Revised and extended analysis of the eighth spectrum of platinum (Pt VIII)

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Abstract. The spectrum of platinum was observed in the 300-2100 Å wavelength region. Grazing and normal incidence VUV spectrographs have been used to record the spectrum. The $(5d^3 + 5d^26s) - 5d^26p$ transition array of seven times ionized platinum, Pt VIII, has been investigated. The configurations $5d^3$ and $5d^26p$ had been previously studied, and all levels of these configurations (19 and 45 levels, respectively) had been established. The previous analysis was based on 178 classified spectral lines. In the current analysis we have confirmed identification of all previously found levels and all but 10 previously assigned spectral lines, although we have detected a large (up to 35 mÅ) systematic shift in wavelength measurements used in the previous analysis. Based on new wavelength measurements, we have corrected the $5d^3$ and $5d^26p$ energy level values (by up to 55 cm⁻¹) and established for the first time 14 out of 16 theoretically possible $5d^26s$ levels in Pt VIII. The total list of identified lines (including 180 new lines) contains 349 entries. The orthogonal operators technique was used to calculate the level structure and transition probabilities. The energy parameters have been determined by the least squares fit to the observed levels. Calculated transition probability and energy values, as well as *LS*-compositions obtained from the fitted parameters are presented.

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1. Introduction and experiment

The first analysis of the Pt VIII spectrum was published in 2002 [1]. It has resulted in establishing all levels of the configurations $5d^3$ and $5d^26p$. One hundred seventy eight lines have been identified as transitions between levels of these configurations. These two configurations are known in the following spectra of the Lu I isoelectronic sequence: Ta III, W IV, Re V, Os VI, Ir VII, Pt VIII, Au IX and Hg X [1-8]. In the sequence, the configuration $5d^26s$ has been studied in the spectra from Ta III till Ir VII [2-5,7]. The purpose of the present work is to determine levels of the configuration $5d^26s$ in Pt VIII, which were never studied before.

The spectrograms for the current analysis have been photographed in the wavelength region of 300-2100 Å at the Institute of Spectroscopy, Troitsk, Moscow, Russian Federation. The spectra in the wavelength region below 340 Å were recorded on a 3 m grazing incidence spectrograph with a plate factor of about 0.4 Å/mm to 0.5 Å/mm. Lines of Ti V - Ti XI were used as the reference lines in the region. The spectra in the wavelength region above 340 Å were obtained on a 6.65 m normal incidence spectrograph with a plate factor of 1.25 Å/mm. For this region, impurity lines of O, C, N, Al and Si [9] present in the spectrograms were used as standards in the initial wavelength interpolation procedure. Details of the experimental setup can be found in Ref. [1]. The photographic plates were measured on an automatic comparator controlled by the system for automatic processing of photo-spectrograms [10]. Lines belonging to different ionization stages could be discriminated on our plates on tracks exposed with different voltages and currents in the sliding and triggered sparks that were used as light sources. Our spectrograms contain Pt lines appearing in the second order. Presence of these lines has allowed us to improve wavelength measurements by using secondary standards derived from the second-order lines. Since wavelengths of spectral lines measured in the first and second orders should match, adding such correlated pairs of lines in the wavelength interpolation procedure provides additional constraints for the calibration curve. Good example is when one line of a pair is in the region with many reliable standards and the second line is in the region where there are no standards or they have large uncertainty. In this case, the second line (with wavelength derived from the first line) may be used as a reference line. The use of internally derived Ritz standards also contributed to improvement of the measurements. Such standards have been obtained in the course of simultaneous analyses of Pt VIII, Pt VII and Pt VI (both to be published), Pt V[11], and Pt IV[12] spectra. The final list of identified Pt VIII lines shows standard deviations of isolated lines from the calculated positions of less than 0.003 Å and 0.004 Å for the regions of 298-930 Å and 940-1150 Å, respectively. The lines resolved in the second order have been measured more accurately.

We have found that wavelength measurements in the region of 337-400 Å used in the previous analysis [1] have significant systematic shift rising gradually from 10 mÅ to 35 mÅ as wavelength goes from 337 Å to 400 Å. Comparing with the previous study, in the present work, for the region shorter than 337 Å, we used the same measurements. For the region longer than 337 Å, we used different spectrogram obtained with the same experimental set up.

The analysis presented here was based on theoretical calculations utilizing the orthogonal operators approach [13-16] and performed using the program suite IDEN [17,18].

2. Level optimization and reliability check

The IDEN computer program [17,18] includes an iterative level optimization procedure (LOP) [19] for optimization of the energy level system comprising specified identified levels and spectral lines. For each established level, the code provides two types of uncertainties of the level with respect to the levels directly connected to it by the identified transitions. These uncertainties are suitable for the verification of the reliability and accuracy of the obtained level. The first type of uncertainty is entirely based on the specified estimated uncertainties of the experimental wavelengths. It is a square root of the weighted mean variance (WMV) of the energy level given by Eq. (7) of Ref. [19]. It is referred to as rwmv_1 . The second type of

uncertainty is calculated by re-estimating uncertainties of the involved experimental wavelengths accounting for the deviations of these wavelengths from the calculated (Ritz) values. It is a square root of the WMV of the energy level given by Eq. (8) of Ref. [19]. It is referred to as rwmv_2 . We exclude from the optimization all levels determined by a single transition. If a spectral line is considered to be masked, blended or its identification is doubtful, the line is not included in the LOP. If the uncertainties of wavelengths of the spectral lines used in the LOP are estimated correctly and all disturbed lines are removed from the optimization, we expect the values given by Eq. (8) of Ref. [19] to be close to or smaller than those given by Eq. (7) of Ref. [19]. We verify this relation for each level and use it as a quality check of the LOP results and the entire analysis. All uncertainties given in this paper are at the level of one standard deviation.

3. Analysis

The ion Pt^{7+} studied here belongs to the Lu I isoelectronic sequence. The ground-state configuration of Pt VIII is $5d^3$ and the lowest two excited configurations of different parities are $5d^26s$ and $5d^26p$. The configurations $5d^3$ and $5d^26p$ are known in Pt VIII [1], as well as in Ta III, W IV, Re V, Os VI, Ir VII, Au IX and Hg X [2-8]. The configuration $5d^26s$ has been determined in the spectra from Ta III till Ir VII [2-5,7]. Parametric approximation of such amount of experimental data in one isoelectronic sequence by utilizing orthogonal operators [13-16] has made it possible to predict parameters of the configuration $5d^26s$ in Pt VIII very accurately. To avoid line misidentifications in the very dense platinum spectra recorded, we were simultaneously making analyses of eighth and lower ionization Pt spectra using the same sets of spectrograms containing spectra photographed under different source conditions. Such approach was helpful as arrays of spectral lines belonging to different Pt ions were overlapping, and it was difficult to distinguish lines belonging to ions of close ionization stages. Spectral line identification, determination of levels of configurations and optimization of level energies were done by using the program suite IDEN [17-19]. The final level uncertainties and uncertainties of the Ritz wavelengths presented here were calculated by the program LOPT [20].

In the region of 298-1150 Å, we have identified 349 spectral lines belonging to the $(5d^3 + 5d^26s) - 5d^26p$ transition array of Pt VIII. Seven spectral lines are doubly classified. To verify if the number of multiply classified lines is acceptable, the following estimations can be done. The most rich of lines region of 300-452 Å contains about 230 identified spectral lines with an average distance between two lines of about 661 mÅ. For our typical line widths of 25-50 mÅ, we may expect that 4 % to 8 % of lines are overlapping. For 230 classified lines, it gives 9 to 18 possible blended lines. In the selected region we have six multiply identified lines, which is a quite reasonable number. Comparing with the previous Pt VIII analysis [1], the current study is based on significantly improved wavelength measurements in the region of 337-400 Å. We have corrected the systematic shift (reaching 35 mÅ) in the measurements that was mentioned above. Eight of the previously identified lines at 327.396, 336.766, 341.065, 365.680, 368.328, 375.244, 380.604 and 392.139 Å have not been confirmed and therefore have been removed from the list. We have identified 68 new spectral lines belonging to the $5d^3 - 5d^26p$ transition array and changed identification of two previously classified lines at 380.5668 Å and 395.1143 Å. All these 70 lines are marked by the symbol "N" in the table of classified lines. In the current analysis, one hundred and twelve spectral lines have been assigned to the $5d^26s - 5d^26p$ transition array.

The list of identified spectral lines is presented in Table 1. Transition probabilities (gA) have been calculated from the final fitted parameters of the investigated configurations. Intensities of the spectral lines (Int) have been obtained by measuring the plate darkening. The optical density was converted to spectral intensity and the spectral background approximated by a spline curve was subtracted. For isolated, unperturbed and unsaturated lines originating from the same upper level or from close upper levels, agreement between gA and Int is good. Taking into account the Boltzmann factor, describing the decrease of population for levels with increasing energy, agreement between the presented gA and Int is good throughout the entire list. In each case when the intensity of an identified spectral line is notably higher than expected, the expected value is given in Table 1. Uncertainties of the Ritz wavelengths, $Unc \lambda_{calc}$, differences between the measured and Ritz wavelengths and wavenumbers, $\Delta(\lambda)$ and $\Delta(\nu)$, as well as the numbers of observed transitions used to determine the odd and even level involved in the particular transition, N_{odd} and N_{even} , are included in the table. Due to strong mixing of the $5d^26p$ levels, their labels in the LS -coupling scheme are omitted in Table 1. For

each transition, we include a name of the linelist part (pa - pd) used to specify the wavelength uncertainty (see Table A), the symbol "*" for transitions that were not used in the LOP, the symbol "N" for new $5d^3 - 5d^26p$ transitions added in the current analysis, expected line intensity (where appropriate, derived from the gA and Int comparison), and comments for masked and blended lines, and for lines that are also identified as belonging to another ion or impurity. Transitions attributed to lines that are masked, much stronger than expected, have suspiciously large deviations $\Delta(\lambda)$, or have small gA values, for which chances of wrong identification increase, were excluded from the LOP. If a known line of another ion or impurity blends the line, we specify the blending spectrum in parentheses following the "bl" symbol. If the line is also identified with a transition in another ion but does not appear as a blend in the spectrogram, we do not give the "bl" symbol, although blending is possible due to a near coincidence of wavelengths. In addition, if the line is also identified with another Pt ion (e.g., Pt VII) and, when using the same linelist, the expected intensity of that identification (e.g., 100) is lower than the observed line intensity, we give "Pt VII (100)".

It should be noted that we used two sets of plates. They may have been obtained under somewhat different experimental conditions. Parts pb, pc and pd (see Table A) correspond to three plates from the same set (same exposure). The part pa corresponds to a plate from a different set (exposure). This information is needed for correct comparison of the presented gA and Int values accounting for the Boltzmann factor, $exp(-E/kT)$. Different exposures may have different kT values.

In Tables 2 and 3 we present experimental and calculated energy values of the even parity levels in the $5d^3$ and $5d^26s$ configurations and the odd parity levels in the $5d^26p$ configuration of Pt VIII, respectively. The uncertainties of the levels, Unc , are given with respect to the "base" even level at $191690.18 \text{ cm}^{-1}$, $J = 7/2$ (see below in the text). Uncertainty of excitation energy for any level can be estimated by combining in quadrature the given uncertainty with the uncertainty of the ground level, 1.00 cm^{-1} .

In the present analysis, all 19 theoretically possible $5d^3$ levels, and all 45 possible $5d^26p$ levels that were established in the previous analysis have been confirmed, but their values have been adjusted. All $5d^3$ previously established levels (except for the ground level) have been shifted down. The shift varies from about -12 cm^{-1} to about -55 cm^{-1} (see level at 75993.15 cm^{-1} , $J = 3/2$). The correction values for $5d^26p$ levels are ranging from about -30 cm^{-1} to about $+25 \text{ cm}^{-1}$. In the current study, we have established 14 of 16 possible $5d^26s$ levels. Two remaining levels either produce too weak transitions to be observed on our plates or are expected to give rise to only one or two relatively weak lines that cannot be chosen without ambiguity among several possibilities.

We have divided the list of experimental lines into four parts, pa - pd (see Table 1, last column), and assigned to them initial estimated uncertainties. The assigned uncertainties are based on the available standards, distribution of the standards around the wavelength interpolation curve, and the expected increased uncertainty near ends of the plates. After correction of local systematic deviations (LSD, see Ref. [2] and [19]) in the linelist and after the final LOP run, for each part, we have calculated the root-mean-square (rms) deviation of wavelengths of the undisturbed experimental lines from their calculated (Ritz) positions. They are presented in Table A below, where for each linelist part the number of lines used in the LOP is also given.

Table A
Description of linelist parts.

Linelist part	pa	pb	pc	pd
Final estimated uncertainty, mÅ	3	3	3	4
Resulting <i>rms</i> , mÅ	2.8	2.3	2.7	3.6
Number of lines used in LOP	58	167	69	34
Wavelength range, Å	298-337	337-460	690-930	940-1150

The *rms* deviations of all undisturbed identified lines from their Ritz positions, including lines not used in the LOP, are 0.0028 Å , 0.0023 Å , 0.0027 Å , and 0.0036 Å in the regions of 298-337 Å, 337-460 Å, 690-930 Å, and 940-1150 Å, respectively. The final estimated uncertainties of wavelength measurements, which were used in the final LOP run, for the $rwmv_1$ and $rwmv_2$ calculations, and in the program LOPT [20], are also included in Table A. These are square root values of combinations of squares of the statistical and systematic

uncertainties, where the latter were estimated from standard deviations of wavelengths of reference lines from their positions derived from the calibration curves. We have found that the optimized level values given by the IDEN's LOP and those given by the program LOPT are in very good agreement: they differ by a small fraction of calculated level uncertainties.

Comparison of the values of rwmv_1 and rwmv_2 (see Tables 2 and 3, and Ref. [19]) shows consistency. For the even system having 33 established levels, $\text{rwmv}_1 \geq \text{rwmv}_2$ for all but three levels (91 %). The remaining three levels have rwmv_2 values exceeding rwmv_1 values by less than 18 %. In the odd system, 51 % of levels have $\text{rwmv}_1 \geq \text{rwmv}_2$. Other 38 % of odd levels have rwmv_2 values exceeding rwmv_1 values by less than 50 %. We have four levels with the difference $\text{rwmv}_2 - \text{rwmv}_1$ within 50 % to 70 % of the rwmv_1 value. One level at $345173.80 \text{ cm}^{-1}$ ($J = 11/2$) has rwmv_2 value 2.5 times greater than rwmv_1 value. According to our validation criteria, the level needs special consideration. It was represented in the LOP by three transitions at $320.7781 \text{ \AA}$, $331.2543 \text{ \AA}$ and $791.6487 \text{ \AA}$ with small deviations from the calculated (Ritz) values: $3.9 \text{ m\AA}$, $1.5 \text{ m\AA}$ and $-0.9 \text{ m\AA}$. For the level, the somewhat large value of rwmv_2 is due to the high value of the coefficient $A = 9.6$ given by Eq. (4) of Ref [19], which, in turn, is explained by the small number of identified transitions (three), with one of them having about 2.4 times greater wavelength and thus about six times greater weight in LOP. Taking these facts into account, we consider the level as identified correctly with acceptable deviations of identified spectral lines from the calculated positions.

As can be seen from the comparison of the values N , N_{opt} , rwmv_1 , and rwmv_2 (see Tables 2 and 3), the most accurately determined level is at $191690.18 \text{ cm}^{-1}$ ($J = 7/2$). It is one of the levels with smallest rwmv_1 (0.13 cm^{-1}), with $\text{rwmv}_1 > \text{rwmv}_2$ ($0.13 \text{ cm}^{-1} > 0.12 \text{ cm}^{-1}$), and with the largest number of higher accuracy $5d^2 6s - 5d^2 6p$ transitions used in the LOP ($N_{\text{opt}} = 11$). This level has been chosen to be the "base" in the current presentation of the analysis.

4. Calculations

The theoretical description and least squares fitting (LSF) of the configurations is given in the frame of the orthogonal operators approach. Tables 4 and 5 present the parameters obtained (or kept fixed) in the calculations for the even and odd systems. The parameter values were obtained in the final LSF. The *ab initio* values of the parameters were calculated using the Hartree-Fock method with relativistic correction (HFR) implemented in the code developed by Cowan [21]. For the orthogonal electrostatic parameters, the *ab initio* (HFR) values were calculated (see Ref. [5]) from the Slater parameters given by the Cowan code. The obtained (or predetermined for fixed parameters) scaling factors (LSF/HFR) are also given in Tables 4 and 5. The values of the fixed parameters $A_c \dots A_0$ and $Z_{\text{pp}}^2 \dots Z_{\text{dd}}^3$ were estimated from the MCDF [23] calculations and the values obtained in the given and neighboring ions.

In both the even and odd parity systems, three configurations were included in the calculations: ($5d^3 + 5d^2 6s + 5d^2 6s^2$) and ($5d^2 6p + 5d^2 6s 6p + 6s^2 6p$). The interaction between the configurations was added explicitly. The interaction integrals, parameters of unknown configurations and some parameters of the studied configurations were kept fixed at the predetermined values.

As can be seen from Tables 4 and 5, the scaling factors for the strong electrostatic core operators O_2 , O_2' and spin-orbit interaction parameter ζ_d for the $5d^3$, $5d^2 6s$ and $5d^2 6p$ configurations are close to each other. These factors, as well as the values of the scaling factor for the electrostatic operator C_{ds} , are in agreement with those obtained in Os VI and Ir VII spectra [5,7]. The parameters of the 2-particle magnetic interaction (spin-orbit effect) of the *ds*-type (A_{mso}) and 3-particle electrostatic T_{dds} interaction in the $5d^2 6s$ configuration are well defined with small uncertainty. These high order parameters are very important as they improve the fit of the $5d^2 6s$ configuration considerably. These values are in agreement with those obtained in the neighboring ions in the sequence. For Os VI, Ir VII and Pt VIII, the parameter A_{mso} has the following values (uncertainties are given in parentheses): $43.5(2.3)$, $49.9(3.6)$ and $50.1(3.9) \text{ cm}^{-1}$. The values of the parameter T_{dds} in the sequence are as follows: $-22.3(4.4)$, $-27.3(5.0)$ and $-38.3(6.5) \text{ cm}^{-1}$. The trends of the parameters in the $5d^2 6s$ configuration are in agreement with those obtained in the $5d^8 6s$ and $5d^7 6s$ [13,22] configurations. The mean deviations of the fit for the even and odd systems in Pt VIII are 13.8 cm^{-1} and 116 cm^{-1} , respectively, close to the values in Ir VII [7] (13 cm^{-1} and 108 cm^{-1}) and in Os VI [5] (10.7 cm^{-1} and 107 cm^{-1}).

In our calculations presented here, as well as in Ta III, Os VI and Ir VII [2,5,7] analyses, the $5d^2 5f$ configuration was not included. In the previous work on Pt VIII [1], the interaction between the $5d^2 6p$ and

5d²5f configuration was taken into account, which resulted in reduction of the mean deviation of the fit and the uncertainties of the fitted parameters by about 50 %.

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Explanation of Tables

Table 1. Classified lines in the (5d³ + 5d²6s) - 5d²6p transition array of Pt VIII

gA	Weighted transition probability (10^8 s^{-1} ; g is the statistical weight of the upper level)
Int	Intensity of the experimental spectral line (arbitrary units)
λ	Wavelength (in vacuum) of the experimental spectral line (Å)
ν	Wavenumber of the experimental spectral line (cm^{-1})

λ_{calc}	Calculated (Ritz) wavelength ($\text{\AA}$) in vacuum
Unc λ_{calc}	Uncertainty of the calculated (Ritz) wavelength ($\text{\AA}$)
$\Delta(\nu)$	Difference between the experimental and Ritz wavenumbers (cm^{-1})
$\Delta(\lambda)$	Difference between the experimental and Ritz wavelengths ($\text{\AA}$)
N_{odd}	Number of observed transitions used to determine the odd level involved in the transition
N_{even}	Number of observed transitions used to determine the even level involved in the transition
Even level	Experimental energy value (cm^{-1}), configuration, <i>LS</i> -term and <i>J</i> -value of the even level involved in the transition
Odd level	Experimental energy value (cm^{-1}) and <i>J</i> -value (in parentheses) of the odd level involved in the transition
Remark	Remarks for the identified transitions:
N	New $5d^3 - 5d^26p$ line added in the present analysis
m	The Pt VIII line is masked by some other line
200	Expected intensity value is 200
bl	The line is blended by a close line
*	The transition has been excluded from the LOP
pa - pd	Parts of the linelist with assigned wavelength uncertainties (see text, Table A)
Pt VII	(without "bl") The line is also identified as Pt VII line. The line does not appear as a blend in the spectrogram, but blending is possible due to a near coincidence of wavelengths
Pt VII (400)	The line is also identified as Pt VII line with expected intensity 400
2d ord	The line has a contribution from a line seen in the 2nd order

Table 2. Experimental and calculated energy levels (cm^{-1}) in the $5d^3$ and $5d^26s$ configurations of Pt VIII

E_{obs}	Observed (experimental) energy value (cm^{-1})
E_{calc}	Calculated from the least squares fitting (LSF) energy value (cm^{-1})
Δ	Difference between the observed and calculated energy values, $E_{\text{obs}} - E_{\text{calc}}$ (cm^{-1})
N	Number of transitions used to identify the energy level
N_{opt}	Number of transitions to the level used in the LOP and WMV calculations for the level (see text)
rwmv_1	Square root of the weighted mean variance given by Eq. (7) of Ref. [19] (cm^{-1})
rwmv_2	Square root of the weighted mean variance given by Eq. (8) of Ref. [19] (cm^{-1}), except for the levels determined by a single line (see text)
Unc	Uncertainty of the level (cm^{-1}) with respect to the "base" even level with $J = 7/2$ at $191690.18 \text{ cm}^{-1}$ (see text)
Composition	<i>LS</i> -composition of the level. The number preceding the symbol " " and the term name has the following meaning: 1 stands for $5d^3$ and 2 stands for $5d^26s$.

Table 3. Experimental and calculated energy levels (cm^{-1}) in the $5d^26p$ configuration of Pt VIII

E_{obs}	Observed (experimental) energy value (cm^{-1})
E_{calc}	Calculated from the least squares fitting (LSF) energy value (cm^{-1})
Δ	Difference between the observed and calculated energy values, $E_{\text{obs}} - E_{\text{calc}}$ (cm^{-1})
N	Number of transitions used to identify the energy level
N_{opt}	Number of transitions from the level used in the LOP and WMV calculations for the level (see text)
rwmv_1	Square root of the weighted mean variance given by Eq. (7) of Ref. [19] (cm^{-1})
rwmv_2	Square root of the weighted mean variance given by Eq. (8) of Ref. [19] (cm^{-1}), except for the levels determined by a single line (see text)
Unc	Uncertainty of the level (cm^{-1}) with respect to the "base" even level with $J = 7/2$

Composition at 191690.18 cm⁻¹ (see text)
LS-composition of the level.

Table 4. Fitted and calculated parameter values (cm⁻¹) in the 5d³, 5d²6s and 5d6s² configurations of Pt VIII

Parameter	Parameter name
Fitted value	Parameter value (cm ⁻¹) obtained in the final least squares fitting (LSF). Uncertainty of the fit (cm ⁻¹) is given in parentheses
HFR	<i>Ab initio</i> value (cm ⁻¹) of the parameter. It was calculated using the Hartree-Fock method with relativistic correction (HFR) implemented in the code developed by Cowan [21]
Fitted/HFR	Obtained (or predetermined for fixed parameters) scaling factors

Table 5. Fitted and calculated parameter values (cm⁻¹) in the 5d²6p, 5d6s6p and 6s²6p configurations of Pt VIII

Parameter	Parameter name
Fitted value	Parameter value (cm ⁻¹) obtained in the final least squares fitting (LSF). Uncertainty of the fit (cm ⁻¹) is given in parentheses
HFR	<i>Ab initio</i> value (cm ⁻¹) of the parameter. It was calculated using the Hartree-Fock method with relativistic correction (HFR) implemented in the code developed by Cowan [21]
Fitted/HFR	Obtained (or predetermined for fixed parameters) scaling factors

Table 1Classified lines in the $(5d^3 + 5d^26s) - 5d^26p$ transition array of Pt VIII.

gA (10 ⁸ s ⁻¹)	Int	λ (Å)	ν (cm ⁻¹)	λcalc (Å)	Unc λcalc (Å)	Δ(ν) (cm ⁻¹)	Δ(λ) (Å)	N _{odd}	N _{even}	Even level (cm ⁻¹)	Odd level (cm ⁻¹)	Remark	
27	28	298.5888	334908.78	298.5877	0.0008	-1.22	0.0011	12	12	5d ³ 4F _{3/2}	0.00	334910.00(3/2)	pa N
45	23	303.5226	329464.73	303.5225	0.0014	-0.14	0.0001	4	18	5d ³ 2D _{5/2}	46366.31	375831.17(3/2)	pa N
57	55	305.8337	326975.03	305.8332	0.0007	-0.56	0.0005	9	16	5d ³ 4F _{5/2}	10194.49	337170.08(5/2)	pa
58	44	308.7406	323896.49	308.7402	0.0008	-0.47	0.0004	10	12	5d ³ 4F _{3/2}	0.00	323896.96(3/2)	pa N
36	46	310.8465	321702.22	310.8483	0.0007	1.85	-0.0018	10	16	5d ³ 4F _{5/2}	10194.49	331894.85(3/2)	pa
44	32	310.9728	321571.57	310.9732	0.0007	0.43	-0.0004	10	16	5d ³ 4F _{5/2}	10194.49	331765.63(5/2)	pa
29	36	311.7060	320815.13	311.7058	0.0007	-0.16	0.0002	8	17	5d ³ 4P _{5/2}	33389.80	354205.09(5/2)	pa N
114	138	312.4197	320082.27	312.4158	0.0007	-4.00	0.0039	9	15	5d ³ 4F _{7/2}	17083.81	337170.08(5/2)	pa
121	64	312.6698	319826.19	312.6687	0.0015	-1.18	0.0012	4	15	5d ³ 2P _{3/2}	56003.81	375831.17(3/2)	pa
17	31	313.2131	319271.48	313.2133	0.0013	0.24	-0.0002	6	17	5d ³ 4P _{5/2}	33389.80	352661.04(3/2)	pa N
61	52	316.1439	316311.66	316.1423	0.0007	-1.61	0.0016	9	16	5d ³ 2G _{7/2}	31715.83	348029.10(7/2)	pa
35	21	316.3087	316146.86	316.3092	0.0007	0.54	-0.0005	12	14	5d ³ 4P _{3/2}	18763.68	334910.00(3/2)	pa N
64	32	316.4025	316053.11	316.4033	0.0007	0.75	-0.0008	8	16	5d ³ 2D _{3/2}	38152.74	354205.09(5/2)	pa
199	56	316.8147	315641.93	316.8127	0.0007	-1.98	0.0020	10	16	5d ³ 2G _{7/2}	31715.83	347359.74(5/2)	pa
131	51	317.3990	315060.87	317.3957	0.0007	-3.27	0.0033	11	15	5d ³ 4F _{7/2}	17083.81	332147.94(7/2)	pa
85	31	317.7841	314679.03	317.7813	0.0008	-2.78	0.0028	10	15	5d ³ 4F _{7/2}	17083.81	331765.63(5/2)	pa
92	104	317.8225	314641.04	317.8243	0.0007	1.74	-0.0018	9	17	5d ³ 4P _{5/2}	33389.80	348029.10(7/2)	pa N, 40
248	71	317.8649	314599.11	317.8629	0.0008	-1.96	0.0020	9	12	5d ³ 2H _{9/2}	33428.03	348029.10(7/2)	pa
71	28	318.7692	313706.58	318.7734	0.0008	4.10	-0.0042	10	16	5d ³ 4F _{5/2}	10194.49	323896.96(3/2)	pa
49	25	318.9559	313522.96	318.9508	0.0008	-4.98	0.0051	6	16	5d ³ 2G _{7/2}	31715.83	345243.77(7/2)	pa N
118	28	319.1802	313302.59	319.1767	0.0008	-3.45	0.0035	8	15	5d ³ 4F _{7/2}	17083.81	330389.85(9/2)	pa
55	29	319.4884	313000.43	319.4868	0.0007	-1.51	0.0015	10	14	5d ³ 4P _{3/2}	18763.68	331765.63(5/2)	pa
52	33	319.6871	312805.82	319.6876	0.0014	0.49	-0.0005	6	9	5d ³ 2P _{1/2}	39855.71	352661.04(3/2)	pa
159	46	320.7781	311741.99	320.7742	0.0009	-3.78	0.0039	3	12	5d ³ 2H _{9/2}	33428.03	345173.80(11/2)	pa
238	191	320.9426	311582.18	320.9407	0.0008	-1.82	0.0019	11	11	5d ³ 4F _{9/2}	20563.94	332147.94(7/2)	pa
75	46	322.3968	310176.81	322.3927	0.0007	-3.95	0.0041	10	16	5d ³ 4F _{5/2}	10194.49	320375.24(3/2)	pa
45	46	322.6919	309893.16	322.6942	0.0009	2.25	-0.0023	10	9	5d ³ 4P _{1/2}	22003.95	331894.85(3/2)	pa
203	63	322.7653	309822.65	322.7619	0.0009	-3.27	0.0034	8	11	5d ³ 4F _{9/2}	20563.94	330389.85(9/2)	pa
59	37	323.4084	309206.59	323.4079	0.0007	-0.42	0.0004	10	16	5d ³ 2D _{3/2}	38152.74	347359.74(5/2)	pa
153	48	323.7025	308925.62	323.6983	0.0008	-4.01	0.0042	10	16	5d ³ 4F _{5/2}	10194.49	319124.12(7/2)	pa
49	41	324.1178	308529.76	324.1115	0.0008	-6.00	0.0063	7	16	5d ³ 2G _{7/2}	31715.83	340251.58(9/2)	pa *
187	35	324.8476	307836.64	324.8454	0.0007	-2.14	0.0023	8	18	5d ³ 2D _{5/2}	46366.31	354205.09(5/2)	pa
143	48	325.9198	306823.97	325.9202	0.0008	0.42	-0.0004	7	12	5d ³ 2H _{9/2}	33428.03	340251.58(9/2)	pa
182	68	326.0973	306656.94	326.0942	0.0010	-2.92	0.0031	5	12	5d ³ 4F _{3/2}	0.00	306659.86(1/2)	pa
345	159	327.0985	305718.27	327.0950	0.0009	-3.33	0.0036	5	11	5d ³ 4F _{9/2}	20563.94	326285.54(11/2)	pa

41	27	327.3189	305512.47	327.3133	0.0009	-5.23	0.0056	9	16	$5d^3 4F_{5/2}$	10194.49	315712.19(5/2)	pa *
86	22	328.9283	304017.62	328.9206	0.0009	-7.11	0.0077	13	12	$5d^3 4F_{3/2}$	0.00	304024.73(5/2)	pa * N
271	72	329.4055	303577.16	329.4016	0.0008	-3.63	0.0039	8	16	$5d^3 2F_{5/2}$	50624.30	354205.09(5/2)	pa
115	45	329.4540	303532.51	329.4514	0.0009	-2.44	0.0026	7	11	$5d^3 4F_{9/2}$	20563.94	324098.89(7/2)	pa
146	62	330.8693	302234.16	330.8687	0.0008	-0.58	0.0006	9	15	$5d^3 4F_{7/2}$	17083.81	319318.55(5/2)	pa
370	161	331.0830	302039.03	331.0816	0.0008	-1.28	0.0014	10	15	$5d^3 4F_{7/2}$	17083.81	319124.12(7/2)	pa
131	161	331.0830	302039.03	331.0855	0.0014	2.28	-0.0025	6	16	$5d^3 2F_{5/2}$	50624.30	352661.04(3/2)	pa
1693	784	331.2543	301882.85	331.2528	0.0011	-1.38	0.0015	3	7	$5d^3 2H_{11/2}$	43289.57	345173.80(11/2)	pa
66	14	331.6591	301514.44	331.6527	0.0007	-5.77	0.0063	12	17	$5d^3 4P_{5/2}$	33389.80	334910.00(3/2)	pa * N
229	66	331.9886	301215.16	331.9881	0.0008	-0.44	0.0005	6	16	$5d^3 2D_{3/2}$	38152.74	339368.34(1/2)	pa
184	32	332.2339	300992.77	332.2332	0.0007	-0.66	0.0007	10	18	$5d^3 2D_{5/2}$	46366.31	347359.74(5/2)	pa
88	24	332.7174	300555.36	332.7180	0.0008	0.49	-0.0005	9	14	$5d^3 4P_{3/2}$	18763.68	319318.55(5/2)	pa
40	12	332.8540	300432.05	332.8539	0.0008	-0.06	0.0001	11	16	$5d^3 2G_{7/2}$	31715.83	332147.94(7/2)	pa N
46	35	333.2985	300031.35	333.2966	0.0010	-1.68	0.0019	11	12	$5d^3 4F_{3/2}$	0.00	300033.03(3/2)	pa N, Pt IX
125	16	333.5137	299837.79	333.5134	0.0017	-0.23	0.0003	4	10	$5d^3 2D_{13/2}$	75993.15	375831.17(3/2)	pa N
117	21	333.8803	299508.57	333.8757	0.0011	-4.06	0.0045	6	9	$5d^3 2P_{1/2}$	39855.71	339368.34(1/2)	pa
84	19	334.4275	299018.48	334.4288	0.0008	1.13	-0.0013	9	16	$5d^3 2D_{3/2}$	38152.74	337170.08(5/2)	pa N
82	27	334.5844	298878.29	334.5853	0.0007	0.83	-0.0009	6	18	$5d^3 2D_{5/2}$	46366.31	345243.77(7/2)	pa
383	118	334.7188	298758.22	334.7189	0.0008	0.08	-0.0001	11	17	$5d^3 4P_{5/2}$	33389.80	332147.94(7/2)	pa
44	296	335.1471	298376.40	335.1529	0.0010	5.10	-0.0057	10	9	$5d^3 4P_{1/2}$	22003.95	320375.24(3/2)	pa * N, 40, m
765	296	335.1471	298376.40	335.1478	0.0008	0.58	-0.0006	10	17	$5d^3 4P_{5/2}$	33389.80	331765.63(5/2)	pa
732	290	335.6580	297922.26	335.6613	0.0009	2.88	-0.0032	7	11	$5d^3 4F_{9/2}$	20563.94	318483.31(9/2)	pa
187	53	335.7226	297864.96	335.7205	0.0008	-1.90	0.0021	10	16	$5d^3 2G_{7/2}$	31715.83	329582.69(5/2)	pa
56	20	335.7907	297804.58	335.7937	0.0025	2.65	-0.0030	2	15	$5d^3 2P_{3/2}$	56003.81	353805.73(1/2)	pa
907	128	336.7150	296987.10	336.7163	0.0018	1.19	-0.0014	4	7	$5d^3 2D_{15/2}$	78845.26	375831.17(3/2)	pa N
410	152	336.7408	296964.33	336.7436	0.0009	2.51	-0.0028	8	12	$5d^3 2H_{9/2}$	33428.03	330389.85(9/2)	pa
75	152	336.7408	296964.33	336.7434	0.0011	2.32	-0.0026	7	7	$5d^3 2H_{11/2}$	43289.57	340251.58(9/2)	pa * N, 45
354	106	336.9978	296737.80	337.0005	0.0007	2.37	-0.0027	10	16	$5d^3 2F_{5/2}$	50624.30	347359.74(5/2)	pa
617	78	337.0898	296656.87	337.0894	0.0015	-0.37	0.0004	6	15	$5d^3 2P_{3/2}$	56003.81	352661.04(3/2)	pa
38	322	337.6731	296144.41	337.6626	0.0010	-9.21	0.0105	13	12	$5d^3 4F_{3/2}$	0.00	296153.62(5/2)	pb * N, 150, Pt IX
156	22	337.7698	296059.62	337.7709	0.0009	0.98	-0.0011	9	9	$5d^3 2G_{9/2}$	51970.45	348029.10(7/2)	pb
93	87	338.1113	295760.60	338.1149	0.0010	3.11	-0.0036	7	12	$5d^3 4F_{3/2}$	0.00	295757.49(1/2)	pb
680	343	338.4697	295447.42	338.4686	0.0008	-0.92	0.0011	9	14	$5d^3 2F_{7/2}$	52580.76	348029.10(7/2)	pb
51	58	338.9016	295070.90	338.9025	0.0008	0.77	-0.0009	10	15	$5d^3 4F_{7/2}$	17083.81	312153.94(9/2)	pb N
193	86	339.2372	294778.99	339.2372	0.0008	0.02	0.0000	10	14	$5d^3 2F_{7/2}$	52580.76	347359.74(5/2)	pb
37	57	339.7106	294368.21	339.7109	0.0010	0.30	-0.0003	9	12	$5d^3 4F_{3/2}$	0.00	294367.91(3/2)	pb N
62	49	339.7382	294344.29	339.7404	0.0008	1.87	-0.0022	12	15	$5d^3 4F_{7/2}$	17083.81	311426.23(7/2)	pb N
213	142	340.3322	293830.56	340.3326	0.0008	0.31	-0.0004	13	16	$5d^3 4F_{5/2}$	10194.49	304024.73(5/2)	pb
4	34	340.5895	293608.58	340.5845	0.0008	-4.31	0.0050	10	16	$5d^3 2D_{3/2}$	38152.74	331765.63(5/2)	pb * N
4194	780	340.9816	293270.96	340.9789	0.0010	-2.36	0.0027	6	9	$5d^3 2G_{9/2}$	51970.45	345243.77(7/2)	pb
132	109	341.4647	292856.04	341.4630	0.0010	-1.47	0.0017	5	12	$5d^3 2H_{9/2}$	33428.03	326285.54(11/2)	pb

800	514	341.9631	292429.21	341.9617	0.0009	-1.22	0.0014	5	16	$5d^3 4F_{5/2}$	10194.49	302624.91(3/2)	pb	
287	274	342.9489	291588.63	342.9473	0.0009	-1.37	0.0016	10	11	$5d^3 4F_{9/2}$	20563.94	312153.94(9/2)	pb	
76	75	343.1328	291432.35	343.1356	0.0008	2.40	-0.0028	10	16	$5d^3 2D_{3/2}$	38152.74	329582.69(5/2)	pb	N
141	92	343.2236	291355.26	343.2228	0.0009	-0.68	0.0008	10	15	$5d^3 2P_{3/2}$	56003.81	347359.74(5/2)	pb	
284	178	343.8067	290861.11	343.8053	0.0009	-1.18	0.0014	12	11	$5d^3 4F_{9/2}$	20563.94	311426.23(7/2)	pb	
2658	854	344.0305	290671.90	344.0317	0.0009	1.05	-0.0012	7	12	$5d^3 2H_{9/2}$	33428.03	324098.89(7/2)	pb	
902	511	344.2271	290505.89	344.2256	0.0008	-1.27	0.0015	10	17	$5d^3 4P_{5/2}$	33389.80	323896.96(3/2)	pb	Pt IX(250)
270	283	345.0194	289838.77	345.0197	0.0009	0.23	-0.0003	11	16	$5d^3 4F_{5/2}$	10194.49	300033.03(3/2)	pb	
404	330	346.5098	288592.13	346.5118	0.0008	1.67	-0.0020	8	15	$5d^3 4F_{7/2}$	17083.81	305674.26(7/2)	pb	
113	101	346.5630	288547.83	346.5680	0.0007	4.13	-0.0050	12	18	$5d^3 2D_{5/2}$	46366.31	334910.00(3/2)	pb	
2409	882	346.8842	288280.64	346.8836	0.0010	-0.49	0.0006	7	9	$5d^3 2G_{9/2}$	51970.45	340251.58(9/2)	pb	
134	137	347.3438	287899.19	347.3474	0.0010	3.01	-0.0036	5	14	$5d^3 4P_{3/2}$	18763.68	306659.86(1/2)	pb	
242	166	347.5466	287731.20	347.5460	0.0008	-0.52	0.0006	4	16	$5d^3 2D_{3/2}$	38152.74	325884.46(1/2)	pb	
226	105	347.6182	287671.93	347.6195	0.0008	1.11	-0.0013	7	14	$5d^3 2F_{7/2}$	52580.76	340251.58(9/2)	pb	
2235	926	347.7009	287603.51	347.7019	0.0009	0.80	-0.0010	9	16	$5d^3 2G_{7/2}$	31715.83	319318.55(5/2)	pb	
57	141	347.9000	287438.92	347.9013	0.0009	1.09	-0.0013	10	16	$5d^3 4F_{5/2}$	10194.49	297632.31(7/2)	pb	
664	423	347.9360	287409.18	347.9371	0.0009	0.89	-0.0011	10	16	$5d^3 2G_{7/2}$	31715.83	319124.12(7/2)	pb	
532	684	348.1698	287216.18	348.1726	0.0011	2.28	-0.0028	4	12	$5d^3 4F_{3/2}$	0.00	287213.90(1/2)	pb	
5194	1086	348.3111	287099.66	348.3103	0.0012	-0.62	0.0008	8	7	$5d^3 2H_{11/2}$	43289.57	330389.85(9/2)	pb	
220	183	348.4462	286988.35	348.4497	0.0008	2.90	-0.0035	10	17	$5d^3 4P_{5/2}$	33389.80	320375.24(3/2)	pb	
1900	914	348.5037	286941.00	348.5038	0.0009	0.08	-0.0001	13	15	$5d^3 4F_{7/2}$	17083.81	304024.73(5/2)	pb	
82	123	349.0761	286470.49	349.0748	0.0011	-1.04	0.0013	8	12	$5d^3 4F_{3/2}$	0.00	286471.53(5/2)	pb	
400	255	349.6156	286028.43	349.6152	0.0012	-0.32	0.0004	4	9	$5d^3 2P_{1/2}$	39855.71	325884.46(1/2)	pb	
571	651	349.7024	285957.43	349.7003	0.0008	-1.70	0.0021	13	16	$5d^3 4F_{5/2}$	10194.49	296153.62(5/2)	pb	
242	125	349.9222	285777.81	349.9175	0.0007	-3.82	0.0047	11	18	$5d^3 2D_{5/2}$	46366.31	332147.94(7/2)	pb	N
172	161	349.9602	285746.78	349.9633	0.0008	2.55	-0.0031	10	16	$5d^3 2D_{3/2}$	38152.74	323896.96(3/2)	pb	
112	190	349.9774	285732.74	349.9755	0.0009	-1.58	0.0019	10	17	$5d^3 4P_{5/2}$	33389.80	319124.12(7/2)	pb	N
1130	643	350.0238	285694.86	350.0223	0.0010	-1.23	0.0015	10	12	$5d^3 2H_{9/2}$	33428.03	319124.12(7/2)	pb	
1062	515	350.2279	285528.37	350.2277	0.0008	-0.18	0.0002	10	18	$5d^3 2D_{5/2}$	46366.31	331894.85(3/2)	pb	
75	37	350.3860	285399.53	350.3863	0.0008	0.21	-0.0003	10	18	$5d^3 2D_{5/2}$	46366.31	331765.63(5/2)	pb	N
139	100	350.5566	285260.64	350.5561	0.0008	-0.41	0.0005	13	14	$5d^3 4P_{3/2}$	18763.68	304024.73(5/2)	pb	N
2498	1138	350.7398	285111.64	350.7414	0.0010	1.32	-0.0016	8	11	$5d^3 4F_{9/2}$	20563.94	305674.26(7/2)	pb	
1244	721	350.8094	285055.08	350.8091	0.0009	-0.21	0.0003	7	12	$5d^3 2H_{9/2}$	33428.03	318483.31(9/2)	pb	
362	368	351.3040	284653.75	351.3013	0.0011	-2.17	0.0027	5	9	$5d^3 2P_{1/2}$	22003.95	306659.86(1/2)	pb	
1621	648	351.3861	284587.24	351.3835	0.0009	-2.08	0.0026	9	14	$5d^3 2F_{7/2}$	52580.76	337170.08(5/2)	pb	
1031	453	351.7603	284284.50	351.7588	0.0008	-1.20	0.0015	12	16	$5d^3 2F_{5/2}$	50624.30	334910.00(3/2)	pb	
495	549	351.8985	284172.85	351.8978	0.0009	-0.57	0.0007	9	16	$5d^3 4F_{5/2}$	10194.49	294367.91(3/2)	pb	
105	138	352.0590	284043.30	352.0615	0.0012	2.05	-0.0025	10	9	$5d^3 2P_{1/2}$	39855.71	323896.96(3/2)	pb	
322	330	352.1180	283995.71	352.1172	0.0010	-0.66	0.0008	9	16	$5d^3 2G_{7/2}$	31715.83	315712.19(5/2)	pb	
405	358	352.2875	283859.06	352.2848	0.0009	-2.17	0.0027	5	14	$5d^3 4P_{3/2}$	18763.68	302624.91(3/2)	pb	
2	41	352.9040	283363.18	352.9023	0.0010	-1.35	0.0017	6	15	$5d^3 2P_{3/2}$	56003.81	339368.34(1/2)	pb	* N

1021	498	353.0873	283216.08	353.0869	0.0007	-0.30	0.0004	10	18	$5d^3 2D_{5/2}$	46366.31	329582.69(5/2)	pb	
274	385	353.3610	282996.71	353.3619	0.0013	0.73	-0.0009	5	7	$5d^3 2H_{11/2}$	43289.57	326285.54(11/2)	pb	
544	424	354.3298	282222.95	354.3303	0.0008	0.44	-0.0005	10	16	$5d^3 2D_{3/2}$	38152.74	320375.24(3/2)	pb	
95	82	355.0651	281638.49	355.0676	0.0010	2.01	-0.0025	6	17	$5d^3 4P_{5/2}$	33389.80	315026.28(3/2)	pb	
617	737	355.5330	281267.84	355.5311	0.0009	-1.50	0.0019	11	14	$5d^3 4P_{3/2}$	18763.68	300033.03(3/2)	pb	
712	737	355.5330	281267.84	355.5296	0.0008	-2.71	0.0034	10	16	$5d^3 2F_{5/2}$	50624.30	331894.85(3/2)	pb	400
288	401	355.6607	281166.85	355.6620	0.0009	1.04	-0.0013	9	16	$5d^3 2D_{3/2}$	38152.74	319318.55(5/2)	pb	
498	401	355.6607	281166.85	355.6614	0.0010	0.58	-0.0007	9	15	$5d^3 2P_{3/2}$	56003.81	337170.08(5/2)	pb	
200	241	356.3548	280619.20	356.3526	0.0011	-1.77	0.0022	5	9	$5d^3 4P_{1/2}$	22003.95	302624.91(3/2)	pb	
1298	912	356.4469	280546.70	356.4446	0.0009	-1.81	0.0023	10	15	$5d^3 4F_{7/2}$	17083.81	297632.31(7/2)	pb	
218	488	356.4815	280519.47	356.4814	0.0012	-0.07	0.0001	10	9	$5d^3 2P_{1/2}$	39855.71	320375.24(3/2)	pb	N, 300
273	293	356.5837	280439.07	356.5849	0.0009	0.96	-0.0012	10	16	$5d^3 2G_{7/2}$	31715.83	312153.94(9/2)	pb	
725	421	356.8577	280223.74	356.8552	0.0010	-1.96	0.0025	4	15	$5d^3 2P_{3/2}$	56003.81	336229.51(1/2)	pb	
341	373	356.9131	280180.25	356.9166	0.0010	2.75	-0.0035	11	9	$5d^3 2G_{9/2}$	51970.45	332147.94(7/2)	pb	
1173	786	357.5126	279710.42	357.5126	0.0009	0.02	0.0000	12	16	$5d^3 2G_{7/2}$	31715.83	311426.23(7/2)	pb	
1088	692	357.6959	279567.09	357.6958	0.0009	-0.10	0.0001	11	14	$5d^3 2F_{7/2}$	52580.76	332147.94(7/2)	pb	
533	613	358.3321	279070.73	358.3333	0.0009	0.92	-0.0012	13	15	$5d^3 4F_{7/2}$	17083.81	296153.62(5/2)	pb	
132	98	358.4735	278960.65	358.4764	0.0008	2.26	-0.0029	10	16	$5d^3 2F_{5/2}$	50624.30	329582.69(5/2)	pb	
192	150	358.5447	278905.25	358.5435	0.0010	-0.94	0.0012	12	15	$5d^3 2P_{3/2}$	56003.81	334910.00(3/2)	pb	
570	616	358.7749	278726.30	358.7754	0.0009	0.39	-0.0005	10	12	$5d^3 2H_{9/2}$	33428.03	312153.94(9/2)	pb	
143	301	359.1733	278417.13	359.1704	0.0010	-2.27	0.0029	8	9	$5d^3 2G_{9/2}$	51970.45	330389.85(9/2)	pb	N
412	651	359.2052	278392.41	359.2045	0.0009	-0.54	0.0007	7	15	$5d^3 4F_{7/2}$	17083.81	295476.76(9/2)	pb	
263	111	359.4388	278211.48	359.4382	0.0011	-0.46	0.0006	8	10	$5d^3 2D_{13/2}$	75993.15	354205.09(5/2)	pb	
226	264	359.6703	278032.41	359.6746	0.0011	3.33	-0.0043	11	9	$5d^3 4P_{1/2}$	22003.95	300033.03(3/2)	pb	
550	544	359.7103	278001.49	359.7146	0.0010	3.29	-0.0043	12	12	$5d^3 2H_{9/2}$	33428.03	311426.23(7/2)	pb	
248	425	359.9575	277810.58	359.9594	0.0009	1.48	-0.0019	8	14	$5d^3 2F_{7/2}$	52580.76	330389.85(9/2)	pb	N
877	425	359.9575	277810.58	359.9549	0.0031	-2.01	0.0026	2	10	$5d^3 2D_{13/2}$	75993.15	353805.73(1/2)	pb	
301	258	360.0549	277735.42	360.0586	0.0008	2.85	-0.0037	7	18	$5d^3 2D_{5/2}$	46366.31	324098.89(7/2)	pb	
235	377	360.2818	277560.51	360.2832	0.0010	1.05	-0.0014	9	16	$5d^3 2D_{3/2}$	38152.74	315712.19(5/2)	pb	
39	118	360.5054	277388.35	360.5033	0.0009	-1.58	0.0021	13	14	$5d^3 4P_{3/2}$	18763.68	296153.62(5/2)	pb	
771	902	360.9194	277070.17	360.9217	0.0010	1.80	-0.0023	10	11	$5d^3 4F_{9/2}$	20563.94	297632.31(7/2)	pb	
518	300	361.0079	277002.25	361.0083	0.0009	0.32	-0.0004	10	14	$5d^3 2F_{7/2}$	52580.76	329582.69(5/2)	pb	
341	866	361.0207	276992.43	361.0189	0.0009	-1.38	0.0018	7	14	$5d^3 4P_{3/2}$	18763.68	295757.49(1/2)	pb	N
707	579	361.1765	276872.94	361.1757	0.0010	-0.60	0.0008	6	16	$5d^3 2D_{3/2}$	38152.74	315026.28(3/2)	pb	
356	231	361.4452	276667.11	361.4442	0.0017	-0.78	0.0010	6	10	$5d^3 2D_{13/2}$	75993.15	352661.04(3/2)	pb	
1008	1025	361.9568	276276.06	361.9555	0.0009	-0.98	0.0013	8	16	$5d^3 4F_{5/2}$	10194.49	286471.53(5/2)	pb	
78	58	362.4645	275889.09	362.4619	0.0010	-1.96	0.0026	10	15	$5d^3 2P_{3/2}$	56003.81	331894.85(3/2)	pb	
20	38	362.6314	275762.11	362.6318	0.0010	0.29	-0.0004	10	15	$5d^3 2P_{3/2}$	56003.81	331765.63(5/2)	pb	N
135	248	362.8417	275602.28	362.8391	0.0009	-1.95	0.0026	9	14	$5d^3 4P_{3/2}$	18763.68	294367.91(3/2)	pb	
1043	519	363.1616	275359.51	363.1612	0.0012	-0.32	0.0004	8	7	$5d^3 2D_{15/2}$	78845.26	354205.09(5/2)	pb	
900	768	363.3829	275191.82	363.3804	0.0013	-1.93	0.0025	7	7	$5d^3 2H_{11/2}$	43289.57	318483.31(9/2)	pb	

334	561	363.4123	275169.55	363.4110	0.0013	-1.01	0.0013	6	9	$5d^3 2P_{1/2}$	39855.71	315026.28(3/2)	pb	
1398	1255	363.7507	274913.56	363.7517	0.0010	0.74	-0.0010	7	11	$5d^3 4F_{9/2}$	20563.94	295476.76(9/2)	pb	
421	829	363.8232	274858.78	363.8252	0.0009	1.47	-0.0020	9	16	$5d^3 4F_{5/2}$	10194.49	285051.79(7/2)	pb	
25	207	364.5446	274314.86	364.5443	0.0011	-0.24	0.0003	5	9	$5d^3 2G_{9/2}$	51970.45	326285.54(11/2)	pb	30, Pt VII
138	173	365.0146	273961.64	365.0189	0.0009	3.21	-0.0043	8	16	$5d^3 2G_{7/2}$	31715.83	305674.26(7/2)	pb	
861	971	365.2103	273814.84	365.2090	0.0017	-0.94	0.0013	6	7	$5d^3 2D_{15/2}$	78845.26	352661.04(3/2)	pb	
1266	1253	365.2345	273796.70	365.2351	0.0012	0.43	-0.0006	7	12	$5d^3 4F_{3/2}$	0.00	273796.26(3/2)	pb	
44	238	365.2907	273754.57	365.2921	0.0011	1.03	-0.0014	7	9	$5d^3 4P_{1/2}$	22003.95	295757.49(1/2)	pb	
209	195	365.5242	273579.70	365.5253	0.0010	0.81	-0.0011	10	15	$5d^3 2P_{3/2}$	56003.81	329582.69(5/2)	pb	
40	76	365.9350	273272.58	365.9349	0.0009	-0.08	0.0001	10	16	$5d^3 2F_{5/2}$	50624.30	323896.96(3/2)	pb	
107	128	366.6245	272758.64	366.6256	0.0008	0.83	-0.0011	10	18	$5d^3 2D_{5/2}$	46366.31	319124.12(7/2)	pb	
310	543	367.1592	272361.42	367.1558	0.0012	-2.54	0.0034	9	9	$5d^3 4P_{1/2}$	22003.95	294367.91(3/2)	pb	
157	288	367.2256	272312.17	367.2300	0.0010	3.27	-0.0044	13	16	$5d^3 2G_{7/2}$	31715.83	304024.73(5/2)	pb	N, 200
103	125	367.2670	272281.47	367.2630	0.0009	-2.99	0.0040	8	17	$5d^3 4P_{5/2}$	33389.80	305674.26(7/2)	pb	N
146	364	367.3135	272247.00	367.3145	0.0010	0.77	-0.0010	8	12	$5d^3 2H_{9/2}$	33428.03	305674.26(7/2)	pb	200, Pt VII
431	269	368.5040	271367.47	368.5052	0.0011	0.89	-0.0012	10	10	$5d^3 2D_{13/2}$	75993.15	347359.74(5/2)	pb	
98	140	369.5048	270632.48	369.5015	0.0009	-2.45	0.0033	13	17	$5d^3 4P_{5/2}$	33389.80	304024.73(5/2)	pb	
34	32	370.7093	269753.15	370.7123	0.0009	2.20	-0.0030	10	16	$5d^3 2F_{5/2}$	50624.30	320375.24(3/2)	pb	
218	300	371.2720	269344.31	371.2698	0.0009	-1.57	0.0022	9	18	$5d^3 2D_{5/2}$	46366.31	315712.19(5/2)	pb	
556	326	371.4953	269182.41	371.4933	0.0012	-1.42	0.0020	9	7	$5d^3 2D_{15/2}$	78845.26	348029.10(7/2)	pb	
546	742	371.9343	268864.69	371.9347	0.0013	0.32	-0.0004	10	7	$5d^3 2H_{11/2}$	43289.57	312153.94(9/2)	pb	
234	327	372.1732	268692.10	372.1702	0.0009	-2.14	0.0030	9	16	$5d^3 2F_{5/2}$	50624.30	319318.55(5/2)	pb	
285	381	372.2199	268658.39	372.2177	0.0009	-1.58	0.0022	6	18	$5d^3 2D_{5/2}$	46366.31	315026.28(3/2)	pb	Pt VII(100)
9	23	372.4320	268505.39	372.4296	0.0011	-1.74	0.0024	5	16	$5d^3 2D_{3/2}$	38152.74	306659.86(1/2)	pb	N
15	190	372.5099	268449.24	372.5085	0.0011	-0.98	0.0014	4	14	$5d^3 4P_{3/2}$	18763.68	287213.90(1/2)	pb	100, Pt VII(100)
152	395	373.1769	267969.43	373.1789	0.0010	1.45	-0.0020	9	15	$5d^3 4F_{7/2}$	17083.81	285051.79(7/2)	pb	
15	90	373.2855	267891.47	373.2831	0.0011	-1.69	0.0024	10	15	$5d^3 2P_{3/2}$	56003.81	323896.96(3/2)	pb	50, Pt VII
287	893	373.4949	267741.27	373.4947	0.0012	-0.13	0.0002	6	12	$5d^3 4F_{3/2}$	0.00	267741.40(5/2)	pb	
493	819	373.5414	267707.94	373.5415	0.0010	0.10	-0.0001	8	14	$5d^3 4P_{3/2}$	18763.68	286471.53(5/2)	pb	
90	139	374.3179	267152.60	374.3164	0.0011	-1.07	0.0015	10	9	$5d^3 2G_{9/2}$	51970.45	319124.12(7/2)	pb	
316	427	375.0319	266643.98	375.0330	0.0010	0.76	-0.0011	11	17	$5d^3 4P_{5/2}$	33389.80	300033.03(3/2)	pb	
114	183	375.1740	266542.99	375.1735	0.0010	-0.36	0.0005	10	14	$5d^3 2F_{7/2}$	52580.76	319124.12(7/2)	pb	
261	142	375.3793	266397.22	375.3775	0.0012	-1.29	0.0018	6	7	$5d^3 2D_{15/2}$	78845.26	345243.77(7/2)	pb	
6	29	376.0539	265919.33	376.0579	0.0010	2.85	-0.0040	10	16	$5d^3 2G_{7/2}$	31715.83	297632.31(7/2)	pb	* N
33	166	377.0590	265210.48	377.0598	0.0013	0.53	-0.0008	4	9	$5d^3 4P_{1/2}$	22003.95	287213.90(1/2)	pb	
66	226	377.2329	265088.22	377.2334	0.0010	0.34	-0.0005	9	16	$5d^3 2F_{5/2}$	50624.30	315712.19(5/2)	pb	Pt VII(50)
156	336	377.2715	265061.10	377.2732	0.0008	1.18	-0.0017	12	18	$5d^3 2D_{5/2}$	46366.31	311426.23(7/2)	pb	
291	885	378.0852	264490.65	378.0892	0.0011	2.80	-0.0040	9	11	$5d^3 4F_{9/2}$	20563.94	285051.79(7/2)	pb	
107	366	378.1639	264435.61	378.1608	0.0010	-2.18	0.0031	13	16	$5d^3 2G_{7/2}$	31715.83	296153.62(5/2)	pb	
67	245	378.2123	264401.77	378.2120	0.0010	-0.21	0.0003	6	16	$5d^3 2F_{5/2}$	50624.30	315026.28(3/2)	pb	
673	956	378.4401	264242.61	378.4402	0.0010	0.10	-0.0001	10	17	$5d^3 4P_{5/2}$	33389.80	297632.31(7/2)	pb	

3	71	379.3569	263604.01	379.3601	0.0010	2.23	-0.0032	7	16	$5d^3 4F_{5/2}$	10194.49	273796.26(3/2)	pb	N
56	33	379.6886	263373.72	379.6865	0.0012	-1.46	0.0021	6	10	$5d^3 2D_{13/2}$	75993.15	339368.34(1/2)	pb	N
371	663	380.0378	263131.72	380.0382	0.0011	0.29	-0.0004	9	14	$5d^3 2F_{7/2}$	52580.76	315712.19(5/2)	pb	
68	242	380.5668	262765.96	380.5699	0.0009	2.14	-0.0031	13	17	$5d^3 4P_{5/2}$	33389.80	296153.62(5/2)	pb	N
128	158	382.8810	261177.76	382.8822	0.0012	0.83	-0.0012	9	10	$5d^3 2D_{13/2}$	75993.15	337170.08(5/2)	pb	N
15	82	383.1754	260977.09	383.1739	0.0010	-1.02	0.0015	9	17	$5d^3 4P_{5/2}$	33389.80	294367.91(3/2)	pb	N
502	835	383.4309	260803.18	383.4327	0.0009	1.26	-0.0018	12	16	$5d^3 2F_{5/2}$	50624.30	311426.23(7/2)	pb	550, Pt VII(300)
106	410	384.2636	260238.02	384.2661	0.0012	1.67	-0.0025	4	10	$5d^3 2D_{13/2}$	75993.15	336229.51(1/2)	pb	N, 250
5	30	384.3581	260174.04	384.3533	0.0014	-3.27	0.0048	11	9	$5d^3 2P_{1/2}$	39855.71	300033.03(3/2)	pb	* N
63	250	385.0425	259711.59	385.0472	0.0013	3.20	-0.0047	9	15	$5d^3 2P_{3/2}$	56003.81	315712.19(5/2)	pb	* bl
106	288	385.2502	259571.57	385.2478	0.0010	-1.60	0.0024	10	14	$5d^3 2F_{7/2}$	52580.76	312153.94(9/2)	pb	
56	172	385.4197	259457.42	385.4221	0.0012	1.64	-0.0024	12	9	$5d^3 2G_{9/2}$	51970.45	311426.23(7/2)	pb	
114	359	386.2093	258926.96	386.2244	0.0012	10.11	-0.0151	12	10	$5d^3 2D_{13/2}$	75993.15	334910.00(3/2)	pb	* N, 150, bl(C III)
60	182	386.3293	258846.53	386.3309	0.0010	1.06	-0.0016	12	14	$5d^3 2F_{7/2}$	52580.76	311426.23(7/2)	pb	
139	244	387.1077	258326.04	387.1095	0.0013	1.22	-0.0018	9	7	$5d^3 2D_{15/2}$	78845.26	337170.08(5/2)	pb	N
23	138	387.5954	258001.00	387.5956	0.0009	0.11	-0.0002	13	16	$5d^3 2D_{3/2}$	38152.74	296153.62(5/2)	pb	N
22	131	390.7725	255903.37	390.7749	0.0014	1.60	-0.0024	7	9	$5d^3 2P_{1/2}$	39855.71	295757.49(1/2)	pb	
64	331	392.1029	255035.09	392.1068	0.0011	2.51	-0.0039	7	14	$5d^3 4P_{3/2}$	18763.68	273796.26(3/2)	pb	
40	530	392.9018	254516.52	392.9085	0.0015	4.33	-0.0067	9	9	$5d^3 2P_{1/2}$	39855.71	294367.91(3/2)	pb	* N, 150, m(Pt VII)
15	84	394.2181	253666.69	394.2181	0.0009	-0.03	0.0000	11	18	$5d^3 2D_{5/2}$	46366.31	300033.03(3/2)	pb	N
55	195	394.6321	253400.57	394.6323	0.0010	0.14	-0.0002	13	16	$5d^3 2F_{5/2}$	50624.30	304024.73(5/2)	pb	N
28	230	394.7321	253336.38	394.7327	0.0011	0.42	-0.0006	9	16	$5d^3 2G_{7/2}$	31715.83	285051.79(7/2)	pb	N
52	664	395.1143	253091.32	395.1293	0.0011	9.59	-0.0150	8	17	$5d^3 4P_{5/2}$	33389.80	286471.53(5/2)	pb	* N, 200, m(Pt VII)
105	497	396.5282	252188.87	396.5309	0.0015	1.69	-0.0027	7	7	$5d^3 2H_{11/2}$	43289.57	295476.76(9/2)	pb	
19	370	397.1528	251792.26	397.1527	0.0013	-0.06	0.0001	7	9	$5d^3 4P_{1/2}$	22003.95	273796.26(3/2)	pb	150, Pt VII(250)
40	440	397.4204	251622.71	397.4188	0.0012	-1.04	0.0016	9	12	$5d^3 2H_{9/2}$	33428.03	285051.79(7/2)	pb	N, 300
16	115	397.7027	251444.11	397.7029	0.0011	0.14	-0.0002	13	14	$5d^3 2F_{7/2}$	52580.76	304024.73(5/2)	pb	N
10	89	398.9448	250661.24	398.9506	0.0011	3.65	-0.0058	6	15	$5d^3 4F_{7/2}$	17083.81	267741.40(5/2)	pb	N
13	63	400.3387	249788.49	400.3406	0.0009	1.18	-0.0019	13	18	$5d^3 2D_{5/2}$	46366.31	296153.62(5/2)	pb	N
83	934	400.9309	249419.54	400.9483	0.0011	10.82	-0.0174	11	16	$5d^3 2F_{5/2}$	50624.30	300033.03(3/2)	pb	* N, 200, m(Pt VII)
19	357	401.6383	248980.24	401.6424	0.0011	2.52	-0.0041	6	14	$5d^3 4P_{3/2}$	18763.68	267741.40(5/2)	pb	N
5	132	403.1854	248024.85	403.1918	0.0013	3.93	-0.0064	13	15	$5d^3 2P_{3/2}$	56003.81	304024.73(5/2)	pb	* N
22	98	403.2260	247999.88	403.2232	0.0010	-1.72	0.0028	9	18	$5d^3 2D_{5/2}$	46366.31	294367.91(3/2)	pb	N
19	49	403.3812	247904.46	403.3823	0.0014	0.65	-0.0011	10	10	$5d^3 2D_{13/2}$	75993.15	323896.96(3/2)	pb	N
44	219	404.8479	247006.35	404.8452	0.0010	-1.66	0.0027	10	16	$5d^3 2F_{5/2}$	50624.30	297632.31(7/2)	pb	N
32	815	408.0756	245052.63	408.0774	0.0011	1.08	-0.0018	10	14	$5d^3 2F_{7/2}$	52580.76	297632.31(7/2)	pb	* N, 150, m(Pt VII)
29	241	410.6665	243506.59	410.6670	0.0013	0.29	-0.0005	7	9	$5d^3 2G_{9/2}$	51970.45	295476.76(9/2)	pb	N
14	72	416.4833	240105.67	416.4841	0.0010	0.45	-0.0008	8	18	$5d^3 2D_{5/2}$	46366.31	286471.53(5/2)	pb	N
11	149	417.0903	239756.23	417.0947	0.0013	2.55	-0.0044	7	15	$5d^3 2P_{3/2}$	56003.81	295757.49(1/2)	pb	N
11	166	424.0021	235847.89	424.0033	0.0011	0.66	-0.0012	8	16	$5d^3 2F_{5/2}$	50624.30	286471.53(5/2)	pb	N
9	117	424.3741	235641.15	424.3698	0.0012	-2.38	0.0043	7	16	$5d^3 2D_{3/2}$	38152.74	273796.26(3/2)	pb	N

12	113	430.1607	232471.26	430.1611	0.0012	0.23	-0.0004	9	14	$5d^3\ ^2F_{7/2}$	52580.76	285051.79(7/2)	pb	N
9	265	435.5615	229588.70	435.5616	0.0012	0.04	-0.0001	6	16	$5d^3\ ^2D_{3/2}$	38152.74	267741.40(5/2)	pb	N, 150
17	110	452.1030	221188.53	452.1046	0.0017	0.77	-0.0016	11	7	$5d^3\ ^2D_{15/2}$	78845.26	300033.03(3/2)	pb	N
11	95	692.8336	144334.80	692.8289	0.0016	-0.97	0.0047	10	7	$5d^26s\ (^3F)^4F_{3/2}$	176039.47	320375.24(3/2)	pc	
40	297	710.6802	140710.27	710.6794	0.0016	-0.15	0.0008	10	10	$5d^26s\ (^3F)^4F_{5/2}$	179664.83	320375.24(3/2)	pc	
19	72	716.0595	139653.20	716.0568	0.0020	-0.52	0.0027	9	10	$5d^26s\ (^3F)^4F_{5/2}$	179664.83	319318.55(5/2)	pc *	
62	263	719.9588	138896.84	719.9600	0.0018	0.23	-0.0012	10	10	$5d^26s\ (^3F)^2F_{7/2}$	208463.13	347359.74(5/2)	pc	
19	126	723.2681	138261.32	723.2674	0.0016	-0.13	0.0007	12	12	$5d^26s\ (^3F)^2F_{5/2}$	196648.56	334910.00(3/2)	pc	
30	146	725.2062	137891.82	725.2026	0.0015	-0.69	0.0036	10	11	$5d^26s\ (^3F)^4F_{7/2}$	191690.18	329582.69(5/2)	pc	
20	83	734.0878	136223.49	734.0865	0.0022	-0.23	0.0013	10	4	$5d^26s\ (^3P)^4P_{1/2}$	195671.13	331894.85(3/2)	pc	
26	210	738.0048	135500.47	738.0107	0.0019	1.09	-0.0059	11	12	$5d^26s\ (^3F)^2F_{5/2}$	196648.56	332147.94(7/2)	pc *	100, Pt V
6	138	739.3880	135246.99	739.3918	0.0020	0.69	-0.0038	10	12	$5d^26s\ (^3F)^2F_{5/2}$	196648.56	331894.85(3/2)	pc *	
31	159	740.1000	135116.88	740.0989	0.0021	-0.19	0.0011	10	12	$5d^26s\ (^3F)^2F_{5/2}$	196648.56	331765.63(5/2)	pc	
44	143	753.3281	132744.29	753.3272	0.0023	-0.16	0.0009	8	6	$5d^26s\ (^1D)^2D_{5/2}$	221460.64	354205.09(5/2)	pc	
49	326	755.2342	132409.26	755.2374	0.0016	0.55	-0.0032	7	11	$5d^26s\ (^3F)^4F_{7/2}$	191690.18	324098.89(7/2)	pc	
230	633	756.1959	132240.86	756.1981	0.0022	0.38	-0.0022	8	8	$5d^26s\ (^1G)^2G_{7/2}$	221964.61	354205.09(5/2)	pc	
15	107	756.4843	132190.45	756.4816	0.0017	-0.46	0.0027	12	9	$5d^26s\ (^3P)^4P_{3/2}$	202719.09	334910.00(3/2)	pc	2d ord
10	58	758.9515	131760.73	758.9476	0.0020	-0.68	0.0039	12	10	$5d^26s\ (^3F)^4F_{5/2}$	179664.83	311426.23(7/2)	pc *	
24	254	759.7703	131618.73	759.7714	0.0017	0.18	-0.0011	12	9	$5d^26s\ (^3P)^4P_{5/2}$	203291.46	334910.00(3/2)	pc	
97	583	761.0882	131390.82	761.0850	0.0018	-0.55	0.0032	11	7	$5d^26s\ (^3F)^4F_{9/2}$	200756.58	332147.94(7/2)	pc	
24	168	761.6884	131287.28	761.6868	0.0022	-0.28	0.0016	6	10	$5d^26s\ (^1D)^2D_{3/2}$	208080.78	339368.34(1/2)	pc	2d ord
106	573	765.5763	130620.55	765.5773	0.0030	0.16	-0.0009	5	7	$5d^26s\ (^3F)^4F_{3/2}$	176039.47	306659.86(1/2)	pc	
218	703	771.4068	129633.29	771.4069	0.0021	0.02	-0.0001	8	7	$5d^26s\ (^3F)^4F_{9/2}$	200756.58	330389.85(9/2)	pc	
54	725	774.1501	129173.92	774.1390	0.0022	-1.85	0.0111	10	9	$5d^26s\ (^3P)^4P_{3/2}$	202719.09	331894.85(3/2)	pc *	200, m
133	725	774.1501	129173.92	774.1507	0.0021	0.11	-0.0006	9	6	$5d^26s\ (^1G)^2G_{9/2}$	218855.29	348029.10(7/2)	pc	
94	354	774.6579	129089.24	774.6575	0.0022	-0.06	0.0004	9	10	$5d^26s\ (^1D)^2D_{3/2}$	208080.78	337170.08(5/2)	pc	
250	973	774.9218	129045.28	774.9142	0.0030	-1.26	0.0076	10	9	$5d^26s\ (^3P)^4P_{3/2}$	202719.09	331765.63(5/2)	pc *	Pt IV
176	633	776.0593	128856.13	776.0572	0.0019	-0.35	0.0021	11	9	$5d^26s\ (^3P)^4P_{5/2}$	203291.46	332147.94(7/2)	pc	
155	585	776.9583	128707.04	776.9588	0.0022	0.08	-0.0005	9	10	$5d^26s\ (^3F)^2F_{7/2}$	208463.13	337170.08(5/2)	pc	
48	238	778.3652	128474.40	778.3666	0.0022	0.23	-0.0014	10	9	$5d^26s\ (^3P)^4P_{5/2}$	203291.46	331765.63(5/2)	pc	
122	686	779.8748	128225.71	779.8741	0.0023	-0.12	0.0007	10	4	$5d^26s\ (^3P)^4P_{1/2}$	195671.13	323896.96(3/2)	pc	
20	238	780.3425	128148.86	780.3433	0.0022	0.12	-0.0008	4	10	$5d^26s\ (^1D)^2D_{3/2}$	208080.78	336229.51(1/2)	pc	2d ord
130	639	781.3402	127985.22	781.3400	0.0018	-0.04	0.0002	13	7	$5d^26s\ (^3F)^4F_{3/2}$	176039.47	304024.73(5/2)	pc	Pt V(100)
61	370	783.5289	127627.71	783.5249	0.0021	-0.65	0.0040	9	11	$5d^26s\ (^3F)^4F_{7/2}$	191690.18	319318.55(5/2)	pc	
148	685	784.7210	127433.83	784.7203	0.0020	-0.11	0.0007	10	11	$5d^26s\ (^3F)^4F_{7/2}$	191690.18	319124.12(7/2)	pc	
38	171	785.8649	127248.34	785.8645	0.0022	-0.07	0.0004	10	12	$5d^26s\ (^3F)^2F_{5/2}$	196648.56	323896.96(3/2)	pc	
53	382	788.4618	126829.23	788.4618	0.0017	0.00	0.0000	12	10	$5d^26s\ (^1D)^2D_{3/2}$	208080.78	334910.00(3/2)	pc	
382	1094	788.6852	126793.30	788.6863	0.0018	0.17	-0.0011	7	11	$5d^26s\ (^3F)^4F_{7/2}$	191690.18	318483.31(9/2)	pc	
153	855	789.9839	126584.86	789.9803	0.0022	-0.58	0.0037	5	7	$5d^26s\ (^3F)^4F_{3/2}$	176039.47	302624.91(3/2)	pc	
173	1150	790.0962	126566.87	790.0863	0.0030	-1.59	0.0099	9	6	$5d^26s\ (^1D)^2D_{5/2}$	221460.64	348029.10(7/2)	pc *	800, m(O IV)
668	1174	791.6487	126318.66	791.6496	0.0030	0.14	-0.0009	3	6	$5d^26s\ (^1G)^2G_{9/2}$	218855.29	345173.80(11/2)	pc	

81	293	791.8234	126290.79	791.8206	0.0018	-0.45	0.0028	10	9	5d ² 6s (3P) ⁴ P _{5/2}	203291.46	329582.69(5/2)	pc	Pt IV(150)
48	420	791.9939	126263.60	791.9968	0.0023	0.46	-0.0029	6	4	5d ² 6s (3P) ² P _{1/2}	213105.19	339368.34(1/2)	pc	
116	404	793.2447	126064.50	793.2448	0.0022	0.02	-0.0001	9	8	5d ² 6s (1G) ² G _{7/2}	221964.61	348029.10(7/2)	pc	
339	1127	793.5883	126009.92	793.5914	0.0018	0.49	-0.0031	8	10	5d ² 6s (3F) ⁴ F _{5/2}	179664.83	305674.26(7/2)	pc	
113	367	794.2872	125899.04	794.2869	0.0022	-0.05	0.0003	10	6	5d ² 6s (1D) ² D _{5/2}	221460.64	347359.74(5/2)	pc	
652	1160	796.6281	125529.09	796.6289	0.0030	0.13	-0.0008	5	7	5d ² 6s (3F) ⁴ F _{9/2}	200756.58	326285.54(11/2)	pc	
71	395	797.4799	125395.01	797.4792	0.0020	-0.12	0.0007	10	8	5d ² 6s (1G) ² G _{7/2}	221964.61	347359.74(5/2)	pc	
47	305	801.8960	124704.45	801.8982	0.0023	0.34	-0.0022	10	4	5d ² 6s (3P) ⁴ P _{1/2}	195671.13	320375.24(3/2)	pc	
137	719	804.1162	124360.14	804.1177	0.0019	0.23	-0.0015	13	10	5d ² 6s (3F) ⁴ F _{5/2}	179664.83	304024.73(5/2)	pc	
83	264	807.6574	123814.88	807.6626	0.0021	0.80	-0.0052	10	10	5d ² 6s (1D) ² D _{3/2}	208080.78	331894.85(3/2)	pc	
241	673	807.8641	123783.20	807.8646	0.0024	0.07	-0.0005	6	6	5d ² 6s (1D) ² D _{5/2}	221460.64	345243.77(7/2)	pc	
97	553	808.2319	123726.87	808.2331	0.0020	0.18	-0.0012	10	12	5d ² 6s (3F) ² F _{5/2}	196648.56	320375.24(3/2)	pc	
115	648	808.5009	123685.70	808.5067	0.0019	0.88	-0.0058	11	10	5d ² 6s (3F) ² F _{7/2}	208463.13	332147.94(7/2)	pc	
43	320	810.7542	123341.95	810.7518	0.0018	-0.36	0.0024	7	7	5d ² 6s (3F) ⁴ F _{9/2}	200756.58	324098.89(7/2)	pc	
129	445	811.1661	123279.31	811.1671	0.0023	0.16	-0.0010	6	8	5d ² 6s (1G) ² G _{7/2}	221964.61	345243.77(7/2)	pc	
57	377	811.9161	123165.43	811.9165	0.0022	0.06	-0.0004	4	9	5d ² 6s (3P) ⁴ P _{3/2}	202719.09	325884.46(1/2)	pc	2d ord
11	71	812.1880	123124.20	812.1872	0.0024	-0.12	0.0008	4	4	5d ² 6s (3P) ² P _{1/2}	213105.19	336229.51(1/2)	pc	
29	161	813.2674	122960.79	813.2720	0.0023	0.70	-0.0046	5	10	5d ² 6s (3F) ⁴ F _{5/2}	179664.83	302624.91(3/2)	pc	
150	572	815.1914	122670.58	815.1953	0.0022	0.59	-0.0039	9	12	5d ² 6s (3F) ² F _{5/2}	196648.56	319318.55(5/2)	pc	
200	792	816.4873	122475.88	816.4894	0.0022	0.32	-0.0021	10	12	5d ² 6s (3F) ² F _{5/2}	196648.56	319124.12(7/2)	pc	
280	728	820.1639	121926.85	820.1647	0.0023	0.12	-0.0008	8	10	5d ² 6s (3F) ² F _{7/2}	208463.13	330389.85(9/2)	pc	
92	435	820.9841	121805.04	820.9856	0.0022	0.23	-0.0016	12	4	5d ² 6s (3P) ² P _{1/2}	213105.19	334910.00(3/2)	pc	
75	347	823.0308	121502.14	823.0323	0.0020	0.22	-0.0015	10	10	5d ² 6s (1D) ² D _{3/2}	208080.78	329582.69(5/2)	pc	
203	647	823.7444	121396.88	823.7484	0.0022	0.59	-0.0040	7	6	5d ² 6s (1G) ² G _{9/2}	218855.29	340251.58(9/2)	pc	
74	243	825.6275	121120.00	825.6305	0.0019	0.44	-0.0030	10	10	5d ² 6s (3F) ² F _{7/2}	208463.13	329582.69(5/2)	pc	
215	657	827.7596	120808.02	827.7637	0.0019	0.59	-0.0041	7	9	5d ² 6s (3P) ⁴ P _{5/2}	203291.46	324098.89(7/2)	pc	
114	766	830.1256	120463.70	830.1252	0.0018	-0.06	0.0004	10	11	5d ² 6s (3F) ⁴ F _{7/2}	191690.18	312153.94(9/2)	pc	
19	131	832.5391	120114.48	832.5414	0.0019	0.33	-0.0023	13	7	5d ² 6s (3F) ⁴ F _{3/2}	176039.47	296153.62(5/2)	pc	
31	111	841.8274	118789.20	841.8241	0.0023	-0.46	0.0033	10	4	5d ² 6s (3P) ² P _{1/2}	213105.19	331894.85(3/2)	pc	pc *
237	840	845.4056	118286.42	845.4016	0.0023	-0.55	0.0040	7	8	5d ² 6s (1G) ² G _{7/2}	221964.61	340251.58(9/2)	pc	
12	68	847.6912	117967.49	847.6912	0.0020	0.00	0.0000	10	10	5d ² 6s (3F) ⁴ F _{5/2}	179664.83	297632.31(7/2)	pc	
19	74	848.8701	117803.65	848.8699	0.0023	-0.03	0.0002	4	10	5d ² 6s (1D) ² D _{3/2}	208080.78	325884.46(1/2)	pc	
44	292	849.4234	117726.92	849.4248	0.0021	0.19	-0.0013	7	7	5d ² 6s (3F) ⁴ F _{9/2}	200756.58	318483.31(9/2)	pc	
21	48	861.8734	116026.32	861.8677	0.0030	-0.77	0.0057	9	9	5d ² 6s (3P) ⁴ P _{5/2}	203291.46	319318.55(5/2)	pc	
73	171	864.7889	115635.16	864.7844	0.0019	-0.60	0.0045	7	10	5d ² 6s (3F) ² F _{7/2}	208463.13	324098.89(7/2)	pc	
16	49	877.3177	113983.79	877.3155	0.0020	-0.29	0.0022	8	11	5d ² 6s (3F) ⁴ F _{7/2}	191690.18	305674.26(7/2)	pc	
31	193	917.2159	109025.59	917.2149	0.0021	-0.12	0.0010	8	12	5d ² 6s (3F) ² F _{5/2}	196648.56	305674.26(7/2)	pc	
20	24	929.0956	107631.55	929.0968	0.0050	0.14	-0.0012	9	10	5d ² 6s (1D) ² D _{3/2}	208080.78	315712.19(5/2)	pc	
42	345	948.8863	105386.70	948.8840	0.0024	-0.26	0.0023	9	10	5d ² 6s (3F) ⁴ F _{5/2}	179664.83	285051.79(7/2)	pd	
14	97	957.2701	104463.73	957.2727	0.0021	0.29	-0.0026	13	11	5d ² 6s (3F) ⁴ F _{7/2}	191690.18	296153.62(5/2)	pd	
22	165	963.5136	103786.81	963.5158	0.0024	0.23	-0.0022	7	11	5d ² 6s (3F) ⁴ F _{7/2}	191690.18	295476.76(9/2)	pd	

12	159	964.4045	103690.93	964.4056	0.0023	0.12	-0.0011	10	10	5d ² 6s (3F) ² F _{7/2}	208463.13	312153.94(9/2)	pd	100
17	69	971.2240	102962.86	971.2217	0.0030	-0.24	0.0023	12	10	5d ² 6s (3F) ² F _{7/2}	208463.13	311426.23(7/2)	pd	
5	41	987.1073	101306.11	987.1118	0.0040	0.46	-0.0045	13	9	5d ² 6s (3P) ⁴ P _{3/2}	202719.09	304024.73(5/2)	pd *	
17	68	992.7225	100733.09	992.7206	0.0030	-0.19	0.0019	13	9	5d ² 6s (3P) ⁴ P _{5/2}	203291.46	304024.73(5/2)	pd	
21	62	1003.7365	99627.74	1003.7336	0.0030	-0.28	0.0029	7	6	5d ² 6s (1G) ² G _{9/2}	218855.29	318483.31(9/2)	pd	
8	85	1004.9758	99504.88	1004.9740	0.0023	-0.18	0.0018	13	12	5d ² 6s (3F) ² F _{5/2}	196648.56	296153.62(5/2)	pd	
24	491	1022.9397	97757.47	1022.9468	0.0031	0.68	-0.0071	7	7	5d ² 6s (3F) ⁴ F _{3/2}	176039.47	273796.26(3/2)	pd	300
30	451	1027.6000	97314.13	1027.6020	0.0030	0.19	-0.0020	11	9	5d ² 6s (3P) ⁴ P _{3/2}	202719.09	300033.03(3/2)	pd	200
122	512	1032.2468	96876.06	1032.2503	0.0030	0.33	-0.0035	10	7	5d ² 6s (3F) ⁴ F _{9/2}	200756.58	297632.31(7/2)	pd	
35	371	1036.0592	96519.58	1036.0686	0.0040	0.88	-0.0094	7	8	5d ² 6s (1G) ² G _{7/2}	221964.61	318483.31(9/2)	pd *	200, Pt V
82	349	1055.0544	94781.84	1055.0599	0.0030	0.50	-0.0055	8	11	5d ² 6s (3F) ⁴ F _{7/2}	191690.18	286471.53(5/2)	pd	
114	487	1055.7417	94720.14	1055.7413	0.0030	-0.04	0.0004	7	7	5d ² 6s (3F) ⁴ F _{9/2}	200756.58	295476.76(9/2)	pd	
41	205	1060.9904	94251.56	1060.9905	0.0040	0.01	-0.0001	9	6	5d ² 6s (1D) ² D _{5/2}	221460.64	315712.19(5/2)	pd	
61	333	1062.3515	94130.80	1062.3444	0.0030	-0.63	0.0071	7	10	5d ² 6s (3F) ⁴ F _{5/2}	179664.83	273796.26(3/2)	pd	
70	175	1068.7680	93565.68	1068.7685	0.0040	0.04	-0.0005	6	6	5d ² 6s (1D) ² D _{5/2}	221460.64	315026.28(3/2)	pd	
26	254	1070.2684	93434.51	1070.2681	0.0030	-0.03	0.0003	13	9	5d ² 6s (3P) ⁴ P _{3/2}	202719.09	296153.62(5/2)	pd	
75	349	1071.1067	93361.38	1071.1041	0.0030	-0.23	0.0026	9	11	5d ² 6s (3F) ⁴ F _{7/2}	191690.18	285051.79(7/2)	pd	
91	331	1071.8342	93298.01	1071.8269	0.0030	-0.64	0.0073	10	6	5d ² 6s (1G) ² G _{9/2}	218855.29	312153.94(9/2)	pd	
18	88	1074.8246	93038.44	1074.8250	0.0030	0.03	-0.0004	7	9	5d ² 6s (3P) ⁴ P _{3/2}	202719.09	295757.49(1/2)	pd	
40	341	1076.8674	92861.94	1076.8648	0.0030	-0.22	0.0026	13	9	5d ² 6s (3P) ⁴ P _{5/2}	203291.46	296153.62(5/2)	pd	
84	475	1080.2485	92571.29	1080.2526	0.0030	0.35	-0.0041	12	6	5d ² 6s (1G) ² G _{9/2}	218855.29	311426.23(7/2)	pd	300, Pt V
17	41	1087.5237	91952.02	1087.5210	0.0030	-0.23	0.0027	11	10	5d ² 6s (1D) ² D _{3/2}	208080.78	300033.03(3/2)	pd	
70	609	1090.4921	91701.72	1090.4896	0.0030	-0.21	0.0025	6	7	5d ² 6s (3F) ⁴ F _{3/2}	176039.47	267741.40(5/2)	pd	
18	186	1091.1139	91649.46	1091.1215	0.0050	0.64	-0.0076	9	9	5d ² 6s (3P) ⁴ P _{3/2}	202719.09	294367.91(3/2)	pd *	100, 2d ord
34	89	1092.3859	91542.74	1092.3855	0.0040	-0.03	0.0004	4	4	5d ² 6s (3P) ⁴ P _{1/2}	195671.13	287213.90(1/2)	pd	
44	252	1097.9764	91076.64	1097.9786	0.0040	0.19	-0.0022	9	9	5d ² 6s (3P) ⁴ P _{5/2}	203291.46	294367.91(3/2)	pd	Pt VI(100)
62	177	1108.7721	90189.86	1108.7787	0.0030	0.53	-0.0066	10	8	5d ² 6s (1G) ² G _{7/2}	221964.61	312153.94(9/2)	pd	
30	108	1113.3060	89822.57	1113.3009	0.0030	-0.41	0.0050	8	12	5d ² 6s (3F) ² F _{5/2}	196648.56	286471.53(5/2)	pd	
49	127	1117.8024	89461.25	1117.7978	0.0030	-0.37	0.0046	12	8	5d ² 6s (1G) ² G _{7/2}	221964.61	311426.23(7/2)	pd	
47	214	1121.4663	89168.98	1121.4637	0.0030	-0.21	0.0026	10	10	5d ² 6s (3F) ² F _{7/2}	208463.13	297632.31(7/2)	pd	Pt IV
52	216	1131.1778	88403.43	1131.1803	0.0030	0.20	-0.0025	9	12	5d ² 6s (3F) ² F _{5/2}	196648.56	285051.79(7/2)	pd	
43	856	1135.3755	88076.59	1135.3757	0.0030	0.01	-0.0002	6	10	5d ² 6s (3F) ⁴ F _{5/2}	179664.83	267741.40(5/2)	pd	300, 2d ord
11	68	1140.5561	87676.53	1140.5537	0.0030	-0.18	0.0024	7	10	5d ² 6s (1D) ² D _{3/2}	208080.78	295757.49(1/2)	pd	Pt VII
72	210	1149.2472	87013.48	1149.2453	0.0030	-0.15	0.0019	7	10	5d ² 6s (3F) ² F _{7/2}	208463.13	295476.76(9/2)	pd	

Table 2Experimental and calculated energy levels (cm⁻¹) in the 5d³ and 5d²6s configurations of Pt VIII.

E _{obs}	E _{calc}	Δ	N	N _{opt}	rwmv ₁	rwmv ₂	Unc	Composition
J = 1/2								
-	250250.38	-						88% 2 ⁽¹ S) ² S + 6% 2 ⁽³ P) ⁴ P + 6% 2 ⁽³ P) ² P
213105.19	213090.63	14.56	4	4	0.22	0.20	0.40	88% 2 ⁽³ P) ² P + 9% 2 ⁽³ P) ⁴ P + 3% 2 ⁽¹ S) ² S
195671.13	195669.43	1.70	4	4	0.22	0.11	0.40	84% 2 ⁽³ P) ⁴ P + 10% 2 ⁽¹ S) ² S + 6% 2 ⁽³ P) ² P
39855.71	39868.50	-12.79	9	7	0.90	0.73	1.10	68% 1 ² P + 32% 1 ⁴ P
22003.95	22005.11	-1.16	9	8	0.80	0.72	1.00	68% 1 ⁴ P + 32% 1 ² P
J = 3/2								
-	227605.79	-						67% 2 ⁽³ P) ² P + 27% 2 ⁽¹ D) ² D + 3% 2 ⁽³ P) ⁴ P
208080.78	208101.17	-20.39	10	9	0.14	0.11	0.30	49% 2 ⁽¹ D) ² D + 31% 2 ⁽³ P) ² P + 13% 2 ⁽³ P) ⁴ P
202719.09	202716.08	3.01	9	5	0.18	0.09	0.30	84% 2 ⁽³ P) ⁴ P + 13% 2 ⁽¹ D) ² D + 3% 2 ⁽³ F) ⁴ F
176039.47	176029.49	9.98	7	7	0.17	0.20	0.30	89% 2 ⁽³ F) ⁴ F + 11% 2 ⁽¹ D) ² D
75993.15	75997.41	-4.26	10	9	0.72	0.41	0.80	62% 1 ² D1 + 36% 1 ² D2 + 1% 1 ² P
56003.81	56002.74	1.07	15	12	0.67	0.49	0.90	56% 1 ² P + 18% 1 ² D1 + 13% 1 ² D2
38152.74	38151.15	1.59	16	15	0.58	0.37	0.70	34% 1 ² D2 + 41% 1 ⁴ P + 10% 1 ² D1
18763.68	18757.02	6.66	14	14	0.62	0.50	0.80	46% 1 ⁴ P + 33% 1 ² P + 13% 1 ⁴ F
0.00	7.89	-7.89	12	10	0.82	0.56	1.00	76% 1 ⁴ F + 12% 1 ² D2 + 8% 1 ² D1
J = 5/2								
221460.64	221442.00	18.64	6	5	0.19	0.04	0.40	53% 2 ⁽¹ D) ² D + 41% 2 ⁽³ P) ⁴ P + 4% 2 ⁽³ F) ² F
203291.46	203307.64	-16.18	9	8	0.15	0.12	0.20	51% 2 ⁽³ P) ⁴ P + 27% 2 ⁽³ F) ² F + 22% 2 ⁽¹ D) ² D
196648.56	196649.17	-0.61	12	10	0.13	0.10	0.20	50% 2 ⁽³ F) ² F + 31% 2 ⁽³ F) ⁴ F + 12% 2 ⁽¹ D) ² D
179664.83	179671.85	-7.02	10	8	0.15	0.15	0.30	67% 2 ⁽³ F) ⁴ F + 18% 2 ⁽³ F) ² F + 13% 2 ⁽¹ D) ² D
78845.26	78842.87	2.39	7	7	0.77	0.43	0.90	76% 1 ² D1 + 15% 1 ² F + 5% 1 ⁴ P
50624.30	50622.75	1.55	16	15	0.56	0.45	0.70	82% 1 ² F + 11% 1 ² D1 + 6% 1 ⁴ P
46366.31	46368.88	-2.57	18	18	0.53	0.41	0.70	89% 1 ² D2 + 5% 1 ⁴ F + 3% 1 ⁴ P
33389.80	33391.55	-1.75	17	15	0.62	0.46	0.80	86% 1 ⁴ P + 9% 1 ² D1 + 2% 1 ² F
10194.49	10193.12	1.37	16	15	0.67	0.53	0.80	93% 1 ⁴ F + 5% 1 ² D2 + 2% 1 ² D1
J = 7/2								
221964.61	221983.07	-18.46	8	7	0.15	0.16	0.30	55% 2 ⁽¹ G) ² G + 40% 2 ⁽³ F) ² F + 5% 2 ⁽³ F) ⁴ F
208463.13	208442.12	21.01	10	10	0.13	0.12	0.23	53% 2 ⁽³ F) ² F + 44% 2 ⁽¹ G) ² G + 2% 2 ⁽³ F) ⁴ F
191690.18	191690.53	-0.35	11	11	0.13	0.12	0.00	93% 2 ⁽³ F) ⁴ F + 7% 2 ⁽³ F) ² F + 1% 2 ⁽¹ G) ² G
52580.76	52578.76	2.00	14	13	0.60	0.27	0.70	93% 1 ² F + 7% 1 ² G + 1% 1 ⁴ F
31715.83	31711.40	4.43	16	14	0.65	0.57	0.80	73% 1 ² G + 23% 1 ⁴ F + 4% 1 ² F
17083.81	17079.47	4.34	15	15	0.65	0.59	0.90	76% 1 ⁴ F + 20% 1 ² G + 4% 1 ² F
J = 9/2								
218855.29	218854.88	0.41	6	6	0.17	0.19	0.30	82% 2 ⁽¹ G) ² G + 18% 2 ⁽³ F) ⁴ F
200756.58	200755.93	0.65	7	7	0.16	0.11	0.30	82% 2 ⁽³ F) ⁴ F + 18% 2 ⁽¹ G) ² G
51970.45	51971.51	-1.06	9	9	0.75	0.55	0.90	58% 1 ² G + 27% 1 ² H + 15% 1 ⁴ F
33428.03	33430.40	-2.37	12	12	0.71	0.54	0.90	53% 1 ² H + 44% 1 ⁴ F + 3% 1 ² G
20563.94	20565.47	-1.53	11	11	0.76	0.70	1.00	41% 1 ⁴ F + 39% 1 ² G + 20% 1 ² H
J = 11/2								
43289.57	43289.85	-0.28	7	6	0.93	0.58	1.10	100% 1 ² H

Table 3Experimental and calculated energy levels (cm^{-1}) in the $5d^26p$ configuration of Pt VIII.

E_{obs}	E_{calc}	Δ	N	N_{opt}	rwmv ₁	rwmv ₂	Unc	Composition
J = 1/2								
353805.73	353915.44	-109.71	2	2	1.75	2.33	3.00	35% $(^1\text{S})^2\text{P}$ + 33% $(^3\text{P})^2\text{P}$ + 24% $(^1\text{D})^2\text{P}$
339368.34	339169.35	198.99	6	5	0.34	0.41	0.40	48% $(^3\text{P})^2\text{P}$ + 24% $(^1\text{S})^2\text{P}$ + 16% $(^3\text{P})^4\text{D}$
336229.51	336406.09	-176.58	4	4	0.33	0.27	0.40	30% $(^1\text{D})^2\text{P}$ + 27% $(^1\text{S})^2\text{P}$ + 21% $(^3\text{P})^2\text{S}$
325884.46	325832.51	51.95	4	4	0.30	0.06	0.40	39% $(^3\text{P})^4\text{P}$ + 26% $(^1\text{D})^2\text{P}$ + 22% $(^3\text{P})^2\text{S}$
306659.86	306762.11	-102.25	5	5	0.47	0.82	0.50	74% $(^3\text{F})^4\text{D}$ + 15% $(^1\text{D})^2\text{P}$ + 6% $(^3\text{P})^4\text{D}$
295757.49	295557.33	200.16	7	7	0.22	0.26	0.30	35% $(^3\text{P})^2\text{S}$ + 34% $(^3\text{P})^4\text{P}$ + 28% $(^3\text{P})^4\text{D}$
287213.90	286984.51	229.39	4	4	0.32	0.49	0.50	48% $(^3\text{P})^4\text{D}$ + 17% $(^3\text{P})^2\text{S}$ + 12% $(^1\text{S})^2\text{P}$
J = 3/2								
352661.04	353060.90	-399.86	6	6	1.06	0.49	1.20	45% $(^3\text{P})^2\text{P}$ + 19% $(^1\text{D})^2\text{D}$ + 12% $(^3\text{P})^2\text{D}$
375831.17	375819.94	11.23	4	4	1.44	0.50	1.50	86% $(^1\text{S})^2\text{P}$ + 4% $(^3\text{P})^4\text{P}$ + 3% $(^3\text{P})^2\text{D}$
334910.00	334773.25	136.75	12	10	0.22	0.17	0.30	46% $(^3\text{P})^2\text{D}$ + 15% $(^3\text{F})^2\text{D}$ + 14% $(^3\text{P})^4\text{P}$
331894.85	331979.12	-84.27	10	8	0.26	0.31	0.40	34% $(^3\text{P})^2\text{P}$ + 25% $(^1\text{D})^2\text{D}$ + 18% $(^1\text{D})^2\text{P}$
323896.96	323918.08	-21.12	10	10	0.32	0.28	0.40	49% $(^3\text{P})^4\text{P}$ + 16% $(^3\text{F})^2\text{D}$ + 16% $(^3\text{P})^4\text{S}$
320375.24	320429.04	-53.80	10	9	0.25	0.26	0.30	51% $(^3\text{F})^4\text{D}$ + 16% $(^3\text{F})^2\text{D}$ + 12% $(^3\text{P})^4\text{D}$
315026.28	314990.70	35.58	6	6	0.33	0.37	0.50	31% $(^3\text{P})^4\text{S}$ + 24% $(^1\text{D})^2\text{P}$ + 20% $(^1\text{D})^2\text{D}$
302624.91	302665.82	-40.91	5	5	0.32	0.45	0.50	32% $(^3\text{F})^4\text{F}$ + 29% $(^3\text{F})^4\text{D}$ + 16% $(^3\text{F})^2\text{D}$
300033.03	300274.60	-241.57	11	9	0.24	0.21	0.40	36% $(^3\text{P})^4\text{D}$ + 25% $(^3\text{P})^4\text{S}$ + 15% $(^3\text{P})^2\text{P}$
294367.91	294329.40	38.51	9	7	0.31	0.47	0.40	31% $(^3\text{P})^4\text{D}$ + 18% $(^1\text{D})^2\text{P}$ + 14% $(^1\text{D})^2\text{D}$
273796.26	273760.23	36.03	7	7	0.25	0.42	0.50	46% $(^3\text{F})^4\text{F}$ + 31% $(^3\text{F})^2\text{D}$ + 9% $(^3\text{F})^4\text{D}$
J = 5/2								
354205.09	354034.13	170.96	8	8	0.35	0.28	0.50	45% $(^1\text{G})^2\text{F}$ + 19% $(^3\text{F})^2\text{D}$ + 11% $(^3\text{P})^2\text{D}$
347359.74	347317.51	42.23	10	10	0.28	0.14	0.40	38% $(^1\text{G})^2\text{F}$ + 26% $(^3\text{P})^4\text{P}$ + 19% $(^1\text{D})^2\text{D}$
337170.08	337273.17	-103.09	9	9	0.33	0.25	0.40	31% $(^3\text{F})^2\text{D}$ + 19% $(^1\text{D})^2\text{D}$ + 17% $(^3\text{P})^2\text{D}$
331765.63	331746.06	19.57	10	8	0.35	0.20	0.40	43% $(^3\text{P})^4\text{P}$ + 27% $(^3\text{P})^4\text{D}$ + 17% $(^1\text{D})^2\text{D}$
329582.69	329747.67	-164.98	10	10	0.23	0.21	0.30	24% $(^3\text{P})^2\text{D}$ + 20% $(^3\text{F})^2\text{D}$ + 17% $(^3\text{P})^4\text{D}$
319318.55	319310.79	7.76	9	7	0.32	0.35	0.50	44% $(^3\text{F})^2\text{F}$ + 32% $(^3\text{F})^4\text{D}$ + 8% $(^3\text{F})^4\text{F}$
315712.19	315617.05	95.14	9	6	0.33	0.27	0.50	41% $(^1\text{D})^2\text{F}$ + 21% $(^3\text{P})^4\text{D}$ + 14% $(^3\text{P})^2\text{D}$
304024.73	304061.87	-37.14	13	10	0.25	0.18	0.30	30% $(^3\text{F})^4\text{F}$ + 27% $(^3\text{F})^2\text{F}$ + 14% $(^3\text{F})^4\text{D}$
296153.62	295994.28	159.34	13	12	0.17	0.12	0.23	21% $(^1\text{D})^2\text{F}$ + 20% $(^3\text{P})^4\text{D}$ + 14% $(^3\text{F})^4\text{G}$
286471.53	286444.26	27.27	8	7	0.23	0.24	0.40	43% $(^3\text{F})^4\text{F}$ + 20% $(^3\text{F})^4\text{D}$ + 20% $(^3\text{F})^2\text{D}$
267741.40	267943.63	-202.23	6	6	0.22	0.30	0.30	60% $(^3\text{F})^4\text{G}$ + 19% $(^3\text{F})^2\text{F}$ + 13% $(^1\text{D})^2\text{F}$
J = 7/2								
348029.10	348051.68	-22.58	9	8	0.33	0.20	0.40	31% $(^1\text{G})^2\text{F}$ + 21% $(^3\text{P})^4\text{D}$ + 19% $(^1\text{D})^2\text{F}$
345243.77	345125.72	118.05	6	6	0.31	0.35	0.40	30% $(^1\text{D})^2\text{F}$ + 23% $(^3\text{P})^4\text{D}$ + 12% $(^1\text{G})^2\text{G}$
332147.94	332082.44	65.50	11	10	0.27	0.33	0.50	27% $(^3\text{P})^4\text{D}$ + 17% $(^1\text{G})^2\text{F}$ + 16% $(^3\text{F})^2\text{F}$
324098.89	324094.06	4.83	7	7	0.22	0.28	0.40	25% $(^3\text{P})^4\text{D}$ + 16% $(^3\text{F})^4\text{D}$ + 15% $(^3\text{F})^2\text{F}$
319124.12	319090.38	33.74	10	10	0.31	0.25	0.40	32% $(^3\text{F})^4\text{F}$ + 28% $(^3\text{F})^2\text{G}$ + 14% $(^3\text{F})^2\text{F}$
311426.23	311467.38	-41.15	12	11	0.20	0.19	0.30	45% $(^1\text{G})^2\text{G}$ + 24% $(^1\text{G})^2\text{F}$ + 20% $(^3\text{F})^4\text{F}$
305674.26	305566.20	108.06	8	8	0.22	0.24	0.30	37% $(^3\text{F})^2\text{G}$ + 20% $(^3\text{F})^4\text{G}$ + 13% $(^1\text{D})^2\text{F}$
297632.31	297607.00	25.31	10	8	0.21	0.16	0.30	35% $(^3\text{F})^4\text{D}$ + 22% $(^3\text{F})^4\text{F}$ + 16% $(^1\text{G})^2\text{G}$
285051.79	285074.34	-22.55	9	9	0.20	0.16	0.24	68% $(^3\text{F})^4\text{G}$ + 12% $(^3\text{F})^2\text{F}$ + 10% $(^3\text{F})^4\text{F}$
J = 9/2								
340251.58	340286.48	-34.90	7	5	0.30	0.35	0.50	36% $(^1\text{G})^2\text{G}$ + 26% $(^1\text{G})^2\text{H}$ + 23% $(^3\text{F})^4\text{F}$
330389.85	330344.67	45.18	8	8	0.32	0.33	0.40	43% $(^3\text{F})^2\text{G}$ + 27% $(^1\text{G})^2\text{G}$ + 20% $(^3\text{F})^4\text{F}$
318483.31	318446.42	36.89	7	6	0.24	0.20	0.30	35% $(^3\text{F})^4\text{F}$ + 31% $(^3\text{F})^4\text{G}$ + 21% $(^3\text{F})^2\text{G}$

312153.94	312222.23	-68.29	10	10	0.18	0.18	0.30	41%	$(^3\text{F})^4\text{G}$	+	34%	$(^1\text{G})^2\text{H}$	+	22%	$(^1\text{G})^2\text{G}$
295476.76	295451.48	25.28	7	7	0.20	0.11	0.30	27%	$(^3\text{F})^4\text{G}$	+	20%	$(^3\text{F})^2\text{G}$	+	19%	$(^3\text{F})^4\text{F}$

J = 11/2

345173.80	345191.95	-18.15	3	3	0.47	1.18	0.50	83%	$(^1\text{G})^2\text{H}$	+	17%	$(^3\text{F})^4\text{G}$
326285.54	326312.16	-26.62	5	5	0.44	0.57	0.50	83%	$(^3\text{F})^4\text{G}$	+	17%	$(^1\text{G})^2\text{H}$

Table 4Fitted and calculated parameter values (cm^{-1}) in the $5d^3$, $5d^26s$ and $5d6s^2$ configurations of Pt VIII.

Parameter	Fitted value	HFR	Fitted/HFR
$5d^3$			
E_{av}	38337.6 (3.1)	41292.7	0.9284
O_2	7839.8 (6.4)	9202.7	0.8519
O_2'	5034.8 (4.6)	6152.5	0.8183
E_α	106.5 (4.0)		
E_β	99.8 (4.4)		
ζ_d	6700.9 (3.8)	6813.0	0.9835
T_1	-1.10 (0.16)		
T_2	0.0 (0.20)		
T_3	0.0		
T_4	0.0		
A_c	20.6 (4.6)		
A_3	3.2 (2.9)		
A_4	3.4 (3.1)		
A_5	8.2 (3.2)		
A_6	12.9 (3.1)		
A_1	-1.8		
A_2	2.0		
A_0	-1.6		
$5d^26s$			
E_{av}	206051.4 (4.0)	213251.9	0.9753 ^a
O_2	7924.1 (14.9)	9331.2	0.8492
O_2'	5083.4 (7.2)	6229.1	0.8161
E_α	98.6 (6.1)		
E_β	100.0		
ζ_d	6954.2 (3.8)	7051.1	0.9863
A_c	20.6		
A_3	3.2		
A_4	3.4		
A_5	8.2		
A_6	12.9		
A_1	-1.8		
A_2	2.0		
A_0	-1.6		
C_{ds}	3396.1 (6.5)	4084.5	0.8315
T_{dds}	-38.3 (6.5)		
A_{mso}	50.1 (3.9)		
A_{ss}	0.0		
$5d6s^2$			
E_{av}	388934.0	404118.6	0.9663 ^a
ζ_d	7189.0	7289.6	0.9862
$R^2(\text{dd}, \text{ds})_{12}^b$	-22688.0	-27334.4	0.83
$R^2(\text{dd}, \text{ss})_{13}$	21093.0	25413.1	0.83
$R^2(\text{dd}, \text{ds})_{23}$	-22670.0	-27313.5	0.83

Mean Deviation^c = 13.8 cm^{-1}

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- ^a The energy differences with respect to the ground configuration were used:
 $(E_{av}(\text{conf}) - E_{av}(5d^3))_{LSF} / (E_{av}(\text{conf}) - E_{av}(5d^3))_{HFR}$, where "conf" is either $5d^26s$ or $5d6s^2$.
- ^b Trailing digits xy in the *R*-integral labels denote interaction between configurations x and y, where 1 stands for $5d^3$, 2 stands for $5d^26s$ and 3 stands for $5d6s^2$.
- ^c Mean Deviation = $[(\sum(E_{obs} - E_{calc})^2)/(n-m)]^{1/2}$, where n is the number of known levels, m is the number of free parameters.

Table 5Fitted and calculated parameter values (cm^{-1}) in the $5d^26p$, $5d6s6p$ and $6s^26p$ configurations of Pt VIII.

Parameter	Fitted value	HFR	Fitted/HFR
$5d^26p$			
E_{av}	320558.7 (17.3)	326520.3	0.9895 ^a
O_2	7962.2 (45.6)	9362.5	0.8504
O_2'	5113.3 (43.0)	6247.5	0.8185
E_α	150.4 (41.1)		
E_β	87.4 (40.1)		
ζ_d	7031.8 (19.6)	7104.7	0.9897
A_c	20.6		
A_3	3.2		
A_4	3.4		
A_5	8.2		
A_6	12.9		
A_1	-1.8		
A_2	2.0		
A_0	-1.6		
$C_1(dp)$	3900.8 (29.6)	4557.9	0.8558
$C_2(dp)$	2787.4 (32.6)	3575.0	0.7797
$C_3(dp)$	1429.4 (34.9)	1726.9	0.8277
$S_1(dp)$	166.0 (26.8)		
$S_2(dp)$	-80.5 (43.0)		
T_{16}	-25.0		
T_{25}	5.0		
T_{26}	-35.0		
T_{27}	5.0		
T_{28}	55.0		
T_{29}	-35.0		
T_{30}	10.0		
ζ_p	21133.9 (33.8)	19603.7	1.0781
SS_{02}	0.0		
SS_{20}	0.0		
$S_d \cdot L_p$	-120.0		
$S_p \cdot L_d$	-17.0		
$Z_{pp'}^2$	-50.0		
$Z_{dd'}^2$	60.0		
$Z_{pp'}^1$	155.0		
$Z_{dd'}^1$	0.0		
$Z_{pp'}^3$	80.0		
$Z_{dd'}^3$	-19.0		
$5d6s6p$			
E_{av}	499601.0	509589.5	0.9850 ^a
ζ_d	7282.0	7341.1	0.9919
C_{ds}	3382.0	4074.6	0.8300
A_{mso}	43.0		
A_{ss}	0.0		
$C_1(dp)$	3991.0	4688.4	0.8512
$C_2(dp)$	2835.0	3629.6	0.7811
$C_3(dp)$	1443.0	1741.3	0.8287
$S_1(dp)$	151.0		
$S_2(dp)$	-65.0		

ζ_p	22461.0	20894.4	1.0750
$S_d \cdot L_p$	-120.0		
$S_p \cdot L_d$	-17.0		
$Z_{pp'}^2$	-50.0		
$Z_{dd'}^2$	60.0		
$Z_{pp'}^1$	155.0		
$Z_{dd'}^1$	0.0		
$Z_{pp'}^3$	80.0		
$Z_{dd'}^3$	-19.0		
C_{sp}	14982.0	18050.2	0.83
$A_{mso}(sp)$	-783.0		
6s²6p			
E_{av}	693966.0	711872.0	0.9777 ^a
ζ_p	23945.0	22274.2	1.0750
$R^2(dd, ds)12^b$	-22561.3	-27182.3	0.83
$R^2(dp, sp)12$	-23153.4	-27895.7	0.83
$R^1(dp, ps)12$	-19517.0	-23514.4	0.83
$R^2(dd, ss)13$	21040.0	25349.4	0.83
$R^2(dp, sp)23$	-23356.8	-28140.7	0.83
$R^1(dp, ps)23$	-19594.2	-23607.5	0.83

Mean Deviation^c = 116 cm⁻¹

^a The energy differences with respect to the ground configuration were used:
 $(E_{av}(conf) - E_{av}(5d^3))_{LSF} / (E_{av}(conf) - E_{av}(5d^3))_{HFR}$, where "conf" is either 5d²6p, 5d6s6p or 6s²6p.

^b Trailing digits xy in the *R*-integral labels denote interaction between configurations x and y,
where 1 stands for 5d²6p, 2 stands for 5d6s6p and 3 stands for 6s²6p.

^c Mean Deviation = $[(\sum(E_{obs} - E_{calc})^2)/(n-m)]^{1/2}$, where n is the number of known levels, m is the number of free parameters.