

Atomic Structure Calculations for Pb^{+70} and Pb^{+71} — Supplement

G.G. KONAN^{a,*} AND B. KARAÇOBAN USTA^b

^aDepartment of Physics, Science Faculty, Sakarya University, 54050, Sakarya, Turkey

^bDepartment of Engineering Fundamental Science, Sakarya University of Applied Sciences, 54050, Sakarya, Turkey

Received: 15.08.2022 & Accepted: 3.10.2022

Doi: [10.12693/APhysPolA.142.539.S1](https://doi.org/10.12693/APhysPolA.142.539.S1)

*e-mail: ggunday@sakarya.edu.tr

TABLE SI

Energies (E), Landé g -factors and lifetimes (τ) of upper levels for Pb^{+71} . Numbers in brackets represent powers of 10.

Levels		E [cm^{-1}]	g -factor	τ [ps]
Conf.	Term	HFR	HFR	HFR
7s	² S _{1/2}	61361290	2.00	2.26(-2)
8s	² S _{1/2}	64361500	2.00	3.18(-2)
9s	² S _{1/2}	66396030	2.00	4.35(-2)
10s	² S _{1/2}	67838700	2.00	5.80(-2)
11s	² S _{1/2}	68898500	2.00	7.58(-2)
12s	² S _{1/2}	69699600	2.00	9.69(-2)
13s	² S _{1/2}	70320150	2.00	1.22(-1)
14s	² S _{1/2}	70810330	2.00	1.58(-1)
15s	² S _{1/2}	71204290	2.00	1.84(-1)
7d	² D _{3/2}	61939800	0.80	1.41(-2)
	² D _{5/2}	62032720	1.20	1.73(-2)
8d	² D _{3/2}	64745660	0.80	2.02(-2)
	² D _{5/2}	64807860	1.20	2.44(-2)
9d	² D _{3/2}	66663950	0.80	2.81(-2)
	² D _{5/2}	66707580	1.20	3.35(-2)
10d	² D _{3/2}	68032820	0.80	3.78(-2)
	² D _{5/2}	68064600	1.20	4.47(-2)
11d	² D _{3/2}	69043520	0.80	4.97(-2)
	² D _{5/2}	69067370	1.20	5.84(-2)
12d	² D _{3/2}	69811070	0.80	6.38(-2)
	² D _{5/2}	69829420	1.20	7.47(-2)
13d	² D _{3/2}	70407430	0.80	8.05(-2)
	² D _{5/2}	70421860	1.20	9.38(-2)
14d	² D _{3/2}	70879930	0.80	9.99(-2)
	² D _{5/2}	70891450	1.20	1.16(-1)
15d	² D _{3/2}	71260840	0.80	1.22(-1)
	² D _{5/2}	71270210	1.20	1.42(-1)
7g	² G _{7/2}	62140400	0.89	2.31(-2)
	² G _{9/2}	62163930	1.11	2.37(-2)

TABLE SI cont.

Levels		E [cm^{-1}]	g -factor	τ [ps]
Conf.	Term	HFR	HFR	HFR
8g	² G _{7/2}	64880000	0.89	3.43(-2)
	² G _{9/2}	64895800	1.11	3.51(-2)
9g	² G _{7/2}	66758200	0.89	4.86(-2)
	² G _{9/2}	66769320	1.11	4.96(-2)
10g	² G _{7/2}	68101510	0.89	6.64(-2)
	² G _{9/2}	68109610	1.11	6.76(-2)
11g	² G _{7/2}	69095180	0.89	8.80(-2)
	² G _{9/2}	69101250	1.11	8.94(-2)
12g	² G _{7/2}	69850740	0.89	1.14(-1)
	² G _{9/2}	69855420	1.11	1.16(-1)
13g	² G _{7/2}	70438630	0.89	1.44(-1)
	² G _{9/2}	70442320	1.11	1.46(-1)
14g	² G _{7/2}	70904980	0.89	1.80(-1)
	² G _{9/2}	70907900	1.11	1.82(-1)
15g	² G _{7/2}	71281100	0.89	2.20(-1)
	² G _{9/2}	71283480	1.11	2.23(-1)
7i	² I _{11/2}	62180530	0.92	4.97(-2)
	² I _{13/2}	62191650	1.08	5.01(-2)
8i	² I _{11/2}	64906740	0.92	7.41(-2)
	² I _{13/2}	64914210	1.08	7.47(-2)
9i	² I _{11/2}	66777070	0.92	1.05(-1)
	² I _{13/2}	66782340	1.08	1.06(-1)
10i	² I _{11/2}	68115260	0.92	1.44(-1)
	² I _{13/2}	68119090	1.08	1.45(-1)
11i	² I _{11/2}	69105510	0.92	1.92(-1)
	² I _{13/2}	69108370	1.08	1.93(-1)
12i	² I _{11/2}	69858710	0.92	2.48(-1)
	² I _{13/2}	69860920	1.08	2.49(-1)
13i	² I _{11/2}	70444880	0.92	3.15(-1)
	² I _{13/2}	70446640	1.08	3.16(-1)
14i	² I _{11/2}	70909850	0.92	3.93(-1)

TABLE SI cont.

Levels		E [cm ⁻¹]	<i>g</i> -factor	τ [ps]
Conf.	Term	HFR	HFR	HFR
14 <i>i</i>	² I _{13/2}	70911280	1.08	3.94(-1)
15 <i>i</i>	² I _{11/2}	71285180	0.92	4.82(-1)
	² I _{13/2}	71286280	1.08	4.84(-1)
7 <i>p</i>	² P _{1/2} ^o	61456380	0.67	2.66(-2)
	² P _{3/2} ^o	61846800	1.33	2.54(-2)
8 <i>p</i>	² P _{1/2} ^o	64424210	0.67	3.67(-2)
	² P _{3/2} ^o	64684040	1.33	3.55(-2)
9 <i>p</i>	² P _{1/2} ^o	66439480	0.67	4.96(-2)
	² P _{3/2} ^o	66621000	1.33	4.83(-2)
10 <i>p</i>	² P _{1/2} ^o	67869950	0.67	6.55(-2)
	² P _{3/2} ^o	68001710	1.33	6.42(-2)
11 <i>p</i>	² P _{1/2} ^o	68921720	0.67	8.47(-2)
	² P _{3/2} ^o	69020360	1.33	8.34(-2)
12 <i>p</i>	² P _{1/2} ^o	69717450	0.67	1.08(-1)
	² P _{3/2} ^o	69793200	1.33	1.06(-1)
13 <i>p</i>	² P _{1/2} ^o	70334010	0.67	1.35(-1)
	² P _{3/2} ^o	70393420	1.33	1.33(-1)
14 <i>p</i>	² P _{1/2} ^o	70821230	0.67	1.66(-1)
	² P _{3/2} ^o	70868700	1.33	1.65(-1)
15 <i>p</i>	² P _{1/2} ^o	71213240	0.67	2.02(-1)
	² P _{3/2} ^o	71251760	1.33	2.01(-1)
7 <i>f</i>	² F _{5/2} ^o	62090640	0.86	1.28(-2)
	² F _{7/2} ^o	62131030	1.14	1.35(-2)
8 <i>f</i>	² F _{5/2} ^o	64846360	0.86	1.90(-2)
	² F _{7/2} ^o	64873450	1.14	2.00(-2)
9 <i>f</i>	² F _{5/2} ^o	66734470	0.86	2.69(-2)
	² F _{7/2} ^o	66753510	1.14	2.82(-2)
10 <i>f</i>	² F _{5/2} ^o	68084010	0.86	3.68(-2)
	² F _{7/2} ^o	68097870	1.14	3.85(-2)
11 <i>f</i>	² F _{5/2} ^o	69082100	0.86	4.88(-2)
	² F _{7/2} ^o	69092530	1.14	5.10(-2)
12 <i>f</i>	² F _{5/2} ^o	69840550	0.86	6.31(-2)
	² F _{7/2} ^o	69848570	1.14	6.59(-2)
13 <i>f</i>	² F _{5/2} ^o	70430680	0.86	8.01(-2)
	² F _{7/2} ^o	70436980	1.14	8.35(-2)
14 <i>f</i>	² F _{5/2} ^o	70898480	0.86	9.98(-2)
	² F _{7/2} ^o	70903520	1.14	1.04(-1)
15 <i>f</i>	² F _{5/2} ^o	71275940	0.86	1.23(-1)
	² F _{7/2} ^o	71280040	1.14	1.28(-1)
7 <i>h</i>	² H _{9/2} ^o	62164720	0.91	3.53(-2)
	² H _{11/2} ^o	62180280	1.09	3.58(-2)
8 <i>h</i>	² H _{9/2} ^o	64896220	0.91	5.25(-2)
	² H _{11/2} ^o	64906720	1.09	5.31(-2)
9 <i>h</i>	² H _{9/2} ^o	66769630	0.91	7.45(-2)
	² H _{11/2} ^o	66777000	1.09	7.52(-2)
10 <i>h</i>	² H _{9/2} ^o	68109830	0.91	1.02(-1)
	² H _{11/2} ^o	68115220	1.09	1.03(-1)
11 <i>h</i>	² H _{9/2} ^o	69101440	0.91	1.35(-1)
	² H _{11/2} ^o	69105450	1.09	1.36(-1)

TABLE SI cont.

Levels		E [cm ⁻¹]	<i>g</i> -factor	τ [ps]
Conf.	Term	HFR	HFR	HFR
12 <i>h</i>	² H _{9/2} ^o	69855580	0.91	1.74(-1)
	² H _{11/2} ^o	69858660	1.09	1.76(-1)
13 <i>h</i>	² H _{9/2} ^o	70442440	0.91	2.21(-1)
	² H _{11/2} ^o	70444860	1.09	2.22(-1)
14 <i>h</i>	² H _{9/2} ^o	70907990	0.91	2.74(-1)
	² H _{11/2} ^o	70909970	1.09	2.77(-1)
15 <i>h</i>	² H _{9/2} ^o	71283550	0.91	3.36(-1)
	² H _{11/2} ^o	71285150	1.09	3.39(-1)

TABLE SII

Weighted oscillator strengths (gf), transition probabilities (A_{ji}), wavelengths (λ), and line strengths (S) for electric dipole (E1) transitions from principal quantum numbers $n = 5$ and $n = 6$ to lower levels in Pb^{+71} . Numbers in brackets represent powers of 10.

Upper level		Transitions		Method	A_{ji} [s^{-1}]	gf	λ [\AA]	S [a. u.]
		Lower level						
5s	$^2S_{1/2}$	3p	$^2P_{1/2}^o$	AUTOS.	8.92(12)	1.17(-2)	2.09	8.04(-5)
				HFR	2.23(13)	3.00(-2)	2.12	2.10(-4)
5s	$^2S_{1/2}$	3p	$^2P_{3/2}^o$	AUTOS.	5.08(13)	8.30(-2)	2.33	6.34(-4)
				HFR	3.20(13)	5.37(-2)	2.36	4.15(-4)
5s	$^2S_{1/2}$	4p	$^2P_{1/2}^o$	AUTOS.	8.52(12)	1.23(-1)	6.93	2.80(-3)
				HFR	1.73(13)	2.49(-1)	6.93	5.68(-3)
5s	$^2S_{1/2}$	4p	$^2P_{3/2}^o$	AUTOS.	3.07(13)	6.02(-1)	8.09	1.60(-2)
				HFR	2.12(13)	4.23(-1)	8.15	1.13(-2)
5p	$^2P_{1/2}^o$	3s	$^2S_{1/2}$	AUTOS.	4.62(13)	5.63(-2)	2.02	3.76(-4)
				HFR	4.07(13)	5.08(-2)	2.04	3.41(-4)
5p	$^2P_{1/2}^o$	3d	$^2D_{3/2}$	AUTOS.	8.68(12)	1.51(-2)	2.41	1.20(-4)
				HFR	8.99(12)	1.61(-2)	2.44	1.29(-4)
5p	$^2P_{1/2}^o$	4s	$^2S_{1/2}$	AUTOS.	2.01(13)	2.56(-1)	6.52	5.50(-3)
				HFR	1.32(13)	1.70(-1)	6.55	3.66(-3)
5p	$^2P_{1/2}^o$	4d	$^2D_{3/2}$	AUTOS.	1.25(13)	2.58(-1)	8.31	7.08(-3)
				HFR	9.53(12)	1.99(-1)	8.34	5.46(-3)
5p	$^2P_{1/2}^o$	5s	$^2S_{1/2}$	AUTOS.	5.42(9)	1.49(-1)	303.16	1.49(-1)
				HFR	3.12(9)	1.25(-1)	365.59	1.50(-1)
5p	$^2P_{3/2}^o$	3s	$^2S_{1/2}$	AUTOS.	3.68(13)	8.61(-2)	1.97	5.55(-4)
				HFR	4.35(13)	1.04(-1)	2.00	6.87(-4)
5p	$^2P_{3/2}^o$	3d	$^2D_{3/2}$	AUTOS.	5.04(11)	1.67(-3)	2.35	1.29(-5)
				HFR	9.73(11)	3.30(-3)	2.38	2.59(-5)
5p	$^2P_{3/2}^o$	3d	$^2D_{5/2}$	AUTOS.	7.87(12)	2.76(-2)	2.42	2.20(-4)
				HFR	8.04(12)	2.89(-2)	2.45	2.33(-4)
5p	$^2P_{3/2}^o$	4s	$^2S_{1/2}$	AUTOS.	1.06(13)	2.39(-1)	6.12	4.80(-3)
				HFR	1.63(13)	3.65(-1)	6.12	7.38(-3)
5p	$^2P_{3/2}^o$	4d	$^2D_{3/2}$	AUTOS.	6.49(11)	2.28(-2)	7.66	5.76(-4)
				HFR	1.24(12)	4.33(-2)	7.64	1.09(-3)
5p	$^2P_{3/2}^o$	4d	$^2D_{5/2}$	AUTOS.	7.69(12)	2.93(-1)	7.97	7.69(-3)
				HFR	9.92(12)	3.75(-1)	7.94	9.80(-3)
5p	$^2P_{3/2}^o$	5s	$^2S_{1/2}$	AUTOS.	3.65(11)	1.21(0)	74.44	2.97(-1)
				HFR	3.89(11)	1.25(0)	73.19	3.01(-1)
5d	$^2D_{3/2}$	3p	$^2P_{1/2}^o$	AUTOS.	7.52(13)	1.85(-1)	2.02	1.22(-3)
				HFR	1.02(14)	2.57(-1)	2.05	1.73(-3)
5d	$^2D_{3/2}$	3p	$^2P_{3/2}^o$	AUTOS.	1.81(13)	5.48(-2)	2.25	4.07(-4)
				HFR	1.49(13)	4.62(-2)	2.28	3.49(-4)
5d	$^2D_{3/2}$	4p	$^2P_{1/2}^o$	AUTOS.	2.41(13)	5.59(-1)	6.22	1.14(-2)
				HFR	3.83(13)	8.90(-1)	6.22	1.82(-2)
5d	$^2D_{3/2}$	4p	$^2P_{3/2}^o$	AUTOS.	7.13(12)	2.18(-1)	7.14	5.12(-3)
				HFR	4.96(12)	1.54(-1)	7.20	3.65(-3)
5d	$^2D_{3/2}$	4f	$^2F_{5/2}^o$	AUTOS.	2.16(12)	8.26(-2)	7.99	2.18(-3)
				HFR	2.13(12)	8.14(-2)	7.98	2.14(-3)
5d	$^2D_{3/2}$	5p	$^2P_{1/2}^o$	AUTOS.	3.35(11)	1.16(0)	76.08	2.91(-1)
				HFR	3.71(11)	1.20(0)	73.60	2.92(-1)
5d	$^2D_{3/2}$	5p	$^2P_{3/2}^o$	AUTOS.	7.88(8)	5.22(-2)	332.27	5.71(-2)
				HFR	5.57(8)	4.72(-2)	375.96	5.84(-2)

TABLE SII cont.

Upper level		Transitions		Method	A_{ji} [s ⁻¹]	gf	λ [Å]	S [a. u.]
		Lower level						
5d	² D _{5/2}	3p	² P _{3/2} ^o	AUTOS.	1.12(14)	5.05(-1)	2.23	3.68(-3)
				HFR	9.08(13)	4.18(-1)	2.26	3.10(-3)
5d	² D _{5/2}	4f	² F _{5/2} ^o	AUTOS.	7.93(10)	4.37(-3)	7.83	1.13(-4)
				HFR	1.08(11)	5.93(-3)	7.82	1.53(-4)
5d	² D _{5/2}	4f	² F _{7/2} ^o	AUTOS.	1.88(12)	1.07(-1)	7.96	2.81(-3)
				HFR	2.05(12)	1.17(-1)	7.96	3.06(-3)
5d	² D _{5/2}	5p	² P _{3/2} ^o	AUTOS.	3.05(10)	8.81(-1)	179.15	5.19(-1)
				HFR	2.51(10)	8.32(-1)	191.84	5.25(-1)
5f	² F _{5/2} ^o	3d	² D _{3/2}	AUTOS.	1.31(14)	6.31(-1)	2.31	4.78(-3)
				HFR	1.30(14)	6.42(-1)	2.34	4.93(-3)
5f	² F _{5/2} ^o	3d	² D _{5/2}	AUTOS.	8.65(12)	4.40(-2)	2.38	3.45(-4)
				HFR	8.56(12)	4.46(-2)	2.41	3.55(-4)
5f	² F _{5/2} ^o	4d	² D _{3/2}	AUTOS.	6.46(13)	3.06(0)	7.26	7.32(-2)
				HFR	6.95(13)	3.29(0)	7.26	7.88(-2)
5f	² F _{5/2} ^o	4d	² D _{5/2}	AUTOS.	4.68(12)	2.39(-1)	7.53	5.92(-3)
				HFR	4.44(12)	2.27(-1)	7.53	5.61(-3)
5f	² F _{5/2} ^o	5d	² D _{3/2}	AUTOS.	1.05(10)	5.34(-1)	237.29	4.15(-1)
				HFR	1.04(10)	5.31(-1)	238.65	4.19(-1)
5f	² F _{5/2} ^o	5d	² D _{5/2}	AUTOS.	4.37(7)	1.46(-2)	609.07	2.92(-2)
				HFR	4.42(7)	1.48(-2)	610.69	2.98(-2)
5f	² F _{7/2} ^o	3d	² D _{5/2}	AUTOS.	1.37(14)	9.23(-1)	2.37	7.20(-3)
				HFR	1.29(14)	8.95(-1)	2.40	7.04(-3)
5f	² F _{7/2} ^o	4d	² D _{5/2}	AUTOS.	6.97(13)	4.67(0)	7.47	1.15(-1)
				HFR	6.83(13)	4.57(0)	7.47	1.12(-1)
5f	² F _{7/2} ^o	5d	² D _{5/2}	AUTOS.	3.09(9)	4.92(-1)	364.59	5.91(-1)
				HFR	3.11(9)	4.96(-1)	364.87	5.96(-1)
5g	² G _{7/2}	4f	² F _{5/2} ^o	AUTOS.	1.12(14)	7.87(0)	7.65	1.98(-1)
				HFR	1.15(14)	8.03(0)	7.65	2.03(-1)
5g	² G _{7/2}	4f	² F _{7/2} ^o	AUTOS.	4.05(12)	2.94(-1)	7.78	7.53(-3)
				HFR	4.04(12)	2.93(-1)	7.77	7.48(-3)
5g	² G _{7/2}	5f	² F _{5/2} ^o	AUTOS.	1.95(8)	1.34(-1)	757.94	3.35(-1)
				HFR	1.93(8)	1.34(-1)	760.08	3.35(-1)
5g	² G _{7/2}	5f	² F _{7/2} ^o	AUTOS.	3.23(4)	8.11(-4)	4578.15	1.22(-2)
				HFR	3.01(4)	8.00(-4)	4706.99	1.24(-2)
5g	² G _{9/2}	4f	² F _{7/2} ^o	AUTOS.	1.15(14)	1.03(1)	7.74	2.63(-1)
				HFR	1.15(14)	1.03(1)	7.74	2.63(-1)
5g	² G _{9/2}	5f	² F _{7/2} ^o	AUTOS.	5.63(7)	1.13(-1)	1158.17	4.32(-1)
				HFR	5.51(7)	1.13(-1)	1168.91	4.34(-1)
6s	² S _{1/2}	3p	² P _{1/2} ^o	AUTOS.	6.81(11)	6.33(-4)	1.76	3.66(-6)
				HFR	1.17(13)	1.15(-2)	1.81	6.85(-5)
6s	² S _{1/2}	3p	² P _{3/2} ^o	AUTOS.	3.62(13)	4.03(-2)	1.93	2.57(-4)
				HFR	1.76(13)	2.09(-2)	1.99	1.37(-4)
6s	² S _{1/2}	4p	² P _{1/2} ^o	AUTOS.	3.67(12)	2.00(-2)	4.26	2.80(-4)
				HFR	7.91(12)	4.74(-2)	4.47	6.97(-4)
6s	² S _{1/2}	4p	² P _{3/2} ^o	AUTOS.	2.04(13)	1.34(-1)	4.67	2.05(-3)
				HFR	1.16(13)	8.57(-2)	4.95	1.39(-3)
6s	² S _{1/2}	5p	² P _{1/2} ^o	AUTOS.	5.49(12)	2.17(-1)	11.48	8.20(-3)
				HFR	6.67(12)	3.41(-1)	13.07	1.47(-2)
6s	² S _{1/2}	5p	² P _{3/2} ^o	AUTOS.	1.88(13)	9.48(-1)	12.99	4.07(-2)

TABLE SII cont.

Upper level		Transitions			A_{ji} [s^{-1}]	gf	λ [\AA]	S [a. u.]
Lower level		Method						
6s	$^2S_{1/2}$	5p	$^2P_{3/2}^o$	HFR	8.40(12)	5.85(-1)	15.25	2.94(-2)
6p	$^2P_{1/2}^o$	3s	$^2S_{1/2}$	AUTOS.	2.78(13)	2.43(-2)	1.71	1.37(-4)
				HFR	2.48(13)	2.31(-2)	1.76	1.33(-4)
6p	$^2P_{1/2}^o$	3d	$^2D_{3/2}$	AUTOS.	4.30(12)	5.08(-3)	1.98	3.29(-5)
				HFR	4.74(12)	5.98(-3)	2.05	4.03(-5)
6p	$^2P_{1/2}^o$	4s	$^2S_{1/2}$	AUTOS.	1.30(13)	6.60(-2)	4.12	8.97(-4)
				HFR	9.64(12)	5.43(-2)	4.34	7.78(-4)
6p	$^2P_{1/2}^o$	4d	$^2D_{3/2}$	AUTOS.	5.65(12)	3.86(-2)	4.77	6.05(-4)
				HFR	5.00(12)	3.82(-2)	5.05	6.36(-4)
6p	$^2P_{1/2}^o$	5s	$^2S_{1/2}$	AUTOS.	8.09(12)	2.83(-1)	10.81	1.01(-2)
				HFR	3.92(12)	1.80(-1)	12.38	7.34(-3)
6p	$^2P_{1/2}^o$	5d	$^2D_{3/2}$	AUTOS.	8.43(12)	4.37(-1)	13.14	1.89(-2)
				HFR	4.47(12)	3.22(-1)	15.51	1.65(-2)
6p	$^2P_{1/2}^o$	6s	$^2S_{1/2}$	AUTOS.	3.04(9)	2.08(-1)	477.19	3.26(-1)
				HFR	1.18(9)	1.50(-1)	651.25	3.22(-1)
6p	$^2P_{3/2}^o$	3s	$^2S_{1/2}$	AUTOS.	2.63(13)	4.51(-2)	1.69	2.51(-4)
				HFR	2.57(13)	4.66(-2)	1.74	2.67(-4)
6p	$^2P_{3/2}^o$	3d	$^2D_{3/2}$	AUTOS.	1.42(11)	3.28(-4)	1.96	2.11(-6)
				HFR	4.92(11)	1.21(-3)	2.03	8.13(-6)
6p	$^2P_{3/2}^o$	3d	$^2D_{5/2}$	AUTOS.	5.41(12)	1.31(-2)	2.01	8.67(-5)
				HFR	4.12(12)	1.06(-2)	2.07	7.21(-5)
6p	$^2P_{3/2}^o$	4s	$^2S_{1/2}$	AUTOS.	9.82(12)	9.56(-2)	4.03	1.27(-3)
				HFR	1.04(13)	1.12(-1)	4.22	1.54(-3)
6p	$^2P_{3/2}^o$	4d	$^2D_{3/2}$	AUTOS.	3.40(11)	4.40(-3)	4.64	6.71(-5)
				HFR	5.49(11)	7.89(-3)	4.90	1.28(-4)
6p	$^2P_{3/2}^o$	4d	$^2D_{5/2}$	AUTOS.	5.31(12)	7.20(-2)	4.76	1.13(-3)
				HFR	4.59(12)	6.93(-2)	5.02	1.15(-3)
6p	$^2P_{3/2}^o$	5s	$^2S_{1/2}$	AUTOS.	4.79(12)	2.98(-1)	10.18	9.98(-3)
				HFR	4.90(12)	3.88(-1)	11.49	1.47(-2)
6p	$^2P_{3/2}^o$	5d	$^2D_{3/2}$	AUTOS.	5.36(11)	4.81(-2)	12.23	1.94(-3)
				HFR	5.90(11)	7.07(-2)	14.14	3.29(-3)
6p	$^2P_{3/2}^o$	5d	$^2D_{5/2}$	AUTOS.	6.22(12)	5.95(-1)	12.63	2.47(-2)
				HFR	4.75(12)	6.13(-1)	14.67	2.96(-2)
6p	$^2P_{3/2}^o$	6s	$^2S_{1/2}$	AUTOS.	1.48(11)	1.48(0)	128.89	6.26(-1)
				HFR	1.54(11)	1.52(0)	128.39	6.43(-1)
6d	$^2D_{3/2}$	3p	$^2P_{1/2}^o$	AUTOS.	2.91(13)	5.24(-2)	1.73	2.97(-4)
				HFR	5.67(13)	1.08(-1)	1.78	6.31(-4)
6d	$^2D_{3/2}$	3p	$^2P_{3/2}^o$	AUTOS.	1.15(13)	2.46(-2)	1.89	1.53(-4)
				HFR	8.61(12)	1.97(-2)	1.95	1.26(-4)
6d	$^2D_{3/2}$	4p	$^2P_{1/2}^o$	AUTOS.	1.55(13)	1.56(-1)	4.10	2.11(-3)
				HFR	2.27(13)	2.51(-1)	4.29	3.54(-3)
6d	$^2D_{3/2}$	4p	$^2P_{3/2}^o$	AUTOS.	5.14(12)	6.18(-2)	4.48	9.12(-4)
				HFR	3.39(12)	4.56(-2)	4.73	7.08(-4)
6d	$^2D_{3/2}$	4f	$^2F_{5/2}^o$	AUTOS.	9.10(11)	1.25(-2)	4.79	1.97(-4)
				HFR	9.20(11)	1.42(-2)	5.06	2.35(-4)
6d	$^2D_{3/2}$	5p	$^2P_{1/2}^o$	AUTOS.	9.01(12)	5.80(-1)	10.36	1.98(-2)
				HFR	1.05(13)	8.53(-1)	11.65	3.28(-2)
6d	$^2D_{3/2}$	5p	$^2P_{3/2}^o$	AUTOS.	3.08(12)	2.47(-1)	11.58	9.44(-3)
				HFR	1.39(12)	1.49(-1)	13.35	6.53(-3)

TABLE SII cont.

Upper level		Transitions		Method	A_{ji} [s^{-1}]	gf	λ [\AA]	S [a. u.]
		Lower level						
6d	$^2D_{3/2}$	5f	$^2F_{5/2}^o$	AUTOS.	2.38(12)	2.28(-1)	12.64	9.49(-3)
				HFR	1.55(12)	2.01(-1)	14.70	9.72(-3)
6d	$^2D_{3/2}$	6p	$^2P_{1/2}^o$	AUTOS.	1.28(11)	1.45(0)	137.41	6.56(-1)
				HFR	1.52(11)	1.51(0)	128.97	6.44(-1)
6d	$^2D_{3/2}$	6p	$^2P_{3/2}^o$	AUTOS.	2.67(8)	6.15(-2)	619.32	1.25(-1)
				HFR	2.20(8)	5.85(-2)	666.56	1.29(-1)
6d	$^2D_{5/2}$	3p	$^2P_{3/2}^o$	AUTOS.	7.58(13)	2.43(-1)	1.89	1.52(-3)
				HFR	5.21(13)	1.78(-1)	1.95	1.14(-3)
6d	$^2D_{5/2}$	4p	$^2P_{3/2}^o$	AUTOS.	3.14(13)	5.58(-1)	4.45	8.19(-3)
				HFR	2.08(13)	4.13(-1)	4.70	6.40(-3)
6d	$^2D_{5/2}$	4f	$^2F_{5/2}^o$	AUTOS.	3.45(10)	7.03(-4)	4.76	1.10(-5)
				HFR	4.48(10)	1.02(-3)	5.03	1.69(-5)
6d	$^2D_{5/2}$	4f	$^2F_{7/2}^o$	AUTOS.	1.07(12)	2.23(-2)	4.81	3.53(-4)
				HFR	8.68(11)	2.02(-2)	5.08	3.37(-4)
6d	$^2D_{5/2}$	5p	$^2P_{3/2}^o$	AUTOS.	1.74(13)	2.03(0)	11.38	7.59(-2)
				HFR	8.85(12)	1.37(0)	13.10	5.89(-2)
6d	$^2D_{5/2}$	5f	$^2F_{5/2}^o$	AUTOS.	9.44(10)	1.31(-2)	12.40	5.33(-4)
				HFR	7.86(10)	1.46(-2)	14.39	6.94(-4)
6d	$^2D_{5/2}$	5f	$^2F_{7/2}^o$	AUTOS.	2.24(12)	3.18(-1)	12.57	1.32(-2)
				HFR	1.50(12)	2.88(-1)	14.62	1.39(-2)
6d	$^2D_{5/2}$	6p	$^2P_{3/2}^o$	AUTOS.	1.13(10)	1.06(0)	322.62	1.12
				HFR	1.03(10)	1.05(0)	335.85	1.16
6f	$^2F_{5/2}^o$	3d	$^2D_{3/2}$	AUTOS.	6.42(13)	2.19(-1)	1.95	1.41(-3)
				HFR	6.16(13)	2.24(-1)	2.01	1.48(-3)
6f	$^2F_{5/2}^o$	3d	$^2D_{5/2}$	AUTOS.	4.41(12)	1.57(-2)	1.99	1.03(-4)
				HFR	4.10(12)	1.56(-2)	2.06	1.06(-4)
6f	$^2F_{5/2}^o$	4d	$^2D_{3/2}$	AUTOS.	3.90(13)	7.29(-1)	4.56	1.10(-2)
				HFR	3.54(13)	7.35(-1)	4.80	1.16(-2)
6f	$^2F_{5/2}^o$	4d	$^2D_{5/2}$	AUTOS.	2.77(12)	5.43(-2)	4.67	8.35(-4)
				HFR	2.35(12)	5.12(-2)	4.92	8.29(-4)
6f	$^2F_{5/2}^o$	5d	$^2D_{3/2}$	AUTOS.	2.58(13)	3.15(0)	11.66	1.21(-1)
				HFR	1.87(13)	3.01(0)	13.40	1.33(-1)
6f	$^2F_{5/2}^o$	5d	$^2D_{5/2}$	AUTOS.	1.94(12)	2.53(-1)	12.02	9.98(-3)
				HFR	1.20(12)	2.08(-1)	13.87	9.48(-3)
6f	$^2F_{5/2}^o$	5g	$^2G_{7/2}$	AUTOS.	5.37(11)	7.50(-2)	12.46	3.08(-3)
				HFR	3.70(11)	6.97(-2)	14.47	3.32(-3)
6f	$^2F_{5/2}^o$	6d	$^2D_{3/2}$	AUTOS.	4.78(9)	7.43(-1)	415.97	1.02
				HFR	4.76(9)	7.39(-1)	415.36	1.01
6f	$^2F_{5/2}^o$	6d	$^2D_{5/2}$	AUTOS.	1.87(7)	1.99(-2)	1088.06	7.13(-2)
				HFR	1.96(7)	2.04(-2)	1074.92	7.21(-2)
6f	$^2F_{7/2}^o$	3d	$^2D_{5/2}$	AUTOS.	7.17(13)	3.40(-1)	1.99	2.23(-3)
				HFR	6.17(13)	3.13(-1)	2.06	2.13(-3)
6f	$^2F_{7/2}^o$	4d	$^2D_{5/2}$	AUTOS.	4.30(13)	1.12(0)	4.65	1.71(-2)
				HFR	3.56(13)	1.03(0)	4.91	1.66(-2)
6f	$^2F_{7/2}^o$	5d	$^2D_{5/2}$	AUTOS.	2.89(13)	4.93(0)	11.93	1.94(-1)
				HFR	1.85(13)	4.19(0)	13.75	1.90(-1)
6f	$^2F_{7/2}^o$	5g	$^2G_{7/2}$	AUTOS.	1.34(10)	2.45(-3)	12.37	1.00(-4)
				HFR	1.06(10)	2.60(-3)	14.33	1.23(-4)
6f	$^2F_{7/2}^o$	5g	$^2G_{9/2}$	AUTOS.	5.43(11)	1.01(-1)	12.46	4.15(-3)

TABLE SII cont.

Upper level		Transitions			A_{ji} [s^{-1}]	gf	λ [\AA]	S [a. u.]
		Lower level		Method				
6f	$^2F_{7/2}^o$	5g	$^2G_{9/2}$	HFR	3.60(11)	9.03(-2)	14.47	4.31(-3)
6f	$^2F_{7/2}^o$	6d	$^2D_{5/2}$	AUTOS.	1.38(9)	6.76(-1)	639.62	1.43
				HFR	1.42(9)	6.89(-1)	636.62	1.45
6g	$^2G_{7/2}$	4f	$^2F_{5/2}^o$	AUTOS.	4.26(13)	1.14(0)	4.72	1.77(-2)
				HFR	3.65(13)	1.09(0)	4.98	1.78(-2)
6g	$^2G_{7/2}$	4f	$^2F_{7/2}^o$	AUTOS.	1.51(12)	4.11(-2)	4.77	6.47(-4)
				HFR	1.31(12)	3.99(-2)	5.04	6.62(-4)
6g	$^2G_{7/2}$	5f	$^2F_{5/2}^o$	AUTOS.	4.40(13)	7.78(0)	12.15	3.12(-1)
				HFR	2.96(13)	7.00(0)	14.04	3.23(-1)
6g	$^2G_{7/2}$	5f	$^2F_{7/2}^o$	AUTOS.	1.63(12)	2.96(-1)	12.31	1.20(-2)
				HFR	1.05(12)	2.55(-1)	14.26	1.20(-2)
6g	$^2G_{7/2}$	6f	$^2F_{7/2}^o$	AUTOS.	1.28(8)	2.54(-1)	1284.85	1.07
				HFR	1.29(8)	2.54(-1)	1280.41	1.07
6g	$^2G_{7/2}$	6f	$^2F_{7/2}^o$	AUTOS.	2.39(4)	1.60(-3)	7465.70	3.93(-2)
				HFR	2.78(4)	1.69(-3)	7117.44	3.96(-2)
6g	$^2G_{9/2}$	4f	$^2F_{7/2}^o$	AUTOS.	4.37(13)	1.49(0)	4.76	2.33(-2)
				HFR	3.69(13)	1.40(0)	5.03	2.32(-2)
6g	$^2G_{9/2}$	5f	$^2F_{7/2}^o$	AUTOS.	4.58(13)	1.03(1)	12.25	4.16(-1)
				HFR	2.98(13)	8.98(0)	14.19	4.20(-1)
6g	$^2G_{9/2}$	6f	$^2F_{7/2}^o$	AUTOS.	3.66(7)	2.13(-1)	1967.07	1.37
				HFR	3.82(7)	2.17(-1)	1945.53	1.39
6h	$^2H_{9/2}^o$	5g	$^2G_{7/2}$	AUTOS.	6.70(13)	1.52(1)	12.29	6.14(-1)
				HFR	4.41(13)	1.34(1)	14.23	6.27(-1)
6h	$^2H_{9/2}^o$	5g	$^2G_{9/2}$	AUTOS.	1.50(12)	3.45(-1)	12.39	1.41(-2)
				HFR	9.75(11)	3.01(-1)	14.36	1.42(-2)
6h	$^2H_{9/2}^o$	6g	$^2G_{7/2}$	AUTOS.	8.38(6)	8.79(-2)	2644.89	7.65(-1)
				HFR	8.84(6)	8.93(-2)	2596.73	7.64(-1)
6h	$^2H_{11/2}^o$	5g	$^2G_{9/2}$	AUTOS.	6.82(13)	1.87(1)	12.35	7.61(-1)
				HFR	4.43(13)	1.63(1)	14.31	7.69(-1)
6h	$^2H_{11/2}^o$	6g	$^2G_{9/2}$	AUTOS.	2.49(6)	7.10(-2)	3981.94	9.31(-1)
				HFR	2.72(6)	7.35(-2)	3875.97	9.38(-1)