Low-lying electronic states of CuBr

T. Hirao and P.F. Bernath

Abstract: The $A^1\Pi - X^1\Sigma^+$ and $B^1\Sigma^+ - X^1\Sigma^+$ transitions of copper monobromide, CuBr, were recorded with a Fourier transform spectrometer. The emission was generated by using a hollow cathode discharge of Ar buffer gas and a mixture of Cu and CuBr powders. The mass-dependent Dunham expansion formula was used to obtain improved molecular constants for the ground, A and B states. These molecular constants provided RKR potential curves and Franck–Condon factors for the A–X and B–X transitions.

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Résumé : Nous avons étudié les transitions $A^1\Pi - X^1\Sigma^+$ et $B^1\Sigma^+ - X^1\Sigma^+$ dans le CuBr à l'aide d'un spectromètre à transformée de Fourier. L'émission est générée par décharge dans un mélange de poudres de Cu et de CuBr dans une cathode creuse contenant de l'Ar comme gaz tampon. Nous avons utilisé la formule de Dunham qui dépend de la masse pour obtenir de meilleures valeurs pour les constantes moléculaires du fondamental et des états A et B. Ces constantes permettent de déterminer les surfaces de potentiel RKR et les facteurs de Franck–Condon pour les transitions A–X et B–X.

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1. Introduction

The spectra of transition metal-containing diatomic molecules have been studied for a long time. Due to the presence of unpaired d-electrons on the transition metal, these molecules tend to have a very dense electronic structure, as well as high spin and orbital angular momenta. The resulting local and global perturbations are often responsible for many misunderstandings in the interpretation of the spectra.

Among the transition metal-containing molecules, the copper monohalides (CuX, X = F, Cl, Br, I) are expected to be relatively simple because they have closed-shell $^1\Sigma^+$ ground states. Moreover, all of these molecules have been studied by millimetre wave spectroscopy in the 1970s, so very accurate structural information is available for the ground state [1–4].

The excited electronic states of the copper monohalides were discovered by visible/UV spectroscopy. However, it was incorrectly supposed before 1982 that all detected spectra of copper halides were due to the transitions between $X^1\Sigma^+$ and other singlet states because of the selection rule, $\Delta S = 0$.

In 1982, Ahmed et al. [5] suggested that some low-lying electronic states of CuF were triplet states. Later, Dufour et al. [6] interpreted the spectra with the aid of ab initio calculations. Brown and co-workers [7–10] and Jakob et al. [11] using laser methods were able to locate the low-lying $a^3\Sigma^+$ and

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$b^3\Pi$ states. The hyperfine structure was helpful in the characterization of these excited states. The assignments of the electronic states were consistent with lifetime measurements [12–14] and ab initio calculations [6,15,16]. Moreover, Delaval and co-workers [17,18] set up rovibronic wave functions for CuF from the experimentally observed and ab initio data. The aim was to understand the mixing of energy levels through configuration interaction and spin–orbit coupling [18]. This extensive work on CuF has motivated additional studies of the excited states of other members of the copper monohalide family such as CuBr.

The first spectroscopic studies of CuBr were carried out in the 1920s [19,20], which identified the $A^1\Pi - X^1\Sigma^+$ (460–510 nm), $B^1\Pi - X^1\Sigma^+$ (420–460 nm), and $C^1\Sigma^+ - X^1\Sigma^+$ (390–460 nm) band systems. Later, the $D^1\Sigma^+ - X^1\Sigma^+$ (370–400 nm) system was photographed by Rao and Apparao in 1964 [21]. They also detected the C–X transition of $^{63}Cu^{81}Br$ and obtained molecular constants for the $v = 0$, 1 levels [22]. After Rai et al. measured the 0–1 and 2–0 bands of the D–X system [23], Manson et al. [4] detected the millimetre-wave spectrum of CuBr for all isotopomers, and obtained Dunham coefficients and Dunham potential constants. Based on the quadrupole coupling constants of the ^{81}Br nucleus, they estimated that the ionic-bonding character between Cu and Br was 66%. Later, Mishra et al. [24] recorded the 0–0, 1–0, and 0–1 bands of the A–X and B–X transitions. They recorded P, Q, and R branches for the B–X transition, but only P- and Q-branches for the A–X transition. After the rotational analysis, it was found that the sign of the lambda doubling constants, q_v, was different for the A and B states. The positive sign of q_v of the A state was said to be similar to other copper halides [25,26], and the negative sign of q_v in the B state was suggested to be the result of an interaction with the C state.

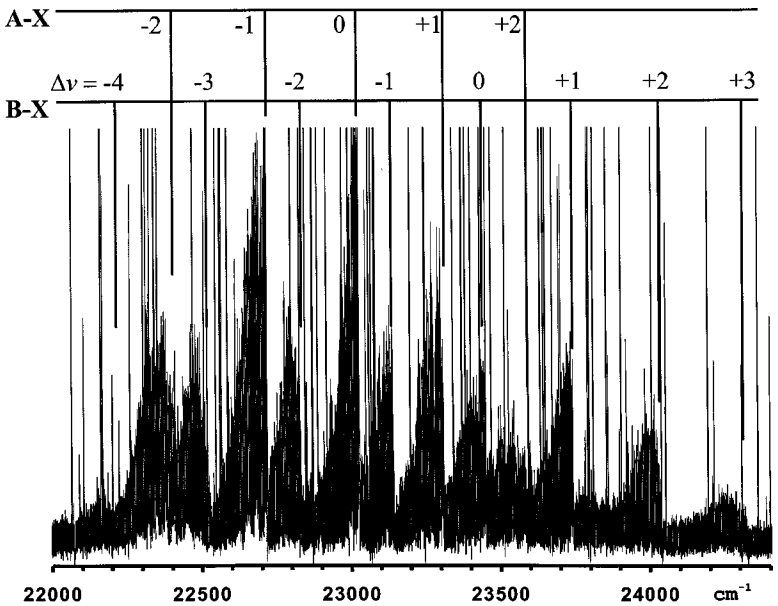
After several years, Kowalczyk et al. [27] reported chemiluminescence from the reaction of Cu* (^2D) with Br_2, and discovered the triplet A' state, which is located below the A state. They also mentioned that the A state should be a triplet because of the unusual intensity ratio of the chemiluminescence [27]. Recently, Hikmet et al. [28] applied the technique of laser-induced fluorescence to this "A'" state and obtained molecular constants. Considering the analogy between the states of CuF, CuCl, and CuBr, they suggested that A', A, B, and C states should be called $a^3\Sigma^+$, $b^3\Pi$, $A^1\Pi$, and $B^1\Sigma^+$ states, respectively. We will adopt this suggestion in our paper. Very recently, Sousa et al. [29] performed ab initio calculations with scalar relativistic effects and a fully relativistic four component SCF-CI (Self-Consistent Field – Configuration Interaction) with the Dirac–Coulomb Hamiltonian. They suggested the same labels for the low-lying excited states as Hikmet et al. [28], and predicted the presence of $^1\Delta$ and $^3\Delta$ states. They also calculated transition dipole moments for the A–X and B–X systems, and the composition of the wave function for the $B^1\Sigma^+$ state, which consisted of 76% of "pure" B state and 12% of the "pure" $X^1\Sigma^+$ state, and some less important configurations [29].

In this study, the A–X and B–X bands in the 450 nm region were recorded by Fourier transform spectroscopy. Applying a comprehensive fit including the previous pure rotational transitions in the ground state [3], conventional band constants and Dunham coefficients for the ground and A and B states were obtained. Based on the molecular constants, Rydberg–Klein–Rees (RKR) potential curves and Franck–Condon factors were calculated. Considering the interactions between the low-lying states, we estimated the mixing of the wave function of the B state with the ground state.

2. Experimental

An emission spectrum of CuBr was generated using a hollow cathode lamp. The hollow cathode was made of copper and had a hole with a diameter of 6 mm. To put more CuBr powder inside the cathode, a copper foil was shaped and inserted into the hole of the cathode. A few grams of a mixture of copper(I) bromide (Aldrich, 99%) and copper powder (Aldrich, 99%) were placed in the hollow cathode. A current of 100 mA was applied to generate a discharge with an Ar buffer gas (2 Torr) (1 Torr = 133.32 Pa). Emission from the hollow cathode was focused with a lens into the aperture of the emission port of our spectrometer.

Fig. 1. Overview spectra of CuBr $A^1\Pi - X^1\Sigma^+$ and $B^1\Sigma^+ - X^1\Sigma^+$ systems.



The A–X and B–X transitions of CuBr were recorded with the Bruker IFS 120HR Fourier transform spectrometer (FTS) at the University of Waterloo [30]. A visible quartz beamsplitter was utilized. To enhance the sensitivity, a photomultiplier tube (PMT) was set at the "back parallel exit." We also inserted a 450 nm red pass filter (CORION LG-450-S) at the emission port and a 550 nm blue pass filter (CORION LS-550-S) in front of the PMT. The optical filters were necessary to eliminate the intense atomic lines outside the observed wave-number region to improve the signal-to-noise ratio. The emission spectra were recorded in the spectral range from 21 000 to 26 000 cm^{-1} at a spectral resolution of 0.03 cm^{-1}. In total, 12 scans were co-added. An overview spectrum of the 450 nm region is displayed in Fig. 1. Note that we also succeeded in detecting the weaker $b^3\Pi - X^1\Sigma^+$ transition, but the spectra were not as good as the A–X and B–X bands.

Spectral line positions were measured by using the program PC-DECOMP written by J. Brault. Because all spectra were recorded with the spectrometer vented, the line positions were systematically shifted by the refractive index of air [31,32]. To obtain vacuum wave numbers from the observed "air" wave numbers, we applied the polynomial conversion formula described previously [30]. After this treatment, we calibrated all measured lines on the basis of the observed Ar atomic line positions. The standard line positions were taken from ref. 33, and the calibration factor was obtained as 1.000 001 5375(71).

3. Analysis

As illustrated in Fig. 1, the spectra show alternate A–X and B–X vibrational bands from 22 000 to 24 000 cm^{-1}. In the first step, we tried to identify 0–0 bands, which should not show the isotopic splitting associated with the different Cu and Br nuclei. Figures 2 and 3 present these bands. The lines are denser near the band origin in Fig. 2 than in Fig. 3 because of the presence of the Q branch in the $A^1\Pi - X^1\Sigma^+$ transition. Although the band heads in Figs. 2 and 3 do not show visible isotopic splittings, all branches were generally split into two series with similar intensities when J increases. Because of this bromine isotopic splitting, we were able to successfully apply combination differences using molecular constants in the ground state [4] to assign these 0–0 bands. For the other vibrational

Fig. 2. A portion of the $A^1\Pi - X^1\Sigma^+$ 0–0 band of CuBr.

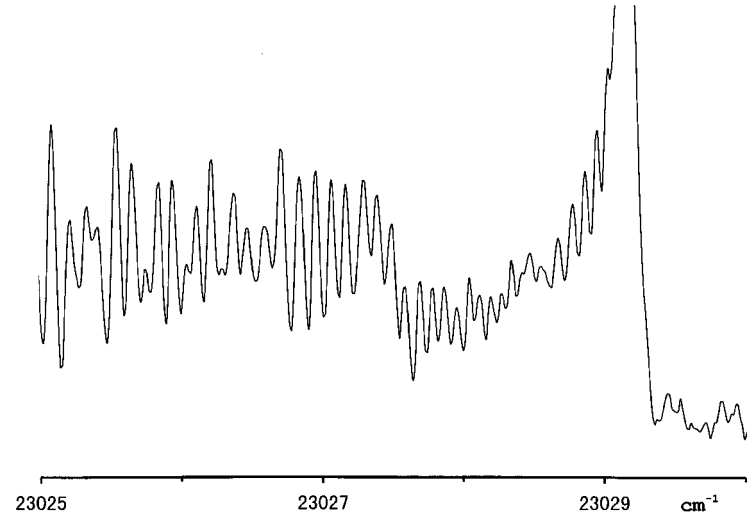
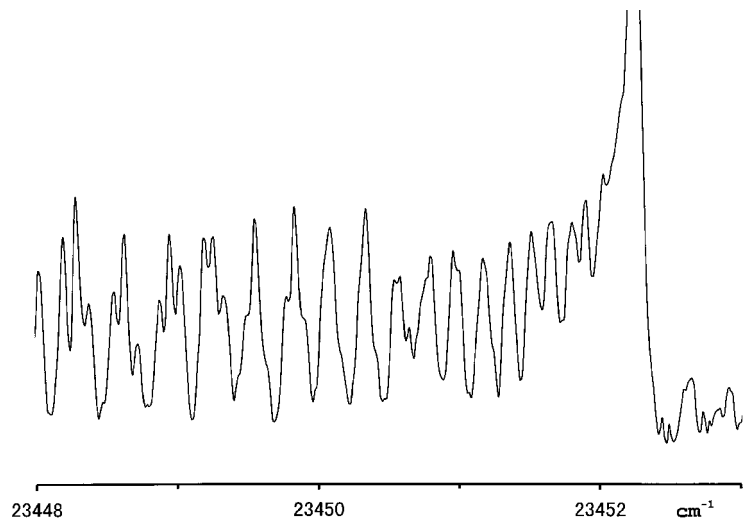


Fig. 3. A portion of the $B^1\Sigma^+ - X^1\Sigma^+$ 0–0 band of CuBr.



bands such as 0–1 and 1–0, the assignment was straightforward, although the spectra were very dense. However, we could not find the 1–1 band in either the A–X or B–X transitions.

To obtain effective molecular constants from the assigned spectra, we applied the conventional band constant formula and the mass-dependent Dunham expansion formula [34] in a least-squares fitting procedure, including the previous millimetre wave data [4]. For the $^1\Sigma$ state, the energy levels are represented by the following expression:

$$E(v, J) = \sum_{i,j} Y_{ij} \left(v + \tfrac{1}{2}\right)^i [J(J+1)]^j \tag{1}$$

where Y_{ij} is a mass-dependent Dunham constant. For the $^1\Pi$ state, the lambda-doubling terms $E_\Lambda(v, J)$

Table 1. Observed band head positions of CuBr.[a]

***A–X* system**				
	v''			
v'	0	1	2	
0	23 029.110	22 716.300	—	
	23 029.110	22 718.083	—	
	23 029.110	22 719.042	—	
	23 029.110	22 720.823	—	
1	23 310.946	—	22 687.242	
	23 309.468	—	22 689.185	
2	—	23 277.304	—	
	—	23 276.004	—	
***B–X* system**				
	v''			
v’	0	1	2	3
0	23 452.204	23 139.336	22 828.408	(*b*)
	23 452.204	23 141.081	22 831.843	22 524.502
	23 452.204	23 141.953	22 833.303	—
	23 452.204	23 143.813	22 837.190	—
1	23 744.787	—	23 121.012	22 811.973
	23 743.229	—	23 122.803	22 815.456
2	24 035.134	23 722.348	—	—
	24 032.007	23 720.857	—	—

[a] In cm^{-1}. The band head positions in the first, second, third, and fourth lines in each block indicate the data for $^{63}Cu^{79}Br$, $^{63}Cu^{81}Br$, $^{65}Cu^{79}Br$, and $^{65}Cu^{81}Br$ isotopomers, respectively.
[b] This head is coincidentally overlapped with an Ar II line.

are added to expression (1)

$$E_{\Lambda}(v, J) = \pm \sum_{i,j\neq 0,0} Q_{ij} \left(v + \frac{1}{2}\right)^{i} [J(J+1)]^{j} \tag{2}$$

In formula (2), Q_{ij} is a Λ-doubling constant and the signs + and – correspond to e and f parity levels, respectively. In the band constant expression, the Λ-doubling term in the $^1\Pi$ state is represented by formula (3)

$$E_{\Lambda}(v, J) = \pm\frac{1}{2}\left[q_v J(J+1) + q_{Dv}\{J(J+1)\}^2 + ...\right] \tag{3}$$

In total, we identified more than 3500 lines for the $^{63}Cu^{79}Br$ and $^{63}Cu^{81}Br$ isotopomers (Tables A1 and A2), while only band head positions were available for $^{65}CuBr$ species (Table 1). Vibrational assignments were made up to $v = 3$ for the ground state and $v = 2$ for the A and B states. The effective mass-dependent Dunham constants are listed in Tables 2 and 3. The quality of fit was indicated by the dimensionless standard error, $\bar{\sigma}_f$

Table 2. Effective Dunham constants for $^{63}Cu^{79}Br$.[a]

	$X^1\Sigma^+$	$A^1\Pi$	$B^1\Sigma^+$
Y_{00}	—	23 042.5776(17)	23 460.9197(16)
Y_{10}	314.8192(23)	284.6902(21)	294.9442(21)
Y_{20}	−0.95755(140)	−1.34712(73)	−1.13362(69)
$Y_{30} \times 10^3$	1.71(24)	—	—
Y_{01}	0.101926218(30)	0.09619951(68)	0.09430633(40)
$Y_{11} \times 10^4$	−4.52115(17)	−4.9426(49)	−4.3296(46)
$Y_{21} \times 10^6$	0.6705(36)	−3.885(139)	−0.674(130)
$Y_{02} \times 10^8$	−4.27201(143)	−4.3937(142)	−3.8223(43)
$Y_{12} \times 10^{10}$	1.41(25)	−4.05(31)	−2.33(15)
$Y_{03} \times 10^{14}$	−0.73(23)	−2.49(98)	−1.03(28)
$Q_{01} \times 10^5$	—	−3.8083(75)	—
$Q_{11} \times 10^6$	—	−0.970(49)	—

[a]All parameters are in cm^{-1}. The numbers in parentheses indicate one standard error for the last significant digits.

Table 3. Effective Dunham constants for $^{63}Cu^{81}Br$.[a]

	$X^1\Sigma^+$	$A^1\Pi$	$B^1\Sigma^+$
Y_{00}	—	23 042.5909(17)	23 460.92697(142)
Y_{10}	313.0987(22)	283.1052(22)	293.3056(18)
Y_{20}	−0.95114(137)	−1.32534(73)	−1.11477(59)
$Y_{30} \times 10^3$	2.24(23)	—	—
Y_{01}	0.100809727(23)	0.09514261(69)	0.09326909(30)
$Y_{11} \times 10^4$	−4.44707(16)	−4.8038(51)	−4.2075(26)
$Y_{21} \times 10^6$	0.6553(35)	−5.462(146)	−2.254(80)
$Y_{02} \times 10^8$	−4.18091(132)	−4.2987(143)	−3.7294(36)
$Y_{12} \times 10^{10}$	1.56(22)	−4.42(31)	−3.452(86)
$Y_{03} \times 10^{14}$	−0.33(27)	−1.10(99)	−0.56(28)
$Q_{01} \times 10^5$	—	−3.6835(74)	—
$Q_{11} \times 10^6$	—	−1.037(50)	—

[a]All parameters are in cm^{-1}. The numbers in parentheses indicate one standard error for the last significant digits.

$$\bar{\sigma}_f = \left\{ \frac{1}{N-M} \sum_{i=1}^{N} \left[\frac{y_{\text{calc}}(i) - y_{\text{obs}}(i)}{u(i)} \right]^2 \right\}^{1/2} \tag{4}$$

where N and M are the total number of experimental data and parameters varying in the fit, respectively, $y_{\text{obs}}(i)$ and $y_{\text{calc}}(i)$ are ith observed and calculated data, and $u(i)$ is an uncertainty for $y_{\text{obs}}(i)$. In our fit for $Cu^{79}Br$ and $Cu^{81}Br$, $\bar{\sigma}_f$ was to be 1.217 and 1.195, respectively.

4. Discussion

When the Born–Oppenheimer approximation is valid, the mass-dependent Dunham constants Y_{ij} are simply related to the molecular reduced mass, μ [35]

$$Y_{ij} \propto \mu^{-(i+2j)/2} \tag{5}$$

Table 4. Franck–Condon factors for the A–X system.

	v''			
v'	0	1	2	3
0	0.5333	0.3273	0.1092	(0.0251)
1	0.3428	(0.0747)[a]	0.2957	(0.1976)
2	0.1033	0.3327	(0.0013)	(0.1703)

[a]The numbers in parentheses are the Franck–Condon factors of bands that were not seen in our spectra.

Table 5. Franck–Condon factors for the B–X system.

	v''			
v'	0	1	2	3
0	0.3119	0.3658	0.2134	0.0811
1	0.3620	(0.0080)[a]	0.1301	0.2438
2	0.2128	0.1260	(0.1271)	(0.0054)

[a]The numbers in parentheses are the Franck–Condon factors of bands that were not seen in our spectra.

where μ is the reduced mass of the molecules. For the lambda-doubling constant, Q_{01}, a simple pure precession theory gives

$$Q_{01} \approx \sum_{v'} \frac{l\,(l+1)\,\langle \Sigma\,|B\,(r)|\,\Pi\rangle^2}{\Delta E_{\Sigma\Pi}} \propto \mu^{-2} \tag{6}$$

and

$$B\,(r) = \left(\frac{h}{8\pi^2 c}\right)\frac{1}{\mu r^2} \tag{7}$$

where $\Delta E_{\Sigma\Pi}$ is the energy difference between the upper $^1\Sigma$ state and the lower $^1\Pi$ state. In the case of the A state of CuBr, the orbital angular momentum l is equal to 2, assuming that the $A^1\Pi$ state has a $Cu^+\ 3d\pi^{-1}$ configuration and the $B^1\Sigma^+$ state is represented by $Cu^+\ 3d\sigma^{-1}$ (see below). The Dunham coefficients listed in Tables 2 and 3 generally obey (5) and (6), indicating that CuBr obeys the Born–Oppenheimer approximation, as expected for a heavy system.

We also calculated RKR potential curves [36], equilibrium bond length, and Franck–Condon factors [37] from our Dunham coefficients. The equilibrium bond lengths in the ground, A and B states were calculated to be 2.173 453 55(31), 2.223 7210(72), and 2.259 5547(46) Å, respectively. The calculated Franck–Condon factors for the A–X and B–X systems are listed in Tables 4 and 5, respectively. As mentioned above, we did not see any 1–1 bands, consistent with our calculated Franck–Condon factors.

The observed values for q_v of $^{63}Cu^{79}Br$ for the $A^1\Pi$ state obtained in a band constant fit have only a small vibrational dependence, $-7.6954(108) \times 10^{-5}$, $-7.9477(117) \times 10^{-5}$, and $-8.0580(145) \times 10^{-5}$ cm^{-1} for $v = 0$, 1, and 2, respectively. These values are consistent with the relationship

$$q_v = 2\left[Q_{01} + \left(v + \frac{1}{2}\right)Q_{11}\right] \tag{8}$$

However, these values should be very influenced by the location of the vibrational levels of the $B^1\Sigma^+$ state, because the difference in energy between the A and B states is very similar to the vibrational intervals. The dominant electronic configurations for the $X^1\Sigma^+$, $A^1\Pi$, and $B^1\Sigma^+$ states are

$$X^1\Sigma^+ : (\text{core})(13\sigma)^2(14\sigma)^2(7\pi)^4(3\delta)^4(15\sigma)^2(8\pi)^4$$
$$A^1\Pi : (\text{core})(13\sigma)^2(14\sigma)^2(7\pi)^4(3\delta)^4(15\sigma)^2(8\pi)^3(16\sigma)^1$$
$$B^1\Sigma^+ : (\text{core})(13\sigma)^2(14\sigma)^2(7\pi)^4(3\delta)^4(15\sigma)^1(8\pi)^4(16\sigma)^1$$

Considering these electronic configurations, we can estimate q_v from our RKR potentials and the simple pure precession theory:

$$q_v = \sum_{v'} \frac{2l\,(l+1)\left\langle v'\,|B(r)|\,v\right\rangle^2}{\Delta E_{v'v}} \tag{9}$$

Considering the interaction between the "pure" A and "pure" B states and taking the matrix element $< v'|B(r)|v >$ into account, one can calculate the theoretical lambda-doubling constants for each vibrational level. Three calculations were carried out:

(*a*) only considering the vibrationally diagonal term, and $l = 2$ (calc1),

(*b*) considering $|\Delta v| < 6$ and $l = 1$ (calc2), and

(*c*) considering $|\Delta v| < 6$ and $l = 2$ (calc3).

We found that calc1 was unsatisfactory and that our observed values are approximately equal to (calc2) and one third of (calc3). Because the electronic configurations come from the excitation of a $3d$ electron on Cu^+, l should not be 1 but should have a value of 2. However, our calculation does not reproduce the values of q_v with $l = 2$. This effect was also seen in CuF [5] and CuCl [38].

Delaval et al. discussed the origin of these differences between the observed parameters and predicted values from the pure precession model in the case of CuF [18]. One possibility is that the actual valence electron (or hole) has not only the $3d$ character of Cu^+ but also $3p$ character of the ligand Br^- ion. This means that l could have a value between 1 and 2. Secondly, because the $^1\Pi$ state also interacts with other states such as $C^1\Delta$ and $b^3\Pi_0$ through homogeneous and heterogeneous interactions [39], the "pure" $A^1\Pi$ state is already corrupted. Thirdly, because the ground state rises from the $Cu^+(3d^{10})$ configuration, configuration interaction between the ground and the B state reduces the $Cu^+(3d^9 4s)$ character of the B state. This configuration mixing was also predicted by the latest ab initio calculations by Sousa et al. [29].

This third mechanism can be tested by assuming that the actual ground and B states are simply represented by linear combination of "pure" ground and B state wave functions, while the A state is perfectly pure. The other states like the $C^1\Delta$ and $a^3\Sigma$ states are assumed to interact weakly with the $A^1\Pi$ state. The "corrupted" wave functions for the ground and B states, $\left|X^1\Sigma^+\right\rangle$ and $\left|B^1\Sigma^+\right\rangle$ would be

$$\left|X^1\Sigma^+\right\rangle = b\left|\bar{X}^1\Sigma^+\right\rangle + \sqrt{1-b^2}\left|\bar{B}^1\Sigma^+\right\rangle \tag{10}$$

$$\left|B^1\Sigma^+\right\rangle = \sqrt{1-b^2}\left|\bar{X}^1\Sigma^+\right\rangle + b\left|\bar{B}^1\Sigma^+\right\rangle \tag{11}$$

where b is the mixing coefficient, and $\left|\bar{X}^1\Sigma^+\right\rangle$ and $\left|\bar{B}^1\Sigma^+\right\rangle$ denote pure basis functions for the ground and B state, respectively. The pure precession formula between the A state and "corrupted" B state

should be modified to

$$q_v = \sum_{v'} \frac{2l\,(l+1)\left\langle B, v' \,|B|\, A, v\right\rangle^2}{\Delta E_{B,v'-A,v}}$$
$$= \sum_{v'} \frac{2l\,(l+1)}{\Delta E_{Bv'-Av}} \left[b^2 \left\langle \bar{B}, v' \,|B|\, A, v\right\rangle^2 + \left(1-b^2\right)\left\langle \bar{X}, v' \,|B|\, A, v\right\rangle^2 \right.$$
$$\left. +2b\sqrt{1-b^2}\left\langle \bar{X}, v' \,|B|\, A, v\right\rangle\left\langle \bar{B}, v' \,|B|\, A, v\right\rangle\right] \quad (12)$$

By using formula (12) and $l = 2$, we obtain $b^2 = 0.842$, 0.782, 0.714 for $v = 0$, 1, 2, respectively, using approximate RKR potentials generated by using the constants of Table 2. These mixing ratios are consistent with the ab initio value, 0.76 [29]. The observed effective l values are approximately the same, consistent with configuration mixing of the $X^1\Sigma^+$ and $B^1\Sigma^+$ states.

5. Conclusion

We have recorded new Fourier transform emission spectra of the $A^1\Pi - X^1\Sigma^+$ and $B^1\Sigma^+ - X^1\Sigma^+$ transitions of CuBr. Bands with $v' = 0$–2 and $v" = 0$–3 were rotationally analysed to obtain improved spectroscopic constants. The Λ-doubling in the $A^1\Pi$ state was interpreted in terms of interaction with $B^1\Sigma^+$ state.

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Table A1. Observed line positions of the $A^1\Pi$–$X^1\Sigma^+$ system of CuBr.[a]

	(0, 0) R_{ee}				(0, 0) Q_{fe}				(0, 0) P_{ee}			
J''	79Br	*o*–*c* [b]	81Br	*o*–*c*	79Br	*o*–*c*	81Br	*o*–*c*	79Br	*o*–*c*	81Br	*o*–*c*
0	23027.626	19 [c]	23027.716	26 [c]								
1	23027.801	13	23027.889	21 [c]								
2	23027.981	25 [c]	23028.049	14					23027.003	5	23027.104	17 [c]
3	23028.134	21 [c]	23028.212	21 [c]	23027.330	–17 [c]	23027.428	–5	23026.773	3	23026.889	26 [c]
4	23028.282	23 [c]	23028.351	16 [c]	23027.330	28 [c]			23026.529	–4	23026.643	16 [c]
5	23028.410	17 [c]	23028.499	32 [c]	23027.228	–16 [c]	23027.330	–1	23026.307	24 [c]	23026.403	23 [c]
6	23028.499	–16 [c]	23028.612	24 [c]					23026.045	23 [c]	23026.146	25 [c]
7	23028.612	–14 [c]	23028.715	17 [c]	23027.104	8			23025.770	21 [c]	23025.875	23 [c]
8	23028.715	–11	23028.806	10	23027.003	–2	23027.104	10	23025.471	7	23025.585	14
9	23028.806	–7 [c]	23028.887	5	23026.889	–13	23027.003	11	23025.146	–22 [c]	23025.266	–12
10	23028.887	–1	23028.962	4	23026.773	–14	23026.889	10	23024.880	19 [c]		
11	23028.962	8	23029.044	22 [c]	23026.643	–18 [c]	23026.773	19 [c]	23024.532	–10	23024.661	3
12			23029.044	–30 [c]	23026.529	4	23026.643	24 [c]				
13	23029.044	–4 [c]	23029.110	–5 [c]					23023.867	–2	23024.000	7
14	23029.110	33 [c]	23029.110	–34 [c]	23026.222	6	23026.307	–7	23023.532	17 [c]		
15	23029.110	15 [c]	23029.110	–52 [c]	23026.045	0	23026.146	2	23023.177	28 [c]	23023.295	14
16	23029.110	8 [c]	23029.110	–58 [c]	23025.875	12	23025.972	8	23022.777	4	23022.926	17 [c]
17	23029.110	14 [c]	23029.110	–53 [c]	23025.682	14	23025.770	–1				
18	23029.110	30 [c]	23029.110	–37 [c]	23025.471	9			23021.977	–7	23022.114	–15 [c]
19	23029.044	–7 [c]	23029.110	–9 [c]	23025.266	20 [c]	23025.343	–10	23021.586	13	23021.743	21 [c]
20			23029.110	31 [c]	23025.012	–5			23021.164	14	23021.326	23 [c]
21	23028.962	2	23029.044	16 [c]	23024.785	8	23024.880	–10	23020.753	38 [c]	23020.879	6
22	23028.887	–9	23028.962	–4	23024.532	6			23020.283	14	23020.440	8
23	23028.806	–16 [c]	23028.887	–4	23024.251	–12	23024.373	–9	23019.804	–6	23019.977	–2
24	23028.715	–21 [c]	23028.806	0	23024.000	11			23019.373	32 [c]	23019.543	29 [c]
25	23028.612	–26 [c]	23028.715	5 [c]	23023.689	–14	23023.825	–3	23018.870	10	23019.051	12
26	23028.499	–29 [c]	23028.612	11 [c]	23023.403	–3	23023.532	–2	23018.376	8	23018.556	5
27	23028.410	4 [c]	23028.499	18 [c]	23023.094	–3	23023.235	6	23017.852	–11	23018.047	–6
28	23028.282	8 [c]	23028.351	1 [c]	23022.777	–1	23022.926	13	23017.362	14	23017.569	25 [c]
29	23028.134	5 [c]	23028.212	5 [c]	23022.429	–17 [c]	23022.574	–11	23016.810	–11	23017.028	6
30	23027.981	8 [c]	23028.049	–3	23022.114	10	23022.241	–5	23016.292	10	23016.493	4
31	23027.801	–5	23027.889	3 [c]	23021.743	–7	23021.896	0	23015.733	1	23015.946	2
32	23027.626	0 [c]	23027.716	7	23021.378	–6	23021.531	–2	23015.161	–9	23015.381	–8
33	23027.428	–8	23027.520	0	23020.994	–12	23021.164	4	23014.590	–6	23014.827	5
34	23027.228	–5	23027.330	10	23020.613	–5	23020.753	–23 [c]			23014.219	–24 [c]
35	23027.003	–16 [c]	23027.104	–5	23020.214	–4	23020.377	–3	23013.413	–1	23013.648	–5
36	23026.773	–19 [c]	23026.889	4	23019.804	–3	23019.977	4	23012.824	18 [c]	23013.068	16 [c]
37	23026.529	–26 [c]	23026.643	–7	23019.373	–11	23019.543	–12	23012.182	–5	23012.433	–5
38	23026.307	1	23026.403	–1	23018.948	–2	23019.120	–5	23011.550	–6	23011.806	–9

Table A1. (*continued*).

	(0, 0) R_{ee}				(0, 0) Q_{fe}				(0, 0) P_{ee}			
J''	79Br	$o–c$ [b]	81Br	$o–c$	79Br	$o–c$	81Br	$o–c$	79Br	$o–c$	81Br	$o–c$
39	23026.045	–1	23026.146	1	23018.499	–5	23018.674	–10	23010.909	–4	23011.166	–12
40	23025.770	–3	23025.875	–2	23018.047	1	23018.229	–3	23010.242	–17 [c]	23010.511	–21 [c]
41	23025.471	–18 [c]	23025.585	–11	23017.569	–10	23017.772	4	23009.584	–8		
42					23017.095	–3	23017.299	5	23008.917	2	23009.182	–21 [c]
43	23024.880	–6	23025.012	13	23016.597	–9	23016.810	3	23008.250	24 [c]	23008.515	–6
44	23024.532	–35 [c]	23024.661	–23 [c]	23016.104	0	23016.292	–18 [c]	23007.492	–34 [c]	23007.841	13
45	23024.251	15 [c]	23024.373	17 [c]	23015.589	0	23015.800	0	23006.805	–8	23007.107	–17 [c]
46	23023.867	–27 [c]	23024.000	–18 [c]	23015.064	1	23015.278	–2	23006.108	18 [c]	23006.416	8
47	23023.532	–7	23023.689	21 [c]	23014.530	4	23014.746	–2	23005.367	12	23005.682	1
48	23023.177	3	23023.295	–11	23013.989	12	23014.219	14	23004.619	11	23004.942	0
49	23022.777	–20 [c]	23022.926	–7	23013.413	–3	23013.648	–3	23003.851	3	23004.185	–7
50	23022.429	22 [c]	23022.574	25 [c]	23012.824	–20 [c]	23013.068	–18 [c]	23003.085	7	23003.423	–8
51	23021.977	–30 [c]			23012.265	4	23012.514	5	23002.289	–8	23002.660	2
52	23021.586	–9	23021.743	–2	23011.670	3	23011.920	0	23001.517	13	23001.892	19 [c]
53	23021.164	–7	23021.326	1	23011.068	7	23011.309	–12	23000.713	13	23001.083	5
54	23020.753	18 [c]	23020.879	–15 [c]	23010.445	3	23010.709	–1	22999.886	3	23000.268	–2
55	23020.283	–5	23020.440	–12	23009.836	22 [c]	23010.085	–3	22999.063	7	22999.458	7
56	23019.804	–24 [c]	23019.977	–21 [c]	23009.182	9	23009.451	–3	22998.191	–25 [c]	22998.591	–30 [c]
57	23019.373	16 [c]	23019.543	11	23008.515	–6	23008.808	–1	22997.362	–3	22997.769	–10
58	23018.870	–4	23019.051	–4	23007.841	–16 [c]	23008.160	8	22996.512	10	22996.935	9
59	23018.376	–5	23018.556	–10	23007.183	1	23007.492	7	22995.635	7	22996.062	0
60	23017.852	–22 [c]	23018.047	–19 [c]	23006.497	2	23006.805	0	22994.745	3	22995.195	9
61	23017.362	5	23017.569	14	23005.798	0	23006.108	–7	22993.848	4	22994.302	4
62	23016.810	–18 [c]	23017.028	–3	23005.081	–7	23005.414	1	22992.936	0	22993.401	1
63	23016.292	5	23016.493	–2	23004.361	–6	23004.696	–4				
64	23015.733	–1	23015.946	–3	23003.628	–7	23003.970	–5	22991.084	1	22991.570	2
65	23015.161	–8	23015.381	–10	23002.891	0	23003.236	–4	22990.149	10	22990.650	16 [c]
66	23014.590	–3	23014.827	6	23002.133	–1	23002.489	–3	22989.180	–5	22989.690	0
67			23014.219	–20 [c]	23001.373	5	23001.727	–6	22988.222	5	22988.735	2
68	23013.413	8	23013.648	2	23000.590	1	23000.966	3	22987.242	2	22987.767	2
69	23012.824	31 [c]	23013.068	26 [c]	22999.790	–10	23000.176	–5	22986.249	0	22986.790	4
70	23012.182	11	23012.433	7	22998.996	–2	22999.387	–1	22985.253	6	22985.796	0
71	23011.550	14	23011.806	8	22998.191	7	22998.591	7	22984.234	0	22984.795	1
72	23010.909	20 [c]	23011.166	8	22997.362	2	22997.769	0	22983.181	–28 [c]	22983.783	3
73	23010.242	12	23010.511	3	22996.512	–12	22996.935	–7	22982.167	–6	22982.762	7
74	23009.584	24 [c]	23009.836	–9	22995.677	1	22996.104	1	22981.134	9	22981.715	–4
75			23009.182	11	22994.814	–3	22995.254	1	22980.095	29 [c]	22980.667	–4
76	23008.160	–24 [c]	23008.515	30 [c]	22993.942	–4	22994.387	–5	22978.981	–13	22979.610	–1
77	23007.492	13			22993.059	–5	22993.514	–5	22977.911	0	22978.541	0

Table A1. (*continued*).

	(0, 0) R_{ee}				(0, 0) Q_{fe}				(0, 0) P_{ee}			
J''	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
78			23007.107	29 [c]					22976.827	11	22977.454	–5
79	23006.033	0	23006.367	10	22991.252	–13	22991.741	1	22975.715	4	22976.366	1
80	23005.296	4	23005.626	1	22990.349	1	22990.845	12	22974.591	–2		
81	23004.534	–5	23004.872	–9	22989.420	0	22989.924	9	22973.466	2	22974.113	–29 [c]
82	23003.766	–8	23004.132	7	22988.483	4	22988.981	–4	22972.321	–2	22973.000	–15 [c]
83	23003.010	12	23003.373	15 [c]	22987.527	0	22988.041	–2	22971.172	2	22971.872	–2
84	23002.218	8	23002.587	9	22986.561	–4	22987.089	–3	22970.008	2	22970.727	4
85	23001.373	–37 [c]	23001.763	–24 [c]	22985.587	–3	22986.122	–5	22968.835	5	22969.560	–1
86	23000.590	–8	23000.966	–19 [c]	22984.605	1	22985.152	0	22967.643	1	22968.390	4
87	22999.790	15 [c]	23000.176	6	22983.610	4	22984.167	2	22966.435	–9	22967.184	–17 [c]
88					22982.598	2	22983.181	15	22965.224	–9	22966.004	0
89	22998.099	7	22998.500	–7	22981.576	1	22982.167	10	22964.004	–6	22964.790	–5
90	22997.229	–4	22997.657	–2	22980.542	–1	22981.134	–1	22962.773	–3	22963.575	1
91	22996.324	–38 [c]	22996.787	–10	22979.496	–2	22980.095	–8	22961.539	8	22962.342	0
92	22995.469	–10	22995.917	–7	22978.437	–5	22979.060	1	22960.276	3	22961.100	0
93	22994.599	15 [c]	22995.011	–30 [c]	22977.372	–3	22978.006	3	22959.011	7	22959.848	4
94	22993.665	–13	22994.118	–26 [c]	22976.294	–2	22976.939	3	22957.728	5	22958.580	1
95	22992.746	–13	22993.213	–23 [c]	22975.212	7	22975.865	7	22956.439	8	22957.304	3
96	22991.819	–11	22992.279	–38 [c]	22974.113	10	22974.773	5	22955.123	–4	22956.003	–9
97			22991.379	–7	22973.000	11	22973.672	6	22953.810	–1	22954.705	–6
98	22989.924	–10	22990.443	0	22971.872	9	22972.563	10	22952.487	3	22953.391	–7
99	22988.981	14 [c]	22989.492	4	22970.727	1	22971.433	5	22951.143	–2	22952.072	–2
100					22969.560	–18 [c]	22970.290	–3	22949.791	–3	22950.744	5
101									22948.417	–14	22949.373	–19 [c]

	(0, 1) R_{ee}				(0, 1) Q_{fe}				(0, 1) P_{ee}			
J''	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
1	22714.887	9 [c]			22714.486	–9	22716.296	10				
2	22715.046	–3			22714.486	12			22714.073	–17 [c]		
3	22715.188	–21 [c]							22713.889	23 [c]		
4	22715.348	–10	22717.132	–8			22716.209	17 [c]	22713.663	31 [c]		
5	22715.487	–9	22717.257	–20 [c]					22713.409	22 [c]	22715.188	–2
6	22715.625	1			22714.314	30 [c]			22713.155	25 [c]		
7			22717.496	–23 [c]			22716.025	20 [c]	22712.900	36 [c]	22714.655	–18 [c]
8			22717.617	–7					22712.639	52 [c]		
9			22717.705	–13	22714.073	41 [c]	22715.799	–29 [c]	22712.273	–26 [c]	22714.073	–41 [c]
10	22716.025	–3 [c]	22717.800	–3							22713.815	–4
11			22717.862	–14	22713.815	3	22715.625	16 [c]				

Table A1. (*continued*).

	(0, 1) R_{ee}				(0, 1) Q_{fe}				(0, 1) P_{ee}			
J''	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
12			22717.945	6			22715.487	3	22711.356	–15 [c]	22713.155	–41 [c]
13	22716.209	–10 [c]			22713.572	23 [c]	22715.348	–1	22711.001	–40 [c]	22712.900	30 [c]
14	22716.296	35 [c]	22718.017	–16 [c]	22713.409	8	22715.188	–16 [c]			22712.539	8
15	22716.296	3 [c]	22718.083	19 [c]			22715.046	–1	22710.378	31 [c]		
16	22716.296	–18 [c]	22718.083	–2 [c]	22713.082	7	22714.887	7	22709.990	5	22711.838	12
17	22716.296	–28 [c]	22718.083	–12 [c]	22712.900	3	22714.655	–49 [c]	22709.613	0	22711.462	6
18	22716.296	–28 [c]	22718.083	–11 [c]	22712.703	–3	22714.486	–30 [c]			22711.093	17 [c]
19	22716.296	–16 [c]	22718.083	0 [c]	22712.478	–29 [c]	22714.314	–4			22710.656	–30 [c]
20	22716.296	6 [c]	22718.083	22 [c]	22712.273	–23 [c]	22714.073	–37 [c]			22710.254	–31 [c]
21	22716.296	38 [c]	22718.017	–12 [c]	22712.072	–4	22713.889	–2	22708.019	6		
22	22716.209	–6 [c]	22718.017	31 [c]	22711.838	–6	22713.663	1	22707.591	5		
23			22717.945	12	22711.625	23 [c]	22713.409	–14			22709.021	2
24			22717.862	–6	22711.356	7	22713.155	–17 [c]	22706.706	4	22708.586	9
25	22716.025	5 [c]	22717.800	6	22711.093	7	22712.900	–13	22706.248	5	22708.163	40 [c]
26			22717.705	–3	22710.801	–12	22712.639	–2	22705.782	8		
27			22717.617	5	22710.526	–3	22712.356	–4	22705.297	2		
28			22717.496	–10 [c]	22710.254	21 [c]	22712.072	3			22706.706	7
29	22715.625	13			22709.927	–1	22711.766	0	22704.305	2	22706.175	–28 [c]
30	22715.487	5	22717.257	–4 [c]	22709.613	0	22711.462	8			22705.692	–5
31	22715.348	5	22717.132	9	22709.284	–3	22711.093	–38 [c]	22703.292	23 [c]	22705.181	1
32	22715.188	–5 [c]	22716.940	–33 [c]	22708.951	1	22710.801	3	22702.738	2	22704.643	–10
33	22715.046	15	22716.821	7	22708.586	–17 [c]	22710.456	3				
34	22714.887	28 [c]	22716.624	–20 [c]	22708.245	1	22710.098	–2	22701.613	–25 [c]	22703.539	–28 [c]
35	22714.655	–22 [c]	22716.469	6	22707.874	–3	22709.733	–2	22701.083	10	22703.007	0
36	22714.486	3	22716.296	25 [c]	22707.501	4	22709.368	8	22700.522	25 [c]	22702.470	32 [c]
37	22714.314	35 [c]			22707.107	–1	22708.951	–23 [c]	22699.894	–16 [c]		
38	22714.073	9			22706.706	–2	22708.586	7	22699.300	–13	22701.262	–5
39	22713.815	–24 [c]	22715.625	–9	22706.297	0	22708.163	–9	22698.706	0	22700.660	–6
40	22713.572	–30 [c]			22705.875	–1	22707.750	–5	22698.091	4		
41	22713.353	–2	22715.188	33 [c]	22705.448	4	22707.327	–1	22697.479	20 [c]	22699.436	3
42	22713.082	–16 [c]	22714.887	–12	22705.024	22 [c]	22706.890	0	22696.831	11	22698.801	2
43	22712.820	–9	22714.655	21 [c]	22704.542	–7	22706.436	–6	22696.165	–3	22698.154	–2
44	22712.539	–10			22704.069	–16 [c]	22705.992	9	22695.494	–14	22697.479	–23 [c]
45	22712.273	14	22714.073	3	22703.604	–8	22705.506	–8	22694.805	–31 [c]	22696.831	–7
46	22711.956	–2			22703.130	2	22705.024	–11	22694.158	4	22696.165	3
47	22711.625	–22 [c]	22713.476	11	22702.625	–7	22704.542	–3	22693.467	6	22695.494	17 [c]
48	22711.356	32 [c]	22713.155	10	22702.129	2	22704.069	25 [c]	22692.754	–4	22694.805	24 [c]
49	22711.001	10	22712.820	4	22701.613	2	22703.539	5	22692.044	1	22694.075	1
50	22710.656	9	22712.478	3	22701.083	–1	22703.007	–5	22691.319	1	22693.358	0

Table A1. (*continued*).

	(0, 1) R_{ee}				(0, 1) Q_{fe}				(0, 1) P_{ee}			
J''	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
51			22712.138	14	22700.522	–25 [c]	22702.470	–10	22690.596	14	22692.607	–23 [c]
52	22709.927	0	22711.766	4	22699.995	–4	22701.910	–29 [c]	22689.846	10	22691.840	–51 [c]
53	22709.549	–1	22711.356	–34 [c]	22699.436	–5	22701.377	–9	22689.071	–8	22691.128	–15 [c]
54	22709.183	20 [c]	22711.001	–6	22698.870	–2	22700.819	–3	22688.313	2	22690.385	3
55	22708.784	18 [c]	22710.656	43 [c]	22698.299	7	22700.249	0	22687.557	23 [c]	22689.640	27 [c]
56	22708.361	5			22697.700	–2	22699.676	11	22686.748	4	22688.813	–19 [c]
57	22707.931	–6	22709.815	21 [c]	22697.099	–2	22699.067	–4	22685.946	1	22688.037	–4
58	22707.501	–6	22709.368	0	22696.491	1	22698.448	–17 [c]	22685.131	–3	22687.242	3
59	22707.042	–24 [c]	22708.951	19 [c]	22695.865	–3	22697.852	2	22684.282	–31 [c]	22686.419	–9
60	22706.578	–36 [c]	22708.478	–6	22695.259	23 [c]	22697.244	20 [c]	22683.471	–11	22685.611	7
61	22706.175	24 [c]	22708.019	–8	22694.602	10	22696.599	11	22682.649	10	22684.772	1
62	22705.692	14			22693.937	–1	22695.945	4	22681.786	–1	22683.947	20 [c]
63	22705.181	–13	22707.107	28 [c]	22693.257	–18 [c]	22695.259	–25 [c]	22680.903	–20 [c]	22683.065	–7
64			22706.578	–12	22692.607	7	22694.602	–14	22680.038	–10	22682.220	13
65			22706.089	1	22691.906	–8	22693.937	0	22679.164	1	22681.341	9
66			22705.585	8	22691.214	–4	22693.257	9	22678.277	10	22680.441	–5
67	22703.130	–19 [c]	22705.024	–32 [c]	22690.511	0	22692.543	–6	22677.344	–17 [c]	22679.521	–28 [c]
68	22702.625	15	22704.542	19 [c]	22689.794	–1	22691.840	1	22676.456	12	22678.634	–8
69					22689.071	5	22691.128	9	22675.552	36 [c]	22677.700	–24 [c]
70	22701.530	30 [c]			22688.313	–14 [c]	22690.385	–3			22676.780	–15 [c]
71	22700.940	11			22687.557	–22 [c]	22689.640	–7	22673.638	10	22675.885	29 [c]
72	22700.343	–5	22702.290	5	22686.822	3	22688.895	0	22672.676	7	22674.896	–10
73	22699.738	–17 [c]	22701.705	6	22686.053	4	22688.130	–2	22671.668	–29 [c]	22673.950	4
74	22699.156	5	22701.083	–19 [c]	22685.251	–17 [c]	22687.360	0	22670.696	–20 [c]	22672.962	–13
75	22698.549	12	22700.522	28 [c]	22684.473	–3	22686.574	–2	22669.706	–18 [c]	22672.009	15
76	22697.939	27 [c]	22699.894	19 [c]	22683.672	–1	22685.785	3	22668.708	–13	22670.975	–26 [c]
77	22697.244	–32 [c]	22699.248	2	22682.855	–6	22684.998	21 [c]	22667.711	3	22669.991	–8
78	22696.599	–30 [c]	22698.606	1	22682.033	–5	22684.168	5	22666.676	–8	22668.979	–7
79	22695.945	–26 [c]	22697.939	–16 [c]	22681.165	–38 [c]	22683.331	–7	22665.649	0	22667.969	7
80					22680.351	–8	22682.520	19 [c]	22664.615	12	22666.936	8
81	22694.602	–20 [c]	22696.599	–22 [c]	22679.521	18 [c]	22681.659	4	22663.558	11	22665.895	12
82	22693.937	6	22695.945	7	22678.634	–3	22680.800	2	22662.498	18 [c]	22664.859	32 [c]
83	22693.257	27 [c]	22695.259	15	22677.771	11	22679.924	–7	22661.435	33 [c]	22663.746	–15 [c]
84	22692.543	25 [c]			22676.882	10	22679.066	14	22660.320	7	22662.677	–8
85	22691.771	–24 [c]			22675.966	–8	22678.160	–3	22659.206	–9	22661.600	3
86	22691.060	0	22693.093	–5	22675.062	–3	22677.264	0	22658.106	1	22660.521	22 [c]
87	22690.342	27 [c]	22692.350	–10	22674.122	–24 [c]	22676.356	2	22656.976	–7	22659.376	–14 [c]
88	22689.562	3	22691.608	–4	22673.234	19 [c]	22675.434	–1			22658.271	0
89	22688.813	21 [c]			22672.277	3	22674.525	21 [c]	22654.708	–2	22657.144	2

Table A1. (*continued*).

	(0, 1) R_{ee}				(0, 1) Q_{fe}				(0, 1) P_{ee}			
J''	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
90	22688.037	23 [c]	22690.064	–21 [c]	22671.314	–9	22673.549	–13	22653.529	–28 [c]	22655.968	–33 [c]
91	22687.242	17 [c]	22689.290	–14 [c]	22670.365	4	22672.600	–10	22652.378	–15 [c]	22654.831	–19 [c]
92	22686.419	–6	22688.518	5	22669.389	1	22671.668	21 [c]	22651.210	–9	22653.683	–5
93	22685.611	–3	22687.716	5	22668.402	–3	22670.696	22 [c]	22650.013	–21 [c]	22652.515	–1
94	22684.772	–20 [c]	22686.952	53 [c]	22667.416	6	22669.706	16	22648.845	8	22651.335	2
95	22683.947	–12	22686.053	–22 [c]	22666.401	–4	22668.708	12	22647.647	16 [c]	22650.143	4
96			22685.251	10	22665.381	–8	22667.711	20 [c]	22646.415	2	22648.926	–9
97	22682.220	–41 [c]			22664.371	8	22666.676	0			22647.711	–9
98					22663.352	26 [c]	22665.649	0			22646.491	–4
99	22680.548	30 [c]	22682.649	–23 [c]	22662.276	–1	22664.615	3	22642.701	5	22645.242	–16 [c]
100					22661.249	30 [c]	22663.558	–7	22641.442	7	22644.049	38 [c]
101									22640.173	10	22642.701	–53 [c]

	(1, 0) R_{ee}				(1, 0) Q_{fe}				(1, 0) P_{ee}			
J''	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
2	23309.960	14 [c]	23308.448	–36 [c]			23307.919	1				
3	23310.144	45 [c]	23308.601	–34 [c]								
4	23310.276	37 [c]	23308.832	58 [c]			23307.813	–19 [c]	23308.559	37 [c]		
5	23310.390	23 [c]	23308.923	23 [c]					23308.283	15	23306.812	–13
6	23310.500	18 [c]	23309.057	42 [c]			23307.719	22 [c]	23308.023	20 [c]	23306.554	–7
7	23310.599	14 [c]	23309.149	32 [c]			23307.611	0	23307.719	–4	23306.287	2
8	23310.694	19 [c]	23309.233	27 [c]			23307.514	1			23305.986	–12
9	23310.790	37 [c]	23309.287	4 [c]					23307.147	19 [c]	23305.692	–5
10	23310.882	64 [c]	23309.373	26 [c]			23307.290	11	23306.812	1	23305.381	–2
11	23310.882	12 [c]	23309.373	–26 [c]	23308.601	10	23307.147	2	23306.477	–5	23305.047	–12
12	23310.882	–28 [c]	23309.468	30 [c]	23308.448	6	23307.029	32 [c]			23304.733	12
13	23310.946	8 [c]	23309.468	3 [c]	23308.283	2	23306.812	–25 [c]	23305.802	15 [c]	23304.359	–11
14	23310.946	–6 [c]	23309.468	–12 [c]	23308.092	–15 [c]	23306.655	–11	23305.381	–38 [c]	23304.005	–3
15	23310.946	–8 [c]	23309.468	–14 [c]	23307.919	–2	23306.477	–4	23305.047	7	23303.639	6
16	23310.946	2 [c]	23309.468	–4 [c]	23307.719	–2	23306.287	3	23304.636	–11	23303.247	2
17	23310.882	–38 [c]	23309.468	19 [c]	23307.514	4	23306.076	0	23304.273	30 [c]	23302.847	2
18	23310.882	–2 [c]	23309.468	54 [c]	23307.290	4	23305.873	18 [c]	23303.814	–12	23302.449	16 [c]
19	23310.790	–45 [c]	23309.373	7 [c]			23305.637	15 [c]			23302.019	11
20	23310.790	16 [c]	23309.287	–19 [c]	23306.812	10	23305.381	5	23302.958	4	23301.575	5
21	23310.694	–6 [c]	23309.233	0 [c]	23306.554	13	23305.133	15 [c]			23301.137	16 [c]
22	23310.599	–15 [c]	23309.149	1 [c]	23306.287	20 [c]	23304.835	–13	23302.019	–13	23300.663	5
23	23310.500	–15 [c]	23309.057	7 [c]	23305.986	3	23304.556	–9	23301.575	23 [c]	23300.200	16 [c]
24	23310.390	–14 [c]	23308.923	–17 [c]	23305.692	8	23304.273	3	23301.063	4	23299.715	18 [c]

Table A1. (*continued*).

	(1, 0) R_{ee}				(1, 0) Q_{fe}				(1, 0) P_{ee}			
J''	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
25	23310.276	–4 [c]	23308.832	15 [c]	23305.381	8	23303.952	–11			23299.223	25 [c]
26	23310.144	1 [c]			23305.047	–3	23303.639	–5	23300.028	–9	23298.707	21 [c]
27	23309.960	–34 [c]	23308.559	24 [c]	23304.733	18 [c]	23303.334	22 [c]	23299.511	5	23298.180	19 [c]
28	23309.831	–1	23308.360	–15 [c]	23304.359	–7	23302.958	–10	23298.967	3	23297.646	21 [c]
29	23309.654	–2	23308.196	–7	23304.005	–1	23302.577	–35 [c]	23298.446	38 [c]	23297.098	22 [c]
30	23309.468	–2	23308.023	5	23303.639	6	23302.242	–2	23297.884	44 [c]	23296.545	30 [c]
31	23309.287	17 [c]	23307.813	–8	23303.247	–1	23301.865	2			23295.964	24 [c]
32	23309.057	0	23307.611	1	23302.847	–3	23301.457	–12	23296.669	3	23295.382	27 [c]
33	23308.832	0			23302.449	9	23301.063	–1	23296.070	10	23294.777	21 [c]
34	23308.601	7	23307.147	–7	23302.019	2	23300.663	17 [c]	23295.451	9	23294.175	30 [c]
35	23308.360	16 [c]	23306.886	–20 [c]	23301.575	–7	23300.200	–16 [c]	23294.777	–35 [c]	23293.521	0
36	23308.092	11	23306.655	9	23301.137	3	23299.808	34 [c]	23294.175	7	23292.913	28 [c]
37	23307.813	8	23306.386	12	23300.663	–11	23299.318	–1	23293.521	9	23292.275	39 [c]
38	23307.514	–2	23306.076	–13 [c]	23300.200	–2	23298.851	–1	23292.839	–4	23291.555	–21 [c]
39			23305.802	10	23299.715	–2	23298.378	5	23292.153	–9	23290.873	–29 [c]
40	23306.886	–15 [c]	23305.497	15	23299.223	3	23297.884	3	23291.460	–9	23290.265	48 [c]
41	23306.554	–21 [c]	23305.133	–26 [c]	23298.707	–2	23297.379	2	23290.759	–4	23289.564	45 [c]
42	23306.250	14	23304.835	10	23298.180	–7	23296.861	0	23290.026	–17 [c]	23288.798	–10
43	23305.873	–11	23304.489	12	23297.646	–6	23296.328	–4	23289.314	2	23288.079	–6
44	23305.497	–23 [c]	23304.104	–13 [c]	23297.098	–8	23295.778	–13	23288.566	–2	23287.354	5
45	23305.133	–10	23303.745	0	23296.545	–1	23295.246	8	23287.815	4	23286.640	38 [c]
46	23304.733	–20 [c]	23303.334	–25 [c]	23295.964	–9	23294.676	3	23287.045	3	23285.869	28 [c]
47	23304.359	9	23302.958	–3	23295.382	–7	23294.095	1	23286.256	–4	23285.076	7
48	23303.952	18 [c]	23302.573	21 [c]	23294.777	–15 [c]	23293.521	16 [c]	23285.468	2	23284.275	–9
49	23303.501	–6	23302.140	11	23294.175	–7	23292.913	11	23284.667	8	23283.508	22 [c]
50	23303.066	0	23301.697	3			23292.275	–12	23283.841	2	23282.656	–20 [c]
51	23302.577	–36 [c]	23301.235	–12	23292.913	–13	23291.685	25 [c]	23283.004	–3	23281.866	12
52	23302.140	–7	23300.768	–18 [c]	23292.275	–3	23291.026	6	23282.160	–3	23281.019	1
53	23301.697	29 [c]	23300.316	3	23291.620	1	23290.361	–8	23281.305	–1		
54			23299.808	–20 [c]	23290.952	5	23289.707	3	23280.433	–3	23279.294	–18 [c]
55	23300.663	–10	23299.318	–12	23290.265	2	23289.022	–5	23279.551	–2	23278.448	9
56			23298.851	32 [c]	23289.564	–1	23288.341	3	23278.657	–2		
57	23299.631	4			23288.855	–1	23287.635	–2	23277.777	26 [c]	23276.649	–9
58	23299.075	–10	23297.758	–3	23288.126	–8	23286.924	0	23276.857	27 [c]	23275.788	40 [c]
59	23298.529	0	23297.193	–20 [c]	23287.400	1	23286.203	5	23275.898	0	23274.882	55 [c]
60			23296.669	17 [c]	23286.640	–12	23285.468	9	23274.984	32 [c]	23273.897	6
61	23297.379	–3	23296.070	–9	23285.908	15	23284.711	3	23273.957	–37 [c]		
62	23296.798	10			23285.128	8	23283.935	–10	23273.014	–10	23272.038	53 [c]

Table A1. (*continued*).

	(1, 0) R_{ee}				(1, 0) Q_{fe}				(1, 0) P_{ee}			
J''	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
63	23296.195	12	23294.916	22 [c]	23284.345	9	23283.170	0	23272.038	–2	23271.036	23 [c]
64	23295.561	–3	23294.278	–5	23283.558	19 [c]	23282.381	–1	23271.036	–8	23270.045	16 [c]
65	23294.916	–16 [c]	23293.699	39 [c]	23282.727	–3	23281.587	5	23270.045	9	23269.077	45 [c]
66	23294.278	–10	23293.001	–22 [c]	23281.924	17 [c]	23280.773	3	23269.019	4	23268.032	9
67	23293.643	11			23281.084	11	23279.947	3	23267.975	–6	23266.983	–18 [c]
68	23293.001	39 [c]	23291.685	–28 [c]	23280.234	9	23279.110	3	23266.911	–23 [c]	23265.966	–1
69	23292.275	–5	23291.026	–13	23279.374	8	23278.253	–4	23265.847	–29 [c]		
70	23291.620	35 [c]	23290.361	9	23278.501	8	23277.396	1	23264.779	–25 [c]	23263.892	30 [c]
71	23290.873	–3	23289.642	–11	23277.606	–2	23276.495	–26 [c]	23263.713	–7	23262.819	29 [c]
72	23290.167	11	23288.941	1	23276.726	15	23275.625	–8			23261.734	28 [c]
73	23289.421	–1	23288.208	–8	23275.788	–13	23274.734	0	23261.485	–29 [c]	23260.645	35 [c]
74	23288.669	–7	23287.484	6	23274.882	3	23273.827	4	23260.419	27 [c]	23259.530	30 [c]
75	23287.911	–5	23286.741	12	23273.957	14	23272.890	–9	23259.251	–6	23258.401	22 [c]
76	23287.144	0			23273.014	18 [c]	23271.962	–1	23258.109	–1	23257.261	16 [c]
77	23286.361	2	23285.176	–15 [c]	23272.038	2	23271.036	23 [c]	23256.937	–13	23256.128	30 [c]
78	23285.548	–14					23270.045	–7	23255.772	–4	23254.951	11
79	23284.756	4					23269.077	–1	23254.609	18 [c]	23253.789	21 [c]
80	23283.935	7	23282.796	7	23269.077	–2	23268.089	–3			23252.585	1
81	23283.079	–13			23268.089	19 [c]	23267.069	–24 [c]	23252.162	–20 [c]	23251.396	8
82			23281.156	31 [c]	23267.069	23 [c]	23266.083	1	23250.963	3	23250.174	–5
83	23281.375	–7			23266.019	8	23265.061	3	23249.704	–19 [c]	23248.960	2
84	23280.511	4	23279.374	–36 [c]	23264.980	18 [c]	23264.024	1	23248.456	–19 [c]	23247.731	7
85	23279.610	–9	23278.501	–32 [c]	23263.892	–9	23262.976	2	23247.205	–8	23246.473	–4
86	23278.726	7			23262.819	–8	23261.912	–1	23245.940	1	23245.222	4
87	23277.777	–29 [c]	23276.726	–16 [c]	23261.734	–7	23260.842	2	23244.656	3	23243.945	–2
88	23276.857	–23 [c]			23260.645	2	23259.775	21 [c]	23243.338	–16 [c]	23242.657	–6
89			23274.882	–18 [c]	23259.530	–1	23258.652	–4	23242.036	–5	23241.364	–2
90	23274.984	–5	23273.957	–2	23258.401	–6	23257.555	10	23240.743	26 [c]	23240.060	3
91	23274.009	–15	23273.014	7	23257.261	–9	23256.427	5	23239.377	–2	23238.716	–19 [c]
92	23273.014	–33 [c]	23272.038	–3	23256.128	7	23255.285	–1	23238.055	26 [c]	23237.386	–16 [c]
93	23272.038	–18 [c]	23271.036	–27 [c]	23254.951	–8	23254.136	–2	23236.667	1	23236.029	–26 [c]
94	23271.036	–16 [c]	23270.045	–27 [c]	23253.789	4	23252.981	4	23235.290	–1	23234.671	–25 [c]
95	23270.045	9	23269.077	9	23252.585	–12	23251.804	0	23233.901	–2	23233.291	–33 [c]
96	23269.019	12	23268.032	–19 [c]	23251.396	–1	23250.627	9	23232.489	–12	23231.904	–35 [c]
97	23267.975	11	23266.983	–39 [c]	23250.174	–11	23249.417	–3	23231.091	3	23230.495	–47 [c]
99	23265.847	5	23264.891	–34 [c]	23247.731	9	23246.976	–10			23227.656	–54 [c]
100					23246.473	2	23245.727	–23 [c]	23226.757	–13	23226.254	–22 [c]
101									23225.294	–12	23224.766	–62 [c]

Table A1. (*continued*).

	(1, 2) R_{ee}				(1, 2) Q_{fe}				(1, 2) P_{ee}			
J''	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
2	22686.053	21 [c]										
3	22686.156	–35 [c]	22688.130	9			22687.360	–7			22686.822	22 [c]
4											22686.574	5
5			22688.420	17 [c]	22685.346	13	22687.242	–30 [c]				
6	22686.574	–27 [c]	22688.518	–9	22685.251	–18 [c]			22684.168	47 [c]	22686.053	–21 [c]
7	22686.748	31 [c]	22688.683	42 [c]					22683.851	–3	22685.837	26 [c]
8	22686.822	1			22685.131	21 [c]						
9			22688.813	–25 [c]	22685.053	39 [c]	22686.952	–5	22683.331	41 [c]	22685.251	–1
10			22688.895	–25 [c]			22686.822	–30 [c]			22684.998	42 [c]
11	22687.093	23 [c]			22684.772	–19 [c]	22686.748	12	22682.649	–32 [c]		
12			22689.071	19 [c]	22684.696	33 [c]	22686.574	–36 [c]			22684.282	–52 [c]
13			22689.071	–31 [c]	22684.531	5			22682.033	2	22684.019	12
14	22687.242	21 [c]	22689.185	44 [c]					22681.659	–30 [c]	22683.672	3
15	22687.242	–8 [c]	22689.185	15 [c]			22686.156	–13	22681.341	5	22683.331	10
16	22687.242	–26 [c]	22689.185	–3 [c]	22684.019	–28 [c]					22682.980	19 [c]
17	22687.242	–34 [c]	22689.185	–10 [c]	22683.851	–15 [c]	22685.837	15 [c]				
18	22687.242	–30 [c]	22689.185	–7 [c]	22683.672	–3	22685.611	–22 [c]	22680.240	25 [c]	22682.220	10
19	22687.242	–16 [c]	22689.185	7 [c]	22683.471	–3			22679.758	–61 [c]	22681.786	–34 [c]
20	22687.242	9 [c]	22689.185	32 [c]			22685.251	28 [c]	22679.371	–42 [c]		
21			22689.071	–47 [c]	22683.065	27 [c]	22684.998	–4				
22			22689.071	–1 [c]	22682.805	1	22684.772	1	22678.579	11	22680.548	–34 [c]
23	22687.093	0 [c]			22682.520	–39 [c]	22684.531	2	22678.160	31 [c]		
24			22688.895	–52 [c]	22682.297	–7	22684.282	6	22677.700	20 [c]		
25	22686.952	6	22688.895	26 [c]	22682.033	–6	22684.019	5	22677.207	–13	22679.241	–8
26			22688.813	33 [c]	22681.786	23 [c]	22683.732	–9	22676.780	31 [c]	22678.800	17
27	22686.748	–7 [c]	22688.683	3	22681.537	61 [c]	22683.471	14	22676.299	31 [c]	22678.277	–29 [c]
28	22686.649	6			22681.165	–13	22683.172	10	22675.752	–23 [c]	22677.771	–49 [c]
29			22688.420	–29 [c]	22680.903	33 [c]	22682.855	–2			22677.344	21 [c]
30	22686.419	31 [c]	22688.313	–4	22680.548	–3	22682.520	–22 [c]	22674.794	36 [c]	22676.780	–33 [c]
31					22680.240	18 [c]	22682.220	4	22674.223	–9	22676.299	5
32	22686.053	–36 [c]	22688.037	16 [c]	22679.924	42 [c]	22681.907	28 [c]			22675.752	–13
33	22685.946	23 [c]	22687.843	–13	22679.521	–10	22681.537	4			22675.183	–41 [c]
34	22685.785	39 [c]	22687.716	34 [c]	22679.164	–5	22681.165	–10	22672.600	6	22674.658	–16 [c]
35			22687.501	4	22678.800	3	22680.800	–7	22672.009	–18 [c]	22674.122	11
36	22685.346	–14	22687.360	59 [c]	22678.400	–14	22680.441	13			22673.549	9
37	22685.131	–20 [c]	22687.093	0	22678.013	–8	22680.038	–1	22670.851	–7	22672.962	6
38			22686.875	–1	22677.601	–16 [c]	22679.637	–3	22670.270	12	22672.384	21 [c]
39	22684.696	–4	22686.649	1	22677.207	5	22679.241	12	22669.618	–29 [c]	22671.802	43 [c]

Table A1. (*continued*).

	(1, 2) R_{ee}				(1, 2) Q_{fe}				(1, 2) P_{ee}			
J''	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
40	22684.473	15 [c]	22686.419	10	22676.780	4	22678.800	–9			22671.142	–2
41	22684.168	–37 [c]	22686.156	–3	22676.356	16 [c]	22678.400	23 [c]	22668.402	9	22670.522	4
42	22683.947	5		[c]	22675.885	–9	22677.939	4			22669.884	2
43	22683.672	5	22685.611	–16 [c]	22675.434	–3	22677.466	–16 [c]	22667.095	0	22669.259	24 [c]
44	22683.415	33 [c]	22685.346	1	22674.965	–3	22677.025	6	22666.401	–30 [c]	22668.579	1
45	22683.065	–21 [c]			22674.525	35 [c]	22676.548	2	22665.753	–2	22667.916	7
46	22682.805	26 [c]	22684.772	23 [c]	22674.009	9	22676.067	5	22665.069	0	22667.217	–14
47			22684.473	39 [c]	22673.490	–10	22675.552	–15 [c]	22664.352	–20 [c]	22666.527	–14
48					22672.962	–27 [c]	22675.062	0	22663.676	12	22665.840	–1
49	22681.786	–7	22683.732	–42 [c]	22672.467	–1	22674.525	–22 [c]			22665.153	22 [c]
50			22683.415	–11	22671.938	2	22674.009	–11			22664.436	27 [c]
51			22683.065	–4	22671.400	6	22673.490	7	22661.435	–41 [c]	22663.676	–1
52	22680.695	–14		[c]	22670.851	12	22672.962	27 [c]			22662.933	–1
53	22680.351	25 [c]	22682.297	–25 [c]	22670.270	–5	22672.384	7			22662.207	27 [c]
54	22679.924	–8	22681.907	–25 [c]	22669.706	5	22671.802	–7	22659.206	16 [c]	22661.435	19 [c]
55	22679.521	–6	22681.537	5	22669.119	4	22671.231	2	22658.413	6	22660.640	–2
56	22679.164	54 [c]	0.000	[c]	22668.512	–7	22670.635	–5	22657.626	14	22659.863	7
57			22680.695	–3	22667.916	4			22656.806	–1	22659.064	4
58	22678.277	32 [c]	22680.240	–26 [c]	22667.299	4					22658.271	18 [c]
59	22677.771	–26 [c]	22679.828	6	22666.676	9	22668.810	3			22657.418	–17 [c]
60	22677.344	6	22679.371	3	22666.034	7	22668.182	7	22654.337	10	22656.611	4
61	22676.882	16 [c]	22678.911	9	22665.381	4	22667.540	8	22653.470	–9	22655.767	–1
62	22676.356	–29 [c]	22678.451	25 [c]	22664.719	2	22666.885	6	22652.612	–8	22654.890	–29 [c]
63	22675.885	–8	22677.939	0	22664.052	6	22666.204	–11	22651.731	–20 [c]	22654.044	–14
64	22675.434	44 [c]	22677.466	25 [c]	22663.352	–12	22665.538	–3	22650.874	4	22653.178	–9
65	22674.896	21 [c]		[c]	22662.677	5	22664.859	4	22650.013	35 [c]	22652.288	–18 [c]
66	22674.348	–2	22676.456	43 [c]	22661.980	12	22664.157	–3			22651.428	14
67	22673.837	24 [c]	22675.885	2	22661.249	–5	22663.450	–3	22648.142	–20 [c]	22650.506	–5
68	22673.234	–32 [c]	22675.343	1	22660.521	–8	22662.743	7	22647.244	5	22649.589	–8
69	22672.676	–32 [c]	22674.794	4	22659.777	–17 [c]	22661.980	–29 [c]	22646.287	–17 [c]		
70	22672.137	–2	22674.223	–4	22658.995	–53 [c]	22661.249	–22 [c]	22645.360	2	22647.711	–26 [c]
71	22671.547	–11	22673.638	–15 [c]	22658.271	–19 [c]	22660.521	–1	22644.388	–14	22646.776	–15 [c]
72	22670.975	8			22657.522	–1	22659.777	15	22643.439	5	22645.799	–36 [c]
73	22670.365	0	22672.467	–6	22656.748	4	22658.995	3	22642.474	17 [c]	22644.863	–4
74	22669.706	–46 [c]			22655.968	13	22658.199	–13	22641.442	–25 [c]	22643.904	15 [c]
75	22669.119	–8	22671.231	–19 [c]	22655.157	3	22657.418	–2	22640.463	–5	22642.900	0
76	22668.512	20 [c]	22670.635	13	22654.337	–6	22656.611	–7	22639.472	15 [c]	22641.877	–24 [c]
77			22669.991	8	22653.529	7	22655.819	14	22638.443	7	22640.880	–10

Table A1. (*continued*).

	(1, 2) R_{ee}				(1, 2) Q_{fe}				(1, 2) P_{ee}			
J''	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
78	22667.217	28 [c]	22669.389	56 [c]	22652.701	11	22654.992	10	22637.396	–7	22639.890	20 [c]
79	22666.527	7	22668.708	36 [c]	22651.850	4	22654.149	1	22636.366	6	22638.851	12
80	22665.885	44 [c]	22667.969	–32 [c]	22650.998	6	22653.302	–2	22635.313	6	22637.794	–2
81	22665.153	2	22667.299	–20 [c]	22650.143	15 [c]	22652.455	7	22634.241	0	22636.731	–12
82	22664.436	–13	22666.676	50 [c]	22649.264	12	22651.580	–2	22633.170	4	22635.658	–22 [c]
83	22663.746	9	22665.895	–26 [c]	22648.375	9	22650.693	–12	22632.066	–13	22634.608	3
84	22663.005	–9	22665.153	–53 [c]	22647.475	6	22649.819	1	22630.945	–37 [c]	22633.515	–4
85	22662.276	–3	22664.436	–43 [c]	22646.572	11	22648.926	6	22629.847	–26 [c]	22632.410	–13
86	22661.560	27 [c]	22663.746	4	22645.653	11	22648.010	–2	22628.744	–10	22631.277	–40 [c]
87			22663.005	10	22644.723	11	22647.091	–1	22627.610	–14	22630.192	–8
88			22662.207	–28 [c]	22643.772	0	22646.171	9	22626.461	–22 [c]		
89	22659.272	41 [c]	22661.435	–31 [c]	22642.832	11	22645.242	21 [c]	22625.314	–17 [c]	22627.924	–8
90	22658.462	22 [c]	22660.723	39 [c]	22641.877	19 [c]	22644.269	–1	22624.153	–15	22626.771	–11
91	22657.626	–13	22659.863	–30 [c]	22640.880	–6	22643.302	–5	22622.993	–1	22625.589	–33 [c]
92	22656.877	49 [c]	22659.064	–26 [c]	22639.890	–12	22642.329	–6	22621.805	–5	22624.444	–6
93			22658.271	–5	22638.918	10	22641.355	3	22620.613	–1	22623.251	–17 [c]
94	22655.207	37 [c]	22657.418	–33 [c]	22637.877	–25 [c]	22640.376	19 [c]	22619.413	5	22622.065	–10
95	22654.337	13	22656.611	–5	22636.895	9	22639.349	–3			22620.920	48 [c]
96	22653.470	2	22655.767	–2	22635.861	3	22638.320	–16 [c]	22616.966	4	22619.630	–27 [c]
97	22652.612	12	22654.890	–22 [c]	22634.826	5	22637.288	–22 [c]	22615.727	3	22618.384	–47 [c]
98	22651.731	9	22654.044	1	22633.794	22 [c]	22636.292	20 [c]	22614.509	36 [c]	22617.183	–12
99	22650.874	43 [c]	22653.178	15	22632.725	13	22635.228	4	22613.260	48 [c]		
100					22631.637	–4	22634.165	0			22614.661	–30 [c]
101									22610.628	–29 [c]	22613.415	–7

	(2, 1) R_{ee}				(2, 1) Q_{fe}				(2, 1) P_{ee}			
J''	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
0			23274.734	–8								
1					23275.788	–2						
2			23275.104	24 [c]					23275.345	–41 [c]	23274.181	39 [c]
3	23276.495	9 [c]	23275.222	–8			23274.489	9			23273.897	–19 [c]
4	23276.649	23 [c]	23275.345	–23 [c]					23274.882	–36 [c]	23273.647	–32 [c]
5	23276.726	–26 [c]			23275.625	10			23274.632	–32 [c]	23273.417	–11 [c]
6	23276.857	–8	23275.625	20 [c]			23274.321	26 [c]			23273.171	6
7	23276.946	–20 [c]					23274.181	–27 [c]	23274.100	–19 [c]	23272.890	0
8			23275.788	–4	23275.345	–7	23274.100	–9	23273.827	–1 [c]	23272.645	43 [c]
9			23275.898	30 [c]	23275.222	–17 [c]	23274.009	12			23272.337	36 [c]
10					23275.104	–9	23273.897	24 [c]	23273.171	–36 [c]	23271.962	–26 [c]

Table A1. (*continued*).

	(2, 1) R_{ee}				(2, 1) Q_{fe}				(2, 1) P_{ee}			
J''	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
11			23276.004	25 [c]	23274.984	8			23272.890	12 [c]		
12	23277.304	25 [c]	23276.004	–12 [c]			23273.596	8	23272.525	–10	23271.358	35 [c]
13	23277.304	0 [c]	23276.004	–36 [c]			23273.417	–10				
14	23277.304	–12 [c]	23276.004	–48 [c]	23274.489	3	23273.245	–8				
15	23277.304	–11 [c]	23276.004	–48 [c]	23274.321	22 [c]			23271.414	–19 [c]	23270.206	–27 [c]
16	23277.304	3 [c]	23276.004	–34 [c]	23274.100	2	23272.890	20 [c]	23271.036	–4	23269.853	8
17	23277.304	29 [c]	23276.004	–8 [c]	23273.897	13	23272.645	–14			23269.463	19 [c]
18			23276.004	30 [c]	23273.647	–12	23272.448	13	23270.206	–10	23269.019	–12
19					23273.417	–3			23269.790	5		
20			23275.898	38 [c]	23273.171	2	23271.962	10	23269.360	19 [c]		
21			23275.788	5	23272.890	–17 [c]	23271.717	26 [c]				
22	23276.946	–7 [c]			23272.645	14	23271.414	–4	23268.412	–3	23267.259	9
23	23276.857	7	23275.625	32 [c]	23272.337	–5			23267.900	–34 [c]		
24	23276.726	–9 [c]			23272.038	–3			23267.464	24 [c]	23266.291	5
25	23276.649	42 [c]	23275.345	–8 [c]	23271.717	–10	23270.551	25 [c]	23266.911	–21 [c]	23265.766	–18 [c]
26	23276.495	30 [c]	23275.222	9	23271.414	13	23270.206	2	23266.422	10	23265.262	–8
27					23271.036	–26 [c]	23269.853	–16 [c]	23265.847	–33 [c]	23264.779	36 [c]
28					23270.705	–6			23265.362	28 [c]	23264.205	1
29							23269.169	8	23264.779	2	23263.660	7
30	23275.788	15 [c]	23275.104	43 [c]			23268.781	–9	23264.205	–1		
31					23269.576	–5	23268.412	7	23263.660	37 [c]	23262.504	–8
32	23275.345	–7 [c]	23274.882	–16 [c]	23269.169	–11	23268.032	24 [c]			23261.912	–11
33	23275.104	–17 [c]	23274.734	14	23268.781	15	23267.609	10	23262.396	–23 [c]	23261.296	–25 [c]
34	23274.882	3 [c]	23274.321	–8	23268.331	–9	23267.168	–9				
35	23274.632	10 [c]	23274.100	–14 [c]	23267.900	0	23266.739	–4	23261.150	–13	23260.056	–24 [c]
36	23274.321	–33 [c]	23273.897	11	23267.464	15 [c]	23266.291	–6	23260.550	34 [c]	23259.441	0
37	23274.100	27 [c]	23273.647	0	23266.983	–1	23265.847	9			23258.797	8
38	23273.827	48 [c]	23273.417	24 [c]	23266.500	–7	23265.362	–3	23259.158	–27 [c]	23258.109	–16 [c]
39					23266.019	1	23264.891	9	23258.508	9	23257.456	9
40	23273.171	20 [c]	23273.171	43 [c]	23265.512	–3	23264.386	0	23257.834	31 [c]	23256.723	–35 [c]
41	23272.890	70 [c]	23272.890	39 [c]	23264.980	–20 [c]	23263.892	16 [c]				
42	23272.448	–26 [c]	23272.275	18 [c]	23264.477	4	23263.368	13	23256.427	58 [c]	23256.128	73 [c]
43	23272.128	12	23271.962	20 [c]			23262.819	–2	23255.619	–14	23254.609	–5
44	23271.717	–28 [c]	23270.551	–1	23263.368	–13	23262.260	–16 [c]				
45	23271.358	–3	23270.206	33 [c]	23262.819	4	23261.150	5	23254.136	12	23253.881	7
46			23269.790	9					23253.338	–12	23253.105	–17 [c]
47	23270.551	–5	23269.360	–16 [c]	23261.640	–8	23260.550	–12	23252.585	22 [c]	23252.316	–40 [c]
48			23269.019	59 [c]	23261.041	–4	23259.947	–19 [c]	23251.804	40 [c]	23250.766	–23 [c]

Table A1. (*continued*).

	(2, 1) R_{ee}				(2, 1) Q_{fe}				(2, 1) P_{ee}			
J''	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
49	23269.688	–10	23268.477	–53 [c]	23260.419	–11	23259.363	5	23250.963	11	23249.989	3
50			23268.089	1			23258.731	–6				
51	23268.781	–9	23267.609	–23 [c]	23259.158	–3	23258.109	5			23248.342	–1
52	23268.331	14	23267.168	4	23258.508	1	23257.456	–1	23248.456	16 [c]	23247.508	5
53	23267.833	3	23266.680	–3	23257.834	–8	23256.809	10	23247.583	6	23246.676	26 [c]
54	23267.325	–6	23266.197	7	23257.160	–3	23256.128	0	23246.676	–25 [c]	23245.762	–23 [c]
55			23265.694	9			23255.442	–4	23245.828	15 [c]	23244.901	–5
56	23266.291	–4	23265.170	4	23255.773	5	23254.757	8	23244.901	–11	23244.017	1
57	23265.766	10	23264.650	15	23255.047	–4	23254.037	–5	23244.017	19 [c]	23243.112	–1
58	23265.262	56 [c]	23264.083	–8	23254.325	3	23253.338	17 [c]	23243.112	40 [c]	23242.212	15
59	23264.650	7	23263.522	–12	23253.588	8	23252.585	–2	23242.111	–22 [c]	23241.260	–9
60	23264.083	17 [c]	23262.976	10	23252.814	–12			23241.181	0	23240.314	–13
61	23263.522	45 [c]	23262.396	13	23252.062	3	23251.084	0	23240.234	18 [c]	23239.377	3
62					23251.288	8	23250.306	–8	23239.242	4	23238.417	10
63	23262.260	–1	23261.150	–30 [c]	23250.499	12	23249.523	–7				
64	23261.640	7	23260.550	–10	23249.704	22 [c]			23237.249	4		
65	23261.041	49 [c]	23259.947	19 [c]	23248.882	18 [c]	23247.921	–5	23236.221	–9	23236.439	2
66			23259.251	–31 [c]	23248.042	8	23247.099	–6	23235.203	2	23235.417	–16 [c]
67			23258.652	29 [c]	23247.205	14	23246.269	–3	23234.163	3	23234.423	6
68			23257.998	46 [c]	23246.347	11			23233.097	–9	23232.355	9
69	23258.306	6	23257.261	–7	23245.457	–10	23244.572	4	23232.044	4	23231.316	24 [c]
70	23257.605	10			23244.572	–15 [c]	23243.689	–8	23230.968	8	23230.190	–34 [c]
71	23256.937	60 [c]	23255.851	–10	23243.689	–3	23242.789	–25 [c]	23229.852	–16 [c]	23229.109	–36 [c]
72	23256.128	–17 [c]	23255.137	–2	23242.789	3	23241.918	0	23228.765	2	23228.054	2
73	23255.442	40 [c]	23254.426	22 [c]	23241.866	–1	23241.013	4	23227.656	12	23226.968	21 [c]
74			23253.648	–9	23240.941	5			23226.540	26 [c]	23225.864	34 [c]
75	23253.881	6			23240.003	12	23239.146	–9	23225.418	48 [c]	23224.710	11
76	23253.105	13	23252.162	40 [c]	23239.043	9	23238.209	0	23224.214	0	23223.547	–10
77	23252.316	20 [c]			23238.055	–9	23237.249	–1	23223.049	3	23222.409	8
78					23237.079	–2	23236.278	0	23221.871	7	23221.235	2
79			23249.704	–21 [c]	23236.088	2	23235.290	–5	23220.660	–10	23220.059	7
80			23248.882	–18 [c]	23235.072	–6	23234.301	3	23219.473	11	23218.882	23 [c]
81	23248.960	–23 [c]	23248.042	–20 [c]	23234.054	–3	23233.291	2	23218.244	3	23217.661	9
82	23248.159	37 [c]	23247.205	–7	23233.029	5	23232.265	–3	23217.005	–4	23216.434	0
83	23247.205	–43 [c]	23246.347	–2	23231.987	10	23231.234	1	23215.763	1	23215.197	–6
84	23246.347	–15	23245.457	–15 [c]	23230.908	–11	23230.190	3	23214.507	3	23213.959	0
85	23245.457	–5	23244.572	–12	23229.852	6	23229.109	–19 [c]	23213.232	–1	23212.665	–36 [c]
86	23244.572	23 [c]	23243.689	7	23228.765	3	23228.054	–1	23211.931	–17 [c]	23211.406	–27 [c]

Table A1. (*continued*).

	(2, 1) R_{ee}				(2, 1) Q_{fe}				(2, 1) P_{ee}			
J''	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
87			23242.789	22 [c]	23227.656	–8	23226.968	–3	23210.617	–34 [c]	23210.150	–1
88	23242.657	–28 [c]	23241.866	27 [c]	23226.540	–14	23225.864	–10	23209.331	–10	23208.846	–10
89	23241.736	4	23240.941	42 [c]	23225.418	–13	23224.766	3	23208.026	8	23207.538	–10
90	23240.743	–25 [c]	23239.946	0	23224.287	–9	23223.643	2	23206.703	20 [c]	23206.225	–3
91	23239.776	–13	23238.983	3	23223.145	–2	23222.518	12	23205.300	–34 [c]	23204.908	13
92					23221.991	5	23221.361	3	23203.962	–10	23203.524	–26 [c]
93	23237.803	9	23237.017	9	23220.820	8	23220.208	10	23202.611	13	23202.168	–23 [c]
94	23236.754	–23 [c]	23236.029	25 [c]	23219.625	0	23219.030	6	23201.199	–12	23200.821	1
95	23235.714	–33 [c]	23234.989	3	23218.416	–10	23217.856	17 [c]	23199.807	–4	23199.428	–9
96	23234.671	–33 [c]	23233.957	2	23217.209	–3	23216.643	3	23198.419	20 [c]	23198.029	–11
97	23233.666	19 [c]	23232.927	16 [c]	23215.993	6	23215.424	–6	23196.977	5	23196.621	–10
98	23232.584	7			23214.754	5	23214.218	12	23195.536	3	23195.192	–17 [c]
99			23230.790	5	23213.493	–5	23212.975	5	23194.084	2	23193.785	10
100					23212.229	–5	23211.729	9	23192.630	12	23192.330	3
101									23191.175	35 [c]	23190.864	–3

	(0, 2) Q_{fe}				(2, 0) Q_{fe}			
J''	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
11	22402.850	–12						
12	22402.740	–6					23584.697	–26 [c]
13	22402.645	24 [c]					23584.577	27 [c]
14							23584.347	–17 [c]
15	22402.338	–4	22405.818	–14	23587.108	7	23584.186	21 [c]
16	22402.191	3	22405.677	–2			23583.941	–12
17	22402.028	4	22405.483	–35 [c]	23586.664	7	23583.759	33 [c]
18	22401.833	–18 [c]	22405.354	8	23586.419	4		
19	22401.642	–26 [c]	22405.160	–5	23586.142	–17 [c]	23583.233	–2
20	22401.471	–5	22404.977	2	23585.916	26 [c]	23582.958	–11
21	22401.286	13	22404.773	–1			23582.692	2
22	22401.077	15 [c]	22404.588	23 [c]	23585.319	7	23582.394	–5
23	22400.830	–11	22404.354	8				
24	22400.618	8	22404.104	–12	23584.697	17 [c]	23581.768	–6
25	22400.369	0	22403.891	12	23584.347	3	23581.441	0
26	22400.104	–15	22403.625	–5	23583.995	1	23581.097	1
27	22399.849	–10	22403.349	–24 [c]	23583.627	–5	23580.720	–18 [c]
28			22403.114	8	23583.233	–22 [c]	23580.347	–19 [c]
29	22399.302	–9	22402.850	19 [c]	23582.882	17 [c]	23579.986	6
30	22399.019	–2	22402.548	4	23582.458	–4	23579.563	–18 [c]

Table A1. (*continued*).

	(0, 2) Q_{fe}				(2, 0) Q_{fe}			
J''	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
31			22402.246	–2	23582.059	14 [c]	23579.144	–26 [c]
32	22398.393	–22 [c]	22401.926	–17 [c]	23581.609	–6	23578.741	–3
33	22398.092	–5	22401.600	–29 [c]	23581.166	–4	23578.317	11
34	22397.757	–13	22401.286	–18 [c]	23580.720	7	23577.840	–14
35	22397.433	0	22400.975	4	23580.251	8	23577.393	5
36	22397.091	4	22400.618	–10	23579.759	1	23576.902	–7
37	22396.731	0	22400.266	–9			23576.411	–7
38	22396.363	–1			23578.741	–8	23575.899	–13
39	22395.989	0	22399.522	–19 [c]	23578.218	–7	23575.396	2
40	22395.607	4	22399.152	–7	23577.665	–21 [c]	23574.873	11
41	22395.198	–10	22398.764	–5	23577.140	6	23574.321	4
42	22394.797	–7	22398.393	26 [c]	23576.582	13	23573.756	–3
43	22394.375	–15	22397.962	4	23575.981	–9	23573.179	–8
44	22393.961	–6	22397.537	0	23575.396	–2	23572.595	–7
45	22393.526	–7	22397.091	–18 [c]	23574.793	0	23572.005	2
46	22393.096	6	22396.666	–4	23574.182	9	23571.397	6
47	22392.618	–19 [c]	22396.216	–5	23573.529	–12	23570.768	2
48	22392.185	10	22395.780	17 [c]	23572.878	–17 [c]	23570.127	0
49	22391.703	1	22395.292	–4	23572.244	9	23569.465	–10
50	22391.208	–13	22394.797	–22 [c]	23571.566	4	23568.810	0
51	22390.728	–1	22394.320	–12	23570.876	1	23568.125	–7
52	22390.239	11	22393.829	–7	23570.173	–2	23567.442	3
53	22389.717	0	22393.337	7	23569.465	4	23566.718	–17 [c]
54	22389.199	2	22392.824	9	23568.736	2	23566.006	–10
55	22388.659	–8	22392.287	–3	23568.008	15 [c]	23565.297	13
56	22388.114	–13			23567.234	–5	23564.532	–6
57	22387.589	12	22391.208	–3	23566.492	20 [c]	23563.770	–10
58	22387.034	16 [c]	22390.648	–9	23565.688	–1	23563.014	6
59	22386.441	–9	22390.090	–4	23564.899	4	23562.218	–4
60	22385.864	–7	22389.523	2	23564.088	2	23561.426	3
61	22385.261	–21 [c]	22388.946	7	23563.254	–11	23560.593	–18 [c]
62	22384.679	–6	22388.351	5	23562.424	–5	23559.808	23 [c]
63	22384.076	–1	22387.739	–6	23561.579	–1	23558.939	–7
64	22383.462	2	22387.139	6	23560.726	9	23558.071	–23 [c]
65	22382.805	–28 [c]	22386.508	–4	23559.870	29 [c]	23557.234	6
66	22382.184	–12	22385.864	–18 [c]	23558.939	–12	23556.363	14 [c]
67			22385.261	19 [c]	23558.071	23 [c]	23555.449	–7
68	22380.902	9	22384.594	2	23557.132	1	23554.542	–8

Table A1. (*concluded*).

	(0, 2) Q_{fe}				(2, 0) Q_{fe}			
J''	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
69	22380.236	8	22383.915	–17 [c]	23556.196	–4	23553.645	15 [c]
70	22379.552	0	22383.268	5	23555.247	–9	23552.690	–8
71	22378.859	–8	22382.578	–7	23554.291	–7	23551.759	7
72	22378.156	–15	22381.885	–12	23553.331	4	23550.775	–16 [c]
73	22377.453	–13			23552.320	–23 [c]	23549.817	–2
74	22376.738	–14	22380.489	–2	23551.345	1	23548.845	13
75	22376.054	26 [c]	22379.771	–4	23550.339	7	23547.862	30 [c]
76	22375.280	–14	22379.037	–10	23549.319	13	23546.795	–24 [c]
77	22374.527	–23 [c]	22378.306	–5	23548.264	–3	23545.797	6
78	22373.771	–25 [c]	22377.558	–8	23547.190	–25 [c]	23544.722	–29 [c]
79	22373.070	36 [c]			23546.129	–19 [c]	23543.677	–20 [c]
80	22372.254	–7	22376.054	9	23545.057	–11	23542.595	–35 [c]
81	22371.467	–11	22375.280	10	23543.993	19 [c]	23541.539	–10
82	22370.693	8			23542.857	–9	23540.480	25 [c]
83	22369.883	0	22373.683	–8	23541.742	–3		
84					23540.631	21 [c]	23538.251	25 [c]
85	22368.263	14	22372.076	3	23539.448	–14	23537.095	4
86	22367.398	–20 [c]	22371.253	3	23538.293	–7	23535.931	–11
87			22370.440	23 [c]	23537.095	–29 [c]	23534.765	–16 [c]
88	22365.737	11	22369.550	–24 [c]	23535.931	–4	23533.594	–12
89							23532.396	–21 [c]
90	22364.001	7			23533.521	6	23531.222	7
91	22363.115	2	22367.006	17 [c]	23532.261	–23 [c]		
92	22362.205	–18 [c]	22366.098	–10	23531.033	–7	23528.800	30 [c]
93			22365.224	8	23529.779	–3		
94					23528.517	6		
95	22359.473	–20 [c]	22363.398	–8			23524.998	–3
96	22358.554	–10					23523.713	–4
97	22357.633	8	22361.554	–1	23524.612	–2	23522.449	29 [c]
98	22356.692	17 [c]			23523.287	0	23521.130	21 [c]
99					23521.955	9	23519.814	29 [c]
100			22358.695	–13			23518.437	–11

[a] All observed line positions are in cm^{-1} units.
[b] Relative to last digits of observed minus calculated values.
[c] Not included in this fit.

Table A2. Observed line positions of the $B^1\Sigma^+$–$X^1\Sigma^+$ system of CuBr.[a]

	(0, 0) *R*				(0, 0) *P*			
J"	79Br	*o*–*c* [b]	81Br	*o*–*c*	79Br	*o*–*c*	81Br	*o*–*c*
0	23451.103	–23 [c]	23451.150	–26 [c]				
1	23451.305	6	23451.305	–41 [c]	23450.736	1		
2	23451.450	–6 [c]	23451.450	–52 [c]	23450.514	–2	23450.570	–2
3	23451.585	–15 [c]	23451.585	–59 [c]	23450.276	–6	23450.337	–3
4	23451.731	4 [c]	23451.731	–38 [c]	23450.023	–11	23450.094	–1
5	23451.832	–7 [c]	23451.832	–48 [c]	23449.763	–6	23449.831	–2
6					23449.484	–6	23449.546	–10
7	23452.062	44 [c]	23452.062	5 [c]	23449.184	–10	23449.262	–3
8	23452.062	–22 [c]	23452.147	24 [c]	23448.875	–9	23448.952	–6
9	23452.147	12 [c]	23452.147	–26 [c]	23448.551	–9	23448.642	5
10	23452.147	–24 [c]	23452.204	–4	23448.212	–8	23448.296	–4
11	23452.204	12 [c]	23452.204	–25	23447.856	–8	23447.945	–3
12	23452.204	7 [c]	23452.204	–30	23447.488	–5	23447.586	5
13	23452.204	16 [c]	23452.204	–20	23447.098	–9	23447.215	15
14	23452.147	–16 [c]	23452.204	4	23446.701	–5	23446.808	5
15	23452.147	25 [c]	23452.147	–13 [c]	23446.281	–9	23446.396	5
16	23452.062	–5 [c]	23452.147	42 [c]	23445.855	–4	23445.969	4
17	23452.062	66 [c]	23452.062	27 [c]	23445.409	–2	23445.528	6
18					23444.939	–10	23445.080	15
19	23451.832	23 [c]	23451.832	–18 [c]	23444.470	–3	23444.605	12
20	23451.731	38 [c]	23451.731	–4 [c]	23443.978	–3	23444.115	8
21	23451.585	23 [c]	23451.585	–20 [c]	23443.470	–2	23443.603	–1
22	23451.450	36 [c]	23451.450	–9 [c]	23442.948	–2	23443.109	22 [c]
23	23451.260	7	23451.305	6 [c]	23442.408	–4	23442.588	33 [c]
24	23451.057	–19 [c]	23451.150	26 [c]	23441.858	–1	23442.006	–2
25	23450.888	5	23450.938	5	23441.293	2	23441.462	16 [c]
26	23450.673	–2	23450.736	8	23440.709	1	23440.871	2
27	23450.466	13	23450.514	6	23440.113	4	23440.277	0
28	23450.225	10	23450.276	4	23439.498	2	23439.673	2
29	23449.963	2	23450.023	1	23438.876	9	23439.054	5
30	23449.694	1	23449.763	7	23438.228	6	23438.406	–5
31	23449.415	6	23449.484	8	23437.578	14	23437.756	–3
32	23449.117	7	23449.184	5	23436.898	9	23437.086	–6
33	23448.797	0	23448.875	7	23436.215	15 [c]	23436.403	–7
34	23448.472	4	23448.551	7	23435.510	15	23435.712	–1
35	23448.114	–9	23448.212	9	23434.798	22 [c]	23435.003	1
36	23447.765	2	23447.856	9	23434.062	21 [c]	23434.271	–4
37	23447.385	–3	23447.488	13	23433.312	21 [c]	23433.537	5
38	23447.001	3	23447.098	8	23432.551	24 [c]	23432.779	3
39	23446.594	0	23446.701	11				
40	23446.170	–3	23446.281	8	23430.951	–1	23431.218	1
41	23445.738	1	23445.855	12	23430.142	1	23430.412	–4
42	23445.290	3	23445.409	13	23429.318	2	23429.597	–2
43	23444.820	–1	23444.939	3	23428.475	0	23428.772	3
44	23444.339	–1	23444.470	10	23427.621	1	23427.916	–6
45	23443.849	5	23443.978	9	23426.749	0	23427.059	–1
46	23443.334	1	23443.470	7	23425.867	4	23426.182	–2
47	23442.809	3	23442.948	6	23424.965	2	23425.285	–8
48	23442.266	1	23442.408	1	23424.050	4	23424.385	–2
49	23441.712	4	23441.858	3	23423.108	–8	23423.466	–1
50	23441.132	–4	23441.293	3	23422.159	–10	23422.521	–9
51	23440.553	4	23440.709	0	23421.206	–3	23421.581	2
52	23439.941	–6	23440.113	0	23420.227	–6	23420.599	–15 [c]
53	23439.327	–3	23439.498	–5	23419.240	–2	23419.629	–5
54	23438.687	–10	23438.876	–1	23418.235	–1	23418.639	0
55	23438.038	–12	23438.228	–8	23417.222	8	23417.617	–12
56	23437.385	–2	23437.578	–3	23416.187	9	23416.593	–10
57	23436.708	–1	23436.898	–12	23415.142	15 [c]	23415.552	–11
58	23436.020	3	23436.215	–9	23414.059	–2	23414.500	–9
59	23435.312	3	23435.510	–14	23412.979	–1	23413.433	–7
60	23434.589	3	23434.798	–11	23411.883	–1	23412.348	–7
61	23433.851	4	23434.062	–17 [c]	23410.782	9	23411.249	–7

Table A2. (*continued*).

	(0, 0) *R*				(0, 0) *P*			
J"	79Br	*o–c* [b]	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
62			23433.312	–21 [c]	23409.649	2	23410.132	–10
63	23432.335	9	23432.551	23 [c]	23408.516	10	23409.007	6
64					23407.351	1	23407.866	–4
65	23430.749	5	23431.007	–2	23406.170	–9	23406.709	–3
66	23429.934	3	23430.201	–3	23404.981	–13	23405.536	–2
67	23429.102	0	23429.388	4	23403.796	3	23404.350	0
68	23428.259	1	23428.545	–4	23402.569	–8	23403.154	6
69	23427.401	0	23427.701	1	23401.342	–5	23401.944	14
70	23426.523	–4	23426.835	0	23400.098	–3		
71	23425.639	1	23425.962	5	23398.846	6	23399.465	14
72	23424.735	0	23425.058	–4	23397.580	15	23398.200	10
73	23423.818	2	23424.153	0	23396.290	15 [c]	23396.932	18 [c]
74			23423.224	–6	23394.968	–2	23395.621	–2
75			23422.291	0	23393.649	–1	23394.324	7
76	23420.963	–6	23421.338	0	23392.313	–3	23393.000	3
77	23419.987	–4	23420.367	–3	23390.965	–1	23391.665	3
78	23419.000	3	23419.385	–2	23389.602	0	23390.315	3
79	23417.990	1	23418.390	1	23388.236	13	23388.956	9
80	23416.972	7	23417.378	2	23386.831	3	23387.559	–8
81	23415.939	13	23416.350	1	23385.427	8	23386.178	4
82	23414.874	2	23415.309	3	23383.992	–4		
83			23414.254	5	23382.556	–1	23383.344	1
84	23412.719	–2	23413.178	1	23381.113	9	23381.900	–5
85	23411.613	–9	23412.094	3	23379.638	2	23380.451	–2
86	23410.510	0	23410.988	–2	23378.164	11	23378.985	–1
87	23409.380	–1	23409.876	3	23376.658	2	23377.502	–2
88	23408.236	–2	23408.747	4	23375.135	–8	23376.003	–6
89	23407.077	–3	23407.597	0	23373.616	0	23374.496	–1
90	23405.905	–2	23406.443	6	23372.076	1	23372.980	8
91	23404.720	1	23405.268	7	23370.508	–10		
92	23403.511	–6	23404.056	–16 [c]	23368.936	–11	23369.884	6
93	23402.315	16 [c]	23402.848	–19 [c]	23367.373	12	23368.310	0
94	23401.070	3	23401.641	–7	23365.762	2	23366.732	6
95	23399.830	10	23400.412	–3	23364.151	5	23365.140	12
96	23398.545	–12	23399.154	–12	23362.514	–2	23363.507	–8
97	23397.291	11	23397.890	–13	23360.867	–4	23361.885	–3
98	23395.978	–11	23396.624	–1			23360.249	2
99	23394.677	–5	23395.329	–3	23357.536	–2	23358.590	–1
100	23393.362	1	23394.030	5	23355.838	–11	23356.919	–2
101	23392.033	8	23392.715	11	23354.144	–3	23355.241	5
102	23390.688	14	23391.375	8	23352.435	6	23353.546	9
103	23389.315	7	23390.039	23 [c]	23350.695	–2	23351.821	–2
104	23387.948	20 [c]	23388.637	–14	23348.969	18 [c]	23350.095	0
105	23386.563	30 [c]	23387.271	1	23347.192	4	23348.357	4
106	23385.159	37 [c]			23345.419	6	23346.594	–2
107	23383.686	–12			23343.620	–2	23344.822	–3
108	23382.252	–7	23383.028	–14	23341.817	–1	23343.047	8
109	23380.803	–2	23381.614	10	23340.004	6	23341.239	0
110	23379.341	5	23380.159	8	23338.171	7	23339.438	13
111	23377.843	–10	23378.687	4	23336.317	1	23337.617	20 [c]
112	23376.358	3	23377.188	–14	23334.453	1	23335.757	4
113	23374.849	8	23375.707	2	23332.575	0	23333.900	4
114	23373.312	–1	23374.180	–14	23330.687	3		
115							23330.140	2
116					23326.870	14	23328.216	–22 [c]
117	23368.631	–12			23324.911	–10	23326.316	–8
118	23367.051	–6			23322.966	–6	23324.396	1
119	23365.466	10	23366.423	2	23321.007	0	23322.444	–9
120			23364.818	–5	23319.030	1	23320.496	0
121			23363.205	–6			23318.522	–2
122	23360.540	–26 [c]	23361.576	–9				
123	23358.880	–28 [c]						

Table A2. (*continued*).

	(0, 0) *R*				(0, 0) *P*			
J"	79Br	*o–c* [b]	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
124	23357.206	–28 [c]	23358.278	–10				
125	23355.528	–18 [c]	23356.632	15				
126	23353.837	–6						
127	23352.131	5	23353.226	–9				
128	23350.393	–1						
129	23348.652	5	23349.792	–3				
130	23346.902	15 [c]	23348.058	5				

	(0, 1) *R*				(0, 1) *P*			
J"	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
0			23139.971	0				
1								
2								
3					23137.388	10	23139.141	–1
4					23137.149	17 [c]		
5	23138.964	22 [c]	23140.710	21 [c]	23136.890	18 [c]		
6	23139.065	20 [c]	23140.805	14 [c]				
7	23139.141	8	23140.906	29 [c]	23136.301	–9	23138.085	–1
8	23139.219	12 [c]	23140.985	35 [c]	23135.992	–16 [c]	23137.798	12
9			23140.985	–23 [c]	23135.688	–2		
10	23139.336	26 [c]	23141.081	28 [c]			23137.149	4
11	23139.336	–5 [c]	23141.081	–2 [c]	23134.995	–19 [c]	23136.795	–8
12	23139.336	–21 [c]	23141.081	–18 [c]	23134.668	15 [c]		
13	23139.336	–23 [c]	23141.081	–20 [c]	23134.270	–9	23136.084	7
14	23139.336	–11 [c]	23141.081	–7 [c]			23135.688	–4
15	23139.336	16 [c]	23141.081	19 [c]	23133.480	–8	23135.290	–4
16			23140.985	–36 [c]	23133.079	8	23134.880	–1
17	23139.219	–5 [c]	23140.985	19 [c]	23132.617	–23 [c]	23134.453	–1
18	23139.141	–13	23140.906	9 [c]			23134.004	–9
19	23139.065	–5 [c]	23140.805	–9 [c]	23131.732	–2		
20	23138.964	–8 [c]	23140.710	–7 [c]			23133.079	–10
21	23138.856	–4	23140.606	0	23130.762	–9		
22	23138.719	–14	23140.475	–5	23130.265	–3	23132.101	–7
23	23138.583	–8	23140.332	–8	23129.747	–4	23131.585	–12
24	23138.441	5			23129.237	17 [c]	23131.060	–11
25	23138.263	–3	23140.019	2	23128.670	–4		
26	23138.085	3	23139.835	0	23128.111	–3		
27	23137.871	–12	23139.656	17 [c]	23127.544	4	23129.391	–18 [c]
28	23137.679	8	23139.429	1	23126.965	13		
29	23137.446	3	23139.219	15 [c]	23126.352	3	23128.220	–10
30	23137.214	12	23138.964	0			23127.608	–12
31	23136.953	7	23138.719	8	23125.103	2		
32	23136.678	1	23138.441	–3	23124.461	5	23126.352	–5
33	23136.395	3			23123.801	5	23125.710	7
34	23136.084	–10	23137.871	5	23123.137	16 [c]	23125.041	4
35	23135.790	9	23137.551	–6	23122.441	7	23124.354	–2
36	23135.464	10	23137.214	–19 [c]	23121.721	–11	23123.661	0
37	23135.113	1	23136.890	–5	23121.012	–3	23122.954	2
38	23134.756	0	23136.534	–9	23120.286	1	23122.228	–1
39	23134.387	0	23136.178	1	23119.530	–9	23121.497	5
40	23134.004	2	23135.790	–6	23118.782	2	23120.725	–16 [c]
41			23135.405	3	23118.010	3	23119.976	0
42			23134.995	1	23117.215	–4	23119.197	1
43	23132.750	–14	23134.574	3	23116.424	6	23118.402	–1
44	23132.324	1	23134.123	–10	23115.597	–5	23117.598	3
45	23131.875	7	23133.689	6	23114.763	–9	23116.770	–4
46	23131.396	–1	23133.208	–9	23113.936	8	23115.934	–5
47	23130.913	–1	23132.750	12	23113.069	0	23115.088	–1
48	23130.419	5	23132.236	–9	23112.198	2	23114.206	–20 [c]
49	23129.895	–7	23131.732	–6	23111.317	7	23113.346	–2
50	23129.391	15 [c]	23131.228	12	23110.400	–9	23112.460	3

Table A2. (*continued*).

	(0, 1) *R*				(0, 1) *P*			
J"	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
51	23128.834	0	23130.689	8	23109.501	7	23111.568	17 [c]
52	23128.278	–1	23130.127	–4	23108.569	4	23110.628	–5
53	23127.716	6	23129.565	–2	23107.622	0	23109.702	3
54	23127.145	19 [c]	23128.989	–1	23106.661	–3	23108.761	9
55	23126.533	4	23128.399	1	23105.683	–10	23107.791	1
56			23127.794	3	23104.716	9	23106.815	0
57	23125.283	–6			23103.706	–1	23105.825	0
58	23124.649	0	23126.533	–5	23102.698	4	23104.819	–3
59	23124.001	6	23125.899	9	23101.665	0	23103.808	3
60	23123.323	–2	23125.230	2	23100.656	33 [c]	23102.763	–11
61	23122.641	–1	23124.549	–2	23099.583	15 [c]	23101.726	–2
62	23121.942	–3	23123.861	0	23098.503	5	23100.656	–14
63	23121.236	3			23097.412	–2	23099.583	–14
64	23120.506	–2	23122.441	3	23096.302	–13	23098.503	–7
65	23119.763	–5	23121.721	14 [c]	23095.189	–14	23097.412	2
66	23119.006	–8	23120.948	–12	23094.078	2	23096.302	7
67	23118.247	1	23120.198	–2	23092.942	6	23095.189	22 [c]
68	23117.461	–2			23091.781	–1	23094.030	6
69	23116.665	–2	23118.636	–1	23090.601	–13	23092.881	13
70	23115.868	11	23117.840	5	23089.432	1	23091.705	8
71	23115.032	0	23117.028	9	23088.232	–3	23090.517	4
72	23114.206	13	23116.197	9	23087.024	0	23089.311	–5
73	23113.346	6	23115.346	1	23085.801	1	23088.118	14
74	23112.460	–13	23114.485	–2	23084.565	4	23086.896	17 [c]
75			23113.606	–8	23083.311	1	23085.657	17 [c]
76	23110.700	3	23112.718	–11			23084.400	13
77	23109.792	5	23111.828	0	23080.768	5	23083.131	12
78	23108.865	0	23110.919	5	23079.470	1		
79	23107.932	5	23109.985	–1	23078.164	3	23080.553	8
80	23106.979	4	23109.046	2	23076.831	–7	23079.243	7
81	23106.009	0	23108.086	–3	23075.501	–1	23077.922	8
82			23107.123	3	23074.149	–4	23076.581	2
83	23104.042	6	23106.142	6	23072.789	–1	23075.229	0
84	23103.026	–2	23105.135	–4	23071.412	0	23073.869	3
85	23102.012	5	23104.134	7	23070.018	–3	23072.493	4
86	23101.000	29 [c]	23103.104	1	23068.611	–4	23071.098	–1
87	23099.930	9	23102.069	6	23067.193	–3	23069.693	–1
88	23098.859	1	23101.000	–10	23065.762	–1	23068.267	–9
89	23097.775	–5	23099.930	–14	23064.312	–4	23066.837	–7
90	23096.680	–8	23098.859	–4	23062.847	–9	23065.392	–6
91	23095.571	–11	23097.775	6	23061.381	0	23063.936	–4
92	23094.473	11	23096.680	19 [c]	23059.892	–1	23062.455	–12
93	23093.333	4	23095.571	33 [c]	23058.388	–2	23060.984	3
94	23092.174	–7	23094.417	15	23056.874	–1	23059.468	–12
95	23091.010	–9	23093.263	10	23055.341	–4	23057.970	3
96	23089.848	5	23092.100	10	23053.803	1	23056.431	–8
97	23088.660	6	23090.911	–2	23052.248	3	23054.899	1
98	23087.446	–5	23089.724	2	23050.672	–2	23053.351	8
99	23086.229	–4	23088.516	0	23049.082	–7	23051.779	4
100	23085.005	2	23087.318	20 [c]	23047.499	8	23050.212	18 [c]
101	23083.758	1	23086.068	2	23045.883	4	23048.597	–2
102	23082.509	11	23084.837	18 [c]	23044.256	3	23046.990	1
103	23081.221	–5	23083.576	16 [c]	23042.617	3	23045.367	–1
104	23079.933	–6	23082.292	5	23040.969	8	23043.722	–9
105	23078.634	–4	23081.003	3	23039.303	9	23042.088	6
106	23077.340	16 [c]	23079.702	3	23037.616	3	23040.419	0
107	23075.996	1	23078.389	5	23035.928	8	23038.750	8
108	23074.651	–2	23077.058	2	23034.211	–1	23037.057	4
109	23073.293	–5	23075.710	–4	23032.480	–11	23035.344	–6
110	23071.925	–3	23074.356	–3	23030.749	–6	23033.642	10
111	23070.548	3	23072.984	–5			23031.907	5
112			23071.603	–4			23030.173	15

Table A2. (*continued*).

	(0, 1) *R*				(0, 1) *P*			
J"	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
113	23067.734	–2	23070.198	–12			23028.410	9
114	23066.306	–5	23068.797	–3			23026.643	13
115	23064.862	–10	23067.370	–6				
116	23063.424	4	23065.929	–10				
117	23061.950	–3	23064.478	–10				
118	23060.469	–5	23063.016	–7				
119	23058.984	3	23061.551	6				
120			23060.055	1				
121	23055.963	11	23058.543	–6				
122	23054.431	14	23057.040	9				
123	23052.864	–6	23055.496	–3				
124	23051.300	–7	23053.958	5				
125			23052.390	–4				
126			23050.831	10				
127	23046.551	12	23049.233	–2				
128	23044.919	–4	23047.615	–20 [c]				
129	23043.311	18 [c]	23046.021	–1				
130	23041.644	–5	23044.402	6				
131	23039.982	–10	23042.738	–18 [c]				
132	23038.330	9	23041.103	1				
133	23036.633	–4						
134	23034.944	5	23037.760	5				
135	23033.227	0	23036.054	–8				
136			23034.359	4				
137			23032.638	3				

	(0, 2) *R*				(0, 2) *P*			
J"	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
0								
1								
2			22830.986	3			22830.060	8
3			22831.138	9			22829.825	–1
4	22827.864	39 [c]	22831.267	5			22829.588	1
5							22829.341	6
6	22828.051	–3 [c]			22825.627	19 [c]		
7							22828.775	–15 [c]
8	22828.191	–38 [c]			22825.039	9	22828.511	14
9			22831.752	25 [c]	22824.734	13	22828.191	0
10			22831.752	–29 [c]	22824.408	9	22827.864	–8
11	22828.408	17 [c]	22831.843	23 [c]	22824.069	6	22827.548	7
12	22828.408	–10 [c]	22831.843	–4 [c]	22823.719	4	22827.203	8
13	22828.408	–23 [c]	22831.843	–17 [c]	22823.359	8	22826.826	–10 [c]
14	22828.408	–24 [c]	22831.843	–17 [c]	22822.998	22 [c]		
15	22828.408	–10 [c]	22831.843	–4 [c]	22822.598	12		
16	22828.408	16 [c]	22831.843	23 [c]	22822.195	12	22825.677	–4
17	22828.408	56 [c]	22831.752	–29 [c]	22821.780	12	22825.265	–4
18			22831.752	24 [c]	22821.355	17 [c]	22824.852	9
19	22828.191	–41 [c]			22820.920	25 [c]	22824.408	3
20	22828.191	40 [c]			22820.442	3 [c]	22823.973	20 [c]
21	22828.051	–7 [c]			22819.974	5 [c]	22823.489	0
22					22819.500	14	22822.998	–13 [c]
23	22827.864	34 [c]	22831.267	4	22819.004	14	22822.519	0
24	22827.709	13	22831.138	8	22818.490	10 [c]	22822.022	8
25	22827.548	–1	22830.986	2	22817.970	13 [c]	22821.502	5
26					22817.429	8 [c]	22820.976	10
27	22827.203	–11			22816.896	25 [c]	22820.442	20 [c]
28	22827.034	8					22819.894	29 [c]
29	22826.826	0			22815.752	21 [c]	22819.287	–6 [c]
30			22830.060	6	22815.183	42 [c]	22818.721	11
31			22829.825	–4	22814.569	32 [c]	22818.120	7
32			22829.588	–2			22817.516	14

Table A2. (*continued*).

	(0, 2) *R*				(0, 2) *P*			
J"	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
33			22829.341	3	22813.329	38 [c]	22816.896	17 [c]
34	22825.627	8 [c]			22812.697	49 [c]	22816.275	33 [c]
35			22828.775	–18 [c]			22815.621	29 [c]
36	22825.039	–4	22828.511	10			22814.964	35 [c]
37	22824.734	–1	22828.191	–5	22810.689	51 [c]	22814.260	8 [c]
38	22824.408	–5	22827.864	–13	22809.948	7 [c]	22813.586	22 [c]
39	22824.069	–9	22827.548	2	22809.273	42 [c]		
40	22823.719	–11	22827.203	3	22808.478	–30 [c]	22812.134	–11 [c]
41	22823.359	–9	22826.826	–16 [c]				
42	22822.998	5 [c]					22810.689	15 [c]
43	22822.598	–7					22809.948	30 [c]
44	22822.195	–8	22825.677	–11	22805.481	–2	22809.165	15 [c]
45	22821.780	–8	22825.265	–12			22808.393	24 [c]
46	22821.355	–4 [c]	22824.852	0			22807.600	27 [c]
47	22820.920	2 [c]	22824.408	–6	22803.064	–10		
48	22820.442	–21 [c]	22823.973	9 [c]	22802.270	25 [c]	22805.970	26 [c]
49	22819.974	–20 [c]	22823.489	–11			22805.126	16 [c]
50	22819.500	–12	22822.998	–24 [c]	22800.540	–6	22804.269	6 [c]
51	22819.004	–13	22822.519	–13				
52	22818.490	–19 [c]	22822.022	–6			22802.563	34 [c]
53	22817.970	–17 [c]	22821.502	–9	22797.903	5	22801.638	–4
54	22817.429	–23 [c]	22820.976	–5	22796.993	3	22800.740	–3
55	22816.896	–7 [c]	22820.442	4 [c]	22796.060	–7		
56	22816.367	26 [c]	22819.894	12 [c]	22795.135	3	22798.892	–13
57	22815.752	–14 [c]	22819.287	–25 [c]	22794.163	–21 [c]	22797.977	12
58	22815.183	5 [c]	22818.721	–8			22796.993	–21 [c]
59	22814.569	–6 [c]	22818.120	–13	22792.244	–3	22796.060	12
60			22817.516	–8	22791.265	5	22795.072	1
61	22813.329	–4 [c]	22816.896	–6 [c]	22790.254	–4	22794.091	12
62	22812.697	6 [c]	22816.275	8 [c]	22789.236	–7	22793.066	–9
63			22815.621	3 [c]	22788.211	–4	22792.049	–9
64			22814.964	8 [c]	22787.169	–6	22791.026	–2
65	22810.689	3 [c]	22814.260	–21 [c]	22786.132	11		
66	22809.948	–44 [c]	22813.586	–8 [c]			22788.932	3
67	22809.273	–10 [c]			22783.983	9	22787.864	5
68	22808.576	13	22812.134	–45 [c]	22782.889	8	22786.766	–11
69					22781.782	8	22785.679	–3
70			22810.689	–22 [c]	22780.648	–7		
71			22809.948	–9 [c]	22779.508	–15 [c]		
72	22805.532	–14	22809.165	–25 [c]	22778.380	3	22782.324	6
73			22808.393	–19 [c]	22777.216	–2	22781.160	–11
74			22807.600	–18 [c]	22776.063	17 [c]	22780.009	–2
75					22774.902	40 [c]		
76	22802.338	21 [c]	22805.970	–23 [c]	22773.673	9	22777.655	3
77			22805.126	–36 [c]	22772.447	–5		
78	22800.632	9	22804.269	–48 [c]	22771.231	3	22775.259	18 [c]
79					22769.961	–30 [c]		
80	22798.892	14	22802.563	–25 [c]	22768.728	–13	22772.769	–10
81	22797.977	–8					22771.545	16 [c]
82	22797.091	12			22766.227	25 [c]	22770.254	–11
83	22796.146	–14	22799.893	–3	22764.914	1	22768.941	–49 [c]
84	22795.227	0					22767.678	–23 [c]
85	22794.253	–29 [c]			22762.292	–4	22766.400	1
86	22793.325	1	22797.091	3				
87	22792.343	–9	22796.146	20 [c]	22759.622	–4	22763.784	27 [c]
88	22791.380	12	22795.135	–16 [c]	22758.284	11	22762.415	–2
89	22790.369	0	22794.163	1	22756.926	20 [c]		
90	22789.356	–2	22793.199	38 [c]	22755.522	–4		
91	22788.329	–5	22792.129	–19 [c]	22754.115	–19 [c]	22758.284	–34 [c]
92	22787.292	–5	22791.122	2	22752.702	–25 [c]	22756.926	–1
93	22786.232	–15 [c]	22790.073	–8			22755.522	0
94	22785.193	9					22754.115	9

Table A2. (*continued*).

	(0, 2) *R*				(0, 2) *P*			
J"	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
95			22787.959	–4	22748.437	3	22752.675	–1
96	22783.038	19 [c]	22786.884	1			22751.253	19 [c]
97	22781.914	–2	22785.786	–6				
98	22780.805	4	22784.692	4			22748.297	–14
99	22779.699	27 [c]	22783.549	–22 [c]				
100	22778.541	10	22782.448	7			22745.340	4
101	22777.386	9	22781.282	–16 [c]			22743.829	–1
102	22776.178	–31 [c]	22780.132	–10				
103	22775.044	15 [c]	22778.980	6			22740.762	–19 [c]
104	22773.803	–33 [c]	22777.820	29 [c]			22739.253	16 [c]
105			22776.612	15				
106			22775.370	–20 [c]			22736.121	11
107	22770.154	–24 [c]						
108	22768.941	8	22772.936	–1				
109	22767.678	3	22771.679	–12			22731.330	3
110	22766.400	–4	22770.431	–3				
111			22769.150	–12				
112	22763.784	–39 [c]						
113	22762.517	3	22766.575	–7				
114								
115			22763.961	11				
116			22762.612	–4				
117	22757.162	15 [c]	22761.284	17 [c]				
118	22755.759	–14						
119	22754.371	–15 [c]	22758.535	1				
120	22752.983	–3	22757.162	13				
121	22751.570	–5	22755.759	8				
122								
123	22748.720	9						

	(0, 3) *R*				(0, 3) *P*			
J"	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
0								
1			22523.354	–17 [c]			22522.805	–8
2			22523.517	–15 [c]				
3			22523.675	–6			22522.358	–20 [c]
4	22518.725	12	22523.801	–16 [c]			22522.121	–21 [c]
5			22523.930	–12	22516.806	37 [c]	22521.900	6
6			22524.046	–7			22521.625	–9
7			22524.137	–15 [c]	22516.238	8	22521.355	–6
8			22524.235	–5	22515.947	6	22521.078	3
9					22515.681	40 [c]	22520.795	18 [c]
10			22524.356	–20 [c]	22515.323	–4 [c]	22520.453	–14 [c]
11			22524.437	12 [c]	22515.017	16 [c]	22520.143	–2
12			22524.502	39 [c]	22514.675	12	22519.835	25 [c]
13			22524.502	14 [c]	22514.342	30 [c]		
14			22524.502	2 [c]				
15			22524.502	2 [c]			22518.725	–6
16			22524.502	15 [c]				
17			22524.437	–26 [c]	22512.784	0 [c]		
18			22524.437	12 [c]	22512.380	10 [c]		
19			22524.356	–20 [c]	22511.971	27 [c]		
20					22511.534	28 [c]		
21			22524.235	–4	22511.093	38 [c]	22516.238	–1
22			22524.137	–15 [c]				
23			22524.046	–7	22510.166	50 [c]	22515.323	14
24			22523.930	–11	22509.638	11 [c]	22514.838	12
25	22518.725	6	22523.801	–16 [c]	22509.158	31 [c]	22514.342	12
26			22523.675	–6				
27			22523.517	–15 [c]	22508.084	–4	22513.314	13
28			22523.354	–17 [c]	22507.581	31 [c]	22512.784	15 [c]
29					22507.022	23 [c]	22512.234	11

Table A2. (*continued*).

	(0, 3) *R*				(0, 3) *P*			
J"	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
30			22523.003	–7	22506.445	9	22511.660	–6 [c]
31			22522.805	–8	22505.886	25 [c]	22511.093	–4 [c]
32					22505.295	22 [c]	22510.529	15 [c]
33			22522.358	–21 [c]			22509.915	–5
34			22522.121	–22 [c]			22509.307	–6 [c]
35	22516.806	25 [c]	22521.900	6	22503.454	20 [c]	22508.677	–17 [c]
36			22521.625	–10	22502.792	–5	22508.084	21 [c]
37	22516.238	–6	22521.355	–7			22507.484	65 [c]
38	22515.947	–9	22521.078	1			22506.767	4 [c]
39	22515.681	25 [c]	22520.795	16 [c]	22500.797	–12	22506.115	20 [c]
40	22515.323	–21 [c]	22520.453	–16 [c]	22500.117	–5	22505.432	18 [c]
41	22515.017	–2 [c]	22520.143	–5	22499.404	–18 [c]	22504.743	22 [c]
42	22514.675	–7	22519.835	22 [c]			22504.026	10 [c]
43	22514.342	11 [c]			22497.978	–7	22503.330	31 [c]
44					22497.249	0	22502.586	17 [c]
45			22518.725	–10	22496.509	10	22501.871	44 [c]
46					22495.746	8	22501.098	25 [c]
47	22512.784	–24 [c]			22494.998	35 [c]	22500.330	24 [c]
48	22512.380	–15 [c]			22494.192	15	22499.551	23 [c]
49	22511.971	0 [c]			22493.375	–3	22498.743	6
50	22511.534	1 [c]			22492.571	4	22497.978	44 [c]
51	22511.093	9 [c]	22516.238	–9			22497.176	57 [c]
52					22490.942	34 [c]	22496.289	–2
53	22510.166	19 [c]	22515.323	4	22490.035	–25 [c]	22495.434	–17 [c]
54	22509.638	–23 [c]	22514.838	1	22489.200	0	22494.604	6
55	22509.158	–4 [c]	22514.342	0	22488.374	47 [c]	22493.751	17 [c]
56	22508.677	27 [c]			22487.475	34 [c]		
57			22513.314	–1	22486.534	–9	22492.000	31 [c]
58	22507.581	–9	22512.784	0 [c]	22485.623	–12	22491.055	–13
59			22512.234	–6			22490.155	0
60	22506.502	23 [c]	22511.660	–24 [c]	22483.762	–16 [c]	22489.200	–31 [c]
61	22505.949	43 [c]	22511.093	–23 [c]	22482.873	41 [c]	22488.286	–6
62			22510.529	–6 [c]	22481.861	–11	22487.353	9
63	22504.743	22 [c]	22509.959	17 [c]	22480.912	11	22486.422	40 [c]
64	22504.107	–4	22509.307	–29 [c]	22479.908	–10	22485.408	1
65			22508.677	–41 [c]	22478.911	–11	22484.430	8
66			22508.084	–5 [c]	22477.893	–21 [c]	22483.437	13
67	22502.195	–9	22507.484	37 [c]	22476.941	47 [c]	22482.426	13
68	22501.542	–2	22506.767	–25 [c]	22475.868	6	22481.390	–2
69	22500.891	19 [c]	22506.115	–11 [c]	22474.818	1	22480.347	–10
70	22500.176	–10	22505.432	–16 [c]			22479.297	–13
71			22504.743	–13 [c]	22472.663	–28 [c]	22478.250	–2
72	22498.802	23 [c]	22504.026	–27 [c]	22471.602	–9		
73			22503.330	–8 [c]	22470.524	7	22476.111	13
74	22497.327	3	22502.586	–25 [c]			22475.042	38 [c]
75	22496.586	9	22501.871	0 [c]	22468.277	–17 [c]	22473.885	–12
76	22495.810	–8	22501.098	–21 [c]	22467.134	–30 [c]	22472.763	–14
77	22495.073	26 [c]	22500.330	–25 [c]			22471.677	30 [c]
78	22494.255	–8	22499.551	–28 [c]			22470.524	20 [c]
79			22498.802	12	22463.695	–6	22469.346	–3
80	22492.706	46 [c]	22497.978	–12	22462.511	–12	22468.172	–10
81	22491.854	14	22497.176	–1	22461.338	6	22467.015	12
82	22491.055	48 [c]	22496.355	3	22460.170	40 [c]	22465.824	12
83	22490.155	–7			22458.911	–4	22464.601	–7
84	22489.305	–1			22457.682	–6	22463.416	23 [c]
85							22462.202	35 [c]
86			22492.947	15 [c]	22455.211	13	22460.937	9
87	22486.702	42 [c]			22453.985	50 [c]		
88	22485.799	44 [c]	22491.137	–11			22458.412	–2
89			22490.252	13			22457.154	15
90			22489.305	–13	22450.096	22 [c]	22455.871	18 [c]
91	22483.002	38 [c]	22488.374	–10			22454.548	–6

Table A2. (*continued*).

	(0, 3) *R*				(0, 3) *P*			
J"	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
92			22487.475	38 [c]	22447.484	44 [c]	22453.255	11
93	22481.093	50 [c]						
94	22480.113	50 [c]	22485.491	–19 [c]	22444.794	36 [c]	22450.604	17 [c]
95	22479.096	24 [c]			22443.408	10	22449.233	–8
96	22478.109	40 [c]	22483.491	–43 [c]	22442.030	3	22447.895	12
97			22482.514	–14	22440.672	28 [c]	22446.503	–10
98	22476.019	–6	22481.534	25 [c]	22439.296	47 [c]	22445.130	–1
99			22480.485	5	22437.872	30 [c]		
100	22473.963	29 [c]	22479.445	8	22436.410	–12	22442.326	–7
101			22478.352	–32 [c]				
102	22471.798	4	22477.314	–4				
103	22470.716	10						
104			22475.173	23 [c]				
105	22468.538	45 [c]	22474.020	–28 [c]				
106	22467.447	77 [c]	22472.963	29 [c]				
107	22466.278	45 [c]	22471.798	–10				
108	22465.050	–35 [c]	22470.659	–11				
109	22463.919	–6						
110	22462.768	16 [c]	22468.375	16 [c]				
111	22461.608	40 [c]						
112								
113			22464.816	12				
114			22463.630	35 [c]				
115			22462.377	3				
116			22461.100	–41 [c]				
117			22459.900	4				
118			22458.669	29 [c]				
119			22457.391	19 [c]				

	(1, 0) *R*				(1, 0) *P*			
J"	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
0			23742.237	–14 [c]				
1							23741.839	–25 [c]
2							23741.626	–21 [c]
3					23742.961	4	23741.402	–12
4	23744.392	2						
5	23744.517	20 [c]			23742.455	18 [c]		
6	23744.605	17 [c]	23743.027	0 [c]	23742.127	–26 [c]	23740.591	–29 [c]
7	23744.672	9 [c]	23743.133	31 [c]	23741.839	–14	23740.341	18 [c]
8			23743.133	–27 [c]			23740.011	0
9	23744.741	–23 [c]	23743.229	27 [c]			23739.689	7
10	23744.787	–3 [c]	23743.229	1 [c]	23740.856	–1		
11	23744.787	–13 [c]	23743.229	–9 [c]	23740.504	11	23738.993	15 [c]
12	23744.787	–7 [c]	23743.229	–3 [c]	23740.100	–13		
13	23744.787	15 [c]	23743.229	18 [c]			23738.205	–4
14	23744.741	6 [c]	23743.133	–40 [c]	23739.288	–16 [c]	23737.816	14
15	23744.672	–8 [c]	23743.133	13 [c]	23738.886	11	23737.383	5
16	23744.605	–5 [c]	23743.027	–23 [c]	23738.419	–12	23736.932	–7
17	23744.517	–7 [c]	23742.961	–4	23737.975	5	23736.490	8
18	23744.426	4	23742.863	–1	23737.491	–3	23735.996	–15 [c]
19	23744.298	–6	23742.759	12			23735.536	12
20	23744.168	–1	23742.609	–5	23736.490	–2	23735.020	–1
21	23744.017	–2	23742.455	–10			23734.468	–33 [c]
22	23743.837	–14	23742.306	6	23735.421	–5	23733.964	–3
23	23743.641	–27 [c]	23742.127	7	23734.862	–8	23733.420	4
24	23743.468	–2	23741.935	12	23734.298	2	23732.836	–14
25	23743.229	–26 [c]	23741.712	1	23733.708	1	23732.265	–3
26	23743.027	4	23741.486	3	23733.103	1	23731.667	–1
27	23742.759	–18 [c]	23741.232	–6			23731.029	–26 [c]
28	23742.509	–4	23740.965	–13	23731.836	–8	23730.412	–12
29	23742.237	3	23740.709	8	23731.211	20 [c]	23729.788	10
30	23741.935	–3	23740.401	–9	23730.527	5	23729.129	12

Table A2. (*continued*).

	(1, 0) *R*				(1, 0) *P*			
J"	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
31	23741.626	–1	23740.100	–2	23729.841	5	23728.431	–8
32	23741.299	–1	23739.769	–9	23729.129	–6	23727.738	–8
33	23740.965	9	23739.429	–9	23728.431	13	23727.046	9
34	23740.591	–6	23739.078	–4	23727.691	6	23726.309	–3
35	23740.221	0	23738.708	–3	23726.943	7	23725.584	13
36	23739.820	–9	23738.331	7	23726.172	2	23724.824	10
37	23739.429	8	23737.922	1	23725.389	0	23724.025	–17 [c]
38	23738.993	–4	23737.491	–11	23724.591	–1	23723.258	4
39	23738.552	–5	23737.047	–19 [c]	23723.780	1	23722.453	4
40	23738.098	–3	23736.628	12	23722.948	–2	23721.640	11
41	23737.633	4	23736.129	–20 [c]	23722.110	5	23720.795	1
42	23737.143	2	23735.659	–8	23721.245	1	23719.940	–2
43	23736.628	–9	23735.161	–7	23720.362	–4	23719.080	5
44	23736.129	12	23734.658	5	23719.464	–9	23718.189	–3
45	23735.585	4	23734.125	1	23718.571	6	23717.296	3
46	23735.020	–8	23733.578	1	23717.639	–1	23716.383	5
47	23734.468	8	23733.014	–2	23716.674	–25 [c]	23715.448	0
48	23733.870	–6	23732.448	10	23715.732	–10	23714.502	0
49	23733.278	2	23731.836	–9	23714.773	3	23713.534	–6
50	23732.662	2			23713.786	5	23712.542	–21 [c]
51	23732.023	–5	23730.606	–4	23712.784	7	23711.569	0
52	23731.388	9	23729.970	1	23711.757	1	23710.558	–2
53	23730.714	–1	23729.327	15 [c]	23710.719	0	23709.528	–7
54	23730.034	0	23728.631	–8	23709.656	–12	23708.494	–1
55	23729.327	–11	23727.954	3	23708.594	–5	23707.439	1
56	23728.631	5	23727.250	3	23707.516	1	23706.372	6
57	23727.902	5	23726.524	–3	23706.418	3	23705.283	4
58	23727.149	–4	23725.791	0	23705.283	–17 [c]	23704.169	–6
59	23726.406	14	23725.045	6	23704.169	1	23703.034	–22 [c]
60			23724.264	–8	23703.034	13	23701.913	–9
61	23724.824	0	23723.485	–3	23701.859	2	23700.766	–5
62	23724.025	8	23722.698	9	23700.681	3	23699.607	2
63	23723.193	1	23721.885	11	23699.486	3	23698.423	0
64	23722.348	–4	23721.044	0	23698.261	–11	23697.226	0
65	23721.496	0	23720.190	–7	23697.048	2	23696.005	–8
66	23720.606	–18 [c]	23719.338	3	23695.794	–8	23694.775	–9
67	23719.743	7	23718.453	–4	23694.553	9	23693.538	–1
68	23718.838	6	23717.559	–4	23693.268	–2	23692.284	5
69	23717.907	–5	23716.674	21 [c]	23691.984	3	23691.004	0
70	23716.986	9	23715.732	4	23690.673	–2	23689.714	2
71	23716.026	0	23714.773	–15 [c]	23689.347	–6	23688.411	6
72	23715.049	–9	23713.786	–45 [c]	23688.011	–5	23687.084	1
73	23714.069	–5	23712.846	–12	23686.665	2	23685.734	–11
74	23713.083	7	23711.860	–10	23685.293	–1	23684.368	–24 [c]
75	23712.061	1	23710.871	4	23683.915	6	23683.023	1
76	23711.026	–3	23709.848	1	23682.505	–4	23681.633	–5
77	23709.977	–6	23708.825	13	23681.091	–2	23680.230	–7
78	23708.924	4	23707.764	3	23679.659	–2	23678.829	8
79	23707.832	–9	23706.702	7	23678.215	1	23677.372	–17 [c]
80	23706.752	5	23705.609	–3	23676.754	3	23675.928	–15
81	23705.667	31 [c]	23704.508	–7			23674.476	–3
82	23704.508	–3	23703.384	–17 [c]	23673.780	2	23673.003	1
83	23703.384	16 [c]	23702.271	0	23672.262	–5	23671.512	4
84	23702.209	–1	23701.128	2	23670.749	8	23670.005	6
85	23701.041	5	23699.967	1	23669.198	–2	23668.476	2
86	23699.845	–2	23698.802	12	23667.645	2	23666.943	8
87	23698.637	–5	23697.594	–3	23666.071	1	23665.376	–3
88	23697.434	13	23696.384	–6	23664.482	1	23663.807	–1
89	23696.181	–3	23695.165	–2	23662.880	2	23662.226	5
90	23694.928	–4	23693.935	7	23661.260	2	23660.611	–8
91	23693.657	–6	23692.667	–6	23659.619	–3	23659.004	1
92	23692.372	–7	23691.396	–8	23657.976	4	23657.374	5

Table A2. (*continued*).

	(1, 0) *R*				(1, 0) *P*			
J"	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
93	23691.080	1	23690.118	0	23656.293	–12	23655.722	1
94	23689.767	4	23688.821	4	23654.618	–5	23654.056	–2
95	23688.411	–21 [c]	23687.497	–3			23652.367	–12
96	23687.084	–1	23686.169	0	23651.218	6	23650.684	0
97	23685.734	12	23684.814	–6	23649.500	17 [c]	23648.973	–1
98	23684.368	24 [c]	23683.453	–4	23647.743	4	23647.243	–7
99	23682.942	–7	23682.065	–13	23645.984	5	23645.504	–4
100	23681.555	16 [c]	23680.681	–3			23643.743	–10
101	23680.124	11	23679.272	–2	23642.414	1	23641.982	0
102	23678.675	3	23677.866	18 [c]	23640.620	13	23640.183	–12
103	23677.218	3	23676.408	1	23638.787	2	23638.390	–3
104	23675.746	4	23674.955	5	23636.943	–5	23636.583	7
105	23674.242	–12	23673.491	12	23635.088	–7	23634.735	–8
106	23672.746	–3	23671.996	5	23633.234	7	23632.896	0
107	23671.231	1	23670.493	5	23631.339	–4	23631.031	–2
108	23669.686	–9	23668.964	–6	23629.440	–4	23629.160	5
109	23668.151	7	23667.440	4	23627.533	3	23627.269	8
110	23666.579	1	23665.890	3	23625.598	–2	23625.347	–5
111	23664.979	–16 [c]	23664.320	–2	23623.652	–2	23623.420	–8
112	23663.398	1	23662.727	–15	23621.707	13	23621.463	–26 [c]
113	23661.807	23 [c]	23661.141	–5	23619.719	1		
114	23660.156	1	23659.550	15 [c]	23617.730	4	23617.564	–1
115	23658.518	7	23657.904	–5	23615.718	–2	23615.575	–5
116	23656.852	1	23656.293	26 [c]	23613.702	4	23613.578	–2
117	23655.174	–1	23654.618	8				
118	23653.488	4	23652.950	13	23609.603	–5	23609.539	4
119	23651.775	–3			23607.521	–19 [c]	23607.521	32 [c]
120	23650.060	5					23605.429	1
121	23648.298	–20 [c]	23647.833	5	23603.352	–6	23603.352	0
122	23646.560	–5	23646.085	–9	23601.257	13	23601.257	–5
123	23644.797	1			23599.115	–1	23599.162	6
124	23643.014	2	23642.566	–15	23596.960	–11	23597.056	22 [c]
125	23641.216	3	23640.804	3	23594.815	4	23594.897	–2
126	23639.386	–11	23639.011	6	23592.624	–13	23592.744	–3
127	23637.569	2	23637.184	–10	23590.426	–21 [c]		
128	23635.731	9	23635.376	7	23588.248	6		
129			23633.530	1	23586.017	–5	23586.207	3
130	23631.980	–3	23631.678	6			23583.995	3
131					23581.524	–12	23581.768	1
132			23627.903	–12				
133	23626.266	4	23626.029	16 [c]	23576.994	5	23577.269	0
134			23624.087	–8	23574.698	5	23574.995	–3
135			23622.152	–11	23572.376	–6		
136					23570.068	12		
137					23567.716	1		
138					23565.375	16 [c]		
139					23562.974	–13		
140					23560.593	–8		
141					23558.207	8		
142					23555.768	–15 [c]		
143					23553.331	–21 [c]		
144					23550.900	–6		
145					23548.455	11		
146					23545.992	23 [c]		

	(1, 2) *R*				(1, 2) *P*			
J"	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
0	23119.910	27 [c]	23121.721	–5 [c]				
1					23119.530	36 [c]		
2	23120.198	–17 [c]	23122.049	–5 [c]	23119.306	28 [c]		
3			23122.228	32 [c]	23119.006	–42 [c]	23120.872	–27 [c]
4	23120.506	17 [c]	23122.294	–31 [c]	23118.782	–22 [c]		

Table A2. (*continued*).

	(1, 2) *R*				(1, 2) *P*			
J"	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
5			23122.441	1 [c]	23118.568	23 [c]		
6	23120.725	18 [c]	23122.557	17 [c]	23118.247	–25 [c]	23120.116	–15 [c]
7			23122.641	15 [c]	23118.010	26 [c]		
8	23120.872	5	23122.732	33 [c]			23119.530	–19 [c]
9	23120.948	23 [c]	23122.732	–25 [c]			23119.197	–39 [c]
10			23122.803	2 [c]	23117.028	–9	23118.946	36 [c]
11	23121.012	12 [c]	23122.803	–27 [c]	23116.665	–27 [c]	23118.568	–2
12	23121.012	–4 [c]	23122.803	–43 [c]	23116.323	–11	23118.247	33 [c]
13	23121.012	–5 [c]	23122.803	–44 [c]	23115.934	–27 [c]	23117.840	–6
14	23121.012	8 [c]	23122.803	–32 [c]	23115.597	23 [c]	23117.461	–1
15			23122.803	–5 [c]				
16	23120.948	12 [c]	23122.732	–35 [c]	23114.763	7	23116.665	11
17	23120.872	–8	23122.732	20 [c]			23116.197	–32 [c]
18			23122.641	–1 [c]	23113.864	–18 [c]		
19	23120.725	–1 [c]	23122.557	–2 [c]			23115.346	10
20			23122.441	–20 [c]	23112.985	34 [c]	23114.850	–18 [c]
21	23120.506	–9 [c]			23112.460	–4	23114.392	6
22			23122.228	4 [c]	23112.002	39 [c]	23113.864	–26 [c]
23			23122.049	–34 [c]			23113.346	–34 [c]
24	23120.116	26 [c]	23121.942	12 [c]	23110.919	2	23112.842	–14
25	23119.910	–10 [c]	23121.721	–41 [c]	23110.400	27 [c]	23112.292	–26 [c]
26	23119.724	–13			23109.792	–22 [c]	23111.768	3
27	23119.530	–8 [c]			23109.246	4		
28	23119.306	–19 [c]					23110.628	9
29	23119.082	–16 [c]	23120.948	1	23108.086	31 [c]		
30			23120.725	17 [c]	23107.443	3	23109.411	–4
31	23118.636	35 [c]			23106.815	5	23108.761	–32 [c]
32			23120.198	10	23106.142	–25 [c]	23108.156	0
33	23118.010	–37 [c]	23119.910	4	23105.480	–29 [c]		
34					23104.819	–18 [c]	23106.815	–26 [c]
35	23117.461	26 [c]	23119.306	4	23104.134	–17 [c]	23106.142	–20 [c]
36	23117.125	16 [c]	23119.006	27 [c]	23103.459	8	23105.480	11
37	23116.770	2	23118.636	–5	23102.763	27 [c]		
38	23116.424	12	23118.247	–42 [c]	23102.012	5	23104.042	2
39	23116.034	–8	23117.904	–19 [c]				
40	23115.652	–6			23100.498	–9		
41	23115.273	13	23117.125	–24 [c]	23099.741	5		
42	23114.850	2			23098.980	30 [c]	23101.000	–16 [c]
43	23114.392	–29 [c]	23116.323	5	23098.131	–20 [c]	23100.221	–4
44			23115.868	–14	23097.340	3		
45	23113.506	–19 [c]	23115.433	1	23096.521	13	23098.594	–7
46	23113.069	13	23114.968	1	23095.659	–8	23097.775	7
47	23112.564	–8	23114.485	–4			23096.923	2
48	23112.054	–20 [c]					23096.051	–9
49	23111.568	6	23113.506	17 [c]	23093.057	1	23095.189	4
50	23111.051	15 [c]	23112.955	–13	23092.174	17 [c]	23094.291	–4
51			23112.460	27 [c]	23091.238	–6		
52					23090.319	1		
53	23109.411	40 [c]	23111.317	–4	23089.382	5	23091.542	–2
54					23088.423	1	23090.601	2
55			23110.184	31 [c]	23087.446	–6	23089.626	–14
56	23107.622	42 [c]			23086.462	–7	23088.660	–7
57	23106.979	26 [c]	23108.946	17 [c]	23085.462	–10	23087.685	5
58	23106.309	–5	23108.279	–16 [c]	23084.450	–10	23086.690	10
59	23105.683	23 [c]	23107.622	–27 [c]	23083.425	–10	23085.657	–9
60	23105.010	19 [c]	23106.979	–8	23082.388	–8	23084.636	–1
61	23104.288	–22 [c]	23106.309	–3	23081.343	1	23083.576	–18 [c]
62	23103.620	7	23105.628	6	23080.282	7	23082.509	–29 [c]
63	23102.917	15 [c]	23104.920	1				
64	23102.185	8	23104.211	10	23078.103	6	23080.382	–1
65	23101.432	–6	23103.459	–12	23077.012	24 [c]	23079.243	–42 [c]
66	23100.656	–29 [c]	23102.698	–27 [c]	23075.881	17 [c]	23078.164	–10

Table A2. (*continued*).

	(1, 2) *R*				(1, 2) *P*			
J"	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
67	23099.930	12	23101.958	–8	23074.736	10	23077.058	11
68	23099.124	–12	23101.187	–5	23073.588	13	23075.881	–28 [c]
69	23098.342	1	23100.400	–5	23072.400	–8	23074.736	–18 [c]
70	23097.526	–5	23099.583	–21 [c]	23071.218	–11	23073.588	0
71	23096.680	–27 [c]			23070.018	–17 [c]	23072.400	–6
72	23095.861	–8			23068.797	–30 [c]	23071.218	7
73			23097.125	9	23067.599	–7	23070.018	16 [c]
74	23094.140	–12			23066.378	8	23068.797	18 [c]
75	23093.263	–8	23095.389	1	23065.115	–5	23067.539	–5
76					23063.878	21 [c]	23066.306	13
77	23091.470	1			23062.565	–14	23065.031	2
78	23090.517	–29 [c]			23061.282	–7	23063.753	2
79	23089.626	16 [c]	23091.781	16 [c]	23060.000	17 [c]	23062.455	–5
80	23088.660	1	23090.820	–4	23058.658	–6	23061.151	–3
81	23087.685	–10	23089.848	–21 [c]	23057.334	3		
82	23086.690	–26 [c]	23088.897	–4	23055.963	–21 [c]	23058.495	–7
83	23085.715	–9	23087.912	–6	23054.633	10	23057.155	–1
84	23084.703	–14	23086.896	–26 [c]	23053.261	12	23055.798	3
85	23083.698	2	23085.930	18 [c]	23051.855	–5	23054.431	10
86							23053.027	–6
87								
88	23080.553	2			23047.615	4	23050.212	–5
89	23079.470	–3			23046.170	4	23048.796	9
90	23078.389	6	23080.652	–1	23044.708	–1		
91			23079.563	3	23043.233	–4	23045.883	–6
92	23076.162	3			23041.740	–12	23044.402	–17 [c]
93	23075.015	–12	23077.340	8			23042.935	0
94	23073.869	–11	23076.209	12	23038.750	10		
95	23072.703	–17 [c]					23039.930	3
96	23071.526	–20 [c]	23073.869	–17 [c]			23038.391	–11
97			23072.703	–7	23034.108	–11	23036.841	–23 [c]
98			23071.526	6	23032.519	–32 [c]	23035.344	31 [c]
99	23067.938	–1					23033.766	19 [c]
100	23066.712	3			23029.383	9	23032.149	–19 [c]
101	23065.474	9						
102	23064.200	–7	23066.644	22 [c]				
103	23062.953	18 [c]	23065.392	28 [c]				
104			23064.083	–9				
105			23062.847	41 [c]				
106	23059.048	11	23061.518	13				
107	23057.705	–4						
108	23056.364	–5	23058.864	0				
109	23055.002	–12	23057.509	–15 [c]				
110	23053.646	1	23056.173	4				
111	23052.248	–15 [c]	23054.827	26 [c]				
112	23050.831	–35 [c]	23053.434	15				
113			23052.012	–11				
114								
115	23046.551	–44 [c]	23049.172	–18 [c]				
116	23045.136	–8						
117	23043.637	–42 [c]						
118			23044.816	–24 [c]				
119								
120			23041.882	10				

	(1, 3) *R*				(1, 3) *P*			
J"	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
0			22814.260	–12				
1	22810.920	–16 [c]						
2			22814.569	–33 [c]	22810.154	–5	22813.658	–18 [c]
3					22809.948	16 [c]	22813.453	1
4			22814.902	21 [c]	22809.696	5	22813.183	–30 [c]

Table A2. (*continued*).

	(1, 3) *R*				(1, 3) *P*			
J"	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
5			22814.964	–36 [c]	22809.434	–3		
6			22815.129	24 [c]	22809.165	–4	22812.697	0
7			22815.183	–15	22808.886	–3	22812.421	2 [c]
8	22811.794	16 [c]	22815.277	1	22808.628	33 [c]	22812.134	6 [c]
9							22811.794	–29 [c]
10			22815.402	7 [c]	22807.969	3		
11			22815.402	–33 [c]	22807.600	–30 [c]		
12	22811.973	8 [c]	22815.456	–5 [c]				
13	22811.973	–5 [c]	22815.456	–18 [c]			22810.454	–19 [c]
14	22811.973	–5 [c]	22815.456	–17 [c]	22806.546	0	22810.096	–5
15	22811.973	9 [c]	22815.456	–4 [c]	22806.155	–4	22809.696	–22 [c]
16			22815.402	–31 [c]	22805.748	–9	22809.273	–47 [c]
17			22815.402	9 [c]	22805.332	–11	22808.886	–24 [c]
18							22808.478	–9
19	22811.794	19 [c]	22815.277	5	22804.464	–9	22808.035	–14
20			22815.183	–10			22807.600	1 [c]
21			22815.129	29 [c]	22803.515	–34 [c]		
22			22814.964	–29 [c]	22803.064	–4	22806.639	–20 [c]
23			22814.902	28 [c]	22802.563	–10	22806.155	–15
24					22802.056	–9	22805.653	–14
25			22814.569	–25 [c]	22801.537	–6	22805.126	–25 [c]
26	22810.920	–10 [c]			22801.006	–2	22804.617	–4 [c]
27			22814.260	–2	22800.453	–7		
28					22799.893	–5	22803.515	–8
29					22799.315	–8	22802.952	–2 [c]
30	22810.154	2	22813.658	–6 [c]	22798.719	–16 [c]	22802.338	–34 [c]
31	22809.948	24 [c]	22813.453	14	22798.125	–9	22801.758	–19 [c]
32	22809.696	13	22813.183	–17 [c]	22797.509	–9	22801.153	–15
33	22809.434	6			22796.890	–1	22800.540	–7 [c]
34	22809.165	5	22812.697	14	22796.249	1	22799.893	–18 [c]
35	22808.886	6	22812.421	17 [c]	22795.593	–1	22799.257	–7
36	22808.628	43 [c]	22812.134	22 [c]	22794.922	–4	22798.597	–6 [c]
37			22811.794	–13 [c]	22794.253	8	22797.903	–25 [c]
38	22807.969	13			22793.568	18 [c]	22797.221	–20 [c]
39	22807.600	–20 [c]			22792.840	–1	22796.526	–14
40					22792.129	8	22795.818	–8
41			22810.454	–1 [c]	22791.380	–6	22795.072	–27 [c]
42	22806.546	10	22810.096	13	22790.638	–1	22794.353	–6
43	22806.155	7	22809.696	–3 [c]	22789.878	1	22793.568	–38 [c]
44	22805.748	2	22809.273	–28 [c]	22789.094	–9	22792.840	1 [c]
45	22805.332	0	22808.886	–5 [c]	22788.329	14	22792.049	–10
46			22808.478	11	22787.508	–6	22791.265	–3
47	22804.464	2	22808.035	6	22786.703	2	22790.446	–16 [c]
48			22807.600	21 [c]	22785.874	1	22789.640	–3
49	22803.515	–24 [c]			22785.044	12	22788.803	–8
50	22803.064	6	22806.639	1 [c]	22784.186	8	22787.959	–7
51	22802.563	1	22806.155	6	22783.320	8	22787.109	2
52	22802.056	2	22805.653	7	22782.448	17 [c]	22786.232	–4
53	22801.537	4	22805.126	–3 [c]	22781.544	6	22785.346	–6
54	22801.006	8	22804.617	17 [c]	22780.648	17 [c]	22784.453	–2
55	22800.453	3			22779.699	–12 [c]	22783.549	5
56	22799.893	5	22803.515	14	22778.799	21 [c]	22782.620	0
57	22799.315	1	22802.952	20 [c]	22777.820	–12 [c]	22781.683	–1
58	22798.719	–7	22802.338	–12 [c]	22776.892	20 [c]	22780.736	1
59	22798.125	0	22801.758	3 [c]	22775.911	11 [c]	22779.765	–7
60	22797.509	–1	22801.153	6	22774.902	–13 [c]	22778.799	3
61	22796.890	7	22800.540	15 [c]	22773.919	4 [c]	22777.820	12
62	22796.249	8	22799.893	3 [c]	22772.936	33 [c]	22776.809	3
63	22795.593	6	22799.257	14	22771.894	16 [c]	22775.788	–3
64	22794.922	2	22798.597	15 [c]	22770.858	19 [c]	22774.771	7
65	22794.253	14	22797.903	–4 [c]	22769.821	33 [c]	22773.723	1
66	22793.568	23 [c]	22797.221	0 [c]	22768.728	5 [c]	22772.674	5
67	22792.840	2	22796.526	6	22767.678	32 [c]	22771.615	13

Table A2. (*continued*).

	(1, 3) *R*				(1, 3) *P*			
J"	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
68	22792.129	12	22795.818	12	22766.575	19 [c]	22770.535	13
69	22791.380	–4	22795.072	–8 [c]	22765.451	0 [c]	22769.442	12
70	22790.638	1	22794.353	12	22764.358	23 [c]	22768.325	1 [c]
71	22789.878	2	22793.568	–20 [c]	22763.231	27 [c]	22767.204	–2 [c]
72	22789.094	–9	22792.840	18 [c]	22762.041	–20 [c]	22766.079	5 [c]
73	22788.329	13	22792.049	6			22764.914	–16 [c]
74	22787.508	–9	22791.265	13			22763.784	12
75	22786.703	–1	22790.446	–1 [c]	22758.579	25 [c]	22762.612	10 [c]
76	22785.874	–4	22789.640	11	22757.380	22 [c]	22761.433	14 [c]
77	22785.044	6	22788.803	6	22756.164	14	22760.232	10 [c]
78	22784.186	0	22787.959	6	22754.939	11	22759.038	25 [c]
79	22783.320	0	22787.109	13	22753.696	3	22757.814	22 [c]
80	22782.448	7 [c]	22786.232	6	22752.445	–1		
81	22781.544	–6	22785.346	3			22755.315	7
82	22780.648	4 [c]	22784.453	6	22749.913	1	22754.036	–11
83	22779.699	–27 [c]	22783.549	12	22748.622	–4	22752.791	17 [c]
84	22778.799	4 [c]	22782.620	6			22751.491	3
85	22777.820	–30 [c]	22781.683	3			22750.172	–17 [c]
86	22776.892	0 [c]	22780.736	4	22744.680	–8	22748.884	8
87	22775.911	–10 [c]	22779.765	–5			22747.558	6
88	22774.902	–36 [c]	22778.799	3	22742.004	6	22746.235	21 [c]
89	22773.919	–22 [c]	22777.820	11	22740.637	3		
90	22772.936	6 [c]	22776.809	1	22739.253	–5	22743.482	–18 [c]
91	22771.894	–13 [c]	22775.788	–7	22737.883	16	22742.117	–7
92	22770.858	–13 [c]	22774.771	1	22736.474	10	22740.762	26 [c]
93	22769.821	–1 [c]	22773.723	–7	22735.053	5	22739.353	19 [c]
94	22768.728	–31 [c]	22772.674	–4	22733.609	–10	22737.883	–37 [c]
95	22767.678	–6 [c]	22771.615	1	22732.158	–20 [c]	22736.474	–18 [c]
96	22766.575	–21 [c]	22770.535	–1	22730.749	25 [c]	22735.053	1
97	22765.451	–43 [c]	22769.442	–3			22733.609	10
98	22764.358	–22 [c]	22768.325	–16 [c]	22727.780	4	22732.158	24 [c]
99	22763.231	–21 [c]	22767.204	–21 [c]	22726.275	–8	22730.655	–1
100			22766.079	–17 [c]	22724.769	–8		
101			22764.914	–40 [c]	22723.251	–7		
102			22763.784	–14				
103			22762.612	–19 [c]				
104			22761.433	–17 [c]				
105			22760.232	–23 [c]				
106			22759.038	–11 [c]				
107			22757.814	–16 [c]				

	(2, 0) *R*				(2, 0) *P*			
J"	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
0			24031.104	8				
1	24034.396	15 [c]	24031.240	–24 [c]	24033.826	4	24030.714	4
2			24031.417	2	24033.601	0	24030.479	–14
3	24034.667	–2	24031.581	32 [c]	24033.367	4	24030.255	–3
4	24034.795	7	24031.665	–1	24033.105	–5	24029.988	–18 [c]
5	24034.895	6	24031.781	14	24032.848	10 [c]	24029.741	3
6	24034.967	–7	24031.867	17 [c]	24032.540	–10	24029.472	19 [c]
7	24035.013	–28 [c]	24031.923	6	24032.247	2	24029.154	2
8	24035.076	–15 [c]	24032.007	39 [c]	24031.923	0	24028.836	3
9	24035.134	8 [c]	24032.007	6 [c]	24031.581	–3	24028.496	–2
10	24035.134	–9 [c]	24032.007	–11 [c]	24031.240	13 [c]	24028.146	1
11	24035.134	–9 [c]	24032.007	–11 [c]	24030.852	–2	24027.771	–6
12	24035.134	8 [c]	24032.007	6 [c]	24030.479	14 [c]	24027.385	–6
13	24035.076	–15 [c]	24032.007	39 [c]	24030.056	–2	24026.992	3
14	24035.013	–27 [c]	24031.923	6	24029.632	–2	24026.592	22 [c]
15	24034.967	–5	24031.867	17 [c]	24029.204	11 [c]	24026.145	11 [c]
16	24034.895	8	24031.781	15	24028.726	–10	24025.640	–42 [c]
17	24034.795	10	24031.665	1	24028.274	12 [c]	24025.214	2

Table A2. (*continued*).

	(2, 0) *R*				(2, 0) *P*			
J"	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
18	24034.667	1	24031.581	34 [c]	24027.771	1	24024.725	–2
19			24031.417	4	24027.260	–1	24024.230	6
20	24034.396	18 [c]	24031.240	–22 [c]	24026.732	–4	24023.700	–5
21			24031.104	10	24026.194	0	24023.157	–11
22	24034.035	14	24030.913	3	24025.640	5 [c]	24022.596	–19 [c]
23	24033.826	9	24030.714	6	24025.059	1	24022.041	–4
24	24033.601	5	24030.479	–11	24024.460	–6	24021.446	–13
25	24033.367	9	24030.255	0	24023.858	3	24020.859	4
26	24033.105	1	24029.988	–16 [c]	24023.227	–1	24020.232	–4
27	24032.848	16 [c]	24029.741	6	24022.596	11 [c]	24019.595	–5
28	24032.540	–4	24029.472	22 [c]	24021.933	9 [c]	24018.946	0
29	24032.247	8	24029.154	5	24021.247	0	24018.275	–1
30	24031.923	7	24028.836	7	24020.545	–7	24017.593	3
31	24031.581	4	24028.496	2	24019.833	–8	24016.889	3
32	24031.240	20 [c]	24028.146	4	24019.116	3 [c]	24016.168	2
33	24030.852	5	24027.771	–2	24018.366	–2	24015.427	–2
34	24030.479	22 [c]	24027.385	–2	24017.593	–13	24014.671	–4
35	24030.056	6	24026.992	7	24016.836	9 [c]	24013.899	–7
36	24029.632	7	24026.592	27 [c]	24016.027	–4	24013.121	2
37	24029.204	20 [c]	24026.145	15 [c]	24015.206	–13	24012.309	–6
38	24028.726	–1	24025.640	–37 [c]	24014.381	–7	24011.487	–9
39	24028.274	21 [c]	24025.214	7	24013.547	5 [c]	24010.649	–9
40	24027.771	11	24024.725	3	24012.670	–9	24009.808	3
41	24027.260	9	24024.230	12	24011.792	–7	24008.935	0
42	24026.732	6	24023.700	1	24010.895	–7	24008.049	1
43	24026.194	10	24023.157	–5	24009.997	8 [c]	24007.139	–5
44	24025.640	16 [c]	24022.596	–14 [c]	24009.041	–17 [c]	24006.186	–38 [c]
45	24025.059	12	24022.041	1	24008.119	8 [c]	24005.272	–15 [c]
46	24024.460	5	24021.446	–7	24007.139	–7	24004.331	–3
47	24023.858	14	24020.859	10	24006.186	21 [c]	24003.354	–10
48	24023.227	10	24020.232	2	24005.144	–24 [c]	24002.370	–7
49	24022.596	22 [c]	24019.595	1	24004.154	1 [c]	24001.372	–2
50	24021.933	20 [c]	24018.946	7	24003.126	4 [c]	24000.341	–13
51	24021.247	12	24018.275	6	24002.063	–11	23999.310	–7
52	24020.545	5	24017.593	10	24001.006	–3	23998.260	–5
53	24019.833	5	24016.889	9	23999.898	–29 [c]	23997.193	–2
54	24019.116	16 [c]	24016.168	9	23998.804	–25 [c]	23996.100	–9
55	24018.366	11	24015.427	5	23997.708	–5	23995.011	6
56	24017.593	0	24014.671	3	23996.573	–8	23993.886	0
57	24016.836	22 [c]	24013.899	1	23995.424	–8	23992.746	–4
58	24016.027	9	24013.121	9	23994.253	–13	23991.589	–9
59	24015.206	1	24012.309	1	23993.076	–8	23990.421	–7
60	24014.381	6	24011.487	–1	23991.874	–11	23989.242	0
61	24013.547	18 [c]	24010.649	–2	23990.666	–3	23988.036	–4
62	24012.670	4	24009.808	10	23989.426	–11	23986.815	–6
63	24011.792	7	24008.935	8	23988.171	–17 [c]	23985.606	20 [c]
64	24010.895	7	24008.049	9	23986.912	–10	23984.331	–3
65	24009.997	22 [c]	24007.139	3	23985.606	–33 [c]	23983.034	–32 [c]
66	24009.041	–3 [c]	24006.186	–30 [c]	23984.331	–8	23981.778	–3
67	24008.119	22 [c]	24005.272	–7 [c]	23983.034	10 [c]	23980.471	–7
68	24007.139	7	24004.331	5	23981.680	–11	23979.160	–1
69	24006.186	35 [c]	24003.354	–2	23980.326	–15	23977.826	0
70	24005.144	–10 [c]	24002.370	1	23978.951	–23 [c]	23976.463	–12
71	24004.154	15 [c]	24001.372	6	23977.577	–15 [c]	23975.104	–4
72	24003.126	19 [c]	24000.341	–5	23976.182	–10	23973.706	–18 [c]
73	24002.063	3	23999.310	1	23974.762	–14	23972.312	–11
74	24001.006	11	23998.260	3	23973.329	–14	23970.901	–5
75	23999.898	–14 [c]	23997.193	6	23971.885	–10	23969.463	–9
76	23998.804	–10 [c]	23996.100	–1	23970.421	–7	23968.020	–3
77	23997.708	9	23995.011	14	23968.925	–21 [c]	23966.548	–8
78	23996.573	7	23993.886	8	23967.430	–16 [c]	23965.071	–3
79	23995.424	6	23992.746	4	23965.908	–23 [c]	23963.576	2

Table A2. (*continued*).

	(2, 1) *R*				(2, 1) *P*			
J"	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
0								
1	23721.496	25 [c]						
2	23721.640	15 [c]						
3			23720.362	12 [c]			23719.080	20 [c]
4	23721.885	–1 [c]	23720.508	37 [c]	23720.190	–18 [c]	23718.838	27 [c]
5	23722.019	26 [c]	23720.606	30 [c]	23719.940	–2		
6	23722.110	27 [c]						
7					23719.338	–22 [c]	23718.010	37 [c]
8	23722.248	34 [c]	23720.795	–1	23719.080	34 [c]		
9	23722.248	–8 [c]	23720.857	20 [c]	23718.704	–10		
10			23720.857	–6 [c]			23716.986	–5
11			23720.857	–15 [c]	23718.010	6		
12			23720.857	–9 [c]	23717.639	14		
13	23722.248	–15 [c]	23720.857	13 [c]	23717.255	25 [c]		
14	23722.248	24 [c]	23720.795	–11	23716.822	3	23715.448	–11
15					23716.383	–8	23715.049	13
16	23722.110	10 [c]			23715.922	–26 [c]		
17	23722.019	6 [c]	23720.606	9 [c]				
18	23721.885	–25 [c]	23720.508	13 [c]	23715.049	35 [c]		
19			23720.362	–15 [c]	23714.502	–20 [c]		
20	23721.640	–16 [c]						
21	23721.496	–10 [c]	23720.088	–7			23712.146	–23 [c]
22	23721.366	28 [c]	23719.940	10				
23	23721.115	–41 [c]	23719.743	–6	23712.421	24 [c]		
24			23719.534	–18 [c]			23710.558	37 [c]
25			23719.338	–2	23711.217	–21 [c]	23709.977	37 [c]
26	23720.508	–3			23710.649	14		
27	23720.283	20 [c]					23708.731	0
28	23720.029	29 [c]					23708.114	12
29	23719.743	22 [c]	23718.318	–12	23708.731	2	23707.439	–19 [c]
30	23719.464	39 [c]	23718.010	–28 [c]				
31			23717.711	–19 [c]	23707.355	–23 [c]	23706.102	–20 [c]
32								
33	23718.453	10			23705.983	20 [c]		
34								
35	23717.711	3			23704.508	23 [c]	23703.266	5
36	23717.296	–20 [c]	23715.922	–30 [c]				
37	23716.885	–23 [c]	23715.539	–10				
38	23716.452	–33 [c]	23715.137	7	23702.134	–13		
39	23716.026	–19 [c]	23714.664	–31 [c]			23700.145	–1
40	23715.622	32 [c]			23700.503	–6	23699.345	17 [c]
41	23715.137	19 [c]	23713.786	8				
42	23714.664	34 [c]			23698.802	–5		
43			23712.784	–13			23696.780	1
44					23697.048	7	23695.911	13
45	23713.083	12	23711.757	4	23696.103	–31 [c]		
46	23712.542	23 [c]	23711.217	10	23695.216	5		
47			23710.649	3	23694.275	2	23693.152	–8
48					23693.348	30 [c]		
49					23692.372	24 [c]		
50	23710.177	25 [c]			23691.396	34 [c]		
51	23709.528	8	23708.230	–12				
52					23689.347	6	23688.272	–10
53			23706.942	–2	23688.272	–35 [c]	23687.246	–13
54	23707.516	–13	23706.271	–1	23687.246	–11	23686.214	–7
55	23706.832	–1	23705.609	25 [c]	23686.214	22 [c]	23685.172	5
56	23706.102	–20 [c]	23704.867	–13			23684.081	–17 [c]
57			23704.169	9	23684.014	1	23683.023	11
58	23704.615	–35 [c]	23703.445	20 [c]			23681.888	–22 [c]
59			23702.678	4	23681.771	2		
60			23701.913	6	23680.631	6	23679.659	–1
61			23701.128	5	23679.497	33 [c]	23678.526	14

Table A2. (*continued*).

	(2, 1) *R*				(2, 1) *P*			
J"	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
0								
1	23721.496	25 [c]						
2	23721.640	15 [c]						
3			23720.362	12 [c]			23719.080	20 [c]
4	23721.885	–1 [c]	23720.508	37 [c]	23720.190	–18 [c]	23718.838	27 [c]
5	23722.019	26 [c]	23720.606	30 [c]	23719.940	–2		
6	23722.110	27 [c]						
7					23719.338	–22 [c]	23718.010	37 [c]
8	23722.248	34 [c]	23720.795	–1	23719.080	34 [c]		
9	23722.248	–8 [c]	23720.857	20 [c]	23718.704	–10		
10			23720.857	–6 [c]			23716.986	–5
11			23720.857	–15 [c]	23718.010	6		
12			23720.857	–9 [c]	23717.639	14		
13	23722.248	–15 [c]	23720.857	13 [c]	23717.255	25 [c]		
14	23722.248	24 [c]	23720.795	–11	23716.822	3	23715.448	–11
15					23716.383	–8	23715.049	13
16	23722.110	10 [c]			23715.922	–26 [c]		
17	23722.019	6 [c]	23720.606	9 [c]				
18	23721.885	–25 [c]	23720.508	13 [c]	23715.049	35 [c]		
19			23720.362	–15 [c]	23714.502	–20 [c]		
20	23721.640	–16 [c]						
21	23721.496	–10 [c]	23720.088	–7			23712.146	–23 [c]
22	23721.366	28 [c]	23719.940	10				
23	23721.115	–41 [c]	23719.743	–6	23712.421	24 [c]		
24			23719.534	–18 [c]			23710.558	37 [c]
25			23719.338	–2	23711.217	–21 [c]	23709.977	37 [c]
26	23720.508	–3			23710.649	14		
27	23720.283	20 [c]					23708.731	0
28	23720.029	29 [c]					23708.114	12
29	23719.743	22 [c]	23718.318	–12	23708.731	2	23707.439	–19 [c]
30	23719.464	39 [c]	23718.010	–28 [c]				
31			23717.711	–19 [c]	23707.355	–23 [c]	23706.102	–20 [c]
32								
33	23718.453	10			23705.983	20 [c]		
34								
35	23717.711	3			23704.508	23 [c]	23703.266	5
36	23717.296	–20 [c]	23715.922	–30 [c]				
37	23716.885	–23 [c]	23715.539	–10				
38	23716.452	–33 [c]	23715.137	7	23702.134	–13		
39	23716.026	–19 [c]	23714.664	–31 [c]			23700.145	–1
40	23715.622	32 [c]			23700.503	–6	23699.345	17 [c]
41	23715.137	19 [c]	23713.786	8				
42	23714.664	34 [c]			23698.802	–5		
43			23712.784	–13			23696.780	1
44					23697.048	7	23695.911	13
45	23713.083	12	23711.757	4	23696.103	–31 [c]		
46	23712.542	23 [c]	23711.217	10	23695.216	5		
47			23710.649	3	23694.275	2	23693.152	–8
48					23693.348	30 [c]		
49					23692.372	24 [c]		
50	23710.177	25 [c]			23691.396	34 [c]		
51	23709.528	8	23708.230	–12				
52					23689.347	6	23688.272	–10
53			23706.942	–2	23688.272	–35 [c]	23687.246	–13
54	23707.516	–13	23706.271	–1	23687.246	–11	23686.214	–7
55	23706.832	–1	23705.609	25 [c]	23686.214	22 [c]	23685.172	5
56	23706.102	–20 [c]	23704.867	–13			23684.081	–17 [c]
57			23704.169	9	23684.014	1	23683.023	11
58	23704.615	–35 [c]	23703.445	20 [c]			23681.888	–22 [c]
59			23702.678	4	23681.771	2		
60			23701.913	6	23680.631	6	23679.659	–1
61			23701.128	5	23679.497	33 [c]	23678.526	14

Table A2. (*concluded*).

	(2, 1) *R*				(2, 1) *P*			
J"	79Br	*o–c*	81Br	*o–c*	79Br	*o–c*	81Br	*o–c*
62			23700.338	13	23678.311	24 [c]	23677.372	24 [c]
63	23700.681	–12	23699.486	–24 [c]			23676.159	–10
64	23699.845	–8			23675.928	41 [c]	23674.955	–19 [c]
65	23699.004	6			23674.687	24 [c]	23673.780	16 [c]
66	23698.154	26 [c]	23696.981	8	23673.448	26 [c]	23672.548	11
67	23697.226	–15	23696.103	8	23672.141	–25 [c]		
68			23695.216	14			23670.051	14
69	23695.406	–13	23694.275	–18 [c]	23669.597	–10	23668.776	12
70	23694.509	26 [c]	23693.348	–20 [c]	23668.315	10	23667.440	–34 [c]
71	23693.538	5			23666.943	–44 [c]	23666.158	–12
72	23692.541	–26 [c]	23691.476	4	23665.640	–12	23664.873	24 [c]
73	23691.577	–7	23690.495	–5	23664.320	19 [c]	23663.529	15 [c]
74			23689.535	22 [c]				
75							23660.762	–34 [c]
76	23688.549	8	23687.497	7	23660.156	0	23659.389	–24 [c]
77	23687.497	2						
78	23686.438	4						
79			23684.368	28 [c]			23655.174	2
80	23684.276	14			23654.400	–9	23653.712	–16
81	23683.143	–11			23652.950	18 [c]	23652.297	30 [c]
82	23682.014	–15						
83								
84	23679.728	–3	23678.764	–10				
85			23677.624	11			23646.273	1
86	23677.372	2			23645.319	2	23644.722	–11
87	23676.159	–7			23643.743	–5	23643.199	19 [c]
88	23674.955	9	23674.045	5	23642.156	–6	23641.601	–11
89					23640.572	12	23640.005	–23 [c]
90	23672.419	–39 [c]	23671.576	–3	23638.949	6	23638.390	–38 [c]
91	23671.231	40 [c]			23637.286	–25 [c]	23636.774	–39 [c]
92			23669.056	1				
93			23667.786	16 [c]			23633.530	–7
94	23667.267	–28 [c]						
95			23665.154	1				
96	23664.595	–24 [c]	23663.807	–15				
97	23663.239	–18 [c]						
98			23661.141	30 [c]				
99								
100								
101			23656.921	–8				
102								
103	23654.760	3	23654.056	–7				
104								
105	23651.775	–23 [c]						
106								
107			23648.141	–5				
108	23647.243	1						
109	23645.672	–20 [c]						
110								
111	23642.566	20 [c]	23641.982	2				
112								
113			23638.787	–18 [c]				
114			23637.184	–9				
115								
116								
117			23632.274	5				
118			23630.601	5				

[a] All observed line positions are in cm^{-1} units.
[b] Relative to last digits of observed minus calculated values.
[c] Not included in this fit.