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Stellar laboratories: new Ge V and Ge VI oscillator strengths and their validation in the hot white dwarf RE 0503−289⋆ ⋆⋆

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ABSTRACT

Context. State-of-the-art spectral analysis of hot stars by means of non-LTE model-atmosphere techniques has arrived at a high level of sophistication. The analysis of high-resolution and high-S/N spectra, however, is strongly restricted by the lack of reliable atomic data for highly ionized species from intermediate-mass metals to trans-iron elements. Especially data for the latter has only been sparsely calculated. Many of their lines are identified in spectra of extremely hot, hydrogen-deficient post-AGB stars. A reliable determination of their abundances establishes crucial constraints for AGB nucleosynthesis simulations and, thus, for stellar evolutionary theory.

Aims. In a previous analysis of the UV spectrum of RE 0503−289, spectral lines of highly ionized Ga, Ge, As, Se, Kr, Mo, Sn, Te, I, and Xe were identified. Individual abundance determinations are hampered by the lack of reliable oscillator strengths. Most of these identified lines stem from Ge V. In addition, we identified Ge VI lines for the first time. We calculated Ge V and Ge VI oscillator strengths in order to reproduce the observed spectrum.

Methods. We newly calculated Ge V and Ge VI oscillator strengths to consider their radiative and collisional bound-bound transitions in detail in our non-LTE stellar-atmosphere models for the analysis of the Ge IV – VI spectrum exhibited in high-resolution and high-S/N FUV (*FUSE*) and UV (ORFEUS/*BEFS*, *IUE*) observations of RE 0503−289.

Results. In the UV spectrum of RE 0503−289, we identify four Ge IV, 37 Ge V, and seven Ge VI lines. Most of these lines are identified for the first time in any star. We can reproduce almost all Ge IV, Ge V, and Ge VI lines in the observed spectrum of RE 0503−289 ($T_{\rm eff}$ = 70 kK, $\log g$ = 7.5) at $\log$ Ge = −3.8 ± 0.3 (mass fraction, about 650 times solar). The Ge IV / V / VI ionization equilibrium, that is a very sensitive $T_{\rm eff}$ indicator, is reproduced well.

Conclusions. Reliable measurements and calculations of atomic data are a prerequisite for stellar-atmosphere modeling. Our oscillator-strength calculations have allowed, for the first time, Ge V and Ge VI lines to be successfully reproduced in a white dwarf's (RE 0503−289) spectrum and determine its photospheric Ge abundance.

Key words. Atomic data – Line: identification – Stars: abundances – Stars: individual: RE 0503−289, WD 0501−289, EUVE J0503−28.8 – Stars: white dwarfs – Virtual observatory tools

1. Introduction

Any model-atmosphere calculation is strongly dependent on the available and reliable atomic data, which is a crucial input. Especially for highly ionized species and higher atomic mass, published data becomes rather sparse. A close inspection of the UV spectrum of the hot white dwarf RE 0503−289 by Werner et al. (2012) has shown that a large number of the hitherto unidentified observed spectral lines stem from trans-iron elements, namely Ga, Ge, As, Se, Mo, Sn, Te, and I.

Identification of the respective spectral lines is fairly straightforward because atomic databases like NIST[1] and Kelly's database[2] have partly included the strongest lines of these elements with accurate wavelengths, whereas a quantitative analysis requires adequate spectral modeling. This is hampered by the fact that line strengths for trans-iron elements, when available at all, are relative intensities measured from emission line spectra. Exploratory atmosphere models that are based on the LTE assumption to calculate occupation numbers of the atomic levels of an ion and on $\log gf$ values scaled to match the relative line strengths may show that the line identifications are correct. A reliable abundance analysis, however, is impossible owing to the lack of measured or calculated transition probabilities.

The line identification was demonstrated by Werner et al. (2012) in the case of RE 0503−289. It is a hot ($T_{\rm eff}$ = 70 kK, $\log g$ = 7.5), helium-rich DO-type white dwarf (WD 0501−289, $\alpha_{2000} = 05^{\rm h}03^{\rm m}55\overset{\rm s}{.}513$, $\delta_{2000} = -28^\circ54'34\overset{''}{.}57$), which is well-suited to UV spectroscopy because its spectrum is only slightly contaminated by interstellar absorption. Werner et al. (2012) performed an abundance analysis of Kr and Xe where level energies and oscillator strengths of Kr VI, Kr VII, Xe VI, and Xe VII were already published. They determined $\log$ Kr = −4.3 ± 0.5 and $\log$ Xe = −4.2 ± 0.6 (mass fractions) and identified a variety of lines of the other trans-iron elements mentioned above.

⋆ Based on observations made with the NASA-CNES-CSA Far Ultraviolet Spectroscopic Explorer.

⋆⋆ Tables 2 and 4 are available in electronic form at the CDS via anonymous ftp to cdsarc.u-strasbg.fr (130.79.128.5) or via http://cdsweb.u-strasbg.fr/cgi-bin/qcat?J/A+A/

[1] http://www.nist.gov/pml/data/asd.cfm
[2] http://www.cfa.harvard.edu/ampcgi/kelly.pl

Only level energies and (partly) relative line strengths were accessible for Ge. A test calculation of an H+Ge-composed model atmosphere with the relevant parameters ($T_{\rm eff}$ = 70 kK, $\log g$ = 7.5), $\log$ Ge = −4) shows that Ge V and Ge VI are dominant in the line-forming region (Fig. 1). Consequently, we calculated transition probabilities anew for Ge V and Ge VI (Sect. 2). In Sect. 3, we briefly introduce the available observed spectra, which are used for our Ge abundance analysis of RE 0503−289 that is presented in Sect. 4. In Sect. 5 we re-assess the effective temperature of RE 0503−289 based on the C III / C IV ionization balance. Results and conclusions are summarized in Sect. 6.

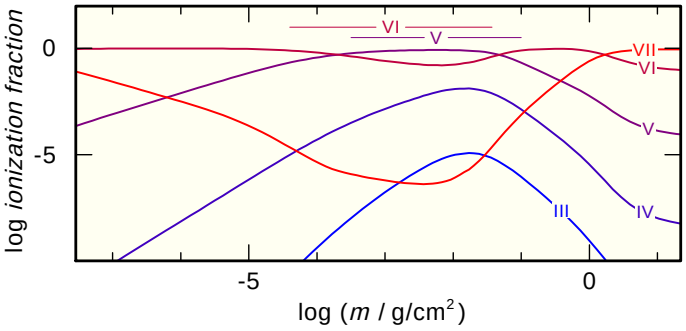

Fig. 1. Ionization fractions of Ge III - VII. The formation depths of the Ge V and Ge VI line cores are marked at the top.

2. Transition probabilities in Ge V and Ge VI

There are not very many transition probabilities or oscillator strengths in Ge V and Ge VI ions. In Ge V, some pioneering HFR[3] and MCDF[4] (Grant & McKenzie 1980; Grant et al. 1980) results were reported by Quinet & Biémont (1990, 1991) but the work of these authors was limited to 3d-4p and 3d-4f transitions in nickel-like ions (Ge V - Pb LV). More recent work comes from Safronova and co-workers (Safronova et al. 2000; Hamasha et al. 2004; Safronova et al. 2006a,b; Safronova & Safronova 2006), who performed relativistic many-body calculations for multipole transitions (E1, M1, E2, M2, E3, M3) originating in the ground states.

In Ge VI, the available results are limited to forbidden transitions in 3d and $3d^9$ configurations (Biémont & Hansen 1989) and to the theoretical investigation of electric dipole transitions between $3d^9$ and d^8p configurations in zinc, gallium, and germanium ions (Jucys et al. 1968).

As there is no uniform set of oscillator strengths available for all the transitions of Ge ions observed in the present work, we decided to perform the relevant calculations. The method adopted here is the relativistic Hartree-Fock approach frequently referred to in the literature as the HFR or Cowan's method (Cowan 1981).

For Ge V, configuration interaction has been considered among the configurations $3d^{10}$, $3d^9ns$ (n = 4–7), $3d^9nd$ (n = 4–7), $3d^84s^2$, $3d^84p^2$, $3d^84d^2$, $3d^84f^2$, $3d^84sns$ (n = 5–7), $3d^84snd$ (n = 4–7), and $3d^84p4f$ for the even parity, and $3d^9np$ (n = 4–7), $3d^9nf$ (n = 4–7), $3d^84snp$ (n = 4–7), $3d^84snf$ (n = 4–7), and $3d^84p4d$ for the odd parity. Using experimental energy levels reported by Sugar & Musgrove (1993) and Churilov et al. (1997), the radial integrals (average energies, Slater integrals, spin-orbit parameters) of $3d^{10}$, $3d^9ns$ (n = 4–7), $3d^9np$ (n = 4–6), $3d^9nd$ (n = 4,5), $3d^94f$ and $3d^84s4p$ were optimized by a well-established least-squares fitting procedure. In this process, the $3d^94d\ ^1S_0$ level at 493765.5 cm^{-1} (Sugar & Musgrove 1993) and the $3d^84s4p$ (J=1) level at 673405 cm^{-1} (Churilov et al. 1997), affected by larger uncertainties, were not considered.

For Ge VI, the configurations included in the HFR model were $3d^9$, $3d^84s$, $3d^85s$, $3d^84d$, $3d^85d$, $3d^74s^2$, $3d^74p^2$, $3d^74d^2$, $3d^74f^2$, $3d^74s5s$, $3d^74s4d$, and $3d^74s5d$ for the even parity and $3d^84p$, $3d^85p$, $3d^84f$, $3d^85f$, $3d^74s4p$, $3d^74s5p$, $3d^74s4f$, $3d^74s5f$, and $3d^74p4d$ for the odd parity. In this case, the semi-empirical process was performed to optimize the radial integrals corresponding to $3d^9$, $3d^84s$, and $3d^84p$ configurations using the experimental levels reported by Sugar & Musgrove (1993). The $3d^94f$ levels were excluded from the fit because many of these were found to be mixed with experimentally unknown levels belonging notably to the $3d^95p$ configuration.

The experimental and calculated energy levels for Ge V, expressed in cm^{-1}, are reported in Table 1 which also shows the differences between both sets of results (ΔE) and, in the last column, the percentage composition in LS-coupling (only the first three components over 5% are given). This last piece of information is useful because oscillator strengths for transitions connecting strongly perturbed levels are more sensitive to configuration interaction effects.

The calculated HFR oscillator strengths on a logarithmic scale ($\log gf$) and transition probabilities (gA, in sec^{-1}) for Ge V are reported in Table 2 with the corresponding wavelengths (in Å) and energy levels (in cm^{-1}). In the last column, we give the cancellation factor CF as defined by Cowan (1981). Low values of this factor indicate strong cancellation effects in the calculations. The corresponding transition probabilities could be very inaccurate so need to be considered with some care. It does appear, however, from the last column of the table that very few transitions are affected by such effects.

The experimental and calculated energy levels for Ge VI appear in Table 3 and the corresponding calculated HFR oscillator strengths and transition probabilities are reported in Table 4. Here too, very few transitions are affected by cancellation effects so that for most of the transitions, the f values should be reliable.

3. Observations

For our analysis, we mainly use the *FUSE* spectrum of RE 0503−289 that is described in detail by Werner et al. (2012). In addition, we use UV spectra that were obtained with ORFEUS[5]/ *BEFS*[6], ORFEUS/ *GHRS*[7] and *IUE*[8]. The *BEFS* spectrum (909 - 1222 Å) is co-added from five observations (ObsIds: BEFS2003, BEFS2126, BEFS2128, BEFS2133, BEFS2173; with a total observation time of 6826 sec). The *GHRS* spectrum (1228 - 1275 Å, 1339 - 1375 Å, 1610 - 1655 Å) is co-added from eight observations (ObsIds: Z3GM0204T, Z3GM0205T, Z3JU0104T, Z3JU0107T, Z3JU0108T, Z3JU0109T, Z3JU010AT, Z3JU010BT; 5155 sec). The *IUE* spectrum (1153 - 1947 Å) is the co-added spectrum (ObsIds: SWP46428, SWP49788, SWP52796, SWP52803; 136 193 sec) provided by the *IUE* NEWSIPS data base[9] (Holberg et al. 1998).

[3] Hartree-Fock with relativistic corrections
[4] Multi-Configuration Dirac-Fock
[5] Orbiting Retrievable Far and Extreme Ultraviolet Spectrometer
[6] Berkeley Extreme and Far-UV Spectrometer
[7] Goddard High-Resolution Spectrograph
[8] International Ultraviolet Explorer
[9] `http://vega.lpl.arizona.edu/newsips/`

Optical spectra were taken in the framework of the *SPY*[10] project (Napiwotzki et al. 2001, 2003) with *UVES*[11] at ESO's[12] *VLT*[13].

4. The photospheric Ge abundance in RE 0503−289

Ge V and Ge VI are the dominant ionization stages in the line-forming region of RE 0503−289 (Fig. 1). Thus, we constructed a Ge III - VII model atom (Table 5, Fig. 2). We used level energies from NIST for all ions. For Ge IV, we considered the oscillator strengths of Nath Dutta & Majumder (2011) and, where missing, approximated values from the isoelectronic C IV. Ge V and Ge VI include our newly calculated oscillator strengths (Sect. 2). Analogously to Werner et al. (2012) in the case of Kr and Xe, the unknown f values (Table 5) of these two ions were set to 10^{-4} within a spin and to 10^{-6} otherwise. Test calculations have shown that the Ge line profiles in the UV do not change when we set $f = 0$ for these lines. Photoionization rates were computed with hydrogen-like crosssections. Electron collisional excitation and ionization rates were evaluated with the usual approximation formulae following van Regemorter (1962) and Seaton (1962), respectively. This enabled us to build on the HeCNOKrXe models for RE 0503−289 described by Werner et al. (2012) and to consider Ge opacities as well as iron-group opacities (elements Ca - Ni, own determination of upper abundance limits) in addition. Compared to Werner et al. (2012), we reduced the N abundance to match the N IV 2p ^{3}P^o - 2p^2 ^{3}P multiplet (921 - 924 Å, Fig. 3).

Table 5. Statistics of the Ge model atom used in our calculations.

ion	levels		line transitions		
	NLTE	LTE	total	known f	unknown f
III	14	2	0		
IV	8	1	8	8	
V	85	0	1345	878	467
VI	36	0	235	160	75
VII	1	0	0		

We used the *Tübingen Model-Atmosphere Package* (*TMAP*[14] Werner et al. 2003) to calculate state-of-the-art, plane-parallel, chemically homogeneous model atmospheres in hydrostatic and radiative equilibrium. The considered model atoms are those that are provided via the *Tübingen Model-Atom Database* (*TMAD*[15], Rauch & Deetjen 2003).

We compared the available UV spectra of RE 0503−289 (Sect. 3) with our *TMAP* model (and wavelength positions given by NIST and Kelly's database) in order to identify Ge lines. The line lists in that energy region, especially for the highly ionized trans-iron elements that are encountered, are rather incomplete, and thus, lines that are not considered in the models may contribute to the assumed isolated Ge lines. Ga V $\lambda\lambda$ 1054.560, 1069.450 Å are two examples (Fig. 3). The consideration of Ga in the model-atmosphere calculation would improve the fit of the blends with Ge V $\lambda\lambda$ 1054.588, 1069.419 Å.

[10] ESO **S**N Ia **P**rogenitor surve**Y**
[11] Ultraviolet and Visual Echelle Spectrograph
[12] `http://www.eso.org/public/`
[13] Very Large Telescope
[14] `http://astro.uni-tuebingen.de/~TMAP`
[15] `http://astro.uni-tuebingen.de/~TMAD`

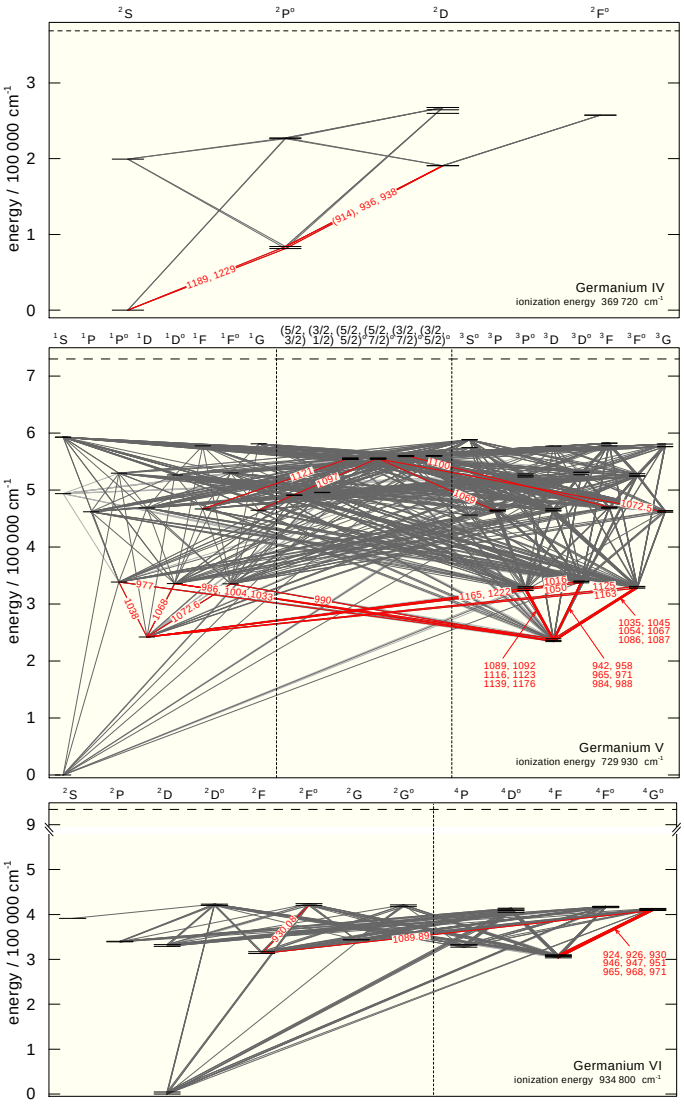

Fig. 2. Grotrian diagram of our Ge IV (top), Ge V (middle), and Ge VI (bottom) model ions. Thick black and thin gray lines represent radiative transitions with known and unknown f values, respectively. The identified lines (red) are labeled with their respective wavelengths in Å.

However, we identify four Ge IV, 37 Ge V, and six Ge VI lines (Table 6). All Ge IV and Ge V lines are in general reproduced in both strength and width by our model simultaneously at log Ge = −3.81 ± 0.3 (Fig. 3). There is only one line, Ge V λ 1123.744 Å that is much too strong in our model. The reason is unknown. The Ge VI lines are weak in our model and just emerge from the noise in the *FUSE* observation, but they do agree. Ge VI $\lambda\lambda$ 986.721, 1039.890 Å are too weak to reproduce the observed absorption features, most likely due to unknown blends at their positions that are not considered in the model. However, the large number of identified Ge lines and their modeling give convincing evidence that our model and the determined Ge abundance are realistic.

5. Effective temperature and surface gravity of RE 0503−289

Both $T_{\rm eff}$ and $\log g$ were adopted from Werner et al. (2012) for this analysis. Figure 3 shows that the C III multiplet 2p ^{3}P^o - 2p^2 ^{3}P (1174 - 1176 Å) in our model is too weak. Since an in-

creased C abundance would strengthen C IV lines as well, e.g. C IV $\lambda\lambda$ 948.09, 948.21 Å (Fig. 3), this is evidence that $T_{\rm eff}$ of the model is too high and/or $\log g$ is too low. A respective variation would change the C III / C IV ionization equilibrium towards the lower ionization and improve the agreement of the C III lines. Figures 4 and 5 demonstrate this for $T_{\rm eff} = 70$ kK and $T_{\rm eff} = 65$ kK. We compared theoretical He I, He II, C III, C IV, O IV, and O V line profiles with *FUSE* and *GHRS* UV observations and optical *UVES* observations. The most prominent C III λ 977.020 Å has a strong, blue-shifted interstellar component and is not well suited to an analysis. The better agreement of C III $\lambda\lambda$ 1175 Å in the line cores favors $T_{\rm eff} = 65$ kK, while the "shoulders" between the C III $\lambda\lambda$ 1175 Å components are better matched at $T_{\rm eff} = 70$ kK. The lower $T_{\rm eff}$ is supported by the Ge IV / Ge V ionization balance (Fig. 6), if we judge e.g. Ge IV λ 936.765 Å. The Ge V lines appear almost with same strengths in both ($T_{\rm eff} = 70$ kK and $T_{\rm eff} = 65$ kK) models. On the other hand, Kr VI / Kr VII favors $T_{\rm eff} = 70$ kK (Werner et al. 2012), and He I λ 4471 Å is too strong in the model at $T_{\rm eff} = 65$ kK (Fig. 6). The O IV / O V ionization appears unchanged between $T_{\rm eff} = 65$ kK and $T_{\rm eff} = 70$ kK.

It is worthwhile mentioning that a lower $T_{\rm eff}$ would strongly improve the agreement between model and the observed EUV flux (EUVE J0503−28.8, Werner et al. 2001). A more precise determination of $T_{\rm eff}$ and $\log g$ of RE 0503−289 based on additional high-S/N optical spectra and more ionization equilibria of different species is highly desirable. Our test calculations have shown that our Ge line identifications and abundance determination are affected only marginally by this uncertainty in atmosphere parameters.

6. Results and conclusions

Successful reproduction of the identified Ge lines in high-resolution UV spectra of RE 0503−289 by our synthetic spectra calculated from NLTE model atmospheres using newly calculated oscillator strengths of Ge V and Ge VI shows that — when done with sufficient care — theory works.

We derive a photospheric abundance of $\log {\rm Ge} = -3.8 \pm 0.3$ (mass fraction) in RE 0503−289. This is about 650 times the solar abundance. This high value is similar to the results of Werner et al. (2012) for Kr (450 times solar) and Xe (3800 times solar).

The identifications of trans-iron elements in the *FUSE* spectrum of RE 0503−289 and the abundance determinations of Ge, Kr, and Xe show that RE 0503−289 is important for our understanding of the non-DA white dwarf evolutionary channel. Further abundance determinations of the identified species is highly desirable. This is a challenge for atomic physicists.

It is worthwhile mentioning here the two HST observations of RE 0503−289 taken with *STIS*[16] (1999-03-23, ObsIds O56401010, O56401020) that missed the star because the prior target acquisition apparently failed. Unfortunately, they were not repeated. The available *GHRS*[17] observations cover only small wavelength sections of the NUV, and the *IUE* high-resolution spectra (e.g. SWP52803HL) have too-low an S/N. Obtaining high-resolution, high S/N spectra with HST/*STIS* should not be missed because the NUV spectrum probably offers important, additional spectral information.

The Ge model ions that were used in this analysis were developed in the framework of the *Virtual Observatory* (*VO*[18]) in a *German Astrophysical Virtual Observatory* (*GAVO*[19]) project and are provided within *TMAD* (Sect. 4). The spectral energy distribution of our final model can be retrieved in *VO*-compliant form via the registered *VO* service *TheoSSA*[20].

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[16] Space Telescope Imaging Spectrograph
[17] Goddard High Resolution Spectrograph
[18] http://www.ivoa.net/
[19] http://www.g-vo.org
[20] http://dc.g-vo.org/theossa

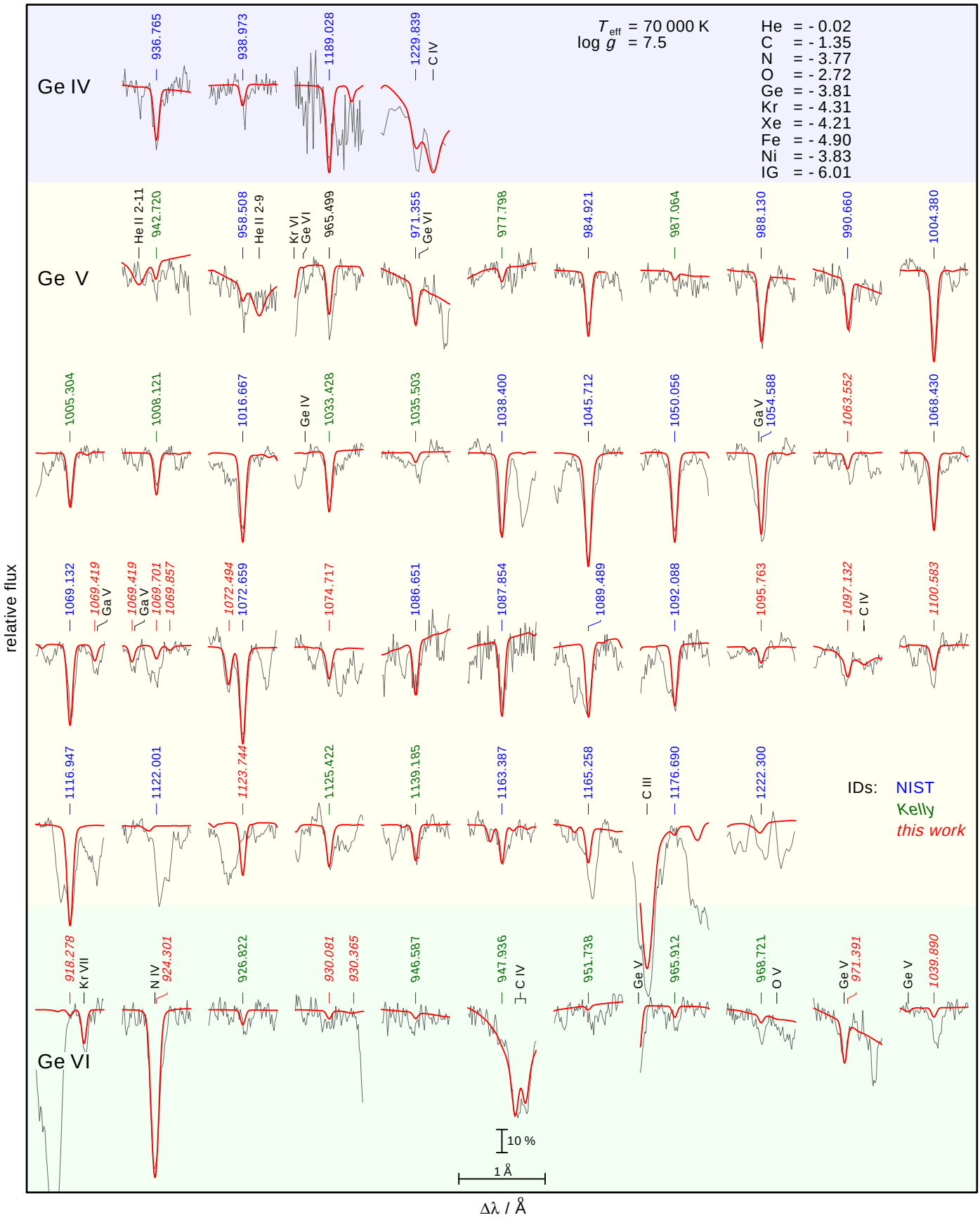

Fig. 3. Ge IV (top), Ge V, and Ge VI (bottom) lines in *FUSE*, ORFEUS/*BEFS* (Ge IV λ 1189 Å), and *IUE* (Ge V λ 1222 Å, Ge IV λ 1229 Å) observations compared with a $T_{\rm eff}$ = 70 kK / log g = 7.5 *TMAP* model. The abundances (top right) are logarithmic mass fractions. IG denotes a generic model atom (Rauch & Deetjen 2003), which comprises Ca, Sc, Ti, V, Cr, Mn, and Co. The synthetic spectra a convolved with a Gaussian of 0.05 Å (FWHM, 0.1 Å for the IUE comparison) to match the instrument resolution. A radial-velocity shift of $v_{\rm rad}$ = 23 km/sec is applied to the observation.

Table 6. Identified Ge lines in the UV spectrum of RE 0503−289.

ion	lower level	upper level	f value	wavelength / Å	comment
Ge IV	$4p\ ^2P^o_{3/2}$	$4d\ ^2D_{5/2}$	8.91E-01	936.765	
	$4p\ ^2P^o_{3/2}$	$4d\ ^2D_{3/2}$	9.89E-02	938.973	
	$4s\ ^2S_{1/2}$	$4p\ ^2P^o_{3/2}$	5.54E-01	1189.028	
	$4s\ ^2S_{1/2}$	$4p\ ^2P^o_{1/2}$	2.66E-01	1229.839	
Ge V	$4s\ ^3D_3$	$4p\ ^3D^o_2$	8.22E-03	942.720	
	$4s\ ^3D_2$	$4p\ ^3D^o_2$	3.17E-02	958.508	
	$4s\ ^3D_2$	$4p\ ^3D^o_1$	3.56E-02	965.499	
	$4s\ ^3D_3$	$4p\ ^3D^o_3$	1.22E-01	971.355	
	$4s\ ^3D_2$	$4p\ ^1P^o_1$	3.56E-03	977.798	Kelly wavelength
	$4s\ ^3D_1$	$4p\ ^3D^o_2$	1.08E-01	984.921	
	$4s\ ^3D_3$	$4p\ ^1D^o_2$	1.13E-03	987.064	Kelly wavelength
	$4s\ ^3D_2$	$4p\ ^3D^o_3$	1.00E-01	988.130	
	$4s\ ^3D_3$	$4p\ ^1F^o_3$	1.13E-01	990.660	
	$4s\ ^3D_2$	$4p\ ^1D^o_2$	1.70E-01	1004.380	NIST wavelength
	$4s\ ^3D_1$	$4p\ ^1P^o_1$	5.41E-02	1005.304	Kelly wavelength
	$4s\ ^3D_2$	$4p\ ^1F^o_3$	1.21E-02	1008.121	
	$4s\ ^1D_2$	$4p\ ^3D^o_2$	1.95E-01	1016.667	
	$4s\ ^3D_1$	$4p\ ^1D^o_2$	6.96E-02	1033.428	Kelly wavelength
	$4s\ ^3D_3$	$4p\ ^3F^o_2$	1.01E-03	1035.503	
	$4s\ ^1D_2$	$4p\ ^1P^o_1$	1.45E-01	1038.400	NIST wavelength
	$4s\ ^3D_3$	$4p\ ^3F^o_4$	3.94E-01	1045.712	
	$4s\ ^1D_2$	$4p\ ^3D^o_3$	1.56E-01	1050.056	
	$4s\ ^3D_2$	$4p\ ^3F^o_2$	8.93E-02	1054.588	
	$4d\ ^3P_1$	$4f\ ^5F^o_2$	8.57E-01	1063.552	
	$4s\ ^1D_2$	$4p\ ^1D^o_2$	8.73E-02	1068.430	NIST wavelength
	$4s\ ^3D_3$	$4p\ ^3F^o_3$	6.53E-02	1069.132	NIST wavelength
	$4d\ ^3P_2$	4f	5.02E-01	1069.419	
	$4d\ ^1P_1$	4f	6.07E-01	1069.701	
	$4d\ ^3P_2$	4f	1.10E-01	1069.857	
	$4d\ ^3G_5$	4f	9.97E-01	1072.494	
	$4s\ ^1D_2$	$4p\ ^1F^o_3$	2.52E-01	1072.659	
	$4d\ ^3G_4$	4f	9.68E-01	1074.717	
	$4s\ ^3D_1$	$4p\ ^3F^o_2$	3.18E-01	1086.651	
	$4s\ ^3D_2$	$4p\ ^3F^o_3$	3.03E-01	1087.854	
	$4s\ ^3D_2$	$4p\ ^3P^o_1$	1.42E-01	1089.489	
	$4s\ ^3D_1$	$4p\ ^3P^o_0$	1.01E-01	1092.088	
	$4d\ ^3G_3$	$4f\ ^5D^o_3$	1.53E-02	1095.763	
	$4d\ ^1G_4$	4f	7.69E-01	1097.132	
	$4d\ ^3F_3$	4f	9.01E-01	1100.583	
	$4s\ ^3D_3$	$4p\ ^3P^o_2$	1.97E-01	1116.947	
	$4d\ ^1F_3$	4f	9.44E-02	1122.001	NIST wavelength, very weak
	$4s\ ^3D_1$	$4p\ ^3P^o_1$	3.83E-02	1123.744	
	$4s\ ^1D_2$	$4p\ ^3F^o_2$	1.29E-02	1125.422	
	$4s\ ^3D_2$	$4p\ ^3P^o_2$	9.14E-03	1139.185	
	$4s\ ^1D_2$	$4p\ ^3F^o_3$	1.29E-02	1163.387	
	$4s\ ^1D_2$	$4p\ ^3P^o_1$	1.48E-02	1165.258	
	$4s\ ^3D_1$	$4p\ ^3P^o_2$	2.06E-03	1176.690	C III blend
	$4s\ ^1D_2$	$4p\ ^3P^o_2$	4.91E-03	1222.300	
Ge VI	$4s\ ^4F_{7/2}$	$4p\ ^4G^o_{9/2}$	2.34E-04	918.278	
	$4s\ ^4F_{9/2}$	$4p\ ^4G^o_{7/2}$	2.34E-04	924.301	N IV blend
	$4s\ ^4F_{9/2}$	$4p\ ^4G^o_{11/2}$	3.63E-01	926.822	
	$4s\ ^2F_{7/2}$	$4p\ ^2F^o_{7/2}$	2.43E-01	930.081	
	$4s\ ^4F_{7/2}$	$4p\ ^4G^o_{5/2}$	8.07E-04	930.365	
	$4s\ ^4F_{7/2}$	$4p\ ^4G^o_{7/2}$	1.28E-01	946.587	
	$4s\ ^4F_{9/2}$	$4p\ ^4G^o_{9/2}$	1.15E-01	947.936	C IV blend
	$4s\ ^4F_{5/2}$	$4p\ ^4G^o_{5/2}$	1.03E-01	951.738	
	$4s\ ^4F_{3/2}$	$4p\ ^4G^o_{5/2}$	2.62E-01	965.912	
	$4s\ ^4F_{5/2}$	$4p\ ^4G^o_{7/2}$	1.96E-01	968.721	
	$4s\ ^4F_{7/2}$	$4p\ ^4G^o_{9/2}$	1.81E-01	971.391	
	$4s\ ^2F_{7/2}$	$4p\ ^4G^o_{9/2}$	1.81E-01	1039.890	

Note: The f values of Ge IV are from Nath Dutta & Majumder (2011). All Ge V and VI wavelengths are calculated from energy levels in Tables 1 and 3 unless otherwise mentioned in the comment column.

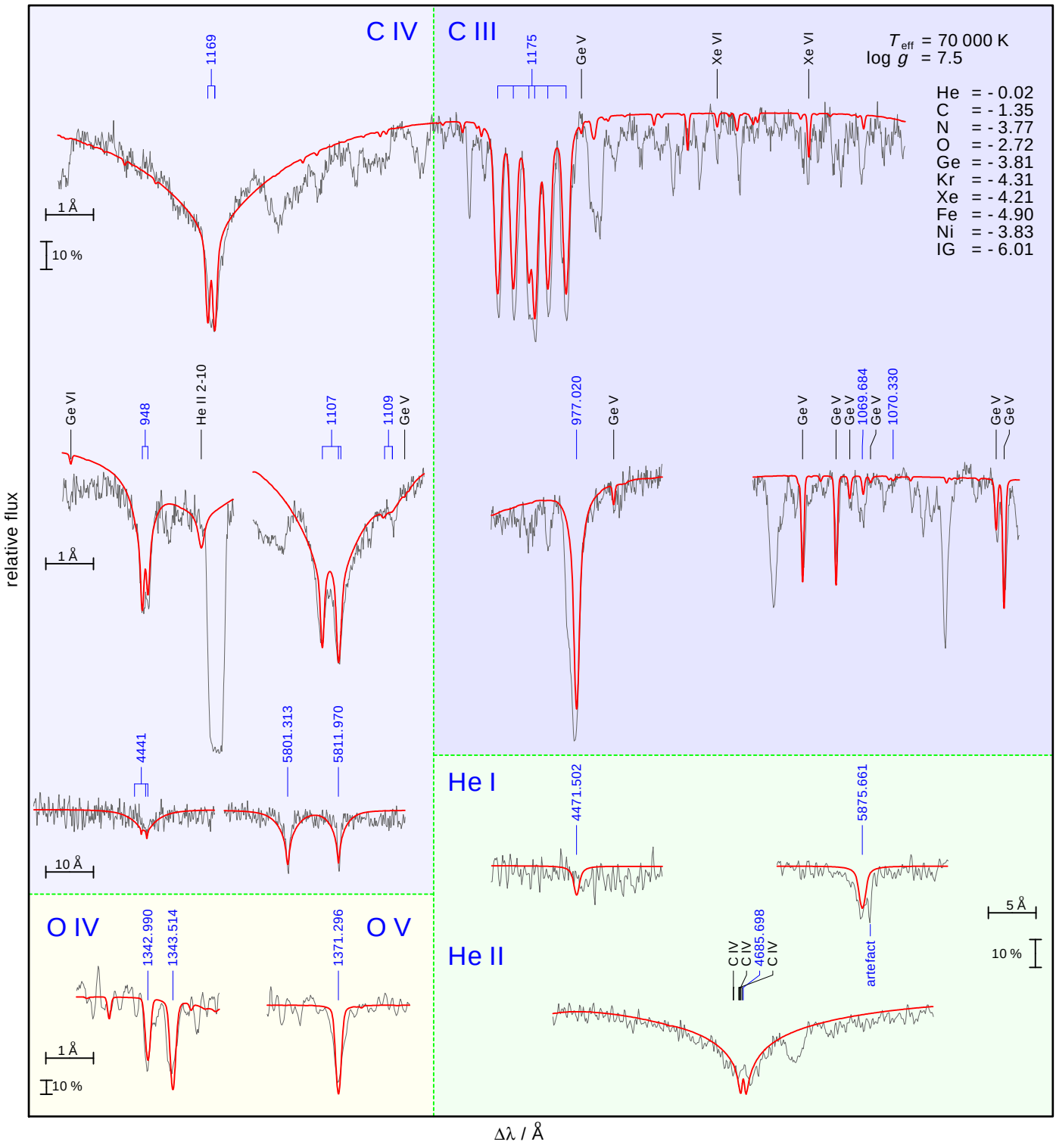

Fig. 4. He I / He II, C III / C IV, and O IV / O V ionization equilibria in our $T_{\rm eff}$ = 70 kK model compared with *FUSE*, *GHRS* (smoothed with a low-pass filter (m = 15, n = 4) for clarity, Savitzky & Golay 1964), and *UVES* observations. Wavelength and flux scales are indicated by bars. The model spectrum is convolved with a Gaussian to match the respective instrument's resolution. Unidentified lines in the model stem from Ca - Ni.

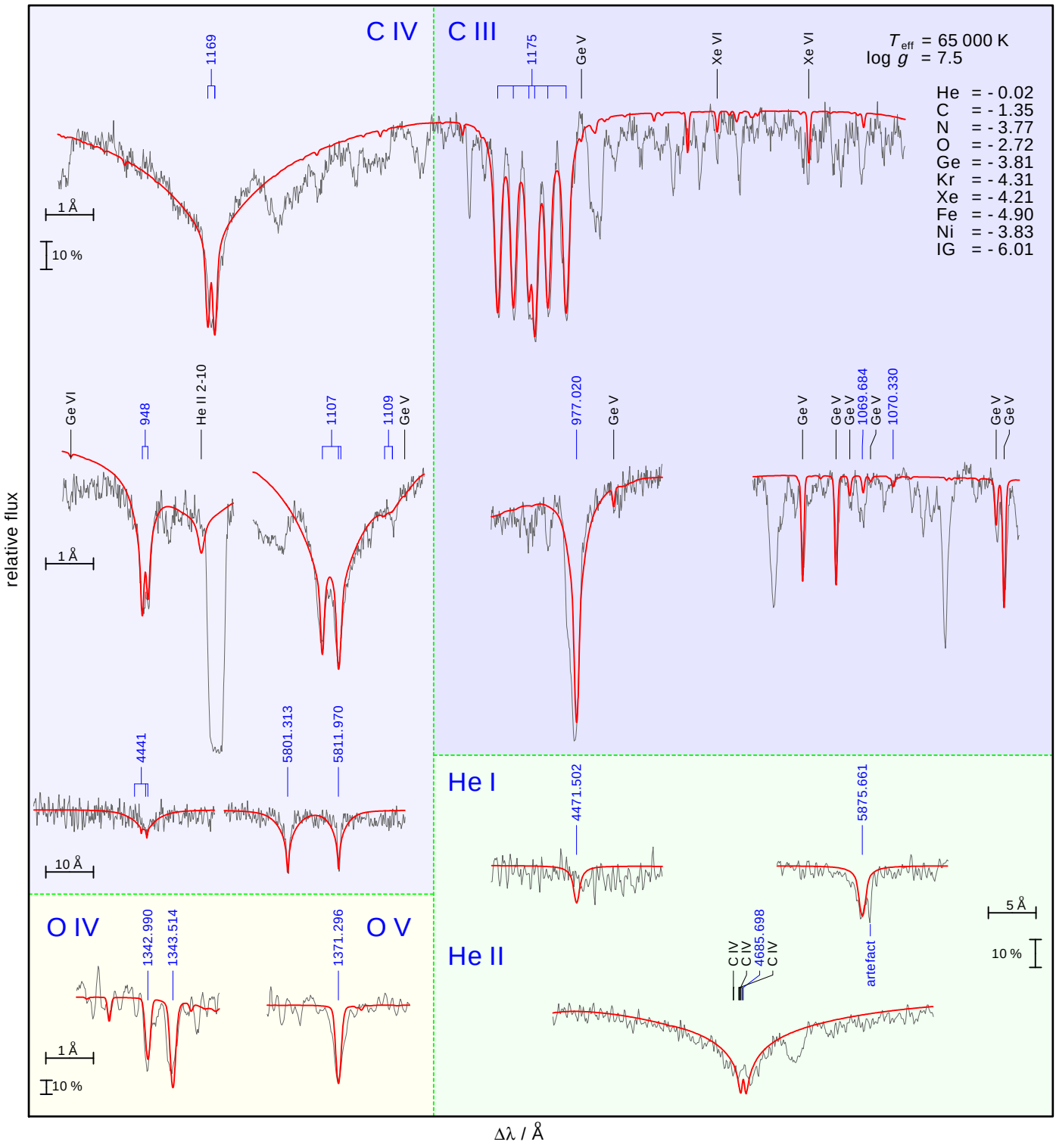

Fig. 5. Same as Fig. 4 for $T_{\rm eff}$ = 65 kK.

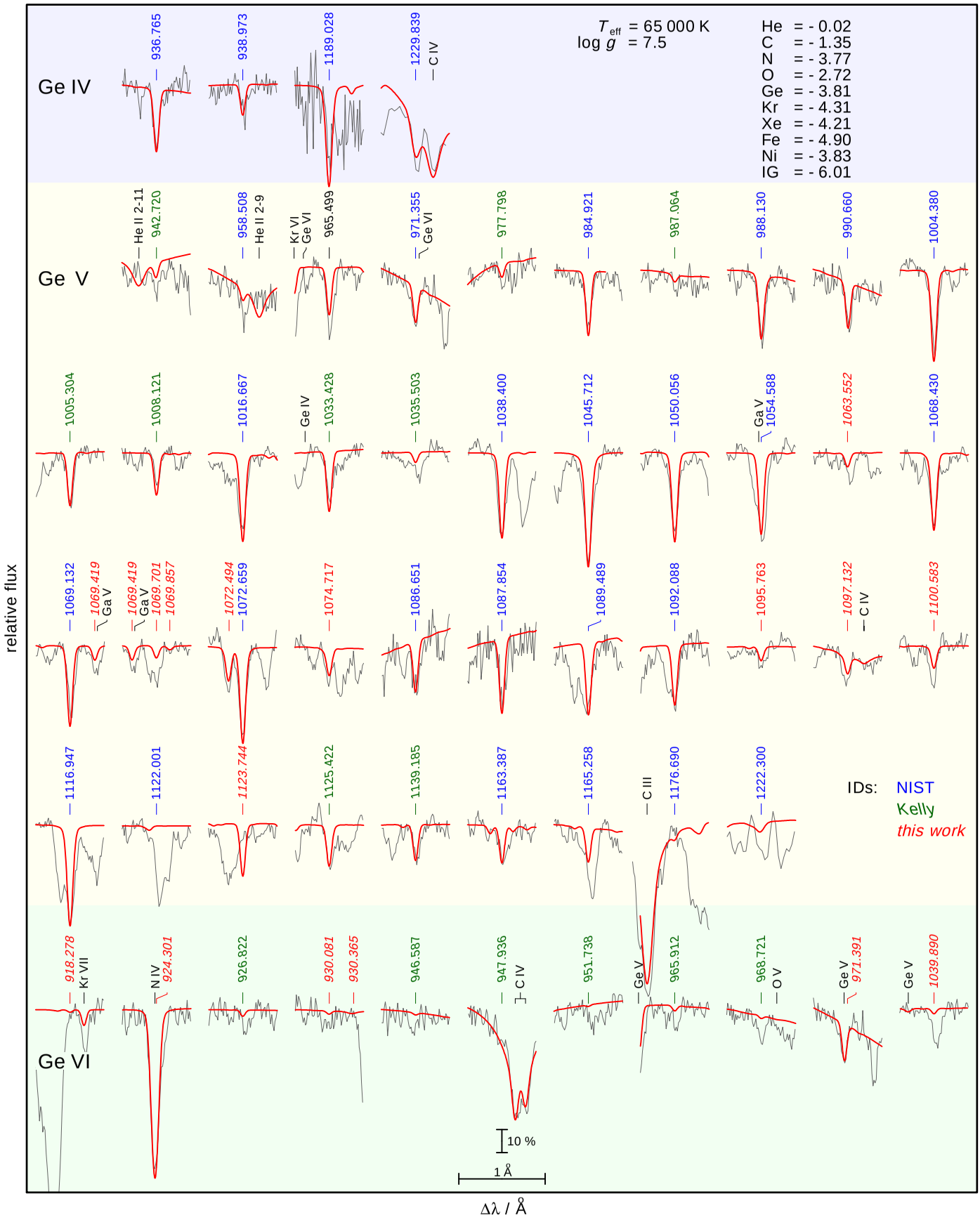

Fig. 6. Same as Fig. 3 for $T_{\rm eff}$ = 65 kK.

Table 1. Energy levels of Ge V (in cm^{-1}). The first three LS-components are given when they are over 5 %.

E_{exp}	E_{calc}	ΔE	J	LS-coupling composition (%)
0.0	0	0	0	99 $3d^{10}\ ^1S$
234219.3	234226	-7	3	99 $3d^9 4s\ ^3D$
235967.0	235958	9	2	83 $3d^9 4s\ ^3D$
238764.9	238765	-4	1	99 $3d^9 4s\ ^3D$
241935.2	241937	-2	2	83 $3d^9 4s\ ^1D$
323748.9	323877	-128	2	96 $3d^9 4p\ ^3P^o$
327753.0	327889	-136	1	96 $3d^9 4p\ ^3P^o$
327891.0	327792	99	3	68 $3d^9 4p\ ^3F^o$ + 27 $3d^9 4p\ ^1F^o$
329847.8	329698	150	4	99 $3d^9 4p\ ^3F^o$
330332.5	330250	83	0	99 $3d^9 4p\ ^3P^o$
330790.6	330735	56	2	94 $3d^9 4p\ ^3F^o$
335161.3	335214	-52	3	60 $3d^9 4p\ ^1F^o$ + 27 $3d^9 4p\ ^3D^o$ + 12 $3d^9 4p\ ^3F^o$
335560.3	335621	-61	2	63 $3d^9 4p\ ^1D^o$ + 32 $3d^9 4p\ ^3D^o$
337168.1	337131	37	3	68 $3d^9 4p\ ^3D^o$ + 19 $3d^9 4p\ ^3F^o$ + 13 $3d^9 4p\ ^1F^o$
338273.5	338268	5	1	75 $3d^9 4p\ ^1P^o$ + 24 $3d^9 4p\ ^3D^o$
339540.2	339552	-12	1	73 $3d^9 4p\ ^3D^o$ + 23 $3d^9 4p\ ^1P^o$
340295.7	340337	-42	2	60 $3d^9 4p\ ^3D^o$ + 36 $3d^9 4p\ ^1D^o$
456051.8	456107	-55	1	92 $3d^9 4d\ ^3S$ + 6 $3d^9 4d\ ^3P$
461417.5	461286	131	5	99 $3d^9 4d\ ^3G$
461642.6	461607	36	4	64 $3d^9 4d\ ^3G$ + 34 $3d^9 4d\ ^1G$
461814.9	461908	-93	1	50 $3d^9 4d\ ^1P$ + 30 $3d^9 4d\ ^3P$ + 19 $3d^9 4d\ ^3D$
461828.5	461834	-6	2	78 $3d^9 4d\ ^3P$ + 21 $3d^9 4d\ ^3D$
463361.6	463383	-21	3	85 $3d^9 4d\ ^3D$ + 11 $3d^9 4d\ ^3F$
463957.9	463958	0	0	99 $3d^9 4d\ ^3P$
464077.0	464020	57	3	63 $3d^9 4d\ ^3G$ + 21 $3d^9 4d\ ^1F$ + 11 $3d^9 4d\ ^3F$
464652.2	464660	-7	2	51 $3d^9 4d\ ^3D$ + 23 $3d^9 4d\ ^1D$ + 13 $3d^9 4d\ ^3P$
464705.7	464754	-49	4	52 $3d^9 4d\ ^3F$ + 35 $3d^9 4d\ ^1G$ + 12 $3d^9 4d\ ^3G$
464852.7	464848	4	1	55 $3d^9 4d\ ^3P$ + 37 $3d^9 4d\ ^1P$ + 7 $3d^9 4d\ ^3S$
466780.2	466778	2	3	38 $3d^9 4d\ ^1F$ + 34 $3d^9 4d\ ^3G$ + 27 $3d^9 4d\ ^3F$
467029.1	466994	35	1	81 $3d^9 4d\ ^3D$ + 11 $3d^9 4d\ ^1P$ + 8 $3d^9 4d\ ^3P$
467386.7	467371	16	4	46 $3d^9 4d\ ^3F$ + 30 $3d^9 4d\ ^1G$ + 23 $3d^9 4d\ ^3G$
468695.8	468676	20	2	33 $3d^9 4d\ ^1D$ + 31 $3d^9 4d\ ^3F$ + 28 $3d^9 4d\ ^3D$
469686.4	469746	-59	3	50 $3d^9 4d\ ^3F$ + 40 $3d^9 4d\ ^1F$ + 9 $3d^9 4d\ ^3D$
469889.6	469901	-12	2	56 $3d^9 4d\ ^3F$ + 43 $3d^9 4d\ ^1D$
490741.7	490744	-2	3	100 $3d^9 5s\ ^3D$
491443.3	491441	2	2	55 $3d^9 5s\ ^3D$ + 45 $3d^9 5s\ ^1D$
495288.4	495287	1	1	100 $3d^9 5s\ ^3D$
495907.7	495909	-2	2	55 $3d^9 5s\ ^1D$ + 45 $3d^9 5s\ ^3D$
522959.0	522993	-34	2	93 $3d^9 5p\ ^3P^o$ + 7 $3d^9 5p\ ^3D^o$
524232.0	524228	4	3	57 $3d^9 5p\ ^3F^o$ + 36 $3d^9 5p\ ^1F^o$ + 6 $3d^9 5p\ ^3D^o$
524950.0	524897	53	4	100 $3d^9 5p\ ^3F^o$
525343.0	525357	-14	1	72 $3d^9 5p\ ^3P^o$ + 22 $3d^9 5p\ ^1P^o$ + 6 $3d^9 5p\ ^3D^o$
526373.0	526383	-10	2	41 $3d^9 5p\ ^1D^o$ + 30 $3d^9 5p\ ^3D^o$ + 26 $3d^9 5p\ ^3F^o$
526902.0	526908	-6	3	80 $3d^9 5p\ ^3D^o$ + 19 $3d^9 5p\ ^1F^o$
528156.0	528159	-3	0	100 $3d^9 5p\ ^3P^o$
528625.0	528600	25	2	71 $3d^9 5p\ ^3F^o$ + 26 $3d^9 5p\ ^1D^o$
529476.0	529472	4	1	77 $3d^9 5p\ ^1P^o$ + 22 $3d^9 5p\ ^3P$
530113.0	530114	-1	3	44 $3d^9 5p\ ^1F^o$ + 42 $3d^9 5p\ ^3F^o$ + 14 $3d^9 5p\ ^3D^o$
530928.0	530919	9	1	94 $3d^9 5p\ ^3D^o$
531321.0	531348	-27	2	60 $3d^9 5p\ ^3D^o$ + 33 $3d^9 5p\ ^1D^o$
553910.9	553895	16	1	88 $3d^9 4f\ ^3P^o$ + 10 $3d^9 4f\ ^3D^o$
554370.9	554374	-3	2	56 $3d^9 4f\ ^3P^o$ + 27 $3d^9 4f\ ^3D^o$ + 17 $3d^9 4f\ ^1D^o$
554658.0	554671	-13	6	100 $3d^9 4f\ ^3H^o$
554690.2	554714	-24	5	53 $3d^9 4f\ ^1H^o$ + 47 $3d^9 4f\ ^3H^o$
555298.8	555305	-6	2	40 $3d^9 4f\ ^1D^o$ + 33 $3d^9 4f\ ^3F^o$ + 26 $3d^9 4f\ ^3D^o$
555337.1	555318	19	3	66 $3d^9 4f\ ^3D^o$ + 25 $3d^9 4f\ ^3F$ + 8 $3d^9 4f\ ^1F$
555730.2	555717	13	1	59 $3d^9 4f\ ^3D^o$ + 37 $3d^9 4f\ ^1P^o$
555798.4	555792	6	4	76 $3d^9 4f\ ^3F^o$ + 20 $3d^9 4f\ ^3G^o$
555852.3	555858	-6	5	79 $3d^9 4f\ ^3G^o$ + 11 $3d^9 4f\ ^3H^o$ + 11 $3d^9 4f\ ^1H^o$
555860.0	555862	-2	4	49 $3d^9 4f\ ^1G^o$ + 28 $3d^9 4f\ ^3G^o$ + 21 $3d^9 4f\ ^3H^o$
555912.7	555912	1	3	47 $3d^9 4f\ ^1F^o$ + 28 $3d^9 4f\ ^3F^o$ + 23 $3d^9 4f\ ^3G^o$
558877.1	558871	6	2	44 $3d^9 4f\ ^3P^o$ + 34 $3d^9 4f\ ^3D^o$ + 22 $3d^9 4f\ ^1D^o$
559463.1	559452	11	4	78 $3d^9 4f\ ^3H^o$ + 12 $3d^9 4f\ ^1G^o$ + 10 $3d^9 4f\ ^3G^o$
559467.6	559487	-20	5	42 $3d^9 4f\ ^3H^o$ + 37 $3d^9 4f\ ^1H^o$ + 21 $3d^9 4f\ ^3G^o$

Table 1. continued.

E_{exp}	E_{calc}	ΔE	J	LS-coupling composition (%)
560034.6	560024	11	2	66 $3d^9 4f\ ^3F^o$ + 21 $3d^9 4f\ ^1D^o$ + 13 $3d^9 4f\ ^3D^o$
560096.6	560095	2	3	41 $3d^9 4f\ ^3F^o$ + 32 $3d^9 4f\ ^3D^o$ + 26 $3d^9 4f\ ^1F^o$
560149.3	560157	-7	1	60 $3d^9 4f\ ^1P^o$ + 30 $3d^9 4f\ ^3D^o$ + 9 $3d^9 4f\ ^3P^o$
560547.2	560559	-12	4	43 $3d^9 4f\ ^3G^o$ + 35 $3d^9 4f\ ^1G^o$ + 22 $3d^9 4f\ ^3F^o$
560587.7	560579	9	3	76 $3d^9 4f\ ^3G^o$ + 18 $3d^9 4f\ ^1F^o$ + 6 $3d^9 4f\ ^3F^o$
574389.0	574404	-14	1	79 $3d^9 5d\ ^3S$ + 15 $3d^9 5d\ ^3P$
576067.0	576047	20	5	100 $3d^9 5d\ ^3G$
576226.0	576206	20	4	55 $3d^9 5d\ ^3G$ + 44 $3d^9 5d\ ^1G$
576963.0	576934	29	3	84 $3d^9 5d\ ^3D$ + 13 $3d^9 5d\ ^3F$
577459.0	577444	15	3	48 $3d^9 5d\ ^1F$ + 29 $3d^9 5d\ ^3F$ + 22 $3d^9 5d\ ^3G$
577553.0	577623	-79	4	80 $3d^9 5d\ ^3F$ + 14 $3d^9 5d\ ^1G$
580695.0	580724	-29	3	78 $3d^9 5d\ ^3G$ + 14 $3d^9 5d\ ^1F$ + 8 $3d^9 5d\ ^3F$
581114.0	581106	8	4	41 $3d^9 5d\ ^1G$ + 40 $3d^9 5d\ ^3G$ + 19 $3d^9 5d\ ^3F$
582225.0	582201	24	3	50 $3d^9 5d\ ^3F$ + 36 $3d^9 5d\ ^1F$ + 14 $3d^9 5d\ ^3D$
582308.0	582311	-3	2	68 $3d^9 5d\ ^3F$ + 30 $3d^9 5d\ ^1D$
588094.0	588095	-1	3	100 $3d^9 6s\ ^3D$
588403.0	588402	1	2	54 $3d^9 6s\ ^1D$ + 46 $3d^9 6s\ ^3D$
592644.0	592643	1	1	100 $3d^9 6s\ ^3D$
592872.0	592873	-1	2	54 $3d^9 6s\ ^3D$ + 46 $3d^9 6s\ ^1D$
601967.0	602124	-157	4	76 $3d^8 4s(^4F) 4p\ ^5F^o$ + 9 $3d^8 4s(^4F) 4p\ ^5G^o$
603355.0	603363	-8	2	90 $3d^9 6p\ ^3P^o$ + 9 $3d^9 6p\ ^3D^o$
603929.0	603934	-5	3	52 $3d^9 6p\ ^3F^o$ + 40 $3d^9 6p\ ^1F^o$ + 7 $3d^9 6p\ ^3D^o$
604182.0	604165	17	4	87 $3d^9 6p\ ^3F^o$
604278.0	604253	25	4	31 $3d^8 4s(^2F) 4p\ ^3G^o$ + 23 $3d^8 4s(^2F) 4p\ ^1G^o$ + 15 $3d^8 4s(^4F) 4p\ ^3G^o$
604648.0	604656	-8	1	48 $3d^9 6p\ ^3P^o$ + 41 $3d^9 6p\ ^1P^o$ + 8 $3d^9 6p\ ^3D^o$
604928.0	604922	6	3	42 $3d^9 6p\ ^3D^o$ + 26 $3d^8 4s(^2F) 4p\ ^3D^o$ + 11 $3d^8 4s(^4F) 4p\ ^3D^o$
604935.0	604910	25	2	54 $3d^9 6p\ ^1D^o$ + 31 $3d^9 6p\ ^3D^o$ + 10 $3d^9 6p\ ^3F^o$
605218.0	605263	-45	3	42 $3d^9 6p\ ^3D^o$ + 26 $3d^8 4s(^2F) 4p\ ^3D^o$ + 8 $3d^9 6p\ ^1F^o$
606815.0	606769	46	2	47 $3d^8 4s(^2F) 4p\ ^3D^o$ + 19 $3d^8 4s(^4F) 4p\ ^3D^o$ + 10 $3d^8 4s(^2F) 4p\ ^3F^o$
607097.0	607108	-11	3	56 $3d^8 4s(^2F) 4p\ ^3G^o$ + 27 $3d^8 4s(^4F) 4p\ ^3G^o$ + 6 $3d^8 4s(^2F) 4p\ ^3D^o$
608207.0	608191	16	0	100 $3d^9 6p\ ^3P^o$
608340.0	608349	-9	2	85 $3d^9 6p\ ^3F^o$ + 14 $3d^9 6p\ ^1D^o$
608587.0	608664	-77	1	54 $3d^9 6p\ ^1P^o$ + 46 $3d^9 6p\ ^3P^o$
609075.0	609063	12	3	47 $3d^9 6p\ ^3F^o$ + 43 $3d^9 6p\ ^1F^o$ + 9 $3d^9 6p\ ^3D^o$
609083.0	608951	132	1	42 $3d^8 4s(^2F) 4p\ ^3D^o$ + 20 $3d^8 4s(^4F) 4p\ ^3D^o$ + 16 $3d^9 6p\ ^3D^o$
609246.0	609294	-48	4	53 $3d^8 4s(^2F) 4p\ ^3F^o$ + 32 $3d^8 4s(^4F) 4p\ ^3F^o$ + 7 $3d^8 4s(^4F) 4p\ ^5F^o$
609501.0	609531	-30	1	76 $3d^9 6p\ ^3D^o$ + 10 $3d^8 4s(^2F) 4p\ ^3D^o$
609609.0	609601	8	2	59 $3d^9 6p\ ^3D^o$ + 31 $3d^9 6p\ ^1D^o$ + 6 $3d^9 6p\ ^3P^o$
609963.0	609943	20	3	32 $3d^8 4s(^2F) 4p\ ^3F^o$ + 23 $3d^8 4s(^2F) 4p\ ^1F^o$ + 19 $3d^8 4s(^4F) 4p\ ^3F^o$
611844.0	611865	-21	2	49 $3d^8 4s(^2F) 4p\ ^3F^o$ + 27 $3d^8 4s(^4F) 4p\ ^3F^o$ + 8 $3d^8 4s(^2F) 4p\ ^3D^o$
614161.0	614129	32	2	66 $3d^8 4s(^2F) 4p\ ^1D^o$ + 14 $3d^8 4s(^4P) 4p\ ^5P^o$ + 6 $3d^8 4s(^2D) 4p\ ^3P^o$
614754.0	614750	4	3	51 $3d^8 4s(^2F) 4p\ ^1F^o$ + 16 $3d^8 4s(^4P) 4p\ ^5P^o$ + 11 $3d^8 4s(^2D) 4p\ ^3D^o$
615820.0	615814	6	2	70 $3d^8 4s(^4P) 4p\ ^5P^o$ + 18 $3d^8 4s(^2F) 4p\ ^1D^o$
617340.0	617318	22	1	81 $3d^9 5f\ ^3P^o$ + 16 $3d^9 5f\ ^3D^o$
618540.0	618619	-79	1	54 $3d^9 5f\ ^3D^o$ + 39 $3d^9 5f\ ^1P^o$ + 7 $3d^9 5f\ ^3P^o$
620940.0	620955	-15	2	75 $3d^8 4s(^2D) 4p\ ^3F^o$
621888.0	621765	123	3	67 $3d^8 4s(^2D) 4p\ ^3F^o$ + 7 $3d^8 4s(^4P) 4p\ ^5D^o$ + 6 $3d^8 4s(^2G) 4p\ ^3F^o$
622200.0	622265	-65	1	44 $3d^8 4s(^2D) 4p\ ^3D^o$ + 16 $3d^8 4s(^2D) 4p\ ^3P^o$ + 11 $3d^8 4s(^2F) 4p\ ^3D^o$
622627.0	622572	55	2	58 $3d^9 5f\ ^3F^o$ + 19 $3d^9 5f\ ^1D^o$ + 14 $3d^9 5f\ ^3D^o$
622759.0	622566	193	4	34 $3d^8 4s(^2D) 4p\ ^3F^o$ + 20 $3d^9 5f\ ^3G^o$ + 18 $3d^9 5f\ ^1G^o$
622980.0	623065	-85	1	59 $3d^9 5f\ ^1P^o$ + 28 $3d^9 5f\ ^3D^o$ + 11 $3d^9 5f\ ^3P^o$
623081.0	623121	-40	2	52 $3d^8 4s(^2D) 4p\ ^3D^o$ + 7 $3d^8 4s(^2F) 4p\ ^3D^o$ + 7 $3d^8 4s(^2D) 4p\ ^3F^o$
624057.0	624159	-102	3	70 $3d^8 4s(^2D) 4p\ ^3D^o$ + 8 $3d^8 4s(^4P) 4p\ ^5P^o$
624684.0	624678	6	1	41 $3d^8 4s(^2D) 4p\ ^3P^o$ + 32 $3d^8 4s(^2D) 4p\ ^3D^o$ + 11 $3d^8 4s(^2P) 4p\ ^3P^o$
625990.0	625902	88	2	67 $3d^8 4s(^2D) 4p\ ^3P^o$ + 15 $3d^8 4s(^2D) 4p\ ^3D^o$
626651.0	626697	-46	1	86 $3d^8 4s(^4P) 4p\ ^5D^o$ + 9 $3d^8 4s(^4F) 4p\ ^5D^o$
627067.0	626899	168	2	82 $3d^8 4s(^4P) 4p\ ^5D^o$ + 7 $3d^8 4s(^4F) 4p\ ^5D^o$
627229.0	627336	-107	3	76 $3d^8 4s(^4P) 4p\ ^5D^o$ + 8 $3d^8 4s(^2D) 4p\ ^3F^o$ + 6 $3d^8 4s(^4F) 4p\ ^5D^o$
627958.0	627879	79	4	67 $3d^8 4s(^4P) 4p\ ^5D^o$ + 17 $3d^8 4s(^2G) 4p\ ^3F^o$ + 11 $3d^8 4s(^2D) 4p\ ^3F^o$
630288.0	630242	46	2	49 $3d^8 4s(^2P) 4p\ ^3P^o$ + 16 $3d^8 4s(^4P) 4p\ ^3P^o$ + 13 $3d^8 4s(^2P) 4p\ ^3D^o$
631618.0	631645	-27	1	34 $3d^8 4s(^2P) 4p\ ^3P^o$ + 23 $3d^8 4s(^2D) 4p\ ^3P^o$ + 17 $3d^8 4s(^2P) 4p\ ^3D^o$
633144.0	633168	-24	2	31 $3d^8 4s(^2P) 4p\ ^3D^o$ + 16 $3d^8 4s(^4P) 4p\ ^3D^o$ + 12 $3d^8 4s(^2P) 4p\ ^3P^o$
633171.0	633282	-111	1	41 $3d^8 4s(^2P) 4p\ ^3D^o$ + 19 $3d^8 4s(^4P) 4p\ ^3D^o$ + 14 $3d^8 4s(^2P) 4p\ ^1P^o$
633258.0	633307	-49	3	36 $3d^8 4s(^2P) 4p\ ^3D^o$ + 21 $3d^8 4s(^2G) 4p\ ^3F^o$ + 20 $3d^8 4s(^2P) 4p\ ^3D^o$

Table 1. continued.

E_{exp}	E_{calc}	ΔE	J	LS-coupling composition (%)
633570.0	633575	-5	0	45 $3d^8 4s(^2P)4p\ ^3P^o$ + 40 $3d^8 4s(^2D)4p\ ^3P^o$ + 10 $3d^8 4s(^4P)4p\ ^3P^o$
634154.0	634294	-140	4	54 $3d^8 4s(^2G)4p\ ^3F^o$ + 21 $3d^8 4s(^2D)4p\ ^3F^o$ + 11 $3d^8 4s(^2F)4p\ ^3F^o$
635602.0	635662	-60	3	51 $3d^8 4s(^2G)4p\ ^3F^o$ + 14 $3d^8 4s(^2D)4p\ ^3F^o$ + 13 $3d^8 4s(^2P)4p\ ^3D^o$
635973.0	635974	-1	3	100 $3d^9 7s\ ^3D$
636143.0	636142	1	2	57 $3d^9 7s\ ^1D$ + 43 $3d^9 7s\ ^3D$
636503.0	636291	212	2	70 $3d^8 4s(^2G)4p\ ^3F^o$ + 8 $3d^8 4s(^2D)4p\ ^3F^o$ + 7 $3d^8 4s(^2F)4p\ ^3F^o$
637786.0	637827	-41	3	56 $3d^8 4s(^4F)4p\ ^3D^o$ + 19 $3d^8 4s(^2F)4p\ ^3D^o$ + 10 $3d^8 4s(^4P)4p\ ^3D^o$
638636.0	638740	-104	4	38 $3d^8 4s(^4F)4p\ ^3G^o$ + 23 $3d^8 4s(^2F)4p\ ^3G^o$ + 18 $3d^8 4s(^4F)4p\ ^3F^o$
640509.0	640508	1	1	100 $3d^9 7s\ ^3D$
640625.0	640626	-1	2	57 $3d^9 7s\ ^3D$ + 43 $3d^9 7s\ ^1D$
640855.0	640666	189	4	36 $3d^8 4s(^4F)4p\ ^3F^o$ + 20 $3d^8 4s(^4F)4p\ ^3G^o$ + 19 $3d^8 4s(^2F)4p\ ^3F^o$
641390.0	641392	-2	2	56 $3d^8 4s(^4F)4p\ ^3D^o$ + 22 $3d^8 4s(^2F)4p\ ^3D^o$ + 8 $3d^8 4s(^4P)4p\ ^3D^o$
643477.0	643461	16	1	56 $3d^8 4s(^4F)4p\ ^3D^o$ + 24 $3d^8 4s(^2F)4p\ ^3D^o$ + 7 $3d^8 4s(^4P)4p\ ^3D^o$
643724.0	643609	115	3	45 $3d^8 4s(^4F)4p\ ^3F^o$ + 23 $3d^8 4s(^2F)4p\ ^3F^o$ + 6 $3d^8 4s(^2F)4p\ ^3G^o$
645100.0	645113	-13	2	31 $3d^9 7p\ ^1D^o$ + 26 $3d^8 4s(^4F)4p\ ^3F^o$ + 15 $3d^9 7p\ ^3P^o$
645761.0	645779	-18	2	31 $3d^8 4s(^4F)4p\ ^3F^o$ + 28 $3d^9 7p\ ^1D^o$ + 15 $3d^8 4s(^2F)4p\ ^3P^o$
649365.0	649363	2	1	55 $3d^9 7p\ ^3P^o$ + 44 $3d^9 7p\ ^1P^o$
652760.0	652759	1	1	48 $3d^9 6f\ ^3D^o$ + 44 $3d^9 6f\ ^1P^o$ + 7 $3d^9 6f\ ^3P^o$
657140.0	657136	4	1	53 $3d^9 6f\ ^1P^o$ + 32 $3d^9 6f\ ^3D^o$ + 14 $3d^9 6f\ ^3P^o$
658225.0	658292	-67	2	44 $3d^8 4s(^2D)4p\ ^1D^o$ + 29 $3d^8 4s(^4P)4p\ ^3P^o$ + 11 $3d^8 4s(^2P)4p\ ^3P^o$
660117.0	660121	-4	1	44 $3d^8 4s(^4P)4p\ ^3P^o$ + 29 $3d^8 4s(^2D)4p\ ^1P^o$ + 15 $3d^8 4s(^2P)4p\ ^3P^o$
662544.0	662506	38	0	71 $3d^8 4s(^4P)4p\ ^3P^o$ + 23 $3d^8 4s(^2P)4p\ ^3P^o$
662890.0	662996	-106	2	37 $3d^8 4s(^2D)4p\ ^1P^o$ + 41 $3d^8 4s(^2D)4p\ ^1D^o$ + 15 $3d^8 4s(^2P)4p\ ^3P^o$
664749.0	664753	-4	1	55 $3d^8 4s(^2D)4p\ ^1P^o$ + 26 $3d^8 4s(^2P)4p\ ^3P^o$ + 9 $3d^8 4s(^2P)4p\ ^3P^o$
665937.0	665832	105	3	44 $3d^8 4s(^4G)4p\ ^3D^o$ + 31 $3d^8 4s(^2P)4p\ ^3D^o$ + 14 $3d^8 4s(^2D)4p\ ^1F^o$
672445.0	672521	-76	3	87 $3d^8 4s(^2G)4p\ ^1F^o$ + 7 $3d^8 4s(^2D)4p\ ^1F^o$
683090.0	683102	-12	0	96 $3d^8 4s(^2S)4p\ ^3P^o$
684337.0	684227	110	1	96 $3d^8 4s(^2S)4p\ ^3P^o$
686617.0	686716	-99	2	97 $3d^8 4s(^2S)4p\ ^3P^o$

Table 2. Calculated HFR oscillator strengths (log gf) and transition probabilities (gA, in sec−1) in Ge V. CF is the cancellation factor as defined by Cowan (1981). In columns 3 and 6, *e* is written for even and *o* for odd.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	*j*	Energy / cm^{-1}	Parity	*j*	$\log gf$	*gA*	CF
150.433	0	e	0	664749	o	1	-2.88	3.85E+08	0.039
151.488	0	e	0	660117	o	1	-2.82	4.42E+08	-0.054
152.175	0	e	0	657140	o	1	-0.76	4.96E+10	-0.382
153.196	0	e	0	652760	o	1	-0.82	4.28E+10	0.391
153.997	0	e	0	649365	o	1	-2.37	1.19E+09	-0.041
155.406	0	e	0	643477	o	1	-3.43	1.04E+08	0.067
157.935	0	e	0	633171	o	1	-3.61	6.51E+07	-0.062
160.081	0	e	0	624684	o	1	-3.30	1.30E+08	0.350
160.519	0	e	0	622980	o	1	-0.54	7.42E+10	-0.450
160.720	0	e	0	622200	o	1	-2.38	1.08E+09	0.414
161.671	0	e	0	618540	o	1	-0.72	4.92E+10	0.460
161.985	0	e	0	617340	o	1	-2.25	1.44E+09	0.465
164.069	0	e	0	609501	o	1	-3.15	1.76E+08	0.080
164.181	0	e	0	609083	o	1	-3.52	7.45E+07	-0.181
164.315	0	e	0	608587	o	1	-1.76	4.27E+09	0.115
165.385	0	e	0	604648	o	1	-1.84	3.54E+09	0.130
178.524	0	e	0	560149	o	1	-0.34	9.66E+10	-0.556
179.943	0	e	0	555730	o	1	-0.54	5.90E+10	0.562
180.534	0	e	0	553911	o	1	-1.84	2.96E+09	0.563
188.349	0	e	0	530928	o	1	-3.28	9.91E+07	0.240
188.866	0	e	0	529476	o	1	-1.12	1.41E+10	0.265
190.352	0	e	0	525343	o	1	-1.66	4.00E+09	0.275
221.044	234219	e	3	686617	o	2	-1.09	1.10E+10	-0.389
221.902	235967	e	2	686617	o	2	-1.87	1.82E+09	0.328
223.030	235967	e	2	684337	o	1	-1.40	5.39E+09	-0.347
223.288	238765	e	1	686617	o	2	-2.87	1.81E+08	-0.384
224.431	238765	e	1	684337	o	1	-1.69	2.73E+09	0.461
224.880	241935	e	2	686617	o	2	-2.33	6.21E+08	-0.398
225.060	238765	e	1	683090	o	0	-1.55	3.70E+09	-0.483
226.039	241935	e	2	684337	o	1	-1.81	2.05E+09	0.474
228.193	234219	e	3	672445	o	3	-3.75	2.30E+07	0.006
229.107	235967	e	2	672445	o	3	-1.11	9.93E+09	0.260
231.633	234219	e	3	665937	o	3	-1.73	2.30E+09	-0.040
232.283	241935	e	2	672445	o	3	-0.29	6.35E+10	0.454
232.574	235967	e	2	665937	o	3	-2.90	1.56E+08	-0.008
233.219	235967	e	2	664749	o	1	-1.86	1.68E+09	-0.027
233.279	234219	e	3	662890	o	2	-0.88	1.64E+10	0.197
234.234	235967	e	2	662890	o	2	-3.06	1.06E+08	-0.002
234.751	238765	e	1	664749	o	1	-2.08	1.02E+09	0.050
235.766	235967	e	2	660117	o	1	-0.84	1.74E+10	-0.232
235.846	234219	e	3	658225	o	2	-0.86	1.67E+10	-0.224
235.848	241935	e	2	665937	o	3	-1.20	7.58E+09	-0.326
235.972	238765	e	1	662544	o	0	-1.13	8.89E+09	-0.265
236.511	241935	e	2	664749	o	1	-0.75	2.15E+10	0.410
236.822	235967	e	2	658225	o	2	-1.14	8.58E+09	0.148
237.331	238765	e	1	660117	o	1	-1.26	6.57E+09	0.249
237.555	241935	e	2	662890	o	2	-0.77	2.00E+10	0.415
238.402	238765	e	1	658225	o	2	-2.01	1.16E+09	-0.106
239.130	241935	e	2	660117	o	1	-1.65	2.64E+09	-0.055
240.217	241935	e	2	658225	o	2	-1.01	1.12E+10	0.196
240.845	241935	e	2	657140	o	1	-3.13	8.53E+07	0.146
241.549	238765	e	1	652760	o	1	-3.09	9.22E+07	0.068
241.898	235967	e	2	649365	o	1	-3.06	1.00E+08	-0.031
242.989	234219	e	3	645761	o	2	-2.54	3.23E+08	-0.064
243.546	238765	e	1	649365	o	1	-3.02	1.06E+08	0.114
244.025	235967	e	2	645761	o	2	-1.32	5.34E+09	-0.136
244.197	234219	e	3	643724	o	3	-1.12	8.41E+09	-0.234
244.419	235967	e	2	645100	o	2	-1.38	4.68E+09	0.211
245.244	235967	e	2	643724	o	3	-0.65	2.47E+10	-0.230
245.393	235967	e	2	643477	o	1	-1.02	1.07E+10	-0.294
245.441	241935	e	2	649365	o	1	-2.18	7.28E+08	0.316
245.597	234219	e	3	641390	o	2	-1.07	9.37E+09	-0.229
245.703	238765	e	1	645761	o	2	-1.09	8.95E+09	-0.142

Table 2. continued.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
245.920	234219	e	3	640855	o	4	-0.45	3.95E+10	-0.305
246.102	238765	e	1	645100	o	2	-0.97	1.19E+10	0.252
246.656	235967	e	2	641390	o	2	-0.53	3.26E+10	-0.209
247.089	238765	e	1	643477	o	1	-0.60	2.72E+10	-0.272
247.270	234219	e	3	638636	o	4	-0.57	2.96E+10	0.386
247.632	241935	e	2	645761	o	2	-2.58	2.86E+08	0.016
247.791	234219	e	3	637786	o	3	-0.17	7.43E+10	-0.243
248.038	241935	e	2	645100	o	2	-2.10	8.57E+08	0.066
248.370	238765	e	1	641390	o	2	-0.76	1.87E+10	0.350
248.581	234219	e	3	636503	o	2	-1.94	1.23E+09	-0.206
248.868	235967	e	2	637786	o	3	-0.57	2.87E+10	0.431
248.887	241935	e	2	643724	o	3	-1.80	1.71E+09	0.061
249.040	241935	e	2	643477	o	1	-2.86	1.49E+08	0.012
249.139	234219	e	3	635602	o	3	-1.43	3.99E+09	-0.076
249.665	235967	e	2	636503	o	2	-1.76	1.84E+09	-0.055
250.041	234219	e	3	634154	o	4	-0.55	3.05E+10	-0.213
250.228	235967	e	2	635602	o	3	-0.71	2.10E+10	-0.235
250.341	241935	e	2	641390	o	2	-1.14	7.75E+09	0.205
250.602	234219	e	3	633258	o	3	-1.10	8.45E+09	0.071
250.674	234219	e	3	633144	o	2	-0.97	1.14E+10	-0.239
251.422	238765	e	1	636503	o	2	-0.57	2.81E+10	-0.372
251.705	235967	e	2	633258	o	3	-1.16	7.23E+09	0.131
251.760	235967	e	2	633171	o	1	-1.11	8.19E+09	-0.223
251.777	235967	e	2	633144	o	2	-1.32	5.06E+09	0.076
252.481	234219	e	3	630288	o	2	-0.36	4.57E+10	-0.547
252.620	241935	e	2	637786	o	3	-1.60	2.61E+09	-0.149
252.748	235967	e	2	631618	o	1	-0.67	2.22E+10	-0.459
253.290	238765	e	1	633570	o	0	-0.87	1.39E+10	-0.878
253.442	241935	e	2	636503	o	2	-1.62	2.52E+09	0.239
253.546	238765	e	1	633171	o	1	-1.49	3.35E+09	0.090
253.563	238765	e	1	633144	o	2	-1.71	2.04E+09	0.072
253.600	235967	e	2	630288	o	2	-1.10	8.34E+09	0.189
253.976	234219	e	3	627958	o	4	-0.70	2.04E+10	0.652
254.022	241935	e	2	635602	o	3	-1.44	3.76E+09	0.190
254.447	234219	e	3	627229	o	3	-3.64	2.37E+07	0.006
254.548	238765	e	1	631618	o	1	-0.96	1.14E+10	0.359
254.552	234219	e	3	627067	o	2	-1.99	1.06E+09	-0.380
255.251	234219	e	3	625990	o	2	-1.33	4.81E+09	-0.080
255.413	238765	e	1	630288	o	2	-1.52	3.11E+09	-0.325
255.544	241935	e	2	633258	o	3	-1.81	1.59E+09	-0.143
255.583	235967	e	2	627229	o	3	-1.31	4.98E+09	0.636
255.600	241935	e	2	633171	o	1	-1.63	2.40E+09	-0.097
255.618	241935	e	2	633144	o	2	-1.14	7.39E+09	-0.314
255.689	235967	e	2	627067	o	2	-3.10	8.15E+07	-0.017
255.961	235967	e	2	626651	o	1	-2.05	9.08E+08	-0.449
256.395	235967	e	2	625990	o	2	-2.28	5.34E+08	-0.018
256.517	234219	e	3	624057	o	3	-0.67	2.17E+10	-0.259
257.161	234219	e	3	623081	o	2	-1.14	7.39E+09	-0.257
257.257	235967	e	2	624684	o	1	-1.62	2.42E+09	-0.062
257.374	234219	e	3	622759	o	4	-0.94	1.16E+10	-0.719
257.461	234219	e	3	622627	o	2	-1.99	1.03E+09	-0.280
257.498	241935	e	2	630288	o	2	-1.82	1.51E+09	-0.105
257.531	238765	e	1	627067	o	2	-1.87	1.36E+09	0.459
257.672	235967	e	2	624057	o	3	-3.02	9.52E+07	0.003
257.808	238765	e	1	626651	o	1	-3.66	2.19E+07	-0.012
257.952	234219	e	3	621888	o	3	-2.63	2.37E+08	-0.016
258.322	235967	e	2	623081	o	2	-1.05	9.01E+09	-0.189
258.389	235967	e	2	622980	o	1	-3.04	9.21E+07	-0.096
258.585	234219	e	3	620940	o	2	-2.31	4.89E+08	0.147
258.625	235967	e	2	622627	o	2	-1.93	1.18E+09	-0.148
258.911	235967	e	2	622200	o	1	-1.09	8.10E+09	-0.224
259.120	235967	e	2	621888	o	3	-0.98	1.04E+10	-0.425
259.122	238765	e	1	624684	o	1	-1.37	4.21E+09	-0.147
259.542	241935	e	2	627229	o	3	-1.87	1.34E+09	-0.650
259.651	241935	e	2	627067	o	2	-3.49	3.21E+07	-0.023

Table 2. continued.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
259.932	241935	e	2	626651	o	1	-3.38	4.08E+07	0.063
260.202	238765	e	1	623081	o	2	-2.00	9.87E+08	0.063
260.271	238765	e	1	622980	o	1	-2.34	4.54E+08	-0.266
260.380	241935	e	2	625990	o	2	-2.08	8.28E+08	-0.076
260.510	238765	e	1	622627	o	2	-2.63	2.33E+08	0.055
260.800	238765	e	1	622200	o	1	-0.97	1.06E+10	-0.277
261.268	241935	e	2	624684	o	1	-3.19	6.34E+07	-0.005
261.388	235967	e	2	618540	o	1	-3.31	4.83E+07	-0.075
261.660	238765	e	1	620940	o	2	-0.89	1.26E+10	-0.637
261.697	241935	e	2	624057	o	3	-1.64	2.25E+09	-0.202
262.054	234219	e	3	615820	o	2	-2.16	6.70E+08	-0.126
262.210	235967	e	2	617340	o	1	-3.49	3.17E+07	0.050
262.367	241935	e	2	623081	o	2	-1.01	9.53E+09	0.425
262.436	241935	e	2	622980	o	1	-2.94	1.11E+08	0.207
262.680	241935	e	2	622627	o	2	-2.00	9.73E+08	0.341
262.788	234219	e	3	614754	o	3	-0.98	1.01E+10	0.567
262.975	241935	e	2	622200	o	1	-2.53	2.86E+08	0.024
263.191	241935	e	2	621888	o	3	-1.23	5.65E+09	0.620
263.198	234219	e	3	614161	o	2	-2.73	1.80E+08	0.022
263.260	235967	e	2	615820	o	2	-2.57	2.61E+08	0.013
263.314	238765	e	1	618540	o	1	-3.27	5.12E+07	-0.054
263.849	241935	e	2	620940	o	2	-3.27	5.10E+07	0.008
264.001	235967	e	2	614754	o	3	-1.56	2.62E+09	-0.061
264.148	238765	e	1	617340	o	1	-3.54	2.77E+07	0.038
264.415	235967	e	2	614161	o	2	-0.88	1.27E+10	-0.266
264.813	234219	e	3	611844	o	2	-1.55	2.70E+09	-0.655
265.213	238765	e	1	615820	o	2	-2.13	6.96E+08	0.325
265.530	241935	e	2	618540	o	1	-3.86	1.29E+07	-0.033
266.044	235967	e	2	611844	o	2	-0.62	2.25E+10	-0.569
266.139	234219	e	3	609963	o	3	-0.61	2.31E+10	-0.634
266.385	238765	e	1	614161	o	2	-2.78	1.56E+08	0.023
266.648	234219	e	3	609246	o	4	-0.52	2.82E+10	-0.376
266.769	234219	e	3	609075	o	3	-3.32	4.53E+07	-0.017
267.293	234219	e	3	608340	o	2	-3.43	3.49E+07	-0.100
267.383	235967	e	2	609963	o	3	-0.89	1.21E+10	-0.194
267.462	241935	e	2	615820	o	2	-0.65	2.11E+10	0.651
267.636	235967	e	2	609609	o	2	-3.25	5.27E+07	0.007
267.713	235967	e	2	609501	o	1	-2.21	5.69E+08	-0.071
268.013	235967	e	2	609083	o	1	-1.31	4.52E+09	-0.235
268.019	235967	e	2	609075	o	3	-2.33	4.37E+08	-0.068
268.040	238765	e	1	611844	o	2	-1.40	3.67E+09	-0.075
268.184	234219	e	3	607097	o	3	-1.16	6.39E+09	0.533
268.227	241935	e	2	614754	o	3	-0.65	2.06E+10	-0.397
268.370	235967	e	2	608587	o	1	-2.89	1.20E+08	0.041
268.387	234219	e	3	606815	o	2	-1.20	5.84E+09	-0.264
268.548	235967	e	2	608340	o	2	-2.59	2.39E+08	-0.085
268.654	241935	e	2	614161	o	2	-0.22	5.61E+10	-0.544
269.447	235967	e	2	607097	o	3	-2.56	2.53E+08	-0.063
269.543	234219	e	3	605218	o	3	-0.93	1.07E+10	-0.137
269.652	235967	e	2	606815	o	2	-0.67	1.96E+10	-0.247
269.655	238765	e	1	609609	o	2	-2.47	3.10E+08	-0.155
269.734	238765	e	1	609501	o	1	-2.19	5.94E+08	-0.031
269.748	234219	e	3	604935	o	2	-3.17	6.19E+07	0.037
269.754	234219	e	3	604928	o	3	-0.47	3.13E+10	-0.366
270.038	238765	e	1	609083	o	1	-0.72	1.73E+10	-0.351
270.227	234219	e	3	604278	o	4	-3.07	7.72E+07	0.012
270.298	234219	e	3	604182	o	4	-1.24	5.26E+09	-0.469
270.337	241935	e	2	611844	o	2	-2.40	3.68E+08	-0.016
270.400	238765	e	1	608587	o	1	-2.93	1.08E+08	-0.155
270.482	234219	e	3	603929	o	3	-2.00	9.16E+08	-0.381
270.581	238765	e	1	608340	o	2	-1.85	1.28E+09	-0.282
270.678	238765	e	1	608207	o	0	-2.30	4.56E+08	-0.297
270.818	235967	e	2	605218	o	3	-1.34	4.13E+09	0.156
270.903	234219	e	3	603355	o	2	-1.57	2.43E+09	-0.303
271.026	235967	e	2	604935	o	2	-1.49	2.94E+09	0.422

Table 2. continued.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
271.031	235967	e	2	604928	o	3	-0.98	9.55E+09	0.367
271.237	235967	e	2	604648	o	1	-1.92	1.09E+09	-0.288
271.702	238765	e	1	606815	o	2	-0.93	1.05E+10	0.269
271.719	241935	e	2	609963	o	3	-1.37	3.87E+09	-0.099
271.767	235967	e	2	603929	o	3	-1.74	1.64E+09	-0.285
271.926	234219	e	3	601967	o	4	-1.73	1.70E+09	-0.355
271.980	241935	e	2	609609	o	2	-1.62	2.14E+09	-0.402
272.060	241935	e	2	609501	o	1	-3.47	3.03E+07	0.014
272.370	241935	e	2	609083	o	1	-1.87	1.20E+09	0.272
272.376	241935	e	2	609075	o	3	-1.52	2.74E+09	0.573
272.738	241935	e	2	608587	o	1	-1.94	1.02E+09	-0.392
272.922	241935	e	2	608340	o	2	-2.04	8.11E+08	0.461
273.097	238765	e	1	604935	o	2	-3.86	1.23E+07	-0.006
273.311	238765	e	1	604648	o	1	-3.36	3.89E+07	0.020
273.851	241935	e	2	607097	o	3	-3.33	4.18E+07	0.046
274.063	241935	e	2	606815	o	2	-2.52	2.66E+08	0.010
275.268	241935	e	2	605218	o	3	-2.03	8.31E+08	-0.086
275.482	241935	e	2	604935	o	2	-2.16	6.12E+08	0.104
275.488	241935	e	2	604928	o	3	-3.12	6.74E+07	-0.007
275.700	241935	e	2	604648	o	1	-2.99	8.98E+07	-0.035
276.248	241935	e	2	603929	o	3	-2.25	4.94E+08	-0.118
294.516	0	e	0	339540	o	1	-0.75	1.37E+10	-0.851
295.619	0	e	0	338274	o	1	-0.24	4.40E+10	0.851
305.108	0	e	0	327753	o	1	-2.19	4.58E+08	0.855
306.440	234219	e	3	560547	o	4	-3.70	1.40E+07	-0.027
308.519	235967	e	2	560097	o	3	-3.30	3.52E+07	-0.031
310.965	234219	e	3	555798	o	4	-3.15	4.86E+07	-0.029
311.265	238765	e	1	560035	o	2	-3.42	2.63E+07	-0.029
311.412	234219	e	3	555337	o	3	-3.38	2.87E+07	0.025
313.154	235967	e	2	555299	o	2	-3.71	1.34E+07	0.025
313.821	241935	e	2	560588	o	3	-3.96	7.39E+06	0.047
315.581	323749	o	2	640625	e	2	-2.82	1.02E+08	0.082
315.696	323749	o	2	640509	e	1	-3.79	1.08E+07	-0.043
318.494	241935	e	2	555913	o	3	-3.48	2.17E+07	0.045
319.620	327753	o	1	640625	e	2	-2.01	6.45E+08	-0.285
319.738	327753	o	1	640509	e	1	-2.52	1.96E+08	0.133
319.761	327891	o	3	640625	e	2	-2.69	1.33E+08	-0.024
320.108	323749	o	2	636143	e	2	-3.45	2.29E+07	0.024
320.283	323749	o	2	635973	e	3	-1.41	2.51E+09	-0.408
322.397	330333	o	0	640509	e	1	-2.09	5.18E+08	-0.394
322.753	330791	o	2	640625	e	2	-2.13	4.73E+08	-0.473
322.874	330791	o	2	640509	e	1	-1.58	1.67E+09	-0.376
324.265	327753	o	1	636143	e	2	-1.94	7.24E+08	-0.412
324.410	327891	o	3	636143	e	2	-1.38	2.67E+09	-0.547
324.589	327891	o	3	635973	e	3	-1.89	8.09E+08	-0.556
326.664	329848	o	4	635973	e	3	-1.14	4.50E+09	-0.556
327.371	335161	o	3	640625	e	2	-1.65	1.41E+09	0.365
327.490	330791	o	2	636143	e	2	-2.18	4.13E+08	-0.549
327.673	330791	o	2	635973	e	3	-3.69	1.28E+07	-0.051
327.799	335560	o	2	640625	e	2	-2.79	1.01E+08	-0.026
327.924	335560	o	2	640509	e	1	-2.25	3.46E+08	-0.549
329.536	337168	o	3	640625	e	2	-1.50	1.95E+09	-0.642
330.741	338274	o	1	640625	e	2	-1.82	9.17E+08	0.483
330.868	338274	o	1	640509	e	1	-2.38	2.57E+08	0.553
332.132	339540	o	1	640625	e	2	-3.34	2.78E+07	-0.015
332.246	335161	o	3	636143	e	2	-1.88	8.00E+08	-0.207
332.260	339540	o	1	640509	e	1	-1.79	9.77E+08	0.538
332.434	335161	o	3	635973	e	3	-1.69	1.23E+09	0.559
332.687	335560	o	2	636143	e	2	-1.46	2.08E+09	0.532
332.875	335560	o	2	635973	e	3	-3.62	1.46E+07	0.022
332.968	340296	o	2	640625	e	2	-1.51	1.84E+09	0.498
333.097	340296	o	2	640509	e	1	-2.09	4.88E+08	-0.552
334.476	337168	o	3	636143	e	2	-2.78	9.87E+07	-0.038
334.667	337168	o	3	635973	e	3	-1.67	1.27E+09	0.259
335.717	338274	o	1	636143	e	2	-2.16	4.06E+08	-0.185

Table 2. continued.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
336.585	234219	e	3	531321	o	2	-3.65	1.31E+07	0.008
337.151	339540	o	1	636143	e	2	-2.14	4.29E+08	0.248
337.959	234219	e	3	530113	o	3	-3.33	2.74E+07	-0.011
338.012	340296	o	2	636143	e	2	-3.69	1.20E+07	-0.004
338.207	340296	o	2	635973	e	3	-2.86	8.09E+07	0.104
338.577	235967	e	2	531321	o	2	-2.45	2.07E+08	0.040
339.028	235967	e	2	530928	o	1	-3.21	3.62E+07	0.022
339.967	235967	e	2	530113	o	3	-2.15	4.08E+08	0.079
340.705	235967	e	2	529476	o	1	-3.59	1.49E+07	0.008
341.667	234219	e	3	526902	o	3	-1.50	1.80E+09	0.281
341.815	238765	e	1	531321	o	2	-2.12	4.35E+08	-0.343
342.275	238765	e	1	530928	o	1	-1.76	9.87E+08	0.290
343.719	235967	e	2	526902	o	3	-2.10	4.51E+08	-0.270
343.961	234219	e	3	524950	o	4	-1.17	3.82E+09	-0.518
343.984	238765	e	1	529476	o	1	-2.94	6.45E+07	-0.218
344.346	235967	e	2	526373	o	2	-1.53	1.65E+09	0.386
344.812	234219	e	3	524232	o	3	-1.95	6.23E+08	-0.378
344.994	238765	e	1	528625	o	2	-1.58	1.47E+09	-0.490
345.553	238765	e	1	528156	o	0	-2.04	5.08E+08	-0.390
345.559	241935	e	2	531321	o	2	-1.67	1.20E+09	-0.371
345.571	235967	e	2	525343	o	1	-1.64	1.28E+09	-0.376
346.029	241935	e	2	530928	o	1	-3.32	2.65E+07	-0.063
346.333	234219	e	3	522959	o	2	-1.37	2.36E+09	-0.379
346.903	235967	e	2	524232	o	3	-1.42	2.11E+09	-0.409
347.008	241935	e	2	530113	o	3	-1.32	2.65E+09	-0.656
347.695	238765	e	1	526373	o	2	-2.62	1.34E+08	0.061
347.777	241935	e	2	529476	o	1	-1.73	1.02E+09	-0.389
348.442	235967	e	2	522959	o	2	-2.95	6.13E+07	0.032
348.809	241935	e	2	528625	o	2	-1.97	5.85E+08	0.342
348.945	238765	e	1	525343	o	1	-2.74	1.00E+08	0.067
350.918	241935	e	2	526902	o	3	-2.19	3.53E+08	-0.234
351.571	241935	e	2	526373	o	2	-2.47	1.85E+08	0.058
351.872	238765	e	1	522959	o	2	-3.74	9.78E+06	-0.029
354.237	241935	e	2	524232	o	3	-2.23	3.15E+08	-0.089
355.842	241935	e	2	522959	o	2	-3.42	2.00E+07	-0.049
371.577	323749	o	2	592872	e	2	-2.37	2.08E+08	0.112
371.892	323749	o	2	592644	e	1	-3.32	2.33E+07	-0.058
377.189	327753	o	1	592872	e	2	-1.58	1.24E+09	-0.382
377.386	327891	o	3	592872	e	2	-2.33	2.20E+08	-0.024
377.514	327753	o	1	592644	e	1	-2.06	4.12E+08	0.183
377.852	323749	o	2	588403	e	2	-2.91	5.81E+07	0.036
378.293	323749	o	2	588094	e	3	-0.96	5.11E+09	-0.548
381.226	330333	o	0	592644	e	1	-1.64	1.06E+09	-0.541
381.561	330791	o	2	592872	e	2	-1.72	8.76E+08	-0.562
381.893	330791	o	2	592644	e	1	-1.14	3.30E+09	-0.461
383.656	327753	o	1	588403	e	2	-1.47	1.54E+09	-0.551
383.859	327891	o	3	588403	e	2	-0.94	5.21E+09	-0.614
384.315	327891	o	3	588094	e	3	-1.46	1.56E+09	-0.644
386.759	323749	o	2	582308	e	2	-3.65	9.93E+06	0.029
386.883	323749	o	2	582225	e	3	-3.01	4.34E+07	-0.025
387.227	329848	o	4	588094	e	3	-0.71	8.78E+09	-0.682
388.032	335161	o	3	592872	e	2	-1.20	2.80E+09	0.411
388.180	330791	o	2	588403	e	2	-1.72	8.43E+08	-0.652
388.634	335560	o	2	592872	e	2	-2.26	2.43E+08	-0.037
388.646	330791	o	2	588094	e	3	-3.29	2.26E+07	-0.056
388.978	335560	o	2	592644	e	1	-1.82	6.60E+08	-0.642
391.077	337168	o	3	592872	e	2	-1.08	3.65E+09	-0.730
392.775	338274	o	1	592872	e	2	-1.40	1.73E+09	0.604
392.842	327753	o	1	582308	e	2	-3.24	2.50E+07	0.083
393.127	338274	o	1	592644	e	1	-1.96	4.70E+08	0.604
393.184	327891	o	3	582225	e	3	-2.91	5.26E+07	-0.013
394.151	323749	o	2	577459	e	3	-3.73	8.05E+06	0.020
394.739	339540	o	1	592872	e	2	-2.82	6.53E+07	-0.024
394.880	335161	o	3	588403	e	2	-1.50	1.34E+09	-0.200
394.909	327891	o	3	581114	e	4	-2.61	1.05E+08	0.012

Table 2. continued.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
394.923	323749	o	2	576963	e	3	-1.68	9.02E+08	-0.167
395.095	339540	o	1	592644	e	1	-1.37	1.82E+09	0.613
395.362	335161	o	3	588094	e	3	-1.27	2.30E+09	0.627
395.503	335560	o	2	588403	e	2	-1.05	3.83E+09	0.587
395.563	327891	o	3	580695	e	3	-3.61	1.04E+07	-0.006
395.920	340296	o	2	592872	e	2	-1.09	3.44E+09	0.566
395.987	335560	o	2	588094	e	3	-3.28	2.25E+07	0.021
396.232	329848	o	4	582225	e	3	-3.40	1.69E+07	0.015
396.278	340296	o	2	592644	e	1	-1.67	9.15E+08	-0.636
397.587	330791	o	2	582308	e	2	-1.87	5.72E+08	-0.285
397.984	329848	o	4	581114	e	4	-3.03	3.92E+07	0.020
398.034	337168	o	3	588403	e	2	-2.24	2.44E+08	-0.054
398.524	337168	o	3	588094	e	3	-1.27	2.28E+09	0.279
398.978	323749	o	2	574389	e	1	-1.73	7.84E+08	-0.149
399.793	338274	o	1	588403	e	2	-1.80	6.60E+08	-0.213
400.153	330791	o	2	580695	e	3	-1.35	1.88E+09	-0.281
400.692	327891	o	3	577459	e	3	-1.62	9.97E+08	-0.310
401.490	327891	o	3	576963	e	3	-2.38	1.71E+08	0.072
401.828	339540	o	1	588403	e	2	-1.75	7.30E+08	0.279
402.682	327891	o	3	576226	e	4	-1.13	3.05E+09	-0.380
403.051	340296	o	2	588403	e	2	-3.46	1.41E+07	-0.002
403.554	340296	o	2	588094	e	3	-2.51	1.28E+08	0.100
403.706	329848	o	4	577553	e	4	-1.51	1.27E+09	-0.327
403.859	329848	o	4	577459	e	3	-3.30	2.07E+07	0.075
404.618	335161	o	3	582308	e	2	-2.73	7.52E+07	-0.137
404.670	329848	o	4	576963	e	3	-2.37	1.74E+08	-0.064
404.754	335161	o	3	582225	e	3	-2.03	3.80E+08	0.102
405.272	335560	o	2	582308	e	2	-2.53	1.20E+08	-0.053
405.403	330791	o	2	577459	e	3	-1.87	5.52E+08	0.177
405.456	327753	o	1	574389	e	1	-2.67	8.62E+07	-0.028
405.880	329848	o	4	576226	e	4	-2.30	2.03E+08	0.347
406.142	329848	o	4	576067	e	5	-0.98	4.22E+09	-0.359
406.582	335161	o	3	581114	e	4	-1.61	9.84E+08	-0.153
407.276	335161	o	3	580695	e	3	-2.77	6.89E+07	-0.077
407.930	337168	o	3	582308	e	2	-2.94	4.61E+07	0.113
407.939	335560	o	2	580695	e	3	-1.77	6.74E+08	-0.398
408.068	337168	o	3	582225	e	3	-2.01	3.96E+08	-0.092
409.778	338274	o	1	582308	e	2	-1.82	5.96E+08	-0.260
409.927	337168	o	3	581114	e	4	-1.25	2.21E+09	0.409
410.632	337168	o	3	580695	e	3	-2.64	9.02E+07	0.119
411.916	339540	o	1	582308	e	2	-2.17	2.63E+08	-0.095
412.555	335161	o	3	577553	e	4	-1.39	1.59E+09	-0.328
412.715	335161	o	3	577459	e	3	-2.92	4.66E+07	-0.019
413.202	340296	o	2	582308	e	2	-2.13	2.87E+08	0.148
413.344	340296	o	2	582225	e	3	-1.33	1.81E+09	-0.384
413.396	335560	o	2	577459	e	3	-1.54	1.12E+09	-0.280
413.562	335161	o	3	576963	e	3	-1.76	6.81E+08	-0.217
414.246	335560	o	2	576963	e	3	-2.81	6.07E+07	-0.031
414.826	335161	o	3	576226	e	4	-2.42	1.47E+08	-0.032
415.975	340296	o	2	580695	e	3	-2.98	4.08E+07	-0.026
416.000	337168	o	3	577553	e	4	-1.80	6.15E+08	-0.098
417.023	337168	o	3	576963	e	3	-1.79	6.19E+08	-0.103
418.710	335560	o	2	574389	e	1	-3.48	1.27E+07	-0.026
421.650	340296	o	2	577459	e	3	-3.87	5.02E+06	0.001
422.534	340296	o	2	576963	e	3	-3.73	6.96E+06	0.003
423.522	338274	o	1	574389	e	1	-3.50	1.17E+07	-0.055
425.806	339540	o	1	574389	e	1	-3.60	9.17E+06	0.020
427.180	340296	o	2	574389	e	1	-3.63	8.51E+06	0.021
444.863	461829	e	2	686617	o	2	-3.99	3.45E+06	-0.014
447.917	463362	e	3	686617	o	2	-3.62	8.04E+06	0.069
449.421	461829	e	2	684337	o	1	-3.79	5.39E+06	-0.035
450.522	464652	e	2	686617	o	2	-3.94	3.78E+06	-0.039
458.881	468696	e	2	686617	o	2	-3.99	3.26E+06	0.056
474.378	461643	e	4	672445	o	3	-2.38	1.24E+08	0.078
479.920	464077	e	3	672445	o	3	-3.39	1.19E+07	-0.037

Table 2. continued.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
481.373	464706	e	4	672445	o	3	-2.35	1.28E+08	0.067
483.470	456052	e	1	662890	o	2	-3.55	8.06E+06	0.006
486.228	466780	e	3	672445	o	3	-3.09	2.30E+07	0.048
487.666	467387	e	4	672445	o	3	-2.32	1.34E+08	-0.084
489.490	461643	e	4	665937	o	3	-3.29	1.42E+07	-0.039
489.935	461829	e	2	665937	o	3	-2.45	9.88E+07	0.045
492.804	461829	e	2	664749	o	1	-3.62	6.65E+06	-0.007
493.197	469686	e	3	672445	o	3	-2.98	2.90E+07	-0.054
493.643	463362	e	3	665937	o	3	-3.86	3.76E+06	-0.003
494.625	456052	e	1	658225	o	2	-3.44	9.82E+06	-0.008
496.809	464652	e	2	665937	o	3	-3.97	2.89E+06	0.002
496.941	464706	e	4	665937	o	3	-3.68	5.65E+06	-0.004
497.294	456052	e	1	657140	o	1	-3.60	6.83E+06	0.018
497.327	461815	e	1	662890	o	2	-3.40	1.07E+07	-0.012
497.360	461829	e	2	662890	o	2	-2.53	8.00E+07	0.042
498.030	463958	e	0	664749	o	1	-2.91	3.34E+07	0.060
498.184	461815	e	1	662544	o	0	-3.46	9.40E+06	-0.019
500.259	464853	e	1	664749	o	1	-3.03	2.47E+07	-0.023
501.182	463362	e	3	662890	o	2	-3.54	7.62E+06	0.009
503.651	467387	e	4	665937	o	3	-3.02	2.51E+07	0.021
504.281	461815	e	1	660117	o	1	-2.87	3.52E+07	-0.031
504.316	461829	e	2	660117	o	1	-2.90	3.27E+07	-0.025
504.955	464853	e	1	662890	o	2	-3.30	1.32E+07	-0.011
505.766	467029	e	1	664749	o	1	-3.79	4.23E+06	0.006
505.839	464853	e	1	662544	o	0	-2.88	3.42E+07	-0.063
506.993	468696	e	2	665937	o	3	-2.82	3.94E+07	-0.035
508.367	456052	e	1	652760	o	1	-3.34	1.17E+07	0.047
509.174	461829	e	2	658225	o	2	-2.37	1.10E+08	-0.056
509.790	463958	e	0	660117	o	1	-3.10	2.04E+07	0.029
509.918	466780	e	3	662890	o	2	-3.33	1.21E+07	-0.034
510.066	468696	e	2	664749	o	1	-2.86	3.58E+07	0.029
510.081	469890	e	2	665937	o	3	-2.92	3.05E+07	-0.060
511.470	467029	e	1	662544	o	0	-3.15	1.82E+07	-0.036
511.601	464652	e	2	660117	o	1	-2.67	5.43E+07	-0.037
511.967	461815	e	1	657140	o	1	-3.13	1.88E+07	-0.030
512.126	464853	e	1	660117	o	1	-3.68	5.32E+06	-0.005
513.180	463362	e	3	658225	o	2	-3.32	1.22E+07	-0.014
513.191	469890	e	2	664749	o	1	-2.73	4.70E+07	0.075
514.948	468696	e	2	662890	o	2	-2.73	4.70E+07	-0.029
515.071	464077	e	3	658225	o	2	-3.93	2.94E+06	0.005
516.602	464652	e	2	658225	o	2	-2.80	3.95E+07	-0.018
517.137	464853	e	1	658225	o	2	-3.60	6.24E+06	0.004
517.295	456052	e	1	649365	o	1	-2.79	4.08E+07	0.052
517.589	469686	e	3	662890	o	2	-3.04	2.27E+07	0.039
517.646	463958	e	0	657140	o	1	-2.61	6.14E+07	0.175
517.899	467029	e	1	660117	o	1	-3.83	3.67E+06	-0.005
518.134	469890	e	2	662890	o	2	-2.55	7.03E+07	-0.080
520.055	464853	e	1	657140	o	1	-2.33	1.15E+08	0.199
522.344	466780	e	3	658225	o	2	-3.06	2.12E+07	-0.038
523.024	467029	e	1	658225	o	2	-3.66	5.41E+06	-0.009
523.711	461815	e	1	652760	o	1	-2.17	1.65E+08	0.269
525.687	469890	e	2	660117	o	1	-3.12	1.83E+07	-0.042
526.009	467029	e	1	657140	o	1	-2.65	5.44E+07	-0.166
527.623	468696	e	2	658225	o	2	-3.37	1.03E+07	-0.005
528.966	456052	e	1	645100	o	2	-3.66	5.21E+06	0.057
529.655	463958	e	0	652760	o	1	-2.68	4.99E+07	0.143
530.395	469686	e	3	658225	o	2	-3.36	1.04E+07	0.014
530.661	468696	e	2	657140	o	1	-3.70	4.75E+06	0.026
530.968	469890	e	2	658225	o	2	-2.78	3.92E+07	-0.032
531.610	464652	e	2	652760	o	1	-3.25	1.34E+07	-0.068
532.177	464853	e	1	652760	o	1	-3.37	1.01E+07	-0.020
533.191	461815	e	1	649365	o	1	-3.53	6.89E+06	-0.010
533.230	461829	e	2	649365	o	1	-3.54	6.80E+06	0.014
534.044	469890	e	2	657140	o	1	-3.30	1.18E+07	0.119
539.354	463958	e	0	649365	o	1	-2.69	4.72E+07	-0.185

Table 2. continued.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
541.381	464652	e	2	649365	o	1	-3.29	1.16E+07	0.017
541.969	464853	e	1	649365	o	1	-2.07	1.93E+08	0.288
543.638	461815	e	1	645761	o	2	-2.76	3.95E+07	0.060
545.598	461815	e	1	645100	o	2	-2.52	6.77E+07	0.124
545.639	461829	e	2	645100	o	2	-3.98	2.36E+06	0.005
548.247	463362	e	3	645761	o	2	-3.77	3.77E+06	0.006
548.438	467029	e	1	649365	o	1	-2.65	4.96E+07	-0.133
549.205	461643	e	4	643724	o	3	-3.13	1.65E+07	0.008
549.766	461829	e	2	643724	o	3	-3.78	3.69E+06	-0.006
550.406	464077	e	3	645761	o	2	-1.98	2.31E+08	-0.128
550.473	461815	e	1	643477	o	1	-3.58	5.83E+06	0.009
552.154	464652	e	2	645761	o	2	-1.84	3.18E+08	0.160
552.416	464077	e	3	645100	o	2	-2.11	1.68E+08	-0.087
552.481	491443	e	2	672445	o	3	-3.13	1.61E+07	0.058
553.498	468696	e	2	649365	o	1	-2.34	9.91E+07	-0.174
554.177	464652	e	2	645100	o	2	-2.63	5.08E+07	0.030
554.439	463362	e	3	643724	o	3	-3.61	5.33E+06	0.003
556.870	461815	e	1	641390	o	2	-3.64	4.94E+06	0.009
557.044	463958	e	0	643477	o	1	-3.75	3.79E+06	0.011
557.179	469890	e	2	649365	o	1	-2.58	5.66E+07	-0.271
557.297	461418	e	5	640855	o	4	-3.26	1.17E+07	-0.006
558.719	466780	e	3	645761	o	2	-2.56	5.84E+07	0.032
559.207	464652	e	2	643477	o	1	-3.87	2.87E+06	-0.003
560.790	466780	e	3	645100	o	2	-2.27	1.14E+08	0.065
561.574	467029	e	1	645100	o	2	-3.64	4.87E+06	-0.006
561.708	463362	e	3	641390	o	2	-3.55	5.96E+06	-0.005
563.401	463362	e	3	640855	o	4	-3.65	4.67E+06	-0.002
563.974	464077	e	3	641390	o	2	-3.17	1.42E+07	-0.020
564.275	461418	e	5	638636	o	4	-3.59	5.45E+06	0.005
564.764	468696	e	2	645761	o	2	-2.40	8.32E+07	0.035
564.993	461643	e	4	638636	o	4	-3.45	7.45E+06	-0.007
565.151	466780	e	3	643724	o	3	-3.11	1.63E+07	-0.008
565.681	464077	e	3	640855	o	4	-2.86	2.85E+07	-0.034
565.810	464652	e	2	641390	o	2	-3.15	1.49E+07	0.009
566.453	464853	e	1	641390	o	2	-3.33	9.72E+06	0.022
566.453	495908	e	2	672445	o	3	-3.07	1.79E+07	0.059
566.740	467029	e	1	643477	o	1	-3.41	8.01E+06	0.008
566.880	468696	e	2	645100	o	2	-3.78	3.45E+06	-0.002
567.095	467387	e	4	643724	o	3	-3.14	1.52E+07	-0.007
567.700	464706	e	4	640855	o	4	-2.55	5.82E+07	-0.020
567.941	469686	e	3	645761	o	2	-3.89	2.67E+06	-0.002
568.319	461829	e	2	637786	o	3	-2.77	3.54E+07	0.024
568.597	469890	e	2	645761	o	2	-2.91	2.55E+07	-0.014
570.081	469686	e	3	645100	o	2	-3.77	3.49E+06	0.004
570.534	463362	e	3	638636	o	4	-2.81	3.21E+07	-0.021
570.742	469890	e	2	645100	o	2	-2.81	3.17E+07	0.019
571.337	468696	e	2	643724	o	3	-2.64	4.66E+07	-0.027
572.144	468696	e	2	643477	o	1	-2.56	5.61E+07	-0.038
572.706	466780	e	3	641390	o	2	-2.53	5.96E+07	0.055
572.872	464077	e	3	638636	o	4	-3.19	1.31E+07	-0.013
573.314	463362	e	3	637786	o	3	-2.75	3.60E+07	0.015
574.466	466780	e	3	640855	o	4	-2.52	6.09E+07	0.063
574.588	469686	e	3	643724	o	3	-2.47	6.86E+07	-0.029
574.943	464706	e	4	638636	o	4	-2.25	1.14E+08	0.054
575.260	469890	e	2	643724	o	3	-2.77	3.44E+07	0.039
576.079	469890	e	2	643477	o	1	-2.50	6.35E+07	0.049
576.474	467387	e	4	640855	o	4	-2.55	5.72E+07	-0.020
577.767	464706	e	4	637786	o	3	-2.05	1.79E+08	0.071
580.859	323749	o	2	495908	e	2	-1.60	4.99E+08	-0.156
580.894	490742	e	3	662890	o	2	-3.52	5.94E+06	0.034
581.883	466780	e	3	638636	o	4	-2.66	4.27E+07	0.031
582.399	469686	e	3	641390	o	2	-2.16	1.36E+08	0.069
582.956	323749	o	2	495288	e	1	-2.50	6.15E+07	-0.076
583.005	464077	e	3	635602	o	3	-3.56	5.45E+06	-0.025
583.089	469890	e	2	641390	o	2	-3.35	8.84E+06	-0.019

Table 2. continued.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
583.944	467387	e	4	638636	o	4	-2.47	6.65E+07	0.030
584.219	469686	e	3	640855	o	4	-2.24	1.13E+08	0.057
586.857	467387	e	4	637786	o	3	-2.06	1.68E+08	0.075
588.134	495908	e	2	665937	o	3	-3.78	3.24E+06	-0.044
588.989	463362	e	3	633144	o	2	-3.86	2.66E+06	0.006
590.151	464706	e	4	634154	o	4	-2.61	4.73E+07	0.072
591.481	464077	e	3	633144	o	2	-3.86	2.65E+06	0.013
591.892	469686	e	3	638636	o	4	-2.43	7.01E+07	0.030
592.272	495908	e	2	664749	o	1	-3.29	9.88E+06	0.055
592.341	466780	e	3	635602	o	3	-3.44	6.96E+06	0.030
592.861	491443	e	2	660117	o	1	-3.40	7.61E+06	-0.040
593.288	464706	e	4	633258	o	3	-2.66	4.18E+07	-0.076
593.406	464652	e	2	633171	o	1	-3.69	3.92E+06	0.010
594.690	327753	o	1	495908	e	2	-0.86	2.58E+09	0.494
595.179	327891	o	3	495908	e	2	-1.98	1.99E+08	0.010
595.922	468696	e	2	636503	o	2	-3.35	8.37E+06	-0.026
596.323	323749	o	2	491443	e	2	-1.97	2.02E+08	0.057
596.889	327753	o	1	495288	e	1	-1.25	1.06E+09	0.248
597.074	490742	e	3	658225	o	2	-3.58	4.91E+06	-0.032
597.887	495288	e	1	662544	o	0	-3.85	2.64E+06	-0.039
598.828	323749	o	2	490742	e	3	-0.15	1.30E+10	-0.761
598.866	495908	e	2	662890	o	2	-3.50	5.87E+06	0.037
599.060	456052	e	1	622980	o	1	-2.96	2.02E+07	0.030
599.586	491443	e	2	658225	o	2	-3.61	4.61E+06	0.023
599.638	467387	e	4	634154	o	4	-2.75	3.31E+07	0.054
600.192	469890	e	2	636503	o	2	-3.47	6.23E+06	0.029
601.092	466780	e	3	633144	o	2	-3.55	5.26E+06	-0.026
602.716	469686	e	3	635602	o	3	-3.02	1.75E+07	0.043
602.877	467387	e	4	633258	o	3	-2.70	3.71E+07	-0.071
605.631	330791	o	2	495908	e	2	-1.00	1.84E+09	0.675
606.223	330333	o	0	495288	e	1	-0.83	2.66E+09	-0.764
606.691	495288	e	1	660117	o	1	-4.00	1.82E+06	0.030
607.911	330791	o	2	495288	e	1	-0.34	8.32E+09	-0.577
607.994	468696	e	2	633171	o	1	-3.51	5.61E+06	0.015
610.910	327753	o	1	491443	e	2	-0.61	4.41E+09	-0.765
611.425	327891	o	3	491443	e	2	-0.13	1.34E+10	-0.697
611.592	466780	e	3	630288	o	2	-3.70	3.60E+06	0.058
611.779	469686	e	3	633144	o	2	-3.44	6.44E+06	-0.019
612.440	469890	e	2	633171	o	1	-3.59	4.53E+06	-0.020
614.041	461829	e	2	624684	o	1	-3.97	1.89E+06	0.008
614.059	327891	o	3	490742	e	3	-0.66	3.87E+09	-0.798
615.429	456052	e	1	618540	o	1	-2.61	4.30E+07	0.092
618.321	469890	e	2	631618	o	1	-3.65	3.87E+06	0.043
620.008	456052	e	1	617340	o	1	-1.32	8.30E+08	0.325
620.482	461815	e	1	622980	o	1	-2.42	6.62E+07	-0.040
620.589	464853	e	1	625990	o	2	-3.76	3.04E+06	-0.018
620.669	461643	e	4	622759	o	4	-3.22	1.05E+07	-0.017
621.528	329848	o	4	490742	e	3	0.10	2.17E+10	-0.861
621.844	461815	e	1	622627	o	2	-3.01	1.67E+07	0.009
621.896	461829	e	2	622627	o	2	-3.59	4.42E+06	0.006
622.098	335161	o	3	495908	e	2	-0.36	7.53E+09	-0.489
622.176	463958	e	0	624684	o	1	-3.84	2.51E+06	-0.014
622.461	330791	o	2	491443	e	2	-0.85	2.44E+09	-0.816
622.659	469686	e	3	630288	o	2	-3.61	4.22E+06	0.024
623.552	461829	e	2	622200	o	1	-3.83	2.55E+06	-0.012
623.646	335560	o	2	495908	e	2	-1.18	1.15E+09	0.083
624.768	461829	e	2	621888	o	3	-3.23	9.97E+06	0.034
625.191	330791	o	2	490742	e	3	-2.49	5.54E+07	-0.073
626.064	335560	o	2	495288	e	1	-1.02	1.62E+09	-0.790
627.334	464652	e	2	624057	o	3	-3.65	3.79E+06	-0.009
627.363	463362	e	3	622759	o	4	-3.06	1.46E+07	0.011
627.544	464706	e	4	624057	o	3	-3.23	9.95E+06	-0.032
628.436	461815	e	1	620940	o	2	-3.08	1.40E+07	0.065
628.490	461829	e	2	620940	o	2	-3.46	5.82E+06	0.038
628.843	463958	e	0	622980	o	1	-1.84	2.45E+08	0.354

Table 2. continued.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
629.963	337168	o	3	495908	e	2	-0.31	8.32E+09	0.854
630.716	464077	e	3	622627	o	2	-3.12	1.26E+07	0.040
630.810	463362	e	3	621888	o	3	-3.62	4.01E+06	-0.012
631.198	464652	e	2	623081	o	2	-3.28	8.87E+06	-0.012
631.943	463958	e	0	622200	o	1	-3.74	3.02E+06	-0.015
631.998	464853	e	1	623081	o	2	-3.28	8.86E+06	0.025
632.402	464853	e	1	622980	o	1	-1.56	4.60E+08	0.336
632.474	456052	e	1	614161	o	2	-3.66	3.66E+06	-0.096
632.698	464706	e	4	622759	o	4	-2.36	7.24E+07	0.068
633.012	464652	e	2	622627	o	2	-2.82	2.53E+07	0.014
633.669	464077	e	3	621888	o	3	-3.09	1.36E+07	-0.048
634.297	467029	e	1	624684	o	1	-3.75	2.93E+06	0.018
634.380	338274	o	1	495908	e	2	-0.56	4.55E+09	-0.820
635.537	464853	e	1	622200	o	1	-3.21	1.02E+07	-0.058
635.751	468696	e	2	625990	o	2	-3.74	2.98E+06	-0.020
636.882	338274	o	1	495288	e	1	-1.17	1.12E+09	0.720
638.060	461815	e	1	618540	o	1	-1.38	6.90E+08	0.450
638.115	461829	e	2	618540	o	1	-3.41	6.37E+06	0.022
638.283	467387	e	4	624057	o	3	-2.96	1.80E+07	-0.063
639.519	339540	o	1	495908	e	2	-1.81	2.53E+08	0.053
639.781	469686	e	3	625990	o	2	-3.63	3.81E+06	-0.053
639.792	466780	e	3	623081	o	2	-3.29	8.39E+06	-0.041
639.869	335161	o	3	491443	e	2	-0.84	2.35E+09	-0.170
640.812	467029	e	1	623081	o	2	-2.25	9.05E+07	-0.179
641.227	467029	e	1	622980	o	1	-1.79	2.65E+08	-0.293
641.507	335560	o	2	491443	e	2	-0.26	8.82E+09	0.698
641.656	466780	e	3	622627	o	2	-3.24	9.34E+06	0.030
642.062	339540	o	1	495288	e	1	-0.57	4.32E+09	0.748
642.624	340296	o	2	495908	e	2	-0.29	8.33E+09	-0.706
642.682	467029	e	1	622627	o	2	-1.09	1.32E+09	0.634
642.754	335161	o	3	490742	e	3	-0.47	5.42E+09	0.757
642.983	461815	e	1	617340	o	1	-2.44	5.87E+07	-0.083
643.039	461829	e	2	617340	o	1	-1.68	3.40E+08	-0.402
643.615	467387	e	4	622759	o	4	-1.85	2.28E+08	-0.216
643.661	468696	e	2	624057	o	3	-2.97	1.75E+07	0.059
644.407	335560	o	2	490742	e	3	-2.47	5.44E+07	0.028
644.451	467029	e	1	622200	o	1	-3.82	2.45E+06	0.010
644.713	466780	e	3	621888	o	3	-3.18	1.05E+07	-0.040
645.192	340296	o	2	495288	e	1	-0.87	2.16E+09	-0.776
646.905	463958	e	0	618540	o	1	-1.69	3.26E+08	0.412
647.792	469686	e	3	624057	o	3	-2.93	1.86E+07	0.065
648.014	491443	e	2	645761	o	2	-2.51	4.92E+07	0.111
648.155	468696	e	2	622980	o	1	-2.92	1.90E+07	0.042
648.192	337168	o	3	491443	e	2	-1.18	1.04E+09	-0.108
649.028	495288	e	1	649365	o	1	-3.00	1.59E+07	0.163
649.727	467029	e	1	620940	o	2	-3.03	1.48E+07	0.065
649.824	464652	e	2	618540	o	1	-2.29	8.16E+07	-0.169
650.672	464853	e	1	618540	o	1	-3.50	4.95E+06	-0.004
650.801	491443	e	2	645100	o	2	-2.12	1.19E+08	0.305
651.154	337168	o	3	490742	e	3	-0.47	5.35E+09	0.339
651.223	456052	e	1	609609	o	2	-3.42	5.98E+06	0.023
651.647	495908	e	2	649365	o	1	-2.10	1.26E+08	0.365
651.681	456052	e	1	609501	o	1	-3.55	4.43E+06	0.036
651.967	463958	e	0	617340	o	1	-3.15	1.12E+07	0.013
652.775	468696	e	2	621888	o	3	-2.36	6.77E+07	-0.154
652.778	469890	e	2	623081	o	2	-2.50	5.01E+07	0.166
652.870	338274	o	1	491443	e	2	-1.16	1.09E+09	-0.231
653.209	469890	e	2	622980	o	1	-2.45	5.59E+07	0.237
653.285	469686	e	3	622759	o	4	-1.03	1.47E+09	0.669
653.670	490742	e	3	643724	o	3	-2.86	2.15E+07	-0.144
653.849	469686	e	3	622627	o	2	-2.78	2.58E+07	-0.078
653.913	461829	e	2	614754	o	3	-3.43	5.74E+06	-0.043
654.718	469890	e	2	622627	o	2	-1.53	4.54E+08	-0.475
654.931	464652	e	2	617340	o	1	-3.23	9.24E+06	0.018
655.586	456052	e	1	608587	o	1	-2.56	4.27E+07	-0.053

Table 2. continued.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
655.792	464853	e	1	617340	o	1	-2.35	6.94E+07	-0.066
656.400	461815	e	1	614161	o	2	-3.63	3.61E+06	-0.027
656.682	491443	e	2	643724	o	3	-2.52	4.70E+07	-0.151
657.224	456052	e	1	608207	o	0	-2.63	3.60E+07	0.064
657.749	491443	e	2	643477	o	1	-2.97	1.67E+07	-0.158
657.902	469890	e	2	621888	o	3	-2.38	6.48E+07	0.268
658.314	339540	o	1	491443	e	2	-0.99	1.58E+09	0.348
660.019	467029	e	1	618540	o	1	-3.03	1.44E+07	-0.014
660.535	463362	e	3	614754	o	3	-3.66	3.34E+06	0.016
661.605	340296	o	2	491443	e	2	-3.84	2.22E+06	0.000
662.031	469890	e	2	620940	o	2	-2.97	1.64E+07	-0.087
662.395	464853	e	1	615820	o	2	-3.97	1.62E+06	-0.037
663.798	490742	e	3	641390	o	2	-3.20	9.49E+06	-0.085
664.573	495288	e	1	645761	o	2	-3.57	4.10E+06	-0.018
664.690	340296	o	2	490742	e	3	-1.69	3.06E+08	0.135
666.163	490742	e	3	640855	o	4	-2.77	2.57E+07	-0.099
666.215	464652	e	2	614754	o	3	-3.64	3.44E+06	-0.010
666.537	461815	e	1	611844	o	2	-3.91	1.85E+06	0.014
666.904	491443	e	2	641390	o	2	-2.89	1.93E+07	-0.074
667.319	495908	e	2	645761	o	2	-3.12	1.15E+07	0.029
667.360	468696	e	2	618540	o	1	-3.31	7.32E+06	-0.017
667.505	495288	e	1	645100	o	2	-3.07	1.28E+07	0.045
669.755	464853	e	1	614161	o	2	-3.94	1.72E+06	0.016
670.276	495908	e	2	645100	o	2	-3.55	4.20E+06	0.012
671.667	456052	e	1	604935	o	2	-2.96	1.61E+07	0.101
672.965	456052	e	1	604648	o	1	-2.08	1.24E+08	0.155
674.816	495288	e	1	643477	o	1	-2.95	1.66E+07	-0.062
676.159	490742	e	3	638636	o	4	-3.07	1.25E+07	0.102
676.460	461418	e	5	609246	o	4	-3.91	1.82E+06	-0.004
676.515	495908	e	2	643724	o	3	-3.86	2.02E+06	0.008
676.741	464077	e	3	611844	o	2	-3.89	1.89E+06	-0.005
677.491	461643	e	4	609246	o	4	-3.81	2.24E+06	0.026
678.194	469890	e	2	617340	o	1	-3.95	1.61E+06	-0.030
678.277	461643	e	4	609075	o	3	-2.70	2.90E+07	0.009
678.514	466780	e	3	614161	o	2	-3.50	4.56E+06	0.023
678.872	456052	e	1	603355	o	2	-1.44	5.29E+08	0.279
679.034	461815	e	1	609083	o	1	-3.63	3.37E+06	-0.010
679.133	461829	e	2	609075	o	3	-3.18	9.52E+06	0.042
680.067	490742	e	3	637786	o	3	-2.51	4.48E+07	-0.072
681.328	461815	e	1	608587	o	1	-2.74	2.64E+07	0.029
681.392	461829	e	2	608587	o	1	-3.28	7.64E+06	-0.014
682.477	461815	e	1	608340	o	2	-3.38	6.03E+06	0.038
683.097	461815	e	1	608207	o	0	-3.22	8.64E+06	0.023
683.328	491443	e	2	637786	o	3	-3.19	9.30E+06	0.103
683.773	463362	e	3	609609	o	2	-2.88	1.89E+07	0.019
684.272	323749	o	2	469890	e	2	-2.31	6.90E+07	0.037
684.455	495288	e	1	641390	o	2	-3.23	8.43E+06	0.075
684.659	468696	e	2	614754	o	3	-2.99	1.45E+07	-0.042
685.225	323749	o	2	469686	e	3	-1.51	4.39E+08	-0.050
685.467	464077	e	3	609963	o	3	-3.54	4.08E+06	0.011
685.474	463362	e	3	609246	o	4	-2.72	2.72E+07	-0.058
686.279	463362	e	3	609075	o	3	-2.87	1.90E+07	0.028
687.082	463958	e	0	609501	o	1	-3.05	1.28E+07	0.044
687.134	464077	e	3	609609	o	2	-3.36	6.14E+06	0.006
687.369	495908	e	2	641390	o	2	-3.19	9.13E+06	0.045
688.180	464652	e	2	609963	o	3	-2.89	1.82E+07	-0.039
688.434	464706	e	4	609963	o	3	-3.85	1.97E+06	0.004
688.852	464077	e	3	609246	o	4	-3.95	1.56E+06	0.013
689.061	463958	e	0	609083	o	1	-3.17	9.50E+06	-0.046
689.665	464077	e	3	609075	o	3	-2.69	2.85E+07	-0.037
689.719	461829	e	2	606815	o	2	-3.57	3.75E+06	-0.013
689.758	463362	e	3	608340	o	2	-2.90	1.77E+07	0.070
689.861	464652	e	2	609609	o	2	-2.10	1.11E+08	0.066
689.908	323749	o	2	468696	e	2	-2.13	1.05E+08	0.007
690.301	469890	e	2	614754	o	3	-3.15	9.88E+06	-0.045

Table 2. continued.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
690.375	464652	e	2	609501	o	1	-2.95	1.56E+07	0.016
690.537	467029	e	1	611844	o	2	-3.08	1.16E+07	-0.046
690.816	464853	e	1	609609	o	2	-2.13	1.05E+08	0.219
691.332	464853	e	1	609501	o	1	-3.09	1.15E+07	0.043
691.424	463958	e	0	608587	o	1	-2.33	6.60E+07	0.261
691.849	464706	e	4	609246	o	4	-3.63	3.29E+06	-0.004
692.163	469686	e	3	614161	o	2	-3.43	5.18E+06	-0.026
692.373	464652	e	2	609083	o	1	-3.27	7.45E+06	-0.013
692.668	464706	e	4	609075	o	3	-1.68	2.91E+08	-0.124
693.178	464077	e	3	608340	o	2	-1.56	3.84E+08	0.160
693.336	464853	e	1	609083	o	1	-3.23	8.24E+06	-0.054
694.759	464652	e	2	608587	o	1	-2.98	1.44E+07	-0.017
695.728	464853	e	1	608587	o	1	-1.58	3.60E+08	-0.416
695.953	464652	e	2	608340	o	2	-3.74	2.50E+06	0.005
696.498	461643	e	4	605218	o	3	-2.86	1.91E+07	0.058
696.926	464853	e	1	608340	o	2	-3.33	6.37E+06	-0.147
697.401	461829	e	2	605218	o	3	-2.13	1.02E+08	0.114
697.572	464853	e	1	608207	o	0	-2.03	1.27E+08	0.347
697.908	461643	e	4	604928	o	3	-2.66	3.03E+07	-0.112
697.933	323749	o	2	467029	e	1	-3.24	7.93E+06	0.002
698.408	466780	e	3	609963	o	3	-3.95	1.53E+06	-0.003
698.577	468696	e	2	611844	o	2	-3.71	2.70E+06	0.005
698.714	461815	e	1	604935	o	2	-1.94	1.56E+08	0.324
698.780	461829	e	2	604935	o	2	-3.18	9.05E+06	0.017
698.814	461829	e	2	604928	o	3	-1.81	2.13E+08	-0.279
699.148	323749	o	2	466780	e	3	-1.81	2.12E+08	0.120
699.203	464077	e	3	607097	o	3	-3.31	6.64E+06	0.019
699.984	461418	e	5	604278	o	4	-1.65	3.07E+08	0.386
700.118	461815	e	1	604648	o	1	-1.56	3.72E+08	0.374
700.139	466780	e	3	609609	o	2	-2.59	3.47E+07	0.030
700.184	461829	e	2	604648	o	1	-2.76	2.37E+07	0.037
700.454	461418	e	5	604182	o	4	-0.82	2.06E+09	0.486
700.584	464077	e	3	606815	o	2	-2.94	1.55E+07	-0.040
701.361	467029	e	1	609609	o	2	-2.49	4.45E+07	-0.101
701.560	461643	e	4	604182	o	4	-2.02	1.30E+08	-0.335
701.674	490742	e	3	633258	o	3	-3.56	3.76E+06	0.043
701.893	467029	e	1	609501	o	1	-1.71	2.64E+08	0.270
702.026	464652	e	2	607097	o	3	-3.69	2.78E+06	0.009
702.290	464706	e	4	607097	o	3	-3.68	2.85E+06	-0.020
702.766	466780	e	3	609075	o	3	-2.37	5.78E+07	-0.071
702.808	461643	e	4	603929	o	3	-0.90	1.70E+09	0.581
703.419	464652	e	2	606815	o	2	-3.92	1.61E+06	0.003
703.549	327753	o	1	469890	e	2	-1.42	5.07E+08	0.290
703.727	461829	e	2	603929	o	3	-2.44	4.88E+07	-0.286
703.958	467029	e	1	609083	o	1	-2.38	5.63E+07	-0.109
704.232	327891	o	3	469890	e	2	-2.75	2.41E+07	0.007
704.412	464853	e	1	606815	o	2	-3.73	2.49E+06	-0.019
704.452	469890	e	2	611844	o	2	-3.66	2.94E+06	-0.006
704.829	495908	e	2	637786	o	3	-3.68	2.79E+06	-0.039
704.924	467387	e	4	609246	o	4	-3.35	5.96E+06	-0.008
704.938	463362	e	3	605218	o	3	-1.48	4.43E+08	0.230
705.241	327891	o	3	469686	e	3	-1.15	9.43E+08	-0.033
705.775	467387	e	4	609075	o	3	-0.93	1.57E+09	0.623
706.347	463362	e	3	604935	o	2	-2.97	1.43E+07	0.022
706.382	463362	e	3	604928	o	3	-1.51	4.10E+08	-0.241
706.415	466780	e	3	608340	o	2	-1.15	9.54E+08	0.549
706.425	467029	e	1	608587	o	1	-2.23	7.91E+07	0.181
706.514	461815	e	1	603355	o	2	-2.09	1.07E+08	-0.296
706.581	461829	e	2	603355	o	2	-1.34	6.15E+08	0.328
707.659	467029	e	1	608340	o	2	-2.63	3.14E+07	0.131
708.142	495288	e	1	636503	o	2	-3.98	1.40E+06	-0.066
708.326	467029	e	1	608207	o	0	-1.93	1.57E+08	0.362
708.511	464077	e	3	605218	o	3	-2.87	1.78E+07	-0.035
708.698	323749	o	2	464853	e	1	-0.88	1.76E+09	0.118
709.508	327753	o	1	468696	e	2	-0.71	2.60E+09	0.182

Table 2. continued.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
709.641	463362	e	3	604278	o	4	-2.82	1.99E+07	0.049
709.657	468696	e	2	609609	o	2	-1.71	2.57E+08	-0.175
709.707	323749	o	2	464652	e	2	-1.60	3.35E+08	0.016
709.935	464077	e	3	604935	o	2	-1.27	7.06E+08	-0.555
709.970	464077	e	3	604928	o	3	-2.70	2.64E+07	0.061
710.124	463362	e	3	604182	o	4	-2.30	6.65E+07	0.103
710.201	468696	e	2	609501	o	1	-1.65	2.93E+08	-0.272
710.203	327891	o	3	468696	e	2	-1.75	2.33E+08	-0.031
710.782	463958	e	0	604648	o	1	-2.07	1.12E+08	-0.346
711.403	463362	e	3	603929	o	3	-2.01	1.30E+08	-0.242
711.493	461418	e	5	601967	o	4	-3.72	2.54E+06	0.056
711.681	464706	e	4	605218	o	3	-1.35	5.83E+08	0.299
712.316	468696	e	2	609083	o	1	-2.36	5.67E+07	0.086
712.356	468696	e	2	609075	o	3	-3.08	1.09E+07	-0.029
712.616	323749	o	2	464077	e	3	-2.95	1.47E+07	0.003
712.673	466780	e	3	607097	o	3	-4.00	1.32E+06	0.004
712.846	464652	e	2	604935	o	2	-1.43	4.88E+08	0.367
712.877	469686	e	3	609963	o	3	-3.64	3.00E+06	-0.004
713.153	464706	e	4	604928	o	3	-1.40	5.20E+08	-0.286
713.395	491443	e	2	631618	o	1	-3.79	2.13E+06	-0.114
713.866	464853	e	1	604935	o	2	-3.53	3.83E+06	-0.011
714.307	464652	e	2	604648	o	1	-1.68	2.76E+08	0.259
714.319	463362	e	3	603355	o	2	-1.61	3.22E+08	0.222
714.681	469686	e	3	609609	o	2	-1.12	9.81E+08	0.658
714.841	468696	e	2	608587	o	1	-1.73	2.42E+08	0.351
715.042	464077	e	3	603929	o	3	-1.69	2.64E+08	-0.396
715.110	329848	o	4	469686	e	3	-1.97	1.40E+08	0.043
715.332	464853	e	1	604648	o	1	-3.39	5.32E+06	-0.006
715.720	469890	e	2	609609	o	2	-1.85	1.83E+08	-0.288
716.106	468696	e	2	608340	o	2	-2.76	2.28E+07	-0.037
716.267	323749	o	2	463362	e	3	0.10	1.62E+10	-0.515
716.274	469890	e	2	609501	o	1	-1.64	2.95E+08	0.389
716.475	464706	e	4	604278	o	4	-2.40	5.20E+07	0.076
716.608	490742	e	3	630288	o	2	-3.52	3.97E+06	-0.094
716.868	327891	o	3	467387	e	4	-1.69	2.66E+08	-0.004
716.968	464706	e	4	604182	o	4	-1.58	3.38E+08	0.335
717.419	469686	e	3	609075	o	3	-1.57	3.47E+08	0.375
717.995	464652	e	2	603929	o	3	-2.30	6.54E+07	0.176
717.998	327753	o	1	467029	e	1	-0.82	1.97E+09	0.168
718.271	464706	e	4	603929	o	3	-3.52	3.88E+06	0.002
718.425	469890	e	2	609083	o	1	-2.43	4.76E+07	-0.096
718.466	469890	e	2	609075	o	3	-2.45	4.58E+07	-0.333
718.912	330791	o	2	469890	e	2	-0.19	8.36E+09	-0.718
719.998	327891	o	3	466780	e	3	-0.39	5.31E+09	-0.215
720.966	464652	e	2	603355	o	2	-2.78	2.15E+07	-0.023
720.994	469890	e	2	608587	o	1	-2.10	1.03E+08	0.376
721.222	469686	e	3	608340	o	2	-3.76	2.22E+06	-0.007
722.010	464853	e	1	603355	o	2	-2.42	4.90E+07	-0.066
722.280	469890	e	2	608340	o	2	-1.69	2.59E+08	0.432
722.346	466780	e	3	605218	o	3	-3.82	1.95E+06	0.005
723.826	466780	e	3	604935	o	2	-1.77	2.15E+08	0.155
724.012	468696	e	2	606815	o	2	-3.70	2.52E+06	0.005
724.220	323749	o	2	461829	e	2	0.32	2.66E+10	-0.686
724.291	323749	o	2	461815	e	1	-0.49	4.16E+09	0.593
725.132	467029	e	1	604935	o	2	-3.53	3.78E+06	-0.011
725.136	330791	o	2	468696	e	2	-0.56	3.50E+09	0.265
725.525	467387	e	4	605218	o	3	-2.30	6.43E+07	0.037
726.644	467029	e	1	604648	o	1	-3.14	9.12E+06	-0.014
727.054	467387	e	4	604928	o	3	-2.28	6.64E+07	-0.042
727.067	329848	o	4	467387	e	4	-0.41	4.90E+09	-0.218
727.284	466780	e	3	604278	o	4	-3.52	3.78E+06	-0.007
727.793	466780	e	3	604182	o	4	-3.91	1.55E+06	-0.008
728.670	495908	e	2	633144	o	2	-3.86	1.74E+06	-0.073
728.776	490742	e	3	627958	o	4	-3.98	1.31E+06	0.120
729.135	466780	e	3	603929	o	3	-1.97	1.34E+08	0.187

Table 2. continued.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
729.396	327753	o	1	464853	e	1	-0.51	3.85E+09	-0.426
730.287	329848	o	4	466780	e	3	-1.87	1.70E+08	0.176
730.464	327753	o	1	464652	e	2	-0.04	1.13E+10	-0.587
730.507	467387	e	4	604278	o	4	-3.05	1.12E+07	0.016
730.916	327891	o	3	464706	e	4	-2.84	1.82E+07	0.000
731.019	467387	e	4	604182	o	4	-2.18	8.20E+07	0.081
731.202	327891	o	3	464652	e	2	-0.61	3.05E+09	-0.405
731.547	330333	o	0	467029	e	1	-0.26	6.83E+09	-0.747
732.199	466780	e	3	603355	o	2	-3.37	5.32E+06	-0.069
732.374	467387	e	4	603929	o	3	-2.92	1.51E+07	-0.007
732.482	468696	e	2	605218	o	3	-3.54	3.57E+06	0.007
734.003	468696	e	2	604935	o	2	-2.26	6.77E+07	0.052
734.007	330791	o	2	467029	e	1	-0.89	1.59E+09	-0.337
734.041	468696	e	2	604928	o	3	-3.84	1.81E+06	-0.004
734.188	327753	o	1	463958	e	0	-0.25	6.95E+09	0.839
734.290	327891	o	3	464077	e	3	-0.01	1.22E+10	0.627
735.350	330791	o	2	466780	e	3	0.11	1.58E+10	-0.459
735.553	468696	e	2	604648	o	1	-2.84	1.79E+07	0.020
737.835	469686	e	3	605218	o	3	-3.09	9.99E+06	-0.010
738.168	327891	o	3	463362	e	3	-0.45	4.35E+09	0.341
738.943	469890	e	2	605218	o	3	-3.68	2.53E+06	0.015
739.379	469686	e	3	604935	o	2	-3.61	3.02E+06	-0.002
739.417	469686	e	3	604928	o	3	-3.29	6.25E+06	0.007
739.463	468696	e	2	603929	o	3	-3.22	7.31E+06	0.023
740.492	469890	e	2	604935	o	2	-3.48	4.03E+06	0.005
740.530	469890	e	2	604928	o	3	-3.94	1.39E+06	-0.010
741.521	329848	o	4	464706	e	4	0.14	1.68E+10	-0.821
742.069	469890	e	2	604648	o	1	-3.64	2.79E+06	0.007
742.235	335161	o	3	469890	e	2	-0.95	1.37E+09	-0.464
743.356	335161	o	3	469686	e	3	-0.14	8.83E+09	0.327
743.383	330333	o	0	464853	e	1	-0.41	4.73E+09	-0.777
743.519	469686	e	3	604182	o	4	-3.77	2.04E+06	-0.005
744.439	335560	o	2	469890	e	2	-0.56	3.31E+09	-0.181
744.994	329848	o	4	464077	e	3	-2.35	5.41E+07	-0.037
745.567	335560	o	2	469686	e	3	-2.87	1.61E+07	0.000
745.848	327753	o	1	461829	e	2	-1.06	1.05E+09	-0.054
745.923	330791	o	2	464853	e	1	-2.30	6.02E+07	0.118
745.924	327753	o	1	461815	e	1	-0.31	5.84E+09	-0.686
746.617	327891	o	3	461829	e	2	-0.86	1.64E+09	0.566
747.040	330791	o	2	464652	e	2	-0.58	3.16E+09	0.340
747.655	327891	o	3	461643	e	4	0.73	6.41E+10	-0.867
748.119	469686	e	3	603355	o	2	-3.97	1.27E+06	-0.004
748.870	335161	o	3	468696	e	2	-1.24	6.77E+08	-0.095
748.986	329848	o	4	463362	e	3	-0.49	3.86E+09	-0.519
750.264	330791	o	2	464077	e	3	0.44	3.23E+10	-0.684
751.114	335560	o	2	468696	e	2	-1.09	9.71E+08	-0.034
753.457	337168	o	3	469890	e	2	-1.24	6.76E+08	0.335
754.313	330791	o	2	463362	e	3	-1.67	2.50E+08	-0.030
754.613	337168	o	3	469686	e	3	-0.33	5.49E+09	-0.208
755.841	323749	o	2	456052	e	1	0.15	1.66E+10	-0.851
756.284	335161	o	3	467387	e	4	-0.20	7.41E+09	0.117
758.755	329848	o	4	461643	e	4	-0.44	4.21E+09	0.879
759.769	335161	o	3	466780	e	3	-0.86	1.60E+09	-0.097
759.785	338274	o	1	469890	e	2	0.08	1.39E+10	-0.828
760.053	329848	o	4	461418	e	5	0.85	8.15E+10	-0.899
760.296	337168	o	3	468696	e	2	-2.00	1.16E+08	0.014
760.558	330333	o	0	461815	e	1	-1.66	2.53E+08	-0.041
760.637	335560	o	2	467029	e	1	-2.81	1.79E+07	-0.003
762.080	335560	o	2	466780	e	3	0.39	2.85E+10	-0.903
763.138	330791	o	2	461829	e	2	-2.42	4.32E+07	0.016
763.217	330791	o	2	461815	e	1	-1.24	6.58E+08	0.373
766.740	338274	o	1	468696	e	2	-3.93	1.33E+06	0.000
767.169	339540	o	1	469890	e	2	-0.61	2.78E+09	-0.143
767.939	337168	o	3	467387	e	4	0.67	5.33E+10	-0.904
771.533	337168	o	3	466780	e	3	-0.88	1.50E+09	0.122

Table 2. continued.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
771.641	340296	o	2	469890	e	2	-0.19	7.29E+09	0.515
771.936	335161	o	3	464706	e	4	0.62	4.70E+10	-0.775
772.255	335161	o	3	464652	e	2	-3.06	9.65E+06	0.001
772.853	340296	o	2	469686	e	3	0.50	3.52E+10	-0.897
773.441	335560	o	2	464853	e	1	-1.82	1.71E+08	0.025
774.260	339540	o	1	468696	e	2	0.24	1.95E+10	0.861
774.642	335560	o	2	464652	e	2	0.13	1.50E+10	-0.606
775.701	335161	o	3	464077	e	3	-1.39	4.51E+08	0.034
776.665	338274	o	1	467029	e	1	-0.17	7.41E+09	-0.895
778.109	335560	o	2	464077	e	3	-0.18	7.27E+09	0.346
778.816	340296	o	2	468696	e	2	-0.11	8.55E+09	0.319
779.431	327753	o	1	456052	e	1	-0.39	4.47E+09	-0.409
780.029	335161	o	3	463362	e	3	0.03	1.19E+10	-0.712
782.465	335560	o	2	463362	e	3	-1.13	8.04E+08	-0.075
784.082	337168	o	3	464706	e	4	-0.77	1.84E+09	-0.034
784.382	339540	o	1	467029	e	1	-0.49	3.53E+09	-0.225
784.412	337168	o	3	464652	e	2	-3.54	3.15E+06	0.000
787.967	337168	o	3	464077	e	3	-1.00	1.06E+09	0.082
789.058	340296	o	2	467029	e	1	-0.93	1.26E+09	0.180
789.470	335161	o	3	461829	e	2	-0.42	4.06E+09	-0.807
790.019	338274	o	1	464853	e	1	-0.55	3.02E+09	0.418
790.611	340296	o	2	466780	e	3	-1.18	6.98E+08	-0.026
790.631	335161	o	3	461643	e	4	-0.90	1.33E+09	-0.034
791.273	338274	o	1	464652	e	2	-0.78	1.76E+09	-0.183
791.965	335560	o	2	461829	e	2	-1.83	1.58E+08	-0.021
792.050	335560	o	2	461815	e	1	-0.39	4.32E+09	-0.520
792.434	337168	o	3	463362	e	3	0.14	1.48E+10	-0.442
795.423	330333	o	0	456052	e	1	-1.09	8.68E+08	-0.192
795.644	338274	o	1	463958	e	0	-1.51	3.25E+08	-0.515
798.005	339540	o	1	464853	e	1	-0.33	4.91E+09	-0.815
798.332	330791	o	2	456052	e	1	-2.41	4.04E+07	0.185
799.284	339540	o	1	464652	e	2	-1.79	1.70E+08	0.010
802.179	337168	o	3	461829	e	2	-0.29	5.33E+09	-0.506
802.845	340296	o	2	464853	e	1	-0.47	3.51E+09	-0.593
803.377	337168	o	3	461643	e	4	-1.70	2.06E+08	-0.009
803.744	339540	o	1	463958	e	0	-1.25	5.75E+08	-0.207
804.140	340296	o	2	464652	e	2	-0.63	2.44E+09	-0.098
807.876	340296	o	2	464077	e	3	-1.62	2.45E+08	-0.013
809.356	338274	o	1	461829	e	2	-3.31	5.05E+06	-0.006
809.445	338274	o	1	461815	e	1	-0.39	4.16E+09	-0.348
812.573	340296	o	2	463362	e	3	-2.41	3.91E+07	-0.003
814.878	491443	e	2	614161	o	2	-3.52	3.05E+06	-0.091
817.740	339540	o	1	461829	e	2	-2.68	2.10E+07	0.005
817.831	339540	o	1	461815	e	1	-0.63	2.34E+09	0.200
822.823	340296	o	2	461829	e	2	-2.00	9.82E+07	0.011
822.915	340296	o	2	461815	e	1	-2.24	5.71E+07	-0.008
829.934	335560	o	2	456052	e	1	-1.65	2.16E+08	-0.192
830.560	491443	e	2	611844	o	2	-3.84	1.39E+06	-0.072
833.943	495908	e	2	615820	o	2	-3.88	1.26E+06	0.106
838.776	490742	e	3	609963	o	3	-3.92	1.13E+06	-0.049
843.851	490742	e	3	609246	o	4	-3.92	1.12E+06	-0.026
845.642	495908	e	2	614161	o	2	-3.56	2.55E+06	-0.077
849.053	338274	o	1	456052	e	1	-2.06	8.01E+07	-0.256
849.863	522959	o	2	640625	e	2	-2.57	2.46E+07	0.040
850.111	491443	e	2	609075	o	3	-3.99	9.50E+05	-0.002
850.702	522959	o	2	640509	e	1	-3.36	4.05E+06	-0.025
858.284	339540	o	1	456052	e	1	-3.32	4.32E+06	0.004
859.158	524232	o	3	640625	e	2	-2.81	1.41E+07	-0.005
863.885	340296	o	2	456052	e	1	-2.74	1.62E+07	0.019
867.438	525343	o	1	640625	e	2	-1.92	1.07E+08	-0.076
868.312	525343	o	1	640509	e	1	-2.27	4.76E+07	0.076
873.543	490742	e	3	605218	o	3	-2.30	4.44E+07	0.101
874.733	495288	e	1	609609	o	2	-2.42	3.29E+07	-0.274
875.258	526373	o	2	640625	e	2	-2.68	1.82E+07	0.009
875.560	495288	e	1	609501	o	1	-2.27	4.65E+07	0.158

Table 2. continued.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
875.762	490742	e	3	604928	o	3	-2.04	7.85E+07	-0.226
876.148	526373	o	2	640509	e	1	-2.00	8.63E+07	0.085
878.776	495288	e	1	609083	o	1	-2.62	2.06E+07	-0.233
878.930	491443	e	2	605218	o	3	-2.63	2.04E+07	-0.187
879.330	526902	o	3	640625	e	2	-2.53	2.56E+07	0.031
879.497	495908	e	2	609609	o	2	-1.94	9.97E+07	-0.229
880.334	495908	e	2	609501	o	1	-3.31	4.19E+06	-0.040
880.776	490742	e	3	604278	o	4	-2.35	3.83E+07	-0.440
881.122	491443	e	2	604935	o	2	-1.79	1.40E+08	0.324
881.176	491443	e	2	604928	o	3	-2.40	3.40E+07	0.387
881.521	490742	e	3	604182	o	4	-1.46	2.95E+08	-0.493
882.623	495288	e	1	608587	o	1	-2.73	1.58E+07	-0.305
883.356	491443	e	2	604648	o	1	-1.92	1.03E+08	-0.317
883.491	490742	e	3	603929	o	3	-2.26	4.75E+07	-0.310
883.517	522959	o	2	636143	e	2	-2.99	8.82E+06	0.020
883.585	495908	e	2	609083	o	1	-3.69	1.73E+06	0.054
883.647	495908	e	2	609075	o	3	-1.51	2.64E+08	0.578
884.552	495288	e	1	608340	o	2	-1.80	1.35E+08	-0.470
884.846	522959	o	2	635973	e	3	-0.76	1.50E+09	-0.600
885.594	495288	e	1	608207	o	0	-2.25	4.74E+07	-0.344
887.474	495908	e	2	608587	o	1	-1.95	9.53E+07	-0.340
887.995	490742	e	3	603355	o	2	-1.60	2.14E+08	-0.330
889.002	491443	e	2	603929	o	3	-1.61	2.09E+08	-0.472
889.424	495908	e	2	608340	o	2	-2.31	4.14E+07	0.330
890.052	528156	o	0	640509	e	1	-1.45	3.02E+08	-0.595
891.043	574389	e	1	686617	o	2	-3.70	1.69E+06	-0.059
892.857	528625	o	2	640625	e	2	-1.40	3.32E+08	-0.338
893.562	491443	e	2	603355	o	2	-3.28	4.42E+06	0.032
893.567	524232	o	3	636143	e	2	-0.73	1.54E+09	-0.647
893.783	528625	o	2	640509	e	1	-0.91	1.03E+09	-0.744
894.927	524232	o	3	635973	e	3	-1.25	4.68E+08	-0.682
896.647	495288	e	1	606815	o	2	-3.38	3.46E+06	0.162
899.076	490742	e	3	601967	o	4	-3.96	9.12E+05	-0.210
899.693	529476	o	1	640625	e	2	-1.06	7.25E+08	0.652
900.633	529476	o	1	640509	e	1	-2.37	3.50E+07	-0.312
900.714	524950	o	4	635973	e	3	-0.51	2.55E+09	-0.754
902.527	525343	o	1	636143	e	2	-1.05	7.35E+08	-0.629
904.879	530113	o	3	640625	e	2	-0.63	1.92E+09	0.806
909.521	574389	e	1	684337	o	1	-3.70	1.62E+06	-0.087
910.996	526373	o	2	636143	e	2	-0.80	1.28E+09	0.700
911.602	530928	o	1	640625	e	2	-2.19	5.12E+07	0.124
912.021	495288	e	1	604935	o	2	-3.61	1.96E+06	0.017
912.409	526373	o	2	635973	e	3	-3.18	5.35E+06	0.013
912.567	530928	o	1	640509	e	1	-1.05	7.11E+08	0.628
914.414	495288	e	1	604648	o	1	-3.19	5.15E+06	0.042
914.827	495908	e	2	605218	o	3	-3.12	6.12E+06	-0.065
914.880	531321	o	2	640625	e	2	-0.90	1.01E+09	0.548
915.407	526902	o	3	636143	e	2	-1.25	4.50E+08	-0.594
915.852	531321	o	2	640509	e	1	-1.42	3.00E+08	-0.663
916.834	526902	o	3	635973	e	3	-0.78	1.32E+09	0.629
917.201	495908	e	2	604935	o	2	-3.56	2.19E+06	0.006
917.260	495908	e	2	604928	o	3	-3.62	1.89E+06	0.025
919.622	495908	e	2	604648	o	1	-3.75	1.41E+06	0.005
919.955	574389	e	1	683090	o	0	-3.99	8.07E+05	-0.104
925.355	495288	e	1	603355	o	2	-3.93	9.19E+05	-0.026
925.743	495908	e	2	603929	o	3	-3.63	1.85E+06	-0.005
930.077	528625	o	2	636143	e	2	-1.91	9.61E+07	0.107
930.689	495908	e	2	603355	o	2	-3.37	3.27E+06	-0.031
937.497	529476	o	1	636143	e	2	-1.83	1.12E+08	-0.102
942.717	234219	e	3	340296	o	2	-1.24	4.30E+08	-0.165
944.644	530113	o	3	635973	e	3	-2.53	2.18E+07	-0.027
950.435	530928	o	1	636143	e	2	-2.95	8.24E+06	0.027
953.998	531321	o	2	636143	e	2	-3.58	1.94E+06	-0.001
955.548	531321	o	2	635973	e	3	-2.79	1.19E+07	0.025
958.509	235967	e	2	340296	o	2	-0.80	1.16E+09	-0.094

Table 2. continued.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
960.638	456052	e	1	560149	o	1	-1.69	1.49E+08	0.050
961.698	456052	e	1	560035	o	2	-3.63	1.70E+06	-0.004
965.501	235967	e	2	339540	o	1	-0.75	1.29E+09	-0.286
971.357	234219	e	3	337168	o	3	-0.07	5.96E+09	-0.363
972.523	456052	e	1	558877	o	2	-0.57	1.88E+09	0.129
977.455	235967	e	2	338274	o	1	-1.75	1.26E+08	0.047
984.923	238765	e	1	340296	o	2	-0.49	2.23E+09	0.813
986.767	234219	e	3	335560	o	2	-2.10	5.49E+07	-0.032
988.132	235967	e	2	337168	o	3	-0.30	3.45E+09	0.324
990.668	234219	e	3	335161	o	3	-0.10	5.40E+09	-0.799
992.307	238765	e	1	339540	o	1	-0.20	4.28E+09	-0.792
1003.226	456052	e	1	555730	o	1	-1.70	1.32E+08	0.085
1004.084	235967	e	2	335560	o	2	-0.07	5.65E+09	-0.619
1004.938	238765	e	1	338274	o	1	-0.79	1.06E+09	-0.774
1007.587	456052	e	1	555299	o	2	-3.09	5.34E+06	-0.007
1008.122	235967	e	2	335161	o	3	-1.22	4.01E+08	0.040
1008.779	461418	e	5	560547	o	4	-3.69	1.34E+06	-0.001
1010.661	461643	e	4	560588	o	3	-2.72	1.25E+07	-0.015
1011.075	461643	e	4	560547	o	4	-1.52	1.98E+08	-0.022
1012.564	461829	e	2	560588	o	3	-2.00	6.47E+07	-0.035
1015.703	461643	e	4	560097	o	3	-2.93	7.66E+06	0.009
1016.668	241935	e	2	340296	o	2	-0.01	6.31E+09	0.737
1016.938	461815	e	1	560149	o	1	-1.34	2.97E+08	-0.028
1017.079	461829	e	2	560149	o	1	-3.55	1.80E+06	0.001
1017.096	456052	e	1	554371	o	2	0.11	8.24E+09	0.557
1017.624	461829	e	2	560097	o	3	-1.42	2.45E+08	0.012
1018.126	461815	e	1	560035	o	2	-1.78	1.08E+08	0.008
1018.267	461829	e	2	560035	o	2	-2.20	4.05E+07	0.009
1019.887	461418	e	5	559468	o	5	-1.58	1.71E+08	-0.025
1019.934	461418	e	5	559463	o	4	-3.30	3.26E+06	-0.025
1021.877	456052	e	1	553911	o	1	0.15	8.95E+09	0.832
1022.234	461643	e	4	559468	o	5	-0.69	1.31E+09	0.022
1022.281	461643	e	4	559463	o	4	-2.18	4.22E+07	-0.006
1024.538	241935	e	2	339540	o	1	-0.97	6.83E+08	-0.214
1028.530	463362	e	3	560588	o	3	-2.90	8.02E+06	-0.002
1028.959	463362	e	3	560547	o	4	-0.98	6.56E+08	0.032
1030.267	461815	e	1	558877	o	2	-2.33	2.92E+07	0.002
1030.412	461829	e	2	558877	o	2	-2.42	2.40E+07	0.001
1033.107	238765	e	1	335560	o	2	-0.68	1.31E+09	0.821
1033.752	463362	e	3	560097	o	3	-2.23	3.71E+07	-0.002
1034.415	463362	e	3	560035	o	2	-3.84	8.91E+05	0.001
1035.504	234219	e	3	330791	o	2	-2.15	4.45E+07	0.081
1036.155	464077	e	3	560588	o	3	-0.50	1.95E+09	-0.169
1036.590	464077	e	3	560547	o	4	-3.03	5.84E+06	0.000
1038.009	241935	e	2	338274	o	1	-0.14	4.54E+09	0.859
1039.296	576226	e	4	672445	o	3	-3.47	2.12E+06	-0.007
1039.594	463958	e	0	560149	o	1	-0.38	2.59E+09	0.723
1040.566	463362	e	3	559463	o	4	-1.35	2.75E+08	0.078
1041.454	464077	e	3	560097	o	3	-2.26	3.40E+07	-0.005
1042.127	464077	e	3	560035	o	2	-1.65	1.38E+08	0.084
1042.949	464706	e	4	560588	o	3	-2.12	4.63E+07	0.065
1043.389	464706	e	4	560547	o	4	-0.68	1.28E+09	0.088
1045.713	234219	e	3	329848	o	4	0.44	1.67E+10	0.881
1046.950	463362	e	3	558877	o	2	-2.43	2.27E+07	-0.007
1047.152	464652	e	2	560149	o	1	-2.29	3.15E+07	-0.012
1047.730	464652	e	2	560097	o	3	-0.23	3.62E+09	0.121
1048.318	464706	e	4	560097	o	3	-1.86	8.33E+07	-0.039
1048.371	464077	e	3	559463	o	4	0.23	1.02E+10	0.227
1048.411	464652	e	2	560035	o	2	-1.20	3.87E+08	0.030
1049.355	464853	e	1	560149	o	1	-0.18	4.05E+09	0.520
1050.057	241935	e	2	337168	o	3	-0.11	4.66E+09	-0.862
1050.620	464853	e	1	560035	o	2	-1.97	6.48E+07	-0.014
1052.787	577459	e	3	672445	o	3	-3.22	3.65E+06	0.048
1054.590	235967	e	2	330791	o	2	-0.35	2.69E+09	0.851
1055.276	464706	e	4	559468	o	5	-0.10	4.78E+09	-0.098

Table 2. continued.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
1055.327	464706	e	4	559463	o	4	-1.58	1.58E+08	-0.051
1058.845	461418	e	5	555860	o	4	-1.91	7.28E+07	-0.237
1058.932	461418	e	5	555852	o	5	0.21	9.75E+09	-0.889
1059.536	461418	e	5	555798	o	4	-0.81	9.16E+08	0.717
1060.782	461643	e	4	555913	o	3	-0.92	7.10E+08	0.702
1061.291	464652	e	2	558877	o	2	-0.94	6.86E+08	-0.059
1061.375	461643	e	4	555860	o	4	0.13	7.94E+09	-0.840
1061.462	461643	e	4	555852	o	5	-1.21	3.65E+08	-0.018
1062.069	461643	e	4	555798	o	4	-0.84	8.53E+08	0.231
1062.878	461829	e	2	555913	o	3	-1.14	4.33E+08	-0.096
1063.554	464853	e	1	558877	o	2	0.41	1.51E+10	0.881
1064.789	461815	e	1	555730	o	1	0.06	6.73E+09	0.742
1064.943	461829	e	2	555730	o	1	-1.51	1.81E+08	0.118
1066.013	466780	e	3	560588	o	3	-0.30	2.93E+09	-0.266
1066.473	466780	e	3	560547	o	4	-1.74	1.08E+08	0.004
1067.299	461643	e	4	555337	o	3	-1.80	9.33E+07	-0.231
1067.558	234219	e	3	327891	o	3	-0.34	2.69E+09	0.838
1068.090	241935	e	2	335560	o	2	-0.36	2.54E+09	-0.269
1069.420	461829	e	2	555337	o	3	0.40	1.46E+10	0.582
1069.703	461815	e	1	555299	o	2	0.26	1.06E+10	0.678
1069.859	461829	e	2	555299	o	2	-0.26	3.18E+09	0.630
1071.623	466780	e	3	560097	o	3	-2.07	4.94E+07	-0.007
1072.125	461418	e	5	554690	o	5	-0.73	1.09E+09	0.921
1072.335	466780	e	3	560035	o	2	-1.70	1.15E+08	0.071
1072.495	461418	e	5	554658	o	6	1.04	6.35E+10	0.923
1072.661	241935	e	2	335161	o	3	0.10	7.24E+09	0.631
1072.950	467387	e	4	560588	o	3	-1.54	1.66E+08	-0.219
1073.416	467387	e	4	560547	o	4	-0.09	4.73E+09	-0.345
1073.881	467029	e	1	560149	o	1	-0.33	2.74E+09	-0.481
1074.719	461643	e	4	554690	o	5	0.94	5.02E+10	0.930
1075.205	467029	e	1	560035	o	2	0.44	1.61E+10	0.926
1078.633	467387	e	4	560097	o	3	-1.53	1.71E+08	0.086
1078.948	466780	e	3	559463	o	4	0.75	3.22E+10	0.937
1080.427	461815	e	1	554371	o	2	-0.62	1.36E+09	0.128
1080.484	463362	e	3	555913	o	3	-0.59	1.47E+09	0.267
1080.586	461829	e	2	554371	o	2	0.28	1.08E+10	-0.734
1081.100	463362	e	3	555860	o	4	-1.46	1.99E+08	-0.027
1081.820	463362	e	3	555798	o	4	0.66	2.60E+10	0.748
1085.823	461815	e	1	553911	o	1	-1.06	4.95E+08	-0.130
1085.984	461829	e	2	553911	o	1	-0.12	4.27E+09	-0.891
1086.002	467387	e	4	559468	o	5	0.91	4.64E+10	0.942
1086.055	467387	e	4	559463	o	4	-0.71	1.09E+09	0.302
1086.653	238765	e	1	330791	o	2	-0.02	5.37E+09	0.591
1087.246	463362	e	3	555337	o	3	0.41	1.45E+10	-0.831
1087.699	463362	e	3	555299	o	2	-0.72	1.07E+09	-0.717
1087.855	235967	e	2	327891	o	3	0.18	8.56E+09	0.667
1088.235	468696	e	2	560588	o	3	-0.21	3.47E+09	-0.169
1088.755	467029	e	1	558877	o	2	-0.72	1.09E+09	0.213
1088.901	464077	e	3	555913	o	3	0.03	5.98E+09	0.621
1089.491	235967	e	2	327753	o	1	-0.15	4.01E+09	0.885
1089.526	464077	e	3	555860	o	4	0.68	2.71E+10	-0.788
1089.653	463958	e	0	555730	o	1	-0.18	3.71E+09	0.908
1089.918	580695	e	3	672445	o	3	-3.95	6.33E+05	0.027
1090.258	464077	e	3	555798	o	4	-0.95	6.28E+08	-0.054
1092.089	238765	e	1	330333	o	0	-0.52	1.69E+09	0.896
1093.452	468696	e	2	560149	o	1	-1.42	2.13E+08	0.098
1094.082	468696	e	2	560097	o	3	0.57	2.08E+10	-0.936
1095.764	464652	e	2	555913	o	3	0.51	1.78E+10	0.809
1095.769	464077	e	3	555337	o	3	-0.97	5.95E+08	0.140
1096.229	464077	e	3	555299	o	2	-1.06	4.90E+08	-0.367
1096.407	464706	e	4	555913	o	3	-1.88	7.23E+07	-0.061
1097.041	464706	e	4	555860	o	4	-2.13	4.15E+07	-0.005
1097.134	464706	e	4	555852	o	5	0.84	3.82E+10	0.851
1097.783	464706	e	4	555798	o	4	0.30	1.10E+10	-0.867
1097.960	464652	e	2	555730	o	1	-0.75	9.86E+08	-0.394

Table 2. continued.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
1098.789	463362	e	3	554371	o	2	-0.36	2.44E+09	0.882
1100.094	469686	e	3	560588	o	3	-0.45	1.96E+09	0.304
1100.382	464853	e	1	555730	o	1	-3.40	2.18E+06	0.000
1100.585	469686	e	3	560547	o	4	0.80	3.50E+10	0.957
1102.559	469890	e	2	560588	o	3	0.61	2.22E+10	0.948
1102.719	464652	e	2	555337	o	3	-0.69	1.12E+09	0.054
1103.185	464652	e	2	555299	o	2	0.11	7.02E+09	-0.562
1103.370	464706	e	4	555337	o	3	-0.58	1.44E+09	0.824
1105.631	464853	e	1	555299	o	2	-2.36	2.40E+07	-0.003
1106.070	469686	e	3	560097	o	3	0.09	6.71E+09	-0.540
1106.684	574389	e	1	664749	o	1	-3.37	2.31E+06	-0.014
1106.829	469686	e	3	560035	o	2	-1.17	3.64E+08	-0.221
1107.495	464077	e	3	554371	o	2	-1.67	1.18E+08	-0.225
1107.914	469890	e	2	560149	o	1	-0.94	6.31E+08	0.651
1108.402	582225	e	3	672445	o	3	-3.57	1.48E+06	-0.025
1108.561	469890	e	2	560097	o	3	-0.70	1.09E+09	-0.142
1108.877	468696	e	2	558877	o	2	-0.09	4.41E+09	0.567
1109.324	469890	e	2	560035	o	2	0.08	6.55E+09	-0.918
1109.422	582308	e	2	672445	o	3	-3.24	3.10E+06	0.096
1111.303	464706	e	4	554690	o	5	-0.50	1.71E+09	0.072
1111.692	463958	e	0	553911	o	1	-1.04	4.93E+08	0.111
1113.875	469686	e	3	559463	o	4	-2.80	8.51E+06	0.001
1114.595	464652	e	2	554371	o	2	-0.71	1.06E+09	-0.114
1116.949	234219	e	3	323749	o	2	0.14	7.48E+09	0.887
1117.091	464853	e	1	554371	o	2	-1.28	2.78E+08	-0.020
1120.339	464652	e	2	553911	o	1	-1.92	6.32E+07	0.024
1121.193	469686	e	3	558877	o	2	-1.09	4.35E+08	0.326
1121.925	466780	e	3	555913	o	3	-0.18	3.51E+09	-0.328
1122.589	466780	e	3	555860	o	4	0.12	7.00E+09	0.192
1122.861	464853	e	1	553911	o	1	-0.83	7.77E+08	-0.156
1123.366	466780	e	3	555798	o	4	-2.60	1.32E+07	0.001
1123.746	238765	e	1	327753	o	1	-0.94	6.07E+08	-0.291
1123.753	469890	e	2	558877	o	2	-0.83	7.76E+08	0.364
1123.924	576963	e	3	665937	o	3	-2.86	7.22E+06	0.033
1125.424	241935	e	2	330791	o	2	-1.19	3.41E+08	-0.566
1127.382	467029	e	1	555730	o	1	-1.15	3.75E+08	-0.061
1129.217	466780	e	3	555337	o	3	-3.10	4.17E+06	-0.001
1129.612	467387	e	4	555913	o	3	-1.96	5.76E+07	-0.049
1129.706	466780	e	3	555299	o	2	-1.11	4.07E+08	0.297
1129.931	574389	e	1	662890	o	2	-3.05	4.69E+06	0.014
1130.224	577459	e	3	665937	o	3	-3.74	9.47E+05	-0.011
1130.285	467387	e	4	555860	o	4	-2.00	5.28E+07	0.007
1130.383	467387	e	4	555852	o	5	-0.21	3.20E+09	0.077
1131.072	467387	e	4	555798	o	4	-0.29	2.66E+09	-0.228
1132.892	467029	e	1	555299	o	2	-2.35	2.35E+07	-0.002
1134.366	574389	e	1	662544	o	0	-2.81	8.11E+06	-0.069
1137.004	467387	e	4	555337	o	3	-1.14	3.77E+08	0.240
1139.187	235967	e	2	323749	o	2	-1.34	2.34E+08	-0.101
1141.674	466780	e	3	554371	o	2	-3.35	2.29E+06	0.007
1144.927	467029	e	1	554371	o	2	-3.61	1.26E+06	0.000
1145.429	467387	e	4	554690	o	5	-1.16	3.49E+08	-0.014
1146.567	468696	e	2	555913	o	3	-0.40	2.02E+09	0.089
1148.971	468696	e	2	555730	o	1	-1.94	5.81E+07	-0.029
1150.989	467029	e	1	553911	o	1	-2.32	2.42E+07	-0.009
1154.184	468696	e	2	555337	o	3	-1.22	3.01E+08	0.022
1154.694	468696	e	2	555299	o	2	-0.84	7.21E+08	-0.065
1159.739	469686	e	3	555913	o	3	-2.98	5.22E+06	-0.001
1160.448	469686	e	3	555860	o	4	-2.06	4.28E+07	-0.002
1161.278	469686	e	3	555798	o	4	-1.19	3.20E+08	-0.018
1162.478	469890	e	2	555913	o	3	-1.17	3.33E+08	0.020
1163.389	241935	e	2	327891	o	3	-1.19	3.16E+08	0.044
1163.779	576963	e	3	662890	o	2	-3.29	2.56E+06	0.024
1164.950	469890	e	2	555730	o	1	-3.08	4.11E+06	0.005
1165.259	241935	e	2	327753	o	1	-1.13	3.64E+08	-0.361
1166.480	574389	e	1	660117	o	1	-2.36	2.15E+07	-0.100

Table 2. continued.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
1167.200	468696	e	2	554371	o	2	-1.38	2.07E+08	-0.034
1167.533	469686	e	3	555337	o	3	-1.55	1.37E+08	0.018
1168.055	469686	e	3	555299	o	2	-3.03	4.51E+06	0.003
1170.309	469890	e	2	555337	o	3	-1.51	1.52E+08	0.049
1170.535	577459	e	3	662890	o	2	-3.52	1.47E+06	-0.020
1170.834	469890	e	2	555299	o	2	-1.57	1.30E+08	-0.021
1173.131	580695	e	3	665937	o	3	-3.55	1.37E+06	-0.069
1173.501	468696	e	2	553911	o	1	-2.75	8.59E+06	-0.006
1176.692	238765	e	1	323749	o	2	-2.21	3.00E+07	0.091
1180.854	469686	e	3	554371	o	2	-2.42	1.82E+07	-0.018
1183.694	469890	e	2	554371	o	2	-1.60	1.19E+08	-0.078
1189.881	588403	e	2	672445	o	3	-2.70	9.33E+06	0.119
1190.174	469890	e	2	553911	o	1	-2.89	6.13E+06	-0.030
1192.805	574389	e	1	658225	o	2	-2.23	2.78E+07	-0.077
1194.572	582225	e	3	665937	o	3	-2.61	1.13E+07	0.091
1195.757	582308	e	2	665937	o	3	-2.54	1.35E+07	0.151
1208.445	574389	e	1	657140	o	1	-3.47	1.54E+06	0.003
1212.989	582308	e	2	664749	o	1	-3.97	4.83E+05	-0.009
1216.619	580695	e	3	662890	o	2	-3.39	1.84E+06	-0.086
1222.289	241935	e	2	323749	o	2	-1.61	1.11E+08	0.220
1230.587	576963	e	3	658225	o	2	-2.64	1.00E+07	-0.081
1238.145	577459	e	3	658225	o	2	-3.05	3.93E+06	-0.034
1239.695	582225	e	3	662890	o	2	-2.69	8.83E+06	0.109
1240.972	582308	e	2	662890	o	2	-2.83	6.47E+06	0.055
1247.278	555798	o	4	635973	e	3	-3.75	7.66E+05	-0.092
1256.708	592872	e	2	672445	o	3	-2.71	8.23E+06	-0.145
1275.982	574389	e	1	652760	o	1	-2.21	2.50E+07	0.075
1289.757	588403	e	2	665937	o	3	-3.75	7.10E+05	-0.042
1289.823	580695	e	3	658225	o	2	-2.85	5.64E+06	-0.128
1315.789	582225	e	3	658225	o	2	-3.12	2.95E+06	0.027
1317.228	582308	e	2	658225	o	2	-2.30	1.94E+07	0.092
1328.565	456052	e	1	531321	o	2	-3.02	3.59E+06	0.012
1333.760	574389	e	1	649365	o	1	-2.78	6.18E+06	0.017
1335.538	456052	e	1	530928	o	1	-2.62	9.01E+06	0.045
1336.327	582308	e	2	657140	o	1	-2.15	2.67E+07	0.320
1336.970	588094	e	3	662890	o	2	-3.00	3.78E+06	0.106
1342.516	588403	e	2	662890	o	2	-3.92	4.43E+05	0.011
1361.949	456052	e	1	529476	o	1	-2.04	3.28E+07	-0.053
1368.644	592872	e	2	665937	o	3	-3.50	1.13E+06	0.093
1377.919	456052	e	1	528625	o	2	-3.37	1.48E+06	0.110
1386.882	456052	e	1	528156	o	0	-1.59	8.90E+07	0.129
1391.266	592872	e	2	664749	o	1	-2.89	4.47E+06	-0.137
1394.428	588403	e	2	660117	o	1	-2.94	3.90E+06	-0.106
1401.110	574389	e	1	645761	o	2	-3.55	9.68E+05	0.026
1414.207	574389	e	1	645100	o	2	-3.04	3.01E+06	0.065
1422.046	456052	e	1	526373	o	2	-1.85	4.62E+07	0.212
1425.903	588094	e	3	658225	o	2	-3.02	3.14E+06	-0.110
1428.204	592872	e	2	662890	o	2	-2.91	4.04E+06	-0.138
1430.349	522959	o	2	592872	e	2	-1.74	5.95E+07	0.050
1430.615	592644	e	1	662544	o	0	-3.30	1.62E+06	-0.132
1431.721	490742	e	3	560588	o	3	-3.70	6.44E+05	0.636
1432.213	588403	e	2	658225	o	2	-3.00	3.24E+06	0.076
1432.552	490742	e	3	560547	o	4	-2.41	1.26E+07	0.775
1435.029	522959	o	2	592644	e	1	-2.51	1.01E+07	-0.031
1438.723	461815	e	1	531321	o	2	-2.80	5.12E+06	0.005
1441.859	490742	e	3	560097	o	3	-3.33	1.51E+06	-0.079
1443.185	456052	e	1	525343	o	1	-0.91	3.95E+08	0.319
1446.904	461815	e	1	530928	o	1	-3.26	1.74E+06	-0.002
1447.429	574389	e	1	643477	o	1	-3.46	1.09E+06	0.047
1453.531	576963	e	3	645761	o	2	-2.79	5.11E+06	0.032
1455.477	491443	e	2	560149	o	1	-2.96	3.46E+06	-0.320
1456.594	491443	e	2	560097	o	3	-2.25	1.75E+07	0.689
1456.876	524232	o	3	592872	e	2	-2.18	2.08E+07	-0.003
1457.911	491443	e	2	560035	o	2	-3.74	5.72E+05	0.059
1460.485	461643	e	4	530113	o	3	-1.88	4.09E+07	-0.006

Table 2. continued.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
1464.086	577459	e	3	645761	o	2	-1.28	1.63E+08	0.371
1464.461	461829	e	2	530113	o	3	-1.70	6.20E+07	-0.135
1467.631	576963	e	3	645100	o	2	-2.57	8.38E+06	0.050
1471.467	463362	e	3	531321	o	2	-1.98	3.21E+07	0.016
1477.954	461815	e	1	529476	o	1	-1.22	1.84E+08	0.113
1478.251	461829	e	2	529476	o	1	-2.58	8.08E+06	-0.016
1478.393	577459	e	3	645100	o	2	-1.29	1.55E+08	0.332
1480.845	525343	o	1	592872	e	2	-1.13	2.26E+08	-0.089
1481.525	576226	e	4	643724	o	3	-1.93	3.61E+07	0.132
1482.074	592644	e	1	660117	o	1	-3.40	1.20E+06	0.109
1482.936	491443	e	2	558877	o	2	-2.82	4.59E+06	-0.531
1485.862	525343	o	1	592644	e	1	-1.42	1.16E+08	0.097
1487.122	464077	e	3	531321	o	2	-2.14	2.21E+07	0.010
1491.269	582308	e	2	649365	o	1	-2.01	2.91E+07	-0.370
1492.515	574389	e	1	641390	o	2	-3.63	7.10E+05	0.028
1493.204	463958	e	0	530928	o	1	-1.81	4.69E+07	0.117
1494.607	456052	e	1	522959	o	2	-0.33	1.40E+09	0.693
1496.780	461815	e	1	528625	o	2	-1.64	6.81E+07	0.189
1497.084	461829	e	2	528625	o	2	-3.65	6.72E+05	0.004
1497.880	576963	e	3	643724	o	3	-2.49	9.67E+06	-0.047
1498.096	463362	e	3	530113	o	3	-1.41	1.15E+08	-0.073
1499.952	464652	e	2	531321	o	2	-0.98	3.13E+08	0.099
1503.782	526373	o	2	592872	e	2	-2.08	2.48E+07	0.006
1504.477	464853	e	1	531321	o	2	-1.00	2.95E+08	0.397
1507.361	461815	e	1	528156	o	0	-2.00	2.93E+07	0.048
1508.846	464652	e	2	530928	o	1	-1.80	4.63E+07	0.028
1508.956	526373	o	2	592644	e	1	-1.16	2.05E+08	0.101
1509.092	577459	e	3	643724	o	3	-2.36	1.27E+07	0.052
1513.425	464853	e	1	530928	o	1	-1.41	1.14E+08	0.382
1514.326	464077	e	3	530113	o	3	-1.59	7.54E+07	0.047
1515.841	526902	o	3	592872	e	2	-1.62	7.00E+07	0.040
1526.296	463958	e	0	529476	o	1	-1.46	9.94E+07	0.537
1528.024	522959	o	2	588403	e	2	-2.08	2.36E+07	0.026
1528.881	464706	e	4	530113	o	3	-0.65	6.34E+08	0.119
1530.152	592872	e	2	658225	o	2	-3.53	8.41E+05	-0.027
1532.252	463362	e	3	528625	o	2	-1.60	7.06E+07	0.134
1532.346	461643	e	4	526902	o	3	-1.33	1.34E+08	0.151
1535.273	522959	o	2	588094	e	3	0.09	3.51E+09	-0.776
1535.667	490742	e	3	555860	o	4	-3.50	8.92E+05	0.442
1536.724	461829	e	2	526902	o	3	-0.53	8.27E+08	0.817
1536.901	580695	e	3	645761	o	2	-2.83	4.20E+06	0.018
1537.121	490742	e	3	555798	o	4	-2.00	2.84E+07	0.695
1541.761	495288	e	1	560149	o	1	-3.11	2.19E+06	-0.673
1542.643	464652	e	2	529476	o	1	-2.92	3.35E+06	0.003
1543.496	576067	e	5	640855	o	4	-3.88	3.64E+05	0.002
1544.492	495288	e	1	560035	o	2	-2.29	1.44E+07	0.766
1546.073	495908	e	2	560588	o	3	-3.22	1.67E+06	-0.545
1547.293	576226	e	4	640855	o	4	-3.82	4.16E+05	0.006
1547.429	464853	e	1	529476	o	1	-0.53	8.25E+08	-0.692
1548.098	490742	e	3	555337	o	3	-2.27	1.51E+07	-0.688
1548.992	461815	e	1	526373	o	2	-0.91	3.43E+08	0.423
1549.016	490742	e	3	555299	o	2	-3.65	6.27E+05	-0.516
1549.235	464077	e	3	528625	o	2	-0.73	5.16E+08	0.116
1549.319	461829	e	2	526373	o	2	-2.05	2.49E+07	0.026
1549.408	466780	e	3	531321	o	2	-1.45	9.92E+07	0.038
1550.676	528156	o	0	592644	e	1	-0.60	7.01E+08	-0.799
1551.123	491443	e	2	555913	o	3	-3.23	1.62E+06	0.109
1552.144	576963	e	3	641390	o	2	-3.38	1.16E+06	0.009
1552.674	580695	e	3	645100	o	2	-3.47	9.45E+05	0.003
1555.406	467029	e	1	531321	o	2	-1.28	1.44E+08	-0.191
1555.527	491443	e	2	555730	o	1	-3.71	5.32E+05	0.069
1556.493	528625	o	2	592872	e	2	-0.54	7.89E+08	-0.423
1556.624	495908	e	2	560149	o	1	-3.08	2.29E+06	-0.276
1557.902	495908	e	2	560097	o	3	-2.82	4.12E+06	-0.296
1558.336	524232	o	3	588403	e	2	0.10	3.47E+09	-0.702

Table 2. continued.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
1562.036	528625	o	2	592644	e	1	-0.07	2.34E+09	-0.888
1563.164	464652	e	2	528625	o	2	-1.46	9.52E+07	0.087
1564.186	577459	e	3	641390	o	2	-2.98	2.86E+06	-0.028
1564.972	467029	e	1	530928	o	1	-0.51	8.45E+08	0.566
1565.097	491443	e	2	555337	o	3	-3.18	1.79E+06	-0.119
1565.876	524232	o	3	588094	e	3	-0.41	1.05E+09	-0.759
1566.036	491443	e	2	555299	o	2	-3.17	1.85E+06	-0.197
1568.079	464853	e	1	528625	o	2	-2.17	1.83E+07	-0.164
1571.605	490742	e	3	554371	o	2	-2.81	4.24E+06	0.662
1572.606	495288	e	1	558877	o	2	-3.52	8.09E+05	0.582
1573.802	463362	e	3	526902	o	3	-0.03	2.49E+09	0.880
1573.998	461418	e	5	524950	o	4	0.40	6.73E+09	0.878
1574.107	461815	e	1	525343	o	1	-0.51	8.32E+08	0.633
1574.444	461829	e	2	525343	o	1	-1.43	9.98E+07	0.073
1575.970	582308	e	2	645761	o	2	-2.94	3.07E+06	0.011
1577.387	577459	e	3	640855	o	4	-2.59	6.82E+06	-0.046
1577.387	529476	o	1	592872	e	2	-0.21	1.65E+09	0.868
1578.961	466780	e	3	530113	o	3	-1.18	1.77E+08	0.108
1579.594	461643	e	4	524950	o	4	-0.88	3.50E+08	-0.898
1579.696	464853	e	1	528156	o	0	-0.85	3.77E+08	0.771
1579.729	577553	e	4	640855	o	4	-3.09	2.15E+06	0.009
1583.080	529476	o	1	592644	e	1	-1.51	8.17E+07	-0.418
1583.682	524950	o	4	588094	e	3	0.33	5.69E+09	-0.890
1585.791	525343	o	1	588403	e	2	-0.20	1.68E+09	-0.791
1586.571	580695	e	3	643724	o	3	-3.05	2.37E+06	0.018
1587.014	463362	e	3	526373	o	2	-2.01	2.62E+07	0.019
1588.073	495908	e	2	558877	o	2	-3.35	1.18E+06	0.253
1589.128	491443	e	2	554371	o	2	-3.62	6.28E+05	0.101
1590.457	582225	e	3	645100	o	2	-3.96	2.92E+05	-0.001
1591.723	464077	e	3	526902	o	3	-1.33	1.23E+08	-0.185
1592.560	582308	e	2	645100	o	2	-3.40	1.05E+06	-0.004
1593.397	530113	o	3	592872	e	2	0.20	4.18E+09	0.904
1594.228	467387	e	4	530113	o	3	0.26	4.72E+09	-0.921
1596.801	468696	e	2	531321	o	2	-0.53	7.75E+08	-0.305
1597.715	461643	e	4	524232	o	3	0.26	4.79E+09	0.862
1598.236	576067	e	5	638636	o	4	-3.53	7.82E+05	0.010
1600.830	491443	e	2	553911	o	1	-3.06	2.25E+06	0.587
1601.361	467029	e	1	529476	o	1	-1.08	2.15E+08	0.373
1602.307	576226	e	4	638636	o	4	-2.96	2.86E+06	0.035
1602.474	461829	e	2	524232	o	3	-1.39	1.06E+08	-0.422
1605.240	464077	e	3	526373	o	2	0.00	2.57E+09	-0.782
1606.431	464652	e	2	526902	o	3	-2.91	3.17E+06	-0.005
1606.885	468696	e	2	530928	o	1	-0.33	1.21E+09	-0.749
1607.813	464706	e	4	526902	o	3	0.12	3.40E+09	0.916
1612.123	526373	o	2	588403	e	2	0.04	2.82E+09	0.821
1614.361	530928	o	1	592872	e	2	-1.39	1.04E+08	0.148
1616.951	466780	e	3	528625	o	2	0.08	3.09E+09	0.912
1620.194	526373	o	2	588094	e	3	-2.40	1.02E+07	0.013
1620.199	464652	e	2	526373	o	2	-0.26	1.40E+09	0.610
1620.325	530928	o	1	592644	e	1	-0.23	1.52E+09	0.748
1621.455	576963	e	3	638636	o	4	-2.36	1.11E+07	0.065
1622.465	469686	e	3	531321	o	2	0.05	2.86E+09	0.926
1623.485	467029	e	1	528625	o	2	-1.75	4.46E+07	0.118
1623.682	463362	e	3	524950	o	4	-1.16	1.74E+08	0.276
1624.669	531321	o	2	592872	e	2	-0.06	2.18E+09	0.672
1625.480	464853	e	1	526373	o	2	-2.59	6.47E+06	-0.013
1625.990	526902	o	3	588403	e	2	-0.44	9.24E+08	-0.612
1626.043	582225	e	3	643724	o	3	-3.08	2.10E+06	0.009
1627.832	469890	e	2	531321	o	2	-0.67	5.36E+08	-0.476
1628.208	468696	e	2	530113	o	3	-2.06	2.18E+07	0.037
1628.240	582308	e	2	643724	o	3	-2.76	4.34E+06	-0.040
1629.060	463958	e	0	525343	o	1	-0.75	4.47E+08	-0.881
1630.710	531321	o	2	592644	e	1	-0.60	6.36E+08	-0.782
1634.201	526902	o	3	588094	e	3	0.05	2.77E+09	0.709
1634.601	577459	e	3	638636	o	4	-2.59	6.43E+06	-0.034

Table 2. continued.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
1634.815	582308	e	2	643477	o	1	-3.83	3.67E+05	-0.003
1635.481	461815	e	1	522959	o	2	-0.92	3.01E+08	-0.615
1635.845	461829	e	2	522959	o	2	-0.13	1.84E+09	0.684
1635.941	467029	e	1	528156	o	0	-0.75	4.48E+08	0.692
1637.117	577553	e	4	638636	o	4	-2.30	1.26E+07	-0.079
1638.313	469890	e	2	530928	o	1	-0.47	8.52E+08	0.809
1642.764	464077	e	3	524950	o	4	-2.42	9.41E+06	0.085
1642.835	463362	e	3	524232	o	3	-0.80	3.88E+08	-0.422
1644.115	576963	e	3	637786	o	3	-2.94	2.83E+06	0.013
1645.273	468696	e	2	529476	o	1	-0.61	6.11E+08	0.649
1647.696	464652	e	2	525343	o	1	-0.44	8.84E+08	0.533
1653.158	464853	e	1	525343	o	1	-1.91	3.03E+07	0.031
1654.484	495288	e	1	555730	o	1	-2.99	2.50E+06	-0.619
1654.900	469686	e	3	530113	o	3	-0.37	1.03E+09	-0.561
1659.908	464706	e	4	524950	o	4	-0.29	1.23E+09	0.964
1660.219	577553	e	4	637786	o	3	-3.53	7.16E+05	-0.004
1660.484	469890	e	2	530113	o	3	-1.23	1.42E+08	0.675
1662.234	580695	e	3	640855	o	4	-2.77	4.11E+06	-0.091
1662.372	464077	e	3	524232	o	3	-0.49	7.76E+08	-0.639
1663.290	466780	e	3	526902	o	3	-2.36	1.06E+07	0.024
1666.378	495288	e	1	555299	o	2	-3.04	2.21E+06	-0.216
1666.528	495908	e	2	555913	o	3	-2.69	4.92E+06	-0.587
1668.636	468696	e	2	528625	o	2	-1.86	3.32E+07	-0.026
1671.612	495908	e	2	555730	o	1	-2.88	3.13E+06	0.548
1672.856	528625	o	2	588403	e	2	-1.12	1.82E+08	0.115
1673.892	581114	e	4	640855	o	4	-2.76	4.13E+06	-0.032
1677.926	463362	e	3	522959	o	2	-0.43	8.72E+08	0.410
1678.055	466780	e	3	526373	o	2	-1.09	1.94E+08	0.064
1678.235	469890	e	2	529476	o	1	-0.72	4.48E+08	0.881
1678.421	464652	e	2	524232	o	3	-1.17	1.60E+08	0.317
1679.930	464706	e	4	524232	o	3	-2.64	5.38E+06	0.001
1680.240	467387	e	4	526902	o	3	-0.99	2.45E+08	0.083
1682.669	495908	e	2	555337	o	3	-3.85	3.32E+05	0.042
1683.754	495908	e	2	555299	o	2	-2.96	2.60E+06	0.492
1684.948	522959	o	2	582308	e	2	-2.69	4.84E+06	0.008
1685.093	467029	e	1	526373	o	2	-1.99	2.40E+07	-0.040
1687.308	522959	o	2	582225	e	3	-1.84	3.37E+07	-0.012
1689.732	574389	e	1	633570	o	0	-3.47	7.98E+05	0.068
1696.681	469686	e	3	528625	o	2	-2.82	3.52E+06	-0.004
1697.015	529476	o	1	588403	e	2	-1.13	1.72E+08	-0.100
1698.312	464077	e	3	522959	o	2	-3.60	5.88E+05	0.002
1702.551	469890	e	2	528625	o	2	-0.48	7.60E+08	0.640
1705.350	576963	e	3	635602	o	3	-3.98	2.44E+05	0.006
1705.611	582225	e	3	640855	o	4	-1.88	3.01E+07	-0.135
1714.857	467029	e	1	525343	o	1	-1.58	5.99E+07	-0.066
1715.066	464652	e	2	522959	o	2	-1.83	3.38E+07	-0.027
1715.560	530113	o	3	588403	e	2	-3.26	1.26E+06	0.000
1718.030	468696	e	2	526902	o	3	-1.97	2.41E+07	0.058
1719.105	466780	e	3	524950	o	4	-2.24	1.30E+07	-0.241
1719.897	577459	e	3	635602	o	3	-3.45	7.97E+05	-0.056
1720.984	464853	e	1	522959	o	2	-1.22	1.35E+08	-0.167
1721.556	576067	e	5	634154	o	4	-3.91	2.77E+05	0.027
1721.882	524232	o	3	582308	e	2	-2.92	2.73E+06	0.004
1724.043	495908	e	2	553911	o	1	-3.69	4.57E+05	-0.199
1724.346	524232	o	3	582225	e	3	-1.65	5.01E+07	-0.008
1724.703	530113	o	3	588094	e	3	-1.83	3.29E+07	-0.023
1725.894	580695	e	3	638636	o	4	-2.49	7.22E+06	-0.107
1732.022	522959	o	2	580695	e	3	-2.69	4.53E+06	0.021
1733.787	468696	e	2	526373	o	2	-1.00	2.20E+08	0.107
1737.218	467387	e	4	524950	o	4	-0.83	3.23E+08	0.279
1739.887	530928	o	1	588403	e	2	-2.21	1.35E+07	0.026
1740.590	466780	e	3	524232	o	3	-0.76	3.79E+08	0.303
1743.436	588403	e	2	645761	o	2	-2.73	4.13E+06	0.054
1745.962	524950	o	4	582225	e	3	-1.89	2.82E+07	0.033
1747.366	574389	e	1	631618	o	1	-3.07	1.87E+06	0.062

Table 2. continued.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
1747.775	469686	e	3	526902	o	3	-1.49	7.07E+07	-0.062
1748.527	576963	e	3	634154	o	4	-2.40	8.68E+06	0.117
1751.866	531321	o	2	588403	e	2	-2.80	3.48E+06	-0.001
1754.004	469890	e	2	526902	o	3	-2.04	1.98E+07	0.234
1755.464	525343	o	1	582308	e	2	-2.43	7.97E+06	0.005
1758.025	524232	o	3	581114	e	4	-1.98	2.25E+07	0.001
1759.160	467387	e	4	524232	o	3	-2.43	8.06E+06	-0.002
1761.401	531321	o	2	588094	e	3	-2.23	1.26E+07	0.016
1763.015	592644	e	1	649365	o	1	-2.81	3.33E+06	0.173
1763.762	588403	e	2	645100	o	2	-2.04	1.97E+07	0.321
1764.085	469686	e	3	526373	o	2	-2.79	3.49E+06	-0.002
1766.753	577553	e	4	634154	o	4	-2.53	6.26E+06	-0.147
1770.131	592872	e	2	649365	o	1	-2.02	2.04E+07	-0.323
1770.432	469890	e	2	526373	o	2	-2.42	8.17E+06	-0.007
1771.071	524232	o	3	580695	e	3	-1.47	7.30E+07	-0.024
1772.704	582225	e	3	638636	o	4	-1.93	2.51E+07	-0.107
1776.357	576963	e	3	633258	o	3	-2.48	7.08E+06	-0.094
1779.961	576963	e	3	633144	o	2	-3.70	4.19E+05	-0.015
1780.031	466780	e	3	522959	o	2	-2.24	1.20E+07	-0.112
1780.500	524950	o	4	581114	e	4	-1.26	1.16E+08	0.039
1787.789	526373	o	2	582308	e	2	-1.15	1.49E+08	0.031
1788.941	574389	e	1	630288	o	2	-2.88	2.72E+06	0.035
1790.446	526373	o	2	582225	e	3	-3.82	3.13E+05	0.000
1793.883	524950	o	4	580695	e	3	-2.79	3.38E+06	0.037
1795.171	577553	e	4	633258	o	3	-3.98	2.19E+05	0.007
1797.591	588094	e	3	643724	o	3	-2.56	5.63E+06	-0.243
1799.824	582225	e	3	637786	o	3	-3.41	8.07E+05	0.011
1800.627	468696	e	2	524232	o	3	-1.78	3.43E+07	0.086
1803.316	469890	e	2	525343	o	1	-3.50	6.44E+05	0.002
1804.859	526902	o	3	582308	e	2	-1.98	2.14E+07	-0.066
1807.566	526902	o	3	582225	e	3	-1.34	9.24E+07	0.018
1807.632	588403	e	2	643724	o	3	-2.21	1.25E+07	-0.293
1809.509	469686	e	3	524950	o	4	-2.05	1.79E+07	-0.110
1815.739	588403	e	2	643477	o	1	-2.66	4.45E+06	-0.298
1821.261	580695	e	3	635602	o	3	-3.78	3.33E+05	-0.089
1833.328	469686	e	3	524232	o	3	-2.27	1.06E+07	0.009
1834.862	522959	o	2	577459	e	3	-1.36	8.69E+07	0.122
1840.875	526373	o	2	580695	e	3	-0.93	2.32E+08	0.031
1842.870	468696	e	2	522959	o	2	-3.09	1.60E+06	-0.002
1845.189	582308	e	2	636503	o	2	-3.18	1.28E+06	-0.106
1851.715	522959	o	2	576963	e	3	0.19	3.02E+09	-0.490
1858.978	526902	o	3	580695	e	3	-2.40	7.70E+06	-0.017
1862.787	528625	o	2	582308	e	2	0.11	2.47E+09	-0.641
1865.672	528625	o	2	582225	e	3	-3.44	7.04E+05	0.000
1873.466	582225	e	3	635602	o	3	-2.95	2.15E+06	-0.094
1875.293	576963	e	3	630288	o	2	-3.39	7.67E+05	0.031
1875.434	524232	o	3	577553	e	4	-2.31	9.38E+06	0.001
1876.313	588094	e	3	641390	o	2	-2.72	3.61E+06	-0.191
1878.746	524232	o	3	577459	e	3	0.31	3.81E+09	-0.808
1882.636	592644	e	1	645761	o	2	-3.07	1.60E+06	-0.050
1885.370	581114	e	4	634154	o	4	-3.09	1.55E+06	0.118
1887.255	588403	e	2	641390	o	2	-2.46	6.49E+06	-0.171
1890.752	592872	e	2	645761	o	2	-3.03	1.76E+06	-0.029
1892.792	529476	o	1	582308	e	2	-0.30	9.33E+08	-0.844
1895.339	588094	e	3	640855	o	4	-2.19	1.19E+07	-0.309
1896.418	524232	o	3	576963	e	3	-0.39	7.63E+08	0.294
1901.032	524950	o	4	577553	e	4	0.38	4.45E+09	-0.933
1904.435	524950	o	4	577459	e	3	-1.43	6.78E+07	0.284
1906.360	592644	e	1	645100	o	2	-2.54	5.29E+06	0.124
1915.892	530113	o	3	582308	e	2	-0.74	3.29E+08	-0.624
1918.944	530113	o	3	582225	e	3	0.20	2.89E+09	0.551
1920.492	528625	o	2	580695	e	3	0.74	9.88E+09	-0.967
1922.596	524950	o	4	576963	e	3	-0.42	6.87E+08	-0.534
1923.299	524232	o	3	576226	e	4	0.85	1.28E+10	-0.940
1925.706	582225	e	3	634154	o	4	-2.82	2.72E+06	0.124

Table 2. continued.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
1937.947	574389	e	1	625990	o	2	-3.01	1.75E+06	-0.034
1944.390	522959	o	2	574389	e	1	0.32	3.66E+09	-0.903
1946.283	530928	o	1	582308	e	2	0.22	2.91E+09	-0.866
1950.230	524950	o	4	576226	e	4	-0.37	7.57E+08	0.957
1956.296	524950	o	4	576067	e	5	0.97	1.64E+10	-0.967
1957.483	526373	o	2	577459	e	3	0.59	6.70E+09	-0.790
1959.516	582225	e	3	633258	o	3	-3.20	1.09E+06	-0.049
1960.746	530113	o	3	581114	e	4	0.88	1.32E+10	-0.980
1960.977	576963	e	3	627958	o	4	-3.93	2.02E+05	0.040
1961.284	531321	o	2	582308	e	2	-0.19	1.12E+09	0.418
1962.709	582308	e	2	633258	o	3	-3.60	4.32E+05	-0.096
1964.482	531321	o	2	582225	e	3	0.63	7.41E+09	-0.964
1966.491	592872	e	2	643724	o	3	-2.81	2.68E+06	-0.074
1967.110	582308	e	2	633144	o	2	-3.61	4.24E+05	-0.033
1967.226	592644	e	1	643477	o	1	-2.37	7.31E+06	-0.192
1974.295	526902	o	3	577553	e	4	0.72	9.04E+09	-0.953
1976.089	592872	e	2	643477	o	1	-3.22	1.03E+06	-0.081
1976.675	526373	o	2	576963	e	3	-0.84	2.47E+08	-0.082
1976.988	530113	o	3	580695	e	3	-0.47	5.77E+08	-0.293
1977.965	526902	o	3	577459	e	3	-1.19	1.11E+08	-0.062
1978.552	588094	e	3	638636	o	4	-2.56	4.67E+06	0.271
1988.269	574389	e	1	624684	o	1	-2.52	5.07E+06	-0.128
1997.563	526902	o	3	576963	e	3	0.53	5.66E+09	-0.961
2011.746	588094	e	3	637786	o	3	-1.91	2.01E+07	-0.217
2024.336	588403	e	2	637786	o	3	-2.68	3.42E+06	0.288
2024.705	531321	o	2	580695	e	3	-0.89	2.10E+08	-0.085
2026.758	526902	o	3	576226	e	4	-0.59	4.15E+08	-0.209
2038.247	525343	o	1	574389	e	1	-0.40	6.40E+08	-0.295
2039.037	576963	e	3	625990	o	2	-3.97	1.72E+05	-0.013
2047.097	528625	o	2	577459	e	3	-1.57	4.30E+07	-0.007
2050.793	592644	e	1	641390	o	2	-2.62	3.82E+06	0.244
2053.068	574389	e	1	623081	o	2	-2.54	4.52E+06	0.034
2057.336	574389	e	1	622980	o	1	-2.91	1.95E+06	0.001
2060.432	592872	e	2	641390	o	2	-2.46	5.44E+06	-0.167
2068.105	528625	o	2	576963	e	3	-1.55	4.43E+07	-0.065
2072.393	574389	e	1	622627	o	2	-3.55	4.40E+05	0.001
2079.940	582225	e	3	630288	o	2	-3.93	1.80E+05	0.020
2081.976	526373	o	2	574389	e	1	-1.31	7.56E+07	-0.162
2083.538	582308	e	2	630288	o	2	-3.08	1.26E+06	0.179
2090.904	574389	e	1	622200	o	1	-2.26	8.47E+06	0.407
2107.258	530113	o	3	577553	e	4	-1.86	2.07E+07	-0.003
2111.442	530113	o	3	577459	e	3	-3.28	7.80E+05	0.000
2122.742	576963	e	3	624057	o	3	-3.67	3.20E+05	-0.003
2133.798	530113	o	3	576963	e	3	-0.98	1.54E+08	0.064
2134.072	581114	e	4	627958	o	4	-3.77	2.47E+05	0.106
2141.020	576067	e	5	622759	o	4	-3.03	1.36E+06	-0.013
2147.505	574389	e	1	620940	o	2	-2.90	1.83E+06	-0.048
2148.290	580695	e	3	627229	o	3	-3.78	2.41E+05	-0.199
2148.336	576226	e	4	622759	o	4	-2.55	4.03E+06	-0.003
2162.278	528156	o	0	574389	e	1	-1.53	4.21E+07	-0.046
2166.731	531321	o	2	577459	e	3	-2.38	5.95E+06	0.001
2167.906	530113	o	3	576226	e	4	-2.77	2.40E+06	0.000
2170.400	588094	e	3	634154	o	4	-3.86	1.96E+05	0.082
2182.913	576963	e	3	622759	o	4	-3.42	5.33E+05	0.000
2184.440	528625	o	2	574389	e	1	-2.43	5.19E+06	-0.137
2185.921	582225	e	3	627958	o	4	-2.91	1.71E+06	0.416
2189.320	576226	e	4	621888	o	3	-2.85	1.95E+06	-0.110
2191.240	577459	e	3	623081	o	2	-3.27	7.53E+05	0.012
2206.817	577459	e	3	622759	o	4	-3.02	1.31E+06	0.000
2211.406	577553	e	4	622759	o	4	-1.49	4.35E+07	0.026
2213.267	577459	e	3	622627	o	2	-2.53	4.01E+06	-0.008
2213.463	588094	e	3	633258	o	3	-2.96	1.50E+06	0.164
2225.240	576963	e	3	621888	o	3	-1.83	1.97E+07	-0.133
2225.438	582308	e	2	627229	o	3	-3.45	4.81E+05	0.271
2225.785	592872	e	2	637786	o	3	-2.87	1.83E+06	0.188

Table 2. continued.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
2225.834	529476	o	1	574389	e	1	-3.67	2.91E+05	0.000
2233.494	582308	e	2	627067	o	2	-3.65	2.97E+05	-0.222
2250.085	577459	e	3	621888	o	3	-1.95	1.46E+07	0.116
2254.856	577553	e	4	621888	o	3	-2.66	2.87E+06	0.113
2264.254	574389	e	1	618540	o	1	-1.22	7.82E+07	0.084
2273.213	576963	e	3	620940	o	2	-2.43	4.80E+06	-0.243
2284.226	582225	e	3	625990	o	2	-3.24	7.39E+05	-0.131
2299.147	577459	e	3	620940	o	2	-2.82	1.91E+06	0.099
2300.205	530928	o	1	574389	e	1	-3.53	3.73E+05	-0.001
2313.300	588403	e	2	631618	o	1	-3.44	4.52E+05	-0.293
2321.196	531321	o	2	574389	e	1	-2.41	4.82E+06	0.012
2327.520	574389	e	1	617340	o	1	0.27	2.27E+09	0.838
2327.954	581114	e	4	624057	o	3	-3.07	1.06E+06	0.094
2358.548	580695	e	3	623081	o	2	-2.31	5.91E+06	-0.206
2359.105	582308	e	2	624684	o	1	-3.20	7.52E+05	-0.281
2369.281	588094	e	3	630288	o	2	-3.11	9.19E+05	-0.262
2376.604	580695	e	3	622759	o	4	-2.92	1.41E+06	-0.001
2384.086	580695	e	3	622627	o	2	-1.32	5.59E+07	0.254
2389.786	582225	e	3	624057	o	3	-1.62	2.80E+07	0.397
2394.537	582308	e	2	624057	o	3	-2.48	3.83E+06	0.123
2400.518	581114	e	4	622759	o	4	-0.22	6.97E+08	0.519
2426.860	580695	e	3	621888	o	3	-1.46	3.86E+07	-0.385
2442.694	592644	e	1	633570	o	0	-3.79	1.82E+05	-0.355
2446.880	582225	e	3	623081	o	2	-1.90	1.39E+07	0.281
2451.801	581114	e	4	621888	o	3	-3.27	5.89E+05	0.030
2451.861	582308	e	2	623081	o	2	-0.89	1.43E+08	0.738
2457.950	582308	e	2	622980	o	1	-0.91	1.37E+08	0.594
2463.565	490742	e	3	531321	o	2	-1.52	3.35E+07	-0.045
2466.319	582225	e	3	622759	o	4	0.58	4.10E+09	0.981
2466.745	592644	e	1	633171	o	1	-3.62	2.67E+05	0.164
2474.377	582225	e	3	622627	o	2	-1.19	7.09E+07	-0.178
2479.471	582308	e	2	622627	o	2	0.13	1.47E+09	-0.883
2482.365	592872	e	2	633144	o	2	-3.31	5.26E+05	0.241
2484.031	580695	e	3	620940	o	2	-3.52	3.29E+05	0.036
2506.013	582308	e	2	622200	o	1	-2.98	1.13E+06	-0.134
2506.912	491443	e	2	531321	o	2	-1.85	1.51E+07	-0.006
2507.774	588094	e	3	627958	o	4	-3.54	3.08E+05	0.403
2513.575	574389	e	1	614161	o	2	-2.56	2.90E+06	-0.270
2520.483	582225	e	3	621888	o	3	-3.38	4.37E+05	-0.005
2525.769	582308	e	2	621888	o	3	-0.77	1.77E+08	0.757
2531.865	491443	e	2	530928	o	1	-1.52	3.17E+07	-0.060
2539.158	490742	e	3	530113	o	3	-1.32	4.98E+07	0.040
2582.205	582225	e	3	620940	o	2	-2.83	1.48E+06	-0.097
2585.230	491443	e	2	530113	o	3	-1.49	3.25E+07	-0.009
2587.753	582308	e	2	620940	o	2	-1.55	2.81E+07	-0.752
2594.739	576226	e	4	614754	o	3	-3.68	2.09E+05	-0.017
2628.532	491443	e	2	529476	o	1	-1.00	9.64E+07	0.078
2645.345	576963	e	3	614754	o	3	-2.04	8.80E+06	0.428
2660.680	555299	o	2	592872	e	2	-3.61	2.32E+05	0.210
2676.925	555299	o	2	592644	e	1	-3.54	2.66E+05	0.114
2680.528	577459	e	3	614754	o	3	-2.24	5.40E+06	0.183
2682.326	603355	o	2	640625	e	2	-2.13	6.85E+06	0.013
2687.302	577553	e	4	614754	o	3	-2.55	2.58E+06	-0.295
2687.519	576963	e	3	614161	o	2	-3.49	3.02E+05	-0.049
2688.697	491443	e	2	528625	o	2	-0.99	9.51E+07	-0.084
2690.701	603355	o	2	640509	e	1	-2.85	1.30E+06	-0.009
2691.585	555730	o	1	592872	e	2	-3.15	6.59E+05	0.498
2704.877	555913	o	3	592872	e	2	-3.34	4.21E+05	-0.288
2708.211	555730	o	1	592644	e	1	-3.50	2.86E+05	0.315
2723.840	577459	e	3	614161	o	2	-3.55	2.50E+05	0.015
2724.286	603929	o	3	640625	e	2	-2.64	2.06E+06	-0.001
2753.855	636143	e	2	672445	o	3	-2.16	6.10E+06	0.207
2759.176	582308	e	2	618540	o	1	-2.27	4.74E+06	0.025
2764.647	490742	e	3	526902	o	3	0.36	1.99E+09	-0.876
2774.446	495288	e	1	531321	o	2	-0.28	4.50E+08	0.915

Table 2. continued.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
2778.733	604648	o	1	640625	e	2	-1.78	1.45E+07	-0.013
2779.815	588094	e	3	624057	o	3	-3.82	1.31E+05	0.073
2787.722	604648	o	1	640509	e	1	-1.97	9.30E+06	0.023
2800.530	604928	o	3	640625	e	2	-3.09	6.96E+05	-0.002
2801.080	604935	o	2	640625	e	2	-3.87	1.15E+05	0.000
2803.908	588403	e	2	624057	o	3	-3.22	5.17E+05	-0.482
2805.041	495288	e	1	530928	o	1	0.08	1.01E+09	-0.889
2805.695	490742	e	3	526373	o	2	-2.08	7.10E+06	-0.019
2810.214	604935	o	2	640509	e	1	-2.21	5.25E+06	0.010
2819.352	491443	e	2	526902	o	3	-0.15	5.96E+08	0.688
2822.967	495908	e	2	531321	o	2	0.22	1.39E+09	0.758
2823.469	605218	o	3	640625	e	2	-2.35	3.72E+06	0.011
2838.461	574389	e	1	609609	o	2	-3.70	1.65E+05	0.001
2847.192	574389	e	1	609501	o	1	-2.86	1.13E+06	0.010
2853.695	582308	e	2	617340	o	1	-3.42	3.10E+05	-0.005
2854.648	495908	e	2	530928	o	1	-1.14	5.90E+07	0.186
2862.053	491443	e	2	526373	o	2	0.32	1.71E+09	-0.943
2883.908	588094	e	3	622759	o	4	-2.47	2.67E+06	0.367
2891.248	588403	e	2	622980	o	1	-2.74	1.45E+06	-0.262
2894.932	588094	e	3	622627	o	2	-3.77	1.34E+05	-0.117
2898.365	553911	o	1	588403	e	2	-3.38	3.32E+05	-0.388
2907.393	577459	e	3	611844	o	2	-2.43	2.92E+06	0.238
2909.763	592872	e	2	627229	o	3	-3.94	9.11E+04	0.472
2921.071	588403	e	2	622627	o	2	-3.71	1.52E+05	0.027
2922.412	490742	e	3	524950	o	4	0.60	3.13E+09	0.987
2922.668	495908	e	2	530113	o	3	0.48	2.35E+09	0.979
2923.292	574389	e	1	608587	o	1	-2.11	6.14E+06	-0.011
2924.181	495288	e	1	529476	o	1	-1.25	4.35E+07	0.515
2939.798	601967	o	4	635973	e	3	-2.69	1.55E+06	-0.558
2940.758	558877	o	2	592872	e	2	-3.48	2.54E+05	0.389
2949.017	491443	e	2	525343	o	1	0.08	9.28E+08	0.961
2956.141	574389	e	1	608207	o	0	-1.97	8.13E+06	0.023
2956.841	606815	o	2	640625	e	2	-3.49	2.46E+05	-0.019
2958.241	588094	e	3	621888	o	3	-3.56	2.08E+05	-0.229
2960.615	558877	o	2	592644	e	1	-3.94	8.66E+04	-0.352
2963.239	576226	e	4	609963	o	3	-2.31	3.74E+06	-0.304
2964.461	554371	o	2	588094	e	3	-3.13	5.69E+05	-0.488
2967.021	606815	o	2	640509	e	1	-2.11	5.97E+06	0.474
2971.784	581114	e	4	614754	o	3	-2.65	1.69E+06	-0.175
2975.765	582225	e	3	615820	o	2	-3.24	4.29E+05	0.130
2978.132	495908	e	2	529476	o	1	0.06	8.71E+08	0.964
2981.712	607097	o	3	640625	e	2	-3.70	1.48E+05	-0.100
2983.135	582308	e	2	615820	o	2	-3.11	5.81E+05	-0.187
2985.068	490742	e	3	524232	o	3	-0.15	5.25E+08	0.927
2987.236	580695	e	3	614161	o	2	-2.92	8.95E+05	0.167
2998.832	495288	e	1	528625	o	2	0.19	1.14E+09	0.978
3013.077	576067	e	5	609246	o	4	-2.00	7.44E+06	-0.423
3018.627	592872	e	2	625990	o	2	-3.74	1.32E+05	0.297
3019.885	555299	o	2	588403	e	2	-3.51	2.28E+05	0.138
3023.383	555337	o	3	588403	e	2	-3.79	1.19E+05	0.043
3027.586	576226	e	4	609246	o	4	-2.94	8.40E+05	0.272
3029.421	576963	e	3	609963	o	3	-3.08	6.02E+05	0.037
3041.625	495288	e	1	528156	o	0	-0.35	3.24E+08	0.985
3043.347	576226	e	4	609075	o	3	-2.93	8.38E+05	0.000
3048.944	491443	e	2	524232	o	3	0.36	1.64E+09	0.760
3049.009	603355	o	2	636143	e	2	-2.11	5.59E+06	0.020
3050.182	560097	o	3	592872	e	2	-3.00	7.24E+05	-0.466
3051.904	555337	o	3	588094	e	3	-2.69	1.47E+06	0.401
3055.094	560149	o	1	592872	e	2	-3.21	4.37E+05	-0.379
3055.598	495908	e	2	528625	o	2	-0.28	3.77E+08	-0.490
3059.760	555730	o	1	588403	e	2	-3.52	2.15E+05	-0.154
3062.272	576963	e	3	609609	o	2	-2.52	2.17E+06	0.002
3064.901	603355	o	2	635973	e	3	0.22	1.19E+09	-0.798
3065.709	560035	o	2	592644	e	1	-2.70	1.42E+06	-0.629
3073.287	582225	e	3	614754	o	3	-2.97	7.65E+05	-0.034

Table 2. continued.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
3075.651	577459	e	3	609963	o	3	-3.92	8.47E+04	0.006
3076.531	560149	o	1	592644	e	1	-3.50	2.21E+05	0.512
3076.948	555913	o	3	588403	e	2	-3.49	2.26E+05	-0.097
3081.149	582308	e	2	614754	o	3	-2.57	1.91E+06	-0.106
3083.050	574389	e	1	606815	o	2	-3.45	2.48E+05	0.066
3084.572	577553	e	4	609963	o	3	-2.87	9.34E+05	0.083
3094.885	608207	o	0	640509	e	1	-0.48	2.33E+08	-0.804
3095.498	555798	o	4	588094	e	3	-2.40	2.74E+06	-0.411
3096.515	608340	o	2	640625	e	2	-0.39	2.85E+08	-0.674
3096.582	560588	o	3	592872	e	2	-3.80	1.09E+05	-0.342
3096.707	576963	e	3	609246	o	4	-1.84	1.02E+07	-0.503
3101.414	555860	o	4	588094	e	3	-3.90	8.80E+04	-0.113
3103.022	490742	e	3	522959	o	2	0.33	1.48E+09	0.973
3103.340	603929	o	3	636143	e	2	0.24	1.20E+09	-0.714
3107.681	608340	o	2	640509	e	1	0.10	8.67E+08	-0.887
3109.518	577459	e	3	609609	o	2	-2.91	8.49E+05	-0.001
3113.198	576963	e	3	609075	o	3	-1.83	1.02E+07	0.016
3119.804	603929	o	3	635973	e	3	-0.26	3.78E+08	-0.834
3120.389	608587	o	1	640625	e	2	-0.06	6.00E+08	0.876
3130.355	582225	e	3	614161	o	2	-2.55	1.93E+06	-0.196
3131.728	608587	o	1	640509	e	1	-0.96	7.39E+07	-0.716
3138.512	582308	e	2	614161	o	2	-2.64	1.55E+06	0.150
3141.767	640625	e	2	672445	o	3	-2.13	5.08E+06	-0.320
3144.633	604182	o	4	635973	e	3	0.41	1.75E+09	-0.895
3145.029	577459	e	3	609246	o	4	-2.45	2.41E+06	-0.408
3154.158	604278	o	4	635973	e	3	-0.43	2.48E+08	-0.899
3154.357	577553	e	4	609246	o	4	-3.27	3.58E+05	0.019
3162.040	577459	e	3	609075	o	3	-3.23	3.93E+05	0.000
3168.655	609075	o	3	640625	e	2	0.36	1.51E+09	-0.924
3169.459	609083	o	1	640625	e	2	-1.79	1.09E+07	-0.186
3171.470	577553	e	4	609075	o	3	-1.52	2.01E+07	-0.014
3172.104	491443	e	2	522959	o	2	-1.72	1.27E+07	-0.040
3174.189	604648	o	1	636143	e	2	-0.02	6.31E+08	-0.851
3181.158	609083	o	1	640509	e	1	-0.82	1.00E+08	-0.813
3186.126	576963	e	3	608340	o	2	-2.57	1.77E+06	0.015
3202.662	604928	o	3	636143	e	2	-0.56	1.80E+08	0.855
3203.381	604935	o	2	636143	e	2	0.21	1.06E+09	0.883
3209.449	580695	e	3	611844	o	2	-2.54	1.89E+06	-0.170
3212.027	609501	o	1	640625	e	2	-1.00	6.51E+07	0.274
3216.098	495288	e	1	526373	o	2	-0.93	7.62E+07	-0.118
3220.201	604928	o	3	635973	e	3	-0.08	5.33E+08	-0.807
3220.927	604935	o	2	635973	e	3	-2.12	4.88E+06	0.021
3223.212	609609	o	2	640625	e	2	0.10	7.99E+08	0.708
3224.043	609501	o	1	640509	e	1	-0.16	4.48E+08	0.829
3225.468	495908	e	2	526902	o	3	-1.10	5.05E+07	0.086
3232.697	605218	o	3	636143	e	2	-0.57	1.71E+08	-0.730
3235.312	609609	o	2	640509	e	1	-0.42	2.42E+08	-0.853
3237.303	577459	e	3	608340	o	2	-1.65	1.44E+07	-0.012
3238.351	576226	e	4	607097	o	3	-3.35	2.84E+05	0.108
3250.566	605218	o	3	635973	e	3	-0.07	5.40E+08	0.798
3260.426	609963	o	3	640625	e	2	-2.64	1.45E+06	0.304
3272.808	574389	e	1	604935	o	2	-1.56	1.71E+07	0.143
3284.529	592644	e	1	623081	o	2	-2.97	6.71E+05	-0.497
3295.464	592644	e	1	622980	o	1	-2.71	1.20E+06	-0.651
3303.851	574389	e	1	604648	o	1	-0.79	9.82E+07	0.242
3309.319	592872	e	2	623081	o	2	-3.46	2.11E+05	-0.226
3317.226	588403	e	2	618540	o	1	-3.47	2.05E+05	0.048
3317.556	576963	e	3	607097	o	3	-3.23	3.54E+05	-0.044
3320.421	592872	e	2	622980	o	1	-3.13	4.52E+05	0.179
3326.321	495288	e	1	525343	o	1	-1.19	3.89E+07	-0.128
3334.264	592644	e	1	622627	o	2	-2.01	5.84E+06	0.815
3336.379	635973	e	3	665937	o	3	-3.43	2.22E+05	-0.060
3348.897	576963	e	3	606815	o	2	-3.04	5.37E+05	0.061
3355.416	636143	e	2	665937	o	3	-3.08	4.91E+05	-0.094
3373.078	577459	e	3	607097	o	3	-2.42	2.26E+06	-0.285

Table 2. continued.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
3375.242	582225	e	3	611844	o	2	-3.62	1.42E+05	0.030
3383.810	577553	e	4	607097	o	3	-2.41	2.25E+06	-0.410
3384.727	582308	e	2	611844	o	2	-3.87	7.81E+04	0.008
3385.885	558877	o	2	588403	e	2	-3.19	3.74E+05	0.373
3396.307	495908	e	2	525343	o	1	-1.16	3.96E+07	-0.067
3405.481	577459	e	3	606815	o	2	-1.96	6.32E+06	0.258
3408.733	606815	o	2	636143	e	2	-2.03	5.33E+06	0.595
3415.721	580695	e	3	609963	o	3	-2.86	7.90E+05	0.165
3421.695	558877	o	2	588094	e	3	-3.97	6.13E+04	-0.086
3428.607	606815	o	2	635973	e	3	-2.96	6.19E+05	0.560
3441.828	607097	o	3	636143	e	2	-3.84	8.11E+04	0.087
3445.387	592872	e	2	621888	o	3	-3.59	1.42E+05	-0.140
3448.239	576226	e	4	605218	o	3	-1.19	3.67E+07	0.222
3451.334	574389	e	1	603355	o	2	-0.02	5.29E+08	0.758
3454.793	588403	e	2	617340	o	1	-2.83	8.26E+05	0.458
3457.542	580695	e	3	609609	o	2	-1.15	3.95E+07	0.088
3462.092	607097	o	3	635973	e	3	-2.63	1.31E+06	-0.644
3465.332	581114	e	4	609963	o	3	-2.68	1.16E+06	0.116
3473.520	611844	o	2	640625	e	2	-3.12	4.20E+05	0.212
3483.081	576226	e	4	604928	o	3	-1.17	3.70E+07	-0.286
3487.577	611844	o	2	640509	e	1	-2.74	1.00E+06	0.275
3494.770	636143	e	2	664749	o	1	-3.62	1.31E+05	0.009
3501.502	580695	e	3	609246	o	4	-3.48	1.81E+05	-0.159
3522.601	580695	e	3	609075	o	3	-0.80	8.51E+07	-0.255
3529.528	495908	e	2	524232	o	3	-3.15	3.76E+05	0.000
3531.760	560097	o	3	588403	e	2	-2.58	1.39E+06	-0.623
3533.058	592644	e	1	620940	o	2	-3.40	2.14E+05	-0.203
3538.185	576963	e	3	605218	o	3	0.00	5.35E+08	0.859
3538.348	560149	o	1	588403	e	2	-3.03	4.96E+05	0.438
3543.704	576067	e	5	604278	o	4	-0.24	3.08E+08	0.899
3555.804	576067	e	5	604182	o	4	0.59	2.05E+09	0.891
3561.759	592872	e	2	620940	o	2	-3.82	7.89E+04	-0.223
3563.790	576226	e	4	604278	o	4	-2.08	4.37E+06	-0.136
3570.741	560097	o	3	588094	e	3	-3.45	1.85E+05	0.104
3573.983	576963	e	3	604935	o	2	-1.08	4.39E+07	0.092
3574.878	576963	e	3	604928	o	3	-0.09	4.25E+08	-0.764
3575.389	581114	e	4	609075	o	3	0.56	1.90E+09	-0.935
3576.029	576226	e	4	604182	o	4	-0.68	1.08E+08	-0.913
3578.448	554371	o	2	582308	e	2	-3.27	2.77E+05	0.006
3595.708	608340	o	2	636143	e	2	-2.10	4.14E+06	0.015
3601.408	577459	e	3	605218	o	3	-1.88	6.83E+06	0.045
3604.134	582225	e	3	609963	o	3	-3.09	4.18E+05	-0.034
3608.688	576226	e	4	603929	o	3	0.51	1.67E+09	0.893
3612.914	495288	e	1	522959	o	2	-2.29	2.63E+06	0.044
3613.645	577553	e	4	605218	o	3	0.09	6.29E+08	0.835
3614.952	582308	e	2	609963	o	3	-2.74	9.36E+05	-0.216
3616.259	580695	e	3	608340	o	2	0.41	1.30E+09	0.911
3627.939	608587	o	1	636143	e	2	-1.61	1.23E+07	-0.026
3629.151	560547	o	4	588094	e	3	-2.55	1.43E+06	-0.754
3634.495	560588	o	3	588094	e	3	-3.83	7.39E+04	-0.459
3638.503	577459	e	3	604935	o	2	0.25	8.99E+08	0.814
3639.430	577459	e	3	604928	o	3	-1.63	1.18E+07	-0.092
3646.333	588403	e	2	615820	o	2	-3.23	2.94E+05	0.157
3650.727	582225	e	3	609609	o	2	0.32	1.04E+09	0.901
3651.927	577553	e	4	604928	o	3	0.10	6.28E+08	-0.924
3659.949	576963	e	3	604278	o	4	-1.55	1.41E+07	0.298
3661.826	582308	e	2	609609	o	2	-0.53	1.47E+08	-0.383
3672.858	576963	e	3	604182	o	4	-1.04	4.47E+07	0.209
3676.370	582308	e	2	609501	o	1	-0.15	3.51E+08	0.808
3695.628	495908	e	2	522959	o	2	-1.60	1.22E+07	0.072
3701.389	555299	o	2	582308	e	2	-2.69	9.93E+05	0.006
3706.645	555337	o	3	582308	e	2	-3.11	3.82E+05	-0.004
3707.319	576963	e	3	603929	o	3	-0.66	1.08E+08	-0.309
3714.068	635973	e	3	662890	o	2	-2.28	2.58E+06	0.251
3716.691	609075	o	3	635973	e	3	-2.37	2.05E+06	0.007

Table 2. continued.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
3718.087	555337	o	3	582225	e	3	-3.63	1.13E+05	-0.001
3723.336	582225	e	3	609075	o	3	-0.09	3.90E+08	0.589
3727.640	577459	e	3	604278	o	4	-1.55	1.35E+07	-0.487
3733.765	582308	e	2	609083	o	1	-0.82	7.12E+07	-0.752
3734.881	582308	e	2	609075	o	3	-1.02	4.55E+07	-0.658
3737.674	636143	e	2	662890	o	2	-3.13	3.57E+05	0.026
3740.471	609246	o	4	635973	e	3	-2.17	3.24E+06	0.675
3740.751	577553	e	4	604278	o	4	-0.91	5.83E+07	0.591
3741.031	577459	e	3	604182	o	4	-2.03	4.41E+06	-0.104
3749.872	588094	e	3	614754	o	3	-3.74	8.65E+04	0.206
3752.405	609501	o	1	636143	e	2	-2.90	5.98E+05	0.004
3754.237	577553	e	4	604182	o	4	0.03	5.00E+08	0.954
3761.470	555730	o	1	582308	e	2	-2.80	7.54E+05	-0.031
3767.679	609609	o	2	636143	e	2	-3.59	1.21E+05	0.000
3776.789	577459	e	3	603929	o	3	-0.03	4.36E+08	0.811
3777.645	614161	o	2	640625	e	2	-2.38	1.96E+06	-0.636
3782.992	555798	o	4	582225	e	3	-2.76	8.01E+05	0.002
3783.392	554690	o	5	581114	e	4	-2.37	2.00E+06	-0.002
3786.516	580695	e	3	607097	o	3	-3.06	4.02E+05	0.084
3787.478	555913	o	3	582308	e	2	-2.65	1.04E+06	-0.003
3787.951	576963	e	3	603355	o	2	-0.20	2.97E+08	0.396
3790.249	577553	e	4	603929	o	3	-3.15	3.30E+05	0.000
3791.974	609609	o	2	635973	e	3	-2.35	2.10E+06	0.009
3799.425	555913	o	3	582225	e	3	-3.44	1.67E+05	0.001
3804.240	582308	e	2	608587	o	1	-0.79	7.44E+07	0.767
3818.626	609963	o	3	636143	e	2	-2.81	7.12E+05	0.279
3827.398	580695	e	3	606815	o	2	-2.13	3.37E+06	-0.199
3828.131	582225	e	3	608340	o	2	-3.56	1.25E+05	-0.001
3840.336	582308	e	2	608340	o	2	-0.19	2.90E+08	0.835
3843.585	609963	o	3	635973	e	3	-2.53	1.33E+06	0.607
3847.579	581114	e	4	607097	o	3	-3.46	1.58E+05	-0.054
3859.909	576067	e	5	601967	o	4	-2.45	1.62E+06	0.663
3860.506	577459	e	3	603355	o	2	-1.70	9.01E+06	-0.114
3860.506	592644	e	1	618540	o	1	-2.62	1.09E+06	-0.557
3864.236	614754	o	3	640625	e	2	-2.82	6.82E+05	-0.572
3878.343	555337	o	3	581114	e	4	-2.79	7.24E+05	0.036
3881.189	588403	e	2	614161	o	2	-2.51	1.36E+06	-0.206
3894.798	592872	e	2	618540	o	1	-2.64	1.03E+06	-0.550
3936.482	555299	o	2	580695	e	3	-2.91	5.29E+05	-0.036
3949.016	555798	o	4	581114	e	4	-1.91	5.27E+06	-0.035
3949.577	640625	e	2	665937	o	3	-2.69	8.62E+05	0.316
3957.442	555852	o	5	581114	e	4	-3.80	6.82E+04	0.000
3966.927	555913	o	3	581114	e	4	-3.88	5.53E+04	-0.003
4015.478	555798	o	4	580695	e	3	-3.33	1.95E+05	-0.002
4019.449	582225	e	3	607097	o	3	-3.31	2.03E+05	-0.043
4025.438	555860	o	4	580695	e	3	-2.98	4.31E+05	-0.001
4030.306	615820	o	2	640625	e	2	-3.03	3.85E+05	0.577
4032.908	582308	e	2	607097	o	3	-2.07	3.53E+06	-0.386
4033.998	555913	o	3	580695	e	3	-1.87	5.48E+06	0.048
4065.546	582225	e	3	606815	o	2	-2.35	1.82E+06	-0.201
4076.653	580695	e	3	605218	o	3	-3.40	1.59E+05	0.007
4079.149	577459	e	3	601967	o	4	-2.87	5.43E+05	-0.551
4079.315	582308	e	2	606815	o	2	-3.34	1.83E+05	-0.019
4085.817	592872	e	2	617340	o	1	-3.10	3.15E+05	0.418
4094.855	577553	e	4	601967	o	4	-2.98	4.22E+05	0.267
4114.235	611844	o	2	636143	e	2	-2.80	6.23E+05	0.578
4124.249	580695	e	3	604935	o	2	-2.02	3.74E+06	0.009
4124.249	640509	e	1	664749	o	1	-3.47	1.32E+05	0.063
4125.440	580695	e	3	604928	o	3	-3.92	4.67E+04	-0.003
4143.222	611844	o	2	635973	e	3	-3.75	6.83E+04	0.356
4144.081	640625	e	2	664749	o	1	-2.05	3.48E+06	-0.428
4147.519	581114	e	4	605218	o	3	-2.63	9.15E+05	-0.004
4170.010	636143	e	2	660117	o	1	-2.09	3.11E+06	-0.295
4198.028	581114	e	4	604928	o	3	-1.99	3.91E+06	0.018
4209.340	588094	e	3	611844	o	2	-3.54	1.10E+05	-0.320

Table 2. continued.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
4239.149	580695	e	3	604278	o	4	-2.35	1.64E+06	-0.237
4264.829	588403	e	2	611844	o	2	-2.51	1.13E+06	-0.630
4266.668	558877	o	2	582308	e	2	-1.80	5.75E+06	-0.179
4281.835	558877	o	2	582225	e	3	-1.72	6.87E+06	-0.293
4293.402	617340	o	1	640625	e	2	-3.65	8.10E+04	-0.203
4302.827	580695	e	3	603929	o	3	-1.65	7.97E+06	0.043
4315.830	581114	e	4	604278	o	4	-2.66	7.84E+05	-0.019
4330.018	554371	o	2	577459	e	3	-2.83	5.31E+05	-0.065
4333.791	581114	e	4	604182	o	4	-1.57	9.50E+06	-0.052
4347.927	582225	e	3	605218	o	3	-2.58	9.37E+05	-0.005
4356.454	592872	e	2	615820	o	2	-2.73	6.57E+05	-0.669
4363.680	582308	e	2	605218	o	3	-2.80	5.60E+05	0.035
4372.689	554690	o	5	577553	e	4	-1.62	8.46E+06	-0.059
4381.850	581114	e	4	603929	o	3	-3.19	2.24E+05	0.000
4392.072	559463	o	4	582225	e	3	-2.71	6.75E+05	-0.007
4402.110	582225	e	3	604935	o	2	-3.92	4.12E+04	0.000
4403.467	582225	e	3	604928	o	3	-3.01	3.34E+05	0.002
4411.823	580695	e	3	603355	o	2	-3.13	2.54E+05	-0.019
4418.258	582308	e	2	604935	o	2	-3.61	8.42E+04	0.000
4419.625	582308	e	2	604928	o	3	-2.82	5.13E+05	-0.039
4425.083	554371	o	2	576963	e	3	-1.00	3.40E+07	-0.890
4475.020	582308	e	2	604648	o	1	-3.08	2.79E+05	0.002
4488.401	560035	o	2	582308	e	2	-0.61	8.18E+07	0.842
4490.094	640625	e	2	662890	o	2	-2.01	3.27E+06	-0.465
4492.718	635973	e	3	658225	o	2	-2.11	2.60E+06	-0.415
4500.018	555337	o	3	577553	e	4	-1.13	2.45E+07	-0.935
4500.930	560097	o	3	582308	e	2	-1.87	4.48E+06	0.047
4505.189	560035	o	2	582225	e	3	-1.88	4.30E+06	0.202
4511.329	555299	o	2	577459	e	3	-1.38	1.35E+07	-0.670
4511.635	560149	o	1	582308	e	2	-1.73	6.15E+06	-0.463
4517.812	560097	o	3	582225	e	3	-0.60	8.23E+07	0.493
4519.140	555337	o	3	577459	e	3	-2.19	2.08E+06	0.036
4526.691	618540	o	1	640625	e	2	-2.90	4.11E+05	0.514
4527.306	636143	e	2	658225	o	2	-2.06	2.84E+06	0.232
4533.259	582225	e	3	604278	o	4	-2.55	9.17E+05	-0.033
4536.962	640509	e	1	662544	o	0	-2.38	1.36E+06	-0.478
4547.902	614161	o	2	636143	e	2	-2.77	5.43E+05	0.253
4550.593	618540	o	1	640509	e	1	-3.27	1.73E+05	0.323
4553.080	582225	e	3	604182	o	4	-1.81	5.04E+06	-0.074
4568.686	592872	e	2	614754	o	3	-2.53	9.38E+05	0.634
4571.402	588094	e	3	609963	o	3	-2.29	1.64E+06	-0.632
4595.441	555798	o	4	577553	e	4	-0.30	1.59E+08	0.893
4602.698	560588	o	3	582308	e	2	-0.05	2.84E+08	-0.962
4606.155	582225	e	3	603929	o	3	-2.83	4.70E+05	0.001
4606.856	555852	o	5	577553	e	4	0.19	4.94E+08	-0.902
4611.722	560547	o	4	582225	e	3	0.13	4.17E+08	-0.975
4614.617	555299	o	2	576963	e	3	-1.47	1.06E+07	0.610
4615.384	555798	o	4	577459	e	3	-2.42	1.20E+06	-0.008
4617.452	559463	o	4	581114	e	4	-1.37	1.34E+07	0.252
4618.412	559468	o	5	581114	e	4	0.27	5.83E+08	0.950
4619.714	555913	o	3	577553	e	4	-2.33	1.46E+06	0.130
4620.354	560588	o	3	582225	e	3	-1.15	2.22E+07	-0.301
4622.790	555337	o	3	576963	e	3	-0.27	1.67E+08	0.842
4628.548	555860	o	4	577459	e	3	0.10	3.94E+08	-0.878
4636.920	588403	e	2	609963	o	3	-2.51	9.65E+05	-0.318
4639.869	555913	o	3	577459	e	3	-0.45	1.09E+08	0.790
4642.131	554690	o	5	576226	e	4	0.26	5.54E+08	-0.940
4646.619	588094	e	3	609609	o	2	-2.15	2.20E+06	-0.006
4669.626	554658	o	6	576067	e	5	0.34	6.72E+08	-0.939
4676.660	554690	o	5	576067	e	5	-1.42	1.15E+07	-0.941
4695.947	592872	e	2	614161	o	2	-2.10	2.39E+06	0.722
4699.700	580695	e	3	601967	o	4	-3.65	6.84E+04	-0.285
4708.576	559463	o	4	580695	e	3	0.17	4.44E+08	-0.947
4714.327	588403	e	2	609609	o	2	-3.40	1.20E+05	0.000
4723.549	555798	o	4	576963	e	3	-0.02	2.87E+08	-0.797

Table 2. continued.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
4726.363	588094	e	3	609246	o	4	-1.89	3.88E+06	-0.743
4731.284	582225	e	3	603355	o	2	-3.08	2.48E+05	-0.002
4737.338	555860	o	4	576963	e	3	-3.45	1.05E+05	-0.001
4738.460	588403	e	2	609501	o	1	-2.47	1.02E+06	-0.005
4749.198	555913	o	3	576963	e	3	-1.47	9.96E+06	-0.166
4756.632	560097	o	3	581114	e	4	-1.97	3.19E+06	0.233
4761.254	636143	e	2	657140	o	1	-2.98	3.08E+05	-0.200
4764.885	588094	e	3	609075	o	3	-2.17	1.97E+06	-0.005
4785.893	555337	o	3	576226	e	4	-2.50	9.12E+05	0.256
4836.110	588403	e	2	609075	o	3	-2.52	8.58E+05	0.001
4838.825	560035	o	2	580695	e	3	-1.98	3.02E+06	-0.315
4853.390	560097	o	3	580695	e	3	-2.69	5.86E+05	0.023
4860.847	560547	o	4	581114	e	4	-0.69	5.74E+07	-0.534
4870.438	560588	o	3	581114	e	4	-2.15	2.00E+06	-0.286
4881.902	553911	o	1	574389	e	1	-0.52	8.55E+07	-0.856
4893.971	555798	o	4	576226	e	4	-1.67	5.92E+06	-0.196
4906.918	555852	o	5	576226	e	4	-2.49	9.04E+05	0.005
4908.774	555860	o	4	576226	e	4	-0.57	7.42E+07	0.916
4919.160	615820	o	2	636143	e	2	-3.46	9.47E+04	-0.216
4921.509	555913	o	3	576226	e	4	-1.57	7.38E+06	-0.921
4932.363	555798	o	4	576067	e	5	-1.43	1.03E+07	-0.980
4945.515	555852	o	5	576067	e	5	-0.49	8.81E+07	0.984
4947.399	555860	o	4	576067	e	5	-2.68	5.73E+05	0.229
4953.037	588403	e	2	608587	o	1	-1.57	7.33E+06	0.013
4961.936	560547	o	4	580695	e	3	-2.92	3.26E+05	-0.004
4971.931	560588	o	3	580695	e	3	-0.80	4.26E+07	0.539
4994.086	554371	o	2	574389	e	1	-0.59	6.96E+07	-0.490
5014.401	588403	e	2	608340	o	2	-2.06	2.31E+06	-0.007
5063.931	582225	e	3	601967	o	4	-3.57	7.13E+04	-0.089
5098.538	640509	e	1	660117	o	1	-2.33	1.20E+06	0.473
5108.699	620940	o	2	640509	e	1	-3.44	9.28E+04	0.376
5206.883	592644	e	1	611844	o	2	-2.47	8.45E+05	-0.353
5236.832	555299	o	2	574389	e	1	-3.54	7.10E+04	0.005
5260.863	588094	e	3	607097	o	3	-2.38	1.01E+06	0.694
5269.459	592872	e	2	611844	o	2	-2.92	2.91E+05	-0.287
5316.821	617340	o	1	636143	e	2	-3.33	1.11E+05	-0.394
5335.549	621888	o	3	640625	e	2	-3.59	6.15E+04	0.280
5340.110	588094	e	3	606815	o	2	-2.76	4.09E+05	-0.635
5347.822	588403	e	2	607097	o	3	-3.63	5.53E+04	-0.077
5357.911	555730	o	1	574389	e	1	-2.49	7.53E+05	-0.043
5429.731	588403	e	2	606815	o	2	-1.80	3.56E+06	-0.642
5527.634	558877	o	2	576963	e	3	-2.97	2.36E+05	0.012
5555.278	559463	o	4	577459	e	3	-2.58	5.67E+05	0.003
5590.663	622627	o	2	640509	e	1	-2.79	3.50E+05	-0.488
5643.049	640509	e	1	658225	o	2	-2.68	4.46E+05	-0.400
5665.755	622980	o	1	640625	e	2	-3.11	1.59E+05	-0.368
5679.274	618540	o	1	636143	e	2	-3.24	1.17E+05	-0.201
5680.242	640625	e	2	658225	o	2	-2.37	8.82E+05	-0.163
5698.373	623081	o	2	640625	e	2	-3.87	2.76E+04	0.222
5703.250	622980	o	1	640509	e	1	-3.42	7.81E+04	0.437
5726.969	560097	o	3	577553	e	4	-3.19	1.32E+05	0.011
5736.302	623081	o	2	640509	e	1	-3.50	6.41E+04	0.455
5737.487	560035	o	2	577459	e	3	-3.08	1.69E+05	0.018
5757.975	560097	o	3	577459	e	3	-2.97	2.17E+05	-0.004
5838.138	588094	e	3	605218	o	3	0.17	2.87E+08	-0.820
5849.411	592872	e	2	609963	o	3	-2.42	7.47E+05	-0.451
5878.717	560547	o	4	577553	e	4	-2.19	1.25E+06	-0.020
5892.751	560588	o	3	577553	e	4	-3.63	4.52E+04	-0.017
5892.855	592644	e	1	609609	o	2	-0.17	1.29E+08	0.895
5911.393	560547	o	4	577459	e	3	-3.96	2.09E+04	0.000
5925.584	560588	o	3	577459	e	3	-2.26	1.05E+06	-0.020
5927.305	560097	o	3	576963	e	3	-3.85	2.68E+04	0.000
5930.610	592644	e	1	609501	o	1	0.08	2.26E+08	-0.854
5936.245	588094	e	3	604935	o	2	-2.09	1.53E+06	-0.014
5938.713	588094	e	3	604928	o	3	0.15	2.64E+08	0.827

Table 2. continued.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
5945.424	588403	e	2	605218	o	3	-0.33	8.91E+07	0.758
5963.903	559463	o	4	576226	e	4	-2.53	5.48E+05	0.021
5965.504	559468	o	5	576226	e	4	-2.30	9.42E+05	-0.004
5973.132	592872	e	2	609609	o	2	0.33	3.94E+08	-0.727
6011.203	640509	e	1	657140	o	1	-2.86	2.54E+05	-0.599
6011.926	592872	e	2	609501	o	1	-0.81	2.85E+07	-0.265
6016.267	636143	e	2	652760	o	1	-3.11	1.43E+05	0.064
6022.646	559468	o	5	576067	e	5	-2.31	8.95E+05	0.032
6047.200	588403	e	2	604935	o	2	0.44	5.02E+08	-0.925
6049.762	588403	e	2	604928	o	3	-0.32	8.71E+07	-0.899
6053.425	640625	e	2	657140	o	1	-3.26	9.91E+04	0.172
6081.411	592644	e	1	609083	o	1	-0.60	4.50E+07	0.848
6090.006	560547	o	4	576963	e	3	-2.56	4.90E+05	-0.005
6154.037	588403	e	2	604648	o	1	0.22	2.90E+08	0.941
6166.944	592872	e	2	609083	o	1	-1.61	4.20E+06	0.182
6169.989	592872	e	2	609075	o	3	0.60	6.89E+08	0.979
6177.233	588094	e	3	604278	o	4	-0.19	1.12E+08	0.980
6198.144	560097	o	3	576226	e	4	-3.97	1.85E+04	-0.006
6214.094	588094	e	3	604182	o	4	0.65	7.70E+08	0.982
6270.611	592644	e	1	608587	o	1	-0.70	3.42E+07	0.894
6313.379	588094	e	3	603929	o	3	-0.05	1.48E+08	0.890
6361.588	592872	e	2	608587	o	1	0.17	2.45E+08	-0.976
6369.289	592644	e	1	608340	o	2	0.32	3.44E+08	0.966
6376.276	560547	o	4	576226	e	4	-2.99	1.68E+05	0.006
6423.721	592644	e	1	608207	o	0	-0.23	9.42E+07	0.987
6439.029	588403	e	2	603929	o	3	0.46	4.62E+08	0.763
6444.882	558877	o	2	574389	e	1	-2.20	1.02E+06	-0.017
6463.174	592872	e	2	608340	o	2	-0.18	1.06E+08	0.731
6550.841	588094	e	3	603355	o	2	0.44	4.33E+08	0.962
6686.222	588403	e	2	603355	o	2	-1.71	2.91E+06	-0.035
6831.050	625990	o	2	640625	e	2	-3.89	1.88E+04	-0.462
7020.684	560149	o	1	574389	e	1	-3.70	2.72E+04	0.002
7027.939	592872	e	2	607097	o	3	-3.43	5.00E+04	0.156
7054.720	592644	e	1	606815	o	2	-1.90	1.67E+06	-0.665
7097.794	621888	o	3	635973	e	3	-3.84	1.94E+04	0.363
7170.081	592872	e	2	606815	o	2	-3.14	9.44E+04	0.041
7206.260	588094	e	3	601967	o	4	-2.48	4.39E+05	0.838
7561.070	636143	e	2	649365	o	1	-2.44	4.25E+05	-0.001
7565.648	622759	o	4	635973	e	3	-3.86	1.66E+04	-0.072
7594.961	622980	o	1	636143	e	2	-2.98	1.19E+05	0.458
8097.563	592872	e	2	605218	o	3	-1.95	1.14E+06	-0.025
8133.798	592644	e	1	604935	o	2	-1.97	1.06E+06	-0.017
8160.355	640509	e	1	652760	o	1	-3.11	7.84E+04	-0.210
8238.361	640625	e	2	652760	o	1	-2.29	5.02E+05	-0.696
8271.762	624057	o	3	636143	e	2	-3.67	2.04E+04	0.569
8287.534	592872	e	2	604935	o	2	-3.05	8.66E+04	0.000
8292.346	592872	e	2	604928	o	3	-2.45	3.45E+05	0.009
8328.267	592644	e	1	604648	o	1	-1.70	1.93E+06	-0.042
8389.772	624057	o	3	635973	e	3	-3.71	1.81E+04	-0.287
8489.515	592872	e	2	604648	o	1	-1.73	1.74E+06	0.015
9041.562	592872	e	2	603929	o	3	-3.38	3.40E+04	0.000
9333.635	592644	e	1	603355	o	2	-2.58	2.03E+05	0.019
9536.638	592872	e	2	603355	o	2	-1.92	8.87E+05	-0.027
10213.792	635973	e	3	645761	o	2	-1.66	1.42E+06	-0.098
10394.323	636143	e	2	645761	o	2	0.19	9.53E+07	-0.910
10953.502	635973	e	3	645100	o	2	-2.19	3.59E+05	-0.020
11161.396	636143	e	2	645100	o	2	0.27	9.91E+07	-0.946
11288.688	640509	e	1	649365	o	1	-0.67	1.12E+07	-0.519
11438.516	640625	e	2	649365	o	1	0.27	9.42E+07	0.982
12473.193	627958	o	4	635973	e	3	-3.88	5.77E+03	-0.543
12898.033	635973	e	3	643724	o	3	-0.80	6.20E+06	0.900
13187.265	636143	e	2	643724	o	3	-0.58	9.81E+06	0.670
13363.542	633144	o	2	640625	e	2	-3.39	1.51E+04	-0.539
13623.966	633171	o	1	640509	e	1	-3.62	8.46E+03	-0.482
13631.396	636143	e	2	643477	o	1	-1.13	2.65E+06	0.909

Table 2. continued.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
17585.346	630288	o	2	635973	e	3	-3.28	1.16E+04	0.564
18455.362	635973	e	3	641390	o	2	-1.63	4.61E+05	0.825
19035.168	640509	e	1	645761	o	2	-2.21	1.14E+05	0.040
19053.307	636143	e	2	641390	o	2	-1.49	5.94E+05	0.609
19465.090	640625	e	2	645761	o	2	-2.15	1.27E+05	0.008
20477.818	635973	e	3	640855	o	4	-1.45	5.18E+05	0.926
21775.803	640509	e	1	645100	o	2	-1.72	2.72E+05	-0.057
22093.417	631618	o	1	636143	e	2	-3.70	2.68E+03	0.589
32259.674	640625	e	2	643724	o	3	-2.39	2.41E+04	0.024
33683.534	640509	e	1	643477	o	1	-1.99	5.90E+04	0.272
35053.552	640625	e	2	643477	o	1	-2.70	1.07E+04	0.061
35214.065	637786	o	3	640625	e	2	-3.05	4.72E+03	-0.226
36822.369	633258	o	3	635973	e	3	-3.08	3.94E+03	-0.591
37541.394	635973	e	3	638636	o	4	-2.28	2.71E+04	-0.855
55142.161	635973	e	3	637786	o	3	-1.85	3.21E+04	0.747
60847.681	636143	e	2	637786	o	3	-2.77	3.25E+03	-0.801

Table 3. Energy levels of Ge VI (in cm^{-1}). The first three LS-components are given when they are over 5 %.

E_{exp}	E_{calc}	ΔE	J	LS-coupling composition (%)
0.0	0	0	2.5	99 $3d^9\ ^2D$
4560.0	4560	0	1.5	99 $3d^9\ ^2D$
303696.2	303702	-6	4.5	99 $3d^8(^3F)4s\ ^4F$
306243.4	306227	17	3.5	93 $3d^8(^3F)4s\ ^4F$ + 7 $3d^8(^3F)4s\ ^2F$
308657.2	308619	38	2.5	97 $3d^8(^3F)4s\ ^4F$
310199.1	310149	50	1.5	97 $3d^8(^3F)4s\ ^4F$
313024.6	313083	-59	3.5	93 $3d^8(^3F)4s\ ^2F$ + 7 $3d^8(^3F)4s\ ^4F$
316936.8	316978	-41	2.5	94 $3d^8(^3F)4s\ ^2F$
327537.9	327580	-42	2.5	52 $3d^8(^3P)4s\ ^4P$ + 45 $3d^8(^1D)4s\ ^2D$
329073.6	328991	83	1.5	74 $3d^8(^1D)4s\ ^2D$ + 17 $3d^8(^3P)4s\ ^4P$ + 7 $3d^8(^3P)4s\ ^2P$
332376.6	332399	-22	1.5	82 $3d^8(^3P)4s\ ^4P$ + 17 $3d^8(^1D)4s\ ^2D$
332497.0	332529	-32	0.5	99 $3d^8(^3P)4s\ ^4P$
333034.6	333108	-73	2.5	50 $3d^8(^1D)4s\ ^2D$ + 48 $3d^8(^3P)4s\ ^4P$
339335.3	339356	-21	1.5	92 $3d^8(^3P)4s\ ^2P$ + 7 $3d^8(^1D)4s\ ^2D$
340525.3	340418	107	0.5	99 $3d^8(^3P)4s\ ^2P$
343624.4	343641	-16	4.5	99 $3d^8(^1G)4s\ ^2G$
343674.0	343658	16	3.5	99 $3d^8(^1G)4s\ ^2G$
391183.2	391183	0	0.5	99 $3d^8(^1S)4s\ ^2S$
404892.3	405152	-260	3.5	87 $3d^8(^3F)4p\ ^4D^o$ + 6 $3d^8(^3F)4p\ ^4F^o$
408981.1	409123	-142	2.5	85 $3d^8(^3F)4p\ ^4D^o$ + 7 $3d^8(^3F)4p\ ^4F^o$ + 6 $3d^8(^3P)4p\ ^4D^o$
409188.4	409218	-30	4.5	56 $3d^8(^3F)4p\ ^4G^o$ + 25 $3d^8(^3F)4p\ ^2G^o$ + 18 $3d^8(^3F)4p\ ^4F^o$
411591.6	411314	278	5.5	99 $3d^8(^3F)4p\ ^4G^o$
411885.9	411737	149	3.5	76 $3d^8(^3F)4p\ ^4G^o$ + 12 $3d^8(^3F)4p\ ^4F^o$ + 9 $3d^8(^3F)4p\ ^2G^o$
412037.7	412098	-60	1.5	87 $3d^8(^3F)4p\ ^4D^o$ + 8 $3d^8(^3P)4p\ ^4D^o$
413728.0	413500	228	2.5	88 $3d^8(^3F)4p\ ^4G^o$ + 7 $3d^8(^3F)4p\ ^4F^o$
413872.6	413887	-14	0.5	89 $3d^8(^3F)4p\ ^4D^o$ + 10 $3d^8(^3P)4p\ ^4D^o$
415142.7	415074	69	4.5	79 $3d^8(^3F)4p\ ^4F^o$ + 14 $3d^8(^3F)4p\ ^2G^o$ + 7 $3d^8(^3F)4p\ ^4G^o$
416709.7	416633	77	3.5	58 $3d^8(^3F)4p\ ^4F^o$ + 25 $3d^8(^3F)4p\ ^2F^o$ + 9 $3d^8(^3F)4p\ ^4G^o$
417421.2	417416	5	4.5	61 $3d^8(^3F)4p\ ^2G^o$ + 37 $3d^8(^3F)4p\ ^4G^o$
417792.2	417828	-36	1.5	64 $3d^8(^3F)4p\ ^4F^o$ + 20 $3d^8(^3F)4p\ ^2D^o$ + 11 $3d^8(^1D)4p\ ^2D^o$
417941.9	417861	81	2.5	63 $3d^8(^3F)4p\ ^4F^o$ + 19 $3d^8(^3F)4p\ ^2D^o$ + 7 $3d^8(^3F)4p\ ^4G^o$
420117.8	420255	-137	2.5	60 $3d^8(^3F)4p\ ^2D^o$ + 15 $3d^8(^3F)4p\ ^2F^o$ + 13 $3d^8(^3F)4p\ ^4F^o$
420542.0	420655	-113	3.5	58 $3d^8(^3F)4p\ ^2F^o$ + 21 $3d^8(^3F)4p\ ^2G^o$ + 19 $3d^8(^3F)4p\ ^4F^o$
421310.0	421376	-66	3.5	66 $3d^8(^3F)4p\ ^2G^o$ + 13 $3d^8(^3F)4p\ ^2F^o$ + 13 $3d^8(^3F)4p\ ^4G^o$
423030.0	423105	-75	1.5	54 $3d^8(^3F)4p\ ^2D^o$ + 30 $3d^8(^3F)4p\ ^4F^o$ + 9 $3d^8(^1D)4p\ ^2D^o$
424506.4	424513	-7	2.5	74 $3d^8(^3F)4p\ ^2F^o$ + 12 $3d^8(^3F)4p\ ^2D^o$ + 9 $3d^8(^3F)4p\ ^4F^o$
429997.3	430095	-98	1.5	73 $3d^8(^3P)4p\ ^4P^o$ + 9 $3d^8(^1D)4p\ ^2P^o$ + 8 $3d^8(^3F)4p\ ^2D^o$
430736.0	430846	-110	2.5	65 $3d^8(^3P)4p\ ^4P^o$ + 12 $3d^8(^1D)4p\ ^2D^o$ + 11 $3d^8(^1D)4p\ ^2F^o$
431041.9	431094	-52	0.5	91 $3d^8(^3P)4p\ ^4P^o$
433507.0	433438	69	2.5	69 $3d^8(^1D)4p\ ^2F^o$ + 20 $3d^8(^3P)4p\ ^4P^o$
436023.6	436071	-47	1.5	43 $3d^8(^1D)4p\ ^2D^o$ + 18 $3d^8(^3P)4p\ ^4P^o$ + 15 $3d^8(^1D)4p\ ^2P^o$
436173.3	435966	207	3.5	71 $3d^8(^1D)4p\ ^2F^o$ + 13 $3d^8(^1G)4p\ ^2F^o$ + 11 $3d^8(^3P)4p\ ^4D^o$
436727.0	436699	28	0.5	60 $3d^8(^1D)4p\ ^2P^o$ + 28 $3d^8(^3P)4p\ ^2P^o$ + 7 $3d^8(^3P)4p\ ^4P^o$
437801.0	437951	-150	2.5	74 $3d^8(^1D)4p\ ^2D^o$ + 8 $3d^8(^3P)4p\ ^4P^o$ + 7 $3d^8(^3P)4p\ ^2D^o$
438871.4	438918	-46	1.5	49 $3d^8(^1D)4p\ ^2P^o$ + 31 $3d^8(^1D)4p\ ^2D^o$ + 6 $3d^8(^3P)4p\ ^2P^o$
441221.0	441056	165	0.5	86 $3d^8(^3P)4p\ ^4D^o$ + 9 $3d^8(^3F)4p\ ^4D^o$
441278.0	441101	177	1.5	74 $3d^8(^3P)4p\ ^4D^o$ + 6 $3d^8(^3F)4p\ ^4D^o$ + 6 $3d^8(^1D)4p\ ^2P^o$
441386.0	441368	18	2.5	60 $3d^8(^3P)4p\ ^4D^o$ + 18 $3d^8(^3P)4p\ ^2D^o$ + 6 $3d^8(^1D)4p\ ^2F^o$
442790.4	442667	123	3.5	76 $3d^8(^3P)4p\ ^4D^o$ + 15 $3d^8(^1G)4p\ ^2F^o$
444442.2	444429	13	4.5	97 $3d^8(^1G)4p\ ^2H^o$
445439.0	445313	126	1.5	74 $3d^8(^3P)4p\ ^2P^o$ + 12 $3d^8(^1D)4p\ ^2P^o$ + 7 $3d^8(^3P)4p\ ^2D^o$
445670.0	445783	-113	2.5	67 $3d^8(^3P)4p\ ^2D^o$ + 25 $3d^8(^3P)4p\ ^4D^o$
447373.0	447431	-58	1.5	83 $3d^8(^3P)4p\ ^2D^o$ + 9 $3d^8(^3P)4p\ ^4D^o$
447780.0	447962	-182	3.5	66 $3d^8(^1G)4p\ ^2F^o$ + 21 $3d^8(^1D)4p\ ^2F^o$ + 7 $3d^8(^3P)4p\ ^4D^o$
448258.9	448097	162	5.5	99 $3d^8(^1G)4p\ ^2H^o$
449093.0	448900	193	0.5	60 $3d^8(^3P)4p\ ^2P^o$ + 23 $3d^8(^1D)4p\ ^2P^o$ + 13 $3d^8(^3P)4p\ ^2S^o$
450153.0	450186	-33	2.5	84 $3d^8(^1G)4p\ ^2F^o$ + 8 $3d^8(^1D)4p\ ^2F^o$
451362.0	451604	-242	0.5	84 $3d^8(^3P)4p\ ^2S^o$ + 8 $3d^8(^1D)4p\ ^2P^o$ + 6 $3d^8(^3P)4p\ ^2P^o$
451501.0	451538	-37	1.5	96 $3d^8(^3P)4p\ ^4S^o$
458378.0	458402	-24	3.5	96 $3d^8(^1G)4p\ ^2G^o$
459014.5	459053	-39	4.5	97 $3d^8(^1G)4p\ ^2G^o$
496179.5	496213	-33	0.5	97 $3d^8(^1S)4p\ ^2P^o$
500575.3	500541	34	1.5	97 $3d^8(^1S)4p\ ^2P^o$

Table 4. Calculated HFR oscillator strengths (log gf) and transition probabilities (gA, in sec−1) in Ge VI. CF is the cancellation factor as defined by Cowan (1981). In columns 3 and 6, *e* is written for even and *o* for odd.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
199.770	0	e	2.5	500575	o	1.5	-1.20	1.06E+10	0.408
201.607	4560	e	1.5	500575	o	1.5	-2.00	1.66E+09	-0.421
203.409	4560	e	1.5	496180	o	0.5	-1.30	8.01E+09	0.471
218.161	0	e	2.5	458378	o	3.5	-1.77	2.40E+09	0.466
221.483	0	e	2.5	451501	o	1.5	-3.80	2.15E+07	-0.011
222.147	0	e	2.5	450153	o	2.5	-1.77	2.29E+09	0.080
223.324	0	e	2.5	447780	o	3.5	-0.23	7.82E+10	0.593
223.527	0	e	2.5	447373	o	1.5	-1.09	1.08E+10	0.559
223.813	4560	e	1.5	451362	o	0.5	-1.21	8.15E+09	-0.889
224.381	0	e	2.5	445670	o	2.5	-1.68	2.77E+09	0.052
224.420	4560	e	1.5	450153	o	2.5	-0.21	8.15E+10	0.661
224.498	0	e	2.5	445439	o	1.5	-0.22	8.04E+10	0.652
224.955	4560	e	1.5	449093	o	0.5	-0.43	4.90E+10	0.899
225.829	4560	e	1.5	447373	o	1.5	-1.59	3.35E+09	0.083
225.840	0	e	2.5	442790	o	3.5	-0.72	2.48E+10	-0.847
226.559	0	e	2.5	441386	o	2.5	-3.76	2.28E+07	0.001
226.615	0	e	2.5	441278	o	1.5	-1.11	1.01E+10	0.771
226.701	4560	e	1.5	445670	o	2.5	-1.44	4.76E+09	-0.374
226.820	4560	e	1.5	445439	o	1.5	-0.64	3.00E+10	-0.863
227.857	0	e	2.5	438871	o	1.5	-1.34	5.83E+09	0.097
228.414	0	e	2.5	437801	o	2.5	-0.25	7.16E+10	0.745
228.924	4560	e	1.5	441386	o	2.5	-1.38	5.35E+09	-0.468
228.981	4560	e	1.5	441278	o	1.5	-2.90	1.60E+08	0.019
229.011	4560	e	1.5	441221	o	0.5	-1.84	1.84E+09	0.613
229.267	0	e	2.5	436173	o	3.5	-0.66	2.80E+10	0.746
229.345	0	e	2.5	436024	o	1.5	-1.14	9.29E+09	0.175
230.250	4560	e	1.5	438871	o	1.5	-1.17	8.50E+09	0.190
230.677	0	e	2.5	433507	o	2.5	-2.80	1.98E+08	0.018
230.818	4560	e	1.5	437801	o	2.5	-1.63	2.93E+09	-0.136
231.392	4560	e	1.5	436727	o	0.5	-2.47	4.26E+08	-0.009
231.769	4560	e	1.5	436024	o	1.5	-0.45	4.41E+10	0.538
232.161	0	e	2.5	430736	o	2.5	-1.08	1.04E+10	0.326
232.560	0	e	2.5	429997	o	1.5	-1.82	1.86E+09	0.085
233.129	4560	e	1.5	433507	o	2.5	-0.97	1.31E+10	0.597
234.477	4560	e	1.5	431042	o	0.5	-3.54	3.48E+07	0.009
234.645	4560	e	1.5	430736	o	2.5	-1.28	6.37E+09	-0.639
235.052	4560	e	1.5	429997	o	1.5	-1.07	1.02E+10	0.458
235.568	0	e	2.5	424506	o	2.5	-0.49	3.86E+10	0.720
236.390	0	e	2.5	423030	o	1.5	-1.33	5.58E+09	0.243
237.355	0	e	2.5	421310	o	3.5	-1.09	9.72E+09	0.587
237.788	0	e	2.5	420542	o	3.5	-0.61	2.93E+10	0.436
238.028	0	e	2.5	420118	o	2.5	-0.27	6.39E+10	0.389
238.126	4560	e	1.5	424506	o	2.5	-0.91	1.44E+10	0.172
238.966	4560	e	1.5	423030	o	1.5	-0.50	3.66E+10	0.382
239.268	0	e	2.5	417942	o	2.5	-0.72	2.20E+10	0.421
239.353	0	e	2.5	417792	o	1.5	-2.01	1.14E+09	0.140
239.975	0	e	2.5	416710	o	3.5	-0.97	1.24E+10	0.444
240.640	4560	e	1.5	420118	o	2.5	-0.88	1.54E+10	-0.299
241.705	0	e	2.5	413728	o	2.5	-2.45	4.04E+08	-0.126
241.907	4560	e	1.5	417942	o	2.5	-3.80	1.81E+07	-0.002
241.995	4560	e	1.5	417792	o	1.5	-1.08	9.40E+09	0.226
242.696	0	e	2.5	412038	o	1.5	-3.23	6.71E+07	-0.199
244.312	4560	e	1.5	413873	o	0.5	-3.48	3.71E+07	-0.087
244.398	4560	e	1.5	413728	o	2.5	-2.84	1.63E+08	0.068
244.510	0	e	2.5	408981	o	2.5	-3.58	2.96E+07	0.036
246.979	0	e	2.5	404892	o	3.5	-2.85	1.53E+08	-0.057
247.267	4560	e	1.5	408981	o	2.5	-3.18	7.25E+07	-0.068
544.548	316937	e	2.5	500575	o	1.5	-3.51	7.02E+06	-0.097
577.910	327538	e	2.5	500575	o	1.5	-2.29	1.03E+08	-0.121
583.085	329074	e	1.5	500575	o	1.5	-3.01	1.91E+07	0.066
594.535	332377	e	1.5	500575	o	1.5	-3.37	8.07E+06	-0.028
596.870	333035	e	2.5	500575	o	1.5	-2.02	1.78E+08	-0.217
598.423	329074	e	1.5	496180	o	0.5	-2.12	1.41E+08	-0.238

Table 4. continued.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
610.490	332377	e	1.5	496180	o	0.5	-2.67	3.86E+07	0.173
620.194	339335	e	1.5	500575	o	1.5	-2.67	3.68E+07	-0.432
624.805	340525	e	0.5	500575	o	1.5	-3.50	5.40E+06	0.014
637.575	339335	e	1.5	496180	o	0.5	-3.40	6.53E+06	0.030
642.450	340525	e	0.5	496180	o	0.5	-3.36	7.15E+06	-0.023
657.313	306243	e	3.5	458378	o	3.5	-3.61	3.75E+06	-0.014
684.979	313025	e	3.5	459015	o	4.5	-2.91	1.74E+07	-0.049
687.978	313025	e	3.5	458378	o	3.5	-2.55	4.01E+07	-0.113
694.041	303696	e	4.5	447780	o	3.5	-2.42	5.29E+07	-0.055
694.881	306243	e	3.5	450153	o	2.5	-3.37	5.96E+06	-0.018
706.531	306243	e	3.5	447780	o	3.5	-3.58	3.55E+06	-0.006
706.735	308657	e	2.5	450153	o	2.5	-3.21	8.21E+06	-0.042
707.008	316937	e	2.5	458378	o	3.5	-2.72	2.57E+07	-0.192
714.521	310199	e	1.5	450153	o	2.5	-3.85	1.84E+06	0.007
717.223	306243	e	3.5	445670	o	2.5	-2.02	1.25E+08	0.140
718.937	303696	e	4.5	442790	o	3.5	-1.07	1.10E+09	-0.443
719.974	310199	e	1.5	449093	o	0.5	-3.73	2.42E+06	0.006
720.898	308657	e	2.5	447373	o	1.5	-2.60	3.23E+07	0.099
729.002	310199	e	1.5	447373	o	1.5	-2.69	2.60E+07	-0.200
729.244	313025	e	3.5	450153	o	2.5	-2.09	1.03E+08	-0.111
729.859	308657	e	2.5	445670	o	2.5	-2.29	6.45E+07	-0.278
731.091	308657	e	2.5	445439	o	1.5	-3.29	6.45E+06	0.028
732.349	306243	e	3.5	442790	o	3.5	-1.63	2.88E+08	0.467
738.166	310199	e	1.5	445670	o	2.5	-3.30	6.17E+06	0.068
739.427	310199	e	1.5	445439	o	1.5	-3.89	1.58E+06	-0.008
739.959	306243	e	3.5	441386	o	2.5	-1.16	8.52E+08	-0.418
742.085	313025	e	3.5	447780	o	3.5	-1.36	5.34E+08	-0.347
743.140	316937	e	2.5	451501	o	1.5	-3.95	1.36E+06	0.019
745.528	308657	e	2.5	442790	o	3.5	-2.72	2.31E+07	-0.131
750.659	316937	e	2.5	450153	o	2.5	-1.37	5.06E+08	-0.281
753.416	308657	e	2.5	441386	o	2.5	-1.63	2.75E+08	0.330
753.890	313025	e	3.5	445670	o	2.5	-1.53	3.47E+08	-0.458
754.030	308657	e	2.5	441278	o	1.5	-1.17	7.90E+08	-0.548
754.847	303696	e	4.5	436173	o	3.5	-1.68	2.42E+08	-0.277
760.123	306243	e	3.5	437801	o	2.5	-3.83	1.73E+06	0.005
760.933	313025	e	3.5	444442	o	4.5	-3.96	1.27E+06	0.003
762.271	310199	e	1.5	441386	o	2.5	-2.78	1.92E+07	-0.051
762.899	310199	e	1.5	441278	o	1.5	-1.64	2.62E+08	0.524
763.231	310199	e	1.5	441221	o	0.5	-1.22	6.86E+08	-0.603
764.292	327538	e	2.5	458378	o	3.5	-3.45	4.08E+06	-0.067
766.658	316937	e	2.5	447373	o	1.5	-1.90	1.44E+08	-0.270
767.965	308657	e	2.5	438871	o	1.5	-2.19	7.24E+07	0.059
769.646	306243	e	3.5	436173	o	3.5	-2.81	1.73E+07	0.035
770.619	313025	e	3.5	442790	o	3.5	-2.13	8.34E+07	0.186
774.331	308657	e	2.5	437801	o	2.5	-3.55	3.14E+06	0.003
776.800	316937	e	2.5	445670	o	2.5	-2.27	5.96E+07	0.223
777.168	310199	e	1.5	438871	o	1.5	-3.25	6.17E+06	-0.005
778.197	316937	e	2.5	445439	o	1.5	-3.15	7.71E+06	0.021
779.050	313025	e	3.5	441386	o	2.5	-3.69	2.25E+06	-0.004
785.136	308657	e	2.5	436024	o	1.5	-2.59	2.78E+07	0.061
785.771	306243	e	3.5	433507	o	2.5	-2.34	4.89E+07	-0.259
794.758	310199	e	1.5	436024	o	1.5	-3.09	8.66E+06	0.013
797.808	333035	e	2.5	458378	o	3.5	-2.73	1.97E+07	-0.394
801.434	313025	e	3.5	437801	o	2.5	-1.13	7.72E+08	0.680
803.261	306243	e	3.5	430736	o	2.5	-1.56	2.86E+08	0.371
803.541	316937	e	2.5	441386	o	2.5	-2.29	5.33E+07	0.121
804.239	316937	e	2.5	441278	o	1.5	-2.60	2.58E+07	0.098
806.692	327538	e	2.5	451501	o	1.5	-0.75	1.81E+09	0.268
812.026	313025	e	3.5	436173	o	3.5	-2.04	9.21E+07	-0.345
815.560	327538	e	2.5	450153	o	2.5	-2.81	1.56E+07	0.023
816.811	329074	e	1.5	451501	o	1.5	-1.25	5.60E+08	-0.330
817.739	329074	e	1.5	451362	o	0.5	-3.77	1.70E+06	0.001
819.143	308657	e	2.5	430736	o	2.5	-2.38	4.13E+07	-0.063
820.112	316937	e	2.5	438871	o	1.5	-1.28	5.21E+08	0.312
824.130	308657	e	2.5	429997	o	1.5	-1.93	1.17E+08	0.709

Table 4. continued.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
825.904	329074	e	1.5	450153	o	2.5	-1.06	8.51E+08	-0.345
827.375	316937	e	2.5	437801	o	2.5	-1.95	1.09E+08	-0.043
827.521	310199	e	1.5	431042	o	0.5	-2.97	1.04E+07	0.631
829.621	310199	e	1.5	430736	o	2.5	-2.99	9.92E+06	0.024
829.997	313025	e	3.5	433507	o	2.5	-1.99	9.83E+07	-0.309
831.655	327538	e	2.5	447780	o	3.5	-1.35	4.29E+08	-0.053
833.199	329074	e	1.5	449093	o	0.5	-1.07	8.23E+08	0.244
834.480	327538	e	2.5	447373	o	1.5	-2.81	1.50E+07	0.035
838.669	316937	e	2.5	436173	o	3.5	-2.19	6.16E+07	0.021
839.459	332377	e	1.5	451501	o	1.5	-0.40	3.77E+09	-0.731
839.724	316937	e	2.5	436024	o	1.5	-1.00	9.42E+08	0.250
840.308	332497	e	0.5	451501	o	1.5	-0.55	2.68E+09	0.769
840.439	332377	e	1.5	451362	o	0.5	-1.93	1.11E+08	0.249
844.121	333035	e	2.5	451501	o	1.5	-0.54	2.72E+09	-0.491
845.313	329074	e	1.5	447373	o	1.5	-1.90	1.18E+08	-0.084
845.573	306243	e	3.5	424506	o	2.5	-1.43	3.47E+08	0.214
846.510	327538	e	2.5	445670	o	2.5	-1.36	4.12E+08	-0.199
848.169	327538	e	2.5	445439	o	1.5	-1.03	8.68E+08	0.546
849.067	332377	e	1.5	450153	o	2.5	-1.46	3.20E+08	0.559
849.535	313025	e	3.5	430736	o	2.5	-1.22	5.59E+08	0.476
850.240	303696	e	4.5	421310	o	3.5	-2.54	2.67E+07	0.105
853.837	333035	e	2.5	450153	o	2.5	-2.60	2.31E+07	0.042
855.829	303696	e	4.5	420542	o	3.5	-1.31	4.44E+08	0.701
856.778	332377	e	1.5	449093	o	0.5	-1.56	2.51E+08	-0.280
857.659	329074	e	1.5	445670	o	2.5	-2.24	5.24E+07	-0.011
857.662	332497	e	0.5	449093	o	0.5	-1.53	2.69E+08	-0.843
857.852	316937	e	2.5	433507	o	2.5	-2.66	1.98E+07	-0.026
859.362	329074	e	1.5	445439	o	1.5	-1.16	6.24E+08	-0.166
863.191	308657	e	2.5	424506	o	2.5	-2.07	7.64E+07	0.020
866.625	343624	e	4.5	459015	o	4.5	0.44	2.45E+10	-0.737
866.998	343674	e	3.5	459015	o	4.5	-0.58	2.36E+09	0.851
867.660	327538	e	2.5	442790	o	3.5	-0.22	5.33E+09	0.351
869.062	306243	e	3.5	421310	o	3.5	-3.38	3.69E+06	-0.001
869.592	332377	e	1.5	447373	o	1.5	-1.42	3.39E+08	-0.331
870.504	332497	e	0.5	447373	o	1.5	-1.40	3.51E+08	-0.470
871.432	343624	e	4.5	458378	o	3.5	-3.26	4.78E+06	0.002
871.495	333035	e	2.5	447780	o	3.5	-0.18	5.79E+09	-0.805
871.809	343674	e	3.5	458378	o	3.5	0.38	2.11E+10	-0.808
874.334	308657	e	2.5	423030	o	1.5	-1.15	6.17E+08	0.235
874.597	333035	e	2.5	447373	o	1.5	-1.69	1.78E+08	0.515
874.835	310199	e	1.5	424506	o	2.5	-0.92	1.04E+09	-0.872
874.901	306243	e	3.5	420542	o	3.5	-1.31	4.25E+08	0.048
878.160	306243	e	3.5	420118	o	2.5	-1.01	8.47E+08	0.170
878.363	327538	e	2.5	441386	o	2.5	-1.22	5.26E+08	0.083
878.741	316937	e	2.5	430736	o	2.5	-2.90	1.10E+07	-0.007
879.197	327538	e	2.5	441278	o	1.5	-1.49	2.81E+08	0.123
879.314	303696	e	4.5	417421	o	4.5	-2.35	3.83E+07	-0.013
882.664	332377	e	1.5	445670	o	2.5	-0.56	2.35E+09	-0.547
884.467	332377	e	1.5	445439	o	1.5	-2.77	1.45E+07	-0.014
884.482	316937	e	2.5	429997	o	1.5	-1.44	3.14E+08	0.192
884.850	303696	e	4.5	416710	o	3.5	-3.41	3.30E+06	-0.001
885.410	332497	e	0.5	445439	o	1.5	-1.63	1.98E+08	-0.621
886.282	310199	e	1.5	423030	o	1.5	-0.53	2.54E+09	0.623
887.683	308657	e	2.5	421310	o	3.5	-0.68	1.78E+09	-0.258
887.820	333035	e	2.5	445670	o	2.5	-0.96	9.38E+08	0.543
889.645	333035	e	2.5	445439	o	1.5	-1.05	7.58E+08	0.517
890.374	329074	e	1.5	441386	o	2.5	-1.15	5.97E+08	0.073
891.231	329074	e	1.5	441278	o	1.5	-2.36	3.70E+07	0.010
891.538	339335	e	1.5	451501	o	1.5	-2.94	9.66E+06	-0.068
891.684	329074	e	1.5	441221	o	0.5	-1.71	1.65E+08	0.196
892.644	339335	e	1.5	451362	o	0.5	-0.28	4.45E+09	0.830
893.776	308657	e	2.5	420542	o	3.5	-0.90	1.06E+09	-0.613
895.267	306243	e	3.5	417942	o	2.5	-2.49	2.69E+07	-0.004
897.007	313025	e	3.5	424506	o	2.5	-1.70	1.67E+08	0.033
897.178	308657	e	2.5	420118	o	2.5	-0.56	2.26E+09	0.579

Table 4. continued.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
897.292	303696	e	4.5	415143	o	4.5	0.27	1.52E+10	-0.616
898.202	327538	e	2.5	438871	o	1.5	-1.09	6.75E+08	0.102
899.460	306243	e	3.5	417421	o	4.5	-0.31	4.01E+09	-0.221
901.098	340525	e	0.5	451501	o	1.5	-3.09	6.63E+06	0.153
902.228	340525	e	0.5	451362	o	0.5	-1.18	5.42E+08	-0.170
902.383	339335	e	1.5	450153	o	2.5	-1.09	6.71E+08	0.778
905.253	306243	e	3.5	416710	o	3.5	0.11	1.04E+10	-0.512
906.922	327538	e	2.5	437801	o	2.5	-0.72	1.54E+09	-0.130
909.763	310199	e	1.5	420118	o	2.5	-1.50	2.57E+08	-0.425
910.765	329074	e	1.5	438871	o	1.5	-0.20	5.14E+09	-0.648
911.098	339335	e	1.5	449093	o	0.5	-1.33	3.75E+08	-0.093
911.114	333035	e	2.5	442790	o	3.5	0.13	1.07E+10	-0.865
914.143	391183	e	0.5	500575	o	1.5	0.08	9.47E+09	0.898
915.041	308657	e	2.5	417942	o	2.5	-0.09	6.53E+09	-0.527
916.296	308657	e	2.5	417792	o	1.5	-1.57	2.14E+08	-0.059
917.352	332377	e	1.5	441386	o	2.5	0.05	8.97E+09	0.764
918.262	332377	e	1.5	441278	o	1.5	-0.37	3.37E+09	0.573
918.280	306243	e	3.5	415143	o	4.5	0.02	8.18E+09	0.902
918.743	332377	e	1.5	441221	o	0.5	-1.44	2.84E+08	0.224
919.278	332497	e	0.5	441278	o	1.5	-0.28	4.16E+09	0.847
919.731	329074	e	1.5	437801	o	2.5	-0.61	1.94E+09	0.476
919.760	332497	e	0.5	441221	o	0.5	-0.35	3.50E+09	0.835
920.510	327538	e	2.5	436173	o	3.5	0.23	1.31E+10	0.887
921.084	340525	e	0.5	449093	o	0.5	-0.38	3.29E+09	-0.847
921.780	327538	e	2.5	436024	o	1.5	-1.19	5.13E+08	-0.108
922.923	333035	e	2.5	441386	o	2.5	-1.54	2.27E+08	-0.044
923.486	313025	e	3.5	421310	o	3.5	-0.97	8.31E+08	-0.118
923.844	333035	e	2.5	441278	o	1.5	-2.22	4.65E+07	0.024
924.302	303696	e	4.5	411886	o	3.5	-2.63	1.81E+07	0.010
925.476	308657	e	2.5	416710	o	3.5	-0.06	6.72E+09	0.892
925.603	339335	e	1.5	447373	o	1.5	-1.18	5.14E+08	0.161
926.824	303696	e	4.5	411592	o	5.5	0.56	2.80E+10	0.919
928.136	310199	e	1.5	417942	o	2.5	-0.25	4.39E+09	0.887
928.907	329074	e	1.5	436727	o	0.5	-0.54	2.22E+09	0.529
929.428	310199	e	1.5	417792	o	1.5	-0.09	6.27E+09	-0.869
929.631	316937	e	2.5	424506	o	2.5	0.19	1.20E+10	-0.868
930.082	313025	e	3.5	420542	o	3.5	0.29	1.50E+10	-0.883
930.366	306243	e	3.5	413728	o	2.5	-2.19	4.93E+07	0.041
933.766	313025	e	3.5	420118	o	2.5	0.09	9.37E+09	0.760
935.016	329074	e	1.5	436024	o	1.5	-0.65	1.71E+09	-0.260
935.912	340525	e	0.5	447373	o	1.5	0.00	7.65E+09	0.903
939.013	332377	e	1.5	438871	o	1.5	-2.01	7.41E+07	0.023
939.152	343674	e	3.5	450153	o	2.5	0.20	1.19E+10	0.899
940.076	332497	e	0.5	438871	o	1.5	-3.62	1.80E+06	0.002
940.427	339335	e	1.5	445670	o	2.5	0.10	9.54E+09	0.895
942.474	339335	e	1.5	445439	o	1.5	-0.04	6.84E+09	-0.768
942.567	316937	e	2.5	423030	o	1.5	-0.16	5.19E+09	0.785
943.671	327538	e	2.5	433507	o	2.5	-2.32	3.60E+07	-0.009
944.851	333035	e	2.5	438871	o	1.5	-0.73	1.40E+09	0.234
946.589	306243	e	3.5	411886	o	3.5	0.01	7.63E+09	0.890
947.937	303696	e	4.5	409188	o	4.5	0.06	8.44E+09	0.890
948.547	332377	e	1.5	437801	o	2.5	-1.10	5.96E+08	-0.233
951.739	308657	e	2.5	413728	o	2.5	-0.21	4.53E+09	0.831
952.415	391183	e	0.5	496180	o	0.5	-0.25	4.19E+09	0.898
953.132	313025	e	3.5	417942	o	2.5	-0.51	2.25E+09	0.463
953.164	340525	e	0.5	445439	o	1.5	-1.80	1.16E+08	0.033
954.504	333035	e	2.5	437801	o	2.5	0.06	8.40E+09	-0.789
955.708	343624	e	4.5	448259	o	5.5	0.55	2.60E+10	0.924
957.548	329074	e	1.5	433507	o	2.5	0.12	9.64E+09	0.856
957.886	313025	e	3.5	417421	o	4.5	0.39	1.79E+10	0.920
958.100	316937	e	2.5	421310	o	3.5	0.31	1.48E+10	0.918
958.310	332377	e	1.5	436727	o	0.5	-0.71	1.40E+09	-0.885
959.417	332497	e	0.5	436727	o	0.5	-2.06	6.25E+07	0.627
960.102	343624	e	4.5	447780	o	3.5	0.21	1.19E+10	0.880
960.559	343674	e	3.5	447780	o	3.5	-3.12	5.47E+06	0.003

Table 4. continued.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
964.459	313025	e	3.5	416710	o	3.5	-0.71	1.41E+09	-0.149
964.567	310199	e	1.5	413873	o	0.5	-0.27	3.89E+09	0.927
964.813	332377	e	1.5	436024	o	1.5	-0.77	1.22E+09	0.543
965.203	316937	e	2.5	420542	o	3.5	-0.74	1.32E+09	-0.194
965.914	310199	e	1.5	413728	o	2.5	0.02	7.45E+09	0.567
965.935	332497	e	0.5	436024	o	1.5	-1.13	5.34E+08	-0.627
967.300	308657	e	2.5	412038	o	1.5	0.00	7.20E+09	0.917
968.723	308657	e	2.5	411886	o	3.5	0.07	8.31E+09	0.480
969.010	327538	e	2.5	430736	o	2.5	0.13	9.55E+09	-0.878
969.171	316937	e	2.5	420118	o	2.5	-1.13	5.25E+08	0.095
969.568	333035	e	2.5	436173	o	3.5	-0.44	2.56E+09	0.194
970.977	333035	e	2.5	436024	o	1.5	-0.30	3.57E+09	-0.895
971.392	306243	e	3.5	409188	o	4.5	0.16	1.03E+10	0.517
973.353	306243	e	3.5	408981	o	2.5	0.19	1.08E+10	0.926
975.996	327538	e	2.5	429997	o	1.5	-0.16	4.80E+09	-0.881
979.258	313025	e	3.5	415143	o	4.5	-0.84	1.00E+09	0.194
979.905	339335	e	1.5	441386	o	2.5	-0.48	2.29E+09	0.636
980.431	343674	e	3.5	445670	o	2.5	-1.35	3.09E+08	-0.803
980.697	329074	e	1.5	431042	o	0.5	-0.70	1.38E+09	-0.854
980.943	339335	e	1.5	441278	o	1.5	-2.69	1.41E+07	-0.013
981.492	339335	e	1.5	441221	o	0.5	-2.28	3.66E+07	-0.227
981.946	310199	e	1.5	412038	o	1.5	-1.18	4.58E+08	-0.142
983.648	329074	e	1.5	430736	o	2.5	-1.72	1.31E+08	-0.024
988.180	303696	e	4.5	404892	o	3.5	0.34	1.49E+10	0.928
988.822	332377	e	1.5	433507	o	2.5	-2.24	3.92E+07	-0.008
990.049	316937	e	2.5	417942	o	2.5	-1.50	2.17E+08	-0.105
990.848	329074	e	1.5	429997	o	1.5	-1.26	3.73E+08	-0.209
991.519	316937	e	2.5	417792	o	1.5	-0.54	1.98E+09	0.792
991.888	343624	e	4.5	444442	o	4.5	-0.63	1.58E+09	0.866
992.377	343674	e	3.5	444442	o	4.5	0.42	1.79E+10	0.847
992.529	340525	e	0.5	441278	o	1.5	-1.07	5.70E+08	0.673
993.015	313025	e	3.5	413728	o	2.5	-1.60	1.68E+08	-0.482
993.091	340525	e	0.5	441221	o	0.5	-1.71	1.31E+08	-0.867
995.298	333035	e	2.5	433507	o	2.5	-0.49	2.16E+09	0.680
996.771	308657	e	2.5	408981	o	2.5	-1.38	2.82E+08	-0.057
1002.276	316937	e	2.5	416710	o	3.5	-1.54	1.93E+08	0.161
1004.661	339335	e	1.5	438871	o	1.5	-0.76	1.14E+09	0.581
1008.410	343624	e	4.5	442790	o	3.5	-0.45	2.30E+09	-0.845
1008.915	343674	e	3.5	442790	o	3.5	-3.38	2.72E+06	0.011
1011.518	313025	e	3.5	411886	o	3.5	-1.44	2.35E+08	-0.259
1012.330	310199	e	1.5	408981	o	2.5	-2.58	1.71E+07	0.026
1013.528	332377	e	1.5	431042	o	0.5	-0.51	2.00E+09	-0.582
1013.696	306243	e	3.5	404892	o	3.5	-2.36	2.87E+07	-0.006
1014.766	332497	e	0.5	431042	o	0.5	-1.24	3.78E+08	0.423
1015.582	339335	e	1.5	437801	o	2.5	-1.32	3.07E+08	0.181
1016.680	332377	e	1.5	430736	o	2.5	-0.67	1.37E+09	0.209
1016.817	340525	e	0.5	438871	o	1.5	-1.34	2.93E+08	-0.676
1023.416	343674	e	3.5	441386	o	2.5	-1.29	3.29E+08	-0.766
1023.527	333035	e	2.5	430736	o	2.5	-1.01	6.16E+08	0.069
1024.373	332377	e	1.5	429997	o	1.5	-1.08	5.29E+08	-0.221
1025.638	332497	e	0.5	429997	o	1.5	-0.68	1.33E+09	0.346
1026.782	339335	e	1.5	436727	o	0.5	-1.61	1.54E+08	0.102
1031.263	327538	e	2.5	424506	o	2.5	-1.92	7.46E+07	0.100
1031.324	333035	e	2.5	429997	o	1.5	-1.23	3.71E+08	0.085
1033.152	316937	e	2.5	413728	o	2.5	-1.36	2.75E+08	-0.601
1034.251	339335	e	1.5	436024	o	1.5	-1.80	9.90E+07	-0.057
1039.122	308657	e	2.5	404892	o	3.5	-2.87	8.34E+06	0.013
1039.483	340525	e	0.5	436727	o	0.5	-1.12	4.73E+08	0.453
1039.892	313025	e	3.5	409188	o	4.5	-0.53	1.80E+09	0.199
1042.139	313025	e	3.5	408981	o	2.5	-1.16	4.29E+08	-0.451
1047.139	340525	e	0.5	436024	o	1.5	-1.59	1.59E+08	0.767
1047.207	327538	e	2.5	423030	o	1.5	-1.69	1.24E+08	0.110
1051.515	316937	e	2.5	412038	o	1.5	-1.68	1.27E+08	-0.824
1053.196	316937	e	2.5	411886	o	3.5	-1.09	4.86E+08	0.202
1061.890	339335	e	1.5	433507	o	2.5	-2.06	5.12E+07	-0.032

Table 4. continued.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
1062.394	343674	e	3.5	437801	o	2.5	-1.59	1.53E+08	0.684
1064.323	329074	e	1.5	423030	o	1.5	-1.01	5.79E+08	0.442
1066.415	327538	e	2.5	421310	o	3.5	-2.42	2.24E+07	-0.018
1075.221	327538	e	2.5	420542	o	3.5	-2.96	6.27E+06	0.026
1080.148	327538	e	2.5	420118	o	2.5	-1.28	3.02E+08	0.264
1080.510	343624	e	4.5	436173	o	3.5	-0.50	1.80E+09	0.899
1081.089	343674	e	3.5	436173	o	3.5	-3.01	5.57E+06	-0.033
1085.425	332377	e	1.5	424506	o	2.5	-3.97	6.02E+05	0.020
1086.433	316937	e	2.5	408981	o	2.5	-1.80	8.93E+07	0.314
1088.522	313025	e	3.5	404892	o	3.5	-1.41	2.18E+08	0.258
1090.434	339335	e	1.5	431042	o	0.5	-2.85	7.97E+06	0.045
1093.233	333035	e	2.5	424506	o	2.5	-2.16	3.83E+07	0.093
1094.084	339335	e	1.5	430736	o	2.5	-2.23	3.33E+07	-0.052
1102.998	339335	e	1.5	429997	o	1.5	-1.63	1.30E+08	-0.288
1103.103	332377	e	1.5	423030	o	1.5	-1.82	8.25E+07	-0.232
1104.570	332497	e	0.5	423030	o	1.5	-2.38	2.28E+07	-0.449
1104.770	340525	e	0.5	431042	o	0.5	-1.81	8.41E+07	-0.862
1106.146	327538	e	2.5	417942	o	2.5	-1.37	2.30E+08	0.266
1107.980	327538	e	2.5	417792	o	1.5	-2.24	3.13E+07	0.066
1111.168	333035	e	2.5	423030	o	1.5	-2.26	2.95E+07	0.038
1113.177	343674	e	3.5	433507	o	2.5	-1.11	4.13E+08	0.858
1117.668	340525	e	0.5	429997	o	1.5	-2.38	2.25E+07	0.258
1121.431	327538	e	2.5	416710	o	3.5	-2.09	4.31E+07	0.139
1125.261	329074	e	1.5	417942	o	2.5	-2.82	7.97E+06	0.019
1127.159	329074	e	1.5	417792	o	1.5	-1.44	1.92E+08	0.156
1132.818	333035	e	2.5	421310	o	3.5	-3.54	1.49E+06	-0.002
1136.939	316937	e	2.5	404892	o	3.5	-3.72	9.94E+05	0.013
1139.715	332377	e	1.5	420118	o	2.5	-2.29	2.67E+07	-0.179
1142.760	333035	e	2.5	420542	o	3.5	-3.65	1.15E+06	0.010
1148.327	333035	e	2.5	420118	o	2.5	-1.37	2.18E+08	0.269
1148.607	343674	e	3.5	430736	o	2.5	-2.60	1.27E+07	-0.619
1160.226	327538	e	2.5	413728	o	2.5	-2.87	6.62E+06	-0.033
1168.698	332377	e	1.5	417942	o	2.5	-2.48	1.62E+07	0.076
1172.399	332497	e	0.5	417792	o	1.5	-3.06	4.24E+06	0.082
1174.107	339335	e	1.5	424506	o	2.5	-2.46	1.67E+07	0.408
1177.755	333035	e	2.5	417942	o	2.5	-2.43	1.80E+07	0.029
1179.259	329074	e	1.5	413873	o	0.5	-2.38	2.02E+07	0.090
1179.835	333035	e	2.5	417792	o	1.5	-3.31	2.36E+06	0.007
1183.435	327538	e	2.5	412038	o	1.5	-2.10	3.78E+07	0.210
1185.565	327538	e	2.5	411886	o	3.5	-2.46	1.63E+07	-0.051
1194.819	339335	e	1.5	423030	o	1.5	-2.93	5.52E+06	0.022
1195.099	333035	e	2.5	416710	o	3.5	-2.25	2.60E+07	-0.135
1205.341	329074	e	1.5	412038	o	1.5	-2.15	3.24E+07	0.147
1212.052	340525	e	0.5	423030	o	1.5	-2.28	2.38E+07	0.238
1227.054	332377	e	1.5	413873	o	0.5	-2.16	3.09E+07	0.252
1227.850	327538	e	2.5	408981	o	2.5	-1.62	1.06E+08	0.317
1228.870	332497	e	0.5	413873	o	0.5	-1.36	1.91E+08	0.850
1229.235	332377	e	1.5	413728	o	2.5	-3.13	3.29E+06	-0.020
1237.128	343674	e	3.5	424506	o	2.5	-1.40	1.75E+08	-0.662
1237.892	339335	e	1.5	420118	o	2.5	-1.85	6.19E+07	0.384
1251.447	329074	e	1.5	408981	o	2.5	-1.75	7.55E+07	0.398
1255.318	332377	e	1.5	412038	o	1.5	-1.38	1.77E+08	0.606
1257.218	332497	e	0.5	412038	o	1.5	-1.48	1.40E+08	0.718
1265.773	333035	e	2.5	412038	o	1.5	-2.84	6.00E+06	-0.050
1268.210	333035	e	2.5	411886	o	3.5	-3.05	3.64E+06	0.021
1272.158	339335	e	1.5	417942	o	2.5	-2.34	1.90E+07	0.288
1287.240	343624	e	4.5	421310	o	3.5	-2.42	1.53E+07	-0.496
1288.062	343674	e	3.5	421310	o	3.5	-2.90	5.11E+06	-0.061
1292.751	327538	e	2.5	404892	o	3.5	-1.17	2.71E+08	0.705
1294.215	340525	e	0.5	417792	o	1.5	-2.72	7.68E+06	0.239
1300.093	343624	e	4.5	420542	o	3.5	-1.45	1.39E+08	-0.781
1300.931	343674	e	3.5	420542	o	3.5	-2.45	1.40E+07	0.155
1305.406	332377	e	1.5	408981	o	2.5	-1.32	1.90E+08	0.507
1308.151	343674	e	3.5	420118	o	2.5	-1.99	4.04E+07	0.204
1316.716	333035	e	2.5	408981	o	2.5	-1.82	5.88E+07	-0.259

Table 4. continued.

	Lower level			Upper level					
Wavelength / Å	Energy / cm^{-1}	Parity	j	Energy / cm^{-1}	Parity	j	$\log gf$	gA	CF
1341.610	339335	e	1.5	413873	o	0.5	-3.46	1.28E+06	-0.098
1344.218	339335	e	1.5	413728	o	2.5	-3.75	6.49E+05	-0.016
1346.477	343674	e	3.5	417942	o	2.5	-2.80	5.88E+06	-0.349
1355.072	343624	e	4.5	417421	o	4.5	-2.81	5.57E+06	-0.142
1363.377	340525	e	0.5	413873	o	0.5	-3.26	2.00E+06	-0.644
1368.264	343624	e	4.5	416710	o	3.5	-1.88	4.71E+07	-0.515
1369.193	343674	e	3.5	416710	o	3.5	-3.45	1.25E+06	0.018
1375.470	339335	e	1.5	412038	o	1.5	-3.47	1.21E+06	-0.117
1391.639	333035	e	2.5	404892	o	3.5	-1.41	1.34E+08	-0.487
1398.359	340525	e	0.5	412038	o	1.5	-3.84	5.00E+05	0.204
1427.470	343674	e	3.5	413728	o	2.5	-2.94	3.75E+06	-0.400
1466.020	343674	e	3.5	411886	o	3.5	-3.57	8.36E+05	-0.117
1525.227	343624	e	4.5	409188	o	4.5	-3.15	2.04E+06	-0.093
1531.227	343674	e	3.5	408981	o	2.5	-3.73	5.38E+05	0.039
1632.176	343624	e	4.5	404892	o	3.5	-3.38	1.06E+06	0.022
1657.885	391183	e	0.5	451501	o	1.5	-3.21	1.50E+06	-0.094
1661.715	391183	e	0.5	451362	o	0.5	-3.04	2.23E+06	-0.185
1726.823	391183	e	0.5	449093	o	0.5	-2.91	2.77E+06	0.385
1843.121	391183	e	0.5	445439	o	1.5	-3.24	1.11E+06	0.092
1996.215	391183	e	0.5	441278	o	1.5	-3.25	9.27E+05	0.153
2096.289	391183	e	0.5	438871	o	1.5	-2.10	1.22E+07	0.719
2195.003	391183	e	0.5	436727	o	0.5	-2.29	7.08E+06	0.506
2229.439	391183	e	0.5	436024	o	1.5	-2.58	3.57E+06	-0.830
2508.107	391183	e	0.5	431042	o	0.5	-3.60	2.66E+05	-0.095
2575.612	391183	e	0.5	429997	o	1.5	-3.08	8.40E+05	-0.121
3139.123	391183	e	0.5	423030	o	1.5	-3.66	1.50E+05	0.268