APPENDIX NUCLEAR MOMENTS

Table 1 contains the nuclear magnetic and quadrupole moments from the *Table of Isotopes*. Most of these moments are from the compilation of Raghavan[1] except for values which have since been updated in the *Nuclear Data Sheets*. The nuclear species for which moments are reported are identified in the first four columns of Table 1. The level energies (in keV), half-lives, and spin/parities are given in columns 5-7. Magnetic dipole moments (μ), in column 8, are given in units of nuclear magnetons, and are based on the uncorrected proton moment, 2.79277564 *6* nm.[2] magnetic moments are corrected for diamagnetic shielding wherever applicable. Electric quadrupole moments (Q), in column 9, are given in units of barns. Signs of magnetic and quadrupole moments are given as reported by the original authors, and absence of a sign indicates that it is undetermined. Tabulated uncertainties are printed in italics. In some instances two possible moment values values exist and these are separated by "or".

[1] P. Raghavan, *At. Data Nucl. Data Tables* **42**, 189 (1989).

[2] E.R. Cohen and B.N. Taylor, *Rev. Mod. Phys.* **59**, 1121 (1987).

Table 1. Table of Nuclear Moments

Nucleus Z	El	A	Level energy	Half-life	J^π	μ (nm)	Q (b)
0	n	1	0	616.3 s	$1/2^+$	-1.91304275 *45*	
1	H	1	0	stable	$1/2^+$	+2.79284739 *7*	
1	H	2	0	stable	1^+	+0.857438230 *24*	+0.002860 *15*
1	H	3	0	12.33 y	$1/2^+$	+2.97896248 *7*	
2	He	3	0	stable	$1/2^+$	-2.12762485 *7*	
3	Li	6	0	stable	1^+	+0.8220473 *6*	-0.00083 *8*
3	Li	7	0	stable	$3/2^-$	+3.2564268 *17*	-0.0406
3	Li	8	0	838 ms	2^+	+1.653560 *18*	0.0317 *4*
3	Li	9	0	178.3 ms	$3/2^-$	3.4391 *6*	0.0278 *8*
3	Li	11	0	8.5 ms	$3/2^-$	3.6678 *25*	
4	Be	9	0	stable	$3/2^-$	-1.1778 *9*	+0.053 *3*
5	B	8	0	770 ms	2^+	1.0355 *3*	
5	B	10	0	stable	3^+	+1.8006448 *6*	+0.08472 *56*
5	B	10	718.35	0.707 ns	1^+	+0.63 *12*	
5	B	11	0	stable	$3/2^-$	+2.6886489 *10*	+0.04065 *26*
5	B	12	0	20.20 ms	1^+	+1.00306 *15*	0.0134 *14*
5	B	13	0	17.36 ms	$3/2^-$	+3.1778 *5*	0.037 *4*
6	C	11	0	20.39 m	$3/2^-$	-0.964 *1*	0.03426
6	C	12	4438.91	0.0108 ev	2^+		+0.06 *3*
6	C	13	0	stable	$1/2^-$	+0.7024118 *14*	
6	C	13	3853.807	8.60 ps	$5/2^+$	1.40 *4*	
6	C	14	6728.2	66 ps	3^-	0.816 *21*	
6	C	15	0	2.449 s	$1/2^+$	1.32 *7*	
6	C	15	740.0	2.61 ns	$5/2^+$	-1.76 *3*	
7	N	12	0	11.000 ms	1^+	+0.4573 *5*	+0.026
7	N	13	0	9.965 m	$1/2^-$	0.3222 *4*	
7	N	14	0	stable	1^+	+0.40376100 *6*	+0.0193 *8*
7	N	14	5105.89	4.35 ps	2^-	1.32 *8*	
7	N	14	5834.25	8.30 ps	3^-	>1.5	
7	N	15	0	stable	$1/2^-$	-0.28318884 *5*	
7	N	15	5270.155	1.79 ps	$5/2^+$	+2.35 *18*	
7	N	16	298.22	91.3 ps	3^-	1.60 *6*	
7	N	16	397.27	3.90 ps	1^-	-1.83 *13*	
8	O	15	0	122.24 s	$1/2^-$	0.7189 *8*	
8	O	15	5240.9	2.25 ps	$5/2^+$	+0.65 *7*	
8	O	16	6129.89	18.4 ps	3^-	+1.668 *12*	
8	O	17	0	stable	$5/2^+$	-1.89379 *9*	-0.02578
8	O	18	1982.07	1.94 ps	2^+	-0.57 *3*	-0.036 *9*
8	O	18	3554.8	17.2 ps	4^+	2.5 *4*	
8	O	19	96.0	1.39 ns	$3/2^+$	-0.72 *9*	
8	O	20	1637.68	7.3 ps	2^+	-0.70 *3*	
9	F	17	0	64.49 s	$5/2^+$	+4.72130 *20*	0.058 *4*
9	F	18	937.20	46.9 ps	3^+	+1.68 *15*	
9	F	18	1121.36	162 ns	5^+	+2.86 *3*	0.077 *5*
9	F	19	0	stable	$1/2^+$	+2.628868 *8*	
9	F	19	197.143	89.3 ns	$5/2^+$	+3.607 *8*	-0.072 *4*
9	F	19	1345.67	2.86 ps	$5/2^-$	0.67 *11*	
9	F	20	0	11.00 s	2^+	+2.0935 *9*	0.042 *3*
10	Ne	19	0	17.34 s	$1/2^+$	-1.88542 *8*	
10	Ne	19	238.27	18.0 ns	$5/2^+$	-0.740 *8*	
10	Ne	20	1633.674	0.73 ps	2^+	+1.08 *8*	-0.23 *3*
10	Ne	20	4247.7	64 fs	4^+	+0.5 *6*	
10	Ne	21	0	stable	$3/2^+$	-0.661797 *5*	+0.103 *8*
10	Ne	21	350.728	7.17 ps	$5/2^+$	0.53 *7*	
10	Ne	22	1274.542	3.63 ps	2^+	+0.65 *2*	-0.19 *4*
10	Ne	22	3357.2	225 fs	4^+	+2.2 *6*	
10	Ne	23	0	37.24 s	$5/2^+$	-1.08 *1*	
11	Na	20	0	447.9 ms	2^+	+0.3694 *2*	
11	Na	21	0	22.49 s	$3/2^+$	+2.38630 *10*	+0.05 *4*
11	Na	21	331.93	7.08 ps	$5/2^+$	3.7 *3*	
11	Na	22	0	2.6019 y	3^+	+1.746 *3*	
11	Na	22	583.03	244 ns	1^+	+0.535 *10*	
11	Na	22	2211.5	14.6 ps	1^-	0.36 *7*	
11	Na	23	0	stable	$3/2^+$	+2.217520 *2*	+0.1006 *20*
11	Na	24	0	14.9590 h	4^+	+1.6903 *8*	
11	Na	24	472.207	20.20 ms	1^+	-1.931 *3*	
11	Na	25	0	59.1 s	$5/2^+$	+3.683 *4*	-0.10 *5*
11	Na	26	0	1.072 s	3^+	+2.851 *2*	-0.08 *5*
11	Na	27	0	301 ms	$5/2^+$	+3.895 *5*	-0.06 *5*
11	Na	28	0	30.5 ms	1^+	+2.426 *3*	-0.02 *4*
11	Na	29	0	44.9 ms	3/2	+2.449 *8*	+0.03 *5*
11	Na	30	0	48 ms	2^+	+2.083 *10*	
11	Na	31	0	17.0 ms		+2.305 *8*	
12	Mg	24	1368.675	1.35 ps	2^+	+1.02 *4*	-0.166 *6*
12	Mg	24	4122.874	24 fs	4^+	+1.6 *12*	
12	Mg	24	4238.36	49 fs	2^+	+1.2 *4*	
12	Mg	24	6010.32	58 fs	4^+	+2.0 *16*	
12	Mg	25	0	stable	$5/2^+$	-0.85545 *8*	+0.201 *3*
12	Mg	26	1808.70	476 fs	2^+	+1.0 *3*	-0.135 *20*
13	Al	25	0	7.183 s	$5/2^+$	3.6455 *12*	
13	Al	26	416.852	1.25 ns	3^+	+2.0 *5*	
13	Al	27	0	stable	$5/2^+$	+3.6415069 *7*	+0.150 *6*
13	Al	28	0	2.2414 m	3^+	3.242 *5*	0.175 *14*
13	Al	28	30.6383	2.07 ns	2^+	+4.3 *4*	
14	Si	27	0	4.16 s	$5/2^+$	(-)0.8554 *4*	
14	Si	28	1779.030	475 fs	2^+	+1.12 *18*	+0.165 *18*
14	Si	29	0	stable	$1/2^+$	-0.55529 *3*	
14	Si	30	2235.33	248 fs	2^+	+0.76 *18*	-0.05 *4*
14	Si	32	1941.5	420 fs	2^+		-0.16 *2* or -0.13 *2*
15	P	29	0	4.140 s	$1/2^+$	1.2349 *3*	
15	P	31	0	stable	$1/2^+$	+1.13160 *3*	
15	P	31	1266.15	520 fs	$3/2^+$	+0.30 *8*	
15	P	31	2233.7	250 fs	$5/2^+$	+2.8 *5*	
15	P	32	0	14.262 d	1^+	-0.2524 *3*	
16	S	31	0	2.572 s	$1/2^+$	0.48793 *8*	
16	S	32	2230.3	168 fs	2^+	+0.94 *18*	-0.149 *13*
16	S	32	4458.9	120 fs	4^+	+1.6 *6*	
16	S	33	0	stable	$3/2^+$	+0.6438212 *14*	-0.076 *10*
16	S	34	2127.564	325 fs	2^+	+1.00 *16*	+0.05 *3*
16	S	35	0	87.51 d	$3/2^+$	+1.00 *4* or -1.07 *4*	+0.045 *10*
17	Cl	33	0	2.511 s	$3/2^+$	+0.7523 *16*	
17	Cl	35	0	stable	$3/2^+$	+0.8218743 *4*	-0.08249 *2*
17	Cl	36	0	3.01×10^5 y	2^+	+1.28547 *5*	-0.0180 *4*
17	Cl	37	0	stable	$3/2^+$	+0.6841236 *4*	-0.06493 *2*
17	Cl	38	0	37.24 m	2^-	2.05 *2*	
18	Ar	35	0	1.775 s	$3/2^+$	+0.633 *2*	
18	Ar	36	1970.39	320 fs	2^+		+0.11 *6*
18	Ar	37	0	35.04 d	$3/2^+$	+1.145 *5*	
18	Ar	37	1611.27	4.37 ns	$7/2^-$	-1.33 *5*	
18	Ar	39	0	269 y	$7/2^-$	-1.3 *3*	
18	Ar	40	1460.859	1.12 ps	2^+		+0.01 *4*
19	K	36	0	342 ms	2^+	(+)0.548 *1*	
19	K	37	0	1.226 s	$3/2^+$	+0.20321 *6*	
19	K	37	1380.25	10.4 ns	$7/2^-$	+5.2 *3*	
19	K	38	0	7.636 m	3^+	+1.371 *6*	
19	K	38	3458.0	21.98 μs	$7^+(5^+)$	+3.836 *14*	
19	K	39	0	stable	$3/2^+$	+0.3914662 *3*	+0.049 *4*
19	K	39	2814.3	47 ps	$7/2^-$	4.0 *4*	
19	K	39	3597.5	38 ps	$9/2^-$	2.4 *2*	
19	K	40	0	1.277×10^9 y	4^-	-1.298100 *3*	-0.061 *5*
19	K	40	29.8299	4.24 ns	3^-	-1.29 *9*	
19	K	40	2542.8	1.08 ns	7^+	+4.1 *7*	
19	K	41	0	stable	$3/2^+$	+0.2148701 *2*	+0.060 *5*
19	K	41	1293.609	7.2 ns	$7/2^-$	+4.42 *5*	
19	K	41	2527.66	150 ps	$11/2^+$	4.5 *10*	
19	K	41	2774.25	51 ps	$13/2^+$	3.0 *5*	
19	K	41	4982.9	75 ps	$19/2^-$	7.0 *29*	
19	K	42	0	12.360 h	2^-	-1.1425 *6*	
19	K	43	0	22.3 h	$3/2^+$	+0.1633 *8*	

Nucleus Z	El	A	Level energy	Half-life	J^π	μ (nm)	Q (b)
19	K	43	738.1	200 ns	$7/2^-$	+4.43 *5*	
19	K	44	0	22.13 m	2^-	-0.856 *4*	
19	K	45	0	17.3 m	$3/2^+$	+0.1734 *8*	
19	K	46	0	105 s	(2^-)	-1.051 *6*	
19	K	47	0	17.5 s	$1/2^+$	+1.933 *9*	
20	Ca	39	0	859.6 ms	$3/2^+$	1.02168 *12*	
20	Ca	40	3736.69	47 ps	3^-	+1.60 *22*	
20	Ca	40	4491.43	290 ps	5^-	+2.6 *5*	
20	Ca	41	0	1.03×10^5 y	$7/2^-$	-1.594781 *9*	-0.080 *8*
20	Ca	41	3829.78	3.1 ns	$15/2^+$	+2.18 *15*	
20	Ca	42	1524.73	0.82 ps	2^+		-0.19 *8*
20	Ca	42	3189.33	5.36 ns	6^+	-2.49 *9*	
20	Ca	43	0	stable	$7/2^-$	-1.317643 *7*	-0.049 *5*
20	Ca	44	1157.047	2.61 ps	2^+	-0.6 *2*	-0.14 *7*
20	Ca	45	0	163.8 d	$7/2^-$	-1.3274 *14*	+0.046 *14*
20	Ca	47	0	4.536 d	$7/2^-$	-1.380 *24*	+0.021 *4*
21	Sc	41	0	596.3 ms	$7/2^-$	5.535 *4*	
21	Sc	43	0	3.891 h	$7/2^-$	+4.62 *4*	-0.26 *6*
21	Sc	43	151.9	438 μs	$3/2^+$	+0.348 *6*	
21	Sc	43	3123.2	468 ns	$(11/2 \text{ to } 19/2)^-$	+3.122 *7*	0.199 *14*
21	Sc	44	0	3.927 h	2^+	+2.56 *3*	+0.10 *5*
21	Sc	44	67.875	155.6 ns	1^-	+0.344 *5*	0.21 *2*
21	Sc	44	234.7	6.1 ns	2^-	+0.68 *10*	
21	Sc	44	271.13	58.6 h	6^+	+3.88 *1*	-0.19 *2*
21	Sc	44	349.84	3.1 ns	4^+	+3.6 *5*	
21	Sc	45	0	stable	$7/2^-$	+4.7564866 *18*	-0.22 *1*
21	Sc	46	0	83.79 d	4^+	+3.03 *2*	+0.119 *6*
21	Sc	47	0	3.345 d	$7/2^-$	+5.34 *2*	-0.22 *3*
21	Sc	47	766.83	274 ns	$(3/2)^+$	0.35 *5*	
22	Ti	43	0	509 ms	$7/2^-$	0.70 *7*	
22	Ti	43	3066	560 ns		+7.22 *1*	0.30 *7*
22	Ti	45	0	184.8 m	$7/2^-$	0.095 *2*	0.015 *15*
22	Ti	45	39.71	11.29 ns	$5/2^-$	-0.133 *10*	
22	Ti	45	329.50	1.099 ns	$3/2^+$	+1.05 *24*	
22	Ti	46	889.286	5.1 ps	2^+	+0.98 *24*	-0.21 *6*
22	Ti	47	0	stable	$5/2^-$	-0.78848 *1*	+0.29 *1*
22	Ti	47	159.369	210 ps	$7/2^-$	-1.9 *6*	
22	Ti	48	983.519	4.27 ps	2^+	+0.86 *38*	-0.177 *8*
22	Ti	49	0	stable	$7/2^-$	-1.10417 *1*	+0.24 *1*
22	Ti	50	1553.792	1.074 ps	2^+	2.7 *9*	+0.08 *16*
22	Ti	50	3198.735	418 ps	6^+	+9.3 *10*	
23	V	46	801.52	1.02 ms	3^+	+1.64 *3*	
23	V	48	0	15.9735 d	4^+	2.012 *11*	
23	V	48	308.27	7.11 ns	2^+	+0.444 *16*	
23	V	49	0	330 d	$7/2^-$	4.47 *5*	
23	V	49	152.928	19.90 ns	$3/2^-$	+2.37 *12*	
23	V	50	0	1.4×10^{17} y	6^+	+3.3456889 *14*	+0.209 *40*
23	V	51	0	stable	$7/2^-$	+5.14870573 *18*	-0.052 *10*
23	V	51	320.0852	184 ps	$5/2^-$	+3.86 *33*	
24	Cr	49	0	42.3 m	$5/2^-$	0.476 *3*	
24	Cr	50	783.30	8.87 ps	2^+	+1.18 *20*	-0.36 *7*
24	Cr	51	0	27.702 d	$7/2^-$	-0.934 *5*	
24	Cr	51	749.10	3.3 ns	$3/2^-$	-0.86 *12*	
24	Cr	52	1434.090	0.679 ps	2^+	+3.00 *50*	-0.082 *16*
24	Cr	53	0	stable	$3/2^-$	-0.47454 *3*	-0.15 *5*
24	Cr	53	1289.52	1.17 ps	$7/2^-$	+2.8 *49*	
24	Cr	54	834.855	7.9 ps	2^+	+1.12 *20*	-0.21 *8*
25	Mn	51	0	46.2 m	$5/2^-$	3.5683 *13*	0.42 *7*
25	Mn	52	0	5.591 d	6^+	+3.0622 *12*	+0.50 *7*
25	Mn	52	377.740	21.1 m	2^+	0.00768 *8*	
25	Mn	53	0	3.74×10^6 y	$7/2^-$	5.024 *7*	
25	Mn	53	377.89	117 ps	$5/2^-$	+3.25 *30*	
25	Mn	54	0	312.3 d	3^+	+3.2819 *13*	+0.33 *3*
25	Mn	54	54.87	49 ps	2^+	3.4 *+28 -16*	
25	Mn	54	156.30	186 ps	4^+	+5.1 *10*	
25	Mn	54	368.29	6.9 ps	5^+	+38 *21*	
25	Mn	54	407.55	1.8 ps	3^+	<+18	
25	Mn	54	1073.3	220 ps	6^+	2.8 *15*	
25	Mn	55	0	stable	$5/2^-$	+3.4532 *13*	+0.33 *1*
25	Mn	55	125.949	259 ps	$7/2^-$	4.4 *7*	
25	Mn	56	0	2.5785 h	3^+	+3.2266 *2*	
26	Fe	53	741.11	63.5 ns	$3/2^-$	-0.386 *15*	
26	Fe	54	1408.19	0.80 ps	2^+	+2.4 *3*	-0.05 *14*
26	Fe	54	2949.2	1.215 ns	6^+	8.22 *18*	
26	Fe	54	6527.1	364 ns	10^+	+7.281 *10*	+0.297 *4*
26	Fe	55	931.29	8 ps	$5/2^-$	+2.7 *12*	
26	Fe	55	1316.54	2.1 ps	$7/2^-$	+2 *2*	
26	Fe	55	1408.45	37.9 ps	$7/2^-$	-2.4 *5*	
26	Fe	56	846.776	6.07 ps	2^+	+1.22 *16*	-0.23 *3*
26	Fe	57	0	stable	$1/2^-$	+0.09044 *7*	
26	Fe	57	14.41300	98.1 ns	$3/2^-$	-0.1549 *2*	+0.082 *8*
26	Fe	57	136.4745	8.7 ns	$5/2^-$	+0.935 *10*	
26	Fe	57	366.759	10.5 ps	$3/2^-$	<0.6	
26	Fe	58	810.764	6.54 ps	2^+	+0.92 *26*	-0.273 *50*
26	Fe	59	0	44.503 d	$3/2^-$	0.29 *3*	
27	Co	55	0	17.53 h	$7/2^-$	+4.822 *3*	
27	Co	56	0	77.27 d	4^+	3.851 *12*	+0.25 *9*
27	Co	57	0	271.79 d	$7/2^-$	+4.720 *10*	+0.52 *9*
27	Co	57	1377.65	19 ps	$3/2^-$	+3.0 *6*	+0.22 *3*
27	Co	58	0	70.82 d	2^+	+4.044 *8*	+0.22 *3*
27	Co	58	53.06	10.4 μs	4^+	+4.194 *8*	
27	Co	58	111.52	0.18 ns	3^+	+2.22 *39*	
27	Co	59	0	stable	$7/2^-$	+4.627 *9*	+0.404 *40*
27	Co	59	1291.612	551 ps	$3/2^-$	+2.54 *12*	
27	Co	60	0	5.2714 y	5^+	+3.799 *8*	+0.44 *5*
27	Co	60	58.59	10.47 m	2^+	+4.40 *9*	+0.3 *5*
28	Ni	57	0	35.60 h	$3/2^-$	0.88 *6*	
28	Ni	58	1454.45	644 fs	2^+	-0.12 *24*	-0.10 *6*
28	Ni	59	339.421	68 ps	$5/2^-$	+0.43 *19*	
28	Ni	60	1332.516	0.713 ps	2^+	+0.18 *24*	+0.03 *5*
28	Ni	61	0	stable	$3/2^-$	-0.75002 *4*	+0.162 *15*
28	Ni	61	67.412	5.34 ns	$5/2^-$	+0.480 *6*	-0.20 *3*
28	Ni	62	1172.91	1.45 ps	2^+	+0.66 *12*	+0.05 *12*
28	Ni	63	87.15	1.67 μs	$5/2^-$	+0.752 *3*	
28	Ni	64	1345.79	0.88 ps	2^+	+0.92 *26*	+0.35 *20*
28	Ni	65	0	2.5172 h	$5/2^-$	0.69 *6*	
29	Cu	60	0	23.7 m	2^+	+1.219 *3*	
29	Cu	61	0	3.333 h	$3/2^-$	+2.14 *4*	
29	Cu	62	0	9.74 m	1^+	-0.380 *4*	
29	Cu	62	40.84	4.57 ns	2^+	+1.32 *3*	
29	Cu	62	390.21	11 ns	4^+	+2.67 *16*	
29	Cu	63	0	stable	$3/2^-$	+2.22329 *18*	-0.211 *4*
29	Cu	63	4496.7	4.1 ns	$17/2^+$	+1.56 *10*	
29	Cu	64	0	12.700 h	1^+	-0.217 *2*	
29	Cu	64	1594.23	20.4 ns	(6^-)	+1.06 *3*	
29	Cu	65	0	stable	$3/2^-$	+2.38167 *25*	-0.195 *4*
29	Cu	65	1115.556	0.285 ps	$5/2^-$	+4.6 *9*	
29	Cu	66	0	5.088 m	1^+	-0.282 *2*	
29	Cu	66	1154.2	600 ns	$(6)^-$	+1.038 *3*	
30	Zn	63	0	38.47 m	$3/2^-$	-0.28164 *5*	+0.29 *3*
30	Zn	64	991.54	1.80 ps	2^+	+0.92 *20*	-0.124 *12*
30	Zn	64	4635.6	94 ps	7^-	1.61	
30	Zn	65	0	244.26 d	$5/2^-$	+0.7690 *2*	-0.023 *2*
30	Zn	65	115.127	444 ps	$3/2^-$	-0.78 *20*	
30	Zn	65	206.94	150 ps	$3/2^-$	+0.73 *25*	
30	Zn	65	1065.51	575 ps	$9/2^+$	-1.7 *5*	
30	Zn	66	1039.39	1.65 ps	2^+	+0.52 *16*	
30	Zn	66	4076.0	29.8 ps	$(6)^-$	0.9	-0.081 *13*
30	Zn	66	4252.1	133 ps	$(7)^-$	0.98	
30	Zn	67	0	stable	$5/2^-$	+0.875479 *9*	+0.150 *15*
30	Zn	67	93.312	9.16 μs	$1/2^-$	+0.587 *11*	
30	Zn	67	184.579	1.04 ns	$3/2^-$	+0.50 *6*	
30	Zn	67	604.49	333 ns	$9/2^+$	-1.097 *9*	0.60 *6*
30	Zn	68	1077.37	1.51 ps	2^+	+1.00 *18*	-0.106 *16*
30	Zn	69	438.64	13.76 h	$9/2^+$	(-)1.14 *2*	-0.51 *5*
30	Zn	70	884.8	2.9 ps	2^+	+0.60 *14*	-0.233 *22*
30	Zn	71	157.7	3.96 h	$9/2^+$	(-)1.035 *18*	
31	Ga	66	66.14	23.0 ns	$1^+,2^+$	1.011 *18*	
31	Ga	66	1464.22	57.3 ns	(7)	+0.903 *21*	0.78 *4*
31	Ga	66	3043.34	0.208 ns	(9)	4.2 *9*	
31	Ga	67	0	3.2612 d	$3/2^-$	+1.8507 *3*	0.195
31	Ga	67	359.123	49 ps	$5/2^-$	1.4 *7*	
31	Ga	67	3577.95	0.16 ns	$15/2^+$	-1.7 *5*	
31	Ga	68	0	67.629 m	1^+	0.01175 *5*	0.0277 *14*
31	Ga	68	1230.05	64 ns	(7^+)	+0.735 *21*	0.72 *2*
31	Ga	69	0	stable	$3/2^-$	+2.01659 *5*	+0.168
31	Ga	70	879.1	22.7 ns	4^-	-0.26 *10*	
31	Ga	71	0	stable	$3/2^-$	+2.562266 *18*	+0.106
31	Ga	72	0	14.10 h	3^-	-0.13224 *2*	+0.52
32	Ge	67	751.70	110.9 ns	$9/2^+$	-0.849 *18*	
32	Ge	68	3696.43	0.48 ps	6^+	+2.4	
32	Ge	68	3883.57	132 ps	6	0.53 *11*	
32	Ge	68	4054.39	118 ps	7^-	0.78 *12*	
32	Ge	68	4837.71	1.04 ps	8^+	+0.80 *32*	
32	Ge	68	5050.02	0.49 ps	8^+	-2.2 *10*	
32	Ge	69	0	39.05 h	$5/2^-$	0.735 *7*	0.024 *5*
32	Ge	69	397.946	2.81 μs	$9/2^+$	-1.0011 *32*	
32	Ge	70	1039.25	1.30 ps	2^+	+0.936 *52*	+0.03 *6* or +0.09 *6*
32	Ge	71	0	11.43 d	$1/2^-$	+0.547 *5*	
32	Ge	71	174.949	79 ns	$5/2^-$	+1.018 *10*	
32	Ge	71	198.367	20.40 ms	$9/2^+$	-1.0413 *7*	0.34 *5*
32	Ge	72	834.14	3.35 ps	2^+	+0.80 *7*	-0.13 *6*
32	Ge	73	0	stable	$9/2^+$	-0.8794677 *2*	-0.173 *26*
32	Ge	73	13.275	2.95 μs	$5/2^+$	-0.0941 *25*	-0.4 *3*
32	Ge	74	595.852	12.35 ps	2^+	+0.87 *4*	-0.25 *6*
32	Ge	74	1204.209	4.9 ps	2^+	+0.82 *24*	
32	Ge	75	0	82.78 m	$1/2^-$	+0.510 *5*	
32	Ge	76	562.93	18.2 ps	2^+	+0.84 *5*	-0.19 *6*
33	As	69	0	15.2 m	$5/2^-$	1.2 *2*	
33	As	69	1306.66	1.35 ns	$(9/2^+)$	+4.7 *6*	
33	As	70	0	52.6 m	$4(^+)$	+2.1061 *2*	+0.094 *24*
33	As	71	0	65.28 h	$5/2^-$	(+)1.6735 *18*	-0.021 *6*
33	As	71	1000.21	19.8 ns	$9/2^+$	+5.15 *9*	
33	As	72	0	26.0 h	2^-	-2.1566 *3*	-0.082 *24*
33	As	72	213.69	85 ns	3^+	+1.580 *18*	
33	As	73	67.03	4.95 ns	$5/2^-$	+1.63 *10*	0.356 *12*
33	As	73	427.76	5.7 μs	$9/2^+$	+5.234 *14*	
33	As	74	0	17.77 d	2^-	-1.597 *3*	
33	As	74	259.25	26.8 ns	(4)	+3.24 *4*	
33	As	75	0	stable	$3/2^-$	+1.43947 *6*	+0.314 *6*
33	As	75	264.6584	11.2 ps	$3/2^-$	+0.98 *19*	
33	As	75	279.5441	280 ps	$5/2^-$	+0.81 *9*	
33	As	76	0	26.32 h	2^-	-0.906 *5*	7 *8*
33	As	76	45.0	1.93 μs	(1^+)	+0.559 *5*	
33	As	77	264.401	0.35 ns	$5/2^-$	+0.83 *7*	
33	As	77	475.428	114.0 μs	$9/2^+$	+5.525 *9*	
33	As	77	631.799	60 ps	$5/2^+$	+2.5 *4*	
34	Se	73	0	7.15 h	$9/2^+$	0.87 *5*	
34	Se	74	634.76	7.08 ps	2^+		-0.36 *7*

Nucleus Z	El	A	Level energy	Half-life	J^π	μ (nm)	Q (b)
34	Se	75	0	119.779 d	$5/2^+$	0.67 *4*	1.0
34	Se	76	559.101	12.3 ps	2^+	+0.80 *22*	-0.34 *7*
34	Se	77	0	stable	$1/2^-$	+0.5350422 *6*	
34	Se	77	249.7868	9.68 ns	$5/2^-$	+1.12 *2*	1.1 *5*
34	Se	77	439.4507	23.0 ps	$5/2^-$	+1.02 *28*	
34	Se	78	613.727	9.7 ps	2^+	+0.82 *22*	-0.26 *9*
34	Se	79	0	6.5×10^4 y	$7/2^+$	-1.018 *15*	+0.8
34	Se	80	666.16	8.56 ps	2^+	+0.84 *24*	-0.31 *7*
34	Se	82	654.69	13.1 ps	2^+	+0.86 *24*	-0.22 *7*
35	Br	73	240.3	35.0 ns	$(3/2,5/2)^-$	1.97 *13*	
35	Br	74	0+x	46 m	$4(^-)$	1.45 *13*	
35	Br	75	0	96.7 m	$3/2^-$	0.75 *11*	
35	Br	76	0	16.2 h	1^-	-0.54821 *2*	0.270 *3*
35	Br	77	0	57.036 h	$3/2^-$	0.92 *5*	
35	Br	77	129.64	9.3 ns	$5/2^+$		0.4
35	Br	78	32.3	8.3 ns	(2^-)	-1.12 *4*	
35	Br	78	180.82	119.2 μs	(4^+)	+4.114 *12*	
35	Br	79	0	stable	$3/2^-$	+2.106400 *4*	+0.331 *4*
35	Br	80	0	17.68 m	1^+	0.5140 *6*	0.196 *3*
35	Br	80	37.0526	7.43 ns	2^-	-1.67 *12*	0.173 *6*
35	Br	80	85.843	4.4205 h	5^-	+1.3177 *6*	+0.751 *10*
35	Br	81	0	stable	$3/2^-$	+2.270562 *4*	+0.276 *4*
35	Br	81	536.20	34.6 μs	$9/2^+$	5.694 *45*	
35	Br	82	0	35.30 h	5^-	+1.6270 *5*	+0.751 *10*
36	Kr	78	455.04	23.9 ps	2^+	+1.08 *10*	
36	Kr	79	147.07	77.7 ns	$5/2^-$	+1.124 *10*	0.45 *3*
36	Kr	83	0	stable	$9/2^+$	-0.970669 *3*	+0.253 *5*
36	Kr	83	9.396	147 ns	$7/2^+$	-0.943 *2*	+0.495 *10*
36	Kr	84	3235.9	1.84 μs	(8^+)	-1.968 *16*	
36	Kr	84	5373.2	45 ns	(12^+)	+1.7 *4*	
36	Kr	85	0	10.756 y	$9/2^+$	1.000 *2*	+0.433 *9*
36	Kr	87	0	76.3 m	$5/2^+$	-1.018 *5*	
36	Kr	93	0	1.286 s	$(1/2^+)$	-0.4	
37	Rb	76	0	39.1 s	1	-0.3726228 *14*	+0.38 *15*
37	Rb	77	0	3.75 m	$3/2^-$	+0.6544680 *16*	+0.70 *4*
37	Rb	78	103.3+x	5.74 m	$4(^-)$	+2.5485 *21*	0.81 *4*
37	Rb	79	0	22.9 m	$5/2^+$	+3.3579 *12*	-0.098 *22*
37	Rb	80	0	34 s	1^+	-0.0836 *6*	+0.348 *20*
37	Rb	80	486.0+x	1.60 μs	(6,7)		0.51 *5*
37	Rb	81	0	4.576 h	$3/2^-$	+2.0595 *14*	+0.398 *23*
37	Rb	81	86.31	30.5 m	$9/2^+$	+5.5980 *17*	-0.743 *57*
37	Rb	82	0	1.273 m	1^+	+0.5545083 *11*	+0.19 *7*
37	Rb	82	80	6.472 h	5^-	+1.5133 *24*	+1.01 *12*
37	Rb	83	0	86.2 d	$5/2^-$	+1.4249 *8*	+0.196 *22*
37	Rb	84	0	32.77 d	2^-	-1.324116 *2*	-0.015 *35*
37	Rb	84	463.62	20.26 m	6^-	+0.2129331 *10*	+0.57 *27*
37	Rb	85	0	stable	$5/2^-$	+1.3533515 *8*	+0.23 *4*
37	Rb	85	514.0083	1.015 μs	$9/2^+$	+6.046 *10*	
37	Rb	85	2826.57	12.5 ns	$(19/2)^-$	≤1.6	
37	Rb	86	0	18.631 d	2^-	-1.6920 *14*	+0.19 *3*
37	Rb	86	556.0	1.017 m	6^-	+1.8150 *10*	+0.37 *10*
37	Rb	87	0	4.75×10^{10} y	$3/2^-$	+2.751818 *2*	+0.127 *1*
37	Rb	88	0	17.78 m	2^-	+0.508 *5*	-0.01 *10*
37	Rb	90	106.90	258 s	3^-	+1.61598 *64*	+0.204 *45*
37	Rb	91	0	58.4 s	$3/2(^-)$	+2.1815 *15*	+0.154 *26*
37	Rb	93	0	5.84 s	$5/2^-$	+1.4095 *16*	+0.18 *4*
37	Rb	94	0	2.702 s	$3(^-)$	+1.4984 *18*	+0.163 *50*
37	Rb	95	0	377.5 ms	$5/2^-$	+1.3336 *34*	+0.21 *7*
37	Rb	96	0	0.199 s	2^+	+1.4658 *17*	+0.25 *6*
37	Rb	97	0	169.9 ms	$3/2(^+)$	+1.8410 *21*	+0.581 *44*
38	Sr	78	278.5	155 ps	(2^+)		3.29 *19*
38	Sr	78	782.2	5.1 ps	(4^+)		3.47 *17*
38	Sr	79	0	2.25 m	$(3/2^-)$	-0.474 *2*	+0.74 *6*
38	Sr	81	0	22.3 m	$1/2^-$	+0.5440 *4*	
38	Sr	83	0	32.41 h	$7/2^+$	-0.8298 *3*	+0.823 *50*
38	Sr	83	259.15	4.95 s	$1/2^-$	+0.582 *1*	
38	Sr	84	793.30	3.2 ps	2^+	+0.84 *10*	
38	Sr	84	3332.25	157 ps	(8^+)	-1.14 *58*	
38	Sr	85	0	64.84 d	$9/2^+$	-1.0005 *3*	+0.323 *20*
38	Sr	85	238.66	67.63 m	$1/2^-$	+0.6008 *4*	
38	Sr	86	1076.68	1.66 ps	2^+	+0.55 *10*	
38	Sr	86	2955.63	0.45 μs	(8^+)	-1.928 *24*	
38	Sr	87	0	stable	$9/2^+$	-1.0936030 *13*	+0.335 *20*
38	Sr	87	388.532	2.803 h	$1/2^-$	+0.6282 *6*	
38	Sr	88	1836.087	0.162 ps	2^+	+2.30 *34*	
38	Sr	89	0	50.53 d	$5/2^+$	-1.1488 *7*	-0.274 *19*
38	Sr	91	0	9.63 h	$5/2^+$	-0.8868 *6*	+0.044 *4*
38	Sr	93	0	7.423 m	$5/2^+$	-0.7942 *5*	+0.265 *19*
38	Sr	95	0	23.90 s	$1/2^+$	-0.537 *2*	
38	Sr	97	0	426 ms	$1/2^+$	-0.4983 *9*	
38	Sr	98	144.225	2.80 ns	2^+	0.76 *14*	
38	Sr	99	0	0.269 s	$3/2^+$	-0.261 *15*	+0.84 *8*
39	Y	83	145.00	119 ps	$(7/2^+)$	+2.1 *6*	
39	Y	83	595.0	5.4 ps	$(13/2^+)$	+8.45 *26*	
39	Y	85	19.8	4.86 h	$9/2^+$	6.2 *5*	
39	Y	85	266.30	178 ns	$5/2^-$	+1.33 *8*	
39	Y	86	0	14.74 h	4^-	<0.6	
39	Y	86	218.30	48 m	(8^+)	4.8 *3*	
39	Y	86	242.80	28.5 ns	2^-	-1.06 *6*	
39	Y	87	380.79	13.37 h	$9/2^+$	6.10 *+32 -15*	
39	Y	88	674.55	13.9 ms	$(8)^+$	+4.87 *5*	
39	Y	89	0	stable	$1/2^-$	-0.1374154 *4*	
39	Y	90	0	64.10 h	2^-	-1.630 *8*	-0.155 *3*
39	Y	90	202.53	250 ps	3^-	-0.85 *7*	
39	Y	90	682.03	3.19 h	7^+	5.1 *5*	
39	Y	91	0	58.51 d	$1/2^-$	0.1641 *8*	

Nucleus Z	El	A	Level energy	Half-life	J^π	μ (nm)	Q (b)
40	Zr	88	2887.79	1.320 μs	(8^+)	-1.811 *16*	+0.51 *3*
40	Zr	89	2995.23	5.12 ns	$(21/2)^+$	+9.3 *4*	
40	Zr	90	2319.000	809.2 ms	5^-	6.25 *13*	
40	Zr	90	3589.419	131 ns	8^+	+10.85 *6*	-0.51 *3*
40	Zr	91	0	stable	$5/2^+$	-1.30362 *2*	-0.206 *10*
40	Zr	91	2287.89	29.0 ns	$(15/2)^-$	+5.25 *8*	
40	Zr	91	3167.3	4.35 μs	$(21/2^+)$	+9.82 *8*	(-)0.86 *5*
40	Zr	92	934.49	5.0 ps	2^+	-0.06 *10*	
40	Zr	94	918.75	7.7 ps	2^+	-0.52 *12*	
40	Zr	97	1264.41	103 ns	$7/2^+$	+1.37 *14*	
40	Zr	100	212.530	0.58 ns	2^+	0.44 *10*	
41	Nb	90	0	14.60 h	8^+	4.961 *4*	
41	Nb	90	122.370	63 μs	6^+	+3.720 *24*	
41	Nb	90	1880.21	472 ns	(11^-)	+8.778 *33*	
41	Nb	91	1984.23	10.0 ns	$(13/2^-)$	+8.14 *13*	
41	Nb	91	2034.36	3.76 μs	$(17/2^-)$	+10.82 *14*	
41	Nb	91	3467.03		$(21/2^+)$	+12.4 *19*	
41	Nb	92	135.5	10.15 d	$(2)^+$	6.137 *4*	
41	Nb	92	225.7	5.9 μs	$(2)^-$	-1.398 *14*	
41	Nb	92	2203.3	167 ns	(11^-)	+9.68 *33*	
41	Nb	93	0	stable	$9/2^+$	+6.1705 *3*	-0.32 *2*
41	Nb	95	0	34.975 d	$9/2^+$	6.141 *5*	
41	Nb	96	0	23.35 h	6^+	4.976 *4*	
41	Nb	97	0	72.1 m	$9/2^+$	6.153 *5*	
42	Mo	90	2875.1	1.12 μs	(8^+)	-1.391 *14*	0.58 *3*
42	Mo	91	2267.4	47 ns	$21/2^+$	+8.88 *6*	
42	Mo	91	2279.6	38 ns	$(17/2^-)$	+4.51 *6*	
42	Mo	92	2760.1	190 ns	8^+	+11.30 *5*	-0.34
42	Mo	92	4485.7	8.77 ns	(11^-)	+13.88 *28*	
42	Mo	93	2424.89	6.85 h	$21/2^+$	(+)9.93 *8*	
42	Mo	94	871.087	2.88 ps	2^+		-0.13 *8* or +0.01 *8*
42	Mo	94	2955.85	98 ns	(8^+)	+10.54 *12*	0.47 *1*
42	Mo	95	0	stable	$5/2^+$	-0.9142 *1*	-0.022 *1*
42	Mo	95	204.1176	751 ps	$3/2^+$	-0.404 *12*	
42	Mo	96	778.245	3.66 ps	2^+		-0.20 *8* or +0.04 *8*
42	Mo	97	0	stable	$5/2^+$	-0.9335 *1*	+0.255 *13*
42	Mo	98	787.384	3.49 ps	2^+	+0.68 *36*	-0.26 *9*
42	Mo	99	0	65.94 h	$1/2^+$	0.375 *3*	
42	Mo	99	97.785	15.5 μs	$5/2^+$	-0.775 *5*	
42	Mo	100	535.57	13.6 ps	2^+	+0.68 *36*	-0.42 *9* or -0.10 *9*
42	Mo	102	296.597	114 ps	2^+	0.84 *14*	
42	Mo	104	192.3	721 ps	2^+	0.48 *30*	
43	Tc	93	0	2.75 h	$9/2^+$	6.26 *10*	
43	Tc	93	2185.16	10.2 μs	$(17/2)^-$	+10.46 *5*	
43	Tc	94	0	293 m	7^+	5.08 *8*	
43	Tc	95	0	20.0 h	$9/2^+$	5.89 *10*	
43	Tc	96	0	4.28 d	7^+	+5.04 *8*	
43	Tc	96	121.26	25.6 ns	$(2)^-$	-0.466 *22*	
43	Tc	99	0	2.111×10^5 y	$9/2^+$	+5.6847 *4*	-0.129 *6*
43	Tc	99	140.5108	0.19 ns	$7/2^+$	+3.60 *88*	
43	Tc	99	181.0939	3.61 ns	$5/2^+$	+3.291 *63*	
44	Ru	93	2082.5	2.15 μs	$(21/2)^+$	+8.970 *21*	+0.04 *1*
44	Ru	93	2279.3	35 ns	$(17/2^-)$	+4.36 *17*	
44	Ru	94	2498.45	65 ns	(6^+)	+8.12 *5*	
44	Ru	94	2644.55	71 μs	(8^+)	+11.10 *4*	
44	Ru	95	0	1.643 h	$5/2^+$	(-)0.861 *7*	
44	Ru	95	2539.8	10.05 ns	$21/2(^+)$	+9.17 *7*	
44	Ru	96	832.57	3.0 ps	2^+		-0.13 *9*
44	Ru	97	0	2.9 d	$5/2^+$	(-)0.787 *8*	
44	Ru	97	2738.8	7.8 ns	$(21/2^+)$	+9.2 *8*	
44	Ru	98	652.44	6.42 ps	2^+	+0.8 *6*	-0.20 *9* or -0.01 *9*
44	Ru	99	0	stable	$5/2^+$	-0.641 *5*	+0.079 *4*
44	Ru	99	89.68	20.5 ns	$3/2^+$	-0.284 *6*	+0.231 *12*
44	Ru	100	539.53	12.8 ps	2^+	+0.94 *12*	-0.43 *7* or -0.20 *7*
44	Ru	101	0	stable	$5/2^+$	-0.7188 *60*	+0.457 *23*
44	Ru	101	127.23	0.655 ns	$3/2^+$	-0.210 *5*	
44	Ru	102	475.079	18.3 ps	2^+	+0.71 *6*	-0.57 *7* or -0.35 *7*
44	Ru	103	0	39.26 d	$3/2^+$	(-)0.200 *7*	(+)0.62 *2*
44	Ru	104	358.02	56.4 ps	2^+	+0.82 *10*	-0.70 *8* or -0.35 *8*
44	Ru	105	0	4.44 h	$3/2^+$	(-)0.32 *+8 -20*	
45	Rh	95	2236.36	19 ns	$(17/2^-)$	+10.88 *34*	
45	Rh	99	64.3	4.7 h	$9/2^+$	5.668 *12*	
45	Rh	100	74.78	214 ns	$(2)^+$	+4.324 *8*	
45	Rh	100	219.6	130 ns	(7^+)	+4.8 *4*	
45	Rh	101	157.32	4.34 d	$9/2^+$	+5.475 *12*	
45	Rh	102	0	207 d	$(1^-,2^-)$	0.45 *35*	
45	Rh	102	140.75	2.9 y	$6(^+)$	4.044 *12*	
45	Rh	103	0	stable	$1/2^-$	-0.08840 *2*	
45	Rh	103	39.756	56.12 m	$7/2^+$	4.540 *11*	
45	Rh	103	93.041	1.11 ns	$9/2^+$	+4.9 *8*	
45	Rh	103	294.984	6.7 ps	$3/2^-$	+0.81 *8*	-0.32 *20*
45	Rh	103	357.408	74 ps	$5/2^-$	+1.09 *5*	-0.41 *18*
45	Rh	103	847.58	1.9 ps	$7/2^-$	+2.0 *6*	
45	Rh	103	920.10	5.6 ps	$9/2^-$	+2.8 *5*	
45	Rh	105	0	35.36 h	$7/2^+$	4.452 *10*	
45	Rh	106	0	29.80 s	1^+	2.575 *7*	
46	Pd	96	2530.8	2.22 μs	8^+	+10.97 *6*	
46	Pd	96	7040	35 ns	(15^+)	+12.5 *5*	
46	Pd	101	0	8.47 h	$(5/2^+)$	(-)0.663 *18*	
46	Pd	102	556.53	11.5 ps	2^+	+0.82 *8*	-0.20 *15*
46	Pd	103	784.86	25 ns	$11/2^-$	-1.05 *6*	
46	Pd	104	555.81	9.9 ps	2^+	+0.92 *8*	-0.47 *10* or -0.45 *1010*
46	Pd	105	0	stable	$5/2^+$	-0.642 *3*	+0.660 *11*
46	Pd	105	280.51	67 ps	$3/2^+$	-0.074 *13*	
46	Pd	105	319.216	39 ps	$5/2^+$	+0.95 *20*	

Nucleus Z El A	Level energy	Half-life	J^π	μ (nm)	Q (b)
46 Pd 105	644.53	126 ps	$7/2^-$	-1.49 *9*	
46 Pd 106	511.851	12.1 ps	2^+	+0.80 *4*	-0.51 *7*
46 Pd 106	1128.01	3.12 ps	2^+	+0.60 *12*	
46 Pd 108	433.938	23.4 ps	2^+	+0.72 *6*	-0.58 *4*
46 Pd 110	373.81	43 ps	2^+	+0.62 *6*	-0.72
47 Ag 101	0	11.1 m	$9/2^+$	5.627 *11*	
47 Ag 102	0	12.9 m	5^+	4.6 *7*	
47 Ag 102	9.3	7.7 m	2^+	+4.14 *25*	
47 Ag 103	0	65.7 m	$7/2^+$	+4.47 *5*	
47 Ag 104	0	69.2 m	5^+	+3.919 *3*	
47 Ag 104	6.9	33.5 m	2^+	+3.7 *2*	
47 Ag 105	0	41.29 d	$1/2^-$	0.1014 *10*	
47 Ag 105	25.465	7.23 m	$7/2^+$	+4.414 *13*	
47 Ag 105	1733.90	5.1 ns	$(15/2)^+$	+3.73 *14*	
47 Ag 106	0	23.96 m	1^+	+2.85 *20*	
47 Ag 106	89.66	8.28 d	6^+	(+)3.709 *4*	+1.08 *6*
47 Ag 107	0	stable	$1/2^-$	-0.113570 *20*	
47 Ag 107	93.13	44.3 s	$7/2^+$	(+)4.398 *5*	0.98 *11*
47 Ag 107	324.81	5.0 ps	$3/2^-$	+0.94 *14*	
47 Ag 107	423.15	29.8 ps	$5/2^-$	+1.03 *18*	
47 Ag 108	0	2.37 m	1^+	2.6884 *7*	
47 Ag 108	109.440	418 y	6^+	3.580 *20*	+1.32 *7*
47 Ag 108	215.382	45.8 ns	3^+	+3.891 *15*	
47 Ag 109	0	stable	$1/2^-$	-0.130563 *23*	
47 Ag 109	88.0341	39.6 s	$7/2^+$	+4.400 *6*	(+)1.02 *12*
47 Ag 109	311.38	5.9 ps	$3/2^-$	+0.99 *15*	-0.7
47 Ag 109	415.21	32.6 ps	$5/2^-$	+0.90 *13*	-0.3
47 Ag 110	0	24.6 s	1^+	+2.7271 *8*	0.24
47 Ag 110	117.59	249.79 d	6^+	+3.607 *4*	+1.44 *10*
47 Ag 110	118.718	36.7 ns	3^+	+3.768 *28*	
47 Ag 111	0	7.45 d	$1/2^-$	-0.146 *2*	
47 Ag 112	0	3.130 h	$2(^-)$	0.0547 *5*	
47 Ag 113	0	5.37 h	$1/2^-$	0.159 *2*	
48 Cd 100	2547.9	73 ns	(8^+)	9.9 *5*	
48 Cd 102	2718.2	56 ns	8^+	+10.32 *24*	
48 Cd 103	0	7.3 m	$(5/2^+)$	-0.81 *3*	-0.8 *7*
48 Cd 105	0	55.5 m	$5/2^+$	-0.7393 *2*	+0.43 *4*
48 Cd 105	2517.3		$(21/2^+)$	+9.17 *7*	(+)1.17 *1*
48 Cd 106	632.64	7.27 ps	2^+	+0.80 *20*	-0.28 *8*
48 Cd 106	4659.71	62 ns	$12(^+)$	+8.88 *24*	
48 Cd 107	0	6.50 h	$5/2^+$	-0.6150554 *11*	+0.68 *7*
48 Cd 107	845.54	71 ns	$11/2^-$	-1.041 *11*	(-)0.94 *1*
48 Cd 107	2678.88	55 ns	$21/2^+$	+9.10 *10*	+1.21 *6*
48 Cd 108	632.96	6.9 ps	2^+	+0.68 *18*	-0.45 *8*
48 Cd 109	0	462.6 d	$5/2^+$	-0.8278461 *15*	+0.69 *7*
48 Cd 109	463.0	10.9 μs	$11/2^-$	-1.096 *2*	(-0.92)
48 Cd 110	657.7638	5.39 ps	2^+	+0.56 *8*	-0.40 *4*
48 Cd 111	0	stable	$1/2^+$	-0.5948861 *9*	
48 Cd 111	245.42	85.0 ns	$5/2^+$	-0.7656 *25*	+0.77 *12*
48 Cd 111	396.22	48.54 m	$11/2^-$	-1.1051 *4*	-0.85 *9*
48 Cd 111	620.2	9.7 ps	$5/2^+$	+0.28 *12*	
48 Cd 112	617.57	6.51 ps	2^+	+0.64 *16*	-0.37 *4*
48 Cd 113	0	9.3×10^{15} y	$1/2^+$	-0.6223009 *9*	
48 Cd 113	263.59	14.1 y	$11/2^-$	-1.087784 *2*	-0.71 *7*
48 Cd 113	298.49	29 ps	$3/2^+$	-0.39 *80*	
48 Cd 113	584.14	6.9 ps	$5/2^+$	+0.15 *12*	
48 Cd 114	558.456	10.2 ps	2^+	+0.58 *14*	-0.36 *8*
48 Cd 115	0	53.46 h	$1/2^+$	-0.6484259 *12*	
48 Cd 115	181.0	44.6 d	$11/2^-$	-1.0410343 *15*	-0.54 *5*
48 Cd 116	513.40	14.07 ps	2^+	+0.60 *14*	-0.42 *4*
49 In 105	0	5.07 m	$(9/2)^+$	+5.675 *5*	+0.83 *5*
49 In 106	0	6.2 m	7^+	+4.916 *7*	+0.97 *6*
49 In 107	0	32.4 m	$9/2^+$	+5.585 *8*	+0.807 *52*
49 In 108	0	58.0 m	7^+	+4.561 *3*	+1.005 *7*
49 In 108	29.75	39.6 m	2^+	+4.935 *5*	+0.467 *14*
49 In 109	0	4.2 h	$9/2^+$	+5.538 *4*	+0.841 *27*
49 In 110	0	4.9 h	7^+	+4.713 *8*	+1.000 *22*
49 In 110	62.09	69.1 m	2^+	+4.365 *4*	+0.35
49 In 111	0	2.8049 d	$9/2^+$	+5.503 *7*	+0.804 *22*
49 In 111	2716.9	14.3 ns	$21/2^+$	+5.27 *19*	
49 In 112	0	14.97 m	1^+	+2.82 *3*	+0.087
49 In 112	156.58	20.56 m	4^+	+5.277 *4*	+0.714 *10*
49 In 112	350.82	0.69 μs	7^+	+4.725 *42*	1.1 *1*
49 In 112	613.73	2.81 μs	8^-	+3.08 *4*	-0.086 *3*
49 In 113	0	stable	$9/2^+$	+5.5289 *2*	+0.799
49 In 113	391.691	1.6582 h	$1/2^-$	-0.21074 *2*	
49 In 114	0	71.9 s	1^+	+2.817 *11*	
49 In 114	190.34	49.51 d	5^+	+4.653 *5*	+0.739 *12*
49 In 115	0	4.41×10^{14} y	$9/2^+$	+5.5408 *2*	+0.86 *4*
49 In 115	336.24	4.486 h	$1/2^-$	-0.24398 *5*	
49 In 115	828.58	5.78 ns	$3/2^+$	+0.74 *13*	-0.60 *2*
49 In 116	0	14.10 s	1^+	2.7863 *10*	0.09 *2*
49 In 116	127.267	54.41 m	5^+	+4.435 *15*	+0.802 *12*
49 In 116	289.660	2.18 s	8^-	+3.215 *11*	+0.310 *9*
49 In 117	0	43.2 m	$9/2^+$	+5.519 *4*	+0.829 *10*
49 In 117	315.302	116.2 m	$1/2^-$	-0.25174 *3*	
49 In 117	588.654	0.192 ns	$3/2^-$	≥0.84	
49 In 117	659.761	53.6 ns	$3/2^+$	+0.938 *10*	(-)0.59 *1*
49 In 118	60	4.45 m	5^+	+4.231 *9*	+0.796 *8*
49 In 118	200	8.5 s	8^-	+3.321 *11*	+0.441 *7*
49 In 119	0	2.4 m	$9/2^+$	+5.515 *10*	+0.854 *7*
49 In 119	311.37	18.0 m	$1/2^-$	-0.319 *5*	
49 In 119	654.27	130 ns	$1/2^+,3/2^+$	+0.53 *3*	0.60 *2*
49 In 120	x+0	46.2 s	$(3,4,5)^+$	+4.295 *5*	+0.810 *17*
49 In 120	y+0	47.3 s	(8^-)	+3.692 *4*	+0.530 *10*
49 In 121	0	23.1 s	$9/2^+$	+5.502 *5*	+0.814 *11*
49 In 121	313.69	3.88 m	$1/2^-$	-0.355 *4*	

Nucleus Z El A	Level energy	Half-life	J^π	μ (nm)	Q (b)
49 In 122	0+x	10.3 s	5^+	+4.318 *5*	+0.806 *20*
49 In 122	220	10.8 s	8^-	+3.781 *6*	+0.592 *21*
49 In 123	0	5.98 s	$9/2^+$	+5.491 *7*	+0.757 *9*
49 In 123	327.21	47.8 s	$1/2^-$	-0.400 *4*	
49 In 124	0	3.17 s	3^+	+4.043 *11*	+0.61 *7*
49 In 124	190	2.4 s	(5 to 8)	+3.888 *9*	+0.664 *9*
49 In 125	0	2.36 s	$9/2(^+)$	+5.502 *9*	+0.710 *36*
49 In 125	360.12	12.2 s	$1/2(^-)$	-0.433 *4*	
49 In 126	0	1.60 s	$3(^+)$	+4.034 *11*	+0.494 *49*
49 In 126	102	1.64 s	$7^-,8^-,9^-$	+4.061 *4*	0.683 *12*
49 In 127	0	1.09 s	$(9/2^+)$	+5.522 *8*	+0.59 *3*
50 Sn 108	2365.1	7.6 ns	6^+	-0.24 *12*	
50 Sn 108	3561.2	71 ps	8^+	>0.8	
50 Sn 109	0	18.0 m	$5/2(^+)$	-1.079 *6*	+0.31 *10*
50 Sn 110	2479.9	5.6 ns	6^+	0.072 *18*	0.34 *4*
50 Sn 111	0	35.3 m	$7/2^+$	+0.608 *4*	+0.18 *9*
50 Sn 111	979.6	9.2 ns	$11/2^-$	-1.26 *11*	
50 Sn 112	1256.85	0.37 ps	2^+	+0.74 *26*	-0.03 *11*
50 Sn 112	2549.30	13.7 ns	6^+	+0.534 *30*	0.25 *2*
50 Sn 113	0	115.09 d	$1/2^+$	-0.8791 *6*	
50 Sn 113	738.4	86 ns	$11/2^-$	-1.298 *22*	0.41 *4*
50 Sn 114	1299.92	0.30 ps	2^+	+	
50 Sn 114	3087.4	733 ns	7^-	-0.567 *4*	0.32 *1*
50 Sn 115	0	stable	$1/2^+$	-0.91883 *7*	
50 Sn 115	612.8	3.26 μs	$7/2^+$	+0.683 *10*	0.26
50 Sn 115	713.4	159 μs	$11/2^-$	-1.378 *11*	0.38 *6*
50 Sn 116	1293.54	0.374 ps	2^+	-0.32 *20*	-0.17 *4*
50 Sn 116	2365.92	348 ns	5^-	-0.376 *3*	0.26 *1*
50 Sn 116	3547.0	833 ns	10^+	-2.326 *15*	0.50
50 Sn 117	0	stable	$1/2^+$	-1.00104 *7*	
50 Sn 117	158.562	0.279 ns	$3/2^+$	+0.658 *46*	
50 Sn 117	314.58	13.60 d	$11/2^-$	-1.3955 *10*	-0.42 *5*
50 Sn 118	1229.652	0.485 ps	2^+	+0.04 *20*	-0.05 *14*
50 Sn 118	2321.24	21.7 ns	5^-	-0.300 *25*	0.16 *2*
50 Sn 118	2574.92	230 ns	7^-	-0.689 *4*	0.32
50 Sn 118	3108.07	2.52 μs	$9^+,10^+$	-2.447 *7*	0.41
50 Sn 119	0	stable	$1/2^+$	-1.04728 *7*	
50 Sn 119	23.871	18.03 ns	$3/2^+$	+0.633 *3*	0.094 *4*
50 Sn 119	89.531	293.1 d	$11/2^-$	-1.40 *8*	0.21 *2*
50 Sn 120	1171.34	0.642 ps	2^+	-0.28 *14*	-0.05 *10*
50 Sn 120	2284.3	5.55 ns	5^-	-0.37 *5*	0.021 *8*
50 Sn 121	0	27.06 h	$3/2^+$	+0.6978 *10*	-0.02 *2*
50 Sn 121	6.30	55 y	$11/2^-$	-1.3877 *9*	-0.14 *3*
50 Sn 122	1140.55	0.76 ps	2^+	-0.14 *22*	<+0.14
50 Sn 123	0	129.2 d	$11/2^-$	-1.3700 *9*	+0.03 *4*
50 Sn 124	1131.64	0.92 ps	2^+	-0.30 *20*	-0.01 *17*
50 Sn 125	0	9.64 d	$11/2^-$	-1.348 *2*	+0.09 *17*
51 Sb 112	796.4	0.56 μs	(8^-)	+2.192 *8*	0.71 *7*
51 Sb 114	495.5	219 μs	(8^-)	+2.265 *5*	0.66 *11*
51 Sb 115	0	32.1 m	$5/2^+$	+3.46 *1*	-0.36 *6*
51 Sb 115	1300.2	6.2 ns	$11/2^-$	+5.53 *8*	
51 Sb 115	2796.2	159 ns	$(19/2)^-$	+2.54 *4*	0.52 *6*
51 Sb 116	0	15.8 m	3^+	2.715 *9*	
51 Sb 116	93.99	200 ns	1^+	+2.47 *9*	
51 Sb 117	0	2.80 h	$5/2^+$	+3.43 *6*	-0.30 *21*
51 Sb 117	1322.5	3.8 ns	$11/2^-$	+5.35 *9*	
51 Sb 117	3130.7	355 μs	$(25/2)^+$	+1.500 *9*	0.75 *9*
51 Sb 117	3230.6	290 ns	$(23/2^-)$	+5.03 *6*	>1.7
51 Sb 118	0	3.6 m	1^+	2.47 *7*	
51 Sb 118	50.811	20.6 μs	$(2,3)^+$	+2.63 *5*	0.57 *14*
51 Sb 118	249	5.00 h	8^-	2.32 *4*	
51 Sb 118	269.82	13.3 ns	$(3)^-$	-3.76 *9*	0.25 *5*
51 Sb 118	963.88	22.6 ns	$(7)^+$	+4.76 *13*	1.75 *30*
51 Sb 119	0	38.19 h	$5/2^+$	+3.45 *1*	-0.37 *6*
51 Sb 119	2552.9	134 ns	$(19/2^-)$	+0.336 *15*	
51 Sb 120	0	15.89 m	1^+	2.34 *22*	
51 Sb 120	0+x	5.76 d	8^-	2.34 *4*	
51 Sb 120	78.16	246 ns	3^+	+2.571 *6*	0.41 *4*
51 Sb 121	0	stable	$5/2^+$	+3.3634 *3*	-0.36 *4*
51 Sb 121	37.133	3.46 ns	$7/2^+$	+2.518 *7*	-0.48 *5*
51 Sb 122	0	2.70 d	2^-	-1.905 *20*	+0.85 *11*
51 Sb 122	61.4131	1.86 μs	3^+	+2.983 *12*	0.41 *4*
51 Sb 122	137.4726	0.53 ms	5^+	+3.05 *10*	
51 Sb 123	0	stable	$7/2^+$	+2.5498 *2*	-0.49 *5*
51 Sb 124	0	60.20 d	3^-	1.20 *2*	+1.9 *4*
51 Sb 124	40.8040	3.2 μs	$3^+,4^+$	+2.970 *33* for J=3	
51 Sb 124	125.2310	86 ns	6^-	+0.384 *12*	
51 Sb 125	0	2.7582 y	$7/2^+$	+2.630 *35*	
51 Sb 126	0	12.46 d	$(8)^-$	1.28 *7*	
51 Sb 127	0	3.85 d	$7/2^+$	2.59 *12*	
51 Sb 128	0	9.01 h	8^-	1.31 *19*	
52 Te 115	280.3	7.5 μs	$11/2^-$	-0.954 *5*	0.8
52 Te 117	274.4	19.9 ns	$5/2^+$	-0.787 *12*	
52 Te 119	0	16.03 h	$1/2^+$	0.25 *5*	
52 Te 119	260.96	4.70 d	$11/2^-$	0.894 *6*	
52 Te 119	320.507	2.2 ns	$5/2^+$	-0.88 *20*	
52 Te 120	560.438	9.3 ps	2^+	+0.58 *6*	
52 Te 121	293.98	154 d	$11/2^-$	0.895 *10*	
52 Te 121	443.12	85.3 ns	$(7/2)^+$	+0.738 *10*	
52 Te 122	564.117	7.4 ps	2^+	+0.66 *4*	-0.57 *5*
52 Te 123	0	1×10^{13} y	$1/2^+$	-0.7369478 *8*	
52 Te 123	159.10	196 ps	$3/2^+$	0.72 *12*	
52 Te 123	247.55	119.7 d	$11/2^-$	-0.927 *8*	
52 Te 123	439.70	22 ps	$3/2^+$	+0.69 *12*	
52 Te 123	489.80	30.7 ns	$(7/2)^+$	+0.787 *14*	
52 Te 123	505.28	13.5 ps	$(5/2)^+$	+0.13 *8*	
52 Te 124	602.732	6.2 ps	2^+	+0.52 *6*	-0.45 *5*

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52 Te 125	0	stable	$1/2^+$	-0.88850513 *43*	
52 Te 125	35.4919	1.48 ns	$3/2^+$	+0.605 *4*	-0.31 *2*
52 Te 125	144.795	57.40 d	$11/2^-$	-0.985 *6*	-0.06 *2*
52 Te 125	321.107	0.703 ns	$9/2^-$	-0.918 *32*	0.12 *+5-9*
52 Te 125	443.556	19.1 ps	$3/2^+$	+0.59 *9*	
52 Te 125	463.3677	13.2 ps	$5/2^+$	+0.80 *22*	
52 Te 125	525.249	160 ps	$7/2^-$	<0	
52 Te 125	671.447	1.26 ps	$5/2^+$	-0.6 *7*	
52 Te 126	666.338	4.52 ps	2^+	+0.68 *8*	-0.20 *9*
52 Te 126	2975.2	13.5 ns	10^+	-1.52 *9*	
52 Te 127	0	9.35 h	$3/2^+$	+0.635 *4*	
52 Te 127	88.26	109 d	$11/2^-$	-1.041 *6*	
52 Te 127	340.1	0.41 ns	$(9/2)^-$	-0.963 *63*	
52 Te 128	743.219	3.32 ps	2^+	+0.50 *6*	-0.06 *5*
52 Te 129	0	69.6 m	$3/2^+$	0.702 *4*	0.055 *13*
52 Te 129	105.50	33.6 d	$11/2^-$	-1.091 *7*	
52 Te 130	839.494	2.30 ps	2^+	+0.62 *8*	-0.15 *10*
52 Te 131	0	25.0 m	$3/2^+$	0.696 *9*	
52 Te 131	182.250	30 h	$11/2^-$	-1.04 *4*	
52 Te 132	1774.10	145 ns	6^+	+4.7 *6*	
52 Te 134	1692.0	165 ns	6^+	+5.08 *15*	
52 Te 135	1555.3	0.51 μs	$(19/2^-)$	-3.8 *4*	
53 I 117	0	2.22 m	$(5/2)^+$	3.1 *2*	
53 I 118	0	13.7 m	2^-	2.0 *2*	
53 I 118	0+x	8.5 m	(7^-)	4.2 *2*	
53 I 119	0	19.1 m	$5/2^+$	(+)2.9 *1*	
53 I 119	306.9	34.6 ns	$9/2^+$	+5.40 *14*	
53 I 120	0	81.0 m	2^-	1.23 *3*	
53 I 120	0+x	53 m	4 to 8	4.2 *2*	
53 I 121	0	2.12 h	$5/2^+$	2.3 *1*	
53 I 121	2353.1	80 ns	(21/2)	+12.6 *11*	
53 I 122	0	3.63 m	1^+	0.94 *3*	
53 I 123	0	13.27 h	$5/2^+$	2.818 *7*	
53 I 123	2659.9	27.2 ns	$(21/2^+)$	+10.9 *9*	
53 I 124	0	4.18 d	2^-	1.14 *8*	
53 I 125	0	59.408 d	$5/2^+$	2.821 *5*	-0.889
53 I 125	188.414	0.34 ns	$3/2^+$	+1.06 *7*	
53 I 126	0	13.11 d	2^-	1.436 *5*	
53 I 126	110.85	55 ns		-2.235 *18*	
53 I 127	0	stable	$5/2^+$	+2.81327 *9*	-0.79
53 I 127	57.606	1.95 ns	$7/2^+$	+2.54 *5*	-0.71
53 I 127	202.860	0.39 ns	$3/2^+$	+0.97 *7*	
53 I 128	137.849	0.845 μs	4^-	-0.720 *28*	
53 I 129	0	1.57×10^7 y	$7/2^+$	+2.6210 *3*	-0.553
53 I 129	27.78	16.8 ns	$5/2^+$	+2.8045 *26*	-0.685
53 I 131	0	8.02070 d	$7/2^+$	+2.742 *1*	-0.40 *1*
53 I 131	149.715	0.95 ns	$5/2^+$	+2.8 *5*	
53 I 131	1797.073	5.9 ns	$9/2^-,11/2^-,13/2^-$		0.75
53 I 132	0	2.295 h	4^+	3.088 *7*	0.09 *1*
53 I 132	49.720	7.14 ns	3^+	+2.24 *30*	0.23 *7*
53 I 132	277.86	1.42 ns	1^+	+1.88 *11*	(-)0.170 *6*
53 I 133	0	20.8 h	$7/2^+$	+2.856 *5*	-0.27 *1*
54 Xe 117	0	61 s	$5/2(^+)$	-0.5938 *15*	
54 Xe 119	0	5.8 m	$(5/2^+)$	0.59 *6*	
54 Xe 121	0	40.1 m	$5/2(^+)$	0.65 *3*	
54 Xe 123	185.18	5.49 μs	$7/2(^-)$	-0.902 *7*	1.33 *14*
54 Xe 123	206.27	11.8 ns	$(9/2^-)$		1.06 *64*
54 Xe 124	354.02	56 ps	2^+	+0.46 *4*	
54 Xe 125	296.0	140 ns	$(7/2)^+$	+0.931 *35*	1.40 *15*
54 Xe 126	388.634	41.3 ps	2^+	0.74 *14*	
54 Xe 127	0	36.4 d	$1/2^+$	-0.5039 *2*	
54 Xe 127	342.23	36.7 ns	$7/2^+$	+0.850 *32*	
54 Xe 128	442.910	23.8 ps	2^+	+0.82 *14*	
54 Xe 128	2786.8	63 ns	8^-	-0.290 *73*	
54 Xe 129	0	stable	$1/2^+$	-0.7779763 *84*	
54 Xe 129	39.578	0.97 ns	$3/2^+$	+0.58 *9*	-0.41 *4*
54 Xe 129	236.14	8.88 d	$11/2^-$	-0.891223 *4*	
54 Xe 130	536.085	8.6 ps	2^+	+0.66 *8*	
54 Xe 130	2972.33	5.17 ns	10^+	-1.58 *21*	
54 Xe 131	0	stable	$3/2^+$	+0.6918619 *39*	-0.120 *12*
54 Xe 131	163.931	11.84 d	$11/2^-$	-0.994048 *6*	
54 Xe 132	667.720	4.7 ps	2^+	+0.76 *8*	
54 Xe 132	2214.06	90 ns	(7^-)	-0.063 *28*	0.010 *5*
54 Xe 132	2752.27	8.39 ms	(10^+)	(-)1.95 *5*	
54 Xe 133	0	5.243 d	$3/2^+$	+0.81340 *7*	+0.145 *14*
54 Xe 133	233.221	2.19 d	$11/2^-$	-1.08247 *15*	
54 Xe 135	0	9.14 h	$3/2^+$	0.90305 *22*	
54 Xe 135	526.551	15.29 m	$11/2^-$	1.10304 *20*	
54 Xe 136	1694.387	1.32 ns	4^+	3.2 *6*	
54 Xe 137	0	3.818 m	$7/2^-$	-0.9704 *10*	-0.490 *17*
54 Xe 139	0	39.68 s	$3/2^-$	-0.304 *10*	+0.40 *2*
54 Xe 141	0	1.73 s	$5/2^+$	+0.010 *4*	-0.58 *2*
54 Xe 143	0	0.30 s	$5/2^-$	-0.4599 *14*	+0.93 *3*
55 Cs 118	0+x	14 s	2	+3.876 *5*	+1.4 *2*
55 Cs 118	0+y	17 s	6,7,8	5.4 *11* for J=6	
55 Cs 119	0	43.0 s	$9/2^+$	+5.46 *3*	+2.8 *1*
55 Cs 119	0+x	30.4 s	$3/2(^+)$	+0.838 *5*	+0.9 *1*
55 Cs 120	x+0	64 s	2	+3.87 *2*	+1.45 *2*
55 Cs 121	0	155 s	$3/2(^+)$	+0.770 *4*	+0.838 *9*
55 Cs 121	68.5	122 s	$9/2(^+)$	+5.41 *3*	+2.69 *5*
55 Cs 122	0	21.0 s	1^+	-0.1333 *9*	-0.19 *1*
55 Cs 122	500	4.5 m	8^-	+4.77 *2*	+3.29 *8*
55 Cs 123	0	5.94 m	$1/2^+$	+1.377 *7*	
55 Cs 124	0	30.8 s	1^+	+0.673 *3*	-0.74 *3*
55 Cs 125	0	45 m	$(1/2^+)$	+1.409 *7*	
55 Cs 126	0	1.64 m	1^+	+0.777 *4*	-0.68 *2*
55 Cs 127	0	6.25 h	$1/2(^+)$	+1.459 *7*	
55 Cs 128	0	3.66 m	1^+	+0.974 *5*	-0.570 *8*
55 Cs 129	0	32.06 h	$1/2^+$	+1.491 *8*	
55 Cs 129	575.44	0.69 μs	$11/2^-$	+6.55 *10*	
55 Cs 130	0	29.21 m	1^+	+1.460 *7*	-0.059 *6*
55 Cs 130	163.25	3.46 m	5^-	+0.629 *4*	+1.45 *5*
55 Cs 131	0	9.689 d	$5/2^+$	+3.543 *2*	-0.575 *6*
55 Cs 131	133.615	8.7 ns	$5/2^+$	+1.86 *8*	
55 Cs 132	0	6.479 d	2^+	+2.222 *7*	+0.508 *7*
55 Cs 133	0	stable	$7/2^+$	+2.582025 *4*	-0.00371 *14*
55 Cs 133	80.997	6.27 ns	$5/2^+$	+3.45 *2*	-0.33 *2*
55 Cs 133	160.614	190 ps	$5/2^+$	+2.0 *2*	
55 Cs 134	0	2.062 y	4^+	+2.9937 *9*	+0.389 *3*
55 Cs 134	11.2461	45.7 ns	5^+	+3.35 *7*	
55 Cs 134	138.7474	2.91 h	8^-	+1.0978 *2*	+0.98 *8*
55 Cs 135	0	2.3×10^6 y	$7/2^+$	+2.7324 *2*	+0.050 *2*
55 Cs 135	1632.9	53 m	$19/2^-$	+2.18 *1*	+0.89 *7*
55 Cs 136	0	13.16 d	5^+	+3.711 *15*	+0.225 *10*
55 Cs 136	0+x	19 s	8^-	+1.319 *7*	+0.74 *10*
55 Cs 137	0	30.07 y	$7/2^+$	+2.8413 *1*	+0.051 *1*
55 Cs 138	0	33.41 m	3^-	+0.700 *4*	+0.125 *18*
55 Cs 138	79.9	2.91 m	6^-	+1.713 *9*	-0.40 *3*
55 Cs 139	0	9.27 m	$7/2^+$	+2.696 *4*	-0.075 *11*
55 Cs 140	0	63.7 s	1^-	+0.1338953 *5*	-0.112 *7*
55 Cs 141	0	24.94 s	$7/2^+$	+2.438 *10*	-0.36 *4*
55 Cs 143	0	1.78 s	$3/2^+$	+0.870 *4*	+0.47 *3*
55 Cs 144	0	1.01 s	1	-0.546 *3*	+0.30 *1*
55 Cs 145	0	0.594 s	$3/2^+$	+0.784 *4*	+0.62 *6*
55 Cs 146	0	0.343 s	1^-	-0.515 *2*	+0.22 *3*
56 Ba 121	0	29.7 s	$5/2(^+)$	+0.660 *1*	+1.79 *12*
56 Ba 123	0	2.7 m	$5/2^+$	-0.680 *1*	+1.49 *12*
56 Ba 125	0	3.5 m	$1/2(^+)$	+0.177 *12*	
56 Ba 127	0	12.7 m	$1/2(^+)$	+0.089 *12*	
56 Ba 127	80.2	1.9 s	$7/2(^-)$	-0.7227 *5*	1.62 *13*
56 Ba 129	0	2.23 h	$1/2^+$	-0.398 *16*	
56 Ba 129	8.42	2.17 h	$7/2^+$	+0.930 *17*	+1.60 *13*
56 Ba 130	357.38	37 ps	2^+	+0.70 *6*	-0.86 *8*
56 Ba 131	0	11.50 d	$1/2^+$	0.708113 *15*	
56 Ba 131	187.14	14.6 m	$9/2^-$	-0.870 *18*	+1.46 *13*
56 Ba 132	464.588	15.1 ps	2^+	+0.68 *6*	
56 Ba 133	0	10.52 y	$1/2^+$	-0.771674 *16*	
56 Ba 133	12.322	7.0 ns	$3/2^+$	+0.51 *7*	
56 Ba 133	288.247	38.9 h	$11/2^-$	-0.91 *5*	+0.89 *7*
56 Ba 134	604.705	5.1 ps	2^+	+0.86 *10*	-0.26 *8* or +0.15 *8*
56 Ba 134	2956.9	2.6 μs	(10^+)	-2.0 *1*	
56 Ba 135	0	stable	$3/2^+$	+0.837943 *17*	+0.160 *3*
56 Ba 135	268.219	28.7 h	$11/2^-$	-1.001 *15*	+0.96 *8*
56 Ba 136	818.515	1.930 ps	2^+	+0.69 *10*	-0.19 *6* or +0.07 *7*
56 Ba 136	2140.222	1.6 ns	5^-	-1.9 *2*	
56 Ba 137	0	stable	$3/2^+$	+0.937365 *20*	+0.245 *4*
56 Ba 137	661.660	2.552 m	$11/2^-$	-0.992 *26*	+0.78 *9*
56 Ba 138	1435.811	0.206 ps	2^+	+1.44 *22*	-0.14 *7* or +0.08 *7*
56 Ba 138	1898.609	2.17 ns	4^+	3.20 *56*	
56 Ba 138	2090.55	0.8 μs	6^+	+5.86 *12*	
56 Ba 139	0	83.06 m	$7/2^-$	-0.973 *5*	-0.573 *13*
56 Ba 141	0	18.27 m	$3/2^-$	-0.337 *5*	+0.454 *10*
56 Ba 142	359.596	0.066 ns	2^+	0.852 *96*	
56 Ba 143	0	14.33 s	$5/2^-$	+0.443 *11*	-0.879 *22*
56 Ba 144	199.326	0.70 ns	2^+	0.68 *10*	
56 Ba 145	0	4.31 s	$5/2^-$	-0.285 *7*	+1.224 *21*
56 Ba 146	181.02	0.86 ns	2^+	+0.54 *14*	
57 La 133	535.60	62 ns	$11/2^-$	7.5 *5*	
57 La 135	2737.0	50 ns		0.04 *20*	
57 La 137	0	6×10^4 y	$7/2^+$	+2.695 *6*	+0.24 *7*
57 La 137	10.56	89 ns	$5/2^+$		+0.24 *7*
57 La 137	1869.5	364 ns	$19/2^-$	+2.337 *57*	
57 La 138	0	1.05×10^{11} y	5^+	+3.713646 *7*	+0.45 *2*
57 La 138	72.57	116 ns	$(3)^+$	+2.886 *48*	
57 La 139	0	stable	$7/2^+$	+2.7830455 *9*	+0.20 *1*
57 La 140	0	1.6781 d	3^-	+0.730 *15*	+0.094 *10*
58 Ce 126	2886.9	8 ps	(10^+)	+10	
58 Ce 126	3316.3	4 ps	(12^+)	+12	
58 Ce 134	3208	336 ns	10^+	-1.87 *2*	+1.32 *12*
58 Ce 135	2125.3	8.2 ns	$(19/2^+)$	-0.66 *10*	
58 Ce 136	3095.5	2.2 μs	10^+	-1.80 *2*	1.11 *11*
58 Ce 137	0	9.0 h	$3/2^+$	0.96 *4*	
58 Ce 137	254.29	34.4 h	$11/2^-$	1.01 *4*	
58 Ce 138	3539.1	81 ns	10^+	-1.70 *3*	0.77
58 Ce 139	0	137.640 d	$3/2^+$	0.91 *14*	
58 Ce 139	2631.0	70 ns	$(19/2^-)$	+3.85 *8*	
58 Ce 140	2083.25	3.45 ns	4^+	+4.35 *10*	0.35 *7*
58 Ce 140	3715.3	23.1 ns	10^+	+10.3 *4*	
58 Ce 141	0	32.501 d	$7/2^-$	1.09 *4*	
58 Ce 142	641.286	5.56 ps	2^+		-0.37 *5* or -0.16 *5*
58 Ce 143	0	33.039 h	$3/2^-$	1	
58 Ce 146	258.47	0.25 ns	2^+	+0.48 *10*	
58 Ce 148	158.468	1.01 ns	2^+	+0.74 *12*	
59 Pr 139	113.92	2.60 ns	$7/2^+$	1.19 *21*	
59 Pr 139	821.98	43.4 ns	$11/2^-$	+6.6 *5*	
59 Pr 141	0	stable	$5/2^+$	+4.2754 *5*	-0.0589 *42*
59 Pr 141	145.440	1.85 ns	$7/2^+$	+2.95 *9*	
59 Pr 141	1117.7	4.8 ns	$11/2^-$	+6.2 *4*	
59 Pr 141	1796.7	1.0 ns	$15/2^+$	+8.0 *17*	
59 Pr 142	0	19.12 h	2^-	+0.234 *1*	+0.0297 *85*
59 Pr 142	3.6815	14.6 m	5^-	2.2 *1*	
59 Pr 143	57.356	4.14 ns	$5/2^+$	+3.4 *1*	
59 Pr 144	80.120	136 ps	1^-	-1.2 *4*	

Nucleus Z El A	Level energy	Half-life	J^{π}	μ (nm)	Q (b)
60 Nd 134	294.30	64 ps	2^+	+1.2 *4*	
60 Nd 134	2816.9	9.0 ps	10^+	0	
60 Nd 135	0	12.4 m	$9/2^{(-)}$	0.78 *3*	+2.0 *4*
60 Nd 135	198.5	35.3 ps	$(11/2^-)$	-0.5 *3*	
60 Nd 136	3296.5	51 ps	10^+	+11.7 *39*	
60 Nd 136	3686.5	19 ps	12^+	+14.0 *46*	
60 Nd 137	0	38.5 m	$1/2^+$	-0.633 *5*	
60 Nd 138	3173.8	0.41 μs	(10^+)	-1.74 *4*	
60 Nd 139	0	29.7 m	$3/2^+$	0.907 *7*	+0.30 *9*
60 Nd 140	3621.2	22 ns	10^+	-1.92 *12*	
60 Nd 141	0	2.49 h	$3/2^+$	1.013 *9*	+0.34 *13*
60 Nd 143	0	stable	$7/2^-$	-1.065 *5*	-0.63 *6*
60 Nd 144	696.513	4.51 ps	2^+	+0.30 *4*	-0.18 *12*
60 Nd 144	1314.54	7.4 ps	4^+	+2.2 *23*	
60 Nd 145	0	stable	$7/2^-$	-0.656 *4*	-0.33 *3*
60 Nd 145	72.50	0.72 ns	$5/2^-$	-0.320 *4*	
60 Nd 146	453.86	21.6 ps	2^+	+0.50 *8*	-0.78 *9*
60 Nd 147	0	10.98 d	$5/2^-$	0.578 *3*	0.9 *3*
60 Nd 148	301.702	78.0 ps	2^+	+0.64 *8*	-1.46 *13*
60 Nd 148	3621	330 ns	10^+	-1.75 *9*	
60 Nd 149	0	1.728 h	$5/2^-$	0.351 *10*	1.3 *3*
60 Nd 150	130.1	1.44 ns	2^+	+0.644 *18*	-2.0 *5*
60 Nd 150	381.4	63 ps	4^+	+1.28 *20*	
61 Pm143	0	265 d	$5/2^+$	+3.8 *5*	
61 Pm143	959.8	24.0 ns	$11/2^-$	+6.8 *4*	
61 Pm143	1898.3	10.5 ns	$15/2^+$	+7.7 *4*	
61 Pm144	0	363 d	5^-	1.69 *14*	
61 Pm147	0	2.6234 y	$7/2^+$	+2.58 *7*	+0.74 *20*
61 Pm147	91.10	2.50 ns	$5/2^+$	+3.22 *16*	0.6 *3*
61 Pm148	0	5.370 d	1^-	+2.08 *21*	+0.2 *2*
61 Pm148	137.9	41.29 d	6^-	1.82 *18*	
61 Pm149	0	53.08 h	$7/2^+$	3.3 *5*	
61 Pm149	114.312	2.53 ns	$5/2^+$	+2.13 *15*	
61 Pm149	188.631	3.27 ns	$3/2^+$	+1.09 *15*	
61 Pm149	211.307	80 ps	$5/2^+$	+2.20 *35*	
61 Pm149	270.169	2.59 ns	$7/2^-$	+2.19 *11*	
61 Pm151	0	28.40 h	$5/2^+$	1.8 *2*	1.9 *3*
61 Pm151	255.692	0.93 ns	$3/2^+$	1.8 *2*	
62 Sm139	0	2.57 m	$(1/2)^+$	-0.53 *3*	
62 Sm140	3172.0	22.3 ns	10^+	-1.76 *20*	1.67 *48*
62 Sm140	3210.8	6.2 ns	10^+	+12.7 *9*	
62 Sm141	0	10.2 m	$1/2^+$	-0.737 *23*	
62 Sm141	175.8	22.6 m	$11/2^-$	-0.83 *2*	+1.63 *44*
62 Sm142	2371.8	170 ns	7^-	+0.42	+1.12 *27*
62 Sm143	0	8.83 m	$3/2^+$	+1.01 *2*	+0.41 *21*
62 Sm145	0	340 d	$7/2^-$	-1.11 *6*	-0.59 *17*
62 Sm147	0	1.06×10^{11} y	$7/2^-$	-0.8148 *7*	-0.26 *3*
62 Sm147	121.220	0.80 ns	$5/2^-$	-0.449 *25*	-0.45 *19*
62 Sm147	197.4	1.24 ns	$3/2^-$	-0.29 *7*	
62 Sm148	550.265	7.70 ps	2^+	+0.508 *42*	-0.97 *27*
62 Sm149	0	2×10^{15} y	$7/2^-$	-0.6717 *7*	+0.075 *8*
62 Sm149	22.507	7.12 ns	$5/2^-$	-0.6238 *8*	+1.01 *9*
62 Sm150	333.99	49.7 ps	2^+	+0.77 *6*	-1.32 *19*
62 Sm150	773.36	6.5 ps	4^+	+1.43 *20*	
62 Sm150	1046.18	0.86 ps	2^+	+0.72 *17*	
62 Sm150	1193.83	1.3 ps	2^+	+0.83 *14*	
62 Sm150	1278.91		6^+	+2.3 *5*	
62 Sm151	0	90 y	$5/2^-$	-0.3630 *5*	+0.67 *7*
62 Sm151	91.532	78 ns	$(9/2)^+$	-0.95 *5*	
62 Sm151	104.831	0.48 ns	$3/2^-$	+0.31 *11*	
62 Sm151	167.750	0.38 ns	$5/2^+$	+1.8 *5*	
62 Sm152	121.7825	1.428 ns	2^+	+0.84 *5*	-1.666 *16*
62 Sm152	366.4814	57.7 ps	4^+	+1.68 *20*	
62 Sm152	706.96	10.1 ps	6^+	+2.39 *33*	
62 Sm152	810.465	7.2 ps	2^+	+0.76 *19*	
62 Sm152	1085.897	0.85 ps	2^+	+0.82 *21*	
62 Sm152	1125.35	3.15 ps	8^+	+2.79 *53*	
62 Sm152	1609.34	1.38 ps	10^+	+3.7 *17*	
62 Sm153	0	46.27 h	$3/2^+$	-0.0216 *1*	+1.26 *13*
62 Sm154	81.976	3.02 ns	2^+	+0.784 *36*	-1.87 *4*
62 Sm154	266.79	172 ps	4^+	+1.35 *15*	-2.2 *8*
62 Sm154	543.74	22.7 ps	6^+	+1.90 *28*	
62 Sm154	902.65	5.9 ps	8^+	2.8 *4*	
62 Sm155	0	22.3 m	$3/2^-$		1.13 *13*
63 Eu 138	0	12.1 s	(6^-)	5.2 *7*	
63 Eu 140	0	1.51 s	1^+	+1.365 *13*	+0.31 *4*
63 Eu 141	0	40.0 s	$5/2^+$	+3.494 *8*	+0.85 *4*
63 Eu 142	0	2.34 s	1^+	+1.536 *19*	+0.12 *5*
63 Eu 142	0+x	1.22 m	8^-	+2.978 *11*	+1.41 *6*
63 Eu 143	0	2.63 m	$5/2^+$	+3.673 *8*	+0.51 *3*
63 Eu 144	0	10.2 s	1^+	+1.893 *13*	+0.10 *3*
63 Eu 145	0	5.93 d	$5/2^+$	+3.993 *7*	+0.29 *2*
63 Eu 145	716.0	490 ns	$11/2^-$	+7.46 *5*	
63 Eu 146	0	4.59 d	4^-	+1.425 *11*	-0.18 *6*
63 Eu 147	0	24.1 d	$5/2^+$	+3.724 *8*	+0.55 *3*
63 Eu 147	625.3	0.765 μs	$11/2^-$	+7.05 *3*	
63 Eu 148	0	54.5 d	5^-	+2.340 *10*	+0.35 *6*
63 Eu 148	720.4	235 ns	9^+	+6.12 *5*	
63 Eu 149	0	93.1 d	$5/2^+$	+3.565 *6*	0.75 *2*
63 Eu 149	496.386	2.45 μs	$11/2^-$	+6.99 *27*	
63 Eu 150	0	35.8 y	$5^{(-)}$	+2.708 *11*	+1.13 *5*
63 Eu 151	0	stable	$5/2^+$	+3.4717 *6*	+0.903 *10*
63 Eu 151	21.532	9.6 ns	$7/2^+$	+2.591 *2*	+1.28 *2*
63 Eu 152	0	13.542 y	3^-	-1.9414 *13*	+2.71 *3*
63 Eu 153	0	stable	$5/2^+$	+1.5330 *8*	+2.412 *21*
63 Eu 153	83.3671	0.79 ns	$7/2^+$	+1.81 *6*	0.44 *2*
63 Eu 153	97.4297	0.20 ns	$5/2^-$	+3.22 *23* or -0.52 *23*	
63 Eu 153	103.1794	3.88 ns	$3/2^+$	+2.048 *6*	1.254 *13*
63 Eu 154	0	8.593 y	3^-	-2.005 *6*	+2.84 *10*
63 Eu 155	0	4.7611 y	$5/2^+$	+1.56 *10*	+2.34 *21*
63 Eu 155	104.3346	0.104 ns	$5/2^-$	+9.6 *10*	
63 Eu 157	0	15.18 h	$5/2^+$	1.5 *2*	2.6 *3*
63 Eu 158	0	45.9 m	(1^-)	1.44 *2*	0.66 *14*
63 Eu 159	0	18.1 m	$5/2^+$	1.38 *2*	
64 Gd 144	3433	145 ns	(10^+)	+12.76 *14*	-1.46 *6*
64 Gd 146	1579.4	1.06 ns	3^-	+2.1 *9*	
64 Gd 146	2982.0	7.2 ns	7^-	+8.98 *19*	
64 Gd 147	0	38.06 h	$7/2^-$	1.02 *9*	
64 Gd 147	997.1	21.4 ns	$13/2^+$	+0.487 *20*	-0.73 *7*
64 Gd 147	2760.47	4.5 ns	$21/2^+$	+7.6 *12*	
64 Gd 147	3581.97	26.8 ns	$27/2^-$	+11.34 *23*	-1.26 *8*
64 Gd 147	8587.8	510 ns	$(49/2^+)$	+10.9 *2*	-3.24 *18*
64 Gd 148	2694.6	16.5 ns	9^-	-0.162 *18*	1.01 *5*
64 Gd 149	0	9.28 d	$7/2^-$	0.88 *4*	
64 Gd 149	164.988	1.7 ns	$5/2^-$	-0.90 *23*	
64 Gd 151	0	124 d	$7/2^-$	0.77 *6*	
64 Gd 151	108.094	2.80 ns	$5/2^-$	-1.24 *17*	
64 Gd 151	395.445	0.29 ns	$3/2^-$	-2.6 *8*	
64 Gd 152	344.282	31.9 ps	2^+	+0.96 *8*	
64 Gd 153	0	241.6 d	$3/2^-$	0.38 *8*	
64 Gd 153	109.76	0.243 ns	$(5/2)^-$	+0.40 *15*	
64 Gd 153	129.15	2.52 ns	$3/2^-$	+0.37 *7*	
64 Gd 154	123.0714	1.186 ns	2^+	+0.96 *6*	-1.82 *4*
64 Gd 155	0	stable	$3/2^-$	-0.2591 *5*	+1.30 *2*
64 Gd 155	60.0087	0.193 ns	$5/2^-$		-0.44 *2*
64 Gd 155	86.5460	6.50 ns	$5/2^+$	-0.525 *2*	+0.111 *7*
64 Gd 155	105.3109	1.16 ns	$3/2^+$	+0.143 *5*	+0.96 *3*
64 Gd 156	88.9666	2.21 ns	2^+	+0.774 *8*	-1.93 *4*
64 Gd 156	288.1799	111.9 ps	4^+	+1.24 *8*	
64 Gd 156	584.706	15.8 ps	6^+	+1.5 *13*	
64 Gd 156	1416.034	1.90 ps	10^+	+3.4 *5*	
64 Gd 156	1510.539	190 ps	4^+	+3.24 *11*	
64 Gd 157	0	stable	$3/2^-$	-0.3398 *7*	+1.36 *2*
64 Gd 157	54.533	130 ps	$5/2^-$		-0.46 *2*
64 Gd 157	63.917	0.46 μs	$5/2^+$	-0.464 *11*	+2.45 *5*
64 Gd 158	79.510	2.52 ns	2^+	+0.762 *8*	-2.01 *4*
64 Gd 158	261.440	0.148 ns	4^+	+1.636 *60*	
64 Gd 158	538.983		6^+	2.46 *24*	
64 Gd 158	904.6	5.1 ps	8^+	3.4 *4*	
64 Gd 158	1350.7	1.85 ps	10^+	3.2 *4*	
64 Gd 159	0	18.479 h	$3/2^-$	-0.44 *3*	
64 Gd 160	75.26	2.69 ns	2^+	+0.72 *4*	-2.08 *4*
64 Gd 160	248.45		4^+	1.5 *2*	
64 Gd 160	514.76		6^+	2.3 *3*	
64 Gd 160	1308		10^+	3.3	
65 Tb 149	0	4.118 h	$1/2^+$	1.35 *2*	
65 Tb 149	2518.4	2.4 ns	$(27/2)^+$	4.8 *12*	
65 Tb 152	0	17.5 h	2^-	0.9 *1*	+0.5 *16*
65 Tb 153	0	2.34 d	$5/2^+$	3.5 *7*	
65 Tb 154	0+v	9.4 h	3^-	1.8 *4*	+2.9 *15*
65 Tb 154	0+w	22.7 h	7^-	0.9 *3*	
65 Tb 155	0	5.32 d	$3/2^+$	2.0 *2*	
65 Tb 156	0	5.35 d	3^-	1.41 *18*	+2.3 *8*
65 Tb 157	0	99 y	$3/2^+$	2.0 *1*	
65 Tb 158	0	180 y	3^-	+1.758 *7*	+2.7 *5*
65 Tb 159	0	stable	$3/2^+$	+2.014 *4*	+1.432 *8*
65 Tb 159	58.00	53.6 ps	$5/2^+$	1.62 *9* or 2.32 *13*	
65 Tb 160	0	72.3 d	3^-	+1.790 *7*	+3.85 *5*
65 Tb 161	0	6.88 d	$3/2^+$	2.2 *1*	+1.2 *6*
66 Dy 147	0	40 s	$1/2^+$	-0.915 *9*	
66 Dy 147	750.5	55 s	$11/2^-$	-0.655 *10*	+0.67 *10*
66 Dy 149	0	4.20 m	$(7/2^-)$	-0.119 *7*	-0.62 *5*
66 Dy 151	0	17.9 m	$7/2^{(-)}$	-0.945 *7*	-0.30 *5*
66 Dy 152	6129	13.7 ns	21^-	+11.6 *12*	
66 Dy 153	0	6.4 h	$7/2^{(-)}$	-0.782 *6*	-0.02 *5*
66 Dy 155	0	9.9 h	$3/2^-$	-0.385 *4*	+1.04 *3*
66 Dy 156	137.83	0.823 ns	2^+	+0.78 *8*	
66 Dy 157	0	8.14 h	$3/2^-$	-0.301 *2*	+1.30 *2*
66 Dy 158	98.911	1.67 ns	2^+	+0.72 *5*	
66 Dy 158	317.124	72 ps	4^+	+1.40 *24*	
66 Dy 158	637.72	9.1 ps	6^+	2.2 *4*	
66 Dy 158	1043.88	2.9 ps	8^+	+3.3 *10*	
66 Dy 159	0	144.4 d	$3/2^-$	-0.354 *3*	+1.37 *2*
66 Dy 160	86.7882	2.02 ns	2^+	+0.725 *17*	1.76 *39*
66 Dy 160	283.824	103 ps	4^+	+1.25 *18*	
66 Dy 160	966.174	1.31 ps	2^+	+0.56 *8*	
66 Dy 161	0	stable	$5/2^+$	-0.4803 *25*	+2.507 *20*
66 Dy 161	25.65150	29.1 ns	$5/2^-$	+0.594 *3*	+2.506 *20*
66 Dy 161	43.8211	0.83 ns	$7/2^+$	-0.141 *5*	+0.53 *13*
66 Dy 161	74.56710	3.14 ns	$3/2^-$	-0.403 *4*	+1.45 *6*
66 Dy 162	80.660	2.20 ns	2^+	+0.686 *28*	
66 Dy 162	265.665	0.132 ns	4^+	1.4	
66 Dy 162	548.531	18.4 ps	6^+	2.0	
66 Dy 162	920.99	4.2 ps	8^+	2.7	
66 Dy 163	0	stable	$5/2^-$	+0.6726 *35*	+2.648 *21*
66 Dy 164	73.392	2.39 ns	2^+	+0.70 *3*	-2.08 *15*
66 Dy 164	242.230	201 ps	4^+	+1.47 *48*	
66 Dy 164	501.32	27.2 ps	6^+	+1.68 *48*	
66 Dy 164	761.86	4.6 ps	2^+	+0.63 *20*	
66 Dy 164	843.67	7.2 ps	8^+	+2.2 *8*	
66 Dy 164	1261.3	2.29 ps	10^+	+3.5 *13*	
66 Dy 165	0	2.334 h	$7/2^+$	-0.520 *5*	-3.49 *7*
67 Ho 152	0	161.8 s	2^-	-1.02 *2*	+0.08 *24*

Nucleus Z El A	Level energy	Half-life	J^{π}	μ (nm)	Q (b)
67 Ho 152	160	49.5 s	9^{+}	+5.94 *5*	-1.3 *8*
67 Ho 153	0	2.0 m	$11/2^{-}$	+6.81 *5*	-1.1 *5*
67 Ho 153	68	9.3 m	$1/2^{+}$	+1.19 *1*	
67 Ho 154	0	11.76 m	$(2)^{-}$	-0.643 *6*	+0.19 *10*
67 Ho 154	320	3.10 m	8^{+}	+5.65 *6*	-1.0 *5*
67 Ho 155	0	48 m	$5/2^{+}$	+3.50 *3*	+1.52 *12*
67 Ho 156	0	56 m	(4^{+})	+2.99 *3*	+2.34 *18*
67 Ho 157	0	12.6 m	$7/2^{-}$	+4.35 *3*	+2.97 *13*
67 Ho 158	0	11.3 m	5^{+}	+3.77 *3*	+4.1 *4*
67 Ho 158	67.200	28 m	2^{-}	+2.44 *3*	+1.62 *17*
67 Ho 159	0	33.05 m	$7/2^{-}$	+4.28 *3*	+3.19 *13*
67 Ho 160	0	25.6 m	5^{+}	+3.70 *3*	+3.95 *23*
67 Ho 160	59.98	5.02 h	2^{-}	+2.51 *3*	+1.78 *17*
67 Ho 161	0	2.48 h	$7/2^{-}$	+4.25 *3*	+3.22 *11*
67 Ho 162	0	15.0 m	1^{+}	2.32 *3*	0.71 *3*
67 Ho 162	106	67.0 m	6^{-}	+3.60 *4*	+3.9 *7*
67 Ho 163	0	4570 y	$7/2^{-}$	+4.23 *4*	+3.6 *6*
67 Ho 165	0	stable	$7/2^{-}$	+4.132 *5*	+3.58 *2*
67 Ho 165	94.700	22.0 ps	$9/2^{-}$	4.09 *20*	3.43 *4*
67 Ho 166	5.985	1.20×10^{3} y	$(7)^{-}$	3.60 *5*	-3.4 *34*
67 Ho 166	54.2399	3.44 ns	2^{-}	+0.068 *10*	
68 Er 152	2182.7	1.8 ns	(8^{+})	-0.56 *64*	
68 Er 152	4518.4	1.2 ns	(16^{+})	+4.6 *21*	
68 Er 153	0	37.1 s	$(7/2^{-})$	-0.934 *5*	-0.42 *2*
68 Er 154	3025	39 ns	11^{-}	+0.169 *13*	
68 Er 155	0	5.3 m	$7/2^{-}$	-0.669 *4*	-0.27 *2*
68 Er 155	563.22	34.8 ns	$13/2^{+}$	-0.55 *3*	
68 Er 156	344.51	34.0 ps	2^{+}	0.80	
68 Er 157	0	18.65 m	$3/2^{-}$	-0.412 *3*	+0.92 *2*
68 Er 157	x+266.36	54 ps	$(17/2^{+})$	0.4 *4*	
68 Er 158	192.15	277 ps	2^{+}	0.72	
68 Er 158	527.22	14.2 ps	4^{+}	1.4	
68 Er 158	970.34	2.7 ps	6^{+}	2.2	
68 Er 158	1493.47	0.91 ps	8^{+}	2.9	
68 Er 159	0	36 m	$3/2^{-}$	-0.304 *2*	+1.17 *1*
68 Er 159	785	9.1 ps	$21/2^{+}$	<0.74	
68 Er 160	389.9	32.3 ps	4^{+}	1.28	
68 Er 160	765.6	5.4 ps	6^{+}	1.92	
68 Er 160	1229.3	1.7 ps	8^{+}	2.56	
68 Er 161	0	3.21 h	$3/2^{-}$	-0.365 *3*	+1.361 *14*
68 Er 162	102.04	1.17 ns	2^{+}		<0
68 Er 162	900.73	1.24 ps	2^{+}		1.8 *6*
68 Er 163	0	75.0 m	$5/2^{-}$	+0.557 *4*	+2.55 *3*
68 Er 164	91.40	1.47 ns	2^{+}	0.697 *15*	<0
68 Er 164	860.18	1.9 ps	2^{+}		2.39 *26*
68 Er 165	0	10.36 h	$5/2^{-}$	+0.643 *3*	+2.71 *3*
68 Er 165	242.935	0.31 ns	$3/2^{-}$	+0.62 *21*	
68 Er 166	80.577	1.82 ns	2^{+}	+0.632 *10*	-1.9 *4*
68 Er 166	264.991	118 ps	4^{+}	+1.26 *7*	-2.7 *9*
68 Er 166	545.455		6^{+}	+1.55 *7*	
68 Er 166	785.910	3.26 ps	2^{+}	+0.56 *9*	2.18 *20*
68 Er 166	911.210	4.2 ps	8^{+}	+2.1 *4*	
68 Er 166	1215.964		6^{+}	+1.52 *19*	
68 Er 166	1349.64	1.7 ps	10^{+}	+2.0 *8*	
68 Er 167	0	stable	$7/2^{+}$	-0.56385 *12*	+3.565 *29*
68 Er 168	79.804	1.88 ns	2^{+}	+0.642 *12*	
68 Er 168	264.089	114 ps	4^{+}	+1.21 *15*	-2.2 *10*
68 Er 168	548.745	11.6 ps	6^{+}	+1.97 *28*	
68 Er 168	821.169	2.73 ps	2^{+}	+0.72 *14*	2.25 *23*
68 Er 168	928.306	3.6 ps	8^{+}	+2.65 *50*	
68 Er 168	1094.040	109.0 ns	4^{-}	+0.96 *4*	
68 Er 168	1396.835	1.48 ps	10^{+}	+3.22 *80*	
68 Er 169	0	9.40 d	$1/2^{-}$	+0.515 *25*	
68 Er 170	78.68	1.89 ns	2^{+}	0.633 *13*	-1.94 *23*
68 Er 170	260.18	135 ps	4^{+}	+1.09 *15*	-2.2 *10*
68 Er 170	934.03	1.7 ps	2^{+}		1.95 *33*
68 Er 171	0	7.516 h	$5/2^{-}$	0.659 *10*	2.86 *9*
69 Tm 156	0	83.8 s	2^{-}	+0.40 *3*	-0.48 *11*
69 Tm 157	0	3.63 m	$1/2^{+}$	+0.476 *15*	
69 Tm 158	0	3.98 m	2^{-}	+0.042 *17*	+0.74 *11*
69 Tm 159	0	9.13 m	$5/2^{+}$	+3.42 *4*	+1.93 *7*
69 Tm 160	0	9.4 m	1^{-}	+0.156 *18*	+0.582 *44*
69 Tm 161	0	33 m	$7/2^{+}$	+2.40 *2*	+2.90 *7*
69 Tm 162	0	21.70 m	1^{-}	+0.068 *8*	+0.69 *3*
69 Tm 163	0	1.810 h	$1/2^{+}$	-0.082 *1*	
69 Tm 164	0	2.0 m	1^{+}	+2.37 *2*	+0.71 *5*
69 Tm 165	0	30.06 h	$1/2^{+}$	-0.139 *2*	
69 Tm 166	0	7.70 h	2^{+}	+0.092 *1*	+2.14 *3*
69 Tm 167	0	9.25 d	$1/2^{+}$	-0.197 *2*	
69 Tm 168	0	93.1 d	$3(^{+})$	+0.227 *11*	+3.23 *7*
69 Tm 169	0	stable	$1/2^{+}$	-0.2316 *15*	
69 Tm 169	8.4103	4.08 ns	$3/2^{+}$	+0.5148 *45*	-1.2 *1*
69 Tm 169	118.1902	62 ps	$5/2^{+}$	+0.761 *45*	
69 Tm 169	138.9341	302 ps	$7/2^{+}$	+1.39 *5*	
69 Tm 169	316.1482	660 ns	$7/2^{+}$	+0.156 *8*	
69 Tm 169	379.2690	52.6 ns	$7/2^{-}$	0.963 *75*	
69 Tm 170	0	128.6 d	1^{-}	+0.2476 *36*	+0.74 *2*
69 Tm 171	0	1.92 y	$1/2^{+}$	-0.2303 *36*	
69 Tm 171	116.652	55 ps	$5/2^{+}$	+0.82 *37*	
69 Tm 171	129.042	415 ps	$7/2^{+}$	+1.27 *12*	
69 Tm 171	635.57	1.26 ns	$7/2^{+}$	+1.15 *21*	
70 Yb 155	0	1.75 s	$(7/2^{-})$	-0.84 *8*	-1.2 *10*
70 Yb 157	0	38.6 s	$7/2^{-}$	-0.639 *8*	
70 Yb 157	494+x	45 ns	$(13/2^{+})$	-0.75 *8*	
70 Yb 159	0	1.58 m	$5/2(^{-})$	-0.366 *8*	-0.22 *2*
70 Yb 160	3363.4	7.7 ps	14^{+}	-3.2 *43*	
70 Yb 161	0	4.2 m	$3/2^{-}$	-0.327 *8*	+1.03 *2*
70 Yb 163	0	11.05 m	$3/2^{-}$	-0.374 *8*	+1.24 *2*
70 Yb 165	0	9.9 m	$5/2^{-}$	+0.478 *8*	+2.48 *4*
70 Yb 167	0	17.5 m	$5/2^{-}$	+0.623 *8*	+2.70 *4*
70 Yb 169	0	32.026 d	$7/2^{+}$	-0.635 *8*	+3.54 *6*
70 Yb 169	24.199	46 s	$1/2^{-}$	+0.507 *8*	
70 Yb 170	84.2551	1.60 ns	2^{+}	+0.674 *8*	2.12 *36*
70 Yb 170	277.45		4^{+}	1.3 *8*	
70 Yb 170	573.54		6^{+}	1.9 *12*	
70 Yb 170	963.67	2.97 ps	8^{+}	2.3 *14*	
70 Yb 170	1437.97	1.16 ps	10^{+}	2.6 *17*	
70 Yb 170	1983.78	0.77 ps	12^{+}	2.7 *17*	
70 Yb 171	0	stable	$1/2^{-}$	+0.49367 *1*	
70 Yb 171	66.721	0.81 ns	$3/2^{-}$	0.350 *2*	1.59 *27*
70 Yb 171	75.878	1.64 ns	$5/2^{-}$	+1.015 *5*	2.16 *37*
70 Yb 172	78.7436	1.65 ns	2^{+}	+0.669 *16*	2.16 *37*
70 Yb 172	260.260	0.122 ns	4^{+}	+1.37 *5*	-2.3 *12*
70 Yb 172	1172.376	8.14 ns	3^{+}	+0.65 *4*	2.87 *41*
70 Yb 172	1757.367		$(2)^{-}$		-3.44 *10*
70 Yb 172	1821.583		3^{-}		1.97 *10*
70 Yb 173	0	stable	$5/2^{-}$	-0.67989 *3*	+2.80 *4*
70 Yb 173	78.647	46 ps	$7/2^{-}$	-0.19 *7*	
70 Yb 173	179.364	32 ps	$9/2^{-}$	+0.20	
70 Yb 173	350.764	0.45 ns	$7/2^{+}$	-0.48	
70 Yb 174	76.471	1.79 ns	2^{+}	+0.676 *8*	2.12 *25*
70 Yb 174	253.117	144 ps	4^{+}		-1.8 *12*
70 Yb 175	0	4.185 d	$7/2^{-}$	0.58 *8*	
70 Yb 176	82.13	1.76 ns	2^{+}	+0.675 *30*	2.22 *38*
70 Yb 176	271.70	0.11 ns	4^{+}		-0.9 *12*
71 Lu 171	0	8.24 d	$7/2^{+}$	2.03 *10*	
71 Lu 172	0	6.70 d	4^{-}	2.25 *10*	
71 Lu 173	0	1.37 y	$7/2^{+}$	2.34 *9*	
71 Lu 174	0	3.31 y	$(1)^{-}$	1.94 *28*	
71 Lu 174	170.83	142 d	$(6)^{-}$	2.34 *33*	
71 Lu 175	0	stable	$7/2^{+}$	+2.2327 *11*	+3.49 *2*
71 Lu 175	113.804	99 ps	$9/2^{+}$	+2.01 *15*	
71 Lu 175	251.463	32.1 ps	$11/2^{+}$	+2.6 *10*	
71 Lu 176	0	3.78×10^{10} y	7^{-}	+3.1692 *45*	+4.92 *3*
71 Lu 176	123.0	3.635 h	1^{-}	+0.318 *3*	-1.47 *1*
71 Lu 177	0	6.734 d	$7/2^{+}$	+2.239 *11*	+3.39 *2*
71 Lu 177	121.6211	0.117 ns	$9/2^{+}$	+2.21 *78*	
71 Lu 177	150.392	122 ns	$9/2^{-}$	+5.5 *3*	
71 Lu 177	970.1749	160.4 d	$23/2^{-}$	2.93 *17*	4.23 *67*
71 Lu 179	0	4.59 h	$7/2(^{+})$		3.3
72 Hf 172	1037.47		8^{+}	1.1 *3*	
72 Hf 172	1684.73	4.8 ns	(6^{+})	+5.59 *61*	
72 Hf 172	2005.84	163 ns	(8^{-})	+7.955 *65*	
72 Hf 173	1982.1	19.5 ns	$(23/2)^{-}$	+6.63 *23*	
72 Hf 174	1549.3	138 ns	(6^{+})	+5.419 *49*	
72 Hf 175	0	70 d	$5/2^{-}$	0.539 *32*	+2.8 *4*
72 Hf 176	88.351	1.43 ns	2^{+}	+0.539 *41*	-2.10 *2*
72 Hf 177	0	stable	$7/2^{-}$	+0.7935 *6*	+3.365 *29*
72 Hf 177	112.9499	0.583 ns	$9/2^{-}$	+0.91 *2*	1.30 *2*
72 Hf 177	249.6744	104 ps	$11/2^{-}$	+1.48 *52*	
72 Hf 177	321.3163	0.66 ns	$9/2^{+}$	-0.73 *9*	
72 Hf 178	93.180	1.48 ns	2^{+}	+0.480 *28*	-2.02 *2*
72 Hf 178	1147.423	4.0 s	8^{-}	1.4 to 5.3	
72 Hf 178	1553.998	77.5 ns	6^{+}	+5.837 *49*	
72 Hf 178	2446.05	31 y	16^{+}	7.36 *10*	
72 Hf 179	0	stable	$9/2^{+}$	-0.6409 *13*	+3.79 *3*
72 Hf 179	122.7909	37 ps	$11/2^{+}$		1.88 *3*
72 Hf 179	1105.84	25.05 d	$25/2^{-}$	7.4 *3*	
72 Hf 180	93.326	1.50 ns	2^{+}	+0.533 *30*	-2.00 *2*
72 Hf 180	308.582	71 ps	4^{+}	+2.2 *4*	
72 Hf 180	1141.48	5.5 h	8^{-}	+8.7 *10*	+4.6 *3*
73 Ta 173	0	3.14 h	$5/2^{-}$	1.703 *34*	-1.9 *2*
73 Ta 175	0	10.5 h	$7/2^{+}$	2.270 *45*	(+)3.65 *35*
73 Ta 177	0	56.56 h	$7/2^{+}$	2.250 *45*	
73 Ta 177	70.45	73 ns	$(5/2)^{+}$	+4.8 *5*	
73 Ta 177	186.1	3.6 μs	$(5/2)^{-}$	+2.05 *13*	
73 Ta 177	1355.4	5.02 μs	$(21/2^{-})$	+0.080 *14*	
73 Ta 178	y+0	9.31 m	1^{+}	+2.740 *12*	+0.65 *6*
73 Ta 180	75.3	1.2×10^{15} y	9^{-}	4.77 *5*	
73 Ta 181	0	stable	$7/2^{+}$	+2.3705 *7*	+3.28 *6*
73 Ta 181	6.238	6.05 μs	$9/2^{-}$	+5.28 *9*	+3.71 *7*
73 Ta 181	136.266	39.5 ps	$9/2^{+}$	+2.57 *67*	
73 Ta 181	482.182	10.8 ns	$5/2^{+}$	+3.29 *3*	(+)2.35 *6*
73 Ta 182	0	114.43 d	3^{-}	(+)3.02 *3*	2.9
73 Ta 183	0	5.1 d	$7/2^{+}$	(+)2.36 *3*	
74 W 168	199.3	213 ps	2^{+}	+0.50 *10*	
74 W 168	562.3	12 ps	4^{+}	+1.36 *76*	
74 W 168	2722.2	60.6 ps	12^{+}	-2.52 *84*	
74 W 180	103.557	1.28 ns	2^{+}	0.509 *34*	2.12 *35*
74 W 182	100.1065	1.369 ns	2^{+}	+0.521 *16*	-2.13 *35*
74 W 182	329.4287	64 ps	4^{+}	+0.88 *17*	
74 W 182	1289.1610	1.12 ns	2^{-}	+1.74 *24*	
74 W 182	1373.8418	78 ps	3^{-}	0.96 *27*	
74 W 183	0	1.1×10^{17} y	$1/2^{-}$	+0.11778476 *9*	
74 W 183	46.4839	0.188 ns	$3/2^{-}$	-0.1 *1*	1.77 *42*
74 W 183	99.0793	0.77 ns	$5/2^{-}$	+0.912 *38*	1.95 *33*
74 W 184	111.208	1.251 ns	2^{+}	+0.578 *14*	-1.87 *20*
74 W 184	364.056	48 ps	4^{+}	+1.17 *9*	
74 W 184	748.310	5.4 ps	6^{+}	+1.79 *26*	
74 W 184	903.281	1.71 ps	2^{+}	+0.24 *8*	+0.1 *4*
74 W 184	1252.3	1.15 ps	8^{+}	+2.88 *64*	
74 W 186	122.58	1.036 ns	2^{+}	+0.615 *24*	-1.57 *30*
74 W 186	396.55	36.0 ps	4^{+}	+1.28 *10*	-2.6 *13*

Nucleus Z El A	Level energy	Half-life	J^π	μ (nm)	Q (b)
74 W 186	737.86	4.6 ps	2^+	+0.39 *8*	+1.3 *3*
74 W 186	808.61	4.1 ps	6^+	+1.90 *37*	
74 W 187	0	23.72 h	$3/2^-$	0.621 *15*	
75 Re 179	0	19.5 m	$(5/2)^+$	2.8 *4*	
75 Re 181	0	19.9 h	$5/2^+$	3.190 *65*	
75 Re 181	356.78	96 ns	$5/2^-$	+2.03 *10*	
75 Re 182	0	64.0 h	7^+	2.84 *6*	+4.1 *3*
75 Re 182	0+x	12.7 h	2^+	3.26 *10*	+1.8 *2*
75 Re 182	235.736+x	585 ns	2^-	2.12 *8*	
75 Re 183	0	70.0 d	$5/2^+$	+3.168 *15*	+2.3 *2*
75 Re 183	496.231	7.8 ns	$9/2^-$	+5.14 *11*	(+)3.8 *3*
75 Re 184	0	38.0 d	$3(^-)$	(+)2.53 *5*	+2.8 *2*
75 Re 184	188.01	169 d	$8(^+)$	(+)2.86 *13*	
75 Re 185	0	stable	$5/2^+$	+3.1871 *3*	+2.18 *2*
75 Re 185	125.3581	10.2 ps	$7/2^+$	2.10 *81*	
75 Re 186	0	90.64 h	1^-	+1.739 *3*	+0.618 *6*
75 Re 186	314.009	25.4 ns	$(3)^+$	+2.18 *6*	
75 Re 186	330	17.0 ns	(5^+)	+4.62 *11*	
75 Re 187	0	4.35×10^{10} y	$5/2^+$	+3.2197 *3*	+2.07 *2*
75 Re 187	134.243	11.0 ps	$7/2^+$	+1.9 *9*	
75 Re 187	206.244	555.3 ns	$9/2^-$	+5.11 *9*	3.04 *5*
75 Re 188	0	16.98 h	1^-	+1.788 *5*	+0.572 *6*
76 Os 182	7049.7	150 ns	(25^+)		4.2 *2*
76 Os 183	0	13.0 h	$9/2^+$	(-)0.794 *14*	+3.12 *27*
76 Os 184	119.80	1.184 ns	2^+		-2.4 *11*
76 Os 186	137.155	818 ps	2^+	+0.562 *16*	-1.63 *4*
76 Os 186	1774.65	8.1 ns	7^-	-0.22 *14*	
76 Os 187	0	stable	$1/2^-$	+0.06465189 *6*	
76 Os 188	155.021	0.71 ns	2^+	+0.584 *20*	-1.46 *4*
76 Os 188	477.94	19.4 ps	4^+	+1.43 *14*	
76 Os 188	633.015	6.6 ps	2^+	+0.78 *7*	+1.00 *25*
76 Os 188	940.31	3.1 ps	(6^+)	+2.5 *4*	
76 Os 188	965.65	6.5 ps	4^+	+1.6 *5*	
76 Os 188	1771.0	14.0 ns	(7^-)	-0.17 *11*	
76 Os 188	2121.2		(3^-)		1.69 *9*
76 Os 189	0	stable	$3/2^-$	+0.659933 *4*	+0.856 *28*
76 Os 189	36.202	0.53 ns	$1/2^-$	+0.226 *29*	
76 Os 189	69.537	1.62 ns	$5/2^-$	+0.988 *6*	-0.629 *23*
76 Os 189	95.254	0.23 ns	$3/2^-$	-0.320 *46*	
76 Os 190	186.718	363 ps	2^+	+0.676 *20*	-1.18 *3*
76 Os 190	547.854	14.1 ps	4^+	+1.52 *20*	
76 Os 190	557.979	13.9 ps	2^+	+0.66 *8*	0.9 *4*
76 Os 190	1705.4	9.9 m	$(10)^-$	-0.56 *+8-12*	
76 Os 191	0	15.4 d	$9/2^-$		+2.53 *16*
76 Os 192	205.79561	288 ps	2^+	+0.792 *20*	-0.96 *3*
76 Os 192	489.0628	32.7 ps	2^+	+0.584 *44*	-0.8 *3*
76 Os 192	580.2812	13.4 ps	4^+	+1.56 *12*	
76 Os 192	909.595	17 ps	4^+	+1.72 *36*	
76 Os 193	0	30.5 h	$3/2^-$	+0.75 *3*	+0.47 *6*
77 Ir 184	0	3.09 h	5^-	0.696 *5*	+2.1 *3*
77 Ir 185	0	14.4 h	$5/2^-$	2.605 *13*	-2.06 *14*
77 Ir 186	0	16.64 h	5^+	3.88 *5*	-2.54 *16*
77 Ir 187	433.81	152 ns	$11/2^-$	+6.21 *5*	3.1 *3*
77 Ir 188	0	41.5 h	1^-	0.302 *10*	+0.543 *18*
77 Ir 189	0	13.2 d	$3/2^+$	0.13 *+3-4*	+1.04 *20*
77 Ir 190	0	11.78 d	$(4)^+$	0.04 *1*	+2.85 *14*
77 Ir 191	0	stable	$3/2^+$	+0.1507 *6*	0.816 *9*
77 Ir 191	82.425	4.08 ns	$1/2^+$	+0.600 *6*	
77 Ir 191	129.430	123 ps	$5/2^+$	+0.450 *23*	
77 Ir 191	171.28	4.94 s	$11/2^-$	6.026 *36*	
77 Ir 191	178.955	39 ps	$3/2^+$	+1.40 *38*	
77 Ir 191	343.19	20 ps	$(7/2^+)$	+1.68 *25*	
77 Ir 191	502.5	9.6 ps	$(9/2)^+$	+3.1 *11*	
77 Ir 191	686.3	2.7 ps	$(7/2)^+$	+0.53 *73*	
77 Ir 192	0	73.831 d	$4(^+)$	+1.924 *10*	+2.28 *6*
77 Ir 193	0	stable	$3/2^+$	+0.1637 *6*	+0.751 *9*
77 Ir 193	73.041	6.09 ns	$1/2^+$	+0.519 *2*	
77 Ir 193	138.89	81.9 ps	$5/2^+$	+0.528 *30*	
77 Ir 193	180.06	59 ps	$3/2^+$	+1.03 *38*	
77 Ir 193	357.69	19.8 ps	$7/2^+$	+1.65 *25*	
77 Ir 193	521.90	12.7 ps	$(9/2)^+$	+3.8 *11*	
77 Ir 193	621.22	4.6 ps	$7/2^+$	+0.53 *39*	
77 Ir 194	0	19.15 h	1^-	0.39 *1*	+0.339 *12*
78 Pt 183	0	6.5 m	$1/2^-$	+0.521 *27*	
78 Pt 185	0	70.9 m	$9/2^+$	-0.83 *1*	+4.3 *5*
78 Pt 185	103.4	33.0 m	$1/2^-$	+0.540 *9*	
78 Pt 187	0	2.35 h	$3/2^-$	-0.397 *5*	-1.13 *5*
78 Pt 189	0	10.87 h	$3/2^-$	0.434 *9*	-0.65 *26*
78 Pt 191	0	2.9 d	$3/2^-$	-0.500 *10*	-0.64 *26*
78 Pt 192	316.50819	43.7 ps	2^+	+0.559 *45*	+0.55 *21*
78 Pt 192	612.46669	26.5 ps	2^+	+0.72 *14*	
78 Pt 192	784.58033	4.2 ps	4^+	+1.6 *11*	
78 Pt 193	149.78	4.33 d	$13/2^+$	(-)0.753 *15*	
78 Pt 194	328.453	41.8 ps	2^+	+0.505 *12*	+0.48 *14*
78 Pt 194	621.995	35 ps	2^+	+0.686 *63*	-0.5 *5*
78 Pt 194	811.318	3.7 ps	4^+		+0.5 *10*
78 Pt 195	0	stable	$1/2^-$	+0.60952 *6*	
78 Pt 195	98.882	0.170 ns	$3/2^-$	-0.62 *6*	
78 Pt 195	129.777	0.67 ns	$5/2^-$	+0.90 *6*	
78 Pt 195	211.398	49 ps	$3/2^-$	+0.156 *32*	
78 Pt 195	239.269	70 ps	$5/2^-$	+0.523 *50*	
78 Pt 195	259.30	4.02 d	$13/2^+$	0.606 *15*	+1.42 *60*
78 Pt 196	355.6843	33.5 ps	2^+	+0.692 *26*	+0.66 *12*
78 Pt 196	688.693	36.8 ps	2^+	+0.75 *15*	
78 Pt 196	876.864	3.6 ps	4^+	+1.5 *3*	
78 Pt 196	1373.60	5.2 ns	7^-	-0.21 *14*	
78 Pt 197	0	18.3 h	$1/2^-$	0.51 *2*	
78 Pt 197	53.088	16.58 ns	$5/2^-$	+0.851 *25*	
78 Pt 198	407.22	22.25 ps	2^+	+0.69 *6*	+0.42 *12* or +0.54 *12*
78 Pt 198	774.72	27 ps	2^+	+0.72 *13*	
78 Pt 198	985.08	3.3 ps	4^+	+1.44 *25*	
79 Au 185	0	4.25 m	$5/2^-$	+2.170 *17*	
79 Au 186	0	10.7 m	3^-	-1.26 *3*	
79 Au 187	0	8.4 m	$1/2^+$	+0.531 *12*	
79 Au 188	0	8.84 m	$1(^-)$	-0.067 *28*	
79 Au 189	0	28.7 m	$1/2^+$	+0.49 *3*	
79 Au 189	247.23	4.59 m	$11/2^-$	+6.19 *3*	
79 Au 190	0	42.8 m	1^-	-0.065 *7*	
79 Au 191	0	3.18 h	$3/2^+$	+0.137 *1*	-1.3 *1*
79 Au 191	266.2	0.92 s	$(11/2^-)$	6.6 *6*	
79 Au 191	2447	0.89 ns	$(27/2^-)$	<20.25	
79 Au 192	0	4.94 h	1^-	-0.009 *24*	
79 Au 193	0	17.65 h	$3/2^+$	+0.140 *1*	
79 Au 193	290.17	3.9 s	$11/2^-$	6.18 *9*	
79 Au 193	1946.9	10.4 ns	$(21/2^+)$	+6.48 *11*	
79 Au 193	2377.7	0.79 ns	$(27/2^-)$	≤+9.5	
79 Au 193	2476.4	3.52 ns	$(31/2^-)$	+4.7 *31*	
79 Au 193	2700.9	1.80 ns	$(35/2^-)$	+2.3 *19*	
79 Au 194	0	38.02 h	1^-	+0.075 *4*	
79 Au 195	0	186.09 d	$3/2^+$	+0.149 *1*	
79 Au 196	0	6.183 d	2^-	+0.5906 *5*	0.81 *7*
79 Au 196	595.66	9.7 h	12^-	+5.72 *8*	
79 Au 197	0	stable	$3/2^+$	+0.145746 *9*	+0.547 *16*
79 Au 197	77.351	1.91 ns	$1/2^+$	+0.420 *3*	
79 Au 197	278.99	18.6 ps	$5/2^+$	+0.525 *50*	
79 Au 197	409.15	7.73 s	$11/2^-$	(+)5.98 *9*	+1.35 *22*
79 Au 197	502.5	1.77 ps	$5/2^+$	+3.0 *5*	
79 Au 197	547.5	4.61 ps	$7/2^+$	+0.84 *8*	
79 Au 197	736.7	1.09 ps	$7/2^+$	+1.7 *5*	
79 Au 197	855.5	2.67 ps	$9/2^+$	+1.5 *6*	
79 Au 197	1231	0.91 ps	$11/2^+$	+2.0 *10*	
79 Au 198	0	2.69517 d	2^-	+0.5934 *4*	+0.68 *2*
79 Au 198	312.042	124 ns	5^+	-1.105 *20*	
79 Au 198	811.7	2.30 d	(12^-)	(+)5.85 *9*	
79 Au 199	0	3.139 d	$3/2^+$	+0.2715 *7*	+0.55 *3*
79 Au 200	962	18.7 h	12^-	5.90 *9*	
80 Hg 181	0	3.6 s	$1/2(^-)$	+0.5071 *7*	
80 Hg 183	0	9.4 s	$1/2^-$	+0.524 *5*	
80 Hg 185	0	49.1 s	$1/2^-$	+0.508 *3*	
80 Hg 185	99.3	21.6 s	$13/2^+$	-1.017 *9*	+0.20 *33*
80 Hg 187	0	2.4 m	$13/2^+$	-1.044 *11*	+0.45 *33*
80 Hg 187	134	1.9 m	$3/2^-$	-0.594 *4*	-0.75 *25*
80 Hg 188	2724.0	134 ns	(12^+)	-2.02 *12*	0.91 *11*
80 Hg 189	0	7.6 m	$3/2^-$	-0.6086 *8*	-0.76 *35*
80 Hg 189	0+x	8.6 m	$13/2^+$	-1.058 *6*	+0.66 *26*
80 Hg 190	2620.8	23 ns	(12^+)	-2.52 *24*	1.17 *14*
80 Hg 191	0	49 m	$(3/2^-)$	-0.618 *11*	-0.80 *25*
80 Hg 191	0+x	50.8 m	$13/2^+$	-1.068 *5*	+0.64 *25*
80 Hg 193	0	3.80 h	$3/2^-$	-0.62757 *18*	-0.72 *38*
80 Hg 193	140.76	11.8 h	$13/2^+$	-1.0584297 *26*	+0.916 *97*
80 Hg 195	0	9.9 h	$1/2^-$	+0.5414749 *14*	
80 Hg 195	176.07	41.6 h	$13/2^+$	-1.0446473 *26*	+1.08 *11*
80 Hg 196	426.10	15.2 ps	2^+	-0.010 *80*	
80 Hg 196	1061.50		4^+	-0.31 *13*	
80 Hg 196	1757.09	0.555 ns	5^-	-0.24 *25*	
80 Hg 196	1841.39	5.25 ns	7^-	-0.29 *13*	
80 Hg 197	0	64.14 h	$1/2^-$	+0.5273744 *9*	
80 Hg 197	133.96	8.07 ns	$5/2^-$	+0.855 *15*	-0.081 *6*
80 Hg 197	298.93	23.8 h	$13/2^+$	-1.0276844 *26*	+1.24 *14*
80 Hg 198	411.8047	23.16 ps	2^+	+1.04 *20*	+0.68 *12* or +0.84 *12*
80 Hg 198	1683.3	6.9 ns	7^-	-0.22 *11*	
80 Hg 199	0	stable	$1/2^-$	+0.5058855 *9*	
80 Hg 199	158.37950	2.45 ns	$5/2^-$	+0.88 *3*	+0.95 *7*
80 Hg 199	208.20616	69 ps	$3/2^-$	-0.29 *15*	+0.62 *15*
80 Hg 199	413.84	115 ps	$5/2^-$	-0.70 *25*	
80 Hg 199	532.48	42.6 m	$13/2^+$	-1.014703 *3*	+1.2 *5*
80 Hg 200	367.944	46.4 ps	2^+	+0.68 *10*	+0.96 *11* or +1.11 *11*
80 Hg 201	0	stable	$3/2^-$	-0.5602257 *14*	+0.385 *40*
80 Hg 201	32.138	0.1 ns	$3/2^-$		0.3 *15* or 0.09 *20*
80 Hg 202	439.59	27.3 ps	2^+	+0.88 *18*	+0.87 *13* or +1.01 *13*
80 Hg 203	0	46.612 d	$5/2^-$	+0.84895 *13*	+0.343 *36*
80 Hg 204	436.552	40.4 ps	2^+	+0.86 *18*	+0.24 *20* or +0.39 *20*
80 Hg 205	0	5.2 m	$1/2^-$	+0.6010 *1*	
80 Hg 206	2102.6	2.15 µs	5^-	+5.45 *5*	0.74 *15*
81 Tl 188	0+x	71 s	(7^+)	0.5	
81 Tl 189	281	1.4 m	$(9/2^-)$	+3.8776 *63*	-2.29 *4*
81 Tl 190	0+x	2.6 m	$(2)^-$	0.25	
81 Tl 190	0+y	3.7 m	(7^+)	+0.495 *4*	
81 Tl 191	0		$(1/2^+)$	1.588 *4*	
81 Tl 191	299	5.22 m	$9/2(^-)$	+3.9034 *48*	-2.28 *3*
81 Tl 192	0+x	9.6 m	(2^-)	+0.200 *3*	-0.337 *11*
81 Tl 192	0+y	10.8 m	(7^+)	+0.5180 *36*	+0.477 *20*
81 Tl 192	250.6+y	296 ns	(8^-)	+1.656 *40*	0.44 *7*
81 Tl 193	0	21.6 m	$1/2(^+)$	+1.5912 *22*	
81 Tl 193	365.2+x	2.11 m	$(9/2^-)$	+3.9482 *39*	-2.20 *2*
81 Tl 194	0	33.0 m	2^-	0.14 *1*	
81 Tl 194	0+s	32.8 m	(7^+)	+0.540 *5*	0.62
81 Tl 195	0	1.16 h	$1/2^+$	+1.58 *4*	
81 Tl 196	0	1.84 h	2^-	0.07 *1*	
81 Tl 197	0	2.84 h	$1/2^+$	+1.58 *2*	
81 Tl 198	0	5.3 h	2^-	0.00 *1*	
81 Tl 198	543.5	1.87 h	7^+	+0.641 *10*	
81 Tl 199	0	7.42 h	$1/2^+$	+1.60 *2*	

Nucleus Z El A	Level energy	Half-life	J^{π}	μ (nm)	Q (b)
81 Tl 200	0	26.1 h	2^-	0.04 *1*	
81 Tl 201	0	72.912 h	$1/2^+$	+1.6051 *17*	
81 Tl 202	0	12.23 d	2^-	0.06 *1*	
81 Tl 202	950.19	572 μs	7^+	+0.90 *4*	
81 Tl 203	0	stable	$1/2^+$	+1.62225787 *12*	
81 Tl 203	279.1970	278 ps	$3/2^+$	+0.16 *5*	
81 Tl 203	680.518	0.88 ps	$5/2^+$	+2.6 *11*	
81 Tl 204	0	3.78 y	2^-	0.09 *1*	
81 Tl 204	1104.0	63 μs	$(7)^+$	+1.187 *6*	
81 Tl 205	0	stable	$1/2^+$	+1.63821461 *12*	
81 Tl 205	203.747	1.46 ns	$3/2^+$	-0.080 *45*	0.74 *15*
81 Tl 205	619.435	1.0 ps	$5/2^+$	+2.03 *25*	
81 Tl 205	2623.11		$(5/2)^-$	+0.71 *15*	-0.54 *20*
81 Tl 205	3290.63	2.6 μs	$25/2^+$	+6.80 *10*	
81 Tl 206	1405.47	78 ns	$(5)^+$	+4.265 *60*	
81 Tl 206	1621.72	10.1 ns	$(6,7)^+$	<2.45	
81 Tl 207	0	4.77 m	$1/2^+$	+1.876 *5*	
82 Pb 191	138	2.18 m	$(13/2^+)$	-1.176 *8*	0.085 *5*
82 Pb 192	2626	1.10 μs	(12^+)	-2.076 *24*	
82 Pb 194	2407.7	18 ns	$(9)^-$	-0.63 *36*	
82 Pb 194	2628.5	350 ns	(12^+)	-2.004 *24*	0.49 *3*
82 Pb 195	203.0	15.0 m	$13/2^+$	-1.1318 *13*	+0.286 *95*
82 Pb 195	2901.8	95 ns	$33/2^+$	-2.57 *10*	
82 Pb 196	1797.51	133 ns	5^-	0.490 *15*	
82 Pb 196	2692.8	271 ns	12^+	-1.920 *18*	0.65 *5*
82 Pb 196	3190.5	72 ns	11^-	10.6 *9*	
82 Pb 197	0	8 m	$3/2^-$	-1.0753 *22*	-0.08 *18*
82 Pb 197	319.3	43 m	$13/2^+$	-1.1045 *27*	+0.47 *34*
82 Pb 197	1913.3	1.15 μs	$(21/2)^-$	-0.531 *7*	
82 Pb 197	3167.9	55 ns	$(33/2)^+$	-2.51 *10*	
82 Pb 198	1823.5	50.4 ns	5^-	0.38 *3*	
82 Pb 198	2141.4	4.19 μs	(7^-)	-0.3768 *64*	
82 Pb 198	2820.5	212 ns	(12^+)	-1.862 *18*	0.75 *5*
82 Pb 199	0	90 m	$3/2^-$	-1.0742 *12*	+0.08 *9*
82 Pb 199	2564	10.2 μs	$29/2^-$	-1.076 *3*	
82 Pb 199	3495	63 ns	$(33/2^+)$	-2.51 *5*	
82 Pb 200	2153.81	44 ns	7^-	-2.1 *10*	0.32 *2*
82 Pb 200	2183.3	424 ns	(9^-)	-0.256 *10*	0.40 *2*
82 Pb 200	3005.8	199 ns	(12^+)	-1.836 *7*	0.79 *3*
82 Pb 200	5075.7	73 ns	(19^-)	-1.79 *13*	
82 Pb 201	0	9.33 h	$5/2^-$	+0.6753 *5*	-0.009 *43*
82 Pb 201	2718.5	63 ns	$25/2^-$	-0.788 *38*	0.46 *2*
82 Pb 201	2718.5+x	508 ns	$(29/2^-)$	-1.0107 *58*	
82 Pb 201	4639.3+x	43 ns	$41/2(^+)$	-3.69 *82*	
82 Pb 202	1382.85	1.97 ns	4^+	+0.008 *16*	
82 Pb 202	2169.84	3.53 h	9^-	-0.2276 *7*	+0.58 *9*
82 Pb 202	2208.45	42 ns	$(7)^-$		0.28 *2*
82 Pb 202	4090.9+x	110 ns	(16^+)	-0.67 *16*	
82 Pb 202	5241.9+y	107 ns	(19^-)	-1.881 *57*	
82 Pb 203	0	51.873 h	$5/2^-$	+0.6864 *5*	+0.095 *52*
82 Pb 203	1922.26	56 ns	$21/2^+$	-0.641 *21*	0.85 *3*
82 Pb 203	2923.6+x	122 ns	$(25/2^-)$	-0.738 *38*	
82 Pb 204	899.171	2.88 ps	2^+	<0.02	+0.23 *9*
82 Pb 204	1274.00	265 ns	4^+	+0.225 *4*	0.44 *2*
82 Pb 205	0	1.53×10^7 y	$5/2^-$	+0.7117 *4*	+0.226 *37*
82 Pb 205	1013.839	5.54 ms	$13/2^+$	-0.975 *40*	0.30 *5*
82 Pb 205	3195.6	217 ns	$25/2^-$	-0.845 *14*	0.63 *3*
82 Pb 205	5161.6	71 ns	$(33/2)^+$	-2.442 *83*	
82 Pb 206	803.10	8.14 ps	2^+	<0.030	+0.05 *9*
82 Pb 206	2200.21	125.3 μs	7^-	-0.1519 *28*	0.33 *5*
82 Pb 206	2384.19	29 ps	6^-	+0.78 *42*	
82 Pb 206	4027.0	205 ns	12^+	-1.795 *22*	0.51 *2*
82 Pb 207	0	stable	$1/2^-$	+0.592583 *9*	
82 Pb 207	569.703	130.5 ps	$5/2^-$	+0.80 *3*	
82 Pb 208	2614.551	16.7 ps	3^-	+1.68 *22*	-0.34 *15*
82 Pb 208	3197.743	294 ps	5^-	+0.112 *37*	
82 Pb 208	4085.4	0.74 fs	2^+		-0.7 *3*
82 Pb 209	0	3.253 h	$9/2^+$	-1.4735 *16*	-0.27 *17*
82 Pb 210	1195.6	49 ns	6^+	-1.872 *90*	
82 Pb 210	1279	201 ns	8^+	-2.496 *64*	
82 Pb 211	0	36.1 m	$9/2^+$	-1.4037 *8*	+0.087 *62*
83 Bi 199	0	27 m	$9/2^-$	4.6 *6*	
83 Bi 202	615	3.04 μs	$(10)^-$	+2.54 *1*	0.106 *13*
83 Bi 202	2607.1	310 ns	(17^+)	+2.074 *34*	0.35 *3*
83 Bi 203	0	11.76 h	$9/2^-$	+4.62 *3*	-0.68 *6*
83 Bi 203	1990.6	90 ns	$(21/2^+)$	2.793 *42*	
83 Bi 203	2041.5	194 ns	$25/2^+$	3.325 *50*	
83 Bi 204	0	11.22 h	6^+	+4.280 *24*	-0.43 *4*
83 Bi 204	805.5	13.0 ms	10^-	2.591 *38*	0.056 *11*
83 Bi 205	0	15.31 d	$9/2^-$	+4.16 *10*	
83 Bi 205	2064.64	100 ns	$21/2^+$	2.699 *42*	
83 Bi 205	2138.9	220 ns	$25/2^+$	3.213 *50*	
83 Bi 206	0	6.243 d	$6(^+)$	+4.60 *4*	-0.20 *4*
83 Bi 206	1044.8	0.89 ms	(10^-)	2.644 *14*	0.043 *7*
83 Bi 207	0	31.55 y	$9/2^-$	4.081 *9*	-0.58 *11*
83 Bi 207	2101.49	182 μs	$21/2^+$	+3.412 *63*	0.039 *6*
83 Bi 208	1571.1	2.58 ms	$(10)^-$	2.672 *14*	
83 Bi 209	0	stable	$9/2^-$	+4.1106 *2*	-0.37 *3*
83 Bi 209	2564.16	0.015 ps	$(9/2)^+$	3.52 *70*	+0.11 *5*
83 Bi 209	2741.05	7.1 ps	$15/2^+$	6.2 *12*	-0.03 *40*
83 Bi 209	2986.79	18 ns	$19/2^+$	3.496 *76*	
83 Bi 210	0	5.013 d	1^-	-0.04451 *6*	+0.136 *1*
83 Bi 210	433.49	57.5 ns	7^-	+2.114 *49*	
83 Bi 210	439.20	37.7 ns	5^-	+1.530 *45*	
83 Bi 211	404.854	0.317 ns	$7/2^-$	+4.53 *71*	
84 Po 198	1853.80	29 ns	8^+	+7.28 *24*	
84 Po 198	2566.10	200 ns	11^-	+12.1 *6*	
84 Po 198	2692+x	750 ns	12^+	-1.86 *4*	
84 Po 199	310	4.13 m	$13/2^+$	(-)0.99 *7*	
84 Po 200	1773.69	61 ns	8^+	+7.44 *16*	1.38 *7*
84 Po 200	2596.22	105 ns	11^-	+11.88 *22*	
84 Po 200	2830	268 ns	(12^+)	-1.788 *24*	
84 Po 201	0	15.3 m	$3/2^-$	0.74 *11*	
84 Po 201	424	8.9 m	$13/2^+$	0.99 *11*	
84 Po 202	1712	98 ns	(8^+)	7.45 *12*	
84 Po 202	2625	85 ns	(11^-)	11.9 *4*	
84 Po 203	0	36.7 m	$5/2^-$	(+)0.742 *26*	
84 Po 204	1639.03	158 ns	8^+	+7.38 *10*	1.14 *5*
84 Po 204	3564.7	12 ns	15^-	6.15 *30*	
84 Po 205	0	1.66 h	$5/2^-$	+0.760 *55*	+0.17
84 Po 205	880.30	645 μs	$13/2^+$	-0.953 *47*	
84 Po 206	1585.9	212 ns	(8^+)	+7.34 *7*	1.02 *4*
84 Po 207	0	5.80 h	$5/2^-$	+0.793 *55*	+0.28
84 Po 207	1115.073	49 μs	$13/2^+$	-0.910 *14*	
84 Po 207	2379.6	43.0 ns	$(25/2)^+$	5.413 *38*	
84 Po 208	1524.18	4.5 ns	6^+	+5.46	
84 Po 208	1528.22	350 ns	$(8)^+$	+7.37 *5*	0.90 *4*
84 Po 208	2702.7	8.0 ns	$(11)^-$	12.11 *14*	
84 Po 209	0	102 y	$1/2^-$	+0.77	
84 Po 209	1417.59	24.7 ns	$(13/2)^-$	6.13 *9*	
84 Po 209	1472.5	93 ns	$(17/2^-)$	7.75 *5*	(-)0.39 *8*
84 Po 209	4265.6	119 ns	$(31/2^-)$	+9.68 *8*	
84 Po 210	1473.34	42.6 ns	6^+	5.48 *5*	
84 Po 210	1556.96	98.9 ns	8^+	+7.35 *5*	(-)0.57
84 Po 210	2849.16	19.6 ns	11^-	+12.20 *9*	0.85 *12*
84 Po 210	4371.94	54.4 ns	13^-	6.84 *17*	0.90 *7*
84 Po 210	5057.61	263 ns	16^+	9.84 *8*	1.34 *8*
84 Po 211	1064.8	15.9 ns	$15/2^-$	-0.38 *15*	
85 At 207	2117.2	108 ns	$(25/2^+)$	+3.75 *13*	
85 At 208	1090.4	46 ns	(10^-)	+2.69 *3*	
85 At 208	2275.8	1.5 μs			1.69 *25*
85 At 209	1427.66	25.5 ns	$(21/2)^-$	+9.98 *21*	0.78 *8*
85 At 209	2429.25	0.89 μs	$(29/2)^+$	15.38 *14*	1.50 *15*
85 At 210	1363.2	27 ns	$(11)^+$	+9.79 *33*	0.65 *8*
85 At 210	2549.6	0.48 μs	$(15)^-$	+15.675 *17*	1.22 *12*
85 At 210	4027.7	5.90 μs	$(19)^+$	13.26 *13*	2.20 *25*
85 At 211	1416.6	50 ns	$(21/2)^-$	+9.56 *9*	0.53 *5*
85 At 211	2641.4	54 ns	$(29/2)^+$	+15.31 *13*	1.01 *19*
85 At 211	4816.2	4.2 μs	$(39/2^-)$	13.46 *14*	1.91 *25*
85 At 212	884.5	19.4 ns	(11^+)	5.95 *12*	
85 At 212	1614.6	37.4 ns	(15^-)	9.33 *15*	
86 Rn 203	361	28 s	$(13/2^+)$	-0.960 *11*	+1.28 *13*
86 Rn 205	0	2.8 m	$5/2^-$	+0.802 *9*	+0.062 *6*
86 Rn 206	1924.3	13.5 ns	$(8)^+$	6.64 *40*	
86 Rn 206	2475.6	65 ns	(10^-)	11.2 *1*	
86 Rn 207	0	9.25 m	$5/2^-$	+0.816 *9*	+0.220 *22*
86 Rn 207	899	181 μs	$(13/2^+)$	-0.903 *3*	
86 Rn 208	1828.3	487 ns	8^+	6.98 *8*	0.39 *5*
86 Rn 208	2618.1	11.8 ns	10^-	10.77 *10*	
86 Rn 209	0	28.5 m	$5/2^-$	(+)0.83881 *39*	+0.311 *31*
86 Rn 210	x+1664.6	644 ns	(8^+)	7.184 *56*	0.31 *4*
86 Rn 210	x+2562.3	64 ns	$(11)^-$	12.16 *11*	
86 Rn 210	x+3247.7	76 ns	$(14)^+$	14.92 *10*	
86 Rn 210	x+3812.0	1.06 μs	$(17)^-$	17.88 *9*	0.86 *10*
86 Rn 210	x+4993.2	12.3 ns	$(20)^+$	22.3 *1*	
86 Rn 210	x+6468.3	1.04 μs	$(22)^+$	15.42 *15*	
86 Rn 210	x+7310.1	34 ns	$(25)^-$	18.33 *22*	
86 Rn 211	0	14.6 h	$1/2^-$	+0.601 *7*	
86 Rn 211	1577.8+x	596 ns	$(17/2^-)$	+7.75 *8*	0.18 *2*
86 Rn 211	3926.1+x	40.2 ns	$(35/2^+)$	+17.80 *21*	
86 Rn 211	5245.9+y	14 ns	$(43/2^-)$	+15.91 *43*	
86 Rn 211	6100.0+y	28.4 ns	$(49/2^+)$	+18.77 *20*	
86 Rn 211	8854.6+y	201 ns	$(63/2^-)$	+19.59 *22*	1.54 *22*
86 Rn 212	1501.5	8.8 ns	4^+	4.04 *24*	
86 Rn 212	1639.8	118 ns	$(6)^+$	5.454 *48*	
86 Rn 212	1694.0	0.91 μs	(8^+)	+7.152 *16*	(-)0.17 *2*
86 Rn 212	3357.6	7.4 ns	(14^+)	14.98 *42*	
86 Rn 212	4066.8	28.9 ns	(17^-)	17.85 *17*	
86 Rn 212	6167.4+x	109 ns	(22^+)	15.84 *22*	
86 Rn 212	7135.2+x	18.0 ns	(25^-)	17.75 *50*	
86 Rn 212	7870.9+x	14 ns	(27^-)	17.01 *81*	
86 Rn 212	8571.0+x	154 ns	(30^+)	19.71 *9*	
86 Rn 213	1664.0	29 ns	$(21/2^+)$	4.73 *11*	
86 Rn 213	1664.0+x	1.00 μs	$(25/2^+)$	7.63 *25*	
86 Rn 213	2186.7+x	1.36 μs	$(31/2^-)$	9.90 *8*	
86 Rn 213	3029.3+x	26 ns	$(37/2^+)$	13.67 *13*	
86 Rn 213	3495.4+x	28 ns	$(43/2^-)$	15.59 *15*	
86 Rn 213	4505.5+x	12 ns	$(49/2^+)$	19.87 *29*	
86 Rn 213	5929+y	164 ns	$(55/2^+)$	16.61 *14*	
86 Rn 219	0	3.96 s	$5/2^+$	-0.442 *5*	+1.15 *12*
86 Rn 221	0	25 m	$7/2(^+)$	-0.020 *1*	-0.38
86 Rn 222	186.10	0.32 ns	2^+	+0.92 *14*	
86 Rn 223	0	23.2 m	7/2	-0.776 *8*	+0.80
86 Rn 225	0	4.5 m	$7/2^-$	-0.696 *8*	+0.84
87 Fr 207	0	14.8 s	$9/2^-$	+3.89 *8*	-0.16 *5*
87 Fr 208	0	59.1 s	7^+	+4.75 *10*	+0.004 *38*
87 Fr 209	0	50.0 s	$9/2^-$	+3.95 *8*	-0.24 *2*
87 Fr 210	0	3.18 m	6^+	+4.40 *9*	+0.19 *2*
87 Fr 211	0	3.10 m	$9/2^-$	+4.00 *8*	-0.19 *3*
87 Fr 211	2423.2	146 ns	$(29/2^+)$	15.37 *15*	1.24 *17*
87 Fr 211	4657.3	123 ns	$(45/2^-)$	24.30 *23*	2.3 *7*
87 Fr 212	0	20.0 m	5^+	+4.62 *9*	-0.10 *1*
87 Fr 212	1551.4	31.9 μs	(11^+)	9.889 *44*	
87 Fr 212	2492.2	604 ns	(15^-)	15.64 *12*	0.96 *8*

Nucleus Z	El	A	Level energy	Half-life	J^{π}	μ (nm)	Q (b)
87	Fr	212	4834.3	4.2 ns	(22^{+})	22.0 *44*	
87	Fr	212	5854.7	312 ns	(27^{-})	21.87 *27*	1.65 *24*
87	Fr	213	0	34.6 s	$9/2^{-}$	+4.02 *8*	-0.14 *2*
87	Fr	213	1411.0	18 ns	$17/2^{-}$	7.5 *14*	
87	Fr	213	1590.4	499 ns	$21/2^{-}$	9.324 *32*	
87	Fr	213	2537.6	243 ns	$29/2^{+}$	15.216 *26*	-0.70 *7*
87	Fr	213	4992.7	13 ns	$45/2^{-}$	22.28 *56*	
87	Fr	213	8094.7	3.1 μs	$(65/2^{-})$	22.6 *3*	-2.19 *53*
87	Fr	215	2015.9	4.7 ns	$(29/2)^{+}$	6.8 *29*	
87	Fr	215	2251.3	5.3 ns	$(33/2)^{+}$	7.8 *17*	
87	Fr	215	3068.9	14.6 ns	$(39/2)^{-}$	9.17 *20*	
87	Fr	220	0	27.4 s	1^{+}	-0.67 *1*	+0.47 *3*
87	Fr	221	0	4.9 m	$5/2^{-}$	+1.58 *3*	-1.00 *1*
87	Fr	222	0	14.2 m	2^{-}	+0.63 *1*	+0.51 *4*
87	Fr	223	0	21.8 m	$3/2(^{-})$	+1.17 *2*	+1.17 *1*
87	Fr	224	0	3.30 m	$1(^{-})$	+0.40 *1*	+0.517 *4*
87	Fr	225	0	4.0 m	$3/2^{-}$	+1.07 *2*	+1.32 *5*
87	Fr	226	0	48 s	1	+0.0712 *14*	-1.35 *2*
87	Fr	227	0	2.47 m	$1/2^{+}$	+1.50 *3*	
87	Fr	228	0	39 s	2^{-}	-0.76 *2*	+2.38 *5*
88	Ra	209	0	4.6 s	$5/2^{-}$	+0.865 *13*	+0.38 *4*
88	Ra	211	0	13 s	$5/2(^{-})$	+0.8780 *38*	+0.46 *5*
88	Ra	212	1958.4	10.9 μs	$(8)^{+}$	7.104 *72*	
88	Ra	212	2613.4	0.85 μs	$(11)^{-}$	12.01 *24*	
88	Ra	213	0	2.74 m	$1/2^{-}$	+0.6133 *18*	
88	Ra	214	1865.2	67 μs	(8^{+})	7.080 *32*	
88	Ra	214	2683.2	295 ns	(11^{-})	11.94 *11*	
88	Ra	214	3478.4	279 ns	(14^{+})	14.31 *13*	
88	Ra	214	4146.8	225 ns	(17^{-})	17.48 *12*	
88	Ra	215	3737	0.59 μs		15.78 *15*	
88	Ra	216	1711.1	1.7 ns	8^{+}	+3.2 *32*	
88	Ra	216	3763.4	6.7 ns	19^{-}	9.69 *57*	
88	Ra	221	0	28 s	$5/2^{+}$	-0.1799 *17*	+1.978 *7*
88	Ra	223	0	11.435 d	$3/2^{+}$	+0.2705 *19*	+1.254 *3*
88	Ra	223	50.133	0.63 ns	$3/2^{-}$	+0.43 *6*	
88	Ra	224	84.373	0.746 ns	2^{+}	+0.92 *22*	
88	Ra	225	0	14.9 d	$1/2^{+}$	-0.7338 *15*	
88	Ra	227	0	42.2 m	$3/2^{+}$	-0.4038 *24*	+1.50 *15*
88	Ra	229	0	4.0 m	$5/2(^{+})$	+0.5025 *27*	+2.96 *30*
89	Ac	215	1621.0	30 ns	$17/2^{-}$	7.82 *16*	
89	Ac	215	1796.0	185 ns	$21/2^{-}$	9.66 *20*	
89	Ac	215	2438+x	335 ns	$(29/2^{+})$	15.13 *30*	
89	Ac	217	0	69 ns	$9/2^{-}$	3.825 *45*	
89	Ac	217	2013	740 ns	$(29/2)^{+}$	5.032 *73*	
89	Ac	227	0	21.773 y	$3/2^{-}$	+1.1 *1*	+1.7 *2*

Nucleus Z	El	A	Level energy	Half-life	J^{π}	μ (nm)	Q (b)
90	Th	229	0	7340 y	$5/2^{+}$	+0.46 *4*	+4.3 *9*
91	Pa	228	0	22 h	(3^{+})	3.48 *33*	
91	Pa	230	0	17.4 d	(2^{-})	2.00 *29*	
91	Pa	231	0	32760 y	$3/2^{-}$	2.01 *2*	-1.72 *5*
91	Pa	231	84.216	45.1 ns	$5/2^{+}$		+0.69 *17*
91	Pa	233	0	26.967 d	$3/2^{-}$	+3.39 *70*	-3.0
92	U	233	0	1.592×10^{5} y	$5/2^{+}$	0.59 *5*	3.663 *8*
92	U	233	40.35	0.12 ns	$7/2^{+}$		0.642 *30*
92	U	235	0	7.038×10^{8} y	$7/2^{-}$	-0.38 *3*	+4.55 *9*
92	U	235	46.204	60 ps	$9/2^{-}$		1.870 *30*
92	U	238	0	4.468×10^{9} y	0^{+}		13.9 *20*
92	U	238	2557.6	225 ns	0^{+}		29 *3*
93	Np	237	0	2.14×10^{6} y	$5/2^{+}$	+3.14 *4*	+3.886 *6*
93	Np	237	59.537	67 ns	$5/2^{-}$	+1.68 *3*	+3.85 *4*
93	Np	239	74.664	1.40 ns	$5/2^{-}$	+2.03 *25*	
94	Pu	237	2600	85 ns		-0.675 *45*	
94	Pu	239	0	24110 y	$1/2^{+}$	+0.203 *4*	
94	Pu	239	7.861	36 ps	$3/2^{+}$		-2.319 *7*
94	Pu	239	57.276	101 ps	$5/2^{+}$		-3.345 *13*
94	Pu	239	75.706	83 ps	$7/2^{+}$		-3.826 *26*
94	Pu	239	285.460	1.12 ns	$5/2^{+}$	-1.25 *29*	
94	Pu	241	0	14.35 y	$5/2^{+}$	-0.683 *15*	+5.6 *20*
95	Am	239	2500	163 ns	$(7/2^{+})$	(+)2.59 *18*	
95	Am	241	0	432.2 y	$5/2^{-}$	+1.61 *3*	+4.2 *13*
95	Am	242	0	16.02 h	1^{-}	+0.3879 *15*	-2.4 *7*
95	Am	242	48.63	141 y	5^{-}	1.00 *5*	+6.5 *20*
95	Am	243	0	7370 y	$5/2^{-}$	1.53 *3*	+4.30 *3*
95	Am	243	84.0	2.34 ns	$5/2^{+}$	+2.74 *14*	4.20 *3*
96	Cm	243	0	29.1 y	$5/2^{+}$	0.41	
96	Cm	245	0	8500 y	$7/2^{+}$	0.5	
96	Cm	247	0	1.56×10^{7} y	$9/2^{-}$	0.37	
96	Cm	248	43.38	121 ps	2^{+}		-2.2 *+10 -5*
96	Cm	248	143.8	78 ps	4^{+}		-4.2 *+7 -13*
96	Cm	248	298.8	33 ps	6^{+}		-6.1 *+12 -30*
96	Cm	248	506.0	13.2 ps	8^{+}		-3.8 *+32 -14*
96	Cm	248	761.9	9.4 ps	10^{+}		-4.5 *+10 -14*
96	Cm	248	1062.8	3.8 ps	12^{+}		-3.5 *+16 -8*
96	Cm	248	1404.3	1.68 ps	14^{+}		-6.6 *+8 -16*
96	Cm	248	1781.6	1.46 ps	16^{+}		-7.1 *+13 -12*
96	Cm	248	2189.7	0.98 ps	18^{+}		-5.2 *+28 -16*
96	Cm	248	2623.6	0.71 ps	20^{+}		-3.9 *+6 -4*
97	Bk	249	0	320 d	$7/2^{+}$	2.0 *4*	
99	Es	253	0	20.47 d	$7/2^{+}$	+4.10 *7*	6.7 *8*