

# Revised Transition Probabilities for Fe XXV

## Relativistic CI Calculations

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### Abstract

Revised data are provided for transition probabilities between fine-structure components of levels with  $n \leq 6$  in FeXXV. Earlier published data for transitions between fine-structure levels in FeXXV is found to in error, especially for certain classes of transitions. The purpose of the present note is to provide a corrected database for transitions in Fe XXV. Wave functions and energies for states with  $n \leq 6$  and  $J = 0 \cdots 3$  are determined using a relativistic configuration interaction (CI) expansion that includes the Breit interaction. To measure and control the numerical accuracy of the calculations, we compare our CI energies and matrix elements with values calculated using relativistic second-order many-body perturbation theory (MBPT), also including the Breit interaction. We obtain good agreement between our CI and MBPT calculations but disagree with earlier calculations for transitions with  $\Delta L = 2$  and for intercombination transitions ( $\Delta S = 1$ ). We provide wavelengths, line strengths and transitions rates for fine-structure transitions between levels with  $n \leq 6$  in FeXXV.

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## INTRODUCTION

Precise values of transition energies and rates in Fe XXV are important for understanding the spectra of galaxies [1, 2], the solar corona [3], Tokamak devices [4], and laboratory plasmas. The most complete and detailed tabulation of transition energies and rates for both Fe XXIV and Fe XXV is contained in the report “Atomic Data from the Iron Project XXXV” by Nahar and Pradhan in Ref. [5] where all dipole transitions in FeXXV up to  $n = 10$  and  $l = 5$  or  $6$  are considered. The estimated accuracy of rates in that work was between 1 and 10%.

Recently, we had occasion to reevaluate rates for some of the transitions given in the Iron Project database using the relativistic CI method described by Plante *et al.* in Ref. [6] and used by Johnson *et al.* in Ref. [7] and Savukov *et al.* in Ref. [8] to evaluate transition rates in lighter ions of the helium isoelectronic sequence. For allowed singlet-singlet and triplet-triplet transitions, we found agreement with the Iron Project values within the above mentioned accuracy estimate. However, for transitions with  $\Delta L = 2$  and for certain intercombination transitions ( $\Delta S = 1$ ), we disagreed with the Iron Project rates by orders of magnitude in many cases.

In order to check the accuracy of our calculations, we undertook a control calculation using the relativistic second-order MBPT method described by Safronova *et al.* in Ref. [9]. We found good agreement between the CI and MBPT results for all transitions considered and confirmed the discrepancies with the Iron Project database described above.

As a remedy, we present below a revised, but somewhat more limited, tabulation of wavelengths and transition rates for fine-structure transitions in Fe XXV,

## METHOD

Both CI and MBPT calculations start from the relativistic “no-pair” Hamiltonian derived from QED by Brown and D. G. Ravenhall in Ref. [10] to resolve difficulties with the Breit interaction in helium and extended to many-electron atoms by Mittleman in Refs. [11, 12, 13] and Sucher in Ref. [14]. It should be emphasized that the electron-electron interaction is the sum of the Coulomb and Breit interactions. Contributions from negative-energy states are projected out of the no-pair Hamiltonian.

The single-particle orbitals used to construct two-particle wave functions are solutions to the Dirac equation in the nuclear Coulomb field. As an aid to evaluating CI and MBPT expressions, we approximate the real spectrum by a discrete pseudospectrum constructed from a finite basis set, thereby reducing the infinite sums and integrals to finite sums. Here, we use a basis set for the Dirac equation constructed from B-splines constrained to a cavity [15]. The single-particle basis set consists of 40 basis functions for each angular momentum state.

### CI calculation

Details of the method used to carry out the CI calculation in this work have been published earlier [7] and are summarized below.

1. The two-electron wave function  $\Psi_{JM}$  is expanded into a linear combination of antisymmetric two-particle configuration state wave functions that are coupled to give angular momentum  $J$ ,  $M$  and parity  $\pi$ .
2. The eigenvalue problem that arises on seeking an extreme value for the expectation value of the no-pair Hamiltonian subject to the normalization constraint is solved to obtain two-particle energies and expansion coefficients for states of given angular momentum and parity.

3. Matrix elements of the *retarded* electric dipole operator  $D(\omega)$ , where  $\omega = E_I - E_F$ , are determined between all final states  $F$  and initial states  $I$  of opposite parity satisfying  $J_I + 1 \geq J_F \geq |J_I - 1|$ . Length-form and velocity-form matrix elements disagree slightly in these CI calculations because negative-energy contributions have been projected out of the no-pair Hamiltonian. However, as shown by [6], the omitted negative-energy states primarily influence velocity-form matrix elements and can be accounted for to high accuracy by adding negative-energy contributions from a second-order MBPT calculation. All CI results presented here are obtained from length-form calculations.

The expression used to evaluate the spontaneous decay rate is

$$A_{FI} = \frac{2.0613 \times 10^{18}}{[J_F]\lambda^3} S_{FI}, \quad (1)$$

where  $S_{FI} = |\langle F || D(\omega) || I \rangle|^2$  is the line-strength of the transition (atomic units) and  $\lambda$  is the transition wavelength ( $\text{\AA}$ ).

## MBPT calculation

The evaluation of matrix elements to second-order in relativistic MBPT for atoms with two valence electrons was described in detail by Safronova *et al.* in Ref. [9]. Here we will just give an outline of the theory.

1. The lowest-order wave function  $\Psi_0(JM)$  is again a linear combination of configuration state functions coupled to angular momentum  $J$ ,  $M$  and parity  $\pi$ ; however, the expansion coefficients are restricted to lie within a minimal complex: for example, to describe a  $4^3P_2$  state this minimal complex would consist of the two configurations  $(1s_{1/2}4p_{3/2})$  and  $(1s_{1/2}4f_{5/2})$  each coupled to  $J = 4$ . Expansion coefficients are obtained from the resulting  $2 \times 2$  CI equation. One obtains two eigenenergies and two sets of orthogonal expansion coefficients;

one corresponding to  $4^3P_2$  and the other to  $4^3F_2$ . These lowest-order CI wave functions are used as described in Sec. to obtain first-order matrix elements of the retarded dipole matrix element  $\langle\Psi_0(J_F M_F)|D(\omega)|\Psi_0(J_I M_I)\rangle$ .

2. Many-body perturbation theory is used to determine the first-order wave function  $\Psi_1(JM)$ .
3. The second-order correction to the retarded dipole matrix element is obtained using first-order wave functions for the initial and final states:  $\langle\Psi_1(J_F M_F)|D(\omega)|\Psi_0(J_I M_I)\rangle + \langle\Psi_0(J_F M_F)|D(\omega)|\Psi_1(J_I M_I)\rangle$ .
4. A “derivative” correction is included to account for first-order corrections to the energies of the initial and final states and, therefore, to the transition energies  $\omega$ .
5. Both negative and positive energy basis functions are included in the MBPT sum over states to insure agreement between length-form and velocity-form matrix elements. Our length and velocity form matrix elements agree to all calculated digits.

## COMPARISON

As mentioned earlier, the MBPT results for transition rates are in very good agreement with our CI results for the singlet-singlet and triplet-triplet transitions (0 - 2%) (see Table I). Larger disagreements are found for singlet-triplet transitions (4 - 11%) and for transitions with  $\Delta L = 2$  (the difference in rates for the  $2^3S_1 - 4^3F_2$  transition is 21%). It should be noted that the non-vanishing MBPT result for the  $2^3S_1 - 4^3F_2$  transition rate is due to mixing between the  $1s4f$  state and  $1s4p$  state through configuration interaction. Indeed, the  $2^3S_1 - 4^3F_2$  transition rate is smaller than the  $2^3S_1 - 4^3P_2$  rate by seven orders of magnitude! Given that the MBPT and CI methods treat the tiny mixing of configurations in very different ways, the 21% difference in rates is understandable. The corresponding difference for the  $2^3S_1 - 4^3F_2$  transition between our CI result and the Iron Project value [5] is three orders of magnitude. The situation is similar for all

other  $n^3S_1 - n'^3F_2$  transitions; about 20% differences between the CI and MBPT values and 3-5 order of magnitude between CI values and Iron Project values.

Relativity, primarily the spin-orbit interaction, is responsible for non-vanishing rates of intercombination ( $\Delta S = 1$ ) transitions. Therefore, to obtain accurate rates for such transitions, relativity must be treated carefully and completely. As mentioned above, we find differences between our CI and MBPT rates of about 4 - 11 %; by contrast, differences in rates between our CI calculations and the Iron Project range up to a factor of 10 (see Table I). The accuracy of the second-order MBPT rates for intercombination transitions in Be-like ions was discussed by [9]. It was shown that the accuracy improves with increasing nuclear charge and that the difference between the MBPT result and the compilation of precise experimental data by Curtis *et al.* in Ref. [16] for the  $2s^2\ ^1S_0 - 2s3p\ ^3P_1$  transitions in (berylliumlike) FeXXIII is about 4%.

The origin of the large differences between the present CI and MBPT calculations and the Iron Project values is not clear but is presumably related to the difference in treating relativistic or retardation effects, or both. In both CI and MBPT calculations relativity is included at every stage: a relativistic basis set is used, the Breit interaction is fully incorporated in the many-body Hamiltonian, and retardation corrections are included in the matrix elements.

## TABULATIONS

We evaluate CI wave functions for  $n^1S_0$ ,  $n^3S_1$ ,  $n^1P_1$ ,  $n^3P_{0,1,2}$ ,  $n^1D_2$  and  $n^3D_{1,2,3}$  states with  $n \leq 6$ . Since our CI wave functions are characterized by  $J$  and parity, our CI datasets also automatically include  $n^3F_2$  states with  $n = 4$  and 5, as well as the  $5^3G_3$  state. For each angular momentum  $J$  and parity, we set up and solve the CI eigenvalue problem. We include all two-particle configurations that can be made up from  $ns_{1/2}$ ,  $np_{1/2}$ ,  $\dots$ ,  $g_{9/2}$  single-particle orbitals with  $n \leq 25$ . The number of configurations ranges from 2925 for even-parity states with  $J = 0$  to 9525 for even

parity states with  $J = 3$ . from

Transition wavelengths, line strengths and spontaneous decay rates between the above states are given in two columns of Table II. Starting in the first column, we present transitions in the following order: odd 1  $\rightarrow$  even 0, even 1  $\rightarrow$  odd 0, odd 1  $\rightarrow$  even 1, odd 2  $\rightarrow$  even 1, even 2  $\rightarrow$  odd 1, odd 2  $\rightarrow$  even 2, even 3  $\rightarrow$  odd 2. The last set of data continues from the first column on the third page of the table to the top of the second column. Starting at row 15 in the second column, we list transitions in the order: even 0  $\rightarrow$  odd 1, odd 0  $\rightarrow$  even 1, even 1  $\rightarrow$  odd 1, even 1  $\rightarrow$  odd 1, odd 1  $\rightarrow$  even 2, even 2  $\rightarrow$  odd 2, odd 2  $\rightarrow$  even 3. Here, odd and even refer to parity and the numbers refer to angular momentum  $J$ .

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## EXPLANATION OF TABLES

TABLE I. Comparison of transition rates in FeXXV calculated by CI and MBPT methods with results obtained by Nahar and Pradhan in Ref. 5 : (NP).

In the first, second, seventh, and eighth columns, we give the principle quantum number  $1snl$  configuration and the angular momenta  $LSJ$ :  $n^{1,3}L_J$  and  $n'^{1,3}L'_J$ , for lower and upper states, respectively.

The rows contain the wavelengths in Å and transition rates in  $s^{-1}$  for FeXXV.

The following notation is used:  $a[-b]=a^{-b}$ ,  $a[b]=a^{+b}$ , and  $a[00]=a$  to represent powers of ten.

TABLE II. Wavelengths, line strengths and transition rates for FeXXV.

In the first, second, sixth, and seventh columns, we give the principle quantum number  $1snl$  configuration and the angular momenta  $LSJ$ :  $n^{1,3}L_J$  and  $n'^{1,3}L'_J$ , for upper and lower states, respectively.

The rows contain the wavelengths in Å line strengths in a.u. and transition rates in  $s^{-1}$  for FeXXV.

The following notation is used:  $a[-b]=a^{-b}$ ,  $a[b]=a^{+b}$ , and  $a[00]=a$  to represent powers of ten.

Table I: Comparison of transition rates in FeXXV calculated by CI and MBPT methods with results obtained by Nahar and Pradhan in Ref. 5 : (NP).

Transitions		$\lambda(\text{\AA})$		$A(\text{s}^{-1})$		Transitions		$\lambda(\text{\AA})$		$A(\text{s}^{-1})$	
Lower	Upper	CI	CI	MBPT	NP	Lower	Upper	CI	CI	MBPT	NP
$1^1S_0$	$4^3P_1$	1.495	5.45[12]	4.98[12]	7.53[12]	$3^3P_1$	$4^1D_2$	29.23	1.28[11]	1.23[11]	1.52[11]
$2^1S_0$	$2^1P_1$	377.3	4.90[08]	4.54[08]	6.00[08]	$3^3S_1$	$5^3F_2$	19.85	1.46[06]	1.72[06]	1.29[-10]
$2^3S_1$	$2^3P_0$	420.4	3.75[08]	3.35[08]	2.71[08]	$3^3D_2$	$5^3P_1$	20.50	4.93[10]	4.86[10]	1.75[10]
$2^1S_0$	$4^3P_1$	7.634	3.82[11]	3.48[11]	5.47[11]	$3^1D_2$	$5^3P_1$	20.57	3.53[09]	3.49[09]	3.43[10]
$2^3S_1$	$4^1P_1$	7.472	3.67[11]	3.33[11]	6.25[11]	$3^3P_1$	$5^1S_0$	20.21	3.47[10]	3.10[10]	5.83[10]
$2^3S_1$	$4^3F_2$	7.469	1.31[05]	1.59[05]	2.38[-08]	$3^3P_1$	$5^3D_2$	20.15	9.80[11]	9.65[11]	3.76[11]
$2^3P_1$	$4^1S_0$	7.635	9.09[10]	8.01[10]	2.70[10]	$3^3P_1$	$5^1D_2$	20.14	5.95[10]	5.72[10]	7.76[11]
$2^1P_1$	$4^3S_1$	7.809	3.70[10]	3.31[10]	6.95[10]	$3^1P_1$	$5^3D_2$	20.46	1.33[11]	1.27[11]	6.42[11]
$2^3P_1$	$4^1D_2$	7.613	4.52[11]	4.53[11]	6.68[11]	$3^1P_1$	$5^1D_2$	20.44	1.16[12]	1.15[12]	5.42[11]
$2^1P_1$	$4^3D_2$	7.774	8.97[11]	8.82[11]	1.09[12]	$3^3P_1$	$6^3D_2$	17.23	5.48[11]	5.42[11]	1.84[11]
$2^3S_1$	$5^3F_2$	6.696	1.22[05]	1.49[05]	2.38[08]	$3^3P_1$	$6^1D_2$	17.22	3.23[10]	3.09[10]	4.21[11]
$2^3P_1$	$5^1S_0$	6.821	4.55[10]	4.01[10]	9.34[10]	$3^1P_1$	$6^3D_2$	17.45	7.20[10]	6.84[10]	3.97[11]
$2^1P_1$	$5^3S_1$	6.953	1.83[10]	1.64[10]	6.09[09]	$3^1P_1$	$6^1D_2$	17.45	6.46[11]	6.44[11]	2.98[11]
$2^3P_1$	$5^3D_2$	6.814	2.78[12]	2.76[12]	1.17[12]	$4^3S_1$	$5^3F_2$	62.11	1.16[06]	1.37[06]	3.33[-09]
$2^3P_1$	$5^1D_2$	6.812	1.97[11]	1.96[11]	2.21[12]	$4^3D_2$	$5^3P_1$	65.22	6.17[10]	6.21[10]	2.04[10]
$2^1P_1$	$5^3D_2$	6.939	3.92[11]	3.82[11]	1.55[12]	$4^1D_2$	$5^3P_1$	65.50	3.81[09]	3.73[09]	4.50[10]
$2^1P_1$	$5^1D_2$	6.937	3.17[12]	3.18[12]	1.66[12]	$4^1D_2$	$5^3F_2$	64.72	5.13[10]	4.87[10]	5.72[10]
$2^3P_1$	$6^3D_2$	6.444	1.52[12]	1.52[12]	5.74[11]	$4^3P_1$	$5^1S_0$	64.04	2.55[10]	2.32[10]	4.92[10]
$2^3P_1$	$6^1D_2$	6.444	1.05[11]	1.04[11]	1.16[12]	$4^3P_1$	$5^3D_2$	63.39	4.17[11]	4.17[11]	1.33[11]
$2^1P_1$	$6^3D_2$	6.556	2.09[11]	2.03[11]	9.64[11]	$4^3P_1$	$5^1D_2$	63.25	2.38[10]	2.31[10]	3.54[11]
$2^1P_1$	$6^1D_2$	6.555	1.74[12]	1.74[12]	8.95[11]	$4^1P_1$	$5^3D_2$	64.67	5.70[10]	5.50[10]	3.23[11]
$3^1S_0$	$4^3P_1$	29.51	1.21[11]	1.08[11]	1.80[11]	$4^1P_1$	$5^1D_2$	64.52	5.09[11]	5.14[11]	2.01[11]
$3^3S_1$	$4^1P_1$	28.68	1.09[11]	9.67[10]	1.78[11]	$4^3P_1$	$6^3D_2$	41.35	2.47[11]	2.49[11]	6.82[10]
$3^3S_1$	$4^3F_2$	28.64	4.91[06]	5.71[06]	2.62[-09]	$4^3P_1$	$6^1D_2$	41.31	1.37[10]	1.33[10]	2.04[11]
$3^3D_1$	$4^1P_1$	29.89	3.38[09]	3.02[09]	5.38[09]	$4^1P_1$	$6^3D_2$	41.89	3.23[10]	3.12[10]	2.07[11]
$3^1D_2$	$4^3P_1$	30.31	8.41[09]	8.26[09]	4.58[09]	$4^1P_1$	$6^1D_2$	41.85	2.97[11]	3.02[11]	1.16[11]
$3^3D_2$	$4^1P_1$	29.88	1.52[10]	1.48[10]	8.39[09]	$5^3P_1$	$6^1D_2$	116.6	6.75[09]	6.61[09]	7.44[09]

Table II: Wavelengths, line strengths and transition rates for FeXXV

Upper	Lower	$\lambda(\text{\AA})$	$S(\text{a.u.})$	$A(\text{s}^{-1})$	Upper	Lower	$\lambda(\text{\AA})$	$S(\text{a.u.})$	$A(\text{s}^{-1})$
2 <sup>3</sup> P <sub>1</sub>	1 <sup>1</sup> S <sub>0</sub>	1.858[+0]	4.208[-4]	4.427[+13]	5 <sup>3</sup> G <sub>3</sub>	2 <sup>3</sup> P <sub>2</sub>	6.867[+0]	7.015[-12]	6.270[+03]
2 <sup>1</sup> P <sub>1</sub>	1 <sup>1</sup> S <sub>0</sub>	1.849[+0]	4.283[-3]	4.573[+14]	6 <sup>3</sup> D <sub>3</sub>	2 <sup>3</sup> P <sub>2</sub>	6.494[+0]	1.958[-3]	2.070[+12]
3 <sup>3</sup> P <sub>1</sub>	1 <sup>1</sup> S <sub>0</sub>	1.574[+0]	7.499[-5]	1.298[+13]	4 <sup>3</sup> D <sub>3</sub>	3 <sup>3</sup> P <sub>2</sub>	2.954[+1]	2.440[-1]	2.739[+12]
3 <sup>1</sup> P <sub>1</sub>	1 <sup>1</sup> S <sub>0</sub>	1.572[+0]	7.103[-4]	1.234[+14]	5 <sup>3</sup> D <sub>3</sub>	3 <sup>3</sup> P <sub>2</sub>	2.028[+1]	3.850[-2]	1.335[+12]
4 <sup>3</sup> P <sub>1</sub>	1 <sup>1</sup> S <sub>0</sub>	1.495[+0]	2.692[-5]	5.445[+12]	5 <sup>3</sup> G <sub>3</sub>	3 <sup>3</sup> P <sub>2</sub>	2.027[+1]	1.933[-11]	6.713[+02]
4 <sup>1</sup> P <sub>1</sub>	1 <sup>1</sup> S <sub>0</sub>	1.494[+0]	2.488[-4]	5.039[+13]	6 <sup>3</sup> D <sub>3</sub>	3 <sup>3</sup> P <sub>2</sub>	1.733[+1]	1.337[-2]	7.436[+11]
5 <sup>3</sup> P <sub>1</sub>	1 <sup>1</sup> S <sub>0</sub>	1.461[+0]	1.282[-5]	2.779[+12]	5 <sup>3</sup> D <sub>3</sub>	4 <sup>3</sup> P <sub>2</sub>	6.388[+1]	5.158[-1]	5.727[+11]
5 <sup>1</sup> P <sub>1</sub>	1 <sup>1</sup> S <sub>0</sub>	1.460[+0]	1.171[-4]	2.541[+13]	5 <sup>3</sup> G <sub>3</sub>	4 <sup>3</sup> P <sub>2</sub>	6.380[+1]	9.930[-8]	1.107[+05]
6 <sup>3</sup> P <sub>1</sub>	1 <sup>1</sup> S <sub>0</sub>	1.443[+0]	7.154[-6]	1.609[+12]	6 <sup>3</sup> D <sub>3</sub>	4 <sup>3</sup> P <sub>2</sub>	4.158[+1]	8.360[-2]	3.367[+11]
6 <sup>1</sup> P <sub>1</sub>	1 <sup>1</sup> S <sub>0</sub>	1.442[+0]	6.492[-5]	1.461[+13]	5 <sup>3</sup> D <sub>3</sub>	4 <sup>3</sup> F <sub>2</sub>	6.475[+1]	4.021[-5]	4.286[+07]
2 <sup>1</sup> P <sub>1</sub>	2 <sup>1</sup> S <sub>0</sub>	3.773[+2]	3.893[-2]	4.897[+08]	5 <sup>3</sup> G <sub>3</sub>	4 <sup>3</sup> F <sub>2</sub>	6.466[+1]	1.429[+0]	1.529[+12]
3 <sup>3</sup> P <sub>1</sub>	2 <sup>1</sup> S <sub>0</sub>	1.029[+1]	1.395[-3]	8.637[+11]	6 <sup>3</sup> D <sub>3</sub>	4 <sup>3</sup> F <sub>2</sub>	4.194[+1]	4.623[-6]	1.813[+07]
3 <sup>1</sup> P <sub>1</sub>	2 <sup>1</sup> S <sub>0</sub>	1.022[+1]	1.225[-2]	7.761[+12]	6 <sup>3</sup> D <sub>3</sub>	5 <sup>3</sup> P <sub>2</sub>	1.177[+2]	9.702[-1]	1.724[+11]
4 <sup>3</sup> P <sub>1</sub>	2 <sup>1</sup> S <sub>0</sub>	7.634[+0]	2.514[-4]	3.817[+11]	6 <sup>3</sup> D <sub>3</sub>	5 <sup>3</sup> F <sub>2</sub>	1.192[+2]	1.964[-4]	3.359[+07]
4 <sup>1</sup> P <sub>1</sub>	2 <sup>1</sup> S <sub>0</sub>	7.616[+0]	2.211[-3]	3.381[+12]	3 <sup>1</sup> S <sub>0</sub>	2 <sup>3</sup> P <sub>1</sub>	1.030[+1]	1.198[-4]	2.222[+11]
5 <sup>3</sup> P <sub>1</sub>	2 <sup>1</sup> S <sub>0</sub>	6.820[+0]	9.279[-5]	1.975[+11]	3 <sup>1</sup> S <sub>0</sub>	2 <sup>1</sup> P <sub>1</sub>	1.059[+1]	1.548[-3]	2.643[+12]
5 <sup>1</sup> P <sub>1</sub>	2 <sup>1</sup> S <sub>0</sub>	6.813[+0]	8.126[-4]	1.735[+12]	4 <sup>1</sup> S <sub>0</sub>	2 <sup>3</sup> P <sub>1</sub>	7.635[+0]	1.997[-5]	9.092[+10]
6 <sup>3</sup> P <sub>1</sub>	2 <sup>1</sup> S <sub>0</sub>	6.448[+0]	4.565[-5]	1.150[+11]	4 <sup>1</sup> S <sub>0</sub>	2 <sup>1</sup> P <sub>1</sub>	7.793[+0]	2.506[-4]	1.073[+12]
6 <sup>1</sup> P <sub>1</sub>	2 <sup>1</sup> S <sub>0</sub>	6.444[+0]	3.983[-4]	1.005[+12]	4 <sup>1</sup> S <sub>0</sub>	3 <sup>3</sup> P <sub>1</sub>	2.955[+1]	8.990[-4]	7.056[+10]
3 <sup>1</sup> P <sub>1</sub>	3 <sup>1</sup> S <sub>0</sub>	1.277[+3]	2.322[-1]	7.539[+07]	4 <sup>1</sup> S <sub>0</sub>	3 <sup>1</sup> P <sub>1</sub>	3.022[+1]	1.013[-2]	7.435[+11]
4 <sup>3</sup> P <sub>1</sub>	3 <sup>1</sup> S <sub>0</sub>	2.951[+1]	4.600[-3]	1.209[+11]	5 <sup>1</sup> S <sub>0</sub>	2 <sup>3</sup> P <sub>1</sub>	6.821[+0]	7.121[-6]	4.546[+10]
4 <sup>1</sup> P <sub>1</sub>	3 <sup>1</sup> S <sub>0</sub>	2.924[+1]	3.845[-2]	1.039[+12]	5 <sup>1</sup> S <sub>0</sub>	2 <sup>1</sup> P <sub>1</sub>	6.947[+0]	8.855[-5]	5.353[+11]
5 <sup>3</sup> P <sub>1</sub>	3 <sup>1</sup> S <sub>0</sub>	2.020[+1]	7.976[-4]	6.539[+10]	5 <sup>1</sup> S <sub>0</sub>	3 <sup>3</sup> P <sub>1</sub>	2.021[+1]	1.416[-4]	3.474[+10]
5 <sup>1</sup> P <sub>1</sub>	3 <sup>1</sup> S <sub>0</sub>	2.013[+1]	6.804[-3]	5.632[+11]	5 <sup>1</sup> S <sub>0</sub>	3 <sup>1</sup> P <sub>1</sub>	2.052[+1]	1.549[-3]	3.631[+11]
6 <sup>3</sup> P <sub>1</sub>	3 <sup>1</sup> S <sub>0</sub>	1.724[+1]	2.921[-4]	3.846[+10]	5 <sup>1</sup> S <sub>0</sub>	4 <sup>3</sup> P <sub>1</sub>	6.404[+1]	3.303[-3]	2.549[+10]
6 <sup>1</sup> P <sub>1</sub>	3 <sup>1</sup> S <sub>0</sub>	1.722[+1]	2.499[-3]	3.307[+11]	5 <sup>1</sup> S <sub>0</sub>	4 <sup>1</sup> P <sub>1</sub>	6.534[+1]	3.546[-2]	2.575[+11]
5 <sup>3</sup> P <sub>1</sub>	4 <sup>1</sup> S <sub>0</sub>	6.392[+1]	1.134[-2]	2.933[+10]	6 <sup>1</sup> S <sub>0</sub>	2 <sup>3</sup> P <sub>1</sub>	6.448[+0]	3.438[-6]	2.598[+10]
5 <sup>1</sup> P <sub>1</sub>	4 <sup>1</sup> S <sub>0</sub>	6.328[+1]	9.256[-2]	2.467[+11]	6 <sup>1</sup> S <sub>0</sub>	2 <sup>1</sup> P <sub>1</sub>	6.560[+0]	4.258[-5]	3.056[+11]
6 <sup>3</sup> P <sub>1</sub>	4 <sup>1</sup> S <sub>0</sub>	4.146[+1]	1.889[-3]	1.790[+10]	6 <sup>1</sup> S <sub>0</sub>	3 <sup>3</sup> P <sub>1</sub>	1.726[+1]	4.946[-5]	1.950[+10]
6 <sup>1</sup> P <sub>1</sub>	4 <sup>1</sup> S <sub>0</sub>	4.131[+1]	1.584[-2]	1.518[+11]	6 <sup>1</sup> S <sub>0</sub>	3 <sup>1</sup> P <sub>1</sub>	1.748[+1]	5.363[-4]	2.033[+11]
6 <sup>3</sup> P <sub>1</sub>	5 <sup>1</sup> S <sub>0</sub>	1.179[+2]	2.359[-2]	9.727[+09]	6 <sup>1</sup> S <sub>0</sub>	4 <sup>3</sup> P <sub>1</sub>	4.150[+1]	4.998[-4]	1.416[+10]
6 <sup>1</sup> P <sub>1</sub>	5 <sup>1</sup> S <sub>0</sub>	1.166[+2]	1.897[-1]	8.079[+10]	6 <sup>1</sup> S <sub>0</sub>	4 <sup>1</sup> P <sub>1</sub>	4.205[+1]	5.205[-3]	1.419[+11]
3 <sup>3</sup> S <sub>1</sub>	2 <sup>3</sup> P <sub>0</sub>	1.035[+1]	5.340[-4]	3.250[+11]	6 <sup>1</sup> S <sub>0</sub>	5 <sup>3</sup> P <sub>1</sub>	1.181[+2]	8.732[-3]	1.074[+10]
3 <sup>3</sup> D <sub>1</sub>	2 <sup>3</sup> P <sub>0</sub>	1.020[+1]	2.262[-2]	1.438[+13]	6 <sup>1</sup> S <sub>0</sub>	5 <sup>1</sup> P <sub>1</sub>	1.203[+2]	9.150[-2]	1.064[+11]
4 <sup>3</sup> S <sub>1</sub>	2 <sup>3</sup> P <sub>0</sub>	7.642[+0]	8.663[-5]	1.311[+11]	2 <sup>3</sup> P <sub>0</sub>	2 <sup>3</sup> S <sub>1</sub>	4.204[+2]	1.375[-2]	3.750[+08]
4 <sup>3</sup> D <sub>1</sub>	2 <sup>3</sup> P <sub>0</sub>	7.608[+0]	3.045[-3]	4.671[+12]	3 <sup>3</sup> P <sub>0</sub>	2 <sup>3</sup> S <sub>1</sub>	1.004[+1]	4.467[-3]	8.949[+12]
5 <sup>3</sup> S <sub>1</sub>	2 <sup>3</sup> P <sub>0</sub>	6.820[+0]	3.062[-5]	6.519[+10]	3 <sup>3</sup> P <sub>0</sub>	3 <sup>3</sup> S <sub>1</sub>	1.523[+3]	8.404[-2]	4.824[+07]
5 <sup>3</sup> D <sub>1</sub>	2 <sup>3</sup> P <sub>0</sub>	6.806[+0]	1.003[-3]	2.147[+12]	4 <sup>3</sup> P <sub>0</sub>	2 <sup>3</sup> S <sub>1</sub>	7.490[+0]	8.062[-4]	3.887[+12]
6 <sup>3</sup> S <sub>1</sub>	2 <sup>3</sup> P <sub>0</sub>	6.445[+0]	1.472[-5]	3.715[+10]	4 <sup>3</sup> P <sub>0</sub>	3 <sup>3</sup> S <sub>1</sub>	2.895[+1]	1.428[-2]	1.192[+12]
6 <sup>3</sup> D <sub>1</sub>	2 <sup>3</sup> P <sub>0</sub>	6.438[+0]	4.650[-4]	1.177[+12]	4 <sup>3</sup> P <sub>0</sub>	3 <sup>3</sup> D <sub>1</sub>	3.018[+1]	2.162[-3]	1.593[+11]
3 <sup>3</sup> D <sub>1</sub>	3 <sup>3</sup> P <sub>0</sub>	1.329[+3]	1.075[-1]	3.093[+07]	5 <sup>3</sup> P <sub>0</sub>	2 <sup>3</sup> S <sub>1</sub>	6.705[+0]	2.965[-4]	1.993[+12]
4 <sup>3</sup> S <sub>1</sub>	3 <sup>3</sup> P <sub>0</sub>	2.975[+1]	3.582[-3]	9.185[+10]	5 <sup>3</sup> P <sub>0</sub>	3 <sup>3</sup> S <sub>1</sub>	1.993[+1]	2.515[-3]	6.436[+11]
4 <sup>3</sup> D <sub>1</sub>	3 <sup>3</sup> P <sub>0</sub>	2.924[+1]	5.631[-2]	1.521[+12]	5 <sup>3</sup> P <sub>0</sub>	3 <sup>3</sup> D <sub>1</sub>	2.051[+1]	2.904[-4]	6.823[+10]
5 <sup>3</sup> S <sub>1</sub>	3 <sup>3</sup> P <sub>0</sub>	2.025[+1]	5.509[-4]	4.481[+10]	5 <sup>3</sup> P <sub>0</sub>	4 <sup>3</sup> S <sub>1</sub>	6.287[+1]	3.467[-2]	2.827[+11]
5 <sup>3</sup> D <sub>1</sub>	3 <sup>3</sup> P <sub>0</sub>	2.013[+1]	9.017[-3]	7.466[+11]	5 <sup>3</sup> P <sub>0</sub>	4 <sup>3</sup> D <sub>1</sub>	6.527[+1]	1.163[-2]	8.477[+10]
6 <sup>3</sup> S <sub>1</sub>	3 <sup>3</sup> P <sub>0</sub>	1.727[+1]	1.910[-4]	2.506[+10]	6 <sup>3</sup> P <sub>0</sub>	2 <sup>3</sup> S <sub>1</sub>	6.344[+0]	1.454[-4]	1.154[+12]
6 <sup>3</sup> D <sub>1</sub>	3 <sup>3</sup> P <sub>0</sub>	1.722[+1]	3.149[-3]	4.168[+11]	6 <sup>3</sup> P <sub>0</sub>	3 <sup>3</sup> S <sub>1</sub>	1.705[+1]	9.226[-4]	3.771[+11]
5 <sup>3</sup> S <sub>1</sub>	4 <sup>3</sup> P <sub>0</sub>	6.452[+1]	1.265[-2]	3.180[+10]	6 <sup>3</sup> P <sub>0</sub>	3 <sup>3</sup> D <sub>1</sub>	1.747[+1]	9.406[-5]	3.575[+10]
5 <sup>3</sup> D <sub>1</sub>	4 <sup>3</sup> P <sub>0</sub>	6.331[+1]	1.186[-1]	3.155[+11]	6 <sup>3</sup> P <sub>0</sub>	4 <sup>3</sup> S <sub>1</sub>	4.101[+1]	5.896[-3]	1.732[+11]

Upper	Lower	$\lambda(\text{\AA})$	$S(\text{a.u.})$	$A(\text{s}^{-1})$	Upper	Lower	$\lambda(\text{\AA})$	$S(\text{a.u.})$	$A(\text{s}^{-1})$
6 <sup>3</sup> S <sub>1</sub>	4 <sup>3</sup> P <sub>0</sub>	4.161[+1]	1.868[-3]	1.752[+10]	6 <sup>3</sup> P <sub>0</sub>	4 <sup>3</sup> D <sub>1</sub>	4.202[+1]	1.544[-3]	4.218[+10]
6 <sup>3</sup> D <sub>1</sub>	4 <sup>3</sup> P <sub>0</sub>	4.131[+1]	1.950[-2]	1.868[+11]	6 <sup>3</sup> P <sub>0</sub>	5 <sup>3</sup> S <sub>1</sub>	1.161[+2]	7.143[-2]	9.252[+10]
6 <sup>3</sup> S <sub>1</sub>	5 <sup>3</sup> P <sub>0</sub>	1.191[+2]	3.278[-2]	1.312[+10]	6 <sup>3</sup> P <sub>0</sub>	5 <sup>3</sup> D <sub>1</sub>	1.202[+2]	3.664[-2]	4.273[+10]
6 <sup>3</sup> D <sub>1</sub>	5 <sup>3</sup> P <sub>0</sub>	1.167[+2]	2.224[-1]	9.450[+10]	3 <sup>3</sup> S <sub>1</sub>	2 <sup>3</sup> P <sub>1</sub>	1.037[+1]	1.446[-3]	8.759[+11]
2 <sup>3</sup> P <sub>1</sub>	2 <sup>3</sup> S <sub>1</sub>	3.935[+2]	3.777[-2]	4.188[+08]	3 <sup>3</sup> S <sub>1</sub>	2 <sup>1</sup> P <sub>1</sub>	1.066[+1]	1.660[-4]	9.247[+10]
2 <sup>1</sup> P <sub>1</sub>	2 <sup>3</sup> S <sub>1</sub>	1.928[+2]	3.681[-3]	3.469[+08]	3 <sup>3</sup> D <sub>1</sub>	2 <sup>3</sup> P <sub>1</sub>	1.022[+1]	1.557[-2]	9.846[+12]
3 <sup>3</sup> P <sub>1</sub>	2 <sup>3</sup> S <sub>1</sub>	1.003[+1]	1.206[-2]	8.069[+12]	3 <sup>3</sup> D <sub>1</sub>	2 <sup>1</sup> P <sub>1</sub>	1.051[+1]	1.554[-3]	9.053[+11]
3 <sup>1</sup> P <sub>1</sub>	2 <sup>3</sup> S <sub>1</sub>	9.958[+0]	1.172[-3]	8.013[+11]	3 <sup>3</sup> D <sub>1</sub>	3 <sup>3</sup> P <sub>1</sub>	1.418[+3]	7.338[-2]	1.740[+07]
4 <sup>3</sup> P <sub>1</sub>	2 <sup>3</sup> S <sub>1</sub>	7.489[+0]	2.175[-3]	3.497[+12]	4 <sup>3</sup> S <sub>1</sub>	2 <sup>3</sup> P <sub>1</sub>	7.651[+0]	2.340[-4]	3.529[+11]
4 <sup>1</sup> P <sub>1</sub>	2 <sup>3</sup> S <sub>1</sub>	7.472[+0]	2.268[-4]	3.673[+11]	4 <sup>3</sup> S <sub>1</sub>	2 <sup>1</sup> P <sub>1</sub>	7.809[+0]	2.608[-5]	3.699[+10]
5 <sup>3</sup> P <sub>1</sub>	2 <sup>3</sup> S <sub>1</sub>	6.704[+0]	7.991[-4]	1.791[+12]	4 <sup>3</sup> S <sub>1</sub>	3 <sup>3</sup> P <sub>1</sub>	2.979[+1]	9.653[-3]	2.465[+11]
5 <sup>1</sup> P <sub>1</sub>	2 <sup>3</sup> S <sub>1</sub>	6.697[+0]	8.573[-5]	1.927[+11]	4 <sup>3</sup> S <sub>1</sub>	3 <sup>1</sup> P <sub>1</sub>	3.047[+1]	1.198[-3]	2.860[+10]
6 <sup>3</sup> P <sub>1</sub>	2 <sup>3</sup> S <sub>1</sub>	6.344[+0]	3.916[-4]	1.036[+12]	4 <sup>3</sup> D <sub>1</sub>	2 <sup>3</sup> P <sub>1</sub>	7.617[+0]	2.090[-3]	3.194[+12]
6 <sup>1</sup> P <sub>1</sub>	2 <sup>3</sup> S <sub>1</sub>	6.340[+0]	4.267[-5]	1.131[+11]	4 <sup>3</sup> D <sub>1</sub>	2 <sup>1</sup> P <sub>1</sub>	7.774[+0]	1.996[-4]	2.870[+11]
3 <sup>3</sup> P <sub>1</sub>	3 <sup>3</sup> S <sub>1</sub>	1.421[+3]	2.275[-1]	5.354[+07]	4 <sup>3</sup> D <sub>1</sub>	3 <sup>3</sup> P <sub>1</sub>	2.928[+1]	3.846[-2]	1.034[+12]
3 <sup>1</sup> P <sub>1</sub>	3 <sup>3</sup> S <sub>1</sub>	6.884[+2]	2.438[-2]	5.049[+07]	4 <sup>3</sup> D <sub>1</sub>	3 <sup>1</sup> P <sub>1</sub>	2.994[+1]	4.368[-3]	1.099[+11]
4 <sup>3</sup> P <sub>1</sub>	3 <sup>3</sup> S <sub>1</sub>	2.894[+1]	3.835[-2]	1.069[+12]	5 <sup>3</sup> S <sub>1</sub>	2 <sup>3</sup> P <sub>1</sub>	6.828[+0]	8.264[-5]	1.754[+11]
4 <sup>1</sup> P <sub>1</sub>	3 <sup>3</sup> S <sub>1</sub>	2.868[+1]	3.801[-3]	1.088[+11]	5 <sup>3</sup> S <sub>1</sub>	2 <sup>1</sup> P <sub>1</sub>	6.953[+0]	9.131[-6]	1.835[+10]
5 <sup>3</sup> P <sub>1</sub>	3 <sup>3</sup> S <sub>1</sub>	1.993[+1]	6.760[-3]	5.770[+11]	5 <sup>3</sup> S <sub>1</sub>	3 <sup>3</sup> P <sub>1</sub>	2.027[+1]	1.481[-3]	1.201[+11]
5 <sup>1</sup> P <sub>1</sub>	3 <sup>3</sup> S <sub>1</sub>	1.986[+1]	7.064[-4]	6.087[+10]	5 <sup>3</sup> S <sub>1</sub>	3 <sup>1</sup> P <sub>1</sub>	2.058[+1]	1.785[-4]	1.382[+10]
6 <sup>3</sup> P <sub>1</sub>	3 <sup>3</sup> S <sub>1</sub>	1.705[+1]	2.480[-3]	3.380[+11]	5 <sup>3</sup> S <sub>1</sub>	4 <sup>3</sup> P <sub>1</sub>	6.460[+1]	3.404[-2]	8.527[+10]
6 <sup>1</sup> P <sub>1</sub>	3 <sup>3</sup> S <sub>1</sub>	1.702[+1]	2.650[-4]	3.629[+10]	5 <sup>3</sup> S <sub>1</sub>	4 <sup>1</sup> P <sub>1</sub>	6.593[+1]	4.321[-3]	1.018[+10]
4 <sup>3</sup> P <sub>1</sub>	3 <sup>3</sup> D <sub>1</sub>	3.017[+1]	1.475[-3]	3.628[+10]	5 <sup>3</sup> D <sub>1</sub>	2 <sup>3</sup> P <sub>1</sub>	6.814[+0]	6.877[-4]	1.468[+12]
4 <sup>1</sup> P <sub>1</sub>	3 <sup>3</sup> D <sub>1</sub>	2.989[+1]	1.338[-4]	3.385[+09]	5 <sup>3</sup> D <sub>1</sub>	2 <sup>1</sup> P <sub>1</sub>	6.939[+0]	6.466[-5]	1.307[+11]
5 <sup>3</sup> P <sub>1</sub>	3 <sup>3</sup> D <sub>1</sub>	2.050[+1]	1.985[-4]	1.556[+10]	5 <sup>3</sup> D <sub>1</sub>	3 <sup>3</sup> P <sub>1</sub>	2.015[+1]	6.143[-3]	5.072[+11]
5 <sup>1</sup> P <sub>1</sub>	3 <sup>3</sup> D <sub>1</sub>	2.044[+1]	1.874[-5]	1.483[+09]	5 <sup>3</sup> D <sub>1</sub>	3 <sup>1</sup> P <sub>1</sub>	2.046[+1]	6.690[-4]	5.277[+10]
6 <sup>3</sup> P <sub>1</sub>	3 <sup>3</sup> D <sub>1</sub>	1.747[+1]	6.433[-5]	8.151[+09]	5 <sup>3</sup> D <sub>1</sub>	4 <sup>3</sup> P <sub>1</sub>	6.339[+1]	8.082[-2]	2.143[+11]
6 <sup>1</sup> P <sub>1</sub>	3 <sup>3</sup> D <sub>1</sub>	1.744[+1]	6.169[-6]	7.855[+08]	5 <sup>3</sup> D <sub>1</sub>	4 <sup>1</sup> P <sub>1</sub>	6.466[+1]	9.614[-3]	2.402[+10]
4 <sup>1</sup> P <sub>1</sub>	4 <sup>3</sup> S <sub>1</sub>	1.664[+3]	8.401[-2]	1.231[+07]	6 <sup>3</sup> S <sub>1</sub>	2 <sup>3</sup> P <sub>1</sub>	6.452[+0]	3.971[-5]	9.987[+10]
5 <sup>3</sup> P <sub>1</sub>	4 <sup>3</sup> S <sub>1</sub>	6.283[+1]	9.285[-2]	2.528[+11]	6 <sup>3</sup> S <sub>1</sub>	2 <sup>1</sup> P <sub>1</sub>	6.564[+0]	4.371[-6]	1.044[+10]
5 <sup>1</sup> P <sub>1</sub>	4 <sup>3</sup> S <sub>1</sub>	6.221[+1]	9.281[-3]	2.603[+10]	6 <sup>3</sup> S <sub>1</sub>	3 <sup>3</sup> P <sub>1</sub>	1.728[+1]	5.129[-4]	6.713[+10]
6 <sup>3</sup> P <sub>1</sub>	4 <sup>3</sup> S <sub>1</sub>	4.100[+1]	1.581[-2]	1.550[+11]	6 <sup>3</sup> S <sub>1</sub>	3 <sup>1</sup> P <sub>1</sub>	1.751[+1]	6.125[-5]	7.710[+09]
6 <sup>1</sup> P <sub>1</sub>	4 <sup>3</sup> S <sub>1</sub>	4.085[+1]	1.655[-3]	1.640[+10]	6 <sup>3</sup> S <sub>1</sub>	4 <sup>3</sup> P <sub>1</sub>	4.164[+1]	5.016[-3]	4.692[+10]
5 <sup>3</sup> P <sub>1</sub>	4 <sup>3</sup> D <sub>1</sub>	6.522[+1]	7.897[-3]	1.922[+10]	6 <sup>3</sup> S <sub>1</sub>	4 <sup>1</sup> P <sub>1</sub>	4.219[+1]	6.177[-4]	5.557[+09]
5 <sup>1</sup> P <sub>1</sub>	4 <sup>3</sup> D <sub>1</sub>	6.456[+1]	7.394[-4]	1.856[+09]	6 <sup>3</sup> S <sub>1</sub>	5 <sup>3</sup> P <sub>1</sub>	1.192[+2]	8.819[-2]	3.517[+10]
6 <sup>3</sup> P <sub>1</sub>	4 <sup>3</sup> D <sub>1</sub>	4.201[+1]	1.051[-3]	9.573[+09]	6 <sup>3</sup> S <sub>1</sub>	5 <sup>1</sup> P <sub>1</sub>	1.215[+2]	1.129[-2]	4.255[+09]
6 <sup>1</sup> P <sub>1</sub>	4 <sup>3</sup> D <sub>1</sub>	4.185[+1]	1.019[-4]	9.391[+08]	6 <sup>3</sup> D <sub>1</sub>	2 <sup>3</sup> P <sub>1</sub>	6.444[+0]	3.188[-4]	8.046[+11]
6 <sup>3</sup> P <sub>1</sub>	5 <sup>3</sup> S <sub>1</sub>	1.160[+2]	1.909[-1]	8.260[+10]	6 <sup>3</sup> D <sub>1</sub>	2 <sup>1</sup> P <sub>1</sub>	6.556[+0]	2.976[-5]	7.132[+10]
6 <sup>1</sup> P <sub>1</sub>	5 <sup>3</sup> S <sub>1</sub>	1.148[+2]	1.917[-2]	8.560[+09]	6 <sup>3</sup> D <sub>1</sub>	3 <sup>3</sup> P <sub>1</sub>	1.723[+1]	2.144[-3]	2.830[+11]
6 <sup>3</sup> P <sub>1</sub>	5 <sup>3</sup> D <sub>1</sub>	1.201[+2]	2.481[-2]	9.665[+09]	6 <sup>3</sup> D <sub>1</sub>	3 <sup>1</sup> P <sub>1</sub>	1.745[+1]	2.299[-4]	2.920[+10]
6 <sup>1</sup> P <sub>1</sub>	5 <sup>3</sup> D <sub>1</sub>	1.188[+2]	2.368[-3]	9.531[+08]	6 <sup>3</sup> D <sub>1</sub>	4 <sup>3</sup> P <sub>1</sub>	4.135[+1]	1.326[-2]	1.267[+11]
2 <sup>3</sup> P <sub>2</sub>	2 <sup>3</sup> S <sub>1</sub>	2.681[+2]	6.982[-2]	1.468[+09]	6 <sup>3</sup> D <sub>1</sub>	4 <sup>1</sup> P <sub>1</sub>	4.189[+1]	1.515[-3]	1.392[+10]
3 <sup>3</sup> P <sub>2</sub>	2 <sup>3</sup> S <sub>1</sub>	9.997[+0]	2.139[-2]	8.677[+12]	6 <sup>3</sup> D <sub>1</sub>	5 <sup>3</sup> P <sub>1</sub>	1.168[+2]	1.515[-1]	6.416[+10]
4 <sup>3</sup> P <sub>2</sub>	2 <sup>3</sup> S <sub>1</sub>	7.481[+0]	3.935[-3]	3.809[+12]	6 <sup>3</sup> D <sub>1</sub>	5 <sup>1</sup> P <sub>1</sub>	1.190[+2]	1.845[-2]	7.389[+09]
4 <sup>3</sup> F <sub>2</sub>	2 <sup>3</sup> S <sub>1</sub>	7.469[+0]	1.352[-10]	1.314[+05]	3 <sup>3</sup> S <sub>1</sub>	2 <sup>3</sup> P <sub>2</sub>	1.050[+1]	2.906[-3]	1.695[+12]
5 <sup>3</sup> P <sub>2</sub>	2 <sup>3</sup> S <sub>1</sub>	6.701[+0]	1.456[-3]	1.961[+12]	3 <sup>3</sup> D <sub>1</sub>	2 <sup>3</sup> P <sub>2</sub>	1.035[+1]	1.159[-3]	7.068[+11]
5 <sup>3</sup> F <sub>2</sub>	2 <sup>3</sup> S <sub>1</sub>	6.696[+0]	9.070[-11]	1.224[+05]	4 <sup>3</sup> S <sub>1</sub>	2 <sup>3</sup> P <sub>2</sub>	7.721[+0]	4.642[-4]	6.809[+11]
6 <sup>3</sup> P <sub>2</sub>	2 <sup>3</sup> S <sub>1</sub>	6.342[+0]	7.163[-4]	1.138[+12]	4 <sup>3</sup> S <sub>1</sub>	3 <sup>3</sup> P <sub>2</sub>	3.011[+1]	1.937[-2]	4.791[+11]
3 <sup>3</sup> P <sub>2</sub>	3 <sup>3</sup> S <sub>1</sub>	9.444[+2]	4.233[-1]	2.036[+08]	4 <sup>3</sup> D <sub>1</sub>	2 <sup>3</sup> P <sub>2</sub>	7.687[+0]	1.525[-4]	2.267[+11]
4 <sup>3</sup> P <sub>2</sub>	3 <sup>3</sup> S <sub>1</sub>	2.881[+1]	6.775[-2]	1.148[+12]	4 <sup>3</sup> D <sub>1</sub>	3 <sup>3</sup> P <sub>2</sub>	2.959[+1]	2.916[-3]	7.600[+10]

Upper	Lower	$\lambda(\text{\AA})$	$S(\text{a.u.})$	$A(\text{s}^{-1})$	Upper	Lower	$\lambda(\text{\AA})$	$S(\text{a.u.})$	$A(\text{s}^{-1})$
4 <sup>3</sup> F <sub>2</sub>	3 <sup>3</sup> S <sub>1</sub>	2.864[+1]	2.847[-7]	4.912[+06]	5 <sup>3</sup> S <sub>1</sub>	2 <sup>3</sup> P <sub>2</sub>	6.883[+0]	1.633[-4]	3.381[+11]
5 <sup>3</sup> P <sub>2</sub>	3 <sup>3</sup> S <sub>1</sub>	1.990[+1]	1.217[-2]	6.262[+11]	5 <sup>3</sup> S <sub>1</sub>	3 <sup>3</sup> P <sub>2</sub>	2.042[+1]	2.931[-3]	2.326[+11]
5 <sup>3</sup> F <sub>2</sub>	3 <sup>3</sup> S <sub>1</sub>	1.985[+1]	2.828[-8]	1.464[+06]	5 <sup>3</sup> S <sub>1</sub>	4 <sup>3</sup> P <sub>2</sub>	6.523[+1]	6.813[-2]	1.658[+11]
6 <sup>3</sup> P <sub>2</sub>	3 <sup>3</sup> S <sub>1</sub>	1.704[+1]	4.496[-3]	3.685[+11]	5 <sup>3</sup> S <sub>1</sub>	4 <sup>3</sup> F <sub>2</sub>	6.614[+1]	6.489[-9]	1.515[+04]
4 <sup>3</sup> P <sub>2</sub>	3 <sup>3</sup> D <sub>1</sub>	3.003[+1]	9.514[-5]	1.424[+09]	5 <sup>3</sup> D <sub>1</sub>	2 <sup>3</sup> P <sub>2</sub>	6.869[+0]	4.978[-5]	1.037[+11]
4 <sup>3</sup> F <sub>2</sub>	3 <sup>3</sup> D <sub>1</sub>	2.984[+1]	2.981[-1]	4.545[+12]	5 <sup>3</sup> D <sub>1</sub>	3 <sup>3</sup> P <sub>2</sub>	2.029[+1]	4.564[-4]	3.688[+10]
5 <sup>3</sup> P <sub>2</sub>	3 <sup>3</sup> D <sub>1</sub>	2.047[+1]	1.290[-5]	6.093[+08]	5 <sup>3</sup> D <sub>1</sub>	4 <sup>3</sup> P <sub>2</sub>	6.400[+1]	6.172[-3]	1.590[+10]
5 <sup>3</sup> F <sub>2</sub>	3 <sup>3</sup> D <sub>1</sub>	2.043[+1]	3.158[-2]	1.502[+12]	5 <sup>3</sup> D <sub>1</sub>	4 <sup>3</sup> F <sub>2</sub>	6.487[+1]	8.303[-3]	2.054[+10]
6 <sup>3</sup> P <sub>2</sub>	3 <sup>3</sup> D <sub>1</sub>	1.745[+1]	4.186[-6]	3.190[+08]	6 <sup>3</sup> S <sub>1</sub>	2 <sup>3</sup> P <sub>2</sub>	6.501[+0]	7.833[-5]	1.925[+11]
4 <sup>3</sup> F <sub>2</sub>	4 <sup>3</sup> S <sub>1</sub>	1.538[+3]	7.064[-7]	7.864[+01]	6 <sup>3</sup> S <sub>1</sub>	3 <sup>3</sup> P <sub>2</sub>	1.739[+1]	1.011[-3]	1.299[+11]
5 <sup>3</sup> P <sub>2</sub>	4 <sup>3</sup> S <sub>1</sub>	6.253[+1]	1.637[-1]	2.713[+11]	6 <sup>3</sup> S <sub>1</sub>	4 <sup>3</sup> P <sub>2</sub>	4.190[+1]	9.898[-3]	9.087[+10]
5 <sup>3</sup> F <sub>2</sub>	4 <sup>3</sup> S <sub>1</sub>	6.211[+1]	6.834[-7]	1.156[+06]	6 <sup>3</sup> S <sub>1</sub>	4 <sup>3</sup> F <sub>2</sub>	4.227[+1]	6.473[-10]	5.786[+03]
6 <sup>3</sup> P <sub>2</sub>	4 <sup>3</sup> S <sub>1</sub>	4.093[+1]	2.840[-2]	1.679[+11]	6 <sup>3</sup> S <sub>1</sub>	5 <sup>3</sup> P <sub>2</sub>	1.203[+2]	1.762[-1]	6.835[+10]
5 <sup>3</sup> P <sub>2</sub>	4 <sup>3</sup> D <sub>1</sub>	6.490[+1]	5.183[-4]	7.684[+08]	6 <sup>3</sup> S <sub>1</sub>	5 <sup>3</sup> F <sub>2</sub>	1.219[+2]	3.870[-8]	1.444[+04]
5 <sup>3</sup> F <sub>2</sub>	4 <sup>3</sup> D <sub>1</sub>	6.445[+1]	5.613[-1]	8.496[+11]	6 <sup>3</sup> D <sub>1</sub>	2 <sup>3</sup> P <sub>2</sub>	6.494[+0]	2.300[-5]	5.671[+10]
6 <sup>3</sup> P <sub>2</sub>	4 <sup>3</sup> D <sub>1</sub>	4.193[+1]	6.966[-5]	3.829[+08]	6 <sup>3</sup> D <sub>1</sub>	3 <sup>3</sup> P <sub>2</sub>	1.734[+1]	1.581[-4]	2.049[+10]
6 <sup>3</sup> P <sub>2</sub>	5 <sup>3</sup> S <sub>1</sub>	1.154[+2]	3.361[-1]	8.860[+10]	6 <sup>3</sup> D <sub>1</sub>	4 <sup>3</sup> P <sub>2</sub>	4.161[+1]	9.929[-4]	9.311[+09]
6 <sup>3</sup> P <sub>2</sub>	5 <sup>3</sup> D <sub>1</sub>	1.195[+2]	1.645[-3]	3.908[+08]	6 <sup>3</sup> D <sub>1</sub>	4 <sup>3</sup> F <sub>2</sub>	4.197[+1]	9.580[-4]	8.750[+09]
3 <sup>3</sup> D <sub>2</sub>	2 <sup>3</sup> P <sub>1</sub>	1.022[+1]	4.844[-2]	1.838[+13]	6 <sup>3</sup> D <sub>1</sub>	5 <sup>3</sup> P <sub>2</sub>	1.179[+2]	1.162[-2]	4.787[+09]
3 <sup>1</sup> D <sub>2</sub>	2 <sup>3</sup> P <sub>1</sub>	1.021[+1]	4.109[-3]	1.566[+12]	6 <sup>3</sup> D <sub>1</sub>	5 <sup>3</sup> F <sub>2</sub>	1.194[+2]	3.997[-2]	1.586[+10]
4 <sup>3</sup> D <sub>2</sub>	2 <sup>3</sup> P <sub>1</sub>	7.617[+0]	6.565[-3]	6.019[+12]	4 <sup>3</sup> P <sub>1</sub>	3 <sup>3</sup> D <sub>2</sub>	3.016[+1]	4.660[-3]	1.147[+11]
4 <sup>1</sup> D <sub>2</sub>	2 <sup>3</sup> P <sub>1</sub>	7.613[+0]	4.923[-4]	4.520[+11]	4 <sup>3</sup> P <sub>1</sub>	3 <sup>1</sup> D <sub>2</sub>	3.031[+1]	3.467[-4]	8.412[+09]
5 <sup>3</sup> D <sub>2</sub>	2 <sup>3</sup> P <sub>1</sub>	6.814[+0]	2.167[-3]	2.776[+12]	4 <sup>1</sup> P <sub>1</sub>	3 <sup>3</sup> D <sub>2</sub>	2.988[+1]	6.020[-4]	1.524[+10]
5 <sup>1</sup> D <sub>2</sub>	2 <sup>3</sup> P <sub>1</sub>	6.812[+0]	1.540[-4]	1.974[+11]	4 <sup>1</sup> P <sub>1</sub>	3 <sup>1</sup> D <sub>2</sub>	3.002[+1]	4.832[-3]	1.206[+11]
6 <sup>3</sup> D <sub>2</sub>	2 <sup>3</sup> P <sub>1</sub>	6.444[+0]	1.007[-3]	1.524[+12]	5 <sup>3</sup> P <sub>1</sub>	3 <sup>3</sup> D <sub>2</sub>	2.050[+1]	6.286[-4]	4.928[+10]
6 <sup>1</sup> D <sub>2</sub>	2 <sup>3</sup> P <sub>1</sub>	6.444[+0]	6.954[-5]	1.053[+11]	5 <sup>3</sup> P <sub>1</sub>	3 <sup>1</sup> D <sub>2</sub>	2.057[+1]	4.551[-5]	3.534[+09]
3 <sup>3</sup> D <sub>2</sub>	2 <sup>1</sup> P <sub>1</sub>	1.051[+1]	8.938[-3]	3.124[+12]	5 <sup>3</sup> P <sub>1</sub>	4 <sup>3</sup> D <sub>2</sub>	6.522[+1]	2.535[-2]	6.173[+10]
3 <sup>1</sup> D <sub>2</sub>	2 <sup>1</sup> P <sub>1</sub>	1.049[+1]	6.107[-2]	2.145[+13]	5 <sup>3</sup> P <sub>1</sub>	4 <sup>1</sup> D <sub>2</sub>	6.550[+1]	1.586[-3]	3.810[+09]
4 <sup>3</sup> D <sub>2</sub>	2 <sup>1</sup> P <sub>1</sub>	7.774[+0]	1.041[-3]	8.975[+11]	5 <sup>1</sup> P <sub>1</sub>	3 <sup>3</sup> D <sub>2</sub>	2.043[+1]	8.193[-5]	6.486[+09]
4 <sup>1</sup> D <sub>2</sub>	2 <sup>1</sup> P <sub>1</sub>	7.770[+0]	8.011[-3]	6.920[+12]	5 <sup>1</sup> P <sub>1</sub>	3 <sup>1</sup> D <sub>2</sub>	2.050[+1]	6.634[-4]	5.201[+10]
5 <sup>3</sup> D <sub>2</sub>	2 <sup>1</sup> P <sub>1</sub>	6.939[+0]	3.229[-4]	3.917[+11]	5 <sup>1</sup> P <sub>1</sub>	4 <sup>3</sup> D <sub>2</sub>	6.455[+1]	2.940[-3]	7.382[+09]
5 <sup>1</sup> D <sub>2</sub>	2 <sup>1</sup> P <sub>1</sub>	6.937[+0]	2.615[-3]	3.175[+12]	5 <sup>1</sup> P <sub>1</sub>	4 <sup>1</sup> D <sub>2</sub>	6.483[+1]	2.668[-2]	6.613[+10]
6 <sup>3</sup> D <sub>2</sub>	2 <sup>1</sup> P <sub>1</sub>	6.556[+0]	1.453[-4]	2.089[+11]	6 <sup>3</sup> P <sub>1</sub>	3 <sup>3</sup> D <sub>2</sub>	1.747[+1]	2.040[-4]	2.586[+10]
6 <sup>1</sup> D <sub>2</sub>	2 <sup>1</sup> P <sub>1</sub>	6.555[+0]	1.208[-3]	1.738[+12]	6 <sup>3</sup> P <sub>1</sub>	3 <sup>1</sup> D <sub>2</sub>	1.751[+1]	1.456[-5]	1.830[+09]
3 <sup>3</sup> D <sub>2</sub>	3 <sup>3</sup> P <sub>1</sub>	1.430[+3]	2.326[-1]	3.221[+07]	6 <sup>3</sup> P <sub>1</sub>	4 <sup>3</sup> D <sub>2</sub>	4.200[+1]	3.377[-3]	3.078[+10]
3 <sup>1</sup> D <sub>2</sub>	3 <sup>3</sup> P <sub>1</sub>	1.167[+3]	1.746[-2]	4.454[+06]	6 <sup>3</sup> P <sub>1</sub>	4 <sup>1</sup> D <sub>2</sub>	4.212[+1]	2.071[-4]	1.872[+09]
4 <sup>3</sup> D <sub>2</sub>	3 <sup>3</sup> P <sub>1</sub>	2.929[+1]	1.235[-1]	1.992[+12]	6 <sup>3</sup> P <sub>1</sub>	5 <sup>3</sup> D <sub>2</sub>	1.201[+2]	8.025[-2]	3.127[+10]
4 <sup>1</sup> D <sub>2</sub>	3 <sup>3</sup> P <sub>1</sub>	2.923[+1]	7.883[-3]	1.279[+11]	6 <sup>3</sup> P <sub>1</sub>	5 <sup>1</sup> D <sub>2</sub>	1.206[+2]	4.628[-3]	1.781[+09]
5 <sup>3</sup> D <sub>2</sub>	3 <sup>3</sup> P <sub>1</sub>	2.015[+1]	1.979[-2]	9.804[+11]	6 <sup>1</sup> P <sub>1</sub>	3 <sup>3</sup> D <sub>2</sub>	1.744[+1]	2.651[-5]	3.377[+09]
5 <sup>1</sup> D <sub>2</sub>	3 <sup>3</sup> P <sub>1</sub>	2.014[+1]	1.198[-3]	5.947[+10]	6 <sup>1</sup> P <sub>1</sub>	3 <sup>1</sup> D <sub>2</sub>	1.749[+1]	2.162[-4]	2.731[+10]
6 <sup>3</sup> D <sub>2</sub>	3 <sup>3</sup> P <sub>1</sub>	1.723[+1]	6.917[-3]	5.480[+11]	6 <sup>1</sup> P <sub>1</sub>	4 <sup>3</sup> D <sub>2</sub>	4.184[+1]	3.981[-4]	3.670[+09]
6 <sup>1</sup> D <sub>2</sub>	3 <sup>3</sup> P <sub>1</sub>	1.722[+1]	4.067[-4]	3.225[+10]	6 <sup>1</sup> P <sub>1</sub>	4 <sup>1</sup> D <sub>2</sub>	4.196[+1]	3.624[-3]	3.312[+10]
4 <sup>3</sup> D <sub>2</sub>	3 <sup>1</sup> P <sub>1</sub>	2.994[+1]	1.917[-2]	2.894[+11]	6 <sup>1</sup> P <sub>1</sub>	5 <sup>3</sup> D <sub>2</sub>	1.188[+2]	8.880[-3]	3.575[+09]
4 <sup>1</sup> D <sub>2</sub>	3 <sup>1</sup> P <sub>1</sub>	2.988[+1]	1.577[-1]	2.395[+12]	6 <sup>1</sup> P <sub>1</sub>	5 <sup>1</sup> D <sub>2</sub>	1.193[+2]	8.514[-2]	3.385[+10]
5 <sup>3</sup> D <sub>2</sub>	3 <sup>1</sup> P <sub>1</sub>	2.046[+1]	2.811[-3]	1.330[+11]	3 <sup>3</sup> D <sub>2</sub>	2 <sup>3</sup> P <sub>2</sub>	1.035[+1]	1.147[-2]	4.196[+12]
5 <sup>1</sup> D <sub>2</sub>	3 <sup>1</sup> P <sub>1</sub>	2.044[+1]	2.450[-2]	1.162[+12]	3 <sup>1</sup> D <sub>2</sub>	2 <sup>3</sup> P <sub>2</sub>	1.033[+1]	5.951[-3]	2.187[+12]
6 <sup>3</sup> D <sub>2</sub>	3 <sup>1</sup> P <sub>1</sub>	1.745[+1]	9.443[-4]	7.195[+10]	3 <sup>1</sup> D <sub>2</sub>	3 <sup>3</sup> P <sub>2</sub>	1.993[+3]	2.774[-2]	1.420[+06]
6 <sup>1</sup> D <sub>2</sub>	3 <sup>1</sup> P <sub>1</sub>	1.745[+1]	8.467[-3]	6.459[+11]	4 <sup>3</sup> D <sub>2</sub>	2 <sup>3</sup> P <sub>2</sub>	7.687[+0]	1.548[-3]	1.381[+12]
5 <sup>3</sup> D <sub>2</sub>	4 <sup>3</sup> P <sub>1</sub>	6.339[+1]	2.622[-1]	4.171[+11]	4 <sup>3</sup> D <sub>2</sub>	3 <sup>3</sup> P <sub>2</sub>	2.959[+1]	2.968[-2]	4.640[+11]
5 <sup>1</sup> D <sub>2</sub>	4 <sup>3</sup> P <sub>1</sub>	6.325[+1]	1.489[-2]	2.384[+10]	4 <sup>1</sup> D <sub>2</sub>	2 <sup>3</sup> P <sub>2</sub>	7.683[+0]	7.525[-4]	6.724[+11]

Upper	Lower	$\lambda(\text{\AA})$	$S(\text{a.u.})$	$A(\text{s}^{-1})$	Upper	Lower	$\lambda(\text{\AA})$	$S(\text{a.u.})$	$A(\text{s}^{-1})$
6 <sup>3</sup> D <sub>2</sub>	4 <sup>3</sup> P <sub>1</sub>	4.135[+1]	4.310[-2]	2.470[+11]	4 <sup>1</sup> D <sub>2</sub>	3 <sup>3</sup> P <sub>2</sub>	2.953[+1]	1.417[-2]	2.229[+11]
6 <sup>1</sup> D <sub>2</sub>	4 <sup>3</sup> P <sub>1</sub>	4.131[+1]	2.388[-3]	1.372[+10]	5 <sup>3</sup> D <sub>2</sub>	2 <sup>3</sup> P <sub>2</sub>	6.869[+0]	5.108[-4]	6.386[+11]
5 <sup>3</sup> D <sub>2</sub>	4 <sup>1</sup> P <sub>1</sub>	6.467[+1]	3.806[-2]	5.703[+10]	5 <sup>3</sup> D <sub>2</sub>	3 <sup>3</sup> P <sub>2</sub>	2.029[+1]	4.694[-3]	2.275[+11]
5 <sup>1</sup> D <sub>2</sub>	4 <sup>1</sup> P <sub>1</sub>	6.452[+1]	3.374[-1]	5.090[+11]	5 <sup>3</sup> D <sub>2</sub>	4 <sup>3</sup> P <sub>2</sub>	6.400[+1]	6.357[-2]	9.826[+10]
6 <sup>3</sup> D <sub>2</sub>	4 <sup>1</sup> P <sub>1</sub>	4.189[+1]	5.858[-3]	3.230[+10]	5 <sup>3</sup> D <sub>2</sub>	4 <sup>3</sup> F <sub>2</sub>	6.487[+1]	1.053[-3]	1.564[+09]
6 <sup>1</sup> D <sub>2</sub>	4 <sup>1</sup> P <sub>1</sub>	4.185[+1]	5.375[-2]	2.971[+11]	5 <sup>1</sup> D <sub>2</sub>	2 <sup>3</sup> P <sub>2</sub>	6.868[+0]	2.415[-4]	3.021[+11]
6 <sup>3</sup> D <sub>2</sub>	5 <sup>3</sup> P <sub>1</sub>	1.168[+2]	4.939[-1]	1.255[+11]	5 <sup>1</sup> D <sub>2</sub>	3 <sup>3</sup> P <sub>2</sub>	2.028[+1]	2.192[-3]	1.065[+11]
6 <sup>1</sup> D <sub>2</sub>	5 <sup>3</sup> P <sub>1</sub>	1.166[+2]	2.640[-2]	6.755[+09]	5 <sup>1</sup> D <sub>2</sub>	4 <sup>3</sup> P <sub>2</sub>	6.386[+1]	2.930[-2]	4.559[+10]
6 <sup>3</sup> D <sub>2</sub>	5 <sup>1</sup> P <sub>1</sub>	1.190[+2]	6.936[-2]	1.666[+10]	5 <sup>1</sup> D <sub>2</sub>	4 <sup>3</sup> F <sub>2</sub>	6.473[+1]	4.720[-4]	7.053[+08]
6 <sup>1</sup> D <sub>2</sub>	5 <sup>1</sup> P <sub>1</sub>	1.188[+2]	6.385[-1]	1.545[+11]	6 <sup>3</sup> D <sub>2</sub>	2 <sup>3</sup> P <sub>2</sub>	6.494[+0]	2.373[-4]	3.511[+11]
4 <sup>3</sup> P <sub>2</sub>	3 <sup>3</sup> D <sub>2</sub>	3.003[+1]	9.673[-4]	1.448[+10]	6 <sup>3</sup> D <sub>2</sub>	3 <sup>3</sup> P <sub>2</sub>	1.734[+1]	1.634[-3]	1.271[+11]
4 <sup>3</sup> F <sub>2</sub>	3 <sup>3</sup> D <sub>2</sub>	2.984[+1]	3.628[-2]	5.535[+11]	6 <sup>3</sup> D <sub>2</sub>	4 <sup>3</sup> P <sub>2</sub>	4.161[+1]	1.028[-2]	5.784[+10]
5 <sup>3</sup> P <sub>2</sub>	3 <sup>3</sup> D <sub>2</sub>	2.047[+1]	1.316[-4]	6.219[+09]	6 <sup>3</sup> D <sub>2</sub>	4 <sup>3</sup> F <sub>2</sub>	4.197[+1]	1.223[-4]	6.700[+08]
5 <sup>3</sup> F <sub>2</sub>	3 <sup>3</sup> D <sub>2</sub>	2.042[+1]	3.846[-3]	1.830[+11]	6 <sup>3</sup> D <sub>2</sub>	5 <sup>3</sup> P <sub>2</sub>	1.179[+2]	1.204[-1]	2.977[+10]
6 <sup>3</sup> P <sub>2</sub>	3 <sup>3</sup> D <sub>2</sub>	1.745[+1]	4.275[-5]	3.259[+09]	6 <sup>3</sup> D <sub>2</sub>	5 <sup>3</sup> F <sub>2</sub>	1.194[+2]	5.092[-3]	1.212[+09]
4 <sup>3</sup> P <sub>2</sub>	3 <sup>1</sup> D <sub>2</sub>	3.017[+1]	5.265[-4]	7.770[+09]	6 <sup>1</sup> D <sub>2</sub>	2 <sup>3</sup> P <sub>2</sub>	6.493[+0]	1.106[-4]	1.636[+11]
4 <sup>3</sup> F <sub>2</sub>	3 <sup>1</sup> D <sub>2</sub>	2.998[+1]	1.905[-2]	2.865[+11]	6 <sup>1</sup> D <sub>2</sub>	3 <sup>3</sup> P <sub>2</sub>	1.733[+1]	7.535[-4]	5.867[+10]
5 <sup>3</sup> P <sub>2</sub>	3 <sup>1</sup> D <sub>2</sub>	2.053[+1]	7.125[-5]	3.335[+09]	6 <sup>1</sup> D <sub>2</sub>	4 <sup>3</sup> P <sub>2</sub>	4.157[+1]	4.704[-3]	2.653[+10]
5 <sup>3</sup> F <sub>2</sub>	3 <sup>1</sup> D <sub>2</sub>	2.049[+1]	1.997[-3]	9.411[+10]	6 <sup>1</sup> D <sub>2</sub>	4 <sup>3</sup> F <sub>2</sub>	4.194[+1]	5.411[-5]	2.973[+08]
6 <sup>3</sup> P <sub>2</sub>	3 <sup>1</sup> D <sub>2</sub>	1.750[+1]	2.311[-5]	1.748[+09]	6 <sup>1</sup> D <sub>2</sub>	5 <sup>3</sup> P <sub>2</sub>	1.176[+2]	5.446[-2]	1.356[+10]
5 <sup>3</sup> P <sub>2</sub>	4 <sup>3</sup> D <sub>2</sub>	6.489[+1]	5.376[-3]	7.973[+09]	6 <sup>1</sup> D <sub>2</sub>	5 <sup>3</sup> F <sub>2</sub>	1.191[+2]	2.252[-3]	5.399[+08]
5 <sup>3</sup> F <sub>2</sub>	4 <sup>3</sup> D <sub>2</sub>	6.444[+1]	7.006[-2]	1.061[+11]	4 <sup>3</sup> P <sub>2</sub>	3 <sup>3</sup> D <sub>3</sub>	3.015[+1]	8.586[-3]	1.270[+11]
6 <sup>3</sup> P <sub>2</sub>	4 <sup>3</sup> D <sub>2</sub>	4.193[+1]	7.238[-4]	3.980[+09]	4 <sup>3</sup> F <sub>2</sub>	3 <sup>3</sup> D <sub>3</sub>	2.996[+1]	1.585[-3]	2.389[+10]
5 <sup>3</sup> P <sub>2</sub>	4 <sup>1</sup> D <sub>2</sub>	6.518[+1]	2.706[-3]	3.960[+09]	5 <sup>3</sup> P <sub>2</sub>	3 <sup>3</sup> D <sub>3</sub>	2.052[+1]	1.163[-3]	5.453[+10]
5 <sup>3</sup> F <sub>2</sub>	4 <sup>1</sup> D <sub>2</sub>	6.472[+1]	3.431[-2]	5.127[+10]	5 <sup>3</sup> P <sub>2</sub>	4 <sup>3</sup> D <sub>3</sub>	6.513[+1]	4.632[-2]	6.794[+10]
6 <sup>3</sup> P <sub>2</sub>	4 <sup>1</sup> D <sub>2</sub>	4.204[+1]	3.622[-4]	1.975[+09]	5 <sup>3</sup> F <sub>2</sub>	3 <sup>3</sup> D <sub>3</sub>	2.048[+1]	1.664[-4]	7.848[+09]
6 <sup>3</sup> P <sub>2</sub>	5 <sup>3</sup> D <sub>2</sub>	1.195[+2]	1.719[-2]	4.083[+09]	5 <sup>3</sup> F <sub>2</sub>	4 <sup>3</sup> D <sub>3</sub>	6.468[+1]	2.992[-3]	4.482[+09]
6 <sup>3</sup> P <sub>2</sub>	5 <sup>1</sup> D <sub>2</sub>	1.200[+2]	8.363[-3]	1.962[+09]	6 <sup>3</sup> P <sub>2</sub>	3 <sup>3</sup> D <sub>3</sub>	1.749[+1]	3.776[-4]	2.858[+10]
3 <sup>3</sup> D <sub>3</sub>	2 <sup>3</sup> P <sub>2</sub>	1.033[+1]	9.735[-2]	2.554[+13]	6 <sup>3</sup> P <sub>2</sub>	4 <sup>3</sup> D <sub>3</sub>	4.202[+1]	6.209[-3]	3.390[+10]
4 <sup>3</sup> D <sub>3</sub>	2 <sup>3</sup> P <sub>2</sub>	7.684[+0]	1.292[-2]	8.242[+12]	6 <sup>3</sup> P <sub>2</sub>	5 <sup>3</sup> D <sub>3</sub>	1.199[+2]	1.462[-1]	3.437[+10]
5 <sup>3</sup> D <sub>3</sub>	2 <sup>3</sup> P <sub>2</sub>	6.868[+0]	4.232[-3]	3.781[+12]	6 <sup>3</sup> P <sub>2</sub>	5 <sup>3</sup> G <sub>3</sub>	1.202[+2]	2.390[-9]	5.576[+02]