192.3	332 730.5	90	69
1005.264	$3d^94p$	$^3D^\circ_2$	$3d^94d$	$^3D_1$	237 458.0	336 933.8	80	69
1008.837	$3d^94p$	$^3D^\circ_2$	$3d^94d$	$^1F_3$	237 458.0	336 581.6	100	69
1010.789	$3d^94p$	$^1D^\circ_2$	$3d^94d$	$^3P_2$	233 824.7	332 757.5	15	69
1011.247	$3d^94p$	$^1P^\circ_1$	$3d^94d$	$^3P_1$	236 311.9	335 199.3	110	69
1012.925	$3d^94p$	$^3F^\circ_2$	$3d^94d$	$^3S_1$	230 040.0	328 763.7	2	69
1014.848	$3d^94p$	$^1P^\circ_1$	$3d^94d$	$^3D_2$	236 311.9	334 851.3	150	69
1017.366	$3d^94p$	$^3D^\circ_1$	$3d^94d$	$^3P_1$	236 906.5	335 199.3	100	69
1020.983	$3d^94p$	$^3D^\circ_1$	$3d^94d$	$^3D_2$	236 906.5	334 851.3	40	69
1022.289	$3d^94p$	$^3D^\circ_3$	$3d^94d$	$^3P_2$	234 939.5	332 757.5	120	69
1022.586	$3d^94p$	$^3D^\circ_3$	$3d^94d$	$^3G_4$	234 939.5	332 730.5	7	69
1023.104	$3d^94p$	$^3D^\circ_2$	$3d^94d$	$^3P_1$	237 458.0	335 199.3	100	69
1025.646	$3d^94p$	$^3D^\circ_1$	$3d^94d$	$^3P_0$	236 906.5	334 403.3	60	69
1026.768	$3d^94p$	$^3D^\circ_2$	$3d^94d$	$^3D_2$	237 458.0	334 851.3	80	69
1036.108	$3d^94p$	$^1P^\circ_1$	$3d^94d$	$^1P_1$	236 311.9	332 826.8	100	69

TABLE 8. Spectral lines of Ga IV—Continued

Wavelength (Å)	Classification Lower		Classification Upper		Energy levels (cm^{-1})		Int.	References
1042.531	$3d^94p$	$^3D^\circ_1$	$3d^94d$	$^1P_1$	236 906.5	332 826.8	70	69
1043.301	$3d^94p$	$^3D^\circ_1$	$3d^94d$	$^3P_2$	236 906.5	332 757.5	1	69
1048.565	$3d^94p$	$^3D^\circ_2$	$3d^94d$	$^1P_1$	237 458.0	332 826.8	3	69
1049.316	$3d^94p$	$^3D^\circ_2$	$3d^94d$	$^3P_2$	237 458.0	332 757.5	7	69
1053.307	$3d^94p$	$^1D^\circ_2$	$3d^94d$	$^3S_1$	233 824.7	328 763.7	15	69
1081.641	$3d^94p$	$^1P^\circ_1$	$3d^94d$	$^3S_1$	236 311.9	328 763.7	7	69
1088.598	$3d^94p$	$^3D^\circ_1$	$3d^94d$	$^3S_1$	236 906.5	328 763.7	8	69
1095.202	$3d^94p$	$^3D^\circ_2$	$3d^94d$	$^3S_1$	237 458.0	328 763.7	13	69
1137.063	$3d^94s$	$^3D_3$	$3d^94p$	$^3D^\circ_2$	149 512.1	237 458.0	60	69
1156.187	$3d^94s$	$^3D_2$	$3d^94p$	$^3D^\circ_2$	150 967.0	237 458.0	110	69
1163.607	$3d^94s$	$^3D_2$	$3d^94p$	$^3D^\circ_1$	150 967.0	236 906.5	100	69
1170.586	$3d^94s$	$^3D_3$	$3d^94p$	$^3D^\circ_3$	149 512.1	234 939.5	220	69
1171.715	$3d^94s$	$^3D_2$	$3d^94p$	$^1P^\circ_1$	150 967.0	236 311.9	10	69
1185.225	$3d^94s$	$^3D_1$	$3d^94p$	$^3D^\circ_2$	153 085.9	237 458.0	160	69
1186.062	$3d^94s$	$^3D_3$	$3d^94p$	$^1D^\circ_2$	149 512.1	233 824.7	25	69
1190.863	$3d^94s$	$^3D_2$	$3d^94p$	$^3D^\circ_3$	150 967.0	234 939.5	220	69
1193.026	$3d^94s$	$^3D_1$	$3d^94p$	$^3D^\circ_1$	153 085.9	236 906.5	180	69
1195.026	$3d^94s$	$^3D_3$	$3d^94p$	$^1F^\circ_3$	149 512.1	233 192.3	250	69
1201.549	$3d^94s$	$^3D_1$	$3d^94p$	$^1P^\circ_1$	153 085.9	236 311.9	110	69
1206.890	$3d^94s$	$^3D_2$	$3d^94p$	$^1D^\circ_2$	150 967.0	233 824.7	260	69
1216.172	$3d^94s$	$^3D_2$	$3d^94p$	$^1F^\circ_3$	150 967.0	233 192.3	40	69
1228.002	$3d^94s$	$^1D_2$	$3d^94p$	$^3D^\circ_2$	156 024.7	237 458.0	600	69
1236.375	$3d^94s$	$^1D_2$	$3d^94p$	$^3D^\circ_1$	156 024.7	236 906.5	150	69
1238.560	$3d^94s$	$^3D_1$	$3d^94p$	$^1D^\circ_2$	153 085.9	233 824.7	200	69
1241.803	$3d^94s$	$^3D_3$	$3d^94p$	$^3F^\circ_2$	149 512.1	230 040.0	40	69
1245.528	$3d^94s$	$^1D_2$	$3d^94p$	$^1P^\circ_1$	156 024.7	236 311.9	600	69
1258.800	$3d^94s$	$^3D_3$	$3d^94p$	$^3F^\circ_4$	149 512.1	228 952.8	1000	69
1264.648	$3d^94s$	$^3F_2$	$3d^94p$	$^3F^\circ_2$	150 967.0	230 040.0	300	69
1267.186	$3d^94s$	$^1D_2$	$3d^94p$	$^3D^\circ_3$	156 024.7	234 939.5	350	69
1279.275	$3d^94s$	$^3D_3$	$3d^94p$	$^3F^\circ_3$	149 512.1	227 681.2	300	69
1285.347	$3d^94s$	$^1D_2$	$3d^94p$	$^1D^\circ_2$	156 024.7	233 824.7	300	69
1295.878	$3d^94s$	$^1D_2$	$3d^94p$	$^1F^\circ_3$	156 024.7	233 192.3	650	69
1299.478	$3d^94s$	$^3D_1$	$3d^94p$	$^3F^\circ_2$	153 085.9	230 040.0	600	69
1303.539	$3d^94s$	$^3D_2$	$3d^94p$	$^3F^\circ_3$	150 967.0	227 681.2	1000	69
1309.699	$3d^94s$	$^3D_2$	$3d^94p$	$^3P^\circ_1$	150 967.0	227 320.4	500	69
1314.849	$3d^94s$	$^3D_1$	$3d^94p$	$^3P^\circ_0$	153 085.9	229 140.3	650	69
1338.128	$3d^94s$	$^3D_3$	$3d^94p$	$^3P^\circ_2$	149 512.1	224 243.3	1000	69
1347.082	$3d^94s$	$^3D_1$	$3d^94p$	$^3P^\circ_1$	153 085.9	227 320.4	250	69
1351.075	$3d^94s$	$^1D_2$	$3d^94p$	$^3F^\circ_2$	156 024.7	230 040.0	150	69
1364.698	$3d^94s$	$^3D_2$	$3d^94p$	$^3P^\circ_2$	150 967.0	224 243.3	200	69
1368.497	$3d^94d$	$^3S_1$	$3d^94f$	$(3/2,7/2)^\circ_2$	328 763.7	401 836.6	6	69
1395.549	$3d^94s$	$^1D_2$	$3d^94p$	$^3F^\circ_3$	156 024.7	227 681.2	450	69
1402.630	$3d^94s$	$^1D_2$	$3d^94p$	$^3P^\circ_1$	156 024.7	227 320.4	200	69
1405.337	$3d^94s$	$^3D_1$	$3d^94p$	$^3P^\circ_2$	153 085.9	224 243.3	80	69
1437.687	$3d^94d$	$^3S_1$	$3d^94f$	$(5/2,7/2)^\circ_2$	328 763.7	398 319.7	50	69
1439.659	$3d^94d$	$^3G_4$	$3d^94f$	$(3/2,7/2)^\circ_5$	332 730.5	402 191.0	5	69
1443.429	$3d^94d$	$^3S_1$	$3d^94f$	$(5/2,5/2)^\circ_1$	328 763.7	398 043.0	55	69
1446.759	$3d^94d$	$^3S_1$	$3d^94f$	$(5/2,5/2)^\circ_0$	328 763.7	397 883.9	30	69
1451.918	$3d^94d$	$^3D_3$	$3d^94f$	$(3/2,7/2)^\circ_4$	333 964.2	402 838.6	1	69
1463.857	$3d^94d$	$^3G_3$	$3d^94f$	$(3/2,5/2)^\circ_3$	334 532.0	402 844.6	25	69
1465.587	$3d^94d$	$^3D_3$	$3d^94f$	$(3/2,5/2)^\circ_4$	333 964.2	402 196.0	1	69

TABLE 8. Spectral lines of Ga IV—Continued

Wavelength (Å)	Classification Lower		Upper		Energy levels (cm^{-1})		Int.	References
1465.871	$3d^94s$	$^1D_2$	$3d^94p$	$^3P^\circ_2$	156 024.7	224 243.3	150	69
1471.667	$3d^94d$	$^3P_0$	$3d^94f$	$(3/2,5/2)^\circ_1$	334 403.3	402 353.4	20	69
1476.754	$3d^94d$	$^3D_2$	$3d^94f$	$(3/2,7/2)^\circ_3$	334 851.3	402 567.4	20	69
1477.896	$3d^94d$	$^3G_3$	$3d^94f$	$(3/2,5/2)^\circ_4$	334 532.0	402 196.0	60	69
	$3d^94d$	$^1G_4$	$3d^94f$	$(3/2,7/2)^\circ_5$	334 527.6	402 191.0		69
1489.116	$3d^94d$	$^3P_1$	$3d^94f$	$(3/2,5/2)^\circ_1$	335 199.3	402 353.4	40	69
1492.856	$3d^94d$	$^3D_2$	$3d^94f$	$(3/2,7/2)^\circ_2$	334 851.3	401 836.6	25	69
1500.662	$3d^94d$	$^3P_1$	$3d^94f$	$(3/2,7/2)^\circ_2$	335 199.3	401 836.6	110	69
1501.015	$3d^94d$	$^3G_5$	$3d^94f$	$(5/2,7/2)^\circ_5$	332 554.3	399 175.9	100	69
1509.141	$3d^94d$	$^1F_3$	$3d^94f$	$(3/2,5/2)^\circ_3$	336 581.6	402 844.6	40	69
1509.275	$3d^94d$	$^1F_3$	$3d^94f$	$(3/2,7/2)^\circ_4$	336 581.6	402 838.6	10	69
1511.232	$3d^94d$	$^3P_2$	$3d^94f$	$(5/2,7/2)^\circ_1$	332 757.5	398 927.7	8	69
1512.020	$3d^94d$	$^3G_4$	$3d^94f$	$(5/2,7/2)^\circ_3$	332 730.5	398 866.0	8	69
1512.665	$3d^94d$	$^3P_2$	$3d^94f$	$(5/2,7/2)^\circ_3$	332 757.5	398 866.0	110	69
1512.837	$3d^94d$	$^1P_1$	$3d^94f$	$(5/2,7/2)^\circ_1$	332 826.8	398 927.7	80	69
1512.989	$3d^94d$	$^3P_2$	$3d^94f$	$(5/2,5/2)^\circ_2$	332 757.5	398 851.5	60	69
1514.049	$3d^94d$	$^3F_4$	$3d^94f$	$(3/2,7/2)^\circ_4$	336 790.0	402 838.6	40	69
1516.710	$3d^94d$	$^3G_5$	$3d^94f$	$(5/2,7/2)^\circ_6$	332 554.3	398 486.2	130	69
1520.673	$3d^94d$	$^3G_4$	$3d^94f$	$(5/2,5/2)^\circ_5$	332 730.5	398 489.8	100	69
1524.081	$3d^94d$	$^1F_3$	$3d^94f$	$(3/2,5/2)^\circ_4$	336 581.6	402 196.0	110	69
	$3d^94d$	$^3D_1$	$3d^94f$	$(3/2,5/2)^\circ_2$	336 933.8	402 546.1		69
1525.268	$3d^94d$	$^3P_2$	$3d^94f$	$(5/2,7/2)^\circ_2$	332 757.5	398 319.7	80	69
1526.886	$3d^94d$	$^1P_1$	$3d^94f$	$(5/2,7/2)^\circ_2$	332 826.8	398 319.7	15	69
1528.594	$3d^94d$	$^3D_1$	$3d^94f$	$(3/2,5/2)^\circ_1$	336 933.8	402 353.4	25	69
1529.036	$3d^94d$	$^3F_4$	$3d^94f$	$(3/2,7/2)^\circ_5$	336 790.0	402 191.0	110	69
1531.744	$3d^94d$	$^3P_2$	$3d^94f$	$(5/2,5/2)^\circ_1$	332 757.5	398 043.0	50	69
1532.788	$3d^94d$	$^3D_3$	$3d^94f$	$(5/2,5/2)^\circ_3$	333 964.2	399 205.0	25	69
1533.701	$3d^94d$	$^3D_3$	$3d^94f$	$(5/2,7/2)^\circ_4$	333 964.2	399 165.8	50	69
1537.106	$3d^94d$	$^1P_1$	$3d^94f$	$(5/2,5/2)^\circ_0$	332 826.8	397 883.9	5	69
1538.209	$3d^94d$	$^1D_2$	$3d^94f$	$(3/2,5/2)^\circ_3$	337 833.8	402 844.6	25	69
1540.788	$3d^94d$	$^3D_3$	$3d^94f$	$(5/2,7/2)^\circ_3$	333 964.2	398 866.0	50	69
1544.786	$3d^94d$	$^1D_2$	$3d^94f$	$(3/2,7/2)^\circ_3$	337 833.8	402 567.4	100	69
1545.308	$3d^94d$	$^1D_2$	$3d^94f$	$(3/2,5/2)^\circ_2$	337 833.8	402 546.1	5	69
1546.249	$3d^94d$	$^3G_3$	$3d^94f$	$(5/2,5/2)^\circ_3$	334 532.0	399 205.0	70	69
1546.816	$3d^94d$	$^3G_3$	$3d^94f$	$(5/2,5/2)^\circ_4$	334 532.0	399 181.0	200	69
	$3d^94d$	$^1G_4$	$3d^94f$	$(5/2,7/2)^\circ_5$	334 527.6	399 175.9		69
1547.068	$3d^94d$	$^1G_4$	$3d^94f$	$(5/2,7/2)^\circ_4$	334 527.6	399 165.8	70	69
1549.804	$3d^94d$	$^3P_0$	$3d^94f$	$(5/2,7/2)^\circ_1$	334 403.3	398 927.7	40	69
1553.909	$3d^94d$	$^3D_2$	$3d^94f$	$(5/2,5/2)^\circ_3$	334 851.3	399 205.0	150	69
1554.384	$3d^94d$	$^3F_3$	$3d^94f$	$(3/2,7/2)^\circ_4$	338 504.4	402 838.6	100	69
1559.457	$3d^94d$	$^3F_2$	$3d^94f$	$(3/2,5/2)^\circ_3$	338 719.6	402 844.6	70	69
1560.974	$3d^94d$	$^3F_3$	$3d^94f$	$(3/2,7/2)^\circ_3$	338 504.4	402 567.4	40	69
1562.146	$3d^94d$	$^3D_2$	$3d^94f$	$(5/2,7/2)^\circ_3$	334 851.3	398 866.0	40	69
1562.432	$3d^94d$	$^1D_2$	$3d^94f$	$(3/2,7/2)^\circ_2$	337 833.8	401 836.6	30	69
1562.497	$3d^94d$	$^3D_2$	$3d^94f$	$(5/2,5/2)^\circ_2$	334 851.3	398 851.5	70	69
1563.396	$3d^94d$	$^1G_4$	$3d^94f$	$(5/2,5/2)^\circ_5$	334 527.6	398 489.8	20	69
1566.221	$3d^94d$	$^3F_2$	$3d^94f$	$(3/2,7/2)^\circ_3$	338 719.6	402 567.4	40	69
1566.742	$3d^94d$	$^3F_2$	$3d^94f$	$(3/2,5/2)^\circ_2$	338 719.6	402 546.1	30	69
1567.705	$3d^94d$	$^3G_3$	$3d^94f$	$(5/2,7/2)^\circ_2$	334 532.0	398 319.7	6	69
1571.341	$3d^94d$	$^3P_0$	$3d^94f$	$(5/2,5/2)^\circ_1$	334 403.3	398 043.0	8	69
1571.485	$3d^94d$	$^3F_2$	$3d^94f$	$(3/2,5/2)^\circ_1$	338 719.6	402 353.4	5	69

TABLE 8. Spectral lines of Ga IV—Continued

Wavelength (Å)	Classification: Lower		Upper		Energy levels (cm^{-1})		Int.	References
1575.586	$3d^94d$	$^3D_2$	$3d^94f$	$(5/2,7/2)^\circ_2$	334 851.3	398 319.7	13	69
1578.980	$3d^94d$	$^3F_3$	$3d^94f$	$(3/2,7/2)^\circ_2$	338 504.4	401 836.6	3	69
1582.474	$3d^94d$	$^3D_2$	$3d^94f$	$(5/2,5/2)^\circ_1$	334 851.3	398 043.0	1	69
1584.267	$3d^94d$	$^3P_1$	$3d^94f$	$(5/2,7/2)^\circ_2$	335 199.3	398 319.7	3	69
1584.356	$3d^94d$	$^3F_2$	$3d^94f$	$(3/2,7/2)^\circ_2$	338 719.6	401 836.6	12	69
1595.283	$3d^94d$	$^3P_1$	$3d^94f$	$(5/2,5/2)^\circ_0$	335 199.3	397 883.9	5	69
1596.847	$3d^94d$	$^1F_3$	$3d^94f$	$(5/2,5/2)^\circ_3$	336 581.6	399 205.0	25	69
1597.454	$3d^94d$	$^1F_3$	$3d^94f$	$(5/2,5/2)^\circ_4$	336 581.6	399 181.0	35	69
1619.757	$3d^94d$	$^1F_3$	$3d^94f$	$(5/2,7/2)^\circ_2$	336 581.6	398 319.7	6	69
1629.426	$3d^94d$	$^1D_2$	$3d^94f$	$(5/2,5/2)^\circ_3$	337 833.8	399 205.0	20	69
1638.483	$3d^94d$	$^1D_2$	$3d^94f$	$(5/2,7/2)^\circ_3$	337 833.8	398 866.0	5	69
1638.876	$3d^94d$	$^1D_2$	$3d^94f$	$(5/2,5/2)^\circ_2$	337 833.8	398 851.5	8	69
1647.429	$3d^94d$	$^3F_3$	$3d^94f$	$(5/2,5/2)^\circ_3$	338 504.4	399 205.0	1	69
1648.085	$3d^94d$	$^3F_3$	$3d^94f$	$(5/2,5/2)^\circ_4$	338 504.4	399 181.0	8	69
1648.491	$3d^94d$	$^3F_3$	$3d^94f$	$(5/2,7/2)^\circ_4$	338 504.4	399 165.8	3	69
1653.290	$3d^94d$	$^3F_2$	$3d^94f$	$(5/2,5/2)^\circ_3$	338 719.6	399 205.0	17	69
1663.013	$3d^94d$	$^3F_2$	$3d^94f$	$(5/2,5/2)^\circ_2$	338 719.6	398 851.5	10	69
1677.849	$3d^94d$	$^3F_2$	$3d^94f$	$(5/2,7/2)^\circ_2$	338 719.6	398 319.7	5	69

TABLE 9. Energy levels of Ga V

Configuration	Term	J	Level (cm^{-1})	Leading percentages			
$3d^9$	^2D	5/2	0				
		3/2	3 583				
$3d^8(^3F)4s$	^4F	9/2	210 052	100			
		7/2	212 121	95	+5		^2F
		5/2	214 000	98			
		3/2	215 237	98			
$3d^8(^3F)4s$	^2F	7/2	218 301	95	+5		^4F
		5/2	221 488	96			
$3d^8(^1D)4s$	^2D	5/2	231 711	48	+50	$3d^8(^3P)4s$	^4P
		3/2	232 968	77	+16	$3d^8(^3P)4s$	^4P
$3d^8(^3P)4s$	^4P	3/2	235 609	84	+16	$3d^8(^1D)4s$	^2D
		1/2	235 752	100			
		5/2	236 072	50	+49	$3d^8(^1D)4s$	^2D
$3d^8(^3P)4s$	^2P	3/2	242 026	94	+5	$3d^8(^1D)4s$	^2D
		1/2	243 053	100			
$3d^8(^1G)4s$	^2G	9/2	246 093	100			
		7/2	246 133	100			
$3d^8(^3F)4p$	$^4D^\circ$	7/2	*296 992*	89	+5	$3d^8(^3P)4p$	$^4D^\circ$
		5/2	*300 144*	88	+6	$3d^8(^3P)4p$	$^4D^\circ$
		3/2	*302 499*	89	+7	$3d^8(^3P)4p$	$^4D^\circ$
		1/2	*303 911*	91	+8	$3d^8(^3P)4p$	$^4D^\circ$
$3d^8(^3F)4p$	$^4G^\circ$	9/2	*300 730*	60	+24		$^2G^\circ$
		11/2	*302 217*	100			

TABLE 9. Energy levels of Ga V—Continued

Configuration	Term	J	Level (cm^{-1})	Leading percentages			
		7/2	*302 779*	78	+12		$^4F°$
		5/2	*304 272*	90	+6		$^4F°$
$3d^8(^3F)4p$	$^4F°$	9/2	*305 249*	81	+13		$^2G°$
		7/2	*306 628*	65	+20		$^2F°$
		5/2	*307 745*	73	+11		$^2D°$
		3/2	*307 864*	74	+15		$^2D°$
$3d^8(^3F)4p$	$^2G°$	9/2	*306 947*	63	+34		$^4G°$
		7/2	*309 679*	57	+31		$^2F°$
$3d^8(^3F)4p$	$^2D°$	5/2	*309 616*	68	+14		$^2F°$
		3/2	*311 991*	64	+21		$^4F°$
$3d^8(^3F)4p$	$^2F°$	7/2	*310 267*	46	+32		$^2G°$
		5/2	*313 088*	77	+12		$^2D°$
$3d^8(^3P)4p$	$^4P°$	3/2	*319 570*	77	+9	$3d^8(^1D)4p$	$^2D°$
		5/2	*320 093*	73	+12	$3d^8(^1D)4p$	$^2D°$
		1/2	*320 429*	92	+5	$3d^8(^1D)4p$	$^2P°$
$3d^8(^1D)4p$	$^2F°$	5/2	*322 388*	75	+13	$3d^8(^3P)4p$	$^4P°$
		7/2	*324 407*	76	+11	$3d^8(^1G)4p$	$^2F°$
$3d^8(^1D)4p$	$^2D°$	3/2	*324 314*	45	+17	$3d^8(^3P)4p$	$^4P°$
		5/2	*325 713*	77	+10	$3d^8(^3P)4p$	$^4P°$
$3d^8(^1D)4p$	$^2P°$	1/2	*324 874*	61	+29	$3d^8(^3P)4p$	$^2P°$
		3/2	*326 549*	51	+32		$^2D°$
$3d^8(^3P)4p$	$^4D°$	5/2	*329 103*	66	+18		$^2D°$
		1/2	*329 108*	88	+8	$3d^8(^3F)4p$	$^4D°$
		3/2	*329 112*	80	+6	$3d^8(^3F)4p$	$^4D°$
		7/2	*330 174*	81	+10	$3d^8(^1G)4p$	$^2F°$
$3d^8(^3P)4p$	$^2D°$	5/2	*332 473*	72	+22		$^4D°$
		3/2	*333 929*	81	+8		$^4D°$
$3d^8(^1G)4p$	$^2H°$	9/2	*332 600*	98			
		11/2	*334 765*	100			
$3d^8(^3P)4p$	$^2P°$	3/2	*332 707*	71	+15	$3d^8(^1D)4p$	$^2P°$
		1/2	*335 605*	63	+25		$^2S°$
$3d^8(^1G)4p$	$^2F°$	7/2	*335 089*	75	+17	$3d^8(^1D)4p$	$^2F°$
		5/2	*336 909*	86	+8	$3d^8(^1D)4p$	$^2F°$
$3d^8(^3P)4p$	$^2S°$	1/2	*337 491*	90	+6	$3d^8(^1D)4p$	$^2P°$
$3d^8(^3P)4p$	$^4S°$	3/2	*337 690*	98			
$3d^8(^1G)4p$	$^2G°$	7/2	*344 200*	98			
		9/2	*344 668*	98			
$3d^8(^3F_4)4f$	(4,7/2)°	3/2	*519 872*	95			
		7/2	*520 289*	57	+39		(4,5/2)°
		5/2	*520 375*	78	+14		(4,5/2)°
$3d^8(^3F_3)4f$	(3,5/2)°	3/2	*522 704*	97			
		5/2	*523 286*	87	+6	$3d^8(^3F_2)4f$	(2,7/2)°
		7/2	*523 286 ?*	95			
$3d^8(^3F_3)4f$	(3,7/2)°	5/2	*522 873*	84	+6	$3d^8(^3F_2)4f$	(2,7/2)°
		3/2	*522 966 ?*	91	+6	$3d^8(^3F_2)4f$	(2,5/2)°

TABLE 9. Energy levels of Ga V—Continued

Configuration	Term	J	Level (cm^{-1})	Leading percentages			
$3d^8(^3F_2)4f$	$(2,5/2)°$	1/2	*524 631*	95			
		3/2	*525 335*	81	+8		$(2,7/2)°$
		5/2	*525 651*	74	+16		$(2,7/2)°$
$3d^8(^3F_2)4f$	$(2,7/2)°$	7/2	*525 362*	51	+43		$(2,5/2)°$
$3d^8(^1D_2)4f$	$(2,7/2)°$	7/2	*540 246*	71	+21	$3d^8(^3P_2)4f$	$(2,7/2)°$
		5/2	*540 517*	63	+19	$3d^8(^3P_2)4f$	$(2,7/2)°$
$3d^8(^1D_2)4f$	$(2,5/2)°$	3/2	*540 357*	46	+21	$3d^8(^3P_2)4f$	$(2,5/2)°$
$3d^8(^3P_2)4f$	$(2,5/2)°$	5/2	*544 401*	29	+31	$3d^8(^3P_1)4f$	$(1,7/2)°$
		7/2	*544 950*	38	+28		$(2,7/2)°$
$3d^8(^3P_2)4f$	$(2,7/2)°$	5/2	*545 735*	44	+17	$3d^8(^1D_2)4f$	$(2,7/2)°$
		3/2	*546 448 ?*	43	+23	$3d^8(^3P_1)4f$	$(1,5/2)°$
$3d^8(^3P_1)4f$	$(1,5/2)°$	7/2	*545 926*	78	+15	$3d^8(^3P_2)4f$	$(2,5/2)°$
$3d^8(^3P_1)4f$	$(1,7/2)°$	5/2	*546 268*	47	+24	$3d^8(^3P_2)4f$	$(2,7/2)°$
$3d^8(^3P_0)4f$	$(0,7/2)°$	7/2	*546 687*	66	+11	$3d^8(^3P_2)4f$	$(2,7/2)°$
$3d^8(^3P_0)4f$	$(0,5/2)°$	5/2	*546 801*	44	+31	$3d^8(^3P_1)4f$	$(1,5/2)°$
$3d^8(^1G_4)4f$	$(4,5/2)°$	3/2	*551 998*	63	+36		$(4,7/2)°$
		5/2	*553 853*	55	+45		$(4,7/2)°$
$3d^8(^1G_4)4f$	$(4,7/2)°$	1/2	*552 156*	99			
		5/2	*552 998*	55	+45		$(4,5/2)°$
		3/2	*553 080*	63	+36		$(4,5/2)°$
		7/2	*553 823*	65	+35		$(4,5/2)°$
$3d^8(^1S_0)4f$	$(0,7/2)°$	7/2	*597 172*	99			
$3d^8(^1S_0)4f$	$(0,5/2)°$	5/2	*597 358*	99			
Ga VI ($^1S_0$)	**Limit**	—	**693 700**				

TABLE 10. Spectral lines of Ga V

Wavelength (Å)	Classification				Energy levels (cm^{-1})		Int.	References
	Lower		Upper					
167.456	$3d^9$	$^2D_{5/2}$	$3d^8(^1S_0)4f$	$(0,7/2)°_{7/2}$	0	597 172	40	47
168.414	$3d^9$	$^2D_{3/2}$	$3d^8(^1S_0)4f$	$(0,5/2)°_{5/2}$	3 583	597 358	30	47
180.563	$3d^9$	$^2D_{5/2}$	$3d^8(^1G_4)4f$	$(4,7/2)°_{7/2}$	0	553 823	90	47
180.805	$3d^9$	$^2D_{5/2}$	$3d^8(^1G_4)4f$	$(4,7/2)°_{3/2}$	0	553 080	20	47
180.833	$3d^9$	$^2D_{5/2}$	$3d^8(^1G_4)4f$	$(4,7/2)°_{5/2}$	0	552 998	330*bl*	47
181.160	$3d^9$	$^2D_{5/2}$	$3d^8(^1G_4)4f$	$(4,5/2)°_{3/2}$	0	551 998	150	47
181.729	$3d^9$	$^2D_{3/2}$	$3d^8(^1G_4)4f$	$(4,5/2)°_{5/2}$	3 583	553 853	70	47
181.985	$3d^9$	$^2D_{3/2}$	$3d^8(^1G_4)4f$	$(4,7/2)°_{3/2}$	3 583	553 080	120	47
182.010	$3d^9$	$^2D_{3/2}$	$3d^8(^1G_4)4f$	$(4,7/2)°_{5/2}$	3 583	552 998	15	47
182.291	$3d^9$	$^2D_{3/2}$	$3d^8(^1G_4)4f$	$(4,7/2)°_{1/2}$	3 583	552 156	120	47
182.882	$3d^9$	$^2D_{5/2}$	$3d^8(^3P_0)4f$	$(0,5/2)°_{5/2}$	0	546 801	20	47
182.920	$3d^9$	$^2D_{5/2}$	$3d^8(^3P_0)4f$	$(0,7/2)°_{7/2}$	0	546 687	80	47
183.175	$3d^9$	$^2D_{5/2}$	$3d^8(^3P_1)4f$	$(1,5/2)°_{7/2}$	0	545 926	70*bl*	47
183.239	$3d^9$	$^2D_{5/2}$	$3d^8(^3P_2)4f$	$(2,7/2)°_{5/2}$	0	545 735	5	47

TABLE 10. Spectral lines of Ga V—Continued

Wavelength (Å)	Classification Lower		Upper		Energy levels (cm^{-1})			Int.	References
183.503	$3d^9$	$^2D_{5/2}$	$3d^8(^3P_2)4f$	$(2,5/2)^\circ_{7/2}$	0	544 950		240	47
183.688	$3d^9$	$^2D_{5/2}$	$3d^8(^3P_2)4f$	$(2,5/2)^\circ_{5/2}$	0	544 401		10	47
184.208	$3d^9$	$^2D_{3/2}$	$3d^8(^3P_2)4f$	$(2,7/2)^\circ_{3/2}$	3 583	546 448	?	200*bl*	47
184.269	$3d^9$	$^2D_{3/2}$	$3d^8(^3P_1)4f$	$(1,7/2)^\circ_{5/2}$	3 583	546 268		60	47
184.450	$3d^9$	$^2D_{3/2}$	$3d^8(^3P_2)4f$	$(2,7/2)^\circ_{5/2}$	3 583	545 735		300	47
185.008	$3d^9$	$^2D_{5/2}$	$3d^8(^1D_2)4f$	$(2,7/2)^\circ_{5/2}$	0	540 517		110	47
185.101	$3d^9$	$^2D_{5/2}$	$3d^8(^1D_2)4f$	$(2,7/2)^\circ_{7/2}$	0	540 246		280*bl*	47
186.242	$3d^9$	$^2D_{3/2}$	$3d^8(^1D_2)4f$	$(2,7/2)^\circ_{5/2}$	3 583	540 517		10	47
186.298	$3d^9$	$^2D_{3/2}$	$3d^8(^1D_2)4f$	$(2,5/2)^\circ_{3/2}$	3 583	540 357		30	47
190.240	$3d^9$	$^2D_{5/2}$	$3d^8(^3F_2)4f$	$(2,5/2)^\circ_{5/2}$	0	525 651		380*bl*	47
190.345	$3d^9$	$^2D_{5/2}$	$3d^8(^3F_2)4f$	$(2,7/2)^\circ_{7/2}$	0	525 362		150*bl*	47
191.100	$3d^9$	$^2D_{5/2}$	$3d^8(^3F_3)4f$	$(3,5/2)^\circ_{5/2}$	0	523 286		430	47
	$3d^9$	$^2D_{5/2}$	$3d^8(^3F_3)4f$	$(3,5/2)^\circ_{7/2}$	0	523 286	?		47
191.248	$3d^9$	$^2D_{5/2}$	$3d^8(^3F_3)4f$	$(3,7/2)^\circ_{5/2}$	0	522 873		400	47
191.313	$3d^9$	$^2D_{5/2}$	$3d^8(^3F_3)4f$	$(3,5/2)^\circ_{3/2}$	0	522 704		200	47
191.547	$3d^9$	$^2D_{3/2}$	$3d^8(^3F_2)4f$	$(2,5/2)^\circ_{5/2}$	3 583	525 651		400*bl*	47
191.662	$3d^9$	$^2D_{3/2}$	$3d^8(^3F_2)4f$	$(2,5/2)^\circ_{3/2}$	3 583	525 335		450	47
191.921	$3d^9$	$^2D_{3/2}$	$3d^8(^3F_2)4f$	$(2,5/2)^\circ_{1/2}$	3 583	524 631		100	47
192.169	$3d^9$	$^2D_{5/2}$	$3d^8(^3F_4)4f$	$(4,7/2)^\circ_{5/2}$	0	520 375		550*bl*	47
192.201	$3d^9$	$^2D_{5/2}$	$3d^8(^3F_4)4f$	$(4,7/2)^\circ_{7/2}$	0	520 289		400	47
192.355	$3d^9$	$^2D_{5/2}$	$3d^8(^3F_4)4f$	$(4,7/2)^\circ_{3/2}$	0	519 872		260	47
192.536	$3d^9$	$^2D_{3/2}$	$3d^8(^3F_3)4f$	$(3,7/2)^\circ_{3/2}$	3 583	522 966	?	130*bl*	47
192.571	$3d^9$	$^2D_{3/2}$	$3d^8(^3F_3)4f$	$(3,7/2)^\circ_{5/2}$	3 583	522 873		150*bl*	47
290.524	$3d^9$	$^2D_{5/2}$	$3d^8(^1G)4p$	$^2G^\circ_{7/2}$	0	344 200		60	17,16°
296.129	$3d^9$	$^2D_{5/2}$	$3d^8(^3P)4p$	$^4S^\circ_{3/2}$	0	337 690		1	17
296.815	$3d^9$	$^2D_{5/2}$	$3d^8(^1G)4p$	$^2F^\circ_{5/2}$	0	336 909		120	10,17,16°
298.428	$3d^9$	$^2D_{5/2}$	$3d^8(^1G)4p$	$^2F^\circ_{7/2}$	0	335 089		1000	10,17,16°
299.466	$3d^9$	$^2D_{5/2}$	$3d^8(^3P)4p$	$^2D^\circ_{3/2}$	0	333 929		580	10,17,16°
299.486	$3d^9$	$^2D_{3/2}$	$3d^8(^3P)4p$	$^2S^\circ_{1/2}$	3 583	337 491		10	17
300.006	$3d^9$	$^2D_{3/2}$	$3d^8(^1G)4p$	$^2F^\circ_{5/2}$	3 583	336 909		830	10,17,16°
300.564	$3d^9$	$^2D_{5/2}$	$3d^8(^3P)4p$	$^2P^\circ_{3/2}$	0	332 707		760	10,17,16°
300.774	$3d^9$	$^2D_{5/2}$	$3d^8(^3P)4p$	$^2D^\circ_{5/2}$	0	332 473		180	10,17,16°
301.187	$3d^9$	$^2D_{3/2}$	$3d^8(^3P)4p$	$^2P^\circ_{1/2}$	3 583	335 605		620	10,17,16°
302.718	$3d^9$	$^2D_{3/2}$	$3d^8(^3P)4p$	$^2D^\circ_{3/2}$	3 583	333 929		50	10,16°
302.871	$3d^9$	$^2D_{5/2}$	$3d^8(^3P)4p$	$^4D^\circ_{7/2}$	0	330 174		360	17,16°
303.837	$3d^9$	$^2D_{3/2}$	$3d^8(^3P)4p$	$^2P^\circ_{3/2}$	3 583	332 707		650	10,17,16°
303.856	$3d^9$	$^2D_{5/2}$	$3d^8(^3P)4p$	$^4D^\circ_{5/2}$	0	329 103		1	17
304.052	$3d^9$	$^2D_{3/2}$	$3d^8(^3P)4p$	$^2D^\circ_{5/2}$	3 583	332 473		100	10,17,16°
306.230	$3d^9$	$^2D_{5/2}$	$3d^8(^1D)4p$	$^2P^\circ_{3/2}$	0	326 549		160	10,17,16°
307.016	$3d^9$	$^2D_{5/2}$	$3d^8(^1D)4p$	$^2D^\circ_{5/2}$	0	325 713		890	10,17,16°
307.202	$3d^9$	$^2D_{3/2}$	$3d^8(^3P)4p$	$^4D^\circ_{5/2}$	3 583	329 103		230	17,16°
308.253	$3d^9$	$^2D_{5/2}$	$3d^8(^1D)4p$	$^2F^\circ_{7/2}$	0	324 407		600	10,17,16°
308.343	$3d^9$	$^2D_{5/2}$	$3d^8(^1D)4p$	$^2D^\circ_{3/2}$	0	324 314		240	10,17,16°
309.627	$3d^9$	$^2D_{3/2}$	$3d^8(^1D)4p$	$^2P^\circ_{3/2}$	3 583	326 549		240	10,17,16°
310.431	$3d^9$	$^2D_{3/2}$	$3d^8(^1D)4p$	$^2D^\circ_{5/2}$	3 583	325 713		60	10,17,16°
311.242	$3d^9$	$^2D_{3/2}$	$3d^8(^1D)4p$	$^2P^\circ_{1/2}$	3 583	324 874		20	17,16°
311.786	$3d^9$	$^2D_{3/2}$	$3d^8(^1D)4p$	$^2D^\circ_{3/2}$	3 583	324 314		700	10,17,16°
312.412	$3d^9$	$^2D_{5/2}$	$3d^8(^3P)4p$	$^4P^\circ_{5/2}$	0	320 093		360	10,17,16°
312.921	$3d^9$	$^2D_{5/2}$	$3d^8(^3P)4p$	$^4P^\circ_{3/2}$	0	319 570		70	10,17,16°
313.669	$3d^9$	$^2D_{3/2}$	$3d^8(^1D)4p$	$^2F^\circ_{5/2}$	3 583	322 388		330	10,17,16°

TABLE 10. Spectral lines of Ga V—Continued

Wavelength (Å)	Classification Lower		Upper		Energy levels (cm^{-1})		Int.	References
315.615	$3d^9$	$^2D_{3/2}$	$3d^8(^3P)4p$	$^4P^\circ_{1/2}$	3 583	320 429	2	17
315.943	$3d^9$	$^2D_{3/2}$	$3d^8(^3P)4p$	$^4P^\circ_{5/2}$	3 583	320 093	200	10,17,16°
316.469	$3d^9$	$^2D_{3/2}$	$3d^8(^3P)4p$	$^4P^\circ_{3/2}$	3 583	319 570	280	10,17,16°
319.398	$3d^9$	$^2D_{5/2}$	$3d^8(^3F)4p$	$^2F^\circ_{5/2}$	0	313 088	700	10,17,16°
320.522	$3d^9$	$^2D_{5/2}$	$3d^8(^3F)4p$	$^2D^\circ_{3/2}$	0	311 991	160	10,17,16°
322.302	$3d^9$	$^2D_{5/2}$	$3d^8(^3F)4p$	$^2F^\circ_{7/2}$	0	310 267	590	10,17,16°
322.917	$3d^9$	$^2D_{5/2}$	$3d^8(^3F)4p$	$^2G^\circ_{7/2}$	0	309 679	520	10,17,16°
322.980	$3d^9$	$^2D_{5/2}$	$3d^8(^3F)4p$	$^2D^\circ_{5/2}$	0	309 616	960	10,17,16°
323.098	$3d^9$	$^2D_{3/2}$	$3d^8(^3F)4p$	$^2F^\circ_{5/2}$	3 583	313 088	380	10,17,16°
324.243	$3d^9$	$^2D_{3/2}$	$3d^8(^3F)4p$	$^2D^\circ_{3/2}$	3 583	311 991	750	10,17,16°
324.820	$3d^9$	$^2D_{5/2}$	$3d^8(^3F)4p$	$^4F^\circ_{3/2}$	0	307 864	50	17,16°
324.945	$3d^9$	$^2D_{5/2}$	$3d^8(^3F)4p$	$^4F^\circ_{5/2}$	0	307 745	520	10,17,16°
326.126	$3d^9$	$^2D_{5/2}$	$3d^8(^3F)4p$	$^4F^\circ_{7/2}$	0	306 628	410	10,17,16°
326.759	$3d^9$	$^2D_{3/2}$	$3d^8(^3F)4p$	$^2D^\circ_{5/2}$	3 583	309 616	400	10,17,16°
328.644	$3d^9$	$^2D_{3/2}$	$3d^8(^3F)4p$	$^4F^\circ_{3/2}$	3 583	307 864	280	10,17,16°
330.583	$3d^9$	$^2D_{5/2}$	$3d^8(^3F)4p$	$^4D^\circ_{3/2}$	0	302 499	0	17
332.972	$3d^9$	$^2D_{3/2}$	$3d^8(^3F)4p$	$^4D^\circ_{1/2}$	3 583	303 911	0	17
333.178	$3d^9$	$^2D_{5/2}$	$3d^8(^3F)4p$	$^4D^\circ_{5/2}$	0	300 144	0	17
334.54	$3d^9$	$^2D_{3/2}$	$3d^8(^3F)4p$	$^4D^\circ_{3/2}$	3 583	302 499	0	17
337.197	$3d^9$	$^2D_{3/2}$	$3d^8(^3F)4p$	$^4D^\circ_{5/2}$	3 583	300 144	0	17
832.50	$3d^8(^3F)4s$	$^4F_{9/2}$	$3d^8(^3P)4p$	$^4D^\circ_{7/2}$	210 052	330 174	5	16
878.17	$3d^8(^3F)4s$	$^4F_{3/2}$	$3d^8(^3P)4p$	$^4D^\circ_{1/2}$	215 237	329 108	20	16
943.58	$3d^8(^1D)4s$	$^2D_{5/2}$	$3d^8(^3P)4p$	$^4S^\circ_{3/2}$	231 711	337 690	10	16
978.34	$3d^8(^1D)4s$	$^2D_{5/2}$	$3d^8(^3P)4p$	$^2D^\circ_{3/2}$	231 711	333 929	10	16
979.60	$3d^8(^3P)4s$	$^4P_{3/2}$	$3d^8(^3P)4p$	$^4S^\circ_{3/2}$	235 609	337 690	15	16
980.98	$3d^8(^3P)4s$	$^4P_{1/2}$	$3d^8(^3P)4p$	$^4S^\circ_{3/2}$	235 752	337 690	10	16
984.05	$3d^8(^3P)4s$	$^4P_{5/2}$	$3d^8(^3P)4p$	$^4S^\circ_{3/2}$	236 072	337 690	5	16
1014.47	$3d^8(^1G)4s$	$^2G_{9/2}$	$3d^8(^1G)4p$	$^2G^\circ_{9/2}$	246 093	344 668	90	16
1014.85	$3d^8(^1G)4s$	$^2G_{7/2}$	$3d^8(^1G)4p$	$^2G^\circ_{9/2}$	246 133	344 668	15	16
1015.62	$3d^8(^1D)4s$	$^2D_{5/2}$	$3d^8(^3P)4p$	$^4D^\circ_{7/2}$	231 711	330 174	20	16
1019.71	$3d^8(^1G)4s$	$^2G_{7/2}$	$3d^8(^1G)4p$	$^2G^\circ_{7/2}$	246 133	344 200	90	16
1021.98	$3d^8(^3F)4s$	$^4F_{3/2}$	$3d^8(^3F)4p$	$^2F^\circ_{5/2}$	215 237	313 088	10	16
1032.38	$3d^8(^3P)4s$	$^4P_{3/2}$	$3d^8(^3P)4p$	$^2D^\circ_{5/2}$	235 609	332 473	10	16
1033.55	$3d^8(^3F)4s$	$^4F_{3/2}$	$3d^8(^3F)4p$	$^2D^\circ_{3/2}$	215 237	311 991	20	16
1038.76	$3d^8(^3F)4s$	$^4F_{5/2}$	$3d^8(^3F)4p$	$^2F^\circ_{7/2}$	214 000	310 267	30	16
1040.20	$3d^8(^1D)4s$	$^2D_{3/2}$	$3d^8(^3P)4p$	$^4D^\circ_{5/2}$	232 968	329 103	5	16
1045.80	$3d^8(^3F)4s$	$^4F_{7/2}$	$3d^8(^3F)4p$	$^4F^\circ_{5/2}$	212 121	307 745	15	16
1047.50	$3d^8(^3P)4s$	$^2P_{3/2}$	$3d^8(^3P)4p$	$^2S^\circ_{1/2}$	242 026	337 491	30	16
1050.48	$3d^8(^3F)4s$	$^4F_{9/2}$	$3d^8(^3F)4p$	$^4F^\circ_{9/2}$	210 052	305 249	120	16
1054.56	$3d^8(^3F)4s$	$^4F_{7/2}$	$3d^8(^3F)4p$	$^2G^\circ_{9/2}$	212 121	306 947	80	16
1058.12	$3d^8(^3F)4s$	$^4F_{7/2}$	$3d^8(^3F)4p$	$^4F^\circ_{7/2}$	212 121	306 628	90	16
1062.66	$3d^8(^3P)4s$	$^4P_{5/2}$	$3d^8(^3P)4p$	$^4D^\circ_{7/2}$	236 072	330 174	80	16
1063.81	$3d^8(^1D)4s$	$^2D_{5/2}$	$3d^8(^1D)4p$	$^2D^\circ_{5/2}$	231 711	325 713	10	16
1065.37	$3d^8(^3F)4s$	$^4F_{5/2}$	$3d^8(^3F)4p$	$^4F^\circ_{3/2}$	214 000	307 864	5	16
1066.69	$3d^8(^3F)4s$	$^4F_{5/2}$	$3d^8(^3F)4p$	$^4F^\circ_{5/2}$	214 000	307 745	80	16
1068.59	$3d^8(^1D)4s$	$^2D_{3/2}$	$3d^8(^1D)4p$	$^2P^\circ_{3/2}$	232 968	326 549	35	16
1069.45	$3d^8(^3P)4s$	$^4P_{3/2}$	$3d^8(^3P)4p$	$^4D^\circ_{3/2}$	235 609	329 112	30	16
1069.60	$3d^8(^3P)4s$	$^4P_{3/2}$	$3d^8(^3P)4p$	$^4D^\circ_{5/2}$	235 609	329 103	60	16
1071.11	$3d^8(^3P)4s$	$^4P_{1/2}$	$3d^8(^3P)4p$	$^4D^\circ_{3/2}$	235 752	329 112	45	16
1071.19	$3d^8(^3P)4s$	$^4P_{1/2}$	$3d^8(^3P)4p$	$^4D^\circ_{1/2}$	235 752	329 108	55	16

TABLE 10. Spectral lines of Ga V—Continued

Wavelength (Å)	Classification Lower		Upper		Energy levels (cm^{-1})		Int.	References
1073.77	$3d^8(^3F)4s$	$^4F_{7/2}$	$3d^8(^3F)4p$	$^4F^\circ_{9/2}$	212 121	305 249	80	16
1074.89	$3d^8(^3P)4s$	$^4P_{5/2}$	$3d^8(^3P)4p$	$^4D^\circ_{5/2}$	236 072	329 103	5	16
1078.83	$3d^8(^1D)4s$	$^2D_{5/2}$	$3d^8(^1D)4p$	$^2F^\circ_{7/2}$	231 711	324 407	90	16
1079.60	$3d^8(^3F)4s$	$^4F_{5/2}$	$3d^8(^3F)4p$	$^4F^\circ_{7/2}$	214 000	306 628	110	16
	$3d^8(^3F)4s$	$^4F_{3/2}$	$3d^8(^3F)4p$	$^4F^\circ_{3/2}$	215 237	307 864		16
1080.55	$3d^8(^3P)4s$	$^2P_{1/2}$	$3d^8(^3P)4p$	$^2P^\circ_{1/2}$	243 053	335 605	10	16
1080.99	$3d^8(^3F)4s$	$^4F_{3/2}$	$3d^8(^3F)4p$	$^4F^\circ_{5/2}$	215 237	307 745	60	16
1085.01	$3d^8(^3F)4s$	$^4F_{9/2}$	$3d^8(^3F)4p$	$^4G^\circ_{11/2}$	210 052	302 217	250	16
1087.37	$3d^8(^3F)4s$	$^2F_{7/2}$	$3d^8(^3F)4p$	$^2F^\circ_{7/2}$	218 301	310 267	80	16
1088.08	$3d^8(^1D)4s$	$^2D_{3/2}$	$3d^8(^1D)4p$	$^2P^\circ_{1/2}$	232 968	324 874	30	16
	$3d^8(^3P)4s$	$^2P_{3/2}$	$3d^8(^3P)4p$	$^2D^\circ_{3/2}$	242 026	333 929		16
1091.71	$3d^8(^3F)4s$	$^2F_{5/2}$	$3d^8(^3F)4p$	$^2F^\circ_{5/2}$	221 488	313 088	90	16
1094.36	$3d^8(^3F)4s$	$^2F_{7/2}$	$3d^8(^3F)4p$	$^2G^\circ_{7/2}$	218 301	309 679	100	16
1094.74	$3d^8(^1D)4s$	$^2D_{3/2}$	$3d^8(^1D)4p$	$^2D^\circ_{3/2}$	232 968	324 314	15	16
1095.10	$3d^8(^3F)4s$	$^2F_{7/2}$	$3d^8(^3F)4p$	$^2D^\circ_{5/2}$	218 301	309 616	80	16
1100.39	$3d^8(^3P)4s$	$^2P_{1/2}$	$3d^8(^3P)4p$	$^2D^\circ_{3/2}$	243 053	333 929	40	16
1101.62	$3d^8(^1G)4s$	$^2G_{7/2}$	$3d^8(^1G)4p$	$^2F^\circ_{5/2}$	246 133	336 909	70	16
1102.83	$3d^8(^3F)4s$	$^4F_{9/2}$	$3d^8(^3F)4p$	$^4G^\circ_{9/2}$	210 052	300 730	160	16
1103.03	$3d^8(^3F)4s$	$^4F_{7/2}$	$3d^8(^3F)4p$	$^4G^\circ_{7/2}$	212 121	302 779	140	16
1104.93	$3d^8(^3F)4s$	$^2F_{5/2}$	$3d^8(^3F)4p$	$^2D^\circ_{3/2}$	221 488	311 991	60	16
1105.26	$3d^8(^3P)4s$	$^4P_{5/2}$	$3d^8(^1D)4p$	$^2P^\circ_{3/2}$	236 072	326 549	20	16
1105.62	$3d^8(^3P)4s$	$^2P_{3/2}$	$3d^8(^3P)4p$	$^2D^\circ_{5/2}$	242 026	332 473	75	16
1107.76	$3d^8(^3F)4s$	$^4F_{5/2}$	$3d^8(^3F)4p$	$^4G^\circ_{5/2}$	214 000	304 272	75	16
1109.85	$3d^8(^3P)4s$	$^4P_{3/2}$	$3d^8(^1D)4p$	$^2D^\circ_{5/2}$	235 609	325 713	10	16
1115.55	$3d^8(^3P)4s$	$^4P_{5/2}$	$3d^8(^1D)4p$	$^2D^\circ_{5/2}$	236 072	325 713	40	16
1118.34	$3d^8(^1D)4s$	$^2D_{3/2}$	$3d^8(^1D)4p$	$^2F^\circ_{5/2}$	232 968	322 388	80	16
1120.29	$3d^8(^3P)4s$	$^4P_{3/2}$	$3d^8(^1D)4p$	$^2P^\circ_{1/2}$	235 609	324 874	20	16
1123.18	$3d^8(^3F)4s$	$^4F_{3/2}$	$3d^8(^3F)4p$	$^4G^\circ_{5/2}$	215 237	304 272	55	16
1123.66	$3d^8(^1G)4s$	$^2G_{9/2}$	$3d^8(^1G)4p$	$^2F^\circ_{7/2}$	246 093	335 089	80	16
1126.40	$3d^8(^3F)4s$	$^4F_{5/2}$	$3d^8(^3F)4p$	$^4G^\circ_{7/2}$	214 000	302 779	120	16
	$3d^8(^3F)4s$	$^2F_{5/2}$	$3d^8(^3F)4p$	$^2F^\circ_{7/2}$	221 488	310 267		16
1127.34	$3d^8(^3P)4s$	$^4P_{3/2}$	$3d^8(^1D)4p$	$^2D^\circ_{3/2}$	235 609	324 314	10	16
1127.75	$3d^8(^3F)4s$	$^4F_{3/2}$	$3d^8(^3F)4p$	$^4D^\circ_{1/2}$	215 237	303 911	80	16
	$3d^8(^1G)4s$	$^2G_{9/2}$	$3d^8(^1G)4p$	$^2H^\circ_{11/2}$	246 093	334 765		16
1128.10	$3d^8(^3F)4s$	$^2F_{7/2}$	$3d^8(^3F)4p$	$^2G^\circ_{9/2}$	218 301	306 947	130	16
1128.53	$3d^8(^3F)4s$	$^4F_{7/2}$	$3d^8(^3F)4p$	$^4G^\circ_{9/2}$	212 121	300 730	120	16
1129.94	$3d^8(^3F)4s$	$^4F_{5/2}$	$3d^8(^3F)4p$	$^4D^\circ_{3/2}$	214 000	302 499	100	16
1131.43	$3d^8(^1D)4s$	$^2D_{5/2}$	$3d^8(^3P)4p$	$^4P^\circ_{5/2}$	231 711	320 093	80	16
1132.08	$3d^8(^3P)4s$	$^4P_{5/2}$	$3d^8(^1D)4p$	$^2F^\circ_{7/2}$	236 072	324 407	30	16
1132.16	$3d^8(^3F)4s$	$^2F_{7/2}$	$3d^8(^3F)4p$	$^4F^\circ_{7/2}$	218 301	306 628	30	16
1133.24	$3d^8(^3P)4s$	$^4P_{5/2}$	$3d^8(^1D)4p$	$^2D^\circ_{3/2}$	236 072	324 314	25	16
1134.69	$3d^8(^3F)4s$	$^2F_{5/2}$	$3d^8(^3F)4p$	$^2D^\circ_{5/2}$	221 488	309 616	10	16
1136.07	$3d^8(^3F)4s$	$^4F_{7/2}$	$3d^8(^3F)4p$	$^4D^\circ_{5/2}$	212 121	300 144	130	16
1138.20	$3d^8(^1D)4s$	$^2D_{5/2}$	$3d^8(^3P)4p$	$^4P^\circ_{3/2}$	231 711	319 570	65	16
1143.35	$3d^8(^1D)4s$	$^2D_{3/2}$	$3d^8(^3P)4p$	$^4P^\circ_{1/2}$	232 968	320 429	30	16
1145.98	$3d^8(^3F)4s$	$^4F_{3/2}$	$3d^8(^3F)4p$	$^4D^\circ_{3/2}$	215 237	302 499	20	16
1148.42	$3d^8(^3P)4s$	$^2P_{3/2}$	$3d^8(^3P)4p$	$^4D^\circ_{5/2}$	242 026	329 103	30	16
1150.09	$3d^8(^3F)4s$	$^2F_{7/2}$	$3d^8(^3F)4p$	$^4F^\circ_{9/2}$	218 301	305 249	45	16
1150.23	$3d^8(^3F)4s$	$^4F_{9/2}$	$3d^8(^3F)4p$	$^4D^\circ_{7/2}$	210 052	296 992	130	16
1154.69	$3d^8(^1D)4s$	$^2D_{3/2}$	$3d^8(^3P)4p$	$^4P^\circ_{3/2}$	232 968	319 570	10	16

TABLE 10. Spectral lines of Ga V—Continued

Wavelength (Å)	Classification Lower		Upper		Energy levels (cm^{-1})		Int.	References
1155.96	$3d^8(^1G)4s$	$^2G_{9/2}$	$3d^8(^1G)4p$	$^2H^\circ_{9/2}$	246 093	332 600	20	16
1156.51	$3d^8(^1G)4s$	$^2G_{7/2}$	$3d^8(^1G)4p$	$^2H^\circ_{9/2}$	246 133	332 600	120	16
1157.74	$3d^8(^3F)4s$	$^2F_{5/2}$	$3d^8(^3F)4p$	$^4F^\circ_{3/2}$	221 488	307 864	35	16
1159.33	$3d^8(^3F)4s$	$^2F_{5/2}$	$3d^8(^3F)4p$	$^4F^\circ_{5/2}$	221 488	307 745	5	16
1160.83	$3d^8(^3F)4s$	$^4F_{5/2}$	$3d^8(^3F)4p$	$^4D^\circ_{5/2}$	214 000	300 144	15	16
1163.17	$3d^8(^3F)4s$	$^2F_{7/2}$	$3d^8(^3F)4p$	$^4G^\circ_{5/2}$	218 301	304 272	2	16
1178.23	$3d^8(^3F)4s$	$^4F_{7/2}$	$3d^8(^3F)4p$	$^4D^\circ_{7/2}$	212 121	296 992	5	16
1178.95	$3d^8(^3P)4s$	$^4P_{3/2}$	$3d^8(^3P)4p$	$^4P^\circ_{1/2}$	235 609	320 429	40	16
1180.96	$3d^8(^3P)4s$	$^4P_{1/2}$	$3d^8(^3P)4p$	$^4P^\circ_{1/2}$	235 752	320 429	10	16
1183.13	$3d^8(^3P)4s$	$^2P_{3/2}$	$3d^8(^1D)4p$	$^2P^\circ_{3/2}$	242 026	326 549	15	16
1183.63	$3d^8(^3P)4s$	$^4P_{3/2}$	$3d^8(^3P)4p$	$^4P^\circ_{5/2}$	235 609	320 093	25	16
1205.27	$3d^8(^1G)4s$	$^2G_{7/2}$	$3d^8(^3P)4p$	$^4D^\circ_{5/2}$	246 133	329 103	5	16
1207.95	$3d^8(^3F)4s$	$^2F_{5/2}$	$3d^8(^3F)4p$	$^4G^\circ_{5/2}$	221 488	304 272	10	16
1213.17	$3d^8(^3F)4s$	$^2F_{7/2}$	$3d^8(^3F)4p$	$^4G^\circ_{9/2}$	218 301	300 730	80	16
1221.87	$3d^8(^3F)4s$	$^2F_{7/2}$	$3d^8(^3F)4p$	$^4D^\circ_{5/2}$	218 301	300 144	10	16
1222.15	$3d^8(^3P)4s$	$^2P_{1/2}$	$3d^8(^1D)4p$	$^2P^\circ_{1/2}$	243 053	324 874	10	16
1230.13	$3d^8(^3F)4s$	$^2F_{5/2}$	$3d^8(^3F)4p$	$^4G^\circ_{7/2}$	221 488	302 779	25	16
1265.45	$3d^8(^1D)4s$	$^2D_{3/2}$	$3d^8(^3F)4p$	$^2D^\circ_{3/2}$	232 968	311 991	30	16
1276.85	$3d^8(^1G)4s$	$^2G_{9/2}$	$3d^8(^1D)4p$	$^2F^\circ_{7/2}$	246 093	324 407	30	16
1283.64	$3d^8(^1D)4s$	$^2D_{5/2}$	$3d^8(^3F)4p$	$^2D^\circ_{5/2}$	231 711	309 616	10	16
1311.35	$3d^8(^1G)4s$	$^2G_{7/2}$	$3d^8(^1D)4p$	$^2F^\circ_{5/2}$	246 133	322 388	10	16

TABLE 11. Energy levels of Ga VI

Configuration	Term	J	Level (cm^{-1})	Leading percentages		
$3d^8$	^3F	4	0.0	100		
		3	3 193.3	100		
		2	5 164.0	98		
$3d^8$	^1D	2	20 531.6	73	+25	^3P
$3d^8$	^3P	2	25 683.2	75	+25	^1D
		1	26 123.7	100		
		0	26 607.4	100		
$3d^8$	^1G	4	34 249.4	100		
$3d^8$	^1S	0	78 106.2	99		
$3d^7(^4F)4s$	^5F	5	290 618.2	99		
		4	292 766.3	98		
		3	294 471.9	99		
		2	295 691.7	99		
		1	296 472.6	99		
$3d^7(^4F)4s$	^3F	4	301 417.4	98		
		3	304 315.6	99		
		2	306 203.6	99		
$3d^7(^4P)4s$	^5P	3	315 882.7	99		
		2	316 294.3	91		
		1	317 488.8	94		

TABLE 11. Energy levels of Ga VI—Continued

Configuration	Term	*J*	Level (cm^{-1})	Leading percentages			
$3d^7(^2G)4s$	^3G	5	320 898.8	95			
		4	321 960.7	89			
		3	323 491.8	99			
$3d^7(^2P)4s$	^3P	2	325 408.1	50	+38	$3d^7(^4P)4s$	^3P
		0	326 334.7	57	+43	$3d^7(^4P)4s$	^3P
		1	328 609.6	55	+34	$3d^7(^4P)4s$	^3P
$3d^7(^4P)4s$	^3P	1	325 534.2	48	+23	$3d^7(^2P)4s$	^3P
		2	327 438.9	49	+39	$3d^7(^2P)4s$	^3P
		0	330 724.3	53	+47	$3d^7(^2P)4s$	^3P
$3d^7(^2G)4s$	^1G	4	327 159.5	84			
$3d^7(^2H)4s$	^3H	6	330 355.3	100			
		5	331 468.2	92			
		4	333 146.0	89	+10	$3d^7(^2G)4s$	^1G
$3d^7(^2D2)4s$	^3D	3	331 283.5	76	+22	$3d^7(^2D1)4s$	^3D
		2	333 121.7	60	+16	$3d^7(^2D1)4s$	^3D
		1	336 737.8	43	+39	$3d^7(^2P)4s$	^1P
$3d^7(^2P)4s$	^1P	1	331 810.7	40	+27	$3d^7(^2D2)4s$	^3D
$3d^7(^2H)4s$	^1H	5	336 722.0	93			
$3d^7(^2D2)4s$	^1D	2	338 579.5	65	+16	$3d^7(^2D1)4s$	^1D
$3d^7(^2F)4s$	^3F	2	353 118.1	99			
		3	353 484.3	98			
		4	354 120.4	100			
$3d^7(^2F)4s$	^1F	3	359 164.4	98			
$3d^7(^2D1)4s$	^3D	1	386 276.8	81	+18	$3d^7(^2D2)4s$	^3D
		2	386 736.8	79	+20	$3d^7(^2D2)4s$	^3D
		3	387 630.8	77	+23	$3d^7(^2D2)4s$	^3D
$3d^7(^4F)4p$	$^5F^\circ$	4	*389 525.6*	46	+43		$^5D^\circ$
		5	*389 982.7*	84	+11		$^5G^\circ$
		3	*391 766.2*	64	+26		$^5D^\circ$
		2	*393 529.7*	77	+15		$^5D^\circ$
		1	*394 800.7*	90			
$3d^7(^2D1)4s$	^1D	2	392 566.6	77	+21	$3d^7(^2D2)4s$	^1D
$3d^7(^4F)4p$	$^5D^\circ$	4	*393 500.8*	41	+31		$^5F^\circ$
		3	*395 680.0*	47	+31		$^5G^\circ$
		2	*398 136.8*	38	+35		$^5G^\circ$
		1	*398 298.7*	78	+14	$3d^7(^4P)4p$	$^5D^\circ$
		0	*398 323.3* ?	83	+15	$3d^7(^4P)4p$	$^5D^\circ$
$3d^7(^4F)4p$	$^5G^\circ$	6	*395 468.8*	99			
		5	*395 852.3*	64	+19		$^3G^\circ$
		4	*397 051.5*	63	+19		$^5F^\circ$
		2	*397 186.4*	56	+34		$^5D^\circ$
		3	*397 796.8*	56	+21		$^5F^\circ$
$3d^7(^4F)4p$	$^3G^\circ$	5	*400 532.9*	75	+24	$^5G^\circ$	
		4	*403 630.9*	86	+12		$^5G^\circ$
		3	*405 788.3*	88			
$3d^7(^4F)4p$	$^3F^\circ$	4	*401 119.8*	86			
		3	*403 397.9*	75	+12		$^3D^\circ$

TABLE 11. Energy levels of Ga VI—Continued

Configuration	Term	J	Level (cm^{-1})	Leading percentages			
		2	*405 283.3*	83			
$3d^7(^4F)4p$	$^3D°$	3	*405 118.4*	75	+11		$^3F°$
		2	*406 689.7*	73	+11	$3d^7(^4P)4p$	$^5S°$
		1	*408 054.2*	86			
$3d^7(^4P)4p$	$^5S°$	2	*406 843.7*	85			
$3d^7(^4P)4p$	$^3S°$	1	*418 007.1*	19	+30	$3d^7(^2P)4p$	$^3P°$
$3d^7(^4P)4p$	$^5D°$	2	*419 168.0*	60	+11	$3d^7(^4F)4p$	$^5D°$
		3	*419 588.7*	68	+10		$^3D°$
		0	*419 644.6 ?*	63	+21	$3d^7(^2P)4p$	$^3P°$
		1	*420 527.4*	55	+16	$3d^7(^2P)4p$	$^3S°$
		4	*421 348.9*	75	+13	$3d^7(^2G)4p$	$^3H°$
$3d^7(^2G)4p$	$^3H°$	5	*419 928.7*	60	+19		$^1H°$
		4	*421 619.2*	69	+11	$3d^7(^4P)4p$	$^5D°$
		6	*422 914.6*	92			
$3d^7(^2G)4p$	$^3F°$	4	*420 030.7*	54	+12		$^3G°$
		3	*423 585.8*	60	+25		$^3G°$
		2	*426 905.5*	92			
$3d^7(^2P)4p$	$^3P°$	0	*422 597.*	57	+18	$3d^7(^4P)4p$	$^5D°$
		2	*422 886.4*	56			
		1	*423 703.8*	36	+26	$3d^7(^4P)4p$	$^5P°$
$3d^7(^2P)4p$	$^1D°$	2	*424 443.2*	21	+28	$3d^7(^4P)4p$	$^5P°$
$3d^7(^2G)4p$	$^1G°$	4	*424 594.2*	41	+27		$^3F°$
$3d^7(^4P)4p$	$^5P°$	3	*425 094.4*	49	+21		$^3D°$
		2	*425 879.8*	45	+18		$^3D°$
		1	*426 209.2*	44	+26		$^3S°$
$3d^7(^2G)4p$	$^3G°$	5	*425 555.0*	77	+13		$^1H°$
		4	*427 165.0*	69	+11		$^3H°$
		3	*427 521.7*	45	+16		$^1F°$
$3d^7(^2G)4p$	$^1F°$	3	*425 605.8*	43	+12		$^3F°$
$3d^7(^4P)4p$	$^3D°$	3	*426 636.8*	47	+22		$^5P°$
		1	*430 034.0*	31	+23		$^3P°$
		2	*430 599.5*	19	+38		$^3P°$
$3d^7(^2P)4p$	$^3D°$	1	*426 973.4*	33	+25	$3d^7(^4P)4p$	$^3D°$
		3	*429 939.8*	43	+25	$3d^7(^2D2)4p$	$^3D°$
		2	*432 884.7*	37	+20		$^1D°$
$3d^7(^2G)4p$	$^1H°$	5	*427 106.4*	45	+21	$3d^7(^2H)4p$	$^3G°$
$3d^7(^2H)4p$	$^3G°$	5	*427 399.6*	66	+13	$3d^7(^2G)4p$	$^1H°$
		4	*430 045.3*	83			
		3	*432 400.5*	69			
$3d^7(^2P)4p$	$^1S°$	0	*428 109.*	64	+25	$3d^7(^4P)4p$	$^3P°$
$3d^7(^2H)4p$	$^3I°$	6	*428 511.4*	63	+32		$^1I°$
		5	*430 311.9*	87			
		7	*431 050.7*	100			
$3d^7(^4P)4p$	$^3P°$	2	*428 900.4*	38	+24		$^3D°$
		1	*432 409.2*	37	+17	$3d^7(^2P)4p$	$^3D°$
		0	*434 590. ?*	67	+31	$3d^7(^2P)4p$	$^1S°$

TABLE 11. Energy levels of Ga VI—Continued

Configuration	Term	J	Level (cm^{-1})	Leading percentages			
$3d^7(^2D2)4p$	$^3D^\circ$	3	*430 763.4*	28	+25		$^3F^\circ$
		2	*431 443.0*	31	+12	$3d^7(^4P)4p$	$^3D^\circ$
		1	*431 472.8*	33	+26	$3d^7(^4P)4p$	$^3P^\circ$
$3d^7(^2D2)4p$	$^3F^\circ$	4	*434 789.2*	77	+20	$3d^7(^2D1)4p$	$^3F^\circ$
		3	*435 668.5*	40	+12	$3d^7(^2G)4p$	$^1F^\circ$
		2	*436 426.1*	43	+16	$3d^7(^2P)4p$	$^1D^\circ$
$3d^7(^2H)4p$	$^1I^\circ$	6	*434 837.6*	64	+31		$^3I^\circ$
$3d^7(^2P)4p$	$^3S^\circ$	1	*436 778.4*	65			
$3d^7(^2P)4p$	$^1P^\circ$	1	*437 611.7*	46	+11	$3d^7(^2D2)4p$	$^3D^\circ$
$3d^7(^2D2)4p$	$^1D^\circ$	2	*437 682.7*	35	+20		$^3P^\circ$
$3d^7(^2H)4p$	$^3H^\circ$	6	*438 288.5*	95			
		5	*438 999.3*	90			
		4	*440 038.2*	93			
$3d^7(^2D2)4p$	$^3P^\circ$	2	*440 844.9*	36	+17		$^1D^\circ$
		1	*443 348.5*	35	+23		$^1P^\circ$
		0	*444 367.4*	67	+14	$3d^7(^2P)4p$	$^3P^\circ$
$3d^7(^2H)4p$	$^1G^\circ$	4	*441 145.2*	63	+33	$3d^7(^2G)4p$	$^1G^\circ$
$3d^7(^2D2)4p$	$^1F^\circ$	3	*442 214.5*	54	+15	$3d^7(^2G)4p$	$^1F^\circ$
$3d^7(^2D2)4p$	$^1P^\circ$	1	*444 362.8*	55	+18		$^3P^\circ$
$3d^7(^2H)4p$	$^1H^\circ$	5	*445 925.7*	92			
$3d^7(^2F)4p$	$^1D^\circ$	2	*453 517.0*	48	+38		$^3F^\circ$
$3d^7(^2F)4p$	$^3G^\circ$	3	*454 836.1*	67	+18		$^3F^\circ$
		4	*455 557.5*	49	+25		$^3F^\circ$
		5	*459 106.5*	92			
$3d^7(^2F)4p$	$^3D^\circ$	3	*456 583.9*	56	+23		$^3F^\circ$
		2	*458 730.8*	70	+18		$^1D^\circ$
		1	*458 909.2*	89			
$3d^7(^2F)4p$	$^3F^\circ$	2	*457 762.6*	53	+28		$^1D^\circ$
		3	*458 164.9*	51	+27		$^3D^\circ$
		4	*459 016.3*	24	+39		$^3G^\circ$
$3d^7(^2F)4p$	$^1G^\circ$	4	*459 534.9*	49	+45		$^3F^\circ$
$3d^7(^2F)4p$	$^1F^\circ$	3	*466 715.5*	93			
$3d^7(^2D1)4p$	$^3P^\circ$	2	*483 570.3*	76	+20	$3d^7(^2D2)4p$	$^3P^\circ$
		1	*484 260.9*	77	+16	$3d^7(^2D2)4p$	$^3P^\circ$
		0	*485 120.7*	83	+16	$3d^7(^2D2)4p$	$^3P^\circ$
$3d^7(^2D1)4p$	$^3F^\circ$	2	*486 095.0*	75	+17	$3d^7(^2D2)4p$	$^3F^\circ$
		3	*487 831.8*	71	+19	$3d^7(^2D2)4p$	$^3F^\circ$
		4	*490 450.6*	74	+22	$3d^7(^2D2)4p$	$^3F^\circ$
$3d^7(^2D1)4p$	$^1P^\circ$	1	*492 658.4*	74	+11	$3d^7(^2D2)4p$	$^1P^\circ$
$3d^7(^2D1)4p$	$^1F^\circ$	3	*493 464.9*	71	+18	$3d^7(^2D2)4p$	$^1F^\circ$
$3d^7(^2D1)4p$	$^3D^\circ$	1	*497 330.1*	67	+20	$3d^7(^2D2)4p$	$^3D^\circ$
		2	*497 893.6*	65	+20	$3d^7(^2D2)4p$	$^3D^\circ$
		3	*499 867.4*	69	+24	$3d^7(^2D2)4p$	$^3D^\circ$

TABLE 11. Energy levels of Ga VI—Continued

Configuration	Term	J	Level (cm^{-1})	Leading percentages			
$3d^7(^2D1)4p$	$^1D°$	2	*498 920.8*	60	+23	$3d^7(^2D2)4p$	$^1D°$
Ga VII ($^4F_{9/2}$)	**Limit**	**—**	**909 000**				

TABLE 12. Spectral lines of Ga VI

Wavelength (Å)	Classification: Lower		Classification: Upper		Energy levels (cm^{-1})		Int.	References
200.056	$3d^8$	$^3F_4$	$3d^7(^2D1)4p$	$^3D°_3$	0.0	499 867.4	120	38
202.146	$3d^8$	$^3F_3$	$3d^7(^2D1)4p$	$^3D°_2$	3 193.3	497 893.6	130	38
202.953	$3d^8$	$^3F_2$	$3d^7(^2D1)4p$	$^3D°_2$	5 164.0	497 893.6	6	38
203.186	$3d^8$	$^3F_2$	$3d^7(^2D1)4p$	$^3D°_1$	5 164.0	497 330.1	50	38
203.896	$3d^8$	$^3F_4$	$3d^7(^2D1)4p$	$^3F°_4$	0.0	490 450.6	90	38
205.231	$3d^8$	$^3F_3$	$3d^7(^2D1)4p$	$^3F°_4$	3 193.3	490 450.6	3	38
206.341	$3d^8$	$^3F_3$	$3d^7(^2D1)4p$	$^3F°_3$	3 193.3	487 831.8	60	38
207.182	$3d^8$	$^3F_2$	$3d^7(^2D1)4p$	$^3F°_3$	5 164.0	487 831.8	5	38
207.931	$3d^8$	$^3F_2$	$3d^7(^2D1)4p$	$^3F°_2$	5 164.0	486 095.0	40	38
208.622	$3d^8$	$^1D_2$	$3d^7(^2D1)4p$	$^3D°_3$	20 531.6	499 867.4	10	38
209.038	$3d^8$	$^1D_2$	$3d^7(^2D1)4p$	$^1D°_2$	20 531.6	498 920.8	10	38
210.889	$3d^8$	$^3P_2$	$3d^7(^2D1)4p$	$^3D°_3$	25 683.2	499 867.4	40	38
211.769	$3d^8$	$^3P_2$	$3d^7(^2D1)4p$	$^3D°_2$	25 683.2	497 893.6	20	38
211.967	$3d^8$	$^3P_1$	$3d^7(^2D1)4p$	$^3D°_2$	26 123.7	497 893.6	25	38
212.220	$3d^8$	$^3P_1$	$3d^7(^2D1)4p$	$^3D°_1$	26 123.7	497 330.1	6	38
212.437	$3d^8$	$^3P_0$	$3d^7(^2D1)4p$	$^3D°_1$	26 607.4	497 330.1	7	38
213.773	$3d^8$	$^3P_2$	$3d^7(^2D1)4p$	$^1F°_3$	25 683.2	493 464.9	3	38
214.144	$3d^8$	$^3P_2$	$3d^7(^2D1)4p$	$^1P°_1$	25 683.2	492 658.4	3	38
214.767	$3d^8$	$^1G_4$	$3d^7(^2D1)4p$	$^3D°_3$	34 249.4	499 867.4	15	38
215.640	$3d^8$	$^1D_2$	$3d^7(^2D1)4p$	$^3P°_1$	20 531.6	484 260.9	20	38
215.965	$3d^8$	$^1D_2$	$3d^7(^2D1)4p$	$^3P°_2$	20 531.6	483 570.3	70	38
217.609	$3d^8$	$^3F_4$	$3d^7(^2F)4p$	$^1G°_4$	0.0	459 534.9	20	38
217.763	$3d^8$	$^1G_4$	$3d^7(^2D1)4p$	$^1F°_3$	34 249.4	493 464.9	400	38
217.813	$3d^8$	$^3F_4$	$3d^7(^2F)4p$	$^3G°_5$	0.0	459 106.5	30	38
217.857	$3d^8$	$^3F_4$	$3d^7(^2F)4p$	$^3F°_4$	0.0	459 016.3	25	38
217.870	$3d^8$	$^3P_1$	$3d^7(^2D1)4p$	$^3P°_0$	26 123.7	485 120.7	80	38
218.061	$3d^8$	$^3P_2$	$3d^7(^2D1)4p$	$^3P°_1$	25 683.2	484 260.9	70	38
218.262	$3d^8$	$^3F_4$	$3d^7(^2F)4p$	$^3F°_3$	0.0	458 164.9	80	38
218.268	$3d^8$	$^3P_1$	$3d^7(^2D1)4p$	$^3P°_1$	26 123.7	484 260.9	70	38
218.395	$3d^8$	$^3P_2$	$3d^7(^2D1)4p$	$^3P°_2$	25 683.2	483 570.3	270	38
218.501	$3d^8$	$^3P_0$	$3d^7(^2D1)4p$	$^3P°_1$	26 607.4	484 260.9	100	38
218.605	$3d^8$	$^3P_1$	$3d^7(^2D1)4p$	$^3P°_2$	26 123.7	483 570.3	150	38
219.016	$3d^8$	$^3F_4$	$3d^7(^2F)4p$	$^3D°_3$	0.0	456 583.9	120	38
219.381	$3d^8$	$^3F_3$	$3d^7(^2F)4p$	$^3F°_4$	3 193.3	459 016.3	30	38
219.517	$3d^8$	$^3F_4$	$3d^7(^2F)4p$	$^3G°_4$	0.0	455 557.5	120*bl*	38
	$3d^8$	$^3F_3$	$3d^7(^2F)4p$	$^3D°_2$	3 193.3	458 730.8		38
219.986	$3d^8$	$^3F_3$	$3d^7(^2F)4p$	$^3F°_2$	3 193.3	457 762.6	25	38
220.384	$3d^8$	$^3F_2$	$3d^7(^2F)4p$	$^3D°_1$	5 164.0	458 909.2	80	38
220.462	$3d^8$	$^1G_4$	$3d^7(^2D1)4p$	$^3F°_3$	34 249.4	487 831.8	50*bl*	38
	$3d^8$	$^3F_2$	$3d^7(^2F)4p$	$^3D°_2$	5 164.0	458 730.8		38
220.557	$3d^8$	$^3F_3$	$3d^7(^2F)4p$	$^3D°_3$	3 193.3	456 583.9	30	38

TABLE 12. Spectral lines of Ga VI—Continued

Wavelength (Å)	Classification Lower		Upper		Energy levels (cm^{-1})		Int.	References
220.747	$3d^8$	$^3F_2$	$3d^7(^2F)4p$	$^3F^\circ_3$	5 164.0	458 164.9	15	38
220.944	$3d^8$	$^3F_2$	$3d^7(^2F)4p$	$^3F^\circ_2$	5 164.0	457 762.6	5	38
221.058	$3d^8$	$^3F_3$	$3d^7(^2F)4p$	$^3G^\circ_4$	3 193.3	455 557.5	25	38
221.411	$3d^8$	$^3F_3$	$3d^7(^2F)4p$	$^3G^\circ_3$	3 193.3	454 836.1	25	38
221.520	$3d^8$	$^3F_2$	$3d^7(^2F)4p$	$^3D^\circ_3$	5 164.0	456 583.9	5	38
222.382	$3d^8$	$^3F_2$	$3d^7(^2F)4p$	$^3G^\circ_3$	5 164.0	454 836.1	30	38
223.038	$3d^8$	$^3F_2$	$3d^7(^2F)4p$	$^1D^\circ_2$	5 164.0	453 517.0	30	38
224.123	$3d^8$	$^1D_2$	$3d^7(^2F)4p$	$^1F^\circ_3$	20 531.6	466 715.5	50	38
224.251	$3d^8$	$^3F_4$	$3d^7(^2H)4p$	$^1H^\circ_5$	0.0	445 925.7	5	38
226.137	$3d^8$	$^3F_4$	$3d^7(^2D2)4p$	$^1F^\circ_3$	0.0	442 214.5	8	38
226.742	$3d^8$	$^3P_2$	$3d^7(^2F)4p$	$^1F^\circ_3$	25 683.2	466 715.5	80	38
227.690	$3d^8$	$^3F_2$	$3d^7(^2D2)4p$	$^1P^\circ_1$	5 164.0	444 362.8	15	38
227.785	$3d^8$	$^3F_3$	$3d^7(^2D2)4p$	$^1F^\circ_3$	3 193.3	442 214.5	40*bl*	38
	$3d^8$	$^3F_4$	$3d^7(^2H)4p$	$^3H^\circ_5$	0.0	438 999.3		38
228.116	$3d^8$	$^1D_2$	$3d^7(^2F)4p$	$^3D^\circ_1$	20 531.6	458 909.2	8	38
228.503	$3d^8$	$^1D_2$	$3d^7(^2F)4p$	$^3F^\circ_3$	20 531.6	458 164.9	80	38
228.714	$3d^8$	$^1D_2$	$3d^7(^2F)4p$	$^3F^\circ_2$	20 531.6	457 762.6	150	38
228.912	$3d^8$	$^3F_3$	$3d^7(^2H)4p$	$^3H^\circ_4$	3 193.3	440 038.2	25	38
229.332	$3d^8$	$^1D_2$	$3d^7(^2F)4p$	$^3D^\circ_3$	20 531.6	456 583.9	220	38
229.999	$3d^8$	$^3F_4$	$3d^7(^2D2)4p$	$^3F^\circ_4$	0.0	434 789.2	370	38
230.157	$3d^8$	$^3F_3$	$3d^7(^2D2)4p$	$^1D^\circ_2$	3 193.3	437 682.7	30	38
230.826	$3d^8$	$^3F_3$	$3d^7(^2D2)4p$	$^3F^\circ_2$	3 193.3	436 426.1	80*bl*	38
	$3d^8$	$^3P_2$	$3d^7(^2F)4p$	$^3D^\circ_1$	25 683.2	458 909.2		38
230.923	$3d^8$	$^3P_2$	$3d^7(^2F)4p$	$^3D^\circ_2$	25 683.2	458 730.8	220	38
230.956	$3d^8$	$^1D_2$	$3d^7(^2F)4p$	$^1D^\circ_2$	20 531.6	453 517.0	230	38
231.064	$3d^8$	$^3P_1$	$3d^7(^2F)4p$	$^3D^\circ_1$	26 123.7	458 909.2	200	38
231.159	$3d^8$	$^3P_1$	$3d^7(^2F)4p$	$^3D^\circ_2$	26 123.7	458 730.8	370	38
231.209	$3d^8$	$^3F_2$	$3d^7(^2D2)4p$	$^1D^\circ_2$	5 164.0	437 682.7	25	38
231.234	$3d^8$	$^3P_2$	$3d^7(^2F)4p$	$^3F^\circ_3$	25 683.2	458 164.9	780*bl*	38
	$3d^8$	$^3F_3$	$3d^7(^2D2)4p$	$^3F^\circ_3$	3 193.3	435 668.5		38
	$3d^8$	$^1G_4$	$3d^7(^2F)4p$	$^1F^\circ_3$	34 249.4	466 715.5		38
	$3d^8$	$^3F_2$	$3d^7(^2P)4p$	$^1P^\circ_1$	5 164.0	437 611.7		38
231.268	$3d^8$	$^3F_4$	$3d^7(^2H)4p$	$^3G^\circ_3$	0.0	432 400.5	25	38
231.322	$3d^8$	$^3P_0$	$3d^7(^2F)4p$	$^3D^\circ_1$	26 607.4	458 909.2	220	38
231.678	$3d^8$	$^3P_1$	$3d^7(^2F)4p$	$^3F^\circ_2$	26 123.7	457 762.6	30	38
231.700	$3d^8$	$^3F_3$	$3d^7(^2D2)4p$	$^3F^\circ_4$	3 193.3	434 789.2	50	38
231.881	$3d^8$	$^3F_2$	$3d^7(^2D2)4p$	$^3F^\circ_2$	5 164.0	436 426.1	70	38
232.075	$3d^8$	$^3P_2$	$3d^7(^2F)4p$	$^3D^\circ_3$	25 683.2	456 583.9	430	38
232.148	$3d^8$	$^3F_4$	$3d^7(^2D2)4p$	$^3D^\circ_3$	0.0	430 763.4	120	38
232.536	$3d^8$	$^3F_4$	$3d^7(^2H)4p$	$^3G^\circ_4$	0.0	430 045.3	15	38
232.593	$3d^8$	$^3F_4$	$3d^7(^2P)4p$	$^3D^\circ_3$	0.0	429 939.8	750	38
232.729	$3d^8$	$^3F_3$	$3d^7(^2P)4p$	$^3D^\circ_2$	3 193.3	432 884.7	400	38
232.989	$3d^8$	$^3F_3$	$3d^7(^2H)4p$	$^3G^\circ_3$	3 193.3	432 400.5	16	38
233.018	$3d^8$	$^3P_2$	$3d^7(^2F)4p$	$^3G^\circ_3$	25 683.2	454 836.1	8	38
233.509	$3d^8$	$^3F_3$	$3d^7(^2D2)4p$	$^3D^\circ_2$	3 193.3	431 443.0	230	38
233.802	$3d^8$	$^3F_2$	$3d^7(^2P)4p$	$^3D^\circ_2$	5 164.0	432 884.7	320	38
233.882	$3d^8$	$^3F_3$	$3d^7(^2D2)4p$	$^3D^\circ_3$	3 193.3	430 763.4	180	38
233.908	$3d^8$	$^3F_4$	$3d^7(^2G)4p$	$^3G^\circ_3$	0.0	427 521.7	220	38
233.975	$3d^8$	$^3F_3$	$3d^7(^4P)4p$	$^3D^\circ_2$	3 193.3	430 599.5	840*bl*	38

TABLE 12. Spectral lines of Ga VI—Continued

Wavelength (Å)	Classification				Energy levels (cm^{-1})		Int.	References
	Lower		Upper					
	$3d^8$	$^3F_4$	$3d^7(^2H)4p$	$^3G^\circ_5$	0.0	427 399.6		38
	$3d^8$	$^3P_1$	$3d^7(^2F)4p$	$^1D^\circ_2$	26 123.7	453 517.0		38
234.063	$3d^8$	$^3F_2$	$3d^7(^4P)4p$	$^3P^\circ_1$	5 164.0	432 409.2	840*bl*	38
	$3d^8$	$^3F_2$	$3d^7(^2H)4p$	$^3G^\circ_3$	5 164.0	432 400.5		38
234.105	$3d^8$	$^3F_4$	$3d^7(^2G)4p$	$^3G^\circ_4$	0.0	427 165.0	130	38
234.136	$3d^8$	$^3F_4$	$3d^7(^2G)4p$	$^1H^\circ_5$	0.0	427 106.4	800	38
234.274	$3d^8$	$^3F_3$	$3d^7(^2H)4p$	$^3G^\circ_4$	3 193.3	430 045.3	900	38
234.333	$3d^8$	$^3F_3$	$3d^7(^2P)4p$	$^3D^\circ_3$	3 193.3	429 939.8	170	38
234.394	$3d^8$	$^3F_4$	$3d^7(^4P)4p$	$^3D^\circ_3$	0.0	426 636.8	30	38
234.573	$3d^8$	$^3F_2$	$3d^7(^2D2)4p$	$^3D^\circ_1$	5 164.0	431 472.8	100	38
234.588	$3d^8$	$^3F_2$	$3d^7(^2D2)4p$	$^3D^\circ_2$	5 164.0	431 443.0	30	38
234.905	$3d^8$	$^3F_3$	$3d^7(^4P)4p$	$^3P^\circ_2$	3 193.3	428 900.4	320	38
234.965	$3d^8$	$^3F_4$	$3d^7(^2G)4p$	$^1F^\circ_3$	0.0	425 605.8	70*bl*	38
	$3d^8$	$^3F_2$	$3d^7(^2D2)4p$	$^3D^\circ_3$	5 164.0	430 763.4		38
234.987	$3d^8$	$^3F_4$	$3d^7(^2G)4p$	$^3G^\circ_5$	0.0	425 555.0	280	38
235.139	$3d^8$	$^1G_4$	$3d^7(^2F)4p$	$^1G^\circ_4$	34 249.4	459 534.9	150	38
235.244	$3d^8$	$^3F_4$	$3d^7(^4P)4p$	$^5P^\circ_3$	0.0	425 094.4	420	38
235.370	$3d^8$	$^3F_2$	$3d^7(^4P)4p$	$^3D^\circ_1$	5 164.0	430 034.0	180*bl*	38
	$3d^8$	$^1G_4$	$3d^7(^2F)4p$	$^3G^\circ_5$	34 249.4	459 106.5		38
235.424	$3d^8$	$^3F_2$	$3d^7(^2P)4p$	$^3D^\circ_3$	5 164.0	429 939.8	80*bl*	38
	$3d^8$	$^1G_4$	$3d^7(^2F)4p$	$^3F^\circ_4$	34 249.4	459 016.3		38
235.520	$3d^8$	$^3F_4$	$3d^7(^2G)4p$	$^1G^\circ_4$	0.0	424 594.2	570	38
235.669	$3d^8$	$^3F_3$	$3d^7(^2G)4p$	$^3G^\circ_3$	3 193.3	427 521.7	150	38
235.867	$3d^8$	$^3F_3$	$3d^7(^2G)4p$	$^3G^\circ_4$	3 193.3	427 165.0	120	38
235.897	$3d^8$	$^1G_4$	$3d^7(^2F)4p$	$^3F^\circ_3$	34 249.4	458 164.9	5	38
235.945	$3d^8$	$^1D_2$	$3d^7(^2D2)4p$	$^1P^\circ_1$	20 531.6	444 362.8	220	38
236.009	$3d^8$	$^3F_3$	$3d^7(^2G)4p$	$^3F^\circ_2$	3 193.3	426 905.5	120	38
236.082	$3d^8$	$^3F_4$	$3d^7(^2G)4p$	$^3F^\circ_3$	0.0	423 585.8	120	38
236.160	$3d^8$	$^3F_3$	$3d^7(^4P)4p$	$^3D^\circ_3$	3 193.3	426 636.8	250	38
236.512	$3d^8$	$^1D_2$	$3d^7(^2D2)4p$	$^3P^\circ_1$	20 531.6	443 348.5	250	38
236.582	$3d^8$	$^3F_3$	$3d^7(^4P)4p$	$^5P^\circ_2$	3 193.3	425 879.8	10	38
236.738	$3d^8$	$^3F_3$	$3d^7(^2G)4p$	$^1F^\circ_3$	3 193.3	425 605.8	450	38
236.781	$3d^8$	$^1G_4$	$3d^7(^2F)4p$	$^3D^\circ_3$	34 249.4	456 583.9	30	38
237.114	$3d^8$	$^3F_2$	$3d^7(^2G)4p$	$^3F^\circ_2$	5 164.0	426 905.5	680	38
237.149	$3d^8$	$^1D_2$	$3d^7(^2D2)4p$	$^1F^\circ_3$	20 531.6	442 214.5	430	38
237.184	$3d^8$	$^3F_4$	$3d^7(^2G)4p$	$^3H^\circ_4$	0.0	421 619.2	220	38
237.267	$3d^8$	$^3F_2$	$3d^7(^4P)4p$	$^3D^\circ_3$	5 164.0	426 636.8	40	38
237.306	$3d^8$	$^3F_3$	$3d^7(^2G)4p$	$^1G^\circ_4$	3 193.3	424 594.2	30	38
237.336	$3d^8$	$^3F_4$	$3d^7(^4P)4p$	$^5D^\circ_4$	0.0	421 348.9	15	38
237.358	$3d^8$	$^1G_4$	$3d^7(^2F)4p$	$^3G^\circ_4$	34 249.4	455 557.5	50	38
237.390	$3d^8$	$^3F_3$	$3d^7(^2P)4p$	$^1D^\circ_2$	3 193.3	424 443.2	40	38
237.849	$3d^8$	$^3F_2$	$3d^7(^2G)4p$	$^1F^\circ_3$	5 164.0	425 605.8	200	38
237.876	$3d^8$	$^3F_3$	$3d^7(^2G)4p$	$^3F^\circ_3$	3 193.3	423 585.8	680	38
237.919	$3d^8$	$^1D_2$	$3d^7(^2D2)4p$	$^3P^\circ_2$	20 531.6	440 844.9	80	38
238.077	$3d^8$	$^3F_4$	$3d^7(^2G)4p$	$^3F^\circ_4$	0.0	420 030.7	820	38
238.137	$3d^8$	$^3F_2$	$3d^7(^4P)4p$	$^5P^\circ_3$	5 164.0	425 094.4	70*bl*	77
	$3d^8$	$^3F_4$	$3d^7(^2G)4p$	$^3H^\circ_5$	0.0	419 928.7		38
238.504	$3d^8$	$^3F_2$	$3d^7(^2P)4p$	$^1D^\circ_2$	5 164.0	424 443.2	15	38
238.532	$3d^8$	$^1S_0$	$3d^7(^2D1)4p$	$^3D^\circ_1$	78 106.2	497 330.1	25	38
238.850	$3d^8$	$^3P_2$	$3d^7(^2D2)4p$	$^1P^\circ_1$	25 683.2	444 362.8	30	38

TABLE 12. Spectral lines of Ga VI—Continued

Wavelength (Å)	Classification Lower		Upper		Energy levels (cm^{-1})		Int.	References
238.996	$3d^8$	$^3F_2$	$3d^7(^2G)4p$	$^3F^\circ_3$	5 164.0	423 585.8	220	38
239.087	$3d^8$	$^3P_1$	$3d^7(^2D2)4p$	$^3P^\circ_0$	26 123.7	444 367.4	80	38
239.099	$3d^8$	$^3P_1$	$3d^7(^2D2)4p$	$^1P^\circ_1$	26 123.7	444 362.8	80	38
239.145	$3d^8$	$^3F_3$	$3d^7(^4P)4p$	$^5D^\circ_4$	3 193.3	421 348.9	15	38
239.377	$3d^8$	$^3P_0$	$3d^7(^2D2)4p$	$^1P^\circ_1$	26 607.4	444 362.8	70	38
239.429	$3d^8$	$^3P_2$	$3d^7(^2D2)4p$	$^3P^\circ_1$	25 683.2	443 348.5	300	38
239.683	$3d^8$	$^3P_1$	$3d^7(^2D2)4p$	$^3P^\circ_1$	26 123.7	443 348.5	30	38
239.723	$3d^8$	$^1D_2$	$3d^7(^2D2)4p$	$^1D^\circ_2$	20 531.6	437 682.7	650	38
239.763	$3d^8$	$^1D_2$	$3d^7(^2P)4p$	$^1P^\circ_1$	20 531.6	437 611.7	170	38
239.899	$3d^8$	$^3F_3$	$3d^7(^2G)4p$	$^3F^\circ_4$	3 193.3	420 030.7	130	38
239.960	$3d^8$	$^3P_0$	$3d^7(^2D2)4p$	$^3P^\circ_1$	26 607.4	443 348.5	25	38
240.080	$3d^8$	$^3P_2$	$3d^7(^2D2)4p$	$^1F^\circ_3$	25 683.2	442 214.5	170	38
240.244	$3d^8$	$^1D_2$	$3d^7(^2P)4p$	$^3S^\circ_1$	20 531.6	436 778.4	270	38
240.398	$3d^8$	$^3F_3$	$3d^7(^4P)4p$	$^5D^\circ_2$	3 193.3	419 168.0	10	38
240.446	$3d^8$	$^1D_2$	$3d^7(^2D2)4p$	$^3F^\circ_2$	20 531.6	436 426.1	25	38
240.752	$3d^8$	$^3F_2$	$3d^7(^4P)4p$	$^5D^\circ_1$	5 164.0	420 527.4	14	38
240.871	$3d^8$	$^3P_2$	$3d^7(^2D2)4p$	$^3P^\circ_2$	25 683.2	440 844.9	550	38
240.885	$3d^8$	$^1D_2$	$3d^7(^2D2)4p$	$^3F^\circ_3$	20 531.6	435 668.5	150	38
241.127	$3d^8$	$^3P_1$	$3d^7(^2D2)4p$	$^3P^\circ_2$	26 123.7	440 844.9	120	38
241.223	$3d^8$	$^1S_0$	$3d^7(^2D1)4p$	$^1P^\circ_1$	78 106.2	492 658.4	320	38
242.719	$3d^8$	$^3P_2$	$3d^7(^2D2)4p$	$^1D^\circ_2$	25 683.2	437 682.7	15	38
242.760	$3d^8$	$^3P_2$	$3d^7(^2P)4p$	$^1P^\circ_1$	25 683.2	437 611.7	130	38
242.794	$3d^8$	$^1D_2$	$3d^7(^2H)4p$	$^3G^\circ_3$	20 531.6	432 400.5	130	38
242.908	$3d^8$	$^1G_4$	$3d^7(^2H)4p$	$^1H^\circ_5$	34 249.4	445 925.7	840	38
242.980	$3d^8$	$^3P_1$	$3d^7(^2D2)4p$	$^1D^\circ_2$	26 123.7	437 682.7	25	38
243.022	$3d^8$	$^3P_1$	$3d^7(^2P)4p$	$^1P^\circ_1$	26 123.7	437 611.7	25	38
243.253	$3d^8$	$^3P_2$	$3d^7(^2P)4p$	$^3S^\circ_1$	25 683.2	436 778.4	170	38
243.305	$3d^8$	$^3P_0$	$3d^7(^2P)4p$	$^1P^\circ_1$	26 607.4	437 611.7	80	38
243.339	$3d^8$	$^1D_2$	$3d^7(^2D2)4p$	$^3D^\circ_1$	20 531.6	431 472.8	200	38
243.356	$3d^8$	$^1D_2$	$3d^7(^2D2)4p$	$^3D^\circ_2$	20 531.6	431 443.0	25	38
243.513	$3d^8$	$^3P_1$	$3d^7(^2P)4p$	$^3S^\circ_1$	26 123.7	436 778.4	200	38
243.721	$3d^8$	$^3P_1$	$3d^7(^2D2)4p$	$^3F^\circ_2$	26 123.7	436 426.1	50	38
243.762	$3d^8$	$^1D_2$	$3d^7(^2D2)4p$	$^3D^\circ_3$	20 531.6	430 763.4	80	38
243.799	$3d^8$	$^3P_0$	$3d^7(^2P)4p$	$^3S^\circ_1$	26 607.4	436 778.4	15	38
243.862	$3d^8$	$^1D_2$	$3d^7(^4P)4p$	$^3D^\circ_2$	20 531.6	430 599.5	50	38
243.912	$3d^8$	$^3P_2$	$3d^7(^2D2)4p$	$^3F^\circ_3$	25 683.2	435 668.5	250	38
244.199	$3d^8$	$^1D_2$	$3d^7(^4P)4p$	$^3D^\circ_1$	20 531.6	430 034.0	30	38
244.254	$3d^8$	$^1D_2$	$3d^7(^2P)4p$	$^3D^\circ_3$	20 531.6	429 939.8	70	38
244.818	$3d^8$	$^3P_1$	$3d^7(^4P)4p$	$^3P^\circ_0$	26 123.7	434 590.?	70	38
244.876	$3d^8$	$^1D_2$	$3d^7(^4P)4p$	$^3P^\circ_2$	20 531.6	428 900.4	25	38
245.121	$3d^8$	$^1G_4$	$3d^7(^2D2)4p$	$^1F^\circ_3$	34 249.4	442 214.5	350	38
245.707	$3d^8$	$^1D_2$	$3d^7(^2G)4p$	$^3G^\circ_3$	20 531.6	427 521.7	280	38
245.764	$3d^8$	$^1G_4$	$3d^7(^2H)4p$	$^1G^\circ_4$	34 249.4	441 145.2	1000	38
245.848	$3d^8$	$^3P_1$	$3d^7(^2P)4p$	$^3D^\circ_2$	26 123.7	432 884.7	50	38
245.865	$3d^8$	$^3P_2$	$3d^7(^4P)4p$	$^3P^\circ_1$	25 683.2	432 409.2	120*bl*	38
	$3d^8$	$^3P_2$	$3d^7(^2H)4p$	$^3G^\circ_3$	25 683.2	432 400.5		38
246.037	$3d^8$	$^1D_2$	$3d^7(^2P)4p$	$^3D^\circ_1$	20 531.6	426 973.4	25	38
246.135	$3d^8$	$^3P_1$	$3d^7(^4P)4p$	$^3P^\circ_1$	26 123.7	432 409.2	10	38
246.207	$3d^8$	$^1S_0$	$3d^7(^2D1)4p$	$^3P^\circ_1$	78 106.2	484 260.9	20	38
246.242	$3d^8$	$^1D_2$	$3d^7(^4P)4p$	$^3D^\circ_3$	20 531.6	426 636.8	100	38

TABLE 12. Spectral lines of Ga VI—Continued

Wavelength (Å)	Classification: Lower		Upper		Energy levels (cm^{-1})		Int.	References
246.432	$3d^8$	$^3P_0$	$3d^7(^4P)4p$	$^3P^\circ_1$	26 607.4	432 409.2	220*bl*	38
	$3d^8$	$^3P_2$	$3d^7(^2D2)4p$	$^3D^\circ_1$	25 683.2	431 472.8		38
	$3d^8$	$^1G_4$	$3d^7(^2H)4p$	$^3H^\circ_4$	34 249.4	440 038.2		38
	$3d^8$	$^3F_4$	$3d^7(^4F)4p$	$^3G^\circ_3$	0.0	405 788.3		38
246.503	$3d^8$	$^1D_2$	$3d^7(^4P)4p$	$^5P^\circ_1$	20 531.6	426 209.2	50	38
246.700	$3d^8$	$^3P_1$	$3d^7(^2D2)4p$	$^3D^\circ_1$	26 123.7	431 472.8	20	38
246.717	$3d^8$	$^3P_1$	$3d^7(^2D2)4p$	$^3D^\circ_2$	26 123.7	431 443.0	40	38
246.842	$3d^8$	$^3F_4$	$3d^7(^4F)4p$	$^3D^\circ_3$	0.0	405 118.4	970	38
246.869	$3d^8$	$^3P_2$	$3d^7(^2D2)4p$	$^3D^\circ_3$	25 683.2	430 763.4	420*bl*	38
	$3d^8$	$^1D_2$	$3d^7(^2G)4p$	$^1F^\circ_3$	20 531.6	425 605.8		38
246.966	$3d^8$	$^3P_2$	$3d^7(^4P)4p$	$^3D^\circ_2$	25 683.2	430 599.5	50	38
246.995	$3d^8$	$^3P_0$	$3d^7(^2D2)4p$	$^3D^\circ_1$	26 607.4	431 472.8	15	38
247.066	$3d^8$	$^1G_4$	$3d^7(^2H)4p$	$^3H^\circ_5$	34 249.4	438 999.3	100	38
247.235	$3d^8$	$^3P_1$	$3d^7(^4P)4p$	$^3D^\circ_2$	26 123.7	430 599.5	15	38
247.312	$3d^8$	$^3P_2$	$3d^7(^4P)4p$	$^3D^\circ_1$	25 683.2	430 034.0	3	38
247.370	$3d^8$	$^3P_2$	$3d^7(^2P)4p$	$^3D^\circ_3$	25 683.2	429 939.8	30	38
247.579	$3d^8$	$^1D_2$	$3d^7(^2P)4p$	$^1D^\circ_2$	20 531.6	424 443.2	25	38
247.740	$3d^8$	$^3F_3$	$3d^7(^4P)4p$	$^5S^\circ_2$	3 193.3	406 843.7	750*bl*	38
	$3d^8$	$^3F_4$	$3d^7(^4F)4p$	$^3G^\circ_4$	0.0	403 630.9		38
247.878	$3d^8$	$^3P_0$	$3d^7(^4P)4p$	$^3D^\circ_1$	26 607.4	430 034.0	80	38
247.891	$3d^8$	$^3F_4$	$3d^7(^4F)4p$	$^3F^\circ_3$	0.0	403 397.9	30	38
248.006	$3d^8$	$^3P_2$	$3d^7(^4P)4p$	$^3P^\circ_2$	25 683.2	428 900.4	40	38
248.032	$3d^8$	$^1D_2$	$3d^7(^2P)4p$	$^3P^\circ_1$	20 531.6	423 703.8	30	38
248.106	$3d^8$	$^1D_2$	$3d^7(^2G)4p$	$^3F^\circ_3$	20 531.6	423 585.8	25	38
248.208	$3d^8$	$^3F_2$	$3d^7(^4F)4p$	$^3D^\circ_1$	5 164.0	408 054.2	530	38
248.277	$3d^8$	$^3P_1$	$3d^7(^4P)4p$	$^3P^\circ_2$	26 123.7	428 900.4	50	38
248.387	$3d^8$	$^3F_3$	$3d^7(^4F)4p$	$^3G^\circ_3$	3 193.3	405 788.3	50	38
248.537	$3d^8$	$^1D_2$	$3d^7(^2P)4p$	$^3P^\circ_2$	20 531.6	422 886.4	80	38
248.765	$3d^8$	$^3P_1$	$3d^7(^2P)4p$	$^1S^\circ_0$	26 123.7	428 109.	15	38
248.802	$3d^8$	$^3F_3$	$3d^7(^4F)4p$	$^3D^\circ_3$	3 193.3	405 118.4	30	38
248.857	$3d^8$	$^3P_2$	$3d^7(^2G)4p$	$^3G^\circ_3$	25 683.2	427 521.7	15	38
249.120	$3d^8$	$^1G_4$	$3d^7(^2D2)4p$	$^3F^\circ_3$	34 249.4	435 668.5	80	38
249.198	$3d^8$	$^3P_2$	$3d^7(^2P)4p$	$^3D^\circ_1$	25 683.2	426 973.4	25	38
249.301	$3d^8$	$^3F_4$	$3d^7(^4F)4p$	$^3F^\circ_4$	0.0	401 119.8	1000	38
249.404	$3d^8$	$^3P_2$	$3d^7(^4P)4p$	$^3D^\circ_3$	25 683.2	426 636.8	20	38
249.608	$3d^8$	$^3F_2$	$3d^7(^4F)4p$	$^3G^\circ_3$	5 164.0	405 788.3	180	38
249.667	$3d^8$	$^3F_4$	$3d^7(^4F)4p$	$^3G^\circ_5$	0.0	400 532.9	450*bl*	38
	$3d^8$	$^3P_2$	$3d^7(^4P)4p$	$^5P^\circ_1$	25 683.2	426 209.2		38
249.726	$3d^8$	$^3F_3$	$3d^7(^4F)4p$	$^3G^\circ_4$	3 193.3	403 630.9	280	38
249.772	$3d^8$	$^3P_0$	$3d^7(^2P)4p$	$^3D^\circ_1$	26 607.4	426 973.4	70	38
249.870	$3d^8$	$^3F_3$	$3d^7(^4F)4p$	$^3F^\circ_3$	3 193.3	403 397.9	920	38
249.925	$3d^8$	$^3F_2$	$3d^7(^4F)4p$	$^3F^\circ_2$	5 164.0	405 283.3	835	38
249.946	$3d^8$	$^3P_1$	$3d^7(^4P)4p$	$^5P^\circ_1$	26 123.7	426 209.2	200	38
250.000	$3d^8$	$^1D_2$	$3d^7(^4P)4p$	$^5D^\circ_1$	20 531.6	420 527.4	30	38
250.028	$3d^8$	$^3F_2$	$3d^7(^4F)4p$	$^3D^\circ_3$	5 164.0	405 118.4	20	38
250.049	$3d^8$	$^3P_2$	$3d^7(^2G)4p$	$^1F^\circ_3$	25 683.2	425 605.8	230	38
250.152	$3d^8$	$^3P_1$	$3d^7(^4P)4p$	$^5P^\circ_2$	26 123.7	425 879.8	100	38
250.250	$3d^8$	$^3P_0$	$3d^7(^4P)4p$	$^5P^\circ_1$	26 607.4	426 209.2	50	38
250.368	$3d^8$	$^3P_2$	$3d^7(^4P)4p$	$^5P^\circ_3$	25 683.2	425 094.4	50	38
250.589	$3d^8$	$^1D_2$	$3d^7(^4P)4p$	$^5D^\circ_3$	20 531.6	419 588.7	9	38

TABLE 12. Spectral lines of Ga VI—Continued

Wavelength (Å)	Classification Lower		Upper		Energy levels (cm^{-1})		Int.	References
250.776	$3d^8$	$^3P_2$	$3d^7(^2P)4p$	$^1D^\circ_2$	25 683.2	424 443.2	25	38
251.106	$3d^8$	$^3F_2$	$3d^7(^4F)4p$	$^3F^\circ_3$	5 164.0	403 397.9	150	38
251.242	$3d^8$	$^3P_2$	$3d^7(^2P)4p$	$^3P^\circ_1$	25 683.2	423 703.8	25	38
251.300	$3d^8$	$^3F_3$	$3d^7(^4F)4p$	$^3F^\circ_4$	3 193.3	401 119.8	250	38
251.381	$3d^8$	$^3F_4$	$3d^7(^4F)4p$	$^5G^\circ_3$	0.0	397 796.8	25	38
251.523	$3d^8$	$^3P_1$	$3d^7(^2P)4p$	$^3P^\circ_1$	26 123.7	423 703.8	230	38
251.585	$3d^8$	$^1D_2$	$3d^7(^4P)4p$	$^3S^\circ_1$	20 531.6	418 007.1	50	38
251.759	$3d^8$	$^3P_2$	$3d^7(^2P)4p$	$^3P^\circ_2$	25 683.2	422 886.4	70	38
251.828	$3d^8$	$^3P_0$	$3d^7(^2P)4p$	$^3P^\circ_1$	26 607.4	423 703.8	30	38
251.854	$3d^8$	$^3F_4$	$3d^7(^4F)4p$	$^5G^\circ_4$	0.0	397 051.5	250	38
252.040	$3d^8$	$^3P_1$	$3d^7(^2P)4p$	$^3P^\circ_2$	26 123.7	422 886.4	25	38
252.224	$3d^8$	$^3P_1$	$3d^7(^2P)4p$	$^3P^\circ_0$	26 123.7	422 597.	11	38
252.483	$3d^8$	$^1G_4$	$3d^7(^2H)4p$	$^3I^\circ_5$	34 249.4	430 311.9	80	38
252.614	$3d^8$	$^3F_4$	$3d^7(^4F)4p$	$^5G^\circ_5$	0.0	395 852.3	160	38
253.196	$3d^8$	$^3F_3$	$3d^7(^4F)4p$	$^5D^\circ_2$	3 193.3	398 136.8	25	38
253.262	$3d^8$	$^3P_2$	$3d^7(^4P)4p$	$^5D^\circ_1$	25 683.2	420 527.4	70	38
253.417	$3d^8$	$^3F_3$	$3d^7(^4F)4p$	$^5G^\circ_3$	3 193.3	397 796.8	120	38
253.544	$3d^8$	$^3P_1$	$3d^7(^4P)4p$	$^5D^\circ_1$	26 123.7	420 527.4	25	38
253.862	$3d^8$	$^3P_0$	$3d^7(^4P)4p$	$^5D^\circ_1$	26 607.4	420 527.4	50*bl*	38
	$3d^8$	$^3P_2$	$3d^7(^4P)4p$	$^5D^\circ_3$	25 683.2	419 588.7		38
254.125	$3d^8$	$^3F_4$	$3d^7(^4F)4p$	$^5D^\circ_4$	0.0	393 500.8	10	38
254.278	$3d^8$	$^1G_4$	$3d^7(^2G)4p$	$^3G^\circ_3$	34 249.4	427 521.7	25	38
254.353	$3d^8$	$^1G_4$	$3d^7(^2H)4p$	$^3G^\circ_5$	34 249.4	427 399.6	170	38
254.422	$3d^8$	$^3P_1$	$3d^7(^4P)4p$	$^5D^\circ_2$	26 123.7	419 168.0	25	38
254.468	$3d^8$	$^3F_2$	$3d^7(^4F)4p$	$^5D^\circ_2$	5 164.0	398 136.8	30	38
254.543	$3d^8$	$^1G_4$	$3d^7(^2G)4p$	$^1H^\circ_5$	34 249.4	427 106.4	80	38
254.784	$3d^8$	$^3F_3$	$3d^7(^4F)4p$	$^5D^\circ_3$	3 193.3	395 680.0	25	38
254.889	$3d^8$	$^3P_2$	$3d^7(^4P)4p$	$^3S^\circ_1$	25 683.2	418 007.1	120	38
255.081	$3d^8$	$^3F_2$	$3d^7(^4F)4p$	$^5G^\circ_2$	5 164.0	397 186.4	10	38
255.176	$3d^8$	$^3P_1$	$3d^7(^4P)4p$	$^3S^\circ_1$	26 123.7	418 007.1	25	38
255.251	$3d^8$	$^3F_4$	$3d^7(^4F)4p$	$^5F^\circ_3$	0.0	391 766.2	12	38
255.491	$3d^8$	$^3P_0$	$3d^7(^4P)4p$	$^3S^\circ_1$	26 607.4	418 007.1	20	38
255.523	$3d^8$	$^1G_4$	$3d^7(^2G)4p$	$^1F^\circ_3$	34 249.4	425 605.8	50	38
255.551	$3d^8$	$^1G_4$	$3d^7(^2G)4p$	$^3G^\circ_5$	34 249.4	425 555.0	100	38
256.183	$3d^8$	$^1G_4$	$3d^7(^2G)4p$	$^1G^\circ_4$	34 249.4	424 594.2	20*bl*	38
	$3d^8$	$^3F_3$	$3d^7(^4F)4p$	$^5F^\circ_2$	3 193.3	393 529.7		38
256.721	$3d^8$	$^3F_4$	$3d^7(^4F)4p$	$^5F^\circ_4$	0.0	389 525.6	70	38
257.349	$3d^8$	$^3F_3$	$3d^7(^4F)4p$	$^5F^\circ_3$	3 193.3	391 766.2	20	38
258.660	$3d^8$	$^3F_2$	$3d^7(^4F)4p$	$^5F^\circ_3$	5 164.0	391 766.2	25	38
258.859	$3d^8$	$^1D_2$	$3d^7(^4P)4p$	$^5S^\circ_2$	20 531.6	406 843.7	30	38
259.282	$3d^8$	$^1G_4$	$3d^7(^2G)4p$	$^3H^\circ_5$	34 249.4	419 928.7	25	38
260.018	$3d^8$	$^1D_2$	$3d^7(^4F)4p$	$^3D^\circ_3$	20 531.6	405 118.4	350	38
261.185	$3d^8$	$^1D_2$	$3d^7(^4F)4p$	$^3F^\circ_3$	20 531.6	403 397.9	50	38
261.831	$3d^8$	$^3P_1$	$3d^7(^4F)4p$	$^3D^\circ_1$	26 123.7	408 054.2	200	38
262.160	$3d^8$	$^3P_0$	$3d^7(^4F)4p$	$^3D^\circ_1$	26 607.4	408 054.2	250	38
262.357	$3d^8$	$^3P_2$	$3d^7(^4P)4p$	$^5S^\circ_2$	25 683.2	406 843.7	120	38
262.660	$3d^8$	$^3P_1$	$3d^7(^4P)4p$	$^5S^\circ_2$	26 123.7	406 843.7	530	38
263.082	$3d^8$	$^3P_2$	$3d^7(^4F)4p$	$^3G^\circ_3$	25 683.2	405 788.3	30	38
263.550	$3d^8$	$^3P_2$	$3d^7(^4F)4p$	$^3D^\circ_3$	25 683.2	405 118.4	630	38
263.740	$3d^8$	$^3P_1$	$3d^7(^4F)4p$	$^3F^\circ_2$	26 123.7	405 283.3	40	38

TABLE 12. Spectral lines of Ga VI—Continued

Wavelength (Å)	Classification Lower		Upper		Energy levels (cm^{-1})		Int.	References
264.747	$3d^8$	$^3P_2$	$3d^7(^4F)4p$	$^3F^{\circ}_3$	25 683.2	403 397.9	170	38
273.036	$3d^8$	$^1S_0$	$3d^7(^2D2)4p$	$^1P^{\circ}_1$	78 106.2	444 362.8	50	38
273.795	$3d^8$	$^1S_0$	$3d^7(^2D2)4p$	$^3P^{\circ}_1$	78 106.2	443 348.5	40	38
764.930	$3d^7(^4F)4s$	$^5F_5$	$3d^7(^4P)4p$	$^5D^{\circ}_4$	290 618.2	421 348.9	80	46
788.511	$3d^7(^4F)4s$	$^5F_4$	$3d^7(^4P)4p$	$^5D^{\circ}_3$	292 766.3	419 588.7	40	46
877.304	$3d^7(^2G)4s$	$^1G_4$	$3d^7(^2H)4p$	$^1G^{\circ}_4$	327 159.5	441 145.2	20	46
890.974	$3d^7(^2D1)4s$	$^3D_3$	$3d^7(^2D1)4p$	$^3D^{\circ}_3$	387 630.8	499 867.4	40	46
899.628	$3d^7(^2D1)4s$	$^3D_2$	$3d^7(^2D1)4p$	$^3D^{\circ}_2$	386 736.8	497 893.6	30	46
900.468	$3d^7(^2D1)4s$	$^3D_1$	$3d^7(^2D1)4p$	$^3D^{\circ}_1$	386 276.8	497 330.1	25	46
902.904	$3d^7(^4P)4s$	$^5P_3$	$3d^7(^4P)4p$	$^3D^{\circ}_3$	315 882.7	426 636.8	40	46
907.091	$3d^7(^4P)4s$	$^3P_2$	$3d^7(^2D2)4p$	$^1D^{\circ}_2$	327 438.9	437 682.7	25	46
907.207	$3d^7(^2D2)4s$	$^3D_2$	$3d^7(^2D2)4p$	$^3P^{\circ}_1$	333 121.7	443 348.5	25	46
909.134	$3d^7(^4P)4s$	$^5P_3$	$3d^7(^4P)4p$	$^5P^{\circ}_2$	315 882.7	425 879.8	110	46
909.805	$3d^7(^4P)4s$	$^5P_2$	$3d^7(^4P)4p$	$^5P^{\circ}_1$	316 294.3	426 209.2	30*bl*	46
	$3d^7(^4F)4s$	$^5F_5$	$3d^7(^4F)4p$	$^3G^{\circ}_5$	290 618.2	400 532.9		46
912.745	$3d^7(^2D2)4s$	$^3D_3$	$3d^7(^2D2)4p$	$^3P^{\circ}_2$	331 283.5	440 844.9	30	46
913.357	$3d^7(^4P)4s$	$^5P_1$	$3d^7(^2P)4p$	$^3D^{\circ}_1$	317 488.8	426 973.4	7	46
915.720	$3d^7(^2H)4s$	$^1H_5$	$3d^7(^2H)4p$	$^1H^{\circ}_5$	336 722.0	445 925.7	320	46
916.102	$3d^7(^4F)4s$	$^5F_3$	$3d^7(^4F)4p$	$^3G^{\circ}_4$	294 471.9	403 630.9	15	46
919.123	$3d^7(^4P)4s$	$^5P_2$	$3d^7(^4P)4p$	$^5P^{\circ}_3$	316 294.3	425 094.4	200	46
921.147	$3d^7(^4P)4s$	$^5P_3$	$3d^7(^2P)4p$	$^1D^{\circ}_2$	315 882.7	424 443.2	10	46
922.579	$3d^7(^4P)4s$	$^5P_1$	$3d^7(^4P)4p$	$^5P^{\circ}_2$	317 488.8	425 879.8	130	46
924.643	$3d^7(^4P)4s$	$^5P_2$	$3d^7(^2P)4p$	$^1D^{\circ}_2$	316 294.3	424 443.2	70	46
926.504	$3d^7(^2H)4s$	$^3H_6$	$3d^7(^2H)4p$	$^3H^{\circ}_6$	330 355.3	438 288.5	470	46
927.931	$3d^7(^4F)4s$	$^5F_4$	$3d^7(^4F)4p$	$^3G^{\circ}_5$	292 766.3	400 532.9	150	46
929.112	$3d^7(^2D2)4s$	$^3D_1$	$3d^7(^2D2)4p$	$^3P^{\circ}_0$	336 737.8	444 367.4	30	77
929.790	$3d^7(^2F)4s$	$^1F_3$	$3d^7(^2F)4p$	$^1F^{\circ}_3$	359 164.4	466 715.5	200	46
929.962	$3d^7(^2H)4s$	$^3H_5$	$3d^7(^2H)4p$	$^3H^{\circ}_5$	331 468.2	438 999.3	670	46
934.983	$3d^7(^4P)4s$	$^5P_1$	$3d^7(^2P)4p$	$^1D^{\circ}_2$	317 488.8	424 443.2	50	46
935.522	$3d^7(^2H)4s$	$^3H_4$	$3d^7(^2H)4p$	$^3H^{\circ}_4$	333 146.0	440 038.2	430	46
936.147	$3d^7(^2H)4s$	$^3H_5$	$3d^7(^2H)4p$	$^3H^{\circ}_6$	331 468.2	438 288.5	50	46
938.003	$3d^7(^2D2)4s$	$^3D_1$	$3d^7(^2D2)4p$	$^3P^{\circ}_1$	336 737.8	443 348.5	3	46
940.254	$3d^7(^2D1)4s$	$^1D_2$	$3d^7(^2D1)4p$	$^1D^{\circ}_2$	392 566.6	498 920.8	80	46
943.931	$3d^7(^4P)4s$	$^3P_1$	$3d^7(^2D2)4p$	$^3D^{\circ}_1$	325 534.2	431 472.8	70	46
944.201	$3d^7(^4P)4s$	$^3P_1$	$3d^7(^2D2)4p$	$^3D^{\circ}_2$	325 534.2	431 443.0	50	46
944.705	$3d^7(^2H)4s$	$^3H_4$	$3d^7(^2H)4p$	$^3H^{\circ}_5$	333 146.0	438 999.3	70	46
945.258	$3d^7(^2F)4s$	$^3F_2$	$3d^7(^2F)4p$	$^3D^{\circ}_1$	353 118.1	458 909.2	80	46
945.328	$3d^7(^2D2)4s$	$^1D_2$	$3d^7(^2D2)4p$	$^1P^{\circ}_1$	338 579.5	444 362.8	70	46
945.757	$3d^7(^4P)4s$	$^5P_3$	$3d^7(^2G)4p$	$^3H^{\circ}_4$	315 882.7	421 619.2	15	46
947.584	$3d^7(^2F)4s$	$^3F_3$	$3d^7(^2F)4p$	$^3F^{\circ}_4$	353 484.3	459 016.3	350	46
948.173	$3d^7(^4P)4s$	$^5P_3$	$3d^7(^4P)4p$	$^5D^{\circ}_4$	315 882.7	421 348.9	550	46
948.635	$3d^7(^2F)4s$	$^3F_4$	$3d^7(^2F)4p$	$^1G^{\circ}_4$	354 120.4	459 534.9	130	46
948.783	$3d^7(^4P)4s$	$^5P_1$	$3d^7(^2P)4p$	$^3P^{\circ}_2$	317 488.8	422 886.4	50	46
950.138	$3d^7(^2F)4s$	$^3F_3$	$3d^7(^2F)4p$	$^3D^{\circ}_2$	353 484.3	458 730.8	100	46
950.493	$3d^7(^2G)4s$	$^3G_4$	$3d^7(^2G)4p$	$^3G^{\circ}_4$	321 960.7	427 165.0	280	46
951.066	$3d^7(^2G)4s$	$^3G_4$	$3d^7(^2G)4p$	$^1H^{\circ}_5$	321 960.7	427 106.4	50	46
952.506	$3d^7(^2F)4s$	$^3F_4$	$3d^7(^2F)4p$	$^3G^{\circ}_5$	354 120.4	459 106.5	450	46
953.738	$3d^7(^4F)4s$	$^5F_5$	$3d^7(^4F)4p$	$^5G^{\circ}_6$	290 618.2	395 468.8	850	46
955.286	$3d^7(^2F)4s$	$^3F_3$	$3d^7(^2F)4p$	$^3F^{\circ}_3$	353 484.3	458 164.9	210	46
955.509	$3d^7(^2G)4s$	$^3G_5$	$3d^7(^2G)4p$	$^3G^{\circ}_5$	320 898.8	425 555.0	500	46

TABLE 12. Spectral lines of Ga VI—Continued

Wavelength (Å)	Classification Lower		Upper		Energy levels (cm^{-1})			Int.	References
955.616	$3d^7(^2F)4s$	$^3F_2$	$3d^7(^2F)4p$	$^3F^\circ_2$	353 118.1	457 762.6		190	46
956.640	$3d^7(^2P)4s$	$^3P_2$	$3d^7(^2P)4p$	$^3D^\circ_3$	325 408.1	429 939.8		320	46
957.641	$3d^7(^2H)4s$	$^1H_5$	$3d^7(^2H)4p$	$^1G^\circ_4$	336 722.0	441 145.2		290	46
959.006	$3d^7(^2P)4s$	$^3P_1$	$3d^7(^2P)4p$	$^3D^\circ_2$	328 609.6	432 884.7		30	46
961.269	$3d^7(^2G)4s$	$^3G_3$	$3d^7(^2G)4p$	$^3G^\circ_3$	323 491.8	427 521.7		290	46
964.264	$3d^7(^4P)4s$	$^5P_3$	$3d^7(^4P)4p$	$^5D^\circ_3$	315 882.7	419 588.7		440	46
964.312	$3d^7(^4F)4s$	$^3F_4$	$3d^7(^4F)4p$	$^3D^\circ_3$	301 417.4	405 118.4		500	46
964.371	$3d^7(^2G)4s$	$^3G_5$	$3d^7(^2G)4p$	$^1G^\circ_4$	320 898.8	424 594.2		340	46
964.605	$3d^7(^2G)4s$	$^3G_3$	$3d^7(^2G)4p$	$^3G^\circ_4$	323 491.8	427 165.0		320*bl*	46
	$3d^7(^4F)4s$	$^5F_3$	$3d^7(^4F)4p$	$^5D^\circ_2$	294 471.9	398 136.8			46
964.924	$3d^7(^2D2)4s$	$^1D_2$	$3d^7(^2D2)4p$	$^1F^\circ_3$	338 579.5	442 214.5		380	46
966.130	$3d^7(^2D2)4s$	$^3D_3$	$3d^7(^2D2)4p$	$^3F^\circ_4$	331 283.5	434 789.2		530	46
966.256	$3d^7(^2P)4s$	$^3P_2$	$3d^7(^4P)4p$	$^3P^\circ_2$	325 408.1	428 900.4		170	46
966.981	$3d^7(^2G)4s$	$^3G_3$	$3d^7(^2G)4p$	$^3F^\circ_2$	323 491.8	426 905.5		350	46
967.397	$3d^7(^2H)4s$	$^3H_5$	$3d^7(^2H)4p$	$^1I^\circ_6$	331 468.2	434 837.6		24	46
967.811	$3d^7(^4F)4s$	$^5F_3$	$3d^7(^4F)4p$	$^5G^\circ_3$	294 471.9	397 796.8		130*bl*	77
	$3d^7(^4P)4s$	$^3P_2$	$3d^7(^2D2)4p$	$^3D^\circ_3$	327 438.9	430 763.4			46
968.102	$3d^7(^4P)4s$	$^5P_2$	$3d^7(^4P)4p$	$^5D^\circ_3$	316 294.3	419 588.7		280	46
969.519	$3d^7(^2G)4s$	$^3G_3$	$3d^7(^4P)4p$	$^3D^\circ_3$	323 491.8	426 636.8		170	46
970.060	$3d^7(^4F)4s$	$^5F_4$	$3d^7(^4F)4p$	$^5G^\circ_5$	292 766.3	395 852.3		830	46
970.506	$3d^7(^4P)4s$	$^5P_1$	$3d^7(^4P)4p$	$^5D^\circ_1$	317 488.8	420 527.4		170	46
971.688	$3d^7(^4F)4s$	$^5F_4$	$3d^7(^4F)4p$	$^5D^\circ_3$	292 766.3	395 680.0		170	46
971.962	$3d^7(^4F)4s$	$^5F_5$	$3d^7(^4F)4p$	$^5D^\circ_4$	290 618.2	393 500.8		250	46
972.076	$3d^7(^4P)4s$	$^5P_2$	$3d^7(^4P)4p$	$^5D^\circ_2$	316 294.3	419 168.0		320	46
972.574	$3d^7(^2D1)4s$	$^3D_3$	$3d^7(^2D1)4p$	$^3F^\circ_4$	387 630.8	490 450.6		200	46
973.580	$3d^7(^4F)4s$	$^5F_3$	$3d^7(^4F)4p$	$^5G^\circ_2$	294 471.9	397 186.4		140	46
974.340	$3d^7(^2G)4s$	$^3G_4$	$3d^7(^2G)4p$	$^1G^\circ_4$	321 960.7	424 594.2		370	46
974.581	$3d^7(^4F)4s$	$^5F_2$	$3d^7(^4F)4p$	$^5D^\circ_1$	295 691.7	398 298.7		210	46
974.853	$3d^7(^4F)4s$	$^5F_3$	$3d^7(^4F)4p$	$^5G^\circ_4$	294 471.9	397 051.5		780	46
975.164	$3d^7(^2D2)4s$	$^3D_2$	$3d^7(^2D2)4p$	$^3F^\circ_3$	333 121.7	435 668.5		400	46
975.337	$3d^7(^4F)4s$	$^3F_3$	$3d^7(^4P)4p$	$^5S^\circ_2$	304 315.6	406 843.7		350	46
975.616	$3d^7(^4P)4s$	$^3P_2$	$3d^7(^2P)4p$	$^3D^\circ_3$	327 438.9	429 939.8		230	46
975.956	$3d^7(^2F)4s$	$^3F_4$	$3d^7(^2F)4p$	$^3D^\circ_3$	354 120.4	456 583.9		260	46
977.834	$3d^7(^2D2)4s$	$^1D_2$	$3d^7(^2D2)4p$	$^3P^\circ_2$	338 579.5	440 844.9		70	46
978.897	$3d^7(^4P)4s$	$^5P_1$	$3d^7(^4P)4p$	$^5D^\circ_0$	317 488.8	419 644.6	?	170	46
979.382	$3d^7(^4F)4s$	$^5F_2$	$3d^7(^4F)4p$	$^5G^\circ_3$	295 691.7	397 796.8		740	46
979.687	$3d^7(^2F)4s$	$^3F_3$	$3d^7(^2F)4p$	$^3G^\circ_4$	353 484.3	455 557.5		210	46
980.241	$3d^7(^2G)4s$	$^3G_5$	$3d^7(^2G)4p$	$^3H^\circ_6$	320 898.8	422 914.6		860	46
980.485	$3d^7(^2P)4s$	$^3P_1$	$3d^7(^4P)4p$	$^3D^\circ_2$	328 609.6	430 599.5		360	46
980.577	$3d^7(^4F)4s$	$^3F_4$	$3d^7(^4F)4p$	$^3F^\circ_3$	301 417.4	403 397.9		470	46
981.830	$3d^7(^4F)4s$	$^5F_1$	$3d^7(^4F)4p$	$^5D^\circ_0$	296 472.6	398 323.3	?	850*bl*	77
	$3d^7(^4F)4s$	$^3F_2$	$3d^7(^4F)4p$	$^3D^\circ_1$	306 203.6	408 054.2			46
982.080	$3d^7(^4F)4s$	$^5F_1$	$3d^7(^4F)4p$	$^5D^\circ_1$	296 472.6	398 298.7		470	46
983.114	$3d^7(^2F)4s$	$^3F_2$	$3d^7(^2F)4p$	$^3G^\circ_3$	353 118.1	454 836.1		250	46
983.152	$3d^7(^4P)4s$	$^5P_2$	$3d^7(^4P)4p$	$^3S^\circ_1$	316 294.3	418 007.1		220	46
983.430	$3d^7(^4P)4s$	$^3P_0$	$3d^7(^4P)4p$	$^3P^\circ_1$	330 724.3	432 409.2		150	46
983.475	$3d^7(^4P)4s$	$^5P_1$	$3d^7(^4P)4p$	$^5D^\circ_2$	317 488.8	419 168.0		130	46
983.643	$3d^7(^4F)4s$	$^5F_1$	$3d^7(^4F)4p$	$^5D^\circ_2$	296 472.6	398 136.8		630	46
984.037	$3d^7(^2G)4s$	$^3G_4$	$3d^7(^2G)4p$	$^3F^\circ_3$	321 960.7	423 585.8		600	46
985.281	$3d^7(^4F)4s$	$^5F_2$	$3d^7(^4F)4p$	$^5G^\circ_2$	295 691.7	397 186.4		550	46

TABLE 12. Spectral lines of Ga VI—Continued

Wavelength (Å)	Classification Lower		Upper		Energy levels (cm^{-1})		Int.	References
985.589	$3d^7(^4P)4s$	$^3P_2$	$3d^7(^4P)4p$	$^3P^\circ_2$	327 438.9	428 900.4	130	46
985.821	$3d^7(^4P)4s$	$^3P_1$	$3d^7(^2P)4p$	$^3D^\circ_1$	325 534.2	426 973.4	460*bl*	46
	$3d^7(^2F)4s$	$^3F_4$	$3d^7(^2F)4p$	$^3G^\circ_4$	354 120.4	455 557.5		46
985.956	$3d^7(^2P)4s$	$^3P_1$	$3d^7(^4P)4p$	$^3D^\circ_1$	328 609.6	430 034.0	140	46
986.657	$3d^7(^2F)4s$	$^3F_3$	$3d^7(^2F)4p$	$^3G^\circ_3$	353 484.3	454 836.1	300	46
987.858	$3d^7(^2P)4s$	$^3P_2$	$3d^7(^4P)4p$	$^3D^\circ_3$	325 408.1	426 636.8	80	46
988.063	$3d^7(^4F)4s$	$^5F_3$	$3d^7(^4F)4p$	$^5D^\circ_3$	294 471.9	395 680.0	720	46
989.166	$3d^7(^2D1)4s$	$^3D_2$	$3d^7(^2D1)4p$	$^3F^\circ_3$	386 736.8	487 831.8	250	46
990.426	$3d^7(^4F)4s$	$^3F_3$	$3d^7(^4F)4p$	$^3F^\circ_2$	304 315.6	405 283.3	360	46
990.629	$3d^7(^2D2)4s$	$^3D_1$	$3d^7(^2D2)4p$	$^1D^\circ_2$	336 737.8	437 682.7	40	46
991.096	$3d^7(^2D1)4s$	$^1D_2$	$3d^7(^2D1)4p$	$^1F^\circ_3$	392 566.6	493 464.9	220	46
992.036	$3d^7(^4F)4s$	$^3F_3$	$3d^7(^4F)4p$	$^3D^\circ_3$	304 315.6	405 118.4	410	46
992.711	$3d^7(^4F)4s$	$^5F_4$	$3d^7(^4F)4p$	$^5D^\circ_4$	292 766.3	393 500.8	870	46
992.905	$3d^7(^4F)4s$	$^5F_1$	$3d^7(^4F)4p$	$^5G^\circ_2$	296 472.6	397 186.4	240	46
993.094	$3d^7(^2H)4s$	$^3H_6$	$3d^7(^2H)4p$	$^3I^\circ_7$	330 355.3	431 050.7	960	46
993.662	$3d^7(^4F)4s$	$^3F_2$	$3d^7(^4P)4p$	$^5S^\circ_2$	306 203.6	406 843.7	360*bl*	46
	$3d^7(^2P)4s$	$^3P_0$	$3d^7(^2P)4p$	$^3D^\circ_1$	326 334.7	426 973.4		46
994.050	$3d^7(^2P)4s$	$^1P_1$	$3d^7(^4P)4p$	$^3P^\circ_1$	331 810.7	432 409.2	90	46
995.302	$3d^7(^2P)4s$	$^3P_2$	$3d^7(^4P)4p$	$^5P^\circ_2$	325 408.1	425 879.8	70	46
996.022	$3d^7(^2F)4s$	$^3F_2$	$3d^7(^2F)4p$	$^1D^\circ_2$	353 118.1	453 517.0	130	46
996.308	$3d^7(^2F)4s$	$^1F_3$	$3d^7(^2F)4p$	$^1G^\circ_4$	359 164.4	459 534.9	620	46
996.384	$3d^7(^2G)4s$	$^1G_4$	$3d^7(^2G)4p$	$^3G^\circ_3$	327 159.5	427 521.7	280	46
996.559	$3d^7(^4P)4s$	$^3P_1$	$3d^7(^4P)4p$	$^5P^\circ_2$	325 534.2	425 879.8	80	46
997.598	$3d^7(^2G)4s$	$^1G_4$	$3d^7(^2H)4p$	$^3G^\circ_5$	327 159.5	427 399.6	480	46
997.993	$3d^7(^2D1)4s$	$^3D_3$	$3d^7(^2D1)4p$	$^3F^\circ_3$	387 630.8	487 831.8	15	46
998.392	$3d^7(^2D2)4s$	$^3D_3$	$3d^7(^2D2)4p$	$^3D^\circ_2$	331 283.5	431 443.0	10	46
999.082	$3d^7(^2G)4s$	$^3G_3$	$3d^7(^2G)4p$	$^3F^\circ_3$	323 491.8	423 585.8	240*bl*	46
	$3d^7(^2D1)4s$	$^1D_2$	$3d^7(^2D1)4p$	$^1P^\circ_1$	392 566.6	492 658.4		46
999.683	$3d^7(^2F)4s$	$^3F_3$	$3d^7(^2F)4p$	$^1D^\circ_2$	353 484.3	453 517.0	190	46
999.971	$3d^7(^2G)4s$	$^1G_4$	$3d^7(^2G)4p$	$^3G^\circ_4$	327 159.5	427 165.0	300	46
1000.532	$3d^7(^2G)4s$	$^1G_4$	$3d^7(^2G)4p$	$^1H^\circ_5$	327 159.5	427 106.4	510	46
1001.255	$3d^7(^2P)4s$	$^3P_0$	$3d^7(^4P)4p$	$^5P^\circ_1$	326 334.7	426 209.2	10	46
1001.478	$3d^7(^2F)4s$	$^1F_3$	$3d^7(^2F)4p$	$^3F^\circ_4$	359 164.4	459 016.3	80	46
1001.821	$3d^7(^2D1)4s$	$^3D_1$	$3d^7(^2D1)4p$	$^3F^\circ_2$	386 276.8	486 095.0	180	46
1002.352	$3d^7(^2D2)4s$	$^3D_2$	$3d^7(^2P)4p$	$^3D^\circ_2$	333 121.7	432 884.7	100	46
1002.986	$3d^7(^4F)4s$	$^3F_4$	$3d^7(^4F)4p$	$^3F^\circ_4$	301 417.4	401 119.8	790	46
1003.126	$3d^7(^2D2)4s$	$^3D_1$	$3d^7(^2D2)4p$	$^3F^\circ_2$	336 737.8	436 426.1	520*bl*	46
	$3d^7(^2P)4s$	$^3P_2$	$3d^7(^4P)4p$	$^5P^\circ_3$	325 408.1	425 094.4		46
1003.401	$3d^7(^2P)4s$	$^1P_1$	$3d^7(^2D2)4p$	$^3D^\circ_1$	331 810.7	431 472.8	140	46
1003.430	$3d^7(^2G)4s$	$^3G_4$	$3d^7(^2G)4p$	$^3H^\circ_4$	321 960.7	421 619.2	150	46
1003.679	$3d^7(^2P)4s$	$^1P_1$	$3d^7(^2D2)4p$	$^3D^\circ_2$	331 810.7	431 443.0	170	46
1004.172	$3d^7(^4F)4s$	$^3F_2$	$3d^7(^4F)4p$	$^3G^\circ_3$	306 203.6	405 788.3	850	46
1004.364	$3d^7(^2F)4s$	$^1F_3$	$3d^7(^2F)4p$	$^3D^\circ_2$	359 164.4	458 730.8	340	46
1005.231	$3d^7(^2D2)4s$	$^3D_3$	$3d^7(^2D2)4p$	$^3D^\circ_3$	331 283.5	430 763.4	470	46
1006.155	$3d^7(^2G)4s$	$^3G_4$	$3d^7(^4P)4p$	$^5D^\circ_4$	321 960.7	421 348.9	40	46
1006.414	$3d^7(^4F)4s$	$^5F_5$	$3d^7(^4F)4p$	$^5F^\circ_5$	290 618.2	389 982.7	950	46
1006.890	$3d^7(^4F)4s$	$^3F_3$	$3d^7(^4F)4p$	$^3G^\circ_4$	304 315.6	403 630.9	780	46
1007.511	$3d^7(^2H)4s$	$^3H_4$	$3d^7(^2H)4p$	$^3G^\circ_3$	333 146.0	432 400.5	480	46
1008.078	$3d^7(^4P)4s$	$^3P_2$	$3d^7(^4P)4p$	$^3D^\circ_3$	327 438.9	426 636.8	320	46
1008.749	$3d^7(^2G)4s$	$^3G_5$	$3d^7(^2G)4p$	$^3F^\circ_4$	320 898.8	420 030.7	660	46

TABLE 12. Spectral lines of Ga VI—Continued

Wavelength (Å)	Classification: Lower		Classification: Upper		Energy levels (cm^{-1})		Int.	References
1008.924	$3d^7(^4F)4s$	$^3F_4$	$3d^7(^4F)4p$	$^3G^\circ_5$	301 417.4	400 532.9	1000	46
1009.050	$3d^7(^4F)4s$	$^5F_2$	$3d^7(^4F)4p$	$^5F^\circ_1$	295 691.7	394 800.7	630*bl*	46
	$3d^7(^2D2)4s$	$^1D_2$	$3d^7(^2D2)4p$	$^1D^\circ_2$	338 579.5	437 682.7		46
1009.254	$3d^7(^4F)4s$	$^3F_3$	$3d^7(^4F)4p$	$^3F^\circ_3$	304 315.6	403 397.9	570*bl*	46
	$3d^7(^4F)4s$	$^3F_2$	$3d^7(^4F)4p$	$^3F^\circ_2$	306 203.6	405 283.3		46
1009.513	$3d^7(^4F)4s$	$^5F_3$	$3d^7(^4F)4p$	$^5F^\circ_2$	294 471.9	393 529.7	680	46
1010.103	$3d^7(^4F)4s$	$^5F_4$	$3d^7(^4F)4p$	$^5F^\circ_3$	292 766.3	391 766.2	980	46
1011.047	$3d^7(^4P)4s$	$^3P_1$	$3d^7(^2P)4p$	$^1D^\circ_2$	325 534.2	424 443.2	920*bl*	46
	$3d^7(^4F)4s$	$^5F_5$	$3d^7(^4F)4p$	$^5F^\circ_4$	290 618.2	389 525.6		46
1011.695	$3d^7(^2D1)4s$	$^3D_1$	$3d^7(^2D1)4p$	$^3P^\circ_0$	386 276.8	485 120.7	90*bl*	77
	$3d^7(^2H)4s$	$^3H_5$	$3d^7(^2H)4p$	$^3I^\circ_5$	331 468.2	430 311.9		46
1013.613	$3d^7(^2D2)4s$	$^3D_3$	$3d^7(^2P)4p$	$^3D^\circ_3$	331 283.5	429 939.8	180	46
1014.216	$3d^7(^2F)4s$	$^1F_3$	$3d^7(^2F)4p$	$^3F^\circ_2$	359 164.4	457 762.6	160	46
1014.443	$3d^7(^2H)4s$	$^3H_5$	$3d^7(^2H)4p$	$^3G^\circ_4$	331 468.2	430 045.3	1000	46
1015.806	$3d^7(^2G)4s$	$^1G_4$	$3d^7(^2G)4p$	$^1F^\circ_3$	327 159.5	425 605.8	370*bl*	46
	$3d^7(^4P)4s$	$^3P_2$	$3d^7(^4P)4p$	$^5P^\circ_2$	327 438.9	425 879.8		77
1016.990	$3d^7(^4F)4s$	$^5F_1$	$3d^7(^4F)4p$	$^5F^\circ_1$	296 472.6	394 800.7	250	46
1017.103	$3d^7(^2D2)4s$	$^3D_2$	$3d^7(^2D2)4p$	$^3D^\circ_2$	333 121.7	431 443.0	380	46
1018.787	$3d^7(^2H)4s$	$^3H_6$	$3d^7(^2H)4p$	$^3I^\circ_6$	330 355.3	428 511.4	290	46
1019.062	$3d^7(^2G)4s$	$^3G_3$	$3d^7(^2G)4p$	$^3H^\circ_4$	323 491.8	421 619.2	700	46
1019.213	$3d^7(^2H)4s$	$^1H_5$	$3d^7(^2H)4p$	$^1I^\circ_6$	336 722.0	434 837.6	920	46
1019.689	$3d^7(^2G)4s$	$^3G_4$	$3d^7(^2G)4p$	$^3F^\circ_4$	321 960.7	420 030.7	1000	46
1020.737	$3d^7(^2G)4s$	$^3G_4$	$3d^7(^2G)4p$	$^3H^\circ_5$	321 960.7	419 928.7	720	46
1022.098	$3d^7(^4F)4s$	$^5F_2$	$3d^7(^4F)4p$	$^5F^\circ_2$	295 691.7	393 529.7	420	46
1024.417	$3d^7(^2D2)4s$	$^3D_3$	$3d^7(^4P)4p$	$^3P^\circ_2$	331 283.5	428 900.4	50	46
1025.387	$3d^7(^2D1)4s$	$^3D_2$	$3d^7(^2D1)4p$	$^3P^\circ_1$	386 736.8	484 260.9	110	46
1025.878	$3d^7(^2P)4s$	$^3P_2$	$3d^7(^2P)4p$	$^3P^\circ_2$	325 408.1	422 886.4	240	46
1026.322	$3d^7(^2G)4s$	$^1G_4$	$3d^7(^2G)4p$	$^1G^\circ_4$	327 159.5	424 594.2	360	46
1027.817	$3d^7(^4F)4s$	$^5F_3$	$3d^7(^4F)4p$	$^5F^\circ_3$	294 471.9	391 766.2	440	46
1028.874	$3d^7(^4F)4s$	$^3F_2$	$3d^7(^4F)4p$	$^3F^\circ_3$	306 203.6	403 397.9	30	46
1029.168	$3d^7(^2H)4s$	$^3H_4$	$3d^7(^2H)4p$	$^3I^\circ_5$	333 146.0	430 311.9	780	46
1030.460	$3d^7(^2H)4s$	$^3H_6$	$3d^7(^2H)4p$	$^3G^\circ_5$	330 355.3	427 399.6	940*bl*	46
	$3d^7(^2H)4s$	$^3H_5$	$3d^7(^2H)4p$	$^3I^\circ_6$	331 468.2	428 511.4		46
1030.880	$3d^7(^4P)4s$	$^3P_2$	$3d^7(^2P)4p$	$^1D^\circ_2$	327 438.9	424 443.2	20	46
1033.575	$3d^7(^2H)4s$	$^3H_6$	$3d^7(^2G)4p$	$^1H^\circ_5$	330 355.3	427 106.4	680	46
1037.034	$3d^7(^2G)4s$	$^1G_4$	$3d^7(^2G)4p$	$^3F^\circ_3$	327 159.5	423 585.8	730	46
1037.418	$3d^7(^2F)4s$	$^1F_3$	$3d^7(^2F)4p$	$^3G^\circ_4$	359 164.4	455 557.5	210	46
1038.800	$3d^7(^4P)4s$	$^3P_2$	$3d^7(^2P)4p$	$^3P^\circ_1$	327 438.9	423 703.8	170	46
1042.418	$3d^7(^2H)4s$	$^3H_5$	$3d^7(^2H)4p$	$^3G^\circ_5$	331 468.2	427 399.6	240	46
1047.701	$3d^7(^4P)4s$	$^3P_2$	$3d^7(^2P)4p$	$^3P^\circ_2$	327 438.9	422 886.4	170	46
1051.316	$3d^7(^2P)4s$	$^3P_2$	$3d^7(^4P)4p$	$^5D^\circ_1$	325 408.1	420 527.4	50	46
1058.661	$3d^7(^2G)4s$	$^1G_4$	$3d^7(^2G)4p$	$^3H^\circ_4$	327 159.5	421 619.2	190	46
1058.936	$3d^7(^4F)4s$	$^3F_4$	$3d^7(^4F)4p$	$^5G^\circ_5$	301 417.4	395 852.3	420	46
1059.848	$3d^7(^2F)4s$	$^1F_3$	$3d^7(^2F)4p$	$^1D^\circ_2$	359 164.4	453 517.0	230	46
1060.405	$3d^7(^2D2)4s$	$^1D_2$	$3d^7(^2P)4p$	$^3D^\circ_2$	338 579.5	432 884.7	40	46
1061.789	$3d^7(^2P)4s$	$^3P_2$	$3d^7(^4P)4p$	$^5D^\circ_3$	325 408.1	419 588.7	3	46
1069.739	$3d^7(^4F)4s$	$^3F_3$	$3d^7(^4F)4p$	$^5G^\circ_3$	304 315.6	397 796.8	70	46
1071.536	$3d^7(^2H)4s$	$^1H_5$	$3d^7(^2H)4p$	$^3G^\circ_4$	336 722.0	430 045.3	80	46
1077.948	$3d^7(^2G)4s$	$^1G_4$	$3d^7(^2G)4p$	$^3H^\circ_5$	327 159.5	419 928.7	140	46
1078.332	$3d^7(^4F)4s$	$^3F_3$	$3d^7(^4F)4p$	$^5G^\circ_4$	304 315.6	397 051.5	180	46

TABLE 12. Spectral lines of Ga VI—Continued

Wavelength (Å)	Classification Lower		Upper		Energy levels (cm^{-1})		Int.	References
1079.932	$3d^7(^2P)4s$	$^3P_2$	$3d^7(^4P)4p$	$^3S^\circ_1$	325 408.1	418 007.1	240	46
1080.389	$3d^7(^2H)4s$	$^3H_6$	$3d^7(^2G)4p$	$^3H^\circ_6$	330 355.3	422 914.6	180	46
1085.988	$3d^7(^4F)4s$	$^3F_4$	$3d^7(^4F)4p$	$^5D^\circ_4$	301 417.4	393 500.8	25	46
1087.746	$3d^7(^4F)4s$	$^3F_2$	$3d^7(^4F)4p$	$^5D^\circ_2$	306 203.6	398 136.8	30	46
1089.452	$3d^7(^2H)4s$	$^1H_5$	$3d^7(^2H)4p$	$^3I^\circ_6$	336 722.0	428 511.4	310	46
1101.210	$3d^7(^4P)4s$	$^5P_3$	$3d^7(^4F)4p$	$^3D^\circ_2$	315 882.7	406 689.7	140	46
1105.706	$3d^7(^2H)4s$	$^3H_4$	$3d^7(^2G)4p$	$^3F^\circ_3$	333 146.0	423 585.8	150	77
1121.090	$3d^7(^4P)4s$	$^5P_1$	$3d^7(^4F)4p$	$^3D^\circ_2$	317 488.8	406 689.7	150	46
1129.096	$3d^7(^4F)4s$	$^3F_4$	$3d^7(^4F)4p$	$^5F^\circ_5$	301 417.4	389 982.7	110	46
1138.016	$3d^7(^2H)4s$	$^1H_5$	$3d^7(^2G)4p$	$^1G^\circ_4$	336 722.0	424 594.2	190	46
1149.072	$3d^7(^2D2)4s$	$^1D_2$	$3d^7(^2G)4p$	$^1F^\circ_3$	338 579.5	425 605.8	40	46

TABLE 13. Energy levels of Ga VII

Configuration	Term	J	Level (cm^{-1})
$3p^63d^7$	^4F	9/2	0
		7/2	2 790
		5/2	4 710
		3/2	5 925
Ga VIII ($^5D_4$)	**Limit**	**—**	**1 136 000**

TABLE 14. Energy levels of Ga XIII

Configuration	Term	J	Level(cm^{-1})
$3p^63d$	^2D	3/2	0
		5/2	6 308
$3p^5(^2P^\circ)3d^2(^3F)$	$^2F^\circ$	5/2	*756 840*
$3p^5(^2P^\circ)3d^2(^1G)$	$^2F^\circ$	7/2	*774 620*
$3p^5(^2P^\circ)3d^2(^3P)$	$^2P^\circ$	1/2	*[829 320]*
		3/2	*837 920*
$3p^5(^2P^\circ)3d^2(^3F)$	$^2D^\circ$	5/2	*836 940*
		3/2	*837 070*
$3p^64f$	$^2F^\circ$	5/2	*1 667 400*
		7/2	*1 668 200*
Ga XIV ($^1S_0$)	**Limit**	**—**	**2 881 000**

TABLE 15. Spectral lines of Ga XIII

Wavelength (Å)	Classification Lower		Upper		Energy levels (cm^{-1})		Int.	Ref.
59.975	$3p^63d$	$^2D_{3/2}$	$3p^64f$	$^2F^\circ_{5/2}$	0	1 667 400	2	18
60.171	$3p^63d$	$^2D_{5/2}$	$3p^64f$	$^2F^\circ_{7/2}$	6 308	1 668 200	3	18
119.464	$3p^63d$	$^2D_{3/2}$	$3p^5(^2P^\circ)3d^2(^3F)$	$^2D^\circ_{3/2}$	0	837 070	20	18,60°
120.249	$3p^63d$	$^2D_{5/2}$	$3p^5(^2P^\circ)3d^2(^3P)$	$^2P^\circ_{3/2}$	6 308	837 920	20	60
120.390	$3p^63d$	$^2D_{5/2}$	$3p^5(^2P^\circ)3d^2(^3F)$	$^2D^\circ_{5/2}$	6 308	836 940	40	18,60°
130.156	$3p^63d$	$^2D_{5/2}$	$3p^5(^2P^\circ)3d^2(^1G)$	$^2F^\circ_{7/2}$	6 308	774 620	200	18,60°
132.128	$3p^63d$	$^2D_{3/2}$	$3p^5(^2P^\circ)3d^2(^3F)$	$^2F^\circ_{5/2}$	0	756 840	10	60

TABLE 16. Energy levels of Ga XIV

Configuration	Team	J	Level (cm^{-1})
$3p^6$	^{1}S	0	0
$3p^53d$	^{3}D°	1	647 601
$3p^53d$	^{1}P°	1	807 911
Ga XV (^{2}P$^\circ_{3/2}$)	**Limit**	**—**	**3 800 600**

TABLE 17. Spectral lines of Ga XIV

Wave-length (Å)	Classification: Lower		Classification: Upper		Energy levels (cm^{-1})		Ref.
55.72^L	$3p^53d$	^{3}F$^\circ_4$	$3p^54f$	^{3}G$_5$			18
123.776^S	$3p^6$	^{1}S$_0$	$3p^53d$	^{1}P$^\circ_1$	0	807 911	18,56°
154.416^S	$3p^6$	^{1}S$_0$	$3p^53d$	^{3}D$^\circ_1$	0	647 601	56

TABLE 18. Energy levels of Ga XV

Configuration	Team	J	Level (cm^{-1})
$3p^5$	^{2}P°	3/2	0
		1/2	40 699
$3p^4(^1\mathrm{D})3d$	^{2}S	1/2	747 460
$3p^4(^3\mathrm{P})3d$	^{2}P	3/2	776 840
$3p^4(^3\mathrm{P})3d$	^{2}P	1/2	791 980
$3p^4(^3\mathrm{P})3d$	^{2}D	5/2	784 690
$3p^4(^3\mathrm{P})3d$	^{2}D	3/2	820 170
Ga XVI (^{3}P$_2$)	**Limit**	**—**	**4 103 900**

TABLE 19. Spectral lines of Ga XV

Wavelength (Å)	Classification: Lower		Classification: Upper		Energy levels (cm^{-1})		Int	Type	A (s^{-1})	Ref.
51.57^L	$3p^4(^3\mathrm{P})3d$	^{4}D$_{7/2}$	$3p^4(^3\mathrm{P})4f$	^{4}F$^\circ_{9/2}$			1			18
52.27^L	$3p^4(^3\mathrm{P})3d$	^{4}F$_{9/2}$	$3p^4(^3\mathrm{P})4f$	^{4}G$^\circ_{11/2}$			1			18
127.439	$3p^5$	^{2}P$^\circ_{3/2}$	$3p^4(^3\mathrm{P})3d$	^{2}D$_{5/2}$	0	784 690	3			18,61°
128.292	$3p^5$	^{2}P$^\circ_{1/2}$	$3p^4(^3\mathrm{P})3d$	^{2}D$_{3/2}$	40 699	820 170	3			18,61°
128.727	$3p^5$	^{2}P$^\circ_{3/2}$	$3p^4(^3\mathrm{P})3d$	^{2}P$_{3/2}$	0	776 840	8			61
133.106	$3p^5$	^{2}P$^\circ_{1/2}$	$3p^4(^3\mathrm{P})3d$	^{2}P$_{1/2}$	40 699	791 980	5			61,64°
133.786	$3p^5$	^{2}P$^\circ_{3/2}$	$3p^4(^1\mathrm{D})3d$	^{2}S$_{1/2}$	0	747 460	10			61
2456.4	$3p^5$	^{2}P$^\circ_{3/2}$	$3p^5$	^{2}P$^\circ_{1/2}$	0	40 699		M1	1.21+3	54°, 51*

TABLE 20. Energy levels of Ga XVI

Configuration	Term	J	Level (cm^{-1})	Leading percentages		
$3p^4$	^{3}P	2	0	90+10		^{1}D
		0	[29 860]	81+19		^{1}S
		1	34 825	100		
$3p^4$	^{1}D	2	65 670	90+10		^{3}P
$3p^4$	^{1}S	0	132 010	81+19		^{3}P
$3p^3(^2\mathrm{D}^\circ)3d$	^{3}P°	2	730 990	78+13	$3s3p^5$	^{3}P°
$3p^3(^4\mathrm{S}^\circ)3d$	^{3}D°	3	756 600	46+22	$3p^3(^2\mathrm{P}^\circ)3d$	^{3}D°
		2	773 220	30+24	$3p^3(^2\mathrm{P}^\circ)3d$	^{3}D°
$3p^3(^2\mathrm{D}^\circ)3d$	^{1}D°	2	803 320	52+18	$3p^3(^2\mathrm{P}^\circ)3d$	^{1}D°

TABLE 20. Energy levels of Ga XVI—Continued

Configuration	Term	J	Level (cm^{-1})	Leading percentages		
$3p^3(^2\mathrm{D}^\circ)3d$	^{1}F°	3	819 360	60+32	$3p^3(^2\mathrm{P}^\circ)3d$	^{1}F°
$3p^3(^2\mathrm{P}^\circ)3d$	^{1}P°	1	863 000	85+4	$3p^3(^4\mathrm{S}^\circ)3d$	^{3}D°
Ga XVII (^{4}S$^\circ_{3/2}$)	**Limit**	**—**	**4 422 400**			

TABLE 21. Spectral lines of Ga XVI

Wavelength (Å)	Classification: Lower		Classification: Upper		Energy levels (cm^{-1})		Int.	Type	A (s^{-1})	References
48.69^{L}	$3p^33d$	$^5D^\circ_4$	$3p^34f$	$^5F_5$						18
49.19^{L}	$3p^3(^2D^\circ)3d$	$^3G^\circ_5$	$3p^34f$	$^3H_6$						18
132.19	$3p^4$	$^3P_2$	$3p^3(^4S^\circ)3d$	$^3D^\circ_3$	0	756 600	2			18
132.680	$3p^4$	$^1D_2$	$3p^3(^2D^\circ)3d$	$^1F^\circ_3$	65 670	819 360	10			64°,18
135.425^{P}	$3p^4$	$^3P_1$	$3p^3(^4S^\circ)3d$	$^3D^\circ_2$	34 825	773 220				64
135.566^{P}	$3p^4$	$^1D_2$	$3p^3(^2D^\circ)3d$	$^1D^\circ_2$	65 670	803 320				64
136.800	$3p^4$	$^3P_2$	$3p^3(^2D^\circ)3d$	$^3P^\circ_2$	0	730 990	30*bl*			64
	$3p^4$	$^1S_0$	$3p^3(^2P^\circ)3d$	$^1P^\circ_1$	132 010	863 000				64
143.644^{P}	$3p^4$	$^3P_1$	$3p^3(^2D^\circ)3d$	$^3P^\circ_2$	34 825	730 990				64
1029.0^{P}	$3p^4$	$^3P_1$	$3p^4$	$^1S_0$	34 825	132 010		M1	9.22+3	64°, 62*
1522.8^{S}	$3p^4$	$^3P_2$	$3p^4$	$^1D_2$	0	65 670		M1	9.03+2	39,64°, 62*
2870.7^{P}	$3p^4$	$^3P_2$	$3p^4$	$^3P_1$	0	34 825		M1	8.54+2	64°, 62*
3241.1^{P}	$3p^4$	$^3P_1$	$3p^4$	$^1D_2$	34 825	65 670		M1	3.82+1	64°, 62*
20140^{P}	$3p^4$	$^3P_0$	$3p^4$	$^3P_1$	[29 860]	34 825		M1	1.79+0	64°, 62*

TABLE 22. Energy levels of Ga XVII

Configuration	Team	J	Level (cm^{-1})	Leading percentages			
$3s^23p^3$	$^4S^\circ$	3/2	0	86	+	9	$^2P^\circ$
$3s^23p^3$	$^2D^\circ$	3/2	52 916	75	+	16	$^2P^\circ$
		5/2	67 727	97			
$3s^23p^3$	$^2P^\circ$	1/2	104 622	97			
		3/2	128 577	72	+	21	$^2D^\circ$
$3s^23p^2(^3P)3d$	^4P	5/2	693 419				
		3/2	701 630				
$3s^23p^2(^1D)3d$	^2D	3/2	755 178				
		5/2	761 320				
$3s^23p^2(^3P)3d$	^2F	7/2	789 800				
$3s^23p^2(^1D)3d$	^2P	3/2	793 220				
$3s^23p^2(^3P)3d$	^2D	5/2	828 010				
Ga XVIII ($^3P_0$)	**Limit**		**4 838 000**				

TABLE 23. Spectral lines of Ga XVII

Wavelength (Å)	Classification: Lower		Classification: Upper		Energy levels (cm^{-1})		Int.	Type	A (s^{-1})	References
45.96	$3s^23p^23d$	$^4F_{9/2}$	$3s^23p^24f$	$^4G^\circ_{11/2}$			1			18
46.3	$3s^23p^23d$	$^2G_{9/2}$	$3s^23p^24f$	$^2H^\circ_{11/2}$			1			18
138.491^{S}	$3s^23p^3$	$^2D^\circ_{5/2}$	$3s^23p^2(^3P)3d$	$^2F_{7/2}$	67 727	789 800	3			70°,18
141.163^{P}	$3s^23p^3$	$^2D^\circ_{3/2}$	$3s^23p^2(^1D)3d$	$^2D_{5/2}$	52 916	761 320				70
142.397	$3s^23p^3$	$^2D^\circ_{3/2}$	$3s^23p^2(^1D)3d$	$^2D_{3/2}$	52 916	755 178	10			70
142.526^{P}	$3s^23p^3$	$^4S^\circ_{3/2}$	$3s^23p^2(^3P)3d$	$^4P_{3/2}$	0	701 630				70
142.973^{P}	$3s^23p^3$	$^2P^\circ_{3/2}$	$3s^23p^2(^3P)3d$	$^2D_{5/2}$	128 577	828 010				70
144.178^{P}	$3s^23p^3$	$^2D^\circ_{5/2}$	$3s^23p^2(^1D)3d$	$^2D_{5/2}$	67 727	761 320				70
144.213	$3s^23p^3$	$^4S^\circ_{3/2}$	$3s^23p^2(^3P)3d$	$^4P_{5/2}$	0	693 419	20			70°,18
145.222^{P}	$3s^23p^3$	$^2P^\circ_{1/2}$	$3s^23p^2(^1D)3d$	$^2P_{3/2}$	104 622	793 220				70
777.7^{P}	$3s^23p^3$	$^4S^\circ_{3/2}$	$3s^23p^3$	$^2P^\circ_{3/2}$	0	128 577		M1	1.91+3	70°,51*
955.8^{P}	$3s^23p^3$	$^4S^\circ_{3/2}$	$3s^23p^3$	$^2P^\circ_{1/2}$	0	104 622		M1	1.82+3	70°,51*
1321.7^{S}	$3s^23p^3$	$^2D^\circ_{3/2}$	$3s^23p^3$	$^2P^\circ_{3/2}$	52 916	128 577		M1	2.76+3	54,70°,51*
1476.5^{P}	$3s^23p^3$	$^4S^\circ_{3/2}$	$3s^23p^3$	$^2D^\circ_{5/2}$	0	67 727		M1	6.39+1	70°,51*
1643.4^{P}	$3s^23p^3$	$^2D^\circ_{5/2}$	$3s^23p^3$	$^2P^\circ_{3/2}$	67 727	128 577		M1	7.79+2	70°,51*

TABLE 23. Spectral lines of Ga XVII—Continued

Wavelength (Å)	Classification Lower		Upper		Energy levels (cm^{-1})		Int.	Type	A (s^{-1})	References
1889.8[P]	$3s^23p^3$	$^4S^\circ_{3/2}$	$3s^23p^3$	$^2D^\circ_{3/2}$	0	52 916		M1	7.64+2	70°,51*
1934.1[P]	$3s^23p^3$	$^2D^\circ_{3/2}$	$3s^23p^3$	$^2P^\circ_{1/2}$	52 916	104 622		M1	4.11+2	70°,51*
4173.[P]	$3s^23p^3$	$^2P^\circ_{1/2}$	$3s^23p^3$	$^2P^\circ_{3/2}$	104 622	128 577		M1	9.37+1	70°,51*
6750.[P]	$3s^23p^3$	$^2D^\circ_{3/2}$	$3s^23p^3$	$^2D^\circ_{5/2}$	52 916	67 727		M1	2.65+1	70°,51*

TABLE 24. Energy levels of Ga XVIII

Configuration	Term	J	Level (cm^{-1})	Leading percentages		
$3s^23p^2$	^3P	0	0	91+9		^1S
		1	28 090	100		
		2	45 700	75+25		^1D
$3s^23p^2$	^1D	2	94 730	75+25		^3P
$3s^23p^2$	^1S	0	151 510	91+9		^3P
$3s3p^3$	$^3D°$	3	*[427 560]*	92+8	$3s^23p3d$	$^3D°$
$3s3p^3$	$^3P°$	2	*[484 860]*	65+12	$3s^23p3d$	$^3D°$
$3s3p^3$	$^3S°$	1	*[580 510]*	70+25		$^1P°$
$3s3p^3$	$^1P°$	1	*[629 770]*	58+27		$^3S°$
$3s^23p3d$	$^3P°$	2	*665 820*	50+17		$^3D°$
		0	*[701 970]*	93+7	$3s3p^3$	$^3P°$
		1	*[707 610]*	58+33	$3s3p^3$	$^3D°$
$3s^23p3d$	$^3D°$	1	*677 397*	55+33		$^3P°$
		3	*708 588*	87+8	$3s3p^3$	$^3D°$
		2	*[713 260]*	48+35	$3s3p^3$	$^3P°$
$3s^23p3d$	$^1D°$	2	*696 896*	39+27	$3s3p^3$	$^3D°$
$3s^23p3d$	$^1F°$	3	*769 986*	96+3	$3s3p^3$	$^3D°$
$3s^23p3d$	$^1P°$	1	*790 477*	83+12	$3s3p^3$	$^3S°$
Ga XIX ($^2P^\circ_{1/2}$)	**Limit**	**—**	**5 162 000**			

TABLE 25. Spectral lines of Ga XVIII

Wavelengh (Å)	Classification Lower		Upper		Energy levels (cm^{-1})		Int.	Type	A (s^{-1})	References
147.163[P]	$3s^23p^2$	$^3P_1$	$3s^23p3d$	$^3P^\circ_1$	28 090	[707 610]				66
147.624	$3s^23p^2$	$^3P_0$	$3s^23p3d$	$^3D^\circ_1$	0	677 397	20			66
148.092	$3s^23p^2$	$^1D_2$	$3s^23p3d$	$^1F^\circ_3$	94 730	769 986	20			66
148.394[P]	$3s^23p^2$	$^3P_1$	$3s^23p3d$	$^3P^\circ_0$	28 090	[701 970]				66
150.855	$3s^23p^2$	$^3P_2$	$3s^23p3d$	$^3D^\circ_3$	45 700	708 588	300			66°,18
156.510	$3s^23p^2$	$^1S_0$	$3s^23p3d$	$^1P^\circ_1$	151 510	790 477	3			66
156.807	$3s^23p^2$	$^3P_1$	$3s^23p3d$	$^3P^\circ_2$	28 090	665 820	5			66
161.259[P]	$3s^23p^2$	$^3P_2$	$3s^23p3d$	$^3P^\circ_2$	45 700	665 820				66
161.673[P]	$3s^23p^2$	$^1D_2$	$3s^23p3d$	$^3D^\circ_2$	94 730	[713 260]				66
166.067	$3s^23p^2$	$^1D_2$	$3s^23p3d$	$^1D^\circ_2$	94 730	696 896	10			66
181.022[P]	$3s^23p^2$	$^3P_1$	$3s3p^3$	$^3S^\circ_1$	28 090	[580 510]				66
186.902[P]	$3s^23p^2$	$^1D_2$	$3s3p^3$	$^1P^\circ_1$	94 730	[629 770]				66
186.982[P]	$3s^23p^2$	$^3P_2$	$3s3p^3$	$^3S^\circ_1$	45 700	[580 510]				66
227.708[P]	$3s^23p^2$	$^3P_2$	$3s3p^3$	$^3P^\circ_2$	45 700	[484 860]				66
261.876[P]	$3s^23p^2$	$^3P_2$	$3s3p^3$	$^3D^\circ_3$	45 700	[427 560]				66
810.2[S]	$3s^23p^2$	$^3P_1$	$3s^23p^2$	$^1S_0$	28 090	151 510		M1	8.40+3	54,66°,51*
1500.0[S]	$3s^23p^2$	$^3P_1$	$3s^23p^2$	$^1D_2$	28 090	94 730		M1	9.15+2	54,66°,51*
2038.4[P]	$3s^23p^2$	$^3P_2$	$3s^23p^2$	$^1D_2$	45 700	94 730		M1	8.33+2	66°, 51*

TABLE 25. Spectral lines of Ga XVIII—Continued

Wavelengh (Å)	Classification Lower		Upper		Energy levels (cm^{-1})		Int.	Type	A (s^{-1})	References
3559.4[P]	$3s^23p^2$	$^3P_0$	$3s^23p^2$	$^3P_1$	0	28 090		M1	3.62+2	66°, 51*
5676.1[P]	$3s^23p^2$	$^3P_1$	$3s^23p^2$	$^3P_2$	28 090	45 700		M1	5.74+1	66°, 51*

TABLE 26. Energy levels of Ga XIX

Configuration	Term	J	Level (cm^{-1})
$3s^23p$	$^2P^\circ$	1/2	*0*
		3/2	*46 584*
$3s3p^2$	^2D	3/2	[425 568]
		5/2	[435 260]
$3s3p^2$	^2S	1/2	501 163
$3s3p^2$	^2P	1/2	548 398
		3/2	559 837
$3s^23d$	^2D	3/2	645 235
		5/2	651 354
Ga XX ($^1S_0$)	**Limit**	**—**	**5 459 500**

TABLE 27. Spectral lines of Ga XIX

Wavelength (Å)	Classification Lower		Upper		Energy levels (cm^{-1})		Int.	Type	A (s^{-1})	References
154.980[S]	$3s^23p$	$^2P^\circ_{1/2}$	$3s^23d$	$^2D_{3/2}$	0	645 235	50			18,58°
165.352[S]	$3s^23p$	$^2P^\circ_{3/2}$	$3s^23d$	$^2D_{5/2}$	46 584	651 354	400			18,58°
167.045[S]	$3s^23p$	$^2P^\circ_{3/2}$	$3s^23d$	$^2D_{3/2}$	46 584	645 235	1			58
178.626[S]	$3s^23p$	$^2P^\circ_{1/2}$	$3s3p^2$	$^2P_{3/2}$	0	559 837	5			58
182.370	$3s^23p$	$^2P^\circ_{1/2}$	$3s3p^2$	$^2P_{1/2}$	0	548 398	3*bl*			58
194.832[S]	$3s^23p$	$^2P^\circ_{3/2}$	$3s3p^2$	$^2P_{3/2}$	46 584	559 837	500			18,58°
199.277[S]	$3s^23p$	$^2P^\circ_{3/2}$	$3s3p^2$	$^2P_{1/2}$	46 584	548 398	20			58
199.536[S]	$3s^23p$	$^2P^\circ_{1/2}$	$3s3p^2$	$^2S_{1/2}$	0	501 163	30			58
234.980[P]	$3s^23p$	$^2P^\circ_{1/2}$	$3s3p^2$	$^2D_{3/2}$	0	[425 568]				58
257.284[P]	$3s^23p$	$^2P^\circ_{3/2}$	$3s3p^2$	$^2D_{5/2}$	46 584	[435 260]				58
2146.0[C]	$3s^23p$	$^2P^\circ_{1/2}$	$3s^23p$	$^2P^\circ_{3/2}$	0	46 584		M1	9.07+2	51*

TABLE 28. Energy levels of Ga XX

Configuration	Term	J	Level (cm^{-1})
$3s^2$	^1S	0	0
$3s3p$	$^3P^\circ$	0	*310 815*
		1	*323 519*
		2	*359 566*
$3s3p$	$^1P^\circ$	1	*480 591*
$3p^2$	^3P	0	739 768
		1	769 392
		2	812 933
$3p^2$	^1D	2	764 337
$3p^2$	^1S	0	908 230
$3s3d$	^3D	1	915 622
		2	918 903
		3	923 833
$3s3d$	^1D	2	1 025 102
$3p3d$	$^3F^\circ$	2	*1 248 680*
		3	*1 273 370*
		4	*1 304 060*
$3p3d$	$^1D^\circ$	2	*1 289 478*
$3p3d$	$^3D^\circ$	1	*1 321 681*
		2	*1 331 885*

TABLE 28. Energy levels of Ga XX—Continued

Configuration	Term	J	Level (cm^{-1})
		3	*1 354 283*
$3p3d$	$^3P°$	1	*1 358 005*
		2	*1 359 394*
$3p3d$	$^1F°$	3	*1 440 365*
$3p3d$	$^1P°$	1	*1 456 566*
$3d^2$	^3F	3	1 856 190
		4	1 862 210
$3d^2$	^1G	4	1 906 040
$3s4p$	$^1P°$	1	*3 084 800*
$3s4d$	^3D	2	3 273 900
		3	3 279 300
$3s4d$	^1D	2	3 281 700
$3s4f$	$^3F°$	4	*3 390 500*
$3s4f$	$^1F°$	3	*3 406 700*
$3p4p$	^3D	3	3 504 500
$3p4f$	^3G	5	3 797 800
$3p4f$	^1G	4	3 832 800
$3s5f$	$^3F°$	4	*4 392 400*
Ga XXI ($^2S_{1/2}$)	**Limit**	**—**	**6 176 000**

TABLE 29. Spectral lines of Ga XX

Wavelength (Å)	Classification Lower		Upper		Energylevels(cm^{-1})		Int.	Type	$A(s^{-1})$	References
28.83	$3s3d$	$^3D_3$	$3s5f$	$^3F^°_4$	923 833	4 392 400	1			18
31.797	$3s3p$	$^3P^°_2$	$3p4p$	$^3D_3$	359 566	3 504 500	2			18
32.417	$3s^2$	$^1S_0$	$3s4p$	$^1P^°_1$	0	3 084 800	1			18
33.894	$3s3p$	$^3P^°_1$	$3s4d$	$^3D_2$	323 519	3 273 900	2			18
34.250	$3s3p$	$^3P^°_2$	$3s4d$	$^3D_3$	359 566	3 279 300	3			18
35.700	$3s3p$	$^1P^°_1$	$3s4d$	$^1D_2$	480 591	3 281 700	2			18
37.849	$3p^2$	$^1D_2$	$3s4f$	$^1F^°_3$	764 337	3 406 700	1			18
40.100	$3p3d$	$^3F^°_4$	$3p4f$	$^3G_5$	1 304 060	3 797 800	4			18
40.54	$3s3d$	$^3D_3$	$3s4f$	$^3F^°_4$	923 833	3 390 500	4			18
41.798	$3p3d$	$^1F^°_3$	$3p4f$	$^1G_4$	1 440 365	3 832 800	2			18
41.983	$3s3d$	$^1D_2$	$3s4f$	$^1F^°_3$	1 025 102	3 406 700	2			18
147.923	$3p^2$	$^1D_2$	$3p3d$	$^1F^°_3$	764 337	1 440 365	100			63
165.342	$3s3p$	$^3P^°_0$	$3s3d$	$^3D_1$	310 815	915 622	400*bl*			63
167.959	$3s3p$	$^3P^°_1$	$3s3d$	$^3D_2$	323 519	918 903	300			18,63°
169.502	$3p^2$	$^1D_2$	$3p3d$	$^3D^°_3$	764 337	1 354 283	80			63
169.890	$3p^2$	$^3P_1$	$3p3d$	$^3P^°_1$	769 392	1 358 005	10			63
171.586	$3p3d$	$^3F^°_3$	$3d^2$	$^3F_3$	1 273 370	1 856 190	10			63
171.847	$3p^2$	$^3P_0$	$3p3d$	$^3D^°_1$	739 768	1 321 681	100			63
177.218	$3s3p$	$^3P^°_2$	$3s3d$	$^3D_3$	359 566	923 833	100			18,63°
177.780	$3p^2$	$^3P_1$	$3p3d$	$^3D^°_2$	769 392	1 331 885	40			63
178.783	$3s3p$	$^3P^°_2$	$3s3d$	$^3D_2$	359 566	918 903	5			63
179.170	$3p3d$	$^3F^°_4$	$3d^2$	$^3F_4$	1 304 060	1 862 210	20			63
182.370	$3p^2$	$^1S_0$	$3p3d$	$^1P^°_1$	908 230	1 456 566	3			63
182.991	$3p^2$	$^3P_2$	$3p3d$	$^3P^°_2$	812 933	1 359 394	20			63
183.463	$3p^2$	$^3P_2$	$3p3d$	$^3P^°_1$	812 933	1 358 005	1			63
183.651	$3s3p$	$^1P^°_1$	$3s3d$	$^1D_2$	480 591	1 025 102	600			18,63°
184.729	$3p^2$	$^3P_2$	$3p3d$	$^3D^°_3$	812 933	1 354 283	100			63
190.425	$3p^2$	$^1D_2$	$3p3d$	$^1D^°_2$	764 337	1 289 478	44			63
196.876	$3p3d$	$^3D^°_3$	$3d^2$	$^3F_4$	1 354 283	1 862 210	10			63
204.325	$3s3p$	$^3P^°_1$	$3p^2$	$^3P_2$	323 519	812 933	3			63
208.072	$3s^2$	$^1S_0$	$3s3p$	$^1P^°_1$	0	480 591	300			18,52,63°

TABLE 29. Spectral lines of Ga XX—Continued

Wavelength (Å)	Classification: Lower		Upper		Energylevels(cm^{-1})		Int.	Type	A(s^{-1})	References
214.746	$3p3d$	$^1F^\circ_3$	$3d^2$	$^1G_4$	1 440 365	1 906 040	10			63
218.066	$3s3p$	$^3P^\circ_0$	$3p^2$	$^3P_1$	310 815	769 392	4			63
220.578	$3s3p$	$^3P^\circ_2$	$3p^2$	$^3P_2$	359 566	812 933	1			63
224.279	$3s3p$	$^3P^\circ_1$	$3p^2$	$^3P_1$	323 519	769 392	1			63
226.851	$3s3p$	$^3P^\circ_1$	$3p^2$	$^1D_2$	323 519	764 337	1			63
231.769	$3s3d$	$^1D_2$	$3p3d$	$^1P^\circ_1$	1 025 102	1 456 566	1			63
240.241	$3s3p$	$^3P^\circ_1$	$3p^2$	$^3P_0$	323 519	739 768	2			63
240.810	$3s3d$	$^1D_2$	$3p3d$	$^1F^\circ_3$	1 025 102	1 440 365	200*bl*			63
263.00	$3s3d$	$^3D_3$	$3p3d$	$^3F^\circ_4$	923 833	1 304 060	7			52
282.11	$3s3d$	$^3D_2$	$3p3d$	$^3F^\circ_3$	918 903	1 273 370	5			52
300.25	$3s3d$	$^3D_1$	$3p3d$	$^3F^\circ_2$	915 622	1 248 680	3			52
589.01^C	$3s3p$	$^3P^\circ_0$	$3s3p$	$^1P^\circ_1$	310 815	480 591		M1	1.93+3	51*
636.65^C	$3s3p$	$^3P^\circ_1$	$3s3p$	$^1P^\circ_1$	323 519	480 591		M1	1.12+3	51*
826.28^C	$3s3p$	$^3P^\circ_2$	$3s3p$	$^1P^\circ_1$	359 566	480 591		M1	8.75+2	51*
2773.3^C	$3s3p$	$^3P^\circ_1$	$3s3p$	$^3P^\circ_2$	323 519	359 566		M1	6.13+2	51*
7869.^{C}	$3s3p$	$^3P^\circ_0$	$3s3p$	$^3P^\circ_1$	310 815	323 519		M1	3.70+1	51*

TABLE 30. Energy levels of Ga XXI

Configuration	Term	J	Level (cm^{-1})
$2p^63s$	^2S	1/2	0
$2p^63p$	$^2P^\circ$	1/2	*364 657*
		3/2	*415 258*
$2p^63d$	^2D	3/2	906 815
		5/2	915 386
$2p^64s$	^2S	1/2	3 037 450
$2p^64p$	$^2P^\circ$	1/2	*3 184 600*
		3/2	*3 204 700*
$2p^64d$	^2D	3/2	3 387 400
		5/2	3 391 200
$2p^64f$	$^2F^\circ$	5/2	*3 476 200*
		7/2	*3 477 700*
$2p^65p$	$^2P^\circ$	1/2	*4 425 600*
		3/2	*4 435 600*
$2p^65d$	^2D	3/2	4 524 100
		5/2	4 526 100
$2p^65f$	$^2F^\circ$	5/2	*4 568 700*
		7/2	*4 569 500*
$2p^65g$	^2G	7/2	4 574 200
		9/2	4 574 800
$2p^66d$	^2D	3/2	5 136 600
		5/2	5 137 800

TABLE 30. Energy levels of Ga XXI—Continued

Configuration	Term	J	Level (cm^{-1})
$2p^66f$	$^2F^\circ$	5/2	*5 162 100*
		7/2	*5 163 500*
$2p^67f$	$^2F^\circ$	5/2	*5 520 200*
		7/2	*5 521 800*
Ga XXII ($^1S_0$)	**Limit**	**—**	**6 511 380**
$2p^53s3d$	$(1,5/2)^\circ$	3/2	*10 233 000*
$2p^53s3d$	$(1,3/2)^\circ$	3/2	*10 288 000*
$2p^53p3d$	$(1,3/2)$	3/2	10 590 000
$2p^53p3d$	$(2,5/2)$	5/2	10 629 000
$2p^53p3d$	$(0,5/2)$	5/2	10 741 000
$2p^5(^2P^\circ_{3/2})3d^2(^1G_4)$	$(3/2,4)^\circ$	7/2	*10 955 000*
$2p^5(^2P^\circ_{3/2})3d^2(^3F_4)$	$(3/2,4)^\circ$	5/2	*10 982 000*
$2p^5(^2P^\circ_{3/2})3d^2(^1S_0)$	$(3/2,0)^\circ$	3/2	*11 011 000*
$2p^5(^2P^\circ_{1/2})3d^2(^3F_2)$	$(1/2,2)^\circ$	5/2	*11 098 000*
$2p^5(^2P^\circ_{1/2})3d^2(^3F_3)$	$(1/2,3)^\circ$	5/2	*11 170 000*
$2p^5(^2P^\circ_{1/2})3d^2(^1G_4)$	$(1/2,4)^\circ$	7/2	*11 183 000*
$2p^5(^2P^\circ_{1/2})3d^2(^1G_4)$	$(1/2,4)^\circ$	7/2	*11 183 000*

TABLE 31. Spectral lines of Ga XXI

Wavelength (Å)	Classification: Lower		Classification: Upper		Energy levels (cm^{-1})		Int.	References
9.685	$2p^63p$	$^2P^\circ_{3/2}$	$2p^53p3d$	$(0,5/2)_{5/2}$	415 258	10 741 000	8	28
9.720	$2p^63s$	$^2S_{1/2}$	$2p^53s3d$	$(1,3/2)^\circ_{3/2}$	0	10 288 000	5	28
9.739	$2p^63d$	$^2D_{5/2}$	$2p^5(^2P^\circ_{1/2})3d^2(^1G_4)$	$(1/2,4)^\circ_{7/2}$	915 386	11 183 000	8	28
9.752	$2p^63d$	$^2D_{5/2}$	$2p^5(^2P^\circ_{1/2})3d^2(^3F_3)$	$(1/2,3)^\circ_{5/2}$	915 386	11 170 000	9	28
9.772	$2p^63s$	$^2S_{1/2}$	$2p^53s3d$	$(1,5/2)^\circ_{3/2}$	0	10 233 000	7	28
9.780	$2p^63p$	$^2P^\circ_{1/2}$	$2p^53p3d$	$(1,3/2)_{3/2}$	364 657	10 590 000	8	28
9.791	$2p^63p$	$^2P^\circ_{3/2}$	$2p^53p3d$	$(2,5/2)_{5/2}$	415 258	10 629 000	6	28
9.812	$2p^63d$	$^2D_{3/2}$	$2p^5(^2P^\circ_{1/2})3d^2(^3F_2)$	$(1/2,2)^\circ_{5/2}$	906 815	11 098 000	5	28
9.905	$2p^63d$	$^2D_{5/2}$	$2p^5(^2P^\circ_{3/2})3d^2(^1S_0)$	$(3/2,0)^\circ_{3/2}$	915 386	11 011 000	7	28
9.920	$2p^63d$	$^2D_{3/2}$	$2p^5(^2P^\circ_{3/2})3d^2(^3F_4)$	$(3/2,4)^\circ_{5/2}$	906 815	10 982 000	6	28
9.939	$2p^63d$	$^2D_{5/2}$	$2p^5(^2P^\circ_{3/2})3d^2(^3F_4)$	$(3/2,4)^\circ_{5/2}$	915 386	10 982 000	7	28
9.961	$2p^63d$	$^2D_{5/2}$	$2p^5(^2P^\circ_{3/2})3d^2(^1G_4)$	$(3/2,4)^\circ_{7/2}$	915 386	10 955 000	9	28
20.956	$2p^63p$	$^2P^\circ_{1/2}$	$2p^66d$	$^2D_{3/2}$	364 657	5 136 600	75	27
21.175	$2p^63p$	$^2P^\circ_{3/2}$	$2p^66d$	$^2D_{5/2}$	415 258	5 137 800	200	27
21.676	$2p^63d$	$^2D_{3/2}$	$2p^67f$	$^2F^\circ_{5/2}$	906 815	5 520 200	100	27
21.709	$2p^63d$	$^2D_{5/2}$	$2p^67f$	$^2F^\circ_{7/2}$	915 386	5 521 800	100	27
22.545	$2p^63s$	$^2S_{1/2}$	$2p^65p$	$^2P^\circ_{3/2}$	0	4 435 600	120	27
22.596	$2p^63s$	$^2S_{1/2}$	$2p^65p$	$^2P^\circ_{1/2}$	0	4 425 600	100	18,27°
23.500	$2p^63d$	$^2D_{3/2}$	$2p^66f$	$^2F^\circ_{5/2}$	906 815	5 162 100	100	27
23.540	$2p^63d$	$^2D_{5/2}$	$2p^66f$	$^2F^\circ_{7/2}$	915 386	5 163 500	200	18,27°
24.039	$2p^63p$	$^2P^\circ_{1/2}$	$2p^65d$	$^2D_{3/2}$	364 657	4 524 100	2	18
24.330	$2p^63p$	$^2P^\circ_{3/2}$	$2p^65d$	$^2D_{5/2}$	415 258	4 526 100	3	18
27.27	$2p^63d$	$^2D_{5/2}$	$2p^65f$	$^2F^\circ_{7/2}$	915 386	4 569 500	6	18
27.32	$2p^63d$	$^2D_{3/2}$	$2p^65f$	$^2F^\circ_{5/2}$	906 815	4 568 700	6	18
31.203	$2p^63s$	$^2S_{1/2}$	$2p^64p$	$^2P^\circ_{3/2}$	0	3 204 700	500	18,27°
31.401	$2p^63s$	$^2S_{1/2}$	$2p^64p$	$^2P^\circ_{1/2}$	0	3 184 600	350	18,27°
33.084	$2p^63p$	$^2P^\circ_{1/2}$	$2p^64d$	$^2D_{3/2}$	364 657	3 387 400	500	18,27°
33.603	$2p^63p$	$^2P^\circ_{3/2}$	$2p^64d$	$^2D_{5/2}$	415 258	3 391 200	700	18,27°
33.644	$2p^63p$	$^2P^\circ_{3/2}$	$2p^64d$	$^2D_{3/2}$	415 258	3 387 400	200	27
37.414	$2p^63p$	$^2P^\circ_{1/2}$	$2p^64s$	$^2S_{1/2}$	364 657	3 037 450	300	18,27°
38.136	$2p^63p$	$^2P^\circ_{3/2}$	$2p^64s$	$^2S_{1/2}$	415 258	3 037 450	400	18,27°
38.920[S]	$2p^63d$	$^2D_{3/2}$	$2p^64f$	$^2F^\circ_{5/2}$	906 815	3 476 200	700	18,27,53°
39.027[S]	$2p^63d$	$^2D_{5/2}$	$2p^64f$	$^2F^\circ_{7/2}$	915 386	3 477 700	1000	18,27,53°
43.683	$2p^63d$	$^2D_{5/2}$	$2p^64p$	$^2P^\circ_{3/2}$	915 386	3 204 700	250	18,27°
43.904	$2p^63d$	$^2D_{3/2}$	$2p^64p$	$^2P^\circ_{1/2}$	906 815	3 184 600	180	18,27°
71.525	$2p^64s$	$^2S_{1/2}$	$2p^65p$	$^2P^\circ_{3/2}$	3 037 450	4 435 600	50	27
74.657	$2p^64p$	$^2P^\circ_{1/2}$	$2p^65d$	$^2D_{3/2}$	3 184 600	4 524 100	80	27
75.677	$2p^64p$	$^2P^\circ_{3/2}$	$2p^65d$	$^2D_{5/2}$	3 204 700	4 526 100	100	27
84.649	$2p^64d$	$^2D_{3/2}$	$2p^65f$	$^2F^\circ_{5/2}$	3 387 400	4 568 700	250	27
84.867	$2p^64d$	$^2D_{5/2}$	$2p^65f$	$^2F^\circ_{7/2}$	3 391 200	4 569 500	300	27
91.071	$2p^64f$	$^2F^\circ_{5/2}$	$2p^65g$	$^2G_{7/2}$	3 476 200	4 574 200	400	22,27°
91.149	$2p^64f$	$^2F^\circ_{7/2}$	$2p^65g$	$^2G_{9/2}$	3 477 700	4 574 800	450	22,27°
184.444[S]	$2p^63p$	$^2P^\circ_{1/2}$	$2p^63d$	$^2D_{3/2}$	364 657	906 815	800	18,27,53°
199.949[S]	$2p^63p$	$^2P^\circ_{3/2}$	$2p^63d$	$^2D_{5/2}$	415 258	915 386	800	18,27,53°
203.440[S]	$2p^63p$	$^2P^\circ_{3/2}$	$2p^63d$	$^2D_{3/2}$	415 258	906 815	300	27,53°
240.814[S]	$2p^63s$	$^2S_{1/2}$	$2p^63p$	$^2P^\circ_{3/2}$	0	415 258	550	18,27,53°
274.230[S]	$2p^63s$	$^2S_{1/2}$	$2p^63p$	$^2P^\circ_{1/2}$	0	364 657		53

TABLE 32. Energy levels of Ga XXII

Configuration	Term	J	Level (cm^{-1})
$2s^22p^6$	^{1}S	0	0
$2s^22p^5(^2P^\circ_{3/2})3s$	$(3/2,1/2)^\circ$	1	*9 228 000*
$2s^22p^5(^2P^\circ_{1/2})3s$	$(1/2,1/2)^\circ$	1	*9 448 000*
$2s^22p^5(^2P^\circ_{3/2})3p$	$(3/2,3/2)$	2	9 633 400
$2s^22p^5(^2P^\circ_{1/2})3p$	$(1/2,3/2)$	2	9 846 200
$2s^22p^5(^2P^\circ_{3/2})3d$	$(3/2,3/2)^\circ$	1	*10 038 000*
$2s^22p^5(^2P^\circ_{3/2})3d$	$(3/2,5/2)^\circ$	1	*10 160 000*
$2s^22p^5(^2P^\circ_{1/2})3d$	$(1/2,3/2)^\circ$	1	*10 370 000*
$2s2p^63p$	$(1/2,1/2)^\circ$	1	*11 013 000*
$2s2p^63p$	$(1/2,3/2)^\circ$	1	*11 079 000*
$2s^22p^5(^2P^\circ_{3/2})4s$	$(3/2,1/2)^\circ$	1	*12 453 000*
$2s^22p^5(^2P^\circ_{1/2})4s$	$(1/2,1/2)^\circ$	1	*12 689 000*
$2s^22p^5(^2P^\circ_{3/2})4d$	$(3/2,5/2)^\circ$	1	*12 830 000*
$2s^22p^5(^2P^\circ_{1/2})4d$	$(1/2,3/2)^\circ$	1	*13 034 000*
$2s2p^64p$	$(1/2,1/2)^\circ$	1	*14 045 000*
$2s^22p^5(^2P^\circ_{3/2})5d$	$(3/2,5/2)^\circ$	1	*14 045 000*
$2s^22p^5(^2P^\circ_{1/2})5d$	$(1/2,3/2)^\circ$	1	*14 265 000*
$2s2p^64p$	$(1/2,3/2)^\circ$	1	*14 265 000*
$2s^22p^5(^2P^\circ_{3/2})6d$	$(3/2,5/2)^\circ$	1	*14 712 000*
Ga XXIII ($^2P^\circ_{3/2}$)	**Limit**	**—**	**16 211 900**

TABLE 33. Spectral lines of Ga XXII

Wavelength (Å)	Classification: Lower		Classification: Upper		Energy levels (cm^{-1})		References
6.797	$2s^22p^6$	$^1S_0$	$2s^22p^5(^2P^\circ_{3/2})6d$	$(3/2,5/2)^\circ_1$	0	14 712 000	28
7.009	$2s^22p^6$	$^1S_0$	$2s2p^64p$	$(1/2,3/2)^\circ_1$	0	14 265 000	28°,31
	$2s^22p^6$	$^1S_0$	$2s^22p^5(^2P^\circ_{1/2})5d$	$(1/2,3/2)^\circ_1$	0	14 265 000	28°,31
7.119	$2s^22p^6$	$^1S_0$	$2s2p^64p$	$(1/2,1/2)^\circ_1$	0	14 045 000	28
	$2s^22p^6$	$^1S_0$	$2s^22p^5(^2P^\circ_{3/2})5d$	$(3/2,5/2)^\circ_1$	0	14 045 000	28°,31
7.673	$2s^22p^6$	$^1S_0$	$2s^22p^5(^2P^\circ_{1/2})4d$	$(1/2,3/2)^\circ_1$	0	13 034 000	28°,31
7.794	$2s^22p^6$	$^1S_0$	$2s^22p^5(^2P^\circ_{3/2})4d$	$(3/2,5/2)^\circ_1$	0	12 830 000	28
7.887	$2s^22p^6$	$^1S_0$	$2s^22p^5(^2P^\circ_{1/2})4s$	$(1/2,1/2)^\circ_1$	0	12 689 000	28°,31
8.028	$2s^22p^6$	$^1S_0$	$2s^22p^5(^2P^\circ_{3/2})4s$	$(3/2,1/2)^\circ_1$	0	12 453 000	28°,31
9.027	$2s^22p^6$	$^1S_0$	$2s2p^63p$	$(1/2,3/2)^\circ_1$	0	11 079 000	28°,31
9.081	$2s^22p^6$	$^1S_0$	$2s2p^63p$	$(1/2,1/2)^\circ_1$	0	11 013 000	28°,31
9.643	$2s^22p^6$	$^1S_0$	$2s^22p^5(^2P^\circ_{1/2})3d$	$(1/2,3/2)^\circ_1$	0	10 370 000	28°,31
9.842	$2s^22p^6$	$^1S_0$	$2s^22p^5(^2P^\circ_{3/2})3d$	$(3/2,5/2)^\circ_1$	0	10 160 000	28°,31
9.961	$2s^22p^6$	$^1S_0$	$2s^22p^5(^2P^\circ_{3/2})3d$	$(3/2,3/2)^\circ_1$	0	10 038 000	28°,31
10.583	$2s^22p^6$	$^1S_0$	$2s^22p^5(^2P^\circ_{1/2})3s$	$(1/2,1/2)^\circ_1$	0	9 448 000	28°,31
10.833	$2s^22p^6$	$^1S_0$	$2s^22p^5(^2P^\circ_{3/2})3s$	$(3/2,1/2)^\circ_1$	0	9 228 000	28°,31
246.70	$2s^22p^5(^2P^\circ_{3/2})3s$	$(3/2,1/2)^\circ_1$	$2s^22p^5(^2P^\circ_{3/2})3p$	$(3/2,3/2)_2$	9 228 000	9 633 400	71
251.11	$2s^22p^5(^2P^\circ_{1/2})3s$	$(1/2,1/2)^\circ_1$	$2s^22p^5(^2P^\circ_{1/2})3p$	$(1/2,3/2)_2$	9 448 000	9 846 200	71

TABLE 34. Energy levels of Ga XXIII

Configuration	Term	J	Level (cm^{-1})
$2s^22p^5$	$^2P^\circ$	3/2	*0*
		1/2	*228 400*
$2s2p^6$	^2S	1/2	1 433 030
$2s^22p^4(^3P)3s$	^4P	5/2	9 678 000
		1/2	9 806 000
		3/2	9 892 000
$2s^22p^4(^3P)3s$	^2P	3/2	9 711 000
		1/2	9 918 000
$2s^22p^4(^1D)3s$	^2D	5/2	9 987 000
		3/2	9 995 000
$2s^22p^4(^1S)3s$	^2S	1/2	10 268 000
$2s^22p^4(^3P)3d$	^4P	1/2	10 518 000
		3/2	10 542 000
		5/2	10 615 000
$2s^22p^4(^3P)3d$	^2F	5/2	10 560 000
$2s^22p^4(^3P)3d$	^4F	5/2	10 561 000
		3/2	10 603 000
$2s^22p^4(^3P)3d$	^4D	1/2	10 660 000
		3/2	10 687 000
$2s^22p^4(^3P)3d$	^2D	3/2	10 684 000
		5/2	10 736 000
$2s^22p^4(^3P)3d$	^2P	3/2	10 723 000

TABLE 34. Energy levels of Ga XXIII—Continued

Configuration	Term	J	Level (cm^{-1})
$2s^22p^4(^1D)3d$	^2S	1/2	10 792 000
$2s^22p^4(^1D)3d$	^2F	5/2	10 797 000
$2s^22p^4(^1D)3d$	^2P	3/2	10 816 000
		1/2	10 888 000
$2s^22p^4(^1D)3d$	^2D	5/2	10 831 000
		3/2	10 870 000
$2s^22p^4(^1S)3d$	^2D	3/2	11 116 000
$2s2p^5(^3P^\circ)3p$	^4D	5/2	11 304 000
		3/2	11 355 000
$2s2p^5(^3P^\circ)3p$	^2D	5/2	11 382 000
		3/2	11 583 000
$2s2p^5(^3P^\circ)3p$	^2P	3/2	11 414 000
		1/2	11 455 000
$2s2p^5(^3P^\circ)3p$	^4P	3/2	11 458 000
		5/2	11 478 000
$2s2p^5(^3P^\circ)3p$	^2S	1/2	11 583 000
$2s2p^5(^1P^\circ)3p$	^2D	3/2	11 760 000
		5/2	11 812 000
$2s2p^5(^1P^\circ)3p$	^2P	1/2	11 812 000
		3/2	11 833 000
$2s^22p^4(^3P)4d$	^2D	3/2	13 470 000
		5/2	13 470 000
$2s^22p^4(^3P)4d$	^4F	3/2	13 539 000
		5/2	13 539 000
$2s^22p^4(^3P)4d$	^4D	5/2	13 567 000
$2s^22p^4(^3P)4d$	^2P	3/2	13 661 000
$2s^22p^4(^3P)4d$	^4P	5/2	13 663 000
$2s^22p^4(^1D)4d$	^2S	1/2	13 740 000
$2s^22p^4(^1D)4d$	^2P	3/2	13 740 000
		1/2	13 768 000
$2s^22p^4(^1D)4d$	^2F	5/2	13 746 000
$2s^22p^4(^1D)4d$	^2D	5/2	13 746 000
		3/2	13 768 000
$2s^22p^4(^1S)4d$	^2D	3/2	14 052 000
Ga XXIV ($^3P_2$)	**Limit**	**—**	**17 172 000**

TABLE 35. Spectral lines of Ga XXIII

Wavelength (Å)	Classification Lower		Upper		Energy Levels (cm^{-1})		Int.	Type	A (s^{-1})	References
7.234	$2s^22p^5$	$^2P^\circ_{1/2}$	$2s^22p^4(^1S)4d$	$^2D_{3/2}$	228 400	14 052 000				28
7.275	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s^22p^4(^1D)4d$	$^2D_{5/2}$	0	13 746 000				28
	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s^22p^4(^1D)4d$	$^2F_{5/2}$	0	13 746 000				28
	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s^22p^4(^1D)4d$	$^2S_{1/2}$	0	13 740 000				28°,30
	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s^22p^4(^1D)4d$	$^2P_{3/2}$	0	13 740 000				28
7.319	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s^22p^4(^3P)4d$	$^4P_{5/2}$	0	13 663 000				28
7.320	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s^22p^4(^3P)4d$	$^2P_{3/2}$	0	13 661 000				30
7.371	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s^22p^4(^3P)4d$	$^4D_{5/2}$	0	13 567 000				30
7.386	$2s^22p^5$	$^2P^\circ_{1/2}$	$2s^22p^4(^1D)4d$	$^2P_{1/2}$	228 400	13 768 000				28°,30
	$2s^22p^5$	$^2P^\circ_{1/2}$	$2s^22p^4(^1D)4d$	$^2D_{3/2}$	228 400	13 768 000				28°,30
	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s^22p^4(^3P)4d$	$^4F_{3/2}$	0	13 539 000				28°,30
	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s^22p^4(^3P)4d$	$^4F_{5/2}$	0	13 539 000				28
7.404	$2s^22p^5$	$^2P^\circ_{1/2}$	$2s^22p^4(^1D)4d$	$^2S_{1/2}$	228 400	13 740 000				30
	$2s^22p^5$	$^2P^\circ_{1/2}$	$2s^22p^4(^1D)4d$	$^2P_{3/2}$	228 400	13 740 000				30
7.424	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s^22p^4(^3P)4d$	$^2D_{3/2}$	0	13 470 000				28
	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s^22p^4(^3P)4d$	$^2D_{5/2}$	0	13 470 000				28
8.466	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s2p^5(^1P^\circ)3p$	$^2D_{5/2}$	0	11 812 000				28
8.617	$2s^22p^5$	$^2P^\circ_{1/2}$	$2s2p^5(^1P^\circ)3p$	$^2P_{3/2}$	228 400	11 833 000				28
8.633	$2s^22p^5$	$^2P^\circ_{1/2}$	$2s2p^5(^1P^\circ)3p$	$^2P_{1/2}$	228 400	11 812 000				28
	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s2p^5(^3P^\circ)3p$	$^2S_{1/2}$	0	11 583 000				28
8.672	$2s^22p^5$	$^2P^\circ_{1/2}$	$2s2p^5(^1P^\circ)3p$	$^2D_{3/2}$	228 400	11 760 000				28
8.712	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s2p^5(^3P^\circ)3p$	$^4P_{5/2}$	0	11 478 000				28

TABLE 35. Spectral lines of Ga XXIII—Continued

Wavelength (Å)	Classification Lower		Upper		Energy Levels (cm^{-1})		Int.	Type	A (s^{-1})	References
8.730	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s2p^5(^3P^\circ)3p$	$^2P_{1/2}$	0	11 455 000				28
8.761	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s2p^5(^3P^\circ)3p$	$^2P_{3/2}$	0	11 414 000				28
8.786	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s2p^5(^3P^\circ)3p$	$^2D_{5/2}$	0	11 382 000				28
8.807	$2s^22p^5$	$^2P^\circ_{1/2}$	$2s2p^5(^3P^\circ)3p$	$^2S_{1/2}$	228 400	11 583 000				28
	$2s^22p^5$	$^2P^\circ_{1/2}$	$2s2p^5(^3P^\circ)3p$	$^2D_{3/2}$	228 400	11 583 000				28
	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s2p^5(^3P^\circ)3p$	$^4D_{3/2}$	0	11 355 000				28
8.846	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s2p^5(^3P^\circ)3p$	$^4D_{5/2}$	0	11 304 000				28
8.905	$2s^22p^5$	$^2P^\circ_{1/2}$	$2s2p^5(^3P^\circ)3p$	$^4P_{3/2}$	228 400	11 458 000				28
9.182	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s^22p^4(^1D)3d$	$^2P_{1/2}$	0	10 888 000	*bl*			31
9.185	$2s^22p^5$	$^2P^\circ_{1/2}$	$2s^22p^4(^1S)3d$	$^2D_{3/2}$	228 400	11 116 000				31,28°
9.201	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s^22p^4(^1D)3d$	$^2D_{3/2}$	0	10 870 000				31,28°
9.233	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s^22p^4(^1D)3d$	$^2D_{5/2}$	0	10 831 000				31,28°
9.248	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s^22p^4(^1D)3d$	$^2P_{3/2}$	0	10 816 000				31,28°
9.261	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s^22p^4(^1D)3d$	$^2F_{5/2}$	0	10 797 000	*bl*			31
9.263	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s^22p^4(^1D)3d$	$^2S_{1/2}$	0	10 792 000				31,28°
9.314	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s^22p^4(^3P)3d$	$^2D_{5/2}$	0	10 736 000				31,28°
9.325	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s^22p^4(^3P)3d$	$^2P_{3/2}$	0	10 723 000	*bl*			31
9.357	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s^22p^4(^3P)3d$	$^4D_{3/2}$	0	10 687 000				28
9.360	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s^22p^4(^3P)3d$	$^2D_{3/2}$	0	10 684 000				31
9.381	$2s^22p^5$	$^2P^\circ_{1/2}$	$2s^22p^4(^1D)3d$	$^2P_{1/2}$	228 400	10 888 000				31,28°
	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s^22p^4(^3P)3d$	$^4D_{1/2}$	0	10 660 000				31,28°
9.395	$2s^22p^5$	$^2P^\circ_{1/2}$	$2s^22p^4(^1D)3d$	$^2D_{3/2}$	228 400	10 870 000				31,28°
9.421	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s^22p^4(^3P)3d$	$^4P_{5/2}$	0	10 615 000	*bl*			31
9.431	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s^22p^4(^3P)3d$	$^4F_{3/2}$	0	10 603 000	*bl*			31
9.442	$2s^22p^5$	$^2P^\circ_{1/2}$	$2s^22p^4(^1D)3d$	$^2P_{3/2}$	228 400	10 816 000				31,28°
9.469	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s^22p^4(^3P)3d$	$^4F_{5/2}$	0	10 561 000	*bl*			31
9.470	$2s^22p^5$	$^2P^\circ_{1/2}$	$2s^22p^4(^1D)3d$	$^2S_{1/2}$	228 400	10 792 000				31,28°
	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s^22p^4(^3P)3d$	$^2F_{5/2}$	0	10 560 000				31,28°
9.486	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s^22p^4(^3P)3d$	$^4P_{3/2}$	0	10 542 000				31,28°
9.507	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s^22p^4(^3P)3d$	$^4P_{1/2}$	0	10 518 000				31,28°
9.529	$2s^22p^5$	$^2P^\circ_{1/2}$	$2s^22p^4(^3P)3d$	$^2P_{3/2}$	228 400	10 723 000				31,28°
9.961	$2s^22p^5$	$^2P^\circ_{1/2}$	$2s^22p^4(^1S)3s$	$^2S_{1/2}$	228 400	10 268 000				28
10.013	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s^22p^4(^1D)3s$	$^2D_{5/2}$	0	9 987 000				31,28°
10.017	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s^22p^4(^1D)3s$	$^2D_{3/2}$	0	9 995 000	*bl*			31
10.083	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s^22p^4(^3P)3s$	$^2P_{1/2}$	0	9 918 000				31,28°
10.109	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s^22p^4(^3P)3s$	$^4P_{3/2}$	0	9 892 000				31,28°
10.198	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s^22p^4(^3P)3s$	$^4P_{1/2}$	0	9 806 000				31,28°
10.239	$2s^22p^5$	$^2P^\circ_{1/2}$	$2s^22p^4(^1D)3s$	$^2D_{3/2}$	228 400	9 995 000				31,28°
10.298	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s^22p^4(^3P)3s$	$^2P_{3/2}$	0	9 711 000				31,28°
10.319	$2s^22p^5$	$^2P^\circ_{1/2}$	$2s^22p^4(^3P)3s$	$^2P_{1/2}$	228 400	9 918 000				31,28°
10.333	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s^22p^4(^3P)3s$	$^4P_{5/2}$	0	9 678 000				31,28°
10.347	$2s^22p^5$	$^2P^\circ_{1/2}$	$2s^22p^4(^3P)3s$	$^4P_{3/2}$	228 400	9 892 000				31
69.782	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s2p^6$	$^2S_{1/2}$	0	1 433 030	40			22,41°
83.013	$2s^22p^5$	$^2P^\circ_{1/2}$	$2s2p^6$	$^2S_{1/2}$	228 400	1 433 030	25			22,41°
437.83^C	$2s^22p^5$	$^2P^\circ_{3/2}$	$2s^22p^5$	$^2P^\circ_{1/2}$	0	228 400		M1	2.13+5	51*

TABLE 36. Energy levels of Ga XXIV

Configuration	Term	J	Level (cm^{-1})
$2s^22p^4$	^{3}P	2	0
		0	119 570
		1	209 330
$2s^22p^4$	^{1}D	2	299 340
$2s^22p^4$	^{1}S	0	575 360
$2s2p^5$	^{3}P°	2	*1 248 280*
		1	*1 367 860*
		0	*1 485 080*
$2s2p^5$	^{1}P°	1	*1 730 730*
$2p^6$	^{1}S	0	2 855 590
$2s^22p^3(^4S°)3s$	^{3}S°	1	*10 264 000*
$2s^22p^3(^2D°)3s$	^{3}D°	2	*10 443 000*
		1	*10 454 000*
		3	*10 517 000*
$2s^22p^3(^2D°)3s$	^{1}D°	2	*10 535 000*
$2s^22p^3(^2P°)3s$	^{3}P°	0	*10 616 000*
		1	*10 643 000*
		2	*10 797 000*
$2s^22p^3(^2P°)3s$	^{1}P°	1	*10 800 000*
$2s^22p^3(^4S°)3d$	^{3}D°	3	*11 033 000*
$2s^22p^3(^2D°)3d$	^{3}D°	3	*11 259 000*
$2s^22p^3(^2D°)3d$	^{3}P°	2	*11 282 000 ?*
$2s^22p^3(^2P°)3d$	^{3}F°	3	*11 311 000*
$2s^22p^3(^2D°)3d$	^{1}F°	3	*11 329 000*
$2s^22p^3(^2P°)3d$	^{3}P°	2	*11 364 000*
		1	*11 514 000*
$2s^22p^3(^2P°)3d$	^{1}D°	2	*11 558 000*
$2s^22p^3(^2P°)3d$	^{1}F°	3	*11 558 000*
$2s^22p^3(^2P°)3d$	^{3}D°	2	*11 564 000*
$2s^22p^3(^2P°)3d$	^{1}P°	1	*11 587 000*
Ga XXV ($^4S°_{3/2}$)	**Limit**	**—**	**18 215 000**

TABLE 37. Spectral lines of Ga XXIV

Wavelength (Å)	Classification Lower		Upper		Energy levels (cm^{-1})		Int.	Type	A (s^{-1})	References
8.807	$2s^22p^4$	$^3P_1$	$2s^22p^3(^2P°)3d$	$^3D°_2$	209 330	11 564 000				28
8.827	$2s^22p^4$	$^3P_2$	$2s^22p^3(^2D°)3d$	$^1F°_3$	0	11 329 000				28
8.846	$2s^22p^4$	$^3P_1$	$2s^22p^3(^2P°)3d$	$^3P°_1$	209 330	11 514 000				28
8.864	$2s^22p^4$	$^3P_2$	$2s^22p^3(^2D°)3d$	$^3P°_2$	0	11 282 000 ?				28
8.882	$2s^22p^4$	$^1D_2$	$2s^22p^3(^2P°)3d$	$^1F°_3$	299 340	11 558 000				28
	$2s^22p^4$	$^1D_2$	$2s^22p^3(^2P°)3d$	$^1D°_2$	299 340	11 558 000				28
	$2s^22p^4$	$^3P_2$	$2s^22p^3(^2D°)3d$	$^3D°_3$	0	11 259 000				28
9.038	$2s^22p^4$	$^1D_2$	$2s^22p^3(^2P°)3d$	$^3P°_2$	299 340	11 364 000				28
9.064	$2s^22p^4$	$^3P_2$	$2s^22p^3(^4S°)3d$	$^3D°_3$	0	11 033 000				28
	$2s^22p^4$	$^1D_2$	$2s^22p^3(^2D°)3d$	$^1F°_3$	299 340	11 329 000				28
9.081	$2s^22p^4$	$^1S_0$	$2s^22p^3(^2P°)3d$	$^1P°_1$	575 360	11 587 000				28
	$2s^22p^4$	$^1D_2$	$2s^22p^3(^2P°)3d$	$^3F°_3$	299 340	11 311 000				28
	$2s^22p^4$	$^3P_1$	$2s^22p^3(^2D°)3d$	$^3P°_2$	209 330	11 282 000 ?				28
9.442	$2s^22p^4$	$^3P_1$	$2s^22p^3(^2P°)3s$	$^3P°_2$	209 330	10 797 000				28
9.508	$2s^22p^4$	$^3P_2$	$2s^22p^3(^2D°)3s$	$^3D°_3$	0	10 517 000				28
	$2s^22p^4$	$^1D_2$	$2s^22p^3(^2P°)3s$	$^1P°_1$	299 340	10 800 000				28
9.529	$2s^22p^4$	$^1D_2$	$2s^22p^3(^2P°)3s$	$^3P°_2$	299 340	10 797 000				28
9.575	$2s^22p^4$	$^3P_2$	$2s^22p^3(^2D°)3s$	$^3D°_2$	0	10 443 000				28
9.609	$2s^22p^4$	$^3P_1$	$2s^22p^3(^2P°)3s$	$^3P°_0$	209 330	10 616 000				28
9.668	$2s^22p^4$	$^1D_2$	$2s^22p^3(^2P°)3s$	$^3P°_1$	299 340	10 643 000				28
9.685	$2s^22p^4$	$^3P_1$	$2s^22p^3(^2D°)3s$	$^1D°_2$	209 330	10 535 000				28
9.739	$2s^22p^4$	$^3P_2$	$2s^22p^3(^4S°)3s$	$^3S°_1$	0	10 264 000				28
9.761	$2s^22p^4$	$^3P_1$	$2s^22p^3(^2D°)3s$	$^3D°_1$	209 330	10 454 000				28
9.772	$2s^22p^4$	$^1D_2$	$2s^22p^3(^2D°)3s$	$^1D°_2$	299 340	10 535 000				28
	$2s^22p^4$	$^3P_1$	$2s^22p^3(^2D°)3s$	$^3D°_2$	209 330	10 443 000				28
9.780	$2s^22p^4$	$^1S_0$	$2s^22p^3(^2P°)3s$	$^1P°_1$	575 360	10 800 000				28

TABLE 37. Spectral lines of Ga XXIV—Continued

Wavelength (Å)	Classification: Lower		Upper		Energy levels (cm^{-1})		Int.	Type	A (s^{-1})	References
9.859	$2s^22p^4$	$^3P_0$	$2s^22p^3(^4S°)3s$	$^3S°_1$	119 570	10 264 000				28
	$2s^22p^4$	$^1D_2$	$2s^22p^3(^2D°)3s$	$^3D°_2$	299 340	10 443 000				28
9.946	$2s^22p^4$	$^3P_1$	$2s^22p^3(^4S°)3s$	$^3S°_1$	209 330	10 264 000				28
57.779	$2s^22p^4$	$^3P_2$	$2s2p^5$	$^1P°_1$	0	1 730 730	6			41
69.862	$2s^22p^4$	$^1D_2$	$2s2p^5$	$^1P°_1$	299 340	1 730 730	30			41
73.107	$2s^22p^4$	$^3P_2$	$2s2p^5$	$^3P°_1$	0	1 367 860	15			41
78.385	$2s^22p^4$	$^3P_1$	$2s2p^5$	$^3P°_0$	209 330	1 485 080	12			41
80.110	$2s^22p^4$	$^3P_2$	$2s2p^5$	$^3P°_2$	0	1 248 280	30*bl*			41
	$2s^22p^4$	$^3P_0$	$2s2p^5$	$^3P°_1$	119 570	1 367 860				41
86.316	$2s^22p^4$	$^3P_1$	$2s2p^5$	$^3P°_1$	209 330	1 367 860	4			41
86.552	$2s^22p^4$	$^1S_0$	$2s2p^5$	$^1P°_1$	575 360	1 730 730	4			41
88.900	$2s2p^5$	$^1P°_1$	$2p^6$	$^1S_0$	1 730 730	2 855 590	2			41
96.255	$2s^22p^4$	$^3P_1$	$2s2p^5$	$^3P°_2$	209 330	1 248 280	4			41
273.20[C]	$2s^22p^4$	$^3P_1$	$2s^22p^4$	$^1S_0$	209 330	575 360		M1	1.01+6	51*
334.07[C]	$2s^22p^4$	$^3P_2$	$2s^22p^4$	$^1D_2$	0	299 340		M1	1.49+5	51*
477.71[C]	$2s^22p^4$	$^3P_2$	$2s^22p^4$	$^3P_1$	0	209 330		M1	1.72+5	51*
1111.[C]	$2s^22p^4$	$^3P_1$	$2s^22p^4$	$^1D_2$	209 330	299 340		M1	1.66+3	51*
1114.[C]	$2s^22p^4$	$^3P_0$	$2s^22p^4$	$^3P_1$	119 570	209 330		M1	8.11+3	51*

TABLE 38. Energy levels of Ga XXV

Configuration	Term	J	Level (cm^{-1})
$2s^22p^3$	$^4S°$	3/2	0
$2s^22p^3$	$^2D°$	3/2	*208 620+x*
		5/2	*281 650+x*
$2s^22p^3$	$^2P°$	1/2	*389 440+x*
		3/2	*561 600+y*
$2s2p^4$	^4P	5/2	1 016 950
		3/2	1 164 010
		1/2	1 188 920
$2s2p^4$	^2D	3/2	1 412 790+x
		5/2	1 466 470+x
$2s2p^4$	^2S	1/2	1 612 310+x
$2s2p^4$	^2P	3/2	1 679 060+x
		1/2	1 897 320+y
$2p^5$	$^2P°$	3/2	*2 593 240+x*
Ga XXVI ($^3P_0$)	**Limit**		**19 287 000**

TABLE 39. Spectral lines of Ga XXV

Wavelength (Å)	Classification: Lower		Upper		Energy levels (cm^{-1})		Int.	Type	A (s^{-1})	References
59.557[C]	$2s^22p^3$	$^4S°_{3/2}$	$2s2p^4$	$^2P_{3/2}$	0	1 679 060+x				41
68.009	$2s^22p^3$	$^2D°_{3/2}$	$2s2p^4$	$^2P_{3/2}$	208 620+*x*	1 679 060+*x*	1			41
71.232	$2s^22p^3$	$^2D°_{3/2}$	$2s2p^4$	$^2S_{1/2}$	208 620+*x*	1 612 310+*x*	2*bl*			41
71.561	$2s^22p^3$	$^2D°_{5/2}$	$2s2p^4$	$^2P_{3/2}$	281 650+*x*	1 679 060+*x*	6			41
74.866	$2s^22p^3$	$^2P°_{3/2}$	$2s2p^4$	$^2P_{1/2}$	561 600+*y*	1 897 320+*y*	8			41
77.54	$2s^22p^3$	$^2P°_{1/2}$	$2s2p^4$	$^2P_{3/2}$	389 440+*x*	1 679 060+*x*	5			41
81.776	$2s^22p^3$	$^2P°_{1/2}$	$2s2p^4$	$^2S_{1/2}$	389 440+*x*	1 612 310+*x*	4			41
83.045[C]	$2s^22p^3$	$^2D°_{3/2}$	$2s2p^4$	$^2D_{3/2}$	208 620+*x*	1 412 790+*x*				41
84.110	$2s^22p^3$	$^4S°_{3/2}$	$2s2p^4$	$^4P_{1/2}$	0	1 188 920	5			41
84.401	$2s^22p^3$	$^2D°_{5/2}$	$2s2p^4$	$^2D_{5/2}$	281 650+*x*	1 466 470+*x*	11			41
84.713	$2s2p^4$	$^2D_{3/2}$	$2p^5$	$^2P°_{3/2}$	1 412 790+*x*	2 593 240+*x*	4*bl*			41

TABLE 39. Spectral lines of Ga XXV—Continued

Wavelength (Å)	Classification Lower		Upper		Energy levels (cm^{-1})		Int.	Type	A (s^{-1})	References
85.910	$2s^22p^3$	$^4S^\circ_{3/2}$	$2s2p^4$	$^4P_{3/2}$	0	1 164 010	2			41
88.749	$2s2p^4$	$^2D_{5/2}$	$2p^5$	$^2P^\circ_{3/2}$	1 466 470+x	2 593 240+x	6			41
98.333	$2s^22p^3$	$^4S^\circ_{3/2}$	$2s2p^4$	$^4P_{5/2}$	0	1 016 950	6*bl*			41
256.78^C	$2s^22p^3$	$^4S^\circ_{3/2}$	$2s^22p^3$	$^2P^\circ_{1/2}$	0	389 440+x		M1	2.59+5	51*
355.05^C	$2s^22p^3$	$^4S^\circ_{3/2}$	$2s^22p^3$	$^2D^\circ_{5/2}$	0	281 650+x		M1	2.34+4	51*
479.3^C	$2s^22p^3$	$^4S^\circ_{3/2}$	$2s^22p^3$	$^2D^\circ_{3/2}$	0	208 620+x		M1	1.52+5	51*
553.0^C	$2s^22p^3$	$^2D^\circ_{3/2}$	$2s^22p^3$	$^2P^\circ_{1/2}$	208 620+x	389 440+x		M1	1.25+4	51*
1369.^{C}	$2s^22p^3$	$^2D^\circ_{3/2}$	$2s^22p^3$	$^2D^\circ_{5/2}$	208 620+x	281 650+x		M1	2.62+3	51*

TABLE 40. Energy levels of Ga XXVI

Configuration	Term	J	Level (cm^{-1})
$2s^22p^2$	^3P	0	0
		1	186 890+x
		2	251 620+x
$2s2p^3$	$^3D^\circ$	1	*1 098 140*
$2s2p^3$	$^3P^\circ$	2	*1 401 750+x*
$2s2p^3$	$^3S^\circ$	1	*1 527 370+x*
Ga XXVII ($^2P^\circ_{1/2}$)	**Limit**		**20 518 000**

TABLE 41. Spectral lines of Ga XXVI

Wavelength (Å)	Classification Lower		Upper		Energy Levels (cm^{-1})		Int.	Type	A (s^{-1})	References
74.60	$2s^22p^2$	$^3P_1$	$2s2p^3$	$^3S^\circ_1$	186 890+x	1 527 370+x	6			41
78.385	$2s^22p^2$	$^3P_2$	$2s2p^3$	$^3S^\circ_1$	251 620+x	1 527 370+x	12			41
86.946	$2s^22p^2$	$^3P_2$	$2s2p^3$	$^3P^\circ_2$	251 620+x	1 401 750+x	2			41
91.063	$2s^22p^2$	$^3P_0$	$2s2p^3$	$^3D^\circ_1$	0	1 098 140	6			41
535.1^C	$2s^22p^2$	$^3P_0$	$2s^22p^2$	$^3P_1$	0	186 890+x		M1	9.76+4	51*
1545.^{C}	$2s^22p^2$	$^3P_1$	$2s^22p^2$	$^3P_2$	186 890+x	251 620+x		M1	2.11+3	51*

TABLE 42. Energy levels of Ga XXIX

Configuration	Term	J	Level (cm^{-1})
$1s^22s$	^2S	1/2	0
$1s^22p$	$^2P^\circ$	1/2	*480 960*
		3/2	*756 320*
$1s^23s$	^2S	1/2	[13 510 430]
$1s^23p$	$^2P^\circ$	1/2	*[13 643 750]*
		3/2	*[13 725 270]*
$1s^23d$	^2D	3/2	[13 775 320]
		5/2	[13 801 060]

TABLE 42. Energy levels of Ga XXIX—Continued

Configuration	Term	J	Level (cm^{-1})
$1s^24s$	^{2}S	1/2	[18 169 440]
$1s^24p$	^{2}P°	1/2	*[18 225 370]*
		3/2	*[18 259 720]*
$1s^24d$	^{2}D	3/2	[18 280 800]
		5/2	[18 291 660]
$1s^25s$	^{2}S	1/2	[20 309 590]
$1s^25p$	^{2}P°	1/2	*[20 338 120]*
		3/2	*[20 355 690]*
$1s^25d$	^{2}D	3/2	[20 366 460]
		5/2	[20 372 020]
Ga XXX (^{1}S$_0$)	**Limit**	—	**24 068 300**
$1s2s^2$	^{2}S	1/2	[76 572 000]
$1s(^2S)2s2p(^3P°)$	^{4}P°	1/2	*[76 699 000]*
		3/2	*[76 752 000]*
$1s(^2S)2s2p(^3P°)$	^{2}P°	1/2	*[77 101 000]*
		3/2	*[77 274 000]*
$1s(^2S)2p^2(^3P)$	^{4}P	1/2	[77 306 000]
		3/2	[77 471 000]
		5/2	[77 549 000]
$1s(^2S)2s2p(^1P°)$	^{2}P°	1/2	*[77 411 000]*
		3/2	*[77 453 000]*
$1s(^2S)2p^2(^3P)$	^{2}P	1/2	[77 687 000]
		3/2	[78 003 000]
$1s(^2S)2p^2(^1D)$	^{2}D	3/2	[77 705 000]
		5/2	[77 857 000]
$1s(^2S)2p^2(^1S)$	^{2}S	1/2	[78 168 000]

TABLE 43. Spectral lines of Ga XXIX

Wavelength (Å)	Classification: Lower		Classification: Upper		Energy levels (cm^{-1})		Type	References
1.2872^{C}	$1s^22p$	$^2P^°_{1/2}$	$1s(^2S)2p^2(^1S)$	$^2S_{1/2}$	480 960	[78 168 000]		49
1.2900^{C}	$1s^22p$	$^2P^°_{1/2}$	$1s(^2S)2p^2(^3P)$	$^2P_{3/2}$	480 960	[78 003 000]		49
1.2911^{C}	$1s^22s$	$^2S_{1/2}$	$1s(^2S)2s2p(^1P°)$	$^2P^°_{3/2}$	0	[77 453 000]		49
1.2918^{C}	$1s^22p$	$^2P^°_{3/2}$	$1s(^2S)2p^2(^1S)$	$^2S_{1/2}$	756 320	[78 168 000]		49
	$1s^22s$	$^2S_{1/2}$	$1s(^2S)2s2p(^1P°)$	$^2P^°_{1/2}$	0	[77 411 000]		49
1.2941^{C}	$1s^22s$	$^2S_{1/2}$	$1s(^2S)2s2p(^3P°)$	$^2P^°_{3/2}$	0	[77 274 000]		49
1.2946^{C}	$1s^22p$	$^2P^°_{3/2}$	$1s(^2S)2p^2(^3P)$	$^2P_{3/2}$	756 320	[78 003 000]		49
1.2949^{C}	$1s^22p$	$^2P^°_{1/2}$	$1s(^2S)2p^2(^1D)$	$^2D_{3/2}$	480 960	[77 705 000]		49
1.2952^{C}	$1s^22p$	$^2P^°_{1/2}$	$1s(^2S)2p^2(^3P)$	$^2P_{1/2}$	480 960	[77 687 000]		49
1.2970^{C}	$1s^22s$	$^2S_{1/2}$	$1s(^2S)2s2p(^3P°)$	$^2P^°_{1/2}$	0	[77 101 000]		49
	$1s^22p$	$^2P^°_{3/2}$	$1s(^2S)2p^2(^1D)$	$^2D_{5/2}$	756 320	[77 857 000]		49
1.2989^{C}	$1s^22p$	$^2P^°_{1/2}$	$1s(^2S)2p^2(^3P)$	$^4P_{3/2}$	480 960	[77 471 000]		49
1.2996^{C}	$1s^22p$	$^2P^°_{3/2}$	$1s(^2S)2p^2(^1D)$	$^2D_{3/2}$	756 320	[77 705 000]		49
1.2999^{C}	$1s^22p$	$^2P^°_{3/2}$	$1s(^2S)2p^2(^3P)$	$^2P_{1/2}$	756 320	[77 687 000]		49
1.3017^{C}	$1s^22p$	$^2P^°_{1/2}$	$1s(^2S)2p^2(^3P)$	$^4P_{1/2}$	480 960	[77 306 000]		49
1.3022^{C}	$1s^22p$	$^2P^°_{3/2}$	$1s(^2S)2p^2(^3P)$	$^4P_{5/2}$	756 320	[77 549 000]		49
1.3029^{C}	$1s^22s$	$^2S_{1/2}$	$1s(^2S)2s2p(^3P°)$	$^4P^°_{3/2}$	0	[76 752 000]		49
1.3035^{C}	$1s^22p$	$^2P^°_{3/2}$	$1s(^2S)2p^2(^3P)$	$^4P_{3/2}$	756 320	[77 471 000]		49
1.3038^{C}	$1s^22s$	$^2S_{1/2}$	$1s(^2S)2s2p(^3P°)$	$^4P^°_{1/2}$	0	[76 699 000]		49
1.3063^{C}	$1s^22p$	$^2P^°_{3/2}$	$1s(^2S)2p^2(^3P)$	$^4P_{1/2}$	756 320	[77 306 000]		49
1.3142^{C}	$1s^22p$	$^2P^°_{1/2}$	$1s2s^2$	$^2S_{1/2}$	480 960	[76 572 000]		49
1.3190^{C}	$1s^22p$	$^2P^°_{3/2}$	$1s2s^2$	$^2S_{1/2}$	756 320	[76 572 000]		49
4.9126^{C}	$1s^22s$	$^2S_{1/2}$	$1s^25p$	$^2P^°_{3/2}$	0	[20 355 690]		49
4.9169^{C}	$1s^22s$	$^2S_{1/2}$	$1s^25p$	$^2P^°_{1/2}$	0	[20 338 120]		49
5.0288^{C}	$1s^22p$	$^2P^°_{1/2}$	$1s^25d$	$^2D_{3/2}$	480 960	[20 366 460]		49
5.0432^{C}	$1s^22p$	$^2P^°_{1/2}$	$1s^25s$	$^2S_{1/2}$	480 960	[20 309 590]		49
5.0980^{C}	$1s^22p$	$^2P^°_{3/2}$	$1s^25d$	$^2D_{5/2}$	756 320	[20 372 020]		49
5.0994^{C}	$1s^22p$	$^2P^°_{3/2}$	$1s^25d$	$^2D_{3/2}$	756 320	[20 366 460]		49

TABLE 43. Spectral lines of Ga XXIX—Continued

Wavelength (Å)	Classification				Energy levels (cm^{-1})		Type	References
	Lower		Upper					
5.1142^{C}	$1s^22p$	$^2P^\circ_{3/2}$	$1s^25s$	$^2S_{1/2}$	756 320	[20 309 590]		49
5.4765^{C}	$1s^22s$	$^2S_{1/2}$	$1s^24p$	$^2P^\circ_{3/2}$	0	[18 259 720]		49
5.4869^{C}	$1s^22s$	$^2S_{1/2}$	$1s^24p$	$^2P^\circ_{1/2}$	0	[18 225 370]		49
5.6180^{C}	$1s^22p$	$^2P^\circ_{1/2}$	$1s^24d$	$^2D_{3/2}$	480 960	[18 280 800]		49
5.6534^{C}	$1s^22p$	$^2P^\circ_{1/2}$	$1s^24s$	$^2S_{1/2}$	480 960	[18 169 440]		49
5.7028^{C}	$1s^22p$	$^2P^\circ_{3/2}$	$1s^24d$	$^2D_{5/2}$	756 320	[18 291 660]		49
5.7063^{C}	$1s^22p$	$^2P^\circ_{3/2}$	$1s^24d$	$^2D_{3/2}$	756 320	[18 280 800]		49
5.7428^{C}	$1s^22p$	$^2P^\circ_{3/2}$	$1s^24s$	$^2S_{1/2}$	756 320	[18 169 440]		49
7.2858^{C}	$1s^22s$	$^2S_{1/2}$	$1s^23p$	$^2P^\circ_{3/2}$	0	[13 725 270]		49
7.3294^{C}	$1s^22s$	$^2S_{1/2}$	$1s^23p$	$^2P^\circ_{1/2}$	0	[13 643 750]		49
7.5220^{C}	$1s^22p$	$^2P^\circ_{1/2}$	$1s^23d$	$^2D_{3/2}$	480 960	[13 775 320]		49
7.6659^{C}	$1s^22p$	$^2P^\circ_{3/2}$	$1s^23d$	$^2D_{5/2}$	756 320	[13 801 060]		49
7.6749^{C}	$1s^22p$	$^2P^\circ_{1/2}$	$1s^23s$	$^2S_{1/2}$	480 960	[13 510 430]		49
7.6811^{C}	$1s^22p$	$^2P^\circ_{3/2}$	$1s^23d$	$^2D_{3/2}$	756 320	[13 775 320]		49
7.8406^{C}	$1s^22p$	$^2P^\circ_{3/2}$	$1s^23s$	$^2S_{1/2}$	756 320	[13 510 430]		49
14.8750^{C}	$1s^23p$	$^2P^\circ_{1/2}$	$1s^25d$	$^2D_{3/2}$	[13 643 750]	[20 366 460]		49
15.0019^{C}	$1s^23p$	$^2P^\circ_{1/2}$	$1s^25s$	$^2S_{1/2}$	[13 643 750]	[20 309 590]		49
15.0449^{C}	$1s^23p$	$^2P^\circ_{3/2}$	$1s^25d$	$^2D_{5/2}$	[13 725 270]	[20 372 020]		49
15.0575^{C}	$1s^23p$	$^2P^\circ_{3/2}$	$1s^25d$	$^2D_{3/2}$	[13 725 270]	[20 366 460]		49
15.1876^{C}	$1s^23p$	$^2P^\circ_{3/2}$	$1s^25s$	$^2S_{1/2}$	[13 725 270]	[20 309 590]		49
21.0558^{C}	$1s^23s$	$^2S_{1/2}$	$1s^24p$	$^2P^\circ_{3/2}$	[13 510 430]	[18 259 720]		49
21.2092^{C}	$1s^23s$	$^2S_{1/2}$	$1s^24p$	$^2P^\circ_{1/2}$	[13 510 430]	[18 225 370]		49
21.5654^{C}	$1s^23p$	$^2P^\circ_{1/2}$	$1s^24d$	$^2D_{3/2}$	[13 643 750]	[18 280 800]		49
21.8991^{C}	$1s^23p$	$^2P^\circ_{3/2}$	$1s^24d$	$^2D_{5/2}$	[13 725 270]	[18 291 660]		49
21.9513^{C}	$1s^23p$	$^2P^\circ_{3/2}$	$1s^24d$	$^2D_{3/2}$	[13 725 270]	[18 280 800]		49
22.0961^{C}	$1s^23p$	$^2P^\circ_{1/2}$	$1s^24s$	$^2S_{1/2}$	[13 643 750]	[18 169 440]		49
22.5014^{C}	$1s^23p$	$^2P^\circ_{3/2}$	$1s^24s$	$^2S_{1/2}$	[13 725 270]	[18 169 440]		49
46.7052^{C}	$1s^24p$	$^2P^\circ_{1/2}$	$1s^25d$	$^2D_{3/2}$	[18 225 370]	[20 366 460]		49
47.3418^{C}	$1s^24p$	$^2P^\circ_{3/2}$	$1s^25d$	$^2D_{5/2}$	[18 259 720]	[20 372 020]		49
47.4667^{C}	$1s^24p$	$^2P^\circ_{3/2}$	$1s^25d$	$^2D_{3/2}$	[18 259 720]	[20 366 460]		49
132.219^{S}	$1s^22s$	$^2S_{1/2}$	$1s^22p$	$^2P^\circ_{3/2}$	0	756 320		68
207.917^{S}	$1s^22s$	$^2S_{1/2}$	$1s^22p$	$^2P^\circ_{1/2}$	0	480 960		68
363.16^{C}	$1s^22p$	$^2P^\circ_{1/2}$	$1s^22p$	$^2P^\circ_{3/2}$	480 960	756 320	M1	68

TABLE 44. Energy levels of Ga XXX

Configuration	Term	J	Level (cm^{-1})
$1s^2$	^1S	0	0
$1s2s$	^3S	1	[76 911 150]
$1s2p$	$^3P^\circ$	0	*[77 202 880]*
		1	*[77 224 190]*
		2	*[77 490 090]*
$1s2s$	^1S	0	[77 225 860]
$1s2p$	$^1P^\circ$	1	*[77 657 700]*
$1s3s$	^3S	1	[91 177 480]
$1s3p$	$^3P^\circ$	0	*[91 257 860]*
		1	*[91 263 800]*
		2	*[91 343 230]*
$1s3s$	^1S	0	[91 261 400]
$1s3d$	^3D	2	[91 384 440]
		1	[91 385 930]
		3	[91 413 210]
$1s3p$	$^1P^\circ$	1	*[91 388 810]*
$1s3d$	^1D	2	[91 416 400]
$1s4s$	^3S	1	[96 120 300]

TABLE 44. Energy levels of Ga XXX—Continued

Configuration	Term	J	Level (cm^{-1})
$1s4p$	$^3P^\circ$	0	*[96 153 900]*
		1	*[96 156 500]*
		2	*[96 189 900]*
$1s4s$	^1S	0	[96 155 100]
$1s4d$	^3D	2	[96 207 300]
		1	[96 207 900]
		3	[96 219 400]
$1s4p$	$^1P^\circ$	1	*[96 209 200]*
$1s4d$	^1D	2	[96 220 800]
$1s5s$	^3S	1	[98 395 400]
$1s5s$	^1S	0	[98 413 100]
$1s5p$	$^3P^\circ$	1	*[98 413 800]*
		2	*[98 430 900]*
$1s5p$	$^1P^\circ$	1	*[98 440 800]*
Ga XXXI ($^2S_{1/2}$)	**Limit**	**—**	**102 405 030**
$2s^2$	^1S	0	[156 500 000]
$2s2p$	$^3P^\circ$	0	*[156 530 000]*
		1	*[156 600 000]*
		2	*[156 860 000]*
$2p^2$	^3P	0	[156 880 000]
		1	[157 080 000]
		2	[157 150 000]
$2s2p$	$^1P^\circ$	1	*[157 190 000]*
$2p^2$	^1D	2	[157 460 000]
$2p^2$	^1S	0	[157 760 000]

TABLE 45. Spectral lines of Ga XXX

Wavelength (Å)	Classification Lower		Upper		Energy Levels (cm^{-1})		Type	$A(s^{-1})$	References
1.01584[C]	$1s^2$	$^1S_0$	$1s5p$	$^1P^\circ_1$	0	[98 440 800]			
1.01612[C]	$1s^2$	$^1S_0$	$1s5p$	$^3P^\circ_1$	0	[98 413 800]			
1.03940[C]	$1s^2$	$^1S_0$	$1s4p$	$^1P^\circ_1$	0	[96 209 200]			
1.03997[C]	$1s^2$	$^1S_0$	$1s4p$	$^3P^\circ_1$	0	[96 156 500]			
1.09423[C]	$1s^2$	$^1S_0$	$1s3p$	$^1P^\circ_1$	0	[91 388 810]			42
1.09572[C]	$1s^2$	$^1S_0$	$1s3p$	$^3P^\circ_1$	0	[91 263 800]			42
1.2417[C]	$1s2p$	$^3P^\circ_1$	$2p^2$	$^1S_0$	[77 224 190]	[157 760 000]			49
1.2457[C]	$1s2s$	$^3S_1$	$2s2p$	$^1P^\circ_1$	[76 911 150]	[157 190 000]			49
1.2464[C]	$1s2p$	$^3P^\circ_1$	$2p^2$	$^1D_2$	[77 224 190]	[157 460 000]			49
1.2483[C]	$1s2p$	$^1P^\circ_1$	$2p^2$	$^1S_0$	[77 657 700]	[157 760 000]			49
1.2504[C]	$1s2p$	$^3P^\circ_2$	$2p^2$	$^1D_2$	[77 490 090]	[157 460 000]			49
1.2506[C]	$1s2s$	$^1S_0$	$2s2p$	$^1P^\circ_1$	[77 225 860]	[157 190 000]			49
1.2508[C]	$1s2s$	$^3S_1$	$2s2p$	$^3P^\circ_2$	[76 911 150]	[156 860 000]			49
1.2512[C]	$1s2p$	$^3P^\circ_1$	$2p^2$	$^3P_2$	[77 224 190]	[157 150 000]			49
1.2520[C]	$1s2p$	$^3P^\circ_0$	$2p^2$	$^3P_1$	[77 202 880]	[157 080 000]			49
1.2523[C]	$1s2p$	$^3P^\circ_1$	$2p^2$	$^3P_1$	[77 224 190]	[157 080 000]			49
1.2530[C]	$1s2p$	$^1P^\circ_1$	$2p^2$	$^1D_2$	[77 657 700]	[157 460 000]			49
1.2549[C]	$1s2s$	$^3S_1$	$2s2p$	$^3P^\circ_1$	[76 911 150]	[156 600 000]			49
1.2553[C]	$1s2p$	$^3P^\circ_2$	$2p^2$	$^3P_2$	[77 490 090]	[157 150 000]			49
1.2554[C]	$1s2p$	$^3P^\circ_1$	$2p^2$	$^3P_0$	[77 224 190]	[156 880 000]			49
1.2559[C]	$1s2s$	$^3S_1$	$2s2p$	$^3P^\circ_0$	[76 911 150]	[156 530 000]			49
1.2564[C]	$1s2p$	$^3P^\circ_2$	$2p^2$	$^3P_1$	[77 490 090]	[157 080 000]			49
1.2579[C]	$1s2p$	$^1P^\circ_1$	$2p^2$	$^3P_2$	[77 657 700]	[157 150 000]			49
1.2590[C]	$1s2p$	$^1P^\circ_1$	$2p^2$	$^3P_1$	[77 657 700]	[157 080 000]			49
1.2599[C]	$1s2s$	$^1S_0$	$2s2p$	$^3P^\circ_1$	[77 225 860]	[156 600 000]			49
1.2615[C]	$1s2p$	$^3P^\circ_1$	$2s^2$	$^1S_0$	[77 224 190]	[156 500 000]			49
1.2621[C]	$1s2p$	$^1P^\circ_1$	$2p^2$	$^3P_0$	[77 657 700]	[156 880 000]			49
1.2683[C]	$1s2p$	$^1P^\circ_1$	$2s^2$	$^1S_0$	[77 657 700]	[156 500 000]			49
1.28770[C]	$1s^2$	$^1S_0$	$1s2p$	$^1P^\circ_1$	0	[77 657 700]			57

TABLE 45. Spectral lines of Ga XXX—Continued

Wavelength (Å)	Classification Lower		Upper		Energy Levels (cm^{-1})		Type	$A(s^{-1})$	References
1.29049[C]	$1s^2$	$^1S_0$	$1s2p$	$^3P^\circ_2$	0	[77 490 090]			
1.29493[C]	$1s^2$	$^1S_0$	$1s2p$	$^3P^\circ_1$	0	[77 224 190]			
1.30020[C]	$1s^2$	$^1S_0$	$1s2s$	$^3S_1$	0	[76 911 150]	M1	1.26+9	75*
4.64689[C]	$1s2s$	$^3S_1$	$1s5p$	$^3P^\circ_2$	[76 911 150]	[98 430 900]			
4.65059[C]	$1s2s$	$^3S_1$	$1s5p$	$^3P^\circ_1$	[76 911 150]	[98 413 800]			
4.71366[C]	$1s2s$	$^1S_0$	$1s5p$	$^1P^\circ_1$	[77 225 860]	[98 440 800]			
4.72340[C]	$1s2p$	$^3P^\circ_1$	$1s5s$	$^3S_1$	[77 224 190]	[98 395 400]			
4.78347[C]	$1s2p$	$^3P^\circ_2$	$1s5s$	$^3S_1$	[77 490 090]	[98 395 400]			
4.81802[C]	$1s2p$	$^1P^\circ_1$	$1s5s$	$^1S_0$	[77 657 700]	[98 413 100]			
5.1871[C]	$1s2s$	$^3S_1$	$1s4p$	$^3P^\circ_2$	[76 911 150]	[96 189 900]			
5.1961[C]	$1s2s$	$^3S_1$	$1s4p$	$^3P^\circ_1$	[76 911 150]	[96 156 500]			
5.2618[C]	$1s2p$	$^3P^\circ_0$	$1s4d$	$^3D_1$	[77 202 880]	[96 207 900]			
5.2677[C]	$1s2p$	$^3P^\circ_1$	$1s4d$	$^3D_1$	[77 224 190]	[96 207 900]			
5.2678[C]	$1s2s$	$^1S_0$	$1s4p$	$^1P^\circ_1$	[77 225 860]	[96 209 200]			
	$1s2p$	$^3P^\circ_1$	$1s4d$	$^3D_2$	[77 224 190]	[96 207 300]			
5.2921[C]	$1s2p$	$^3P^\circ_1$	$1s4s$	$^3S_1$	[77 224 190]	[96 120 300]			
5.3392[C]	$1s2p$	$^3P^\circ_2$	$1s4d$	$^3D_3$	[77 490 090]	[96 219 400]			
5.3427[C]	$1s2p$	$^3P^\circ_2$	$1s4d$	$^3D_2$	[77 490 090]	[96 207 300]			
5.3676[C]	$1s2p$	$^3P^\circ_2$	$1s4s$	$^3S_1$	[77 490 090]	[96 120 300]			
5.3870[C]	$1s2p$	$^1P^\circ_1$	$1s4d$	$^1D_2$	[77 657 700]	[96 220 800]			
5.4062[C]	$1s2p$	$^1P^\circ_1$	$1s4s$	$^1S_0$	[77 657 700]	[96 155 100]			
6.9290[C]	$1s2s$	$^3S_1$	$1s3p$	$^3P^\circ_2$	[76 911 150]	[91 343 230]			
6.9674[C]	$1s2s$	$^3S_1$	$1s3p$	$^3P^\circ_1$	[76 911 150]	[91 263 800]			
7.0507[C]	$1s2p$	$^3P^\circ_0$	$1s3d$	$^3D_1$	[77 202 880]	[91 385 930]			
7.0607[C]	$1s2s$	$^1S_0$	$1s3p$	$^1P^\circ_1$	[77 225 860]	[91 388 810]			
7.0613[C]	$1s2p$	$^3P^\circ_1$	$1s3d$	$^3D_1$	[77 224 190]	[91 385 930]			
7.0620[C]	$1s2p$	$^3P^\circ_1$	$1s3d$	$^3D_2$	[77 224 190]	[91 384 440]			
7.1668[C]	$1s2p$	$^3P^\circ_1$	$1s3s$	$^3S_1$	[77 224 190]	[91 177 480]			
7.1823[C]	$1s2p$	$^3P^\circ_2$	$1s3d$	$^3D_3$	[77 490 090]	[91 413 210]			
7.1972[C]	$1s2p$	$^3P^\circ_2$	$1s3d$	$^3D_2$	[77 490 090]	[91 384 440]			
7.2681[C]	$1s2p$	$^1P^\circ_1$	$1s3d$	$^1D_2$	[77 657 700]	[91 416 400]			
7.3060[C]	$1s2p$	$^3P^\circ_2$	$1s3s$	$^3S_1$	[77 490 090]	[91 177 480]			
7.3509[C]	$1s2p$	$^1P^\circ_1$	$1s3s$	$^1S_0$	[77 657 700]	[91 261 400]			
13.787[C]	$1s3s$	$^3S_1$	$1s5p$	$^3P^\circ_2$	[91 177 480]	[98 430 900]			
13.819[C]	$1s3s$	$^3S_1$	$1s5p$	$^3P^\circ_1$	[91 177 480]	[98 413 800]			
13.929[C]	$1s3s$	$^1S_0$	$1s5p$	$^1P^\circ_1$	[91 261 400]	[98 440 800]			
14.022[C]	$1s3p$	$^3P^\circ_1$	$1s5s$	$^3S_1$	[91 263 800]	[98 395 400]			
14.180[C]	$1s3p$	$^3P^\circ_2$	$1s5s$	$^3S_1$	[91 343 230]	[98 395 400]			
14.236[C]	$1s3p$	$^1P^\circ_1$	$1s5s$	$^1S_0$	[91 388 810]	[98 413 100]			
19.950[C]	$1s3s$	$^3S_1$	$1s4p$	$^3P^\circ_2$	[91 177 480]	[96 189 900]			
20.084[C]	$1s3s$	$^3S_1$	$1s4p$	$^3P^\circ_1$	[91 177 480]	[96 156 500]			
20.202[C]	$1s3p$	$^3P^\circ_0$	$1s4d$	$^3D_1$	[91 257 860]	[96 207 900]			
20.211[C]	$1s3s$	$^1S_0$	$1s4p$	$^1P^\circ_1$	[91 261 400]	[96 209 200]			
20.226[C]	$1s3p$	$^3P^\circ_1$	$1s4d$	$^3D_1$	[91 263 800]	[96 207 900]			
20.229[C]	$1s3p$	$^3P^\circ_1$	$1s4d$	$^3D_2$	[91 263 800]	[96 207 300]			
20.508[C]	$1s3p$	$^3P^\circ_2$	$1s4d$	$^3D_3$	[91 343 230]	[96 219 400]			
20.559[C]	$1s3p$	$^3P^\circ_2$	$1s4d$	$^3D_2$	[91 343 230]	[96 207 300]			
20.591[C]	$1s3p$	$^3P^\circ_1$	$1s4s$	$^3S_1$	[91 263 800]	[96 120 300]			
20.695[C]	$1s3p$	$^1P^\circ_1$	$1s4d$	$^1D_2$	[91 388 810]	[96 220 800]			
20.810[C]	$1s3d$	$^3D_2$	$1s4p$	$^3P^\circ_2$	[91 384 440]	[96 189 900]			

TABLE 45. Spectral lines of Ga XXX—Continued

Wavelength (Å)	Classification Lower		Upper		Energy Levels (cm^{-1})		Type	$A(s^{-1})$	References
20.865^C	$1s3d$	$^1D_2$	$1s4p$	$^1P^\circ_1$	[91 416 400]	[96 209 200]			
20.933^C	$1s3p$	$^3P^\circ_2$	$1s4s$	$^3S_1$	[91 343 230]	[96 120 300]			
20.935^C	$1s3d$	$^3D_3$	$1s4p$	$^3P^\circ_2$	[91 413 210]	[96 189 900]			
20.955^C	$1s3d$	$^3D_2$	$1s4p$	$^3P^\circ_1$	[91 384 440]	[96 156 500]			
20.962^C	$1s3d$	$^3D_1$	$1s4p$	$^3P^\circ_1$	[91 385 930]	[96 156 500]			
20.973^C	$1s3d$	$^3D_1$	$1s4p$	$^3P^\circ_0$	[91 385 930]	[96 153 900]			
20.981^C	$1s3p$	$^1P^\circ_1$	$1s4s$	$^1S_0$	[91 388 810]	[96 155 100]			
43.601^C	$1s4s$	$^3S_1$	$1s5p$	$^3P^\circ_1$	[96 120 300]	[98 413 800]			49
43.750^C	$1s4s$	$^1S_0$	$1s5p$	$^1P^\circ_1$	[96 155 100]	[98 440 800]			49
44.665^C	$1s4p$	$^3P^\circ_1$	$1s5s$	$^3S_1$	[96 156 500]	[98 395 400]			49
45.341^C	$1s4p$	$^3P^\circ_2$	$1s5s$	$^3S_1$	[96 189 900]	[98 395 400]			49
45.374^C	$1s4p$	$^1P^\circ_1$	$1s5s$	$^1S_0$	[96 209 200]	[98 413 100]			49
133.95^C	$1s2s$	$^3S_1$	$1s2p$	$^1P^\circ_1$	[76 911 150]	[77 657 700]			
172.73^C	$1s2s$	$^3S_1$	$1s2p$	$^3P^\circ_2$	[76 911 150]	[77 490 090]			
231.57^C	$1s2s$	$^1S_0$	$1s2p$	$^1P^\circ_1$	[77 225 860]	[77 657 700]			
319.45^C	$1s2s$	$^3S_1$	$1s2p$	$^3P^\circ_1$	[76 911 150]	[77 224 190]			
342.78^C	$1s2s$	$^3S_1$	$1s2p$	$^3P^\circ_0$	[76 911 150]	[77 202 880]			
603.^{C}	$1s3s$	$^3S_1$	$1s3p$	$^3P^\circ_2$	[91 177 480]	[91 343 230]			42
785.^{C}	$1s3s$	$^1S_0$	$1s3p$	$^1P^\circ_1$	[91 261 400]	[91 388 810]			42
1160.^{C}	$1s3s$	$^3S_1$	$1s3p$	$^3P^\circ_1$	[91 177 480]	[91 263 800]			42
1440.^{C}	$1s4s$	$^3S_1$	$1s4p$	$^3P^\circ_2$	[96 120 300]	[96 189 900]			49
1850.^{C}	$1s4s$	$^1S_0$	$1s4p$	$^1P^\circ_1$	[96 155 100]	[96 209 200]			49
	$1s4p$	$^3P^\circ_0$	$1s4d$	$^3D_1$	[96 153 900]	[96 207 900]			49
1950.^{C}	$1s4p$	$^3P^\circ_1$	$1s4d$	$^3D_1$	[96 156 500]	[96 207 900]			49
1970.^{C}	$1s4p$	$^3P^\circ_1$	$1s4d$	$^3D_2$	[96 156 500]	[96 207 300]			49
2760.^{C}	$1s4s$	$^3S_1$	$1s4p$	$^3P^\circ_1$	[96 120 300]	[96 156 500]			49
2820.^{C}	$1s5s$	$^3S_1$	$1s5p$	$^3P^\circ_2$	[98 395 400]	[98 430 900]			49
3390.^{C}	$1s4p$	$^3P^\circ_2$	$1s4d$	$^3D_3$	[96 189 900]	[96 219 400]			49
3610.^{C}	$1s5s$	$^1S_0$	$1s5p$	$^1P^\circ_1$	[98 413 100]	[98 440 800]			49
5430.^{C}	$1s5s$	$^3S_1$	$1s5p$	$^3P^\circ_1$	[98 395 400]	[98 413 800]			49
5750.^{C}	$1s4p$	$^3P^\circ_2$	$1s4d$	$^3D_2$	[96 189 900]	[96 207 300]			49

TABLE 46. Energy levels of ^{69}Ga XXXI

Configuration	Term	J	Level (cm^{-1})
$1s$	^2S	1/2	0
$2p$	$^2P^\circ$	1/2	*[79 985 971]*
		3/2	*[80 335 139]*
$2s$	^2S	1/2	[79 994 296]
$3p$	$^2P^\circ$	1/2	*[94 912 550]*
		3/2	*[95 016 101]*
$3s$	^2S	1/2	[94 915 190]
$3d$	^2D	3/2	[95 015 912.8]
		5/2	[95 049 600.6]
$4p$	$^2P^\circ$	1/2	*[100 122 541]*
		3/2	*[100 166 172]*
$4s$	^2S	1/2	[100 123 651]
$4d$	^2D	3/2	[100 166 091.0]
		5/2	[100 180 318.2]
$4f$	$^2F^\circ$	5/2	*[100 180 293.0]*
		7/2	*[100 187 364.8]*
$5p$	$^2P^\circ$	1/2	*[102 527 923]*
		3/2	*[102 550 238]*

TABLE 46. Energy levels of ^{69}Ga XXXI—Continued

Configuration	Term	J	Level (cm^{-1})
5*s*	^{2}S	1/2	[102 528 494]
5*d*	^{2}D	3/2	[102 550 196.3]
		5/2	[102 557 481.5]
5*f*	^{2}F°	5/2	*[102 557 468.5]*
		7/2	*[102 561 091.5]*
5*g*	^{2}G	7/2	[102 561 084.8]
		9/2	[102 563 253.5]
	Limit	—	**106 783 680**

TABLE 47. Spectral lines of ^{69}Ga XXXI

Wavelength (Å)	Classification Lower		Upper		Energy levels (cm^{-1})		References
0.9751318^C	1*s*	$^2S_{1/2}$	5*p*	$^2P^\circ_{3/2}$	0	[102 550 238]	
0.9983410^C	1*s*	$^2S_{1/2}$	4*p*	$^2P^\circ_{3/2}$	0	[100 166 172]	
1.0524532^C	1*s*	$^2S_{1/2}$	3*p*	$^2P^\circ_{3/2}$	0	[95 016 101]	
1.0536014^C	1*s*	$^2S_{1/2}$	3*p*	$^2P^\circ_{1/2}$	0	[94 912 550]	
1.2447853^C	1*s*	$^2S_{1/2}$	2*p*	$^2P^\circ_{3/2}$	0	[80 335 139]	45
1.2502192^C	1*s*	$^2S_{1/2}$	2*p*	$^2P^\circ_{1/2}$	0	[79 985 971]	45
4.433422^C	2*s*	$^2S_{1/2}$	5*p*	$^2P^\circ_{3/2}$	[79 994 296]	[102 550 238]	
4.499976^C	2*p*	$^2P^\circ_{3/2}$	5*d*	$^2D_{5/2}$	[80 335 139]	[102 557 481.5]	
4.957397^C	2*s*	$^2S_{1/2}$	4*p*	$^2P^\circ_{3/2}$	[79 994 296]	[100 166 172]	
5.039007^C	2*p*	$^2P^\circ_{3/2}$	4*d*	$^2D_{5/2}$	[80 335 139]	[100 180 318.2]	
6.65699^C	2*s*	$^2S_{1/2}$	3*p*	$^2P^\circ_{3/2}$	[79 994 296]	[95 016 101]	
6.79604^C	2*p*	$^2P^\circ_{3/2}$	3*d*	$^2D_{5/2}$	[80 335 139]	[95 049 600.6]	
13.09304^C	3*p*	$^2P^\circ_{1/2}$	5*d*	$^2D_{3/2}$	[94 912 550]	[102 550 196.3]	
13.09749^C	3*s*	$^2S_{1/2}$	5*p*	$^2P^\circ_{3/2}$	[94 915 190]	[102 550 238]	
13.2598636^C	3*d*	$^2D_{3/2}$	5*f*	$^2F^\circ_{5/2}$	[95 015 912.8]	[102 557 468.5]	
13.260172^C	3*p*	$^2P^\circ_{3/2}$	5*d*	$^2D_{5/2}$	[95 016 101]	[102 557 481.5]	
13.3129363^C	3*d*	$^2D_{5/2}$	5*f*	$^2F^\circ_{7/2}$	[95 049 600.6]	[102 561 091.5]	
19.03478^C	3*p*	$^2P^\circ_{1/2}$	4*d*	$^2D_{3/2}$	[94 912 550]	[100 166 091.0]	
19.04406^C	3*s*	$^2S_{1/2}$	4*p*	$^2P^\circ_{3/2}$	[94 915 190]	[100 166 172]	
19.363408^C	3*d*	$^2D_{3/2}$	4*f*	$^2F^\circ_{5/2}$	[95 015 912.8]	[100 180 293.0]	
19.36402^C	3*p*	$^2P^\circ_{3/2}$	4*d*	$^2D_{5/2}$	[95 016 101]	[100 180 318.2]	
19.463719^C	3*d*	$^2D_{5/2}$	4*f*	$^2F^\circ_{7/2}$	[95 049 600.6]	[100 187 364.8]	
41.19201^C	4*p*	$^2P^\circ_{1/2}$	5*d*	$^2D_{3/2}$	[100 122 541]	[102 550 196.3]	
41.21014^C	4*s*	$^2S_{1/2}$	5*p*	$^2P^\circ_{3/2}$	[100 123 651]	[102 550 238]	
41.816903^C	4*d*	$^2D_{3/2}$	5*f*	$^2F^\circ_{5/2}$	[100 166 091.0]	[102 557 468.5]	
41.81809^C	4*p*	$^2P^\circ_{3/2}$	5*d*	$^2D_{5/2}$	[100 166 172]	[102 557 481.5]	
42.002833^C	4*f*	$^2F^\circ_{5/2}$	5*g*	$^2G_{7/2}$	[100 180 293.0]	[102 561 084.8]	
42.003159^C	4*d*	$^2D_{5/2}$	5*f*	$^2F^\circ_{7/2}$	[100 180 318.2]	[102 561 091.5]	
42.089514^C	4*f*	$^2F^\circ_{7/2}$	5*g*	$^2G_{9/2}$	[100 187 364.8]	[102 563 253.5]	
293.390^C	2*s*	$^2S_{1/2}$	2*p*	$^2P^\circ_{3/2}$	[79 994 296]	[80 335 139]	
967.5^C	3*p*	$^2P^\circ_{1/2}$	3*d*	$^2D_{3/2}$	[94 912 550]	[95 015 912.8]	
991.0^C	3*s*	$^2S_{1/2}$	3*p*	$^2P^\circ_{3/2}$	[94 915 190]	[95 016 101]	
2295.5^C	4*p*	$^2P^\circ_{1/2}$	4*d*	$^2D_{3/2}$	[100 122 541]	[100 166 091.0]	
2351.1^C	4*s*	$^2S_{1/2}$	4*p*	$^2P^\circ_{3/2}$	[100 123 651]	[100 166 172]	
2984.2^C	3*p*	$^2P^\circ_{3/2}$	3*d*	$^2D_{5/2}$	[95 016 101]	[95 049 600.6]	
4488.4^C	5*p*	$^2P^\circ_{1/2}$	5*d*	$^2D_{3/2}$	[102 527 923]	[102 550 196.3]	
4597.7^C	5*s*	$^2S_{1/2}$	5*p*	$^2P^\circ_{3/2}$	[102 528 494]	[102 550 238]	
7067.^{C}	4*p*	$^2P^\circ_{3/2}$	4*d*	$^2D_{5/2}$	[100 166 172]	[100 180 318.2]	
13747.2^C	5*d*	$^2D_{3/2}$	5*f*	$^2F^\circ_{5/2}$	[102 550 196.3]	[102 557 468.5]	
13802.^{C}	5*p*	$^2P^\circ_{3/2}$	5*d*	$^2D_{5/2}$	[102 550 238]	[102 557 481.5]	

Note Added in Proof: While our manuscript was being prepared for publication, we noticed that an important article of Podobedova *et al.*[85] on the Ga VII spectrum was overlooked. These authors identified about 400 lines of the $3d^7-3d^64p$ transition array in the region 167 through 222 Å. The lines were observed in emission of a vacuum spark with estimated uncertainties of ±0.005 Å. From the observed wavelengths Podobedova *et al.*[85] derived all energy levels of the ground configuration $3d^7$ and most of the $3d^64p$ levels.

The tables of observed lines and energy levels of Podobedova *et al.*[85] contained several misprints. In most cases, they were easy to detect and correct using the relations between the line and level lists. For example, the energy of the $3d^7$ $^2H_{11/2}$ level was misprinted as 33 710 cm^{-1}, while the correct value is 37 710 cm^{-1}. For an additional consistency check, and also in order to retrieve the additional quantum numbers and percentage compositions omitted in description of the levels, we reproduced their parametric fit using their values of the Slater parameters. The list of energy levels given in Table 48 uses additional sequential indexes produced by the Cowan HFR code[33] to distinguish between the terms of d^7 and d^6 shells having the same *LS* designations (e.g., $3d^7$ ^{2}D1 and ^{2}D2).

While the $3d^7$ configuration is fairly well described by *LS* coupling, the *LS* labels assigned to the levels of the $3d^64p$ configuration do not fully describe their physical nature and in many cases even do not represent the leading *LS* term. The sole purpose of these labels is to relate the level list in Table 48 with the transition list in Table 49.

19 levels of the $3d^64p$ configuration (out of a total of 180) were not identified because transition rates from them to the $3d^7$ levels are very small. In particular, the lowest term, $3p^6(^5D)4p$ $^6D^\circ$, is still unknown.

By analyzing the list of identified transitions, we estimated that the uncertainties of the energy levels of the $3d^7$ configuration are between 5 and 8 cm^{-1}. For the $3d^64p$ levels, uncertainties vary between 6 and 30 cm^{-1} with an average of 20 cm^{-1}. We designated several levels determined from only one weak or blended spectral line as questionable.

The list of observed spectral lines of Ga VII is given in Table 49. It was noted by Podobedova *et al.*[85] that the lines of Ga VII were measured on the same photographic plates as the lines of Ga V tabulated by Ryabtsev and Ramonas.[47] Based on several blended lines present in both Ga V and Ga VII tables, we multiplied the observed Ga VII intensities from Podobedova *et al.*[85] by a factor of 10 to bring them on the same scale with lines of Ga V. The question marks after the energy values in Table 49 correspond to the questionable identification of the levels in Table 48. The question marks in the observed intensity column indicate that assignment of the line is questionable (e.g., because of blending or small calculated transition rate), but the levels of the transition are nevertheless firmly established using other lines.

We did not include in our table the radiative transition rates calculated by Podobedova *et al.*,[85] since they were obtained using a single-configuration Hartree-Fock method, which is known to produce large uncertainties. It should be noted that the units of transition rates were misprinted in the header of the *gW* column of their line list as 10^{-7} s^{-1}. According to a private communication from the authors of Ref. 85, the correct units are 10^9 s^{-1}.

TABLE 48. Energy levels of Ga VII, revised and extended

Configuration	Term	*J*	Level (cm^{-1})	Leading percentages			
$3d^7$	^{4}F	9/2	0	99			
		7/2	2 753	100			
		5/2	4 641	99			
		3/2	5 885	99			
$3d^7$	^{4}P	5/2	26 072	99			
		3/2	26 142	82	+	18	^{2}P
		1/2	27 850	93	+	7	^{2}P
$3d^7$	^{2}G	9/2	27 941	94	+	5	^{2}H
		7/2	30 562	100			
$3d^7$	^{2}P	3/2	33 799	67	+	17	^{4}P
		1/2	36 072	93	+	7	^{4}P
$3d^7$	^{2}H	11/2	37 710	100			
		9/2	40 229	95	+	5	^{2}G
$3d^7$	^{2}D2	5/2	38 580	76	+	23	^{2}D1
		3/2	42 718	67	+	16	^{2}P
$3d^7$	^{2}F	5/2	61 134	99			
		7/2	62 189	100			
$3d^7$	^{2}D1	3/2	94 873	81	+	19	^{2}D2

TABLE 48. Energy levels of Ga VII, revised and extended—Continued

Configuration	Term	J	Level (cm^{-1})		Leading percentages				
		5/2	96 280		76	+	23		^{2}D2
$3d^6(^5\mathrm{D})4p$	$^6\mathrm{F}^\circ$	7/2	494 326		77	+	8		$^4\mathrm{D}^\circ$
		5/2	494 440	?	86	+	6		$^4\mathrm{D}^\circ$
		1/2	494 482		92	+	6		$^4\mathrm{D}^\circ$
		3/2	494 485		90	+	6		$^4\mathrm{D}^\circ$
		9/2	494 690	?	85	+	9		$^4\mathrm{F}^\circ$
$3d^6(^5\mathrm{D})4p$	$^6\mathrm{P}^\circ$	7/2	497 349		65	+	14		$^4\mathrm{D}^\circ$
		5/2	500 456		69	+	19		$^4\mathrm{D}^\circ$
		3/2	502 569		70	+	23		$^4\mathrm{D}^\circ$
$3d^6(^5\mathrm{D})4p$	$^4\mathrm{D}^\circ$	7/2	500 860		71	+	23		$^6\mathrm{P}^\circ$
		5/2	502 264		67	+	25		$^6\mathrm{P}^\circ$
		3/2	503 232		64	+	27		$^6\mathrm{P}^\circ$
		1/2	503 540		87	+	6		$^6\mathrm{F}^\circ$
$3d^6(^5\mathrm{D})4p$	$^4\mathrm{F}^\circ$	9/2	501 754		87	+	11		$^6\mathrm{F}^\circ$
		7/2	504 279		90	+	7		$^6\mathrm{F}^\circ$
		5/2	505 926		93				
		3/2	507 030		95				
$3d^6(^5\mathrm{D})4p$	$^4\mathrm{P}^\circ$	5/2	508 288		94				
		3/2	509 937		95				
		1/2	510 702		96				
$3d^6(^3\mathrm{P2})4p$	$^4\mathrm{S}^\circ$	3/2	523 322		37	+	22		$^4\mathrm{P}^\circ$
$3d^6(^3\mathrm{H})4p$	$^4\mathrm{G}^\circ$	11/2	525 209		70	+	14	$3d^6(^3\mathrm{F2})4p$	$^4\mathrm{G}^\circ$
		9/2	525 794		25	+	21	$3d^6(^3\mathrm{F2})4p$	$^4\mathrm{G}^\circ$
		7/2	526 708		38	+	32	$3d^6(^3\mathrm{F2})4p$	$^4\mathrm{G}^\circ$
		5/2	537 616	?	27	+	16	$3d^6(^3\mathrm{G})4p$	$^4\mathrm{G}^\circ$
$3d^6(^3\mathrm{P2})4p$	$^2\mathrm{D}^\circ$	5/2	525 918		14	+	22		$^4\mathrm{D}^\circ$
		3/2	535 468		15	+	19		$^4\mathrm{D}^\circ$
$3d^6(^3\mathrm{H})4p$	$^4\mathrm{H}^\circ$	7/2	525 973		23	+	16		$^2\mathrm{G}^\circ$
		13/2	531 430		52	+	31		$^4\mathrm{I}^\circ$
		9/2	531 542		28	+	17		$^2\mathrm{G}^\circ$
$3d^6(^3\mathrm{H})4p$	$^4\mathrm{I}^\circ$	9/2	526 292		22	+	32		$^4\mathrm{H}^\circ$
		13/2	526 392	?	43	+	36		$^4\mathrm{H}^\circ$
$3d^6(^3\mathrm{F2})4p$	$^4\mathrm{G}^\circ$	5/2	527 077		43	+	31	$3d^6(^3\mathrm{H})4p$	$^4\mathrm{G}^\circ$
		9/2	535 157		22	+	20	$3d^6(^3\mathrm{G})4p$	$^4\mathrm{F}^\circ$
		7/2	535 599		26	+	12	$3d^6(^3\mathrm{H})4p$	$^4\mathrm{G}^\circ$
		11/2	536 341		39	+	25	$3d^6(^3\mathrm{H})4p$	$^2\mathrm{I}^\circ$
$3d^6(^3\mathrm{H})4p$	$^2\mathrm{G}^\circ$	9/2	528 877		17	+	48		$^4\mathrm{I}^\circ$
		7/2	531 498		14	+	22	$3d^6(^3\mathrm{F2})4p$	$^4\mathrm{F}^\circ$
$3d^6(^3\mathrm{F2})4p$	$^4\mathrm{F}^\circ$	5/2	529 270		40	+	13	$3d^6(^3\mathrm{F1})4p$	$^4\mathrm{F}^\circ$
		7/2	529 414		11	+	24	$3d^6(^3\mathrm{H})4p$	$^4\mathrm{H}^\circ$
		3/2	530 051	?	55	+	17	$3d^6(^3\mathrm{F1})4p$	$^4\mathrm{F}^\circ$
		9/2	530 711		32	+	19	$3d^6(^3\mathrm{H})4p$	$^2\mathrm{G}^\circ$
$3d^6(^3\mathrm{P2})4p$	$^4\mathrm{P}^\circ$	5/2	530 038		24	+	25		$^2\mathrm{D}^\circ$
		3/2	534 111	?	15	+	14	$3d^6(^3\mathrm{P1})4p$	$^4\mathrm{P}^\circ$
$3d^6(^3\mathrm{P2})4p$	$^4\mathrm{D}^\circ$	3/2	530 435	?	27	+	20		$^4\mathrm{S}^\circ$
		7/2	530 991		44	+	23	$3d^6(^3\mathrm{P1})4p$	$^4\mathrm{D}^\circ$
		1/2	533 148		51	+	21	$3d^6(^3\mathrm{P1})4p$	$^4\mathrm{D}^\circ$
		5/2	535 728		39	+	17	$3d^6(^3\mathrm{P1})4p$	$^4\mathrm{D}^\circ$

TABLE 48. Energy levels of Ga VII, revised and extended—Continued

Configuration	Term	J	Level (cm^{-1})		Leading percentages				
$3d^6(^3F2)4p$	$^4D^\circ$	7/2	532 549		34	+	11	$3d^6(^3H)4p$	$^2G^\circ$
		5/2	533 379		46	+	12		$^4F^\circ$
		1/2	534 888		58	+	14	$3d^6(^3D)4p$	$^4D^\circ$
$3d^6(^3H)4p$	$^2I^\circ$	13/2	533 649		69	+	23		$^4I^\circ$
		11/2	534 726		52	+	15	$3d^6(^3F2)4p$	$^4G^\circ$
$3d^6(^3F2)4p$	$^2F^\circ$	5/2	535 302		19	+	21	$3d^6(^3G)4p$	$^4G^\circ$
		7/2	538 050		21	+	11	$3d^6(^3F1)4p$	$^2F^\circ$
$3d^6(^3G)4p$	$^4F^\circ$	9/2	535 733		39	+	27		$^4G^\circ$
		7/2	537 262		43	+	27		$^4G^\circ$
		5/2	539 366		32	+	13	$3d^6(^3F2)4p$	$^2F^\circ$
		3/2	540 577		31	+	16	$3d^6(^3P2)4p$	$^2P^\circ$
$3d^6(^3G)4p$	$^2H^\circ$	11/2	536 744		28	+	20		$^4G^\circ$
		9/2	538 040		28	+	14	$3d^6(^3H)4p$	$^2H^\circ$
$3d^6(^3P2)4p$	$^2P^\circ$	1/2	538 004		20	+	29		$^2S^\circ$
		3/2	539 725		26	+	24	$3d^6(^3G)4p$	$^4F^\circ$
$3d^6(^3G)4p$	$^4G^\circ$	11/2	539 238		40	+	17	$3d^6(^3H)4p$	$^4G^\circ$
		9/2	540 480		25	+	21	$3d^6(^3H)4p$	$^2H^\circ$
		7/2	540 685		25	+	16		$^4H^\circ$
		5/2	541 060		41	+	18		$^4F^\circ$
$3d^6(^3F2)4p$	$^2G^\circ$	9/2	539 841		26	+	13	$3d^6(^3H)4p$	$^4H^\circ$
		7/2	540 484		41	+	12	$3d^6(^3G)4p$	$^4H^\circ$
$3d^6(^3P2)4p$	$^2S^\circ$	1/2	541 268		40	+	15	$3d^6(^3P1)4p$	$^2S^\circ$
$3d^6(^3G)4p$	$^4H^\circ$	7/2	541 304		34	+	20	$3d^6(^3F2)4p$	$^2G^\circ$
		11/2	541 424		62	+	13	$3d^6(^3H)4p$	$^2H^\circ$
		9/2	541 471		54	+	12		$^4G^\circ$
$3d^6(^3F2)4p$	$^2D^\circ$	5/2	543 934		46	+	11	$3d^6(^3P2)4p$	$^2D^\circ$
		3/2	545 417		55	+	18	$3d^6(^3P2)4p$	$^2D^\circ$
$3d^6(^3G)4p$	$^2F^\circ$	5/2	545 632		29	+	20	$3d^6(^3F2)4p$	$^2D^\circ$
		7/2	546 341		39	+	21	$3d^6(^3D)4p$	$^2F^\circ$
$3d^6(^1I)4p$	$^2K^\circ$	13/2	546 431	?	93	+	5		$^2I^\circ$
$3d^6(^3H)4p$	$^2H^\circ$	11/2	546 960		52	+	30	$3d^6(^3G)4p$	$^2H^\circ$
		9/2	547 868		20	+	16	$3d^6(^3G)4p$	$^2H^\circ$
$3d^6(^3D)4p$	$^4P^\circ$	5/2	547 996		79	+	5		$^2D^\circ$
		3/2	548 824		57	+	14		$^2P^\circ$
		1/2	551 797	?	65	+	9		$^2P^\circ$
$3d^6(^1G2)4p$	$^2H^\circ$	9/2	549 753		26	+	23	$3d^6(^3G)4p$	$^2H^\circ$
		11/2	555 468		43	+	26	$3d^6(^1G1)4p$	$^2H^\circ$
$3d^6(^3G)4p$	$^2G^\circ$	7/2	549 771		53	+	13	$3d^6(^1G2)4p$	$^2F^\circ$
		9/2	550 920		50	+	16	$3d^6(^3H)4p$	$^2H^\circ$
$3d^6(^1I)4p$	$^2H^\circ$	11/2	549 929		53	+	19	$3d^6(^3G)4p$	$^2H^\circ$
		9/2	555 406		60	+	13	$3d^6(^3G)4p$	$^2H^\circ$
$3d^6(^3D)4p$	$^4D^\circ$	1/2	550 217		30	+	26		$^2P^\circ$
		7/2	552 825		15	+	20	$3d^6(^1G2)4p$	$^2G^\circ$
		5/2	553 516		57	+	19		$^4F^\circ$
		3/2	553 821		42	+	37		$^2P^\circ$

TABLE 48. Energy levels of Ga VII, revised and extended—Continued

Configuration	Term	J	Level (cm^{-1})	Leading percentages				
$3d^6(^3D)4p$	$^4F^\circ$	3/2	551 436	48	+	29	$3d^6(^3G)4p$	$^4F^\circ$
		5/2	552 194	38	+	21	$3d^6(^3G)4p$	$^4F^\circ$
		7/2	554 233	23	+	37		$^4D^\circ$
		9/2	554 816	61	+	11	$3d^6(^1G2)4p$	$^2G^\circ$
$3d^6(^3D)4p$	$^2P^\circ$	3/2	552 107	26	+	24		$^4P^\circ$
		1/2	554 060	29	+	35		$^4D^\circ$
$3d^6(^1G2)4p$	$^2G^\circ$	7/2	552 256	22	+	18	$3d^6(^3D)4p$	$^4D^\circ$
		9/2	554 178	38	+	18	$3d^6(^3D)4p$	$^4F^\circ$
$3d^6(^1G2)4p$	$^2F^\circ$	7/2	553 976	18	+	25	$3d^6(^3D)4p$	$^4F^\circ$
		5/2	555 091	30	+	17	$3d^6(^3G)4p$	$^2F^\circ$
$3d^6(^1D2)4p$	$^2P^\circ$	3/2	556 405	22	+	44	$3d^6(^3D)4p$	$^2D^\circ$
		1/2	564 312	49	+	20	$3d^6(^1D1)4p$	$^2P^\circ$
$3d^6(^1I)4p$	$^2I^\circ$	13/2	556 798	94	+	5		$^2K^\circ$
		11/2	556 952	67	+	15		$^2H^\circ$
$3d^6(^3D)4p$	$^2D^\circ$	5/2	557 668	71	+	8		$^2F^\circ$
		3/2	557 825	26	+	17	$3d^6(^1D2)4p$	$^2P^\circ$
$3d^6(^3D)4p$	$^2F^\circ$	7/2	558 566	58	+	15	$3d^6(^1D2)4p$	$^2F^\circ$
		5/2	558 978	26	+	29	$3d^6(^1D2)4p$	$^2F^\circ$
$3d^6(^1S2)4p$	$^2P^\circ$	1/2	559 904	35	+	20	$3d^6(^3D)4p$	$^2P^\circ$
		3/2	567 000	35	+	20	$3d^6(^1D2)4p$	$^2P^\circ$
$3d^6(^1D2)4p$	$^2D^\circ$	5/2	561 991	26	+	26	$3d^6(^3D)4p$	$^2F^\circ$
		3/2	562 112	48	+	12	$3d^6(^1S2)4p$	$^2P^\circ$
$3d^6(^1D2)4p$	$^2F^\circ$	5/2	564 156	23	+	20	$3d^6(^1G2)4p$	$^2F^\circ$
		7/2	565 606	45	+	11	$3d^6(^3G)4p$	$^2F^\circ$
$3d^6(^1F)4p$	$^2G^\circ$	7/2	568 768	82	+	5	$3d^6(^3G)4p$	$^2G^\circ$
		9/2	572 452	89				
$3d^6(^1F)4p$	$^2D^\circ$	5/2	572 071	38	+	25	$3d^6(^1D2)4p$	$^2D^\circ$
		3/2	575 975	65	+	7	$3d^6(^3P1)4p$	$^4D^\circ$
$3d^6(^3P1)4p$	$^4D^\circ$	1/2	573 006	41	+	32	$3d^6(^3F1)4p$	$^4D^\circ$
		3/2	573 291	30	+	34	$3d^6(^3F1)4p$	$^4D^\circ$
		5/2	591 396	12	+	22		$^4P^\circ$
		7/2	595 711	22	+	22	$3d^6(^3F1)4p$	$^4F^\circ$
$3d^6(^3F1)4p$	$^4D^\circ$	7/2	574 464	55	+	20	$3d^6(^3P1)4p$	$^4D^\circ$
		5/2	574 543	39	+	28	$3d^6(^3P1)4p$	$^4D^\circ$
		1/2	590 804	49	+	19	$3d^6(^3P1)4p$	$^4D^\circ$
		3/2	591 892	30	+	18	$3d^6(^3P1)4p$	$^4D^\circ$
$3d^6(^1F)4p$	$^2F^\circ$	5/2	578 795	73	+	8		$^2D^\circ$
		7/2	578 883	77	+	6	$3d^6(^1G2)4p$	$^2F^\circ$
$3d^6(^3F1)4p$	$^4G^\circ$	5/2	582 673	75	+	15	$3d^6(^3F2)4p$	$^4G^\circ$
		7/2	583 630	73	+	16	$3d^6(^3F2)4p$	$^4G^\circ$
		9/2	584 357	63	+	15	$3d^6(^3F2)4p$	$^4G^\circ$
$3d^6(^3P1)4p$	$^4S^\circ$	3/2	585 126	74	+	21	$3d^6(^3P2)4p$	$^4S^\circ$
$3d^6(^3F1)4p$	$^2D^\circ$	3/2	588 009	46	+	19	$3d^6(^3P1)4p$	$^2D^\circ$
		5/2	589 686	39	+	21	$3d^6(^3P1)4p$	$^2D^\circ$
$3d^6(^3P1)4p$	$^4P^\circ$	3/2	589 210	49	+	39	$3d^6(^3P2)4p$	$^4P^\circ$

TABLE 48. Energy levels of Ga VII, revised and extended—Continued

Configuration	Term	J	Level (cm^{-1})	Leading percentages			
		5/2	592 966	23	+	19 $3d^6(^3P2)4p$	$^4P^\circ$
$3d^6(^3F1)4p$	$^2G^\circ$	9/2	589 966	53	+	13 $3d^6(^3F2)4p$	$^2G^\circ$
		7/2	591 670	50	+	18	$^4F^\circ$
$3d^6(^3F1)4p$	$^4F^\circ$	3/2	592 793	45	+	14 $3d^6(^3F2)4p$	$^4F^\circ$
		7/2	593 217	27	+	21	$^2G^\circ$
		5/2	594 384	36	+	20	$^4D^\circ$
		9/2	594 880	61	+	23 $3d^6(^3F2)4p$	$^4F^\circ$
$3d^6(^3P1)4p$	$^2D^\circ$	3/2	595 580	17	+	25 $3d^6(^3F1)4p$	$^2D^\circ$
		5/2	597 628	31	+	23 $3d^6(^3P2)4p$	$^2D^\circ$
$3d^6(^3F1)4p$	$^2F^\circ$	7/2	597 601	34	+	23 $3d^6(^1G1)4p$	$^2F^\circ$
		5/2	599 465	61	+	24 $3d^6(^3F2)4p$	$^2F^\circ$
$3d^6(^3P1)4p$	$^2P^\circ$	1/2	597 627	52	+	33 $3d^6(^3P2)4p$	$^2P^\circ$
		3/2	599 692	41	+	28 $3d^6(^3P2)4p$	$^2P^\circ$
$3d^6(^1G1)4p$	$^2H^\circ$	9/2	598 337	54	+	31 $3d^6(^1G2)4p$	$^2H^\circ$
		11/2	602 300	61	+	35 $3d^6(^1G2)4p$	$^2H^\circ$
$3d^6(^1G1)4p$	$^2G^\circ$	7/2	601 349	32	+	19 $3d^6(^3F1)4p$	$^2F^\circ$
		9/2	605 052	61	+	24 $3d^6(^1G2)4p$	$^2G^\circ$
$3d^6(^1G1)4p$	$^2F^\circ$	5/2	603 604	51	+	22 $3d^6(^1G2)4p$	$^2F^\circ$
		7/2	606 160	17	+	33	$^2G^\circ$
$3d^6(^1D1)4p$	$^2D^\circ$	3/2	629 143	77	+	16 $3d^6(^1D2)4p$	$^2D^\circ$
		5/2	630 195	76	+	15 $3d^6(^1D2)4p$	$^2D^\circ$
$3d^6(^1D1)4p$	$^2P^\circ$	3/2	640 060	62	+	24 $3d^6(^1D2)4p$	$^2P^\circ$
		1/2	641 064	63	+	24 $3d^6(^1D2)4p$	$^2P^\circ$
$3d^6(^1D1)4p$	$^2F^\circ$	7/2	641 323	72	+	22 $3d^6(^1D2)4p$	$^2F^\circ$
Ga VIII ($^5D_4$)	**Limit**	—	**1 136 000**				

TABLE 49. Spectral lines of Ga VII

Wavelength (Å)	Classification				Energy Levels (cm^{-1})		Int.	Ref.
	Lower		Upper					
167.868	$3d^7$	$^4F_{9/2}$	$3d^6(^3P1)4p$	$^4D^\circ_{7/2}$	0	595 711	40	85
168.108	$3d^7$	$^4F_{9/2}$	$3d^6(^3F1)4p$	$^4F^\circ_{9/2}$	0	594 880	140	85
169.032	$3d^7$	$^4F_{7/2}$	$3d^6(^3F1)4p$	$^4F^\circ_{5/2}$	2 753	594 384	70	85
169.360	$3d^7$	$^4F_{7/2}$	$3d^6(^3F1)4p$	$^4F^\circ_{7/2}$	2 753	593 217	70	85
169.505	$3d^7$	$^4F_{9/2}$	$3d^6(^3F1)4p$	$^2G^\circ_{9/2}$	0	589 966	10	85
169.806	$3d^7$	$^4F_{7/2}$	$3d^6(^3F1)4p$	$^2G^\circ_{7/2}$	2 753	591 670	10	85
169.975	$3d^7$	$^4F_{5/2}$	$3d^6(^3P1)4p$	$^4P^\circ_{5/2}$	4 641	592 966	10	85
170.649	$3d^7$	$^4F_{3/2}$	$3d^6(^3F1)4p$	$^4D^\circ_{3/2}$	5 885	591 892	40	85
170.966	$3d^7$	$^4F_{3/2}$	$3d^6(^3F1)4p$	$^4D^\circ_{1/2}$	5 885	590 804	10	85
172.672	$3d^7$	$^2F_{7/2}$	$3d^6(^1D1)4p$	$^2F^\circ_{7/2}$	62 189	641 323	10	85
174.073	$3d^7$	$^4F_{9/2}$	$3d^6(^3F1)4p$	$^4D^\circ_{7/2}$	0	574 464	30	85
174.889	$3d^7$	$^4F_{7/2}$	$3d^6(^3F1)4p$	$^4D^\circ_{5/2}$	2 753	574 543	10	85

TABLE 49. Spectral lines of Ga VII—Continued

Wavelength (Å)	Classification				Energy Levels (cm^{-1})		Int.	Ref.
	Lower		Upper					
175.550	$3d^7$	$^4P_{5/2}$	$3d^6(^3P1)4p$	$^4D^\circ_{7/2}$	26 072	595 711	70	85
175.959	$3d^7$	$^4P_{5/2}$	$3d^6(^3F1)4p$	$^4F^\circ_{5/2}$	26 072	594 384	2	85
175.981	$3d^7$	$^4P_{3/2}$	$3d^6(^3F1)4p$	$^4F^\circ_{5/2}$	26 142	594 384	20	85
176.054	$3d^7$	$^2F_{7/2}$	$3d^6(^1D1)4p$	$^2D^\circ_{5/2}$	62 189	630 195	80	85
	$3d^7$	$^2F_{5/2}$	$3d^6(^1D1)4p$	$^2D^\circ_{3/2}$	61 134	629 143		85
176.260	$3d^7$	$^2H_{11/2}$	$3d^6(^1G1)4p$	$^2G^\circ_{9/2}$	37 710	605 052	290	85
176.325	$3d^7$	$^4P_{5/2}$	$3d^6(^3F1)4p$	$^4F^\circ_{7/2}$	26 072	593 217	20	85
176.400	$3d^7$	$^4P_{5/2}$	$3d^6(^3P1)4p$	$^4P^\circ_{5/2}$	26 072	592 966	30	85
176.700	$3d^7$	$^2H_{9/2}$	$3d^6(^1G1)4p$	$^2F^\circ_{7/2}$	40 229	606 160	150	85
176.758	$3d^7$	$^4P_{3/2}$	$3d^6(^3F1)4p$	$^4D^\circ_{3/2}$	26 142	591 892	30	85
176.913	$3d^7$	$^4P_{3/2}$	$3d^6(^3P1)4p$	$^4D^\circ_{5/2}$	26 142	591 396	50	85
177.120	$3d^7$	$^2H_{11/2}$	$3d^6(^1G1)4p$	$^2H^\circ_{11/2}$	37 710	602 300	70	85
177.289	$3d^7$	$^4P_{1/2}$	$3d^6(^3F1)4p$	$^4D^\circ_{3/2}$	27 850	591 892	20	85
177.576	$3d^7$	$^4P_{5/2}$	$3d^6(^3P1)4p$	$^4P^\circ_{3/2}$	26 072	589 210	30	85
177.634	$3d^7$	$^4P_{1/2}$	$3d^6(^3F1)4p$	$^4D^\circ_{1/2}$	27 850	590 804	30	85
178.139	$3d^7$	$^4P_{1/2}$	$3d^6(^3P1)4p$	$^4P^\circ_{3/2}$	27 850	589 210	20	85
178.215	$3d^7$	$^2H_{9/2}$	$3d^6(^1G1)4p$	$^2G^\circ_{7/2}$	40 229	601 349	90	85
	$3d^7$	$^2D2_{5/2}$	$3d^6(^3P1)4p$	$^2P^\circ_{3/2}$	38 580	599 692		85
178.371	$3d^7$	$^2H_{11/2}$	$3d^6(^1G1)4p$	$^2H^\circ_{9/2}$	37 710	598 337	60	85
178.874	$3d^7$	$^4P_{5/2}$	$3d^6(^3P1)4p$	$^4S^\circ_{3/2}$	26 072	585 126	150	85
178.897	$3d^7$	$^4P_{3/2}$	$3d^6(^3P1)4p$	$^4S^\circ_{3/2}$	26 142	585 126	30	85
179.177	$3d^7$	$^2H_{9/2}$	$3d^6(^1G1)4p$	$^2H^\circ_{9/2}$	40 229	598 337	40	85
179.445	$3d^7$	$^4P_{1/2}$	$3d^6(^3P1)4p$	$^4S^\circ_{3/2}$	27 850	585 126	40	85
179.480	$3d^7$	$^2H_{11/2}$	$3d^6(^3F1)4p$	$^4F^\circ_{9/2}$	37 710	594 880	90	85
180.022	$3d^7$	$^2H_{9/2}$	$3d^6(^3P1)4p$	$^4D^\circ_{7/2}$	40 229	595 711	20	85
180.210	$3d^7$	$^2D2_{3/2}$	$3d^6(^3P1)4p$	$^2P^\circ_{1/2}$	42 718	597 627	2	85
180.428	$3d^7$	$^4F_{9/2}$	$3d^6(^3D)4p$	$^4F^\circ_{7/2}$	0	554 233	40	85
180.833	$3d^7$	$^2H_{9/2}$	$3d^6(^3F1)4p$	$^4F^\circ_{7/2}$	40 229	593 217	330*bl*	85
181.075	$3d^7$	$^2H_{11/2}$	$3d^6(^3F1)4p$	$^2G^\circ_{9/2}$	37 710	589 966	370	85
	$3d^7$	$^4F_{9/2}$	$3d^6(^1G2)4p$	$^2G^\circ_{7/2}$	0	552 256		85
181.343	$3d^7$	$^2H_{9/2}$	$3d^6(^3F1)4p$	$^2G^\circ_{7/2}$	40 229	591 670	260	85
181.382	$3d^7$	$^2P_{3/2}$	$3d^6(^3P1)4p$	$^4S^\circ_{3/2}$	33 799	585 126	10	85
181.567	$3d^7$	$^4F_{7/2}$	$3d^6(^3D)4p$	$^4D^\circ_{5/2}$	2 753	553 516	20	85
182.090	$3d^7$	$^2D2_{3/2}$	$3d^6(^3F1)4p$	$^4D^\circ_{3/2}$	42 718	591 892	10	85
182.323	$3d^7$	$^4P_{5/2}$	$3d^6(^3F1)4p$	$^4D^\circ_{5/2}$	26 072	574 543	30	85
182.351	$3d^7$	$^4P_{5/2}$	$3d^6(^3F1)4p$	$^4D^\circ_{7/2}$	26 072	574 464	700	85
	$3d^7$	$^4P_{3/2}$	$3d^6(^3F1)4p$	$^4D^\circ_{5/2}$	26 142	574 543		85
182.767	$3d^7$	$^4P_{3/2}$	$3d^6(^3P1)4p$	$^4D^\circ_{3/2}$	26 142	573 291	30	85
182.933	$3d^7$	$^2H_{11/2}$	$3d^6(^3F1)4p$	$^4G^\circ_{9/2}$	37 710	584 357	210	85
183.086	$3d^7$	$^2D1_{3/2}$	$3d^6(^1D1)4p$	$^2P^\circ_{1/2}$	94 873	641 064	30	85
183.150	$3d^7$	$^4P_{5/2}$	$3d^6(^1F)4p$	$^2D^\circ_{5/2}$	26 072	572 071	10	85
183.175	$3d^7$	$^4P_{3/2}$	$3d^6(^1F)4p$	$^2D^\circ_{5/2}$	26 142	572 071	70*bl*	85
183.337	$3d^7$	$^4P_{1/2}$	$3d^6(^3P1)4p$	$^4D^\circ_{3/2}$	27 850	573 291	30	85
183.434	$3d^7$	$^4P_{1/2}$	$3d^6(^3P1)4p$	$^4D^\circ_{1/2}$	27 850	573 006	40	85
183.480	$3d^7$	$^2F_{5/2}$	$3d^6(^1G1)4p$	$^2F^\circ_{7/2}$	61 134	606 160	30	85
183.648	$3d^7$	$^2G_{9/2}$	$3d^6(^1F)4p$	$^2G^\circ_{9/2}$	27 941	572 452	4	85
183.834	$3d^7$	$^2F_{7/2}$	$3d^6(^1G1)4p$	$^2F^\circ_{7/2}$	62 189	606 160	2	85
183.897	$3d^7$	$^2D1_{5/2}$	$3d^6(^1D1)4p$	$^2P^\circ_{3/2}$	96 280	640 060	90	85
184.026	$3d^7$	$^2H_{9/2}$	$3d^6(^3F1)4p$	$^4G^\circ_{7/2}$	40 229	583 630	30	85
184.208	$3d^7$	$^2F_{7/2}$	$3d^6(^1G1)4p$	$^2G^\circ_{9/2}$	62 189	605 052	200	85

TABLE 49. Spectral lines of Ga VII—Continued

Wavelength (Å)	Classification Lower		Upper		Energy Levels (cm^{-1})		Int.	Ref.
184.341	$3d^7$	$^2F_{5/2}$	$3d^6(^1G1)4p$	$^2F^{\circ}_{5/2}$	61 134	603 604	40	85
184.684	$3d^7$	$^4F_{9/2}$	$3d^6(^3G)4p$	$^4H^{\circ}_{9/2}$	0	541 471	4	85
184.873	$3d^7$	$^4P_{5/2}$	$3d^6(^1S2)4p$	$^2P^{\circ}_{3/2}$	26 072	567 000	20	85
184.893	$3d^7$	$^4P_{3/2}$	$3d^6(^1S2)4p$	$^2P^{\circ}_{3/2}$	26 142	567 000	50	85
184.932	$3d^7$	$^2P_{3/2}$	$3d^6(^3F1)4p$	$^4D^{\circ}_{5/2}$	33 799	574 543	90	85
185.086	$3d^7$	$^2D2_{5/2}$	$3d^6(^1F)4p$	$^2F^{\circ}_{7/2}$	38 580	578 883	100	85
185.113	$3d^7$	$^2F_{5/2}$	$3d^6(^1G1)4p$	$^2G^{\circ}_{7/2}$	61 134	601 349	130	85
	$3d^7$	$^2D2_{5/2}$	$3d^6(^1F)4p$	$^2F^{\circ}_{5/2}$	38 580	578 795		85
185.215	$3d^7$	$^2P_{1/2}$	$3d^6(^1F)4p$	$^2D^{\circ}_{3/2}$	36 072	575 975	30	85
185.241	$3d^7$	$^4F_{9/2}$	$3d^6(^3F2)4p$	$^2G^{\circ}_{9/2}$	0	539 841	30	85
185.345	$3d^7$	$^4F_{3/2}$	$3d^6(^3F2)4p$	$^2D^{\circ}_{3/2}$	5 885	545 417	40	85
185.428	$3d^7$	$^4F_{5/2}$	$3d^6(^3F2)4p$	$^2D^{\circ}_{5/2}$	4 641	543 934	20	85
185.686	$3d^7$	$^4F_{7/2}$	$3d^6(^3G)4p$	$^4H^{\circ}_{7/2}$	2 753	541 304	50	85
	$3d^7$	$^2F_{5/2}$	$3d^6(^3P1)4p$	$^2P^{\circ}_{3/2}$	61 134	599 692		85
185.759	$3d^7$	$^2F_{5/2}$	$3d^6(^3F1)4p$	$^2F^{\circ}_{5/2}$	61 134	599 465	130	85
185.859	$3d^7$	$^4F_{9/2}$	$3d^6(^3G)4p$	$^2H^{\circ}_{9/2}$	0	538 040	140	85
185.897	$3d^7$	$^4F_{7/2}$	$3d^6(^3G)4p$	$^4G^{\circ}_{7/2}$	2 753	540 685	190	85
185.989	$3d^7$	$^2G_{9/2}$	$3d^6(^1D2)4p$	$^2F^{\circ}_{7/2}$	27 941	565 606	4	85
186.127	$3d^7$	$^4F_{9/2}$	$3d^6(^3G)4p$	$^4F^{\circ}_{7/2}$	0	537 262	20	85
186.189	$3d^7$	$^4F_{7/2}$	$3d^6(^3F2)4p$	$^2G^{\circ}_{9/2}$	2 753	539 841	110	85
186.354	$3d^7$	$^4F_{7/2}$	$3d^6(^3G)4p$	$^4F^{\circ}_{5/2}$	2 753	539 366	40	85
186.421	$3d^7$	$^4F_{5/2}$	$3d^6(^3G)4p$	$^4G^{\circ}_{5/2}$	4 641	541 060	290	85
186.449	$3d^7$	$^4F_{9/2}$	$3d^6(^3F2)4p$	$^4G^{\circ}_{11/2}$	0	536 341	490	85
186.518	$3d^7$	$^2F_{7/2}$	$3d^6(^1G1)4p$	$^2H^{\circ}_{9/2}$	62 189	598 337	40	85
186.542	$3d^7$	$^2D2_{3/2}$	$3d^6(^1F)4p$	$^2F^{\circ}_{5/2}$	42 718	578 795	70	85
186.551	$3d^7$	$^4F_{5/2}$	$3d^6(^3G)4p$	$^4G^{\circ}_{7/2}$	4 641	540 685	70	85
186.589	$3d^7$	$^4F_{5/2}$	$3d^6(^3G)4p$	$^4F^{\circ}_{3/2}$	4 641	540 577	60	85
186.622	$3d^7$	$^4F_{5/2}$	$3d^6(^3F2)4p$	$^2G^{\circ}_{7/2}$	4 641	540 484	90	85
	$3d^7$	$^4P_{3/2}$	$3d^6(^1D2)4p$	$^2D^{\circ}_{5/2}$	26 142	561 991		85
186.660	$3d^7$	$^4F_{9/2}$	$3d^6(^3G)4p$	$^4F^{\circ}_{9/2}$	0	535 733	430	85
186.710	$3d^7$	$^4F_{9/2}$	$3d^6(^3F2)4p$	$^4G^{\circ}_{7/2}$	0	535 599	10	85
186.763	$3d^7$	$^2F_{7/2}$	$3d^6(^3P1)4p$	$^2D^{\circ}_{5/2}$	62 189	597 628	140	85
186.772	$3d^7$	$^2F_{7/2}$	$3d^6(^3F1)4p$	$^2F^{\circ}_{7/2}$	62 189	597 601	410	85
186.816	$3d^7$	$^4F_{7/2}$	$3d^6(^3G)4p$	$^2H^{\circ}_{9/2}$	2 753	538 040	50	85
186.861	$3d^7$	$^4F_{9/2}$	$3d^6(^3F2)4p$	$^4G^{\circ}_{9/2}$	0	535 157	1100	85
187.004	$3d^7$	$^2H_{11/2}$	$3d^6(^1F)4p$	$^2G^{\circ}_{9/2}$	37 710	572 452	1100	85
187.013	$3d^7$	$^4F_{9/2}$	$3d^6(^3H)4p$	$^2I^{\circ}_{11/2}$	0	534 726	1100	85
	$3d^7$	$^4F_{5/2}$	$3d^6(^3G)4p$	$^4F^{\circ}_{5/2}$	4 641	539 366		85
187.023	$3d^7$	$^4F_{3/2}$	$3d^6(^3G)4p$	$^4F^{\circ}_{3/2}$	5 885	540 577	500	85
187.088	$3d^7$	$^4F_{7/2}$	$3d^6(^3G)4p$	$^4F^{\circ}_{7/2}$	2 753	537 262	800	85
187.171	$3d^7$	$^2D1_{3/2}$	$3d^6(^1D1)4p$	$^2D^{\circ}_{3/2}$	94 873	629 143	140	85
187.297	$3d^7$	$^2D1_{5/2}$	$3d^6(^1D1)4p$	$^2D^{\circ}_{5/2}$	96 280	630 195	120	85
187.322	$3d^7$	$^4F_{3/2}$	$3d^6(^3P2)4p$	$^2P^{\circ}_{3/2}$	5 885	539 725	140	85
187.447	$3d^7$	$^4F_{3/2}$	$3d^6(^3G)4p$	$^4F^{\circ}_{5/2}$	5 885	539 366	550	85
	$3d^7$	$^2D2_{5/2}$	$3d^6(^1F)4p$	$^2D^{\circ}_{5/2}$	38 580	572 071		85
187.473	$3d^7$	$^4F_{5/2}$	$3d^6(^3F2)4p$	$^2F^{\circ}_{7/2}$	4 641	538 050	210	85
187.527	$3d^7$	$^2D2_{3/2}$	$3d^6(^1F)4p$	$^2D^{\circ}_{3/2}$	42 718	575 975	450	85
187.547	$3d^7$	$^2P_{3/2}$	$3d^6(^1S2)4p$	$^2P^{\circ}_{3/2}$	33 799	567 000	50	85
187.626	$3d^7$	$^4F_{7/2}$	$3d^6(^3G)4p$	$^4F^{\circ}_{9/2}$	2 753	535 733	850	85
	$3d^7$	$^4F_{5/2}$	$3d^6(^3H)4p$	$^4G^{\circ}_{5/2}$	4 641	537 616 ?		85

TABLE 49. Spectral lines of Ga VII—Continued

Wavelength (Å)	Classification Lower		Upper		Energy Levels (cm^{-1})			Int.	Ref.
	$3d^7$	$^4F_{7/2}$	$3d^6(^3P2)4p$	$^4D^\circ_{5/2}$	2 753	535 728			85
187.675	$3d^7$	$^4F_{7/2}$	$3d^6(^3F2)4p$	$^4G^\circ_{7/2}$	2 753	535 599		290	85
187.752	$3d^7$	$^4F_{5/2}$	$3d^6(^3G)4p$	$^4F^\circ_{7/2}$	4 641	537 262		340	85
187.776	$3d^7$	$^4F_{7/2}$	$3d^6(^3F2)4p$	$^2F^\circ_{5/2}$	2 753	535 302		220	85
	$3d^7$	$^4F_{9/2}$	$3d^6(^3F2)4p$	$^4D^\circ_{7/2}$	0	532 549			85
187.827	$3d^7$	$^4F_{7/2}$	$3d^6(^3F2)4p$	$^4G^\circ_{9/2}$	2 753	535 157		70	85
188.090	$3d^7$	$^2F_{5/2}$	$3d^6(^3F1)4p$	$^4F^\circ_{3/2}$	61 134	592 793		20	85
188.116	$3d^7$	$^4P_{5/2}$	$3d^6(^3D)4p$	$^2D^\circ_{5/2}$	26 072	557 668		10	85
188.147	$3d^7$	$^4F_{9/2}$	$3d^6(^3H)4p$	$^2G^\circ_{7/2}$	0	531 498		410	85
188.171	$3d^7$	$^2G_{7/2}$	$3d^6(^1D2)4p$	$^2D^\circ_{5/2}$	30 562	561 991		70	85
188.297	$3d^7$	$^4F_{5/2}$	$3d^6(^3P2)4p$	$^4D^\circ_{5/2}$	4 641	535 728		30	85
188.327	$3d^7$	$^4F_{9/2}$	$3d^6(^3P2)4p$	$^4D^\circ_{7/2}$	0	530 991		600	85
188.342	$3d^7$	$^4F_{5/2}$	$3d^6(^3F2)4p$	$^4G^\circ_{7/2}$	4 641	535 599		400	85
188.405	$3d^7$	$^2F_{7/2}$	$3d^6(^3P1)4p$	$^4P^\circ_{5/2}$	62 189	592 966		30	85
	$3d^7$	$^2F_{5/2}$	$3d^6(^3F1)4p$	$^4D^\circ_{3/2}$	61 134	591 892			85
188.426	$3d^7$	$^4F_{9/2}$	$3d^6(^3F2)4p$	$^4F^\circ_{9/2}$	0	530 711		70	85
188.457	$3d^7$	$^4F_{7/2}$	$3d^6(^3F2)4p$	$^4D^\circ_{5/2}$	2 753	533 379		1300	85
	$3d^7$	$^2G_{9/2}$	$3d^6(^3D)4p$	$^2F^\circ_{7/2}$	27 941	558 566			85
188.494	$3d^7$	$^2P_{3/2}$	$3d^6(^1D2)4p$	$^2P^\circ_{1/2}$	33 799	564 312		30	85
188.552	$3d^7$	$^2P_{3/2}$	$3d^6(^1D2)4p$	$^2F^\circ_{5/2}$	33 799	564 156		2	85
188.825	$3d^7$	$^4F_{3/2}$	$3d^6(^3P2)4p$	$^2D^\circ_{3/2}$	5 885	535 468		20	85
188.868	$3d^7$	$^4F_{5/2}$	$3d^6(^3P2)4p$	$^4P^\circ_{3/2}$	4 641	534 111	?	460	85
188.888	$3d^7$	$^4F_{3/2}$	$3d^6(^3F2)4p$	$^2F^\circ_{5/2}$	5 885	535 302		480	85
	$3d^7$	$^4F_{9/2}$	$3d^6(^3F2)4p$	$^4F^\circ_{7/2}$	0	529 414			85
188.956	$3d^7$	$^2F_{7/2}$	$3d^6(^3P1)4p$	$^4D^\circ_{5/2}$	62 189	591 396		20	85
189.035	$3d^7$	$^4F_{3/2}$	$3d^6(^3F2)4p$	$^4D^\circ_{1/2}$	5 885	534 888		750	85
189.123	$3d^7$	$^4F_{5/2}$	$3d^6(^3F2)4p$	$^4D^\circ_{5/2}$	4 641	533 379		190?	85
189.201	$3d^7$	$^2H_{9/2}$	$3d^6(^1F)4p$	$^2G^\circ_{7/2}$	40 229	568 768		600	85
189.245	$3d^7$	$^2G_{7/2}$	$3d^6(^3D)4p$	$^2F^\circ_{5/2}$	30 562	558 978		650	85
	$3d^7$	$^2D2_{5/2}$	$3d^6(^1S2)4p$	$^2P^\circ_{3/2}$	38 580	567 000			85
189.308	$3d^7$	$^2P_{1/2}$	$3d^6(^1D2)4p$	$^2P^\circ_{1/2}$	36 072	564 312		130	85
189.333	$3d^7$	$^2P_{3/2}$	$3d^6(^1D2)4p$	$^2D^\circ_{5/2}$	33 799	561 991		230	85
	$3d^7$	$^4P_{5/2}$	$3d^6(^3D)4p$	$^4F^\circ_{7/2}$	26 072	554 233			85
189.410	$3d^7$	$^4F_{7/2}$	$3d^6(^3F2)4p$	$^4F^\circ_{9/2}$	2 753	530 711		550	85
189.574	$3d^7$	$^4F_{3/2}$	$3d^6(^3F2)4p$	$^4D^\circ_{5/2}$	5 885	533 379		250	85
	$3d^7$	$^2F_{7/2}$	$3d^6(^3F1)4p$	$^2D^\circ_{5/2}$	62 189	589 686			85
189.594	$3d^7$	$^4P_{5/2}$	$3d^6(^3D)4p$	$^4D^\circ_{5/2}$	26 072	553 516		170	85
189.621	$3d^7$	$^4P_{3/2}$	$3d^6(^3D)4p$	$^4D^\circ_{5/2}$	26 142	553 516		20	85
189.659	$3d^7$	$^4F_{3/2}$	$3d^6(^3P2)4p$	$^4D^\circ_{1/2}$	5 885	533 148		90	85
189.715	$3d^7$	$^2G_{7/2}$	$3d^6(^3D)4p$	$^2D^\circ_{5/2}$	30 562	557 668		20	85
189.746	$3d^7$	$^2D2_{5/2}$	$3d^6(^1D2)4p$	$^2F^\circ_{7/2}$	38 580	565 606		110	85
189.798	$3d^7$	$^2G_{9/2}$	$3d^6(^3D)4p$	$^4F^\circ_{9/2}$	27 941	554 816		300	85
	$3d^7$	$^2F_{5/2}$	$3d^6(^3F1)4p$	$^2D^\circ_{3/2}$	61 134	588 009			85
189.804	$3d^7$	$^4F_{5/2}$	$3d^6(^3H)4p$	$^2G^\circ_{7/2}$	4 641	531 498		290	85
189.876	$3d^7$	$^4F_{7/2}$	$3d^6(^3F2)4p$	$^4F^\circ_{7/2}$	2 753	529 414		30	85
189.927	$3d^7$	$^4F_{7/2}$	$3d^6(^3F2)4p$	$^4F^\circ_{5/2}$	2 753	529 270		60	85
190.008	$3d^7$	$^2G_{9/2}$	$3d^6(^3D)4p$	$^4F^\circ_{7/2}$	27 941	554 233		600	85
	$3d^7$	$^4F_{9/2}$	$3d^6(^3H)4p$	$^4I^\circ_{9/2}$	0	526 292			85
190.028	$3d^7$	$^2G_{9/2}$	$3d^6(^1G2)4p$	$^2G^\circ_{9/2}$	27 941	554 178		600	85
190.051	$3d^7$	$^4P_{5/2}$	$3d^6(^1G2)4p$	$^2G^\circ_{7/2}$	26 072	552 256		70	85

TABLE 49. Spectral lines of Ga VII—Continued

Wavelength (Å)	Classification				Energy Levels (cm^{-1})			Int.	Ref.
	Lower		Upper						
190.071	$3d^7$	$^4P_{5/2}$	$3d^6(^3D)4p$	$^4F^\circ_{5/2}$	26 072	552 194		60	85
190.101	$3d^7$	$^2G_{9/2}$	$3d^6(^1G2)4p$	$^2F^\circ_{7/2}$	27 941	553 976		430	85
	$3d^7$	$^4P_{5/2}$	$3d^6(^3D)4p$	$^2P^\circ_{3/2}$	26 072	552 107			85
	$3d^7$	$^2P_{1/2}$	$3d^6(^1D2)4p$	$^2D^\circ_{3/2}$	36 072	562 112			85
	$3d^7$	$^4P_{3/2}$	$3d^6(^3D)4p$	$^4F^\circ_{5/2}$	26 142	552 194			85
190.124	$3d^7$	$^4F_{9/2}$	$3d^6(^3H)4p$	$^4H^\circ_{7/2}$	0	525 973		260	85
	$3d^7$	$^4P_{3/2}$	$3d^6(^3D)4p$	$^2P^\circ_{3/2}$	26 142	552 107			85
	$3d^7$	$^4P_{1/2}$	$3d^6(^3D)4p$	$^4D^\circ_{3/2}$	27 850	553 821			85
190.189	$3d^7$	$^4F_{5/2}$	$3d^6(^3P2)4p$	$^4D^\circ_{3/2}$	4 641	530 435	?	700	85
	$3d^7$	$^4F_{9/2}$	$3d^6(^3H)4p$	$^4G^\circ_{9/2}$	0	525 794			85
190.240	$3d^7$	$^4P_{3/2}$	$3d^6(^3D)4p$	$^4P^\circ_{1/2}$	26 142	551 797	?	380*bl*	85
190.267	$3d^7$	$^2D2_{5/2}$	$3d^6(^1D2)4p$	$^2F^\circ_{5/2}$	38 580	564 156		100	85
190.345	$3d^7$	$^4P_{5/2}$	$3d^6(^3D)4p$	$^4F^\circ_{3/2}$	26 072	551 436		150*bl*	85
190.371	$3d^7$	$^4P_{3/2}$	$3d^6(^3D)4p$	$^4F^\circ_{3/2}$	26 142	551 436		30	85
190.400	$3d^7$	$^4F_{9/2}$	$3d^6(^3H)4p$	$^4G^\circ_{11/2}$	0	525 209		1350	85
	$3d^7$	$^2P_{3/2}$	$3d^6(^3D)4p$	$^2F^\circ_{5/2}$	33 799	558 978			85
190.518	$3d^7$	$^2G_{9/2}$	$3d^6(^3D)4p$	$^4D^\circ_{7/2}$	27 941	552 825		20	85
190.533	$3d^7$	$^2G_{7/2}$	$3d^6(^1I)4p$	$^2H^\circ_{9/2}$	30 562	555 406		150	85
190.612	$3d^7$	$^4F_{5/2}$	$3d^6(^3F2)4p$	$^4F^\circ_{5/2}$	4 641	529 270		30	85
190.647	$3d^7$	$^2G_{7/2}$	$3d^6(^1G2)4p$	$^2F^\circ_{5/2}$	30 562	555 091		480	85
190.738	$3d^7$	$^2D2_{3/2}$	$3d^6(^1S2)4p$	$^2P^\circ_{3/2}$	42 718	567 000		100	85
190.779	$3d^7$	$^4F_{3/2}$	$3d^6(^3F2)4p$	$^4F^\circ_{3/2}$	5 885	530 051	?	100	85
190.856	$3d^7$	$^4F_{7/2}$	$3d^6(^3H)4p$	$^4G^\circ_{7/2}$	2 753	526 708		260	85
190.955	$3d^7$	$^2D_{7/2}$	$3d^6(^3D)4p$	$^4F^\circ_{7/2}$	30 562	554 233		20	85
191.010	$3d^7$	$^2D2_{5/2}$	$3d^6(^1D2)4p$	$^2D^\circ_{3/2}$	38 580	562 112		260	85
	$3d^7$	$^4F_{7/2}$	$3d^6(^3H)4p$	$^4I^\circ_{9/2}$	2 753	526 292			85
191.055	$3d^7$	$^2G_{7/2}$	$3d^6(^1G2)4p$	$^2F^\circ_{7/2}$	30 562	553 976		140	85
	$3d^7$	$^2D2_{5/2}$	$3d^6(^1D2)4p$	$^2D^\circ_{5/2}$	38 580	561 991			85
	$3d^7$	$^4F_{3/2}$	$3d^6(^3F2)4p$	$^4F^\circ_{5/2}$	5 885	529 270			85
191.122	$3d^7$	$^4F_{7/2}$	$3d^6(^3H)4p$	$^4H^\circ_{7/2}$	2 753	525 973		60	85
191.144	$3d^7$	$^4F_{7/2}$	$3d^6(^3P2)4p$	$^2D^\circ_{5/2}$	2 753	525 918		290	85
191.189	$3d^7$	$^4F_{7/2}$	$3d^6(^3H)4p$	$^4G^\circ_{9/2}$	2 753	525 794		420	85
191.294	$3d^7$	$^4P_{5/2}$	$3d^6(^3D)4p$	$^4P^\circ_{3/2}$	26 072	548 824		160	85
191.353	$3d^7$	$^2P_{3/2}$	$3d^6(^1D2)4p$	$^2P^\circ_{3/2}$	33 799	556 405		220	85
191.408	$3d^7$	$^4F_{5/2}$	$3d^6(^3F2)4p$	$^4G^\circ_{5/2}$	4 641	527 077		130	85
191.436	$3d^7$	$^4P_{1/2}$	$3d^6(^3D)4p$	$^4D^\circ_{1/2}$	27 850	550 217		70	85
191.474	$3d^7$	$^2G_{7/2}$	$3d^6(^3D)4p$	$^4D^\circ_{7/2}$	30 562	552 825		340	85
191.546	$3d^7$	$^4F_{5/2}$	$3d^6(^3H)4p$	$^4G^\circ_{7/2}$	4 641	526 708		400*bl*	85
191.575	$3d^7$	$^2G_{9/2}$	$3d^6(^1I)4p$	$^2H^\circ_{11/2}$	27 941	549 929		650	85
191.598	$3d^7$	$^4P_{5/2}$	$3d^6(^3D)4p$	$^4P^\circ_{5/2}$	26 072	547 996		450	85
191.630	$3d^7$	$^2G_{9/2}$	$3d^6(^3G)4p$	$^2G^\circ_{7/2}$	27 941	549 771		390	85
	$3d^7$	$^4P_{3/2}$	$3d^6(^3D)4p$	$^4P^\circ_{5/2}$	26 142	547 996			85
191.662	$3d^7$	$^2P_{1/2}$	$3d^6(^3D)4p$	$^2D^\circ_{3/2}$	36 072	557 825		450*bl*	85
191.683	$3d^7$	$^2G_{7/2}$	$3d^6(^1G2)4p$	$^2G^\circ_{7/2}$	30 562	552 256		450	85
191.740	$3d^7$	$^2F_{5/2}$	$3d^6(^3F1)4p$	$^4G^\circ_{5/2}$	61 134	582 673		190	85
191.778	$3d^7$	$^2D2_{3/2}$	$3d^6(^1D2)4p$	$^2F^\circ_{5/2}$	42 718	564 156		200	85
	$3d^7$	$^2F_{7/2}$	$3d^6(^3F1)4p$	$^4G^\circ_{7/2}$	62 189	583 630			85
191.835	$3d^7$	$^4F_{5/2}$	$3d^6(^3P2)4p$	$^2D^\circ_{5/2}$	4 641	525 918		20	85
	$3d^7$	$^2P_{3/2}$	$3d^6(^1G2)4p$	$^2F^\circ_{5/2}$	33 799	555 091			85
191.868	$3d^7$	$^4F_{3/2}$	$3d^6(^3F2)4p$	$^4G^\circ_{5/2}$	5 885	527 077		250	85
191.948	$3d^7$	$^4P_{1/2}$	$3d^6(^3D)4p$	$^4P^\circ_{3/2}$	27 850	548 824		220	85

TABLE 49. Spectral lines of Ga VII—Continued

Wavelength (Å)	Classification Lower		Upper		Energy Levels (cm^{-1})		Int.	Ref.
192.169	$3d^7$	$^2G_{7/2}$	$3d^6(^3G)4p$	$^2G^{\circ}_{9/2}$	30 562	550 920	550*bl*	85
192.300	$3d^7$	$^2P_{3/2}$	$3d^6(^3D)4p$	$^4D^{\circ}_{3/2}$	33 799	553 821	70	85
	$3d^7$	$^4F_{3/2}$	$3d^6(^3P2)4p$	$^2D^{\circ}_{5/2}$	5 885	525 918		85
192.335	$3d^7$	$^2G_{9/2}$	$3d^6(^3H)4p$	$^2H^{\circ}_{9/2}$	27 941	547 868	700	85
192.535	$3d^7$	$^2D2_{3/2}$	$3d^6(^1D2)4p$	$^2D^{\circ}_{3/2}$	42 718	562 112	130*bl*	85
192.571	$3d^7$	$^2D2_{3/2}$	$3d^6(^1D2)4p$	$^2D^{\circ}_{5/2}$	42 718	561 991	150*bl*	85
192.587	$3d^7$	$^2H_{11/2}$	$3d^6(^1I)4p$	$^2I^{\circ}_{11/2}$	37 710	556 952	400	85
	$3d^7$	$^2D2_{5/2}$	$3d^6(^3D)4p$	$^2D^{\circ}_{3/2}$	38 580	557 825		85
192.604	$3d^7$	$^2G_{7/2}$	$3d^6(^1G2)4p$	$^2H^{\circ}_{9/2}$	30 562	549 753	650	85
	$3d^7$	$^2G_{7/2}$	$3d^6(^3G)4p$	$^2G^{\circ}_{7/2}$	30 562	549 771		85
192.645	$3d^7$	$^2D2_{5/2}$	$3d^6(^3D)4p$	$^2D^{\circ}_{5/2}$	38 580	557 668	1150	85
	$3d^7$	$^2H_{11/2}$	$3d^6(^1I)4p$	$^2I^{\circ}_{13/2}$	37 710	556 798		85
192.666	$3d^7$	$^2G_{9/2}$	$3d^6(^3H)4p$	$^2H^{\circ}_{11/2}$	27 941	546 960	260	85
192.793	$3d^7$	$^4F_{5/2}$	$3d^6(^3P2)4p$	$^4S^{\circ}_{3/2}$	4 641	523 322	20	85
192.901	$3d^7$	$^2G_{9/2}$	$3d^6(^3G)4p$	$^2F^{\circ}_{7/2}$	27 941	546 341	600	85
192.934	$3d^7$	$^2P_{3/2}$	$3d^6(^3D)4p$	$^2P^{\circ}_{3/2}$	33 799	552 107	6	85
193.055	$3d^7$	$^2P_{1/2}$	$3d^6(^3D)4p$	$^2P^{\circ}_{1/2}$	36 072	554 060	10	85
193.115	$3d^7$	$^2D2_{5/2}$	$3d^6(^1D2)4p$	$^2P^{\circ}_{3/2}$	38 580	556 405	80	85
193.140	$3d^7$	$^2H_{11/2}$	$3d^6(^1G2)4p$	$^2H^{\circ}_{11/2}$	37 710	555 468	180	85
193.177	$3d^7$	$^2F_{5/2}$	$3d^6(^1F)4p$	$^2F^{\circ}_{5/2}$	61 134	578 795	130	85
193.354	$3d^7$	$^2D2_{3/2}$	$3d^6(^1S2)4p$	$^2P^{\circ}_{1/2}$	42 718	559 904	240	85
193.383	$3d^7$	$^2H_{11/2}$	$3d^6(^3D)4p$	$^4F^{\circ}_{9/2}$	37 710	554 816	20	85
193.527	$3d^7$	$^2H_{9/2}$	$3d^6(^1I)4p$	$^2I^{\circ}_{11/2}$	40 229	556 952	550	85
193.537	$3d^7$	$^2F_{7/2}$	$3d^6(^1F)4p$	$^2F^{\circ}_{7/2}$	62 189	578 883	700*bl*	85
193.627	$3d^7$	$^2H_{11/2}$	$3d^6(^1G2)4p$	$^2G^{\circ}_{9/2}$	37 710	554 178	30	85
193.643	$3d^7$	$^2P_{3/2}$	$3d^6(^3D)4p$	$^4D^{\circ}_{1/2}$	33 799	550 217	40	85
193.883	$3d^7$	$^2G_{7/2}$	$3d^6(^3G)4p$	$^2F^{\circ}_{7/2}$	30 562	546 341	10	85
193.925	$3d^7$	$^2D2_{5/2}$	$3d^6(^3D)4p$	$^4F^{\circ}_{7/2}$	38 580	554 233	6	85
194.027	$3d^7$	$^2D2_{5/2}$	$3d^6(^1G2)4p$	$^2F^{\circ}_{7/2}$	38 580	553 976	130	85
194.084	$3d^7$	$^2H_{9/2}$	$3d^6(^1G2)4p$	$^2H^{\circ}_{11/2}$	40 229	555 468	280	85
	$3d^7$	$^2D2_{5/2}$	$3d^6(^3D)4p$	$^4D^{\circ}_{3/2}$	38 580	553 821		85
194.108	$3d^7$	$^2H_{9/2}$	$3d^6(^1I)4p$	$^2H^{\circ}_{9/2}$	40 229	555 406	1000	85
194.146	$3d^7$	$^2G_{7/2}$	$3d^6(^3G)4p$	$^2F^{\circ}_{5/2}$	30 562	545 632	140	85
194.198	$3d^7$	$^2D2_{3/2}$	$3d^6(^3D)4p$	$^2D^{\circ}_{5/2}$	42 718	557 668	20	85
194.327	$3d^7$	$^2H_{9/2}$	$3d^6(^3D)4p$	$^4F^{\circ}_{9/2}$	40 229	554 816	10	85
194.490	$3d^7$	$^2P_{3/2}$	$3d^6(^3D)4p$	$^4P^{\circ}_{5/2}$	33 799	547 996	250*bl*	85
194.546	$3d^7$	$^2H_{9/2}$	$3d^6(^3D)4p$	$^4F^{\circ}_{7/2}$	40 229	554 233	40	85
194.571	$3d^7$	$^2H_{9/2}$	$3d^6(^1G2)4p$	$^2G^{\circ}_{9/2}$	40 229	554 178	330	85
194.730	$3d^7$	$^2D2_{5/2}$	$3d^6(^3D)4p$	$^2P^{\circ}_{3/2}$	38 580	552 107	6	85
194.748	$3d^7$	$^2G_{9/2}$	$3d^6(^3G)4p$	$^4H^{\circ}_{11/2}$	27 941	541 424	170	85
194.787	$3d^7$	$^2G_{7/2}$	$3d^6(^3F2)4p$	$^2D^{\circ}_{5/2}$	30 562	543 934	10	85
194.852	$3d^7$	$^2H_{11/2}$	$3d^6(^3G)4p$	$^2G^{\circ}_{9/2}$	37 710	550 920	500	85
195.027	$3d^7$	$^2G_{9/2}$	$3d^6(^3G)4p$	$^4G^{\circ}_{7/2}$	27 941	540 685	4	85
195.086	$3d^7$	$^2H_{9/2}$	$3d^6(^3D)4p$	$^4D^{\circ}_{7/2}$	40 229	552 825	330	85
195.105	$3d^7$	$^2G_{9/2}$	$3d^6(^3F2)4p$	$^2G^{\circ}_{7/2}$	27 941	540 484	70	85
195.174	$3d^7$	$^2D2_{3/2}$	$3d^6(^1G2)4p$	$^2F^{\circ}_{5/2}$	42 718	555 091	40	85
195.229	$3d^7$	$^2H_{11/2}$	$3d^6(^1I)4p$	$^2H^{\circ}_{11/2}$	37 710	549 929	950	85
195.296	$3d^7$	$^2H_{11/2}$	$3d^6(^1G2)4p$	$^2H^{\circ}_{9/2}$	37 710	549 753	390	85
195.350	$3d^7$	$^2G_{9/2}$	$3d^6(^3F2)4p$	$^2G^{\circ}_{9/2}$	27 941	539 841	90	85
195.364	$3d^7$	$^4P_{3/2}$	$3d^6(^3P2)4p$	$^2P^{\circ}_{1/2}$	26 142	538 004	30	85

TABLE 49. Spectral lines of Ga VII—Continued

Wavelength (Å)	Classification				Energy Levels (cm^{-1})		Int.	Ref.
	Lower		Upper					
195.457	$3d^7$	$^2P_{3/2}$	$3d^6(^3F2)4p$	$^2D^\circ_{3/2}$	33 799	545 417	40	85
195.581	$3d^7$	$^2G_{9/2}$	$3d^6(^3G)4p$	$^4G^\circ_{11/2}$	27 941	539 238	120	85
195.624	$3d^7$	$^2D2_{5/2}$	$3d^6(^3G)4p$	$^2G^\circ_{7/2}$	38 580	549 771	2	85
195.729	$3d^7$	$^2G_{7/2}$	$3d^6(^3G)4p$	$^4H^\circ_{9/2}$	30 562	541 471	50	85
195.794	$3d^7$	$^2G_{7/2}$	$3d^6(^3G)4p$	$^4H^\circ_{7/2}$	30 562	541 304	20	85
195.813	$3d^7$	$^2H_{9/2}$	$3d^6(^3G)4p$	$^2G^\circ_{9/2}$	40 229	550 920	80	85
195.886	$3d^7$	$^2G_{7/2}$	$3d^6(^3G)4p$	$^4G^\circ_{5/2}$	30 562	541 060	10	85
195.981	$3d^7$	$^2D2_{5/2}$	$3d^6(^3D)4p$	$^4P^\circ_{3/2}$	38 580	548 824	20	85
	$3d^7$	$^2F_{7/2}$	$3d^6(^1F)4p$	$^2G^\circ_{9/2}$	62 189	572 452		85
196.038	$3d^7$	$^2G_{9/2}$	$3d^6(^3G)4p$	$^2H^\circ_{9/2}$	27 941	538 040	650	85
	$3d^7$	$^2P_{3/2}$	$3d^6(^3F2)4p$	$^2D^\circ_{5/2}$	33 799	543 934		85
	$3d^7$	$^2G_{9/2}$	$3d^6(^3F2)4p$	$^2F^\circ_{7/2}$	27 941	538 050		85
196.108	$3d^7$	$^2G_{7/2}$	$3d^6(^3F2)4p$	$^2G^\circ_{7/2}$	30 562	540 484	480	85
	$3d^7$	$^2G_{7/2}$	$3d^6(^3G)4p$	$^4G^\circ_{9/2}$	30 562	540 480		85
196.121	$3d^7$	$^2F_{7/2}$	$3d^6(^1F)4p$	$^2D^\circ_{5/2}$	62 189	572 071	320	85
	$3d^7$	$^2D1_{5/2}$	$3d^6(^1G1)4p$	$^2F^\circ_{7/2}$	96 280	606 160		85
196.255	$3d^7$	$^2H_{9/2}$	$3d^6(^3G)4p$	$^2G^\circ_{7/2}$	40 229	549 771	170	85
196.280	$3d^7$	$^2D2_{3/2}$	$3d^6(^3D)4p$	$^4F^\circ_{5/2}$	42 718	552 194	4	85
196.331	$3d^7$	$^2P_{1/2}$	$3d^6(^3F2)4p$	$^2D^\circ_{3/2}$	36 072	545 417	40	85
196.367	$3d^7$	$^2H_{11/2}$	$3d^6(^3H)4p$	$^2H^\circ_{11/2}$	37 710	546 960	800	85
196.540	$3d^7$	$^2G_{9/2}$	$3d^6(^3G)4p$	$^2H^\circ_{11/2}$	27 941	536 744	150	85
	$3d^7$	$^2G_{7/2}$	$3d^6(^3G)4p$	$^4F^\circ_{5/2}$	30 562	539 366		85
196.572	$3d^7$	$^2H_{11/2}$	$3d^6(^1I)4p$	$^2K^\circ_{13/2}$	37 710	546 431 ?	150	85
	$3d^7$	$^2D1_{3/2}$	$3d^6(^1G1)4p$	$^2F^\circ_{5/2}$	94 873	603 604		85
196.692	$3d^7$	$^2G_{9/2}$	$3d^6(^3F2)4p$	$^4G^\circ_{11/2}$	27 941	536 341	70	85
196.932	$3d^7$	$^2G_{9/2}$	$3d^6(^3G)4p$	$^4F^\circ_{9/2}$	27 941	535 733	90	85
196.943	$3d^7$	$^2D2_{5/2}$	$3d^6(^3G)4p$	$^2F^\circ_{7/2}$	38 580	546 341	270	85
196.989	$3d^7$	$^2G_{9/2}$	$3d^6(^3F2)4p$	$^4G^\circ_{7/2}$	27 941	535 599	250	85
	$3d^7$	$^2F_{5/2}$	$3d^6(^1F)4p$	$^2G^\circ_{7/2}$	61 134	568 768		85
	$3d^7$	$^2H_{9/2}$	$3d^6(^3H)4p$	$^2H^\circ_{9/2}$	40 229	547 868		85
197.051	$3d^7$	$^2G_{7/2}$	$3d^6(^3G)4p$	$^2H^\circ_{9/2}$	30 562	538 040	160	85
	$3d^7$	$^2P_{3/2}$	$3d^6(^3P2)4p$	$^2S^\circ_{1/2}$	33 799	541 268		85
197.109	$3d^7$	$^2D1_{5/2}$	$3d^6(^1G1)4p$	$^2F^\circ_{5/2}$	96 280	603 604	20	85
197.121	$3d^7$	$^4P_{5/2}$	$3d^6(^3F2)4p$	$^4D^\circ_{5/2}$	26 072	533 379	50	85
197.154	$3d^7$	$^4P_{3/2}$	$3d^6(^3F2)4p$	$^4D^\circ_{5/2}$	26 142	533 379	230	85
	$3d^7$	$^2G_{9/2}$	$3d^6(^3F2)4p$	$^4G^\circ_{9/2}$	27 941	535 157		85
197.224	$3d^7$	$^4P_{1/2}$	$3d^6(^3F2)4p$	$^4D^\circ_{1/2}$	27 850	534 888	40	85
197.320	$3d^7$	$^2G_{9/2}$	$3d^6(^3H)4p$	$^2I^\circ_{11/2}$	27 941	534 726	30	85
	$3d^7$	$^2P_{3/2}$	$3d^6(^3G)4p$	$^4F^\circ_{3/2}$	33 799	540 577		85
197.344	$3d^7$	$^2H_{9/2}$	$3d^6(^3H)4p$	$^2H^\circ_{11/2}$	40 229	546 960	10	85
197.445	$3d^7$	$^4P_{5/2}$	$3d^6(^3F2)4p$	$^4D^\circ_{7/2}$	26 072	532 549	170	85
197.659	$3d^7$	$^2P_{3/2}$	$3d^6(^3P2)4p$	$^2P^\circ_{3/2}$	33 799	539 725	80	85
197.799	$3d^7$	$^2P_{3/2}$	$3d^6(^3G)4p$	$^4F^\circ_{5/2}$	33 799	539 366	6	85
197.881	$3d^7$	$^2D2_{5/2}$	$3d^6(^3F2)4p$	$^2D^\circ_{5/2}$	38 580	543 934	280	85
197.943	$3d^7$	$^2P_{1/2}$	$3d^6(^3P2)4p$	$^2S^\circ_{1/2}$	36 072	541 268	30	85
197.993	$3d^7$	$^2D1_{5/2}$	$3d^6(^1G1)4p$	$^2G^\circ_{7/2}$	96 280	601 349	180	85
198.005	$3d^7$	$^2G_{7/2}$	$3d^6(^3F2)4p$	$^4G^\circ_{7/2}$	30 562	535 599	110	85
198.117	$3d^7$	$^2G_{7/2}$	$3d^6(^3F2)4p$	$^2F^\circ_{5/2}$	30 562	535 302	30	85
198.182	$3d^7$	$^2D1_{3/2}$	$3d^6(^3F1)4p$	$^2F^\circ_{5/2}$	94 873	599 465	60	85
198.303	$3d^7$	$^4F_{9/2}$	$3d^6(^5D)4p$	$^4F^\circ_{7/2}$	0	504 279	220	85

TABLE 49. Spectral lines of Ga VII—Continued

Wavelength (Å)	Classification Lower		Upper		Energy Levels (cm^{-1})		Int.	Ref.
198.332	$3d^7$	$^2P_{3/2}$	$3d^6(^3P2)4p$	$^2P^\circ_{1/2}$	33 799	538 004	130	85
198.459	$3d^7$	$^4P_{3/2}$	$3d^6(^3P2)4p$	$^4P^\circ_{5/2}$	26 142	530 038	6	85
198.525	$3d^7$	$^2H_{11/2}$	$3d^6(^3G)4p$	$^4H^\circ_{11/2}$	37 710	541 424	100	85
198.570	$3d^7$	$^2G_{9/2}$	$3d^6(^3H)4p$	$^4H^\circ_{9/2}$	27 941	531 542	110	85
198.642	$3d^7$	$^2F_{7/2}$	$3d^6(^1D2)4p$	$^2F^\circ_{7/2}$	62 189	565 606	440	85
	$3d^7$	$^2D1_{5/2}$	$3d^6(^3P1)4p$	$^2P^\circ_{3/2}$	96 280	599 692		85
198.666	$3d^7$	$^4P_{5/2}$	$3d^6(^3F2)4p$	$^4F^\circ_{7/2}$	26 072	529 414	110	85
198.739	$3d^7$	$^4F_{7/2}$	$3d^6(^5D)4p$	$^4F^\circ_{5/2}$	2 753	505 926	170	85
198.761	$3d^7$	$^4P_{3/2}$	$3d^6(^3F2)4p$	$^4F^\circ_{5/2}$	26 142	529 270	50	85
198.799	$3d^7$	$^2F_{5/2}$	$3d^6(^1D2)4p$	$^2F^\circ_{5/2}$	61 134	564 156	180	85
198.841	$3d^7$	$^2D2_{3/2}$	$3d^6(^3G)4p$	$^2F^\circ_{5/2}$	42 718	545 632	380	85
198.897	$3d^7$	$^2G_{9/2}$	$3d^6(^3F2)4p$	$^4F^\circ_{9/2}$	27 941	530 711	160	85
198.904	$3d^7$	$^2D1_{3/2}$	$3d^6(^3P1)4p$	$^2P^\circ_{1/2}$	94 873	597 627	60	85
198.923	$3d^7$	$^2D2_{3/2}$	$3d^6(^3F2)4p$	$^2D^\circ_{3/2}$	42 718	545 417	70	85
199.049	$3d^7$	$^4F_{5/2}$	$3d^6(^5D)4p$	$^4F^\circ_{3/2}$	4 641	507 030	70	85
199.207	$3d^7$	$^2D2_{5/2}$	$3d^6(^3G)4p$	$^4F^\circ_{3/2}$	38 580	540 577	150	85
	$3d^7$	$^2G_{7/2}$	$3d^6(^3F2)4p$	$^4D^\circ_{7/2}$	30 562	532 549		85
199.239	$3d^7$	$^2P_{1/2}$	$3d^6(^3P2)4p$	$^2P^\circ_{1/2}$	36 072	538 004	200	85
	$3d^7$	$^2D2_{5/2}$	$3d^6(^3F2)4p$	$^2G^\circ_{7/2}$	38 580	540 484		85
	$3d^7$	$^2P_{3/2}$	$3d^6(^3P2)4p$	$^4D^\circ_{5/2}$	33 799	535 728		85
199.301	$3d^7$	$^4F_{9/2}$	$3d^6(^5D)4p$	$^4F^\circ_{9/2}$	0	501 754	950	85
199.391	$3d^7$	$^4F_{7/2}$	$3d^6(^5D)4p$	$^4F^\circ_{7/2}$	2 753	504 279	1150	85
	$3d^7$	$^2H_{11/2}$	$3d^6(^3G)4p$	$^4G^\circ_{11/2}$	37 710	539 238		85
199.462	$3d^7$	$^2D1_{5/2}$	$3d^6(^3P1)4p$	$^2D^\circ_{5/2}$	96 280	597 628	30	85
199.488	$3d^7$	$^4F_{5/2}$	$3d^6(^5D)4p$	$^4F^\circ_{5/2}$	4 641	505 926	450	85
199.507	$3d^7$	$^2H_{9/2}$	$3d^6(^3G)4p$	$^4H^\circ_{9/2}$	40 229	541 471	40	85
199.543	$3d^7$	$^4F_{3/2}$	$3d^6(^5D)4p$	$^4F^\circ_{3/2}$	5 885	507 030	530	85
	$3d^7$	$^2D2_{5/2}$	$3d^6(^3P2)4p$	$^2P^\circ_{3/2}$	38 580	539 725		85
199.626	$3d^7$	$^2G_{9/2}$	$3d^6(^3H)4p$	$^2G^\circ_{9/2}$	27 941	528 877	320	85
	$3d^7$	$^2G_{7/2}$	$3d^6(^3H)4p$	$^2G^\circ_{7/2}$	30 562	531 498		85
199.656	$3d^7$	$^4F_{9/2}$	$3d^6(^5D)4p$	$^4D^\circ_{7/2}$	0	500 860	1450	85
	$3d^7$	$^2F_{5/2}$	$3d^6(^1D2)4p$	$^2D^\circ_{5/2}$	61 134	561 991		85
199.718	$3d^7$	$^2D1_{3/2}$	$3d^6(^3P1)4p$	$^2D^\circ_{3/2}$	94 873	595 580	40	85
199.825	$3d^7$	$^2G_{7/2}$	$3d^6(^3P2)4p$	$^4D^\circ_{7/2}$	30 562	530 991	30	85
199.866	$3d^7$	$^2H_{11/2}$	$3d^6(^3G)4p$	$^2H^\circ_{9/2}$	37 710	538 040	30	85
199.900	$3d^7$	$^2H_{9/2}$	$3d^6(^3F2)4p$	$^2G^\circ_{7/2}$	40 229	540 484	410	85
	$3d^7$	$^2H_{9/2}$	$3d^6(^3G)4p$	$^4G^\circ_{9/2}$	40 229	540 480		85
199.938	$3d^7$	$^2G_{7/2}$	$3d^6(^3F2)4p$	$^4F^\circ_{9/2}$	30 562	530 711	30	85
199.987	$3d^7$	$^4F_{3/2}$	$3d^6(^5D)4p$	$^4F^\circ_{5/2}$	5 885	505 926	130*bl*	85
200.038	$3d^7$	$^4P_{5/2}$	$3d^6(^3H)4p$	$^4H^\circ_{7/2}$	26 072	525 973	50	85
200.145	$3d^7$	$^4F_{5/2}$	$3d^6(^5D)4p$	$^4F^\circ_{7/2}$	4 641	504 279	80	85
200.196	$3d^7$	$^4F_{7/2}$	$3d^6(^5D)4p$	$^4D^\circ_{5/2}$	2 753	502 264	900	85
200.210	$3d^7$	$^2D2_{5/2}$	$3d^6(^3F2)4p$	$^2F^\circ_{7/2}$	38 580	538 050	210	85
200.242	$3d^7$	$^2P_{1/2}$	$3d^6(^3P2)4p$	$^2D^\circ_{3/2}$	36 072	535 468	70	85
200.387	$3d^7$	$^2H_{11/2}$	$3d^6(^3G)4p$	$^2H^\circ_{11/2}$	37 710	536 744	210	85
200.399	$3d^7$	$^4F_{7/2}$	$3d^6(^5D)4p$	$^4F^\circ_{9/2}$	2 753	501 754	100	85
200.549	$3d^7$	$^2H_{11/2}$	$3d^6(^3F2)4p$	$^4G^\circ_{11/2}$	37 710	536 341	30	85
200.564	$3d^7$	$^4F_{5/2}$	$3d^6(^5D)4p$	$^4D^\circ_{3/2}$	4 641	503 232	440	85
200.577	$3d^7$	$^2D2_{3/2}$	$3d^6(^3P2)4p$	$^2S^\circ_{1/2}$	42 718	541 268	100	85
200.663	$3d^7$	$^2G_{9/2}$	$3d^6(^3H)4p$	$^4I^\circ_{9/2}$	27 941	526 292	60	85

TABLE 49. Spectral lines of Ga VII—Continued

Wavelength (Å)	Classification: Lower		Classification: Upper		Energy Levels (cm^{-1})		Int.	Ref.
	$3d^7$	$^2D2_{3/2}$	$3d^6(^3G)4p$	$^4G^\circ_{5/2}$	42 718	541 060		85
200.760	$3d^7$	$^4F_{7/2}$	$3d^6(^5D)4p$	$^4D^\circ_{7/2}$	2 753	500 860	200	85
200.791	$3d^7$	$^2H_{11/2}$	$3d^6(^3G)4p$	$^4F^\circ_{9/2}$	37 710	535 733	20	85
200.832	$3d^7$	$^4F_{5/2}$	$3d^6(^5D)4p$	$^6P^\circ_{3/2}$	4 641	502 569	450	85
200.879	$3d^7$	$^2H_{9/2}$	$3d^6(^3G)4p$	$^2H^\circ_{9/2}$	40 229	538 040	100	85
200.923	$3d^7$	$^4F_{7/2}$	$3d^6(^5D)4p$	$^6P^\circ_{5/2}$	2 753	500 456	470	85
200.942	$3d^7$	$^4F_{3/2}$	$3d^6(^5D)4p$	$^4D^\circ_{1/2}$	5 885	503 540	500	85
200.952	$3d^7$	$^4F_{5/2}$	$3d^6(^5D)4p$	$^4D^\circ_{5/2}$	4 641	502 264	340	85
201.066	$3d^7$	$^4F_{9/2}$	$3d^6(^5D)4p$	$^6P^\circ_{7/2}$	0	497 349	900	85
	$3d^7$	$^4F_{3/2}$	$3d^6(^5D)4p$	$^4D^\circ_{3/2}$	5 885	503 232		85
201.106	$3d^7$	$^4P_{5/2}$	$3d^6(^3P2)4p$	$^4S^\circ_{3/2}$	26 072	523 322	40	85
201.203	$3d^7$	$^2D2_{5/2}$	$3d^6(^3F2)4p$	$^4G^\circ_{7/2}$	38 580	535 599	130	85
	$3d^7$	$^2D2_{3/2}$	$3d^6(^3P2)4p$	$^2P^\circ_{3/2}$	42 718	539 725		85
	$3d^7$	$^2D1_{3/2}$	$3d^6(^3F1)4p$	$^4D^\circ_{3/2}$	94 873	591 892		85
201.245	$3d^7$	$^2D2_{5/2}$	$3d^6(^3P2)4p$	$^2D^\circ_{3/2}$	38 580	535 468	60	85
201.334	$3d^7$	$^4F_{3/2}$	$3d^6(^5D)4p$	$^6P^\circ_{3/2}$	5 885	502 569	340	85
	$3d^7$	$^2D1_{5/2}$	$3d^6(^3P1)4p$	$^4P^\circ_{5/2}$	96 280	592 966		85
	$3d^7$	$^2F_{5/2}$	$3d^6(^3D)4p$	$^2D^\circ_{3/2}$	61 134	557 825		85
201.458	$3d^7$	$^2F_{7/2}$	$3d^6(^3D)4p$	$^2F^\circ_{7/2}$	62 189	558 566	30	85
201.516	$3d^7$	$^2P_{3/2}$	$3d^6(^3P2)4p$	$^4P^\circ_{5/2}$	33 799	530 038	110	85
201.566	$3d^7$	$^2H_{9/2}$	$3d^6(^3F2)4p$	$^4G^\circ_{11/2}$	40 229	536 341	160	85
201.638	$3d^7$	$^2H_{11/2}$	$3d^6(^3H)4p$	$^2I^\circ_{13/2}$	37 710	533 649	310	85
201.687	$3d^7$	$^4F_{5/2}$	$3d^6(^5D)4p$	$^6P^\circ_{5/2}$	4 641	500 456	70	85
201.825	$3d^7$	$^2F_{7/2}$	$3d^6(^3D)4p$	$^2D^\circ_{5/2}$	62 189	557 668	40	85
201.848	$3d^7$	$^2G_{7/2}$	$3d^6(^3H)4p$	$^4H^\circ_{7/2}$	30 562	525 973	110	85
201.910	$3d^7$	$^2F_{5/2}$	$3d^6(^1D2)4p$	$^2P^\circ_{3/2}$	61 134	556 405	40	85
202.146	$3d^7$	$^4F_{9/2}$	$3d^6(^5D)4p$	$^6F^\circ_{9/2}$	0	494 690 ?	420*bl*	85
202.185	$3d^7$	$^4F_{7/2}$	$3d^6(^5D)4p$	$^6P^\circ_{7/2}$	2 753	497 349	70	85
202.223	$3d^7$	$^2H_{9/2}$	$3d^6(^3H)4p$	$^2I^\circ_{11/2}$	40 229	534 726	100	85
202.295	$3d^7$	$^4F_{9/2}$	$3d^6(^5D)4p$	$^6F^\circ_{7/2}$	0	494 326	500*bl*	85
202.450	$3d^7$	$^2F_{5/2}$	$3d^6(^1G2)4p$	$^2F^\circ_{5/2}$	61 134	555 091	70	85
202.497	$3d^7$	$^2H_{11/2}$	$3d^6(^3H)4p$	$^4H^\circ_{9/2}$	37 710	531 542	4	85
202.544	$3d^7$	$^2H_{11/2}$	$3d^6(^3H)4p$	$^4H^\circ_{13/2}$	37 710	531 430	90 ?	85
202.673	$3d^7$	$^2D1_{5/2}$	$3d^6(^3F1)4p$	$^2D^\circ_{5/2}$	96 280	589 686	290	85
202.784	$3d^7$	$^2D1_{3/2}$	$3d^6(^3F1)4p$	$^2D^\circ_{3/2}$	94 873	588 009	160	85
202.875	$3d^7$	$^2D2_{5/2}$	$3d^6(^3H)4p$	$^2G^\circ_{7/2}$	38 580	531 498	2	85
202.990	$3d^7$	$^2F_{7/2}$	$3d^6(^3D)4p$	$^4F^\circ_{9/2}$	62 189	554 816	20	85
203.013	$3d^7$	$^2D2_{3/2}$	$3d^6(^3F2)4p$	$^2F^\circ_{5/2}$	42 718	535 302	10	85
203.203	$3d^7$	$^2P_{3/2}$	$3d^6(^3P2)4p$	$^2D^\circ_{5/2}$	33 799	525 918	400*bl*	85
203.229	$3d^7$	$^2F_{7/2}$	$3d^6(^3D)4p$	$^4F^\circ_{7/2}$	62 189	554 233	30	85
203.255	$3d^7$	$^2F_{7/2}$	$3d^6(^1G2)4p$	$^2G^\circ_{9/2}$	62 189	554 178	20	85
203.380	$3d^7$	$^2F_{5/2}$	$3d^6(^3D)4p$	$^4D^\circ_{7/2}$	61 134	552 825	240	85
	$3d^7$	$^4F_{7/2}$	$3d^6(^5D)4p$	$^6F^\circ_{5/2}$	2 753	494 440 ?		85
203.535	$3d^7$	$^2H_{9/2}$	$3d^6(^3H)4p$	$^4H^\circ_{9/2}$	40 229	531 542	20	85
203.597	$3d^7$	$^2H_{11/2}$	$3d^6(^3H)4p$	$^2G^\circ_{9/2}$	37 710	528 877	10	85
203.641	$3d^7$	$^2F_{5/2}$	$3d^6(^3D)4p$	$^4F^\circ_{5/2}$	61 134	552 194	8	85
203.818	$3d^7$	$^2F_{7/2}$	$3d^6(^3D)4p$	$^4D^\circ_{7/2}$	62 189	552 825	20	85
204.055	$3d^7$	$^2F_{7/2}$	$3d^6(^1G2)4p$	$^2G^\circ_{7/2}$	62 189	552 256	10	85
204.147	$3d^7$	$^4F_{5/2}$	$3d^6(^5D)4p$	$^6F^\circ_{3/2}$	4 641	494 485	70	85
204.611	$3d^7$	$^2F_{7/2}$	$3d^6(^3G)4p$	$^2G^\circ_{9/2}$	62 189	550 920	250	85

TABLE 49. Spectral lines of Ga VII—Continued

Wavelength (Å)	Classification Lower		Upper		Energy Levels (cm^{-1})			Int.	Ref.
204.632	$3d^7$	$^2H_{11/2}$	$3d^6(^3H)4p$	$^4I^\circ_{13/2}$	37 710	526 392	?	40	85
204.654	$3d^7$	$^2F_{5/2}$	$3d^6(^3G)4p$	$^2G^\circ_{7/2}$	61 134	549 771		190	85
204.668	$3d^7$	$^4F_{3/2}$	$3d^6(^5D)4p$	$^6F^\circ_{1/2}$	5 885	494 482		40	85
205.101	$3d^7$	$^2F_{7/2}$	$3d^6(^1G2)4p$	$^2H^\circ_{9/2}$	62 189	549 753		140	85
206.101	$3d^7$	$^2F_{5/2}$	$3d^6(^3G)4p$	$^2F^\circ_{7/2}$	61 134	546 341		10	85
206.374	$3d^7$	$^4P_{3/2}$	$3d^6(^5D)4p$	$^4P^\circ_{1/2}$	26 142	510 702		340	85
206.484	$3d^7$	$^2F_{5/2}$	$3d^6(^3F2)4p$	$^2D^\circ_{3/2}$	61 134	545 417		30	85
206.545	$3d^7$	$^2F_{7/2}$	$3d^6(^3G)4p$	$^2F^\circ_{7/2}$	62 189	546 341		60	85
206.669	$3d^7$	$^4P_{5/2}$	$3d^6(^5D)4p$	$^4P^\circ_{3/2}$	26 072	509 937		360	85
206.701	$3d^7$	$^4P_{3/2}$	$3d^6(^5D)4p$	$^4P^\circ_{3/2}$	26 142	509 937		60	85
206.844	$3d^7$	$^2F_{7/2}$	$3d^6(^3G)4p$	$^2F^\circ_{5/2}$	62 189	545 632		20	85
207.103	$3d^7$	$^4P_{1/2}$	$3d^6(^5D)4p$	$^4P^\circ_{1/2}$	27 850	510 702		40	85
207.126	$3d^7$	$^2F_{5/2}$	$3d^6(^3F2)4p$	$^2D^\circ_{5/2}$	61 134	543 934		20	85
207.376	$3d^7$	$^4P_{5/2}$	$3d^6(^5D)4p$	$^4P^\circ_{5/2}$	26 072	508 288		1100	85
207.409	$3d^7$	$^4P_{3/2}$	$3d^6(^5D)4p$	$^4P^\circ_{5/2}$	26 142	508 288		370	85
207.431	$3d^7$	$^4P_{1/2}$	$3d^6(^5D)4p$	$^4P^\circ_{3/2}$	27 850	509 937		160	85
207.577	$3d^7$	$^2F_{7/2}$	$3d^6(^3F2)4p$	$^2D^\circ_{5/2}$	62 189	543 934		20	85
208.262	$3d^7$	$^2F_{5/2}$	$3d^6(^3G)4p$	$^4H^\circ_{7/2}$	61 134	541 304		280	85
208.529	$3d^7$	$^2F_{5/2}$	$3d^6(^3G)4p$	$^4G^\circ_{7/2}$	61 134	540 685		40	85
209.354	$3d^7$	$^2F_{7/2}$	$3d^6(^3F2)4p$	$^2G^\circ_{9/2}$	62 189	539 841		20	85
209.606	$3d^7$	$^4P_{3/2}$	$3d^6(^5D)4p$	$^4D^\circ_{3/2}$	26 142	503 232		10	85
209.675	$3d^7$	$^2F_{5/2}$	$3d^6(^3F2)4p$	$^2F^\circ_{7/2}$	61 134	538 050		40	85
	$3d^7$	$^2P_{3/2}$	$3d^6(^5D)4p$	$^4P^\circ_{1/2}$	33 799	510 702			85
209.896	$3d^7$	$^4P_{3/2}$	$3d^6(^5D)4p$	$^6P^\circ_{3/2}$	26 142	502 569		10	85
210.000	$3d^7$	$^4P_{5/2}$	$3d^6(^5D)4p$	$^4D^\circ_{5/2}$	26 072	502 264		8	85
210.032	$3d^7$	$^4P_{3/2}$	$3d^6(^5D)4p$	$^4D^\circ_{5/2}$	26 142	502 264		90	85
210.218	$3d^7$	$^4P_{1/2}$	$3d^6(^5D)4p$	$^4D^\circ_{1/2}$	27 850	503 540		30	85
210.356	$3d^7$	$^4P_{1/2}$	$3d^6(^5D)4p$	$^4D^\circ_{3/2}$	27 850	503 232		30	85
210.620	$3d^7$	$^4P_{5/2}$	$3d^6(^5D)4p$	$^4D^\circ_{7/2}$	26 072	500 860		160	85
210.752	$3d^7$	$^2P_{3/2}$	$3d^6(^5D)4p$	$^4P^\circ_{5/2}$	33 799	508 288		10	85
210.798	$3d^7$	$^4P_{5/2}$	$3d^6(^5D)4p$	$^6P^\circ_{5/2}$	26 072	500 456		20	85
210.834	$3d^7$	$^4P_{3/2}$	$3d^6(^5D)4p$	$^6P^\circ_{5/2}$	26 142	500 456		8	85
212.192	$3d^7$	$^4P_{5/2}$	$3d^6(^5D)4p$	$^6P^\circ_{7/2}$	26 072	497 349		60?	85
213.433	$3d^7$	$^2F_{7/2}$	$3d^6(^3F2)4p$	$^4F^\circ_{9/2}$	62 189	530 711		20	85
213.555	$3d^7$	$^4P_{5/2}$	$3d^6(^5D)4p$	$^6F^\circ_{7/2}$	26 072	494 326		30	85
217.289	$3d^7$	$^2D1_{3/2}$	$3d^6(^1G2)4p$	$^2F^\circ_{5/2}$	94 873	555 091		8	85
221.852	$3d^7$	$^2D1_{3/2}$	$3d^6(^3G)4p$	$^2F^\circ_{5/2}$	94 873	545 632		30	85
222.182	$3d^7$	$^2D1_{5/2}$	$3d^6(^3G)4p$	$^2F^\circ_{7/2}$	96 280	546 341		40?	85

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