Nuclear Wallet Cards

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
0	**n**	1	1/2+	8.071	10.183 m *17*	β–
1	**H**	1	1/2+	7.289	**99.9885% *70***	
		2	1+	13.136	**0.0115% *70***	
		3	1/2+	14.950	12.32 y *2*	β–
		4	2–	24.6		n
		5	(1/2+)	32.89	5.7 MeV *21*	2n
		6	(2–)	41.9	1.6 MeV *4*	n
		7	(1/2+)	47.9	29×10^{-23} y *7*	
2	**He**	3	1/2+	14.931	**0.000134% *3***	
		4	0+	2.425	**99.999866% *3***	
		5	3/2–	11.23	0.60 MeV *2*	α, n
		6	0+	17.592	801 ms *10*	β–
		7	(3/2)–	26.067	150 keV *20*	n
		8	0+	31.609	119.1 ms *12*	β–, β–n 16%
		9	1/2+	39.78		n
		10	0+	48.81	300 keV *200*	n
3	**Li**	3		29s	unbound	p?
		4	2–	25.3	6.03 MeV	p
		5	3/2–	11.68	≈1.5 MeV	p, α
		6	1+	14.087	**7.59% *4***	
		7	3/2–	14.907	**92.41% *4***	
		8	2+	20.945	839.9 ms *9*	β–, β–α
		9	3/2–	24.954	178.3 ms *4*	β–, β–n 50.8%
		10	(1–,2–)	33.05		n
		11	3/2–	40.728	8.75 ms *14*	β–, β–n 83%, β–2n 4.1%, β–nα 0.027%
		12		48.92	<10 ns	n?
		13		58.3		
4	**Be**	5	(1/2+)	37s		p
		6	0+	18.375	92 keV *6*	p, α
		7	3/2–	15.768	53.24 d *4*	ε
		8	0+	4.941	5.57 eV *25*	α
		9	3/2–	11.348	**100.%**	
		10	0+	12.607	1.387×10^{6} y *12*	β–
		11	1/2+	20.177	13.81 s *8*	β–, β–α 3.1%
		12	0+	25.076	21.49 ms *3*	β–, β–n ≤ 1%
		13	(1/2–)	33.21	2.7×10^{-21} s *18*	n
		14	0+	40.0	4.35 ms *17*	β–, β–n 81%, β–2n 5%
		15		49.8s	<200 ns	n?
		16	0+	57.7s	<200 ns	2n?
5	**B**	6		47s	unbound	2p?
		7	(3/2–)	27.87	1.4 MeV *2*	α, p
		8	2+	22.921	770 ms *3*	ε, εα
		9	3/2–	12.416	0.54 keV *21*	p, 2α
		10	3+	12.050	**19.9% *7***	
		11	3/2–	8.667	**80.1% *7***	
		12	1+	13.368	20.20 ms *2*	β–, β–3α 1.58%
		13	3/2–	16.562	17.33 ms *17*	β–
		14	2–	23.66	12.5 ms *5*	β–

Nuclear Wallet Cards

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
5	**B**	15		28.96	9.93 ms *7*	β−, β−n 93.6%, β−2n 0.4%
		16	0−	37.12	<190 ps	n
		17	(3/2−)	43.8	5.08 ms *5*	β−, β−n 63%, β−2n 11%, β−3n 3.5%, β−4n 0.4%
		18	(4−)	51.9s	<26 ns	n?
		19	(3/2−)	58.8s	2.92 ms *13*	β−, β−n 72%, β−2n 16%
		20		67.1s		
		21		75.7s		
6	**C**	8	0+	35.08	230 keV *50*	p, α
		9	(3/2−)	28.909	126.5 ms *9*	ε, εp 61.6%, εα 38.4%
		10	0+	15.698	19.308 s *4*	ε
		11	3/2−	10.650	20.334 m *24*	ε
		12	0+	0.000	**98.93%** ***8***	
		13	1/2−	3.125	**1.07%** ***8***	
		14	0+	3.020	5700 y *30*	β−
		15	1/2+	9.873	2.449 s *5*	β−
		16	0+	13.694	0.747 s *8*	β−, β−n 99%
		17	3/2+	21.03	193 ms *13*	β−, β−n 32%
		18	0+	24.92	92 ms *2*	β−, β−n 31.5%
		19	1/2+	32.41	49 ms *4*	β−, β−n 61%
		20	0+	37.6	14 ms *+6−5*	β−, β−n 72%
		21	(1/2+)	45.6s	<30 ns	n?
		22	0+	52.1s	6.1 ms *+14−12*	β−, β−n 61%, β−2n<37%
		23		62.7s		
7	**N**	10		38.8		p
		11	1/2+	24.30	0.83 MeV *3*	p
		12	1+	17.338	11.000 ms *16*	ε
		13	1/2−	5.345	9.965 m *4*	ε
		14	1+	2.863	**99.636%** ***20***	
		15	1/2−	0.101	**0.364%** ***20***	
		16	2−	5.683	7.13 s *2*	β−, β−α 1.2×10^{-3}%
		17	1/2−	7.87	4.173 s *4*	β−, β−n 95.1%
		18	1−	13.11	620 ms *8*	β−, β−α 12.2%, β−n 7%
		19		15.86	336 ms *3*	β−, β−n 41.8%
		20	2−	21.76	136 ms *3*	β−, β−n 42.9%
		21	(1/2−)	25.25	83 ms *8*	β−, β−n 90.5%
		22	(0−,1−)	32.0	20 ms *2*	β−, β−n 33%, β−2n 12%
		23		38.4s	14.5 ms *14*	β−, β−n, β−2n
		24		47.5s	<52 ns	n?
		25		56.5s		
8	**O**	12	0+	32.05	0.40 MeV *25*	p
		13	(3/2−)	23.114	8.58 ms *5*	ε, εp
		14	0+	8.007	70.620 s *15*	ε
		15	1/2−	2.855	122.24 s *16*	ε

Nuclear Wallet Cards

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
8	**O**	16	0+	−4.737	**99.757%** ***16***	
		17	5/2+	−0.809	**0.038%** ***1***	
		18	0+	−0.783	**0.205%** ***14***	
		19	5/2+	3.333	26.88 s *5*	β−
		20	0+	3.796	13.51 s *5*	β−
		21	(5/2+)	8.06	3.42 s *10*	β−
		22	0+	9.28	2.25 s *9*	β−, β−n<22%
		23	1/2+	14.62	97 ms *8*	β−, β−n 7%
		24	0+	18.5	65 ms *5*	β−, β−n 58%
		25		27.3		
		26	0+	35.1s	<40 ns	n?
		27		44.1s	<260 ns	n?
		28	0+	52.9s	<100 ns	n?
9	**F**	14	(2−)	31.96		p
		15	(1/2+)	16.81	1.0 MeV *2*	p
		16	0−	10.680	40 keV *20*	p
		17	5/2+	1.951	64.49 s *16*	ε
		18	1+	0.873	109.77 m *5*	ε
		19	1/2+	−1.487	**100%**	
		20	2+	−0.017	11.07 s *6*	β−
		21	5/2+	−0.047	4.158 s *20*	β−
		22	(4+)	2.79	4.23 s *4*	β−, β−n<11%
		23	5/2+	3.3	2.23 s *14*	β−
		24	(1,2,3)+	7.56	390 ms *70*	β−, β−n<5.9%
		25	5/2+	11.36	80 ms *9*	β−, β−n 23.1%
		26	(1+)	18.67	9.7 ms *7*	β−, β−n 11%
		27	(5/2+)	24.6	5.0 ms *2*	β−, β−n 77%
		28		33.1s	<40 ns	
		29	(5/2+)	40.0s	2.5 ms *3*	β−, β−n
		30		48.4s		n
		31		55.9s	>250 ns	β−n, β−
10	**Ne**	16	0+	24.00	9×10^{-21} s	2p
		17	1/2−	16.500	109.2 ms *6*	ε, εp, εα
		18	0+	5.317	1.6670 s *17*	ε
		19	1/2+	1.752	17.22 s *2*	ε
		20	0+	−7.042	**90.48%** ***3***	
		21	3/2+	−5.731	**0.27%** ***1***	
		22	0+	−8.024	**9.25%** ***3***	
		23	5/2+	−5.154	37.24 s *12*	β−
		24	0+	−5.951	3.38 m *2*	β−
		25	1/2+	−2.06	602 ms *8*	β−
		26	0+	0.48	197 ms *1*	β−, β−n 0.13%
		27	(3/2+)	7.03	31.5 ms *13*	β−, β−n 2%
		28	0+	11.29	18.9 ms *4*	β−, β−n 12%, β− 3.6%
		29	(3/2+)	18.40	14.8 ms *3*	β−, β−n 28%, β−2n 4%
		30	0+	23.0	7.3 ms *3*	β−, β−n 13%, β− 8.9%
		31		31	3.4 ms *8*	β−, β−n
		32	0+	37.0s	3.5 ms *9*	β−, β−n
		33		46.0s	<180 ns	n

Nuclear Wallet Cards

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
10	**Ne**	34	0+	52.8s	>60 ns	β–n, β–
11	**Na**	18	1–	25.0	1.3×10^{-21} s *4*	p
		19	(5/2+)	12.93	<40 ns	p
		20	2+	6.850	447.9 ms *23*	ε , εα 20.05%
		21	3/2+	–2.184	22.49 s *4*	ε
		22	3+	–5.181	2.6027 y *10*	ε
		23	3/2+	–9.530	**100%**	
		24	4+	–8.417	14.997 h *12*	β–
		24m	1+	–7.945	20.18 ms *10*	IT 99.95%, β–=0.05%
		25	5/2+	–9.357	59.1 s *6*	β–
		26	3+	–6.860	1.07128 s *25*	β–
		27	5/2+	–5.517	301 ms *6*	β–, β–n 0.13%
		28	1+	–0.99	30.5 ms *4*	β–, β–n 0.58%
		29	3/2+	2.67	44.9 ms *12*	β–, β–n 21.5%
		30	2+	8.37	48 ms *2*	β–, β–n 30%, β–2n 1.15%, β–α 5.5×10^{-5}%
		31	3/2(+)	12.5	17.0 ms *4*	β–, β–n 37%, β–2n 0.87%, β–3n<0.05%
		32	(3–,4–)	18.8	13.2 ms *4*	β–, β–n 24%, β–2n 8%
		33	(3/2+)	24.0s	8.0 ms *4*	β–, β–n 47%, β–2n 13%
		34		31.3s	5.5 ms *10*	β–, β–2n=50%, β–n=15%
		35		37.8s	1.5 ms *5*	β–, β–n
		36		45.9s	<180 ns	n
		37		53.1s	>60 ns	β–n, β–
12	**Mg**	19		31.83	4.0 ps *15*	2p
		20	0+	17.56	90.8 ms *24*	ε , εp=27%
		21	5/2+	10.91	122 ms *3*	ε , εp 32.6%, εα<0.5%
		22	0+	–0.399	3.8755 s *12*	ε
		23	3/2+	–5.473	11.317 s *11*	ε
		24	0+	–13.933	**78.99%** ***4***	
		25	5/2+	–13.192	**10.00%** ***1***	
		26	0+	–16.214	**11.01%** ***3***	
		27	1/2+	–14.586	9.458 m *12*	β–
		28	0+	–15.018	20.915 h *9*	β–
		29	3/2+	–10.60	1.30 s *12*	β–
		30	0+	–8.89	335 ms *17*	β–
		31	1/2(+)	–3.19	232 ms *15*	β–, β–n 1.7%
		32	0+	–0.91	86 ms *5*	β–, β–n 5.5%
		33	3/2–	4.95	90.5 ms *16*	β–, β–n 14%
		34	0+	8.56	20 ms *10*	β–, β–n
		35	(7/2–)	15.6	70 ms *40*	β–, β–n 52%
		36	0+	20.4	3.9 ms *13*	β–, β–n
		37	(7/2–)	28.3s	>260 ns	β–, β–n
		38	0+	34.1s	>260 ns	β–, β–n
		39		42.3s	<180 ns	n

Nuclear Wallet Cards

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
12	**Mg**	40	0+	48.6s	>170 ns	β–, β–n
13	**Al**	21	(5/2+)	27.1s	<35 ns	p
		22	4+	18.2s	91.1 ms *5*	ε, εp 54.5%, ε2p 1.1%, εα 0.04%
		23	5/2+	6.748	446 ms *6*	ε, εp 1.22%
		24	4+	–0.048	2.053 s *4*	ε, εp 1.6×10^{-3}%, εα 0.04%
		24m	1+	0.378	130 ms *3*	IT 82.5%, ε 17.5%, εα 0.03%
		25	5/2+	–8.916	7.183 s *12*	ε
		26	5+	–12.210	7.17×10^{5} y *24*	ε
		26m	0+	–11.982	6.3464 s *7*	ε
		27	5/2+	–17.196	**100%**	
		28	3+	–16.850	2.2414 m *12*	β–
		29	5/2+	–18.215	6.56 m *6*	β–
		30	3+	–15.87	3.62 s *6*	β–
		31	(3/2,5/2)+	–14.95	644 ms *25*	β–
		32	1+	–11.06	33.0 ms *2*	β–, β–n 0.7%
		33	(5/2)+	–8.44	41.7 ms *2*	β–, β–n 8.5%
		34		–3.05	42 ms *6*	β–, β–n 27%
		35		–0.22	37.2 ms *8*	β–, β–n 38%
		36		5.95	90 ms *40*	β–, β–n<31%
		37		9.8	10.7 ms *13*	β–
		38		16.2	7.6 ms *6*	β–, β–n
		39		21.0s	7.6 ms *16*	β–, β–n
		40		28.0s	>260 ns	β–, β–n
		41		33.9s	>260 ns	β–
		42		41.5s	>170 ns	β–, β–n
		43		48.4s	>170 ns	β–, β–n
14	**Si**	22	0+	33.0s	29 ms *2*	ε, εp 32%
		23	(5/2)+	23.1s	42.3 ms *4*	ε, εp 71%, ε2p 3.6%
		24	0+	10.75	140.5 ms *15*	ε, εp 45%
		25	5/2+	3.83	220 ms *3*	ε, εp 35%
		26	0+	–7.140	2.229 s *3*	ε
		27	5/2+	–12.384	4.15 s *4*	ε
		28	0+	–21.493	**92.223%** ***19***	
		29	1/2+	–21.895	**4.685%** ***8***	
		30	0+	–24.432	**3.092%** ***11***	
		31	3/2+	–22.949	157.3 m *3*	β–
		32	0+	–24.077	153 y *19*	β–
		33	3/2+	–20.514	6.11 s *21*	β–
		34	0+	–19.96	2.77 s *20*	β–
		35		–14.36	0.78 s *12*	β–, β–n<5%
		36	0+	–12.42	0.45 s *6*	β–, β–n<10%
		37	(7/2–)	–6.59	90 ms *60*	β–, β–n 17%
		38	0+	–4.17	>1 μs	β–, β–n
		39		2.32	47.5 ms *20*	β–, β–n
		40	0+	5.4	33.0 ms *10*	β–, β–n
		41		12.1	20.0 ms *25*	β–, β–n?
		42	0+	16.6s	12.5 ms *35*	β–, β–n
		43		23.1s	>60 ns	β–, β–n
		44	0+	28.5s	>360 ns	β–, β–n

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14	**Si**	45		37.2s		
15	**P**	24	(1+)	32.8s		ε ?, p ?
		25	(1/2+)	19.7s	<30 ns	p
		26	(3+)	11.0s	43.7 ms *6*	ε , εp
		27	1/2+	–0.71	260 ms *80*	ε , εp 0.07%
		28	3+	–7.149	270.3 ms *5*	ε , εp 1.3×10^{-3}%, εα 8.6×10^{-4}%
		29	1/2+	–16.952	4.142 s *15*	ε
		30	1+	–20.200	2.498 m *4*	ε
		31	1/2+	–24.441	**100%**	
		32	1+	–24.304	14.262 d *14*	β–
		33	1/2+	–26.337	25.35 d *11*	β–
		34	1+	–24.548	12.43 s *8*	β–
		35	1/2+	–24.857	47.3 s *7*	β–
		36	4–	–20.25	5.6 s *3*	β–
		37		–19.00	2.31 s *13*	β–
		38	(0–:4–)	–14.64	0.64 s *14*	β–, β–n 12%
		39	(1/2+)	–12.80	0.28 s *4*	β–, β–n 26%
		40	(2–,3–)	–8.1	125 ms *25*	β–, β–n 15.8%
		41	(1/2+)	–4.98	100 ms *5*	β–, β–n 30%
		42		1.0	48.5 ms *15*	β–, β–n 50%
		43	(1/2+)	4.7	36.5 ms *15*	β–, β–n
		44		10.4s	18.5 ms *25*	β–, β–n
		45		15.3s	>200 ns	β–
		46		22.8s	>200 ns	β–
		47		29.2s		
16	**S**	26	0+	27.1s	<79 ns	2p ?
		27	(5/2+)	17.0s	15.5 ms *15*	ε , εp 2.3%, ε2p 1.1%
		28	0+	4.1	125 ms *10*	ε , εp 20.7%
		29	5/2+	–3.16	187 ms *4*	ε , εp 47%
		30	0+	–14.062	1.178 s *5*	ε
		31	1/2+	–19.043	2.572 s *13*	ε
		32	0+	–26.015	**94.99%** ***26***	
		33	3/2+	–26.586	**0.75%** ***2***	
		34	0+	–29.931	**4.25%** ***24***	
		35	3/2+	–28.846	87.37 d *4*	β–
		36	0+	–30.664	**0.01%** ***1***	
		37	7/2–	–26.896	5.05 m *2*	β–
		38	0+	–26.861	170.3 m *7*	β–
		39	(7/2)–	–23.16	11.5 s *5*	β–
		40	0+	–22.9	8.8 s *22*	β–
		41	(7/2–)	–19.09	1.99 s *5*	β–, β–n
		42	0+	–17.7	1.03 s *3*	β–
		43		–12.07	0.28 s *3*	β–, β–n 40%
		44	0+	–9.1	100 ms *1*	β–, β–n 18%
		45		–4.0	68 ms *2*	β–, β–n 54%
		46	0+	0.0s	50 ms *8*	β–
		47		7.4s		
		48	0+	12.8s	≥200 ns	β–
		49		21.2s	<200 ns	n
17	**Cl**	28	(1+)	27.5s		p ?

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17	**Cl**	29	(3/2+)	13.8s	<20 ns	p
		30	(3+)	4.4s	<30 ns	p
		31		–7.07	150 ms *25*	ε , εp 0.7%
		32	1+	–13.335	298 ms *1*	ε , εα 0.05%, εp 0.03%
		33	3/2+	–21.003	2.511 s *4*	ε
		34	0+	–24.440	1.5264 s *14*	ε
		34m	3+	–24.294	32.00 m *4*	ε 55.4%, IT 44.6%
		35	3/2+	–29.013	**75.76%** ***10***	
		36	2+	–29.521	3.01×10^5 y *2*	β– 98.1%, ε 1.9%
		37	3/2+	–31.761	**24.24%** ***10***	
		38	2–	–29.798	37.24 m *5*	β–
		38m	5–	–29.127	715 ms *3*	IT
		39	3/2+	–29.800	56.2 m *6*	β–
		40	2–	–27.56	1.35 m *2*	β–
		41	(1/2+)	–27.31	38.4 s *8*	β–
		42		–24.9	6.8 s *3*	β–
		43	(1/2+)	–24.4	3.13 s *9*	β–
		44	(2–)	–20.6	0.56 s *11*	β–, β–n<8%
		45	(1/2+)	–18.36	413 ms *25*	β–, β–n 24%
		46		–13.8	232 ms *2*	β–, β–n 60%
		47		–10.1s	101 ms *6*	β–, β–n>0%
		48		–4.1s	≥200 ns	β–
		49		1.1s	≥170 ns	β–
		50		8.4s	>620 ns	β–, β–n
		51	(3/2+)	14.5s	>200 ns	β–
18	**Ar**	30	0+	21.5s	<20 ns	p?
		31	5/2(+)	11.3s	14.4 ms *6*	ε , εp 62%, ε2p 8.5%
		32	0+	–2.200	100.5 ms *3*	ε , εp 35.6%
		33	1/2+	–9.384	173.0 ms *20*	ε , εp 38.7%
		34	0+	–18.377	844.5 ms *34*	ε
		35	3/2+	–23.047	1.7756 s *10*	ε
		36	0+	–30.231	**0.3336%** ***21***	
		37	3/2+	–30.947	35.04 d *4*	ε
		38	0+	–34.714	**0.0629%** ***7***	
		39	7/2–	–33.242	269 y *3*	β–
		40	0+	–35.040	**99.6035%** ***25***	
		41	7/2–	–33.067	109.61 m *4*	β–
		42	0+	–34.422	32.9 y *11*	β–
		43	(5/2–)	–32.009	5.37 m *6*	β–
		44	0+	–32.673	11.87 m *5*	β–
		45	5/2–,7/2–	–29.770	21.48 s *15*	β–
		46	0+	–29.73	8.4 s *6*	β–
		47	(3/2)–	–25.21	1.23 s *3*	β–, β–n<0.2%
		48	0+	–22.6s	475 ms *40*	β–
		49		–16.8s	170 ms *50*	β–, β–n 65%
		50	0+	–12.8s	85 ms *30*	β–, β–n 35%
		51		–5.9s	>200 ns	β–
		52	0+	–1.0s	>620 ns	β–?
		53		7.1s	>620 ns	β–?, β–n?, β–2n?
19	**K**	32		21.1s		p?
		33		7.0s	<25 ns	p

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
19	**K**	34	(1+)	–1.2s	<25 ns	p
		35	3/2+	–11.172	178 ms *8*	ε , εp 0.37%
		36	2+	–17.417	342 ms *2*	ε , εp 0.05%, εα 3.4×10^{-3}%
		37	3/2+	–24.800	1.226 s *7*	ε
		38	3+	–28.800	7.636 m *18*	ε
		38m	0+	–28.670	924.3 ms *3*	ε 99.97%, IT 0.03%
		39	3/2+	–33.807	**93.2581% *44***	
		40	4–	–33.535	1.248×10^{9} y *3*	β– 89.28%,
					0.0117% *1*	ε 10.72%
		41	3/2+	–35.560	**6.7302% *44***	
		42	2–	–35.022	12.321 h *25*	β–
		43	3/2+	–36.575	22.3 h *1*	β–
		44	2–	–35.781	22.13 m *19*	β–
		45	3/2+	–36.615	17.81 m *61*	β–
		46	(2–)	–35.413	105 s *10*	β–
		47	1/2+	–35.708	17.50 s *24*	β–
		48	(2–)	–32.285	6.8 s *2*	β–, β–n 1.14%
		49	(1/2+,3/2+)	–29.611	1.26 s *5*	β–, β–n 86%
		50	(0–,1–,2–)	–25.74	472 ms *4*	β–, β–n 29%
		51	(1/2+,3/2+)	–21.6s	365 ms *5*	β–, β–n 47%
		52	(2–)	–16.0s	118 ms *6*	β–, β–n=73%
		53	(3/2+)	–11.1s	30 ms *5*	β–, β–n=75%, β–2n<1%
		54		–4.3s	10 ms *5*	β–, β–n>0%
		55		2s	>360 ns	β–, β–n
		56		8.7s	>620 ns	β–, β–n?, β–2n?
20	**Ca**	34	0+	13.9s	<35 ns	p
		35		4.8s	25.7 ms *2*	ε , εp 95.9%, ε2p 4.1%
		36	0+	–6.45	102 ms *2*	ε , εp 54.3%
		37	3/2+	–13.135	181.1 ms *10*	ε , εp 82.1%
		38	0+	–22.058	440 ms *12*	ε
		39	3/2+	–27.282	859.6 ms *14*	ε
		40	0+	–34.846	>3.0×10^{21} y	2ε
					96.94% *16*	
		41	7/2–	–35.137	1.02×10^{5} y *7*	ε
		42	0+	–38.547	**0.647% *23***	
		43	7/2–	–38.408	**0.135% *10***	
		44	0+	–41.468	**2.09% *11***	
		45	7/2–	–40.812	162.61 d *9*	β–
		46	0+	–43.139	>0.28×10^{16} y	2β–
					0.004% *3*	
		47	7/2–	–42.345	4.536 d *3*	β–
		48	0+	–44.223	>5.8×10^{22} y	2β– 75%
					0.187% *21*	
		49	3/2–	–41.298	8.718 m *6*	β–
		50	0+	–39.588	13.9 s *6*	β–
		51	(3/2–)	–35.87	10.0 s *8*	β–, β–n
		52	0+	–32.5	4.6 s *3*	β–, β–n≤2%
		53	(3/2–,5/2–)	–27.5s	90 ms *15*	β–, β–n>30%
		54	0+	–23.0s	86 ms *7*	β–

Nuclear Wallet Cards

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
20	**Ca**	55	(5/2−)	−17.0s	22 ms *2*	β−, β−n
		56	0+	−12.4s	11 ms *2*	β−, β−n?
		57		−5s	>620 ns	β−, β−n, β−2n
		58	0+	−0.3s	>620 ns	β−, β−n
21	**Sc**	36		15.5s		p?
		37		3.6s		p?
		38		−4.4s		p
		39	(7/2−)	−14.17	<300 ns	p
		40	4−	−20.523	182.3 ms *7*	ε, εp 0.44%, εα 0.02%
		41	7/2−	−28.642	596.3 ms *17*	ε
		42	0+	−32.121	681.3 ms *7*	ε
		42m	(7)+	−31.505	61.7 s *4*	ε
		43	7/2−	−36.188	3.891 h *12*	ε
		44	2+	−37.816	3.97 h *4*	ε
		44m	6+	−37.545	58.61 h *10*	IT 98.8%, ε 1.2%
		45	7/2−	−41.070	**100%**	
		45m	3/2+	−41.058	318 ms *7*	IT
		46	4+	−41.759	83.79 d *4*	β−
		46m	1−	−41.617	18.75 s *4*	IT
		47	7/2−	−44.336	3.3492 d *6*	β−
		48	6+	−44.502	43.67 h *9*	β−
		49	7/2−	−46.560	57.18 m *13*	β−
		50	5+	−44.55	102.5 s *5*	β−
		50m	2+,3+	−44.29	0.35 s *4*	IT>97.5%, β−<2.5%
		51	(7/2)−	−43.23	12.4 s *1*	β−
		52	3(+)	−40.4	8.2 s *2*	β−
		53	(7/2−)	−37.5s	2.4 s *6*	β−, β−n?
		54	(3)+	−33.7s	526 ms *15*	β−
		55	(7/2)−	−29.6	96 ms *2*	β−, β−n 17%
		56	(1+)	−24.5s	26 ms *6*	β−, β−n?
		56m	(5,6)+	−24.5s	75 ms *6*	β−, β−n>14%
		57	(7/2−)	−20.1s	22 ms *2*	β−, β−n
		58		−14.4s	12 ms *5*	β−, β−n
		59		−9.6s	>360 ns	β−, β−n
		60		−3.4s	>360 ns	β−, β−n
		61		1.6s	>360 ns	β−, β−n
22	**Ti**	38	0+	10.6s		
		39	(3/2+)	2.2s	31 ms *+6−4*	ε, εp
		40	0+	−8.9	52.4 ms *3*	ε, εp 97.5%
		41	3/2+	−15.1	80.4 ms *9*	ε, εp
		42	0+	−25.104	199 ms *6*	ε
		43	7/2−	−29.321	509 ms *5*	ε
		44	0+	−37.548	60.0 y *11*	ε
		45	7/2−	−39.008	184.8 m *5*	ε
		46	0+	−44.127	**8.25%** ***3***	
		47	5/2−	−44.936	**7.44%** ***2***	
		48	0+	−48.491	**73.72%** ***3***	
		49	7/2−	−48.562	**5.41%** ***2***	
		50	0+	−51.430	**5.18%** ***2***	
		51	3/2−	−49.731	5.76 m *1*	β−
		52	0+	−49.468	1.7 m *1*	β−

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
22	**Ti**	53	(3/2)−	−46.8	32.7 s *9*	β−
		54	0+	−45.6	1.5 s *4*	β−
		55	(1/2)−	−41.7	1.3 s *1*	β−
		56	0+	−38.9	0.200 s *5*	β−, β−n
		57	(5/2−)	−33.5	98 ms *5*	β−, β−n
		58	0+	−30.7s	57 ms *10*	β−, β−n
		59	(5/2−)	−25.0s	27.5 ms *25*	β−
		60	0+	−21.5s	22.4 ms *25*	β−
		61	(1/2−)	−15.5s	15 ms *4*	β−, β−n
		62	0+	−11.8s	>620 ns	β−, β−n
		63		−5.2s	>360 ns	β−, β−n
23	**V**	40		11.6s		p?
		41		0.0s		p?
		42		−7.6s	<55 ns	p
		43		−18.0s	79.3 ms *24*	ε
		44	(2+)	−24.1	111 ms *7*	ε, εα
		44m	(6+)	−24.1	150 ms *3*	ε
		45	7/2−	−31.88	547 ms *6*	ε
		46	0+	−37.074	422.50 ms *11*	ε
		46m	3+	−36.272	1.02 ms *7*	IT
		47	3/2−	−42.005	32.6 m *3*	ε
		48	4+	−44.476	15.9735 d *25*	ε
		49	7/2−	−47.960	330 d *15*	ε
		50	6+	−49.224	$>2.1\times10^{17}$ y	ε>92.9%,
					0.250% *2*	β−<7.1%
		51	7/2−	−52.203	**99.750% *2***	
		52	3+	−51.443	3.743 m *5*	β−
		53	7/2−	−51.849	1.543 m *14*	β−
		54	3+	−49.89	49.8 s *5*	β−
		55	(7/2−)	−49.2	6.54 s *15*	β−
		56	1+	−46.1	0.216 s *4*	β−, β−n
		57	(7/2−)	−44.2	0.32 s *3*	β−, β−n
		58	(1+)	−40.2	191 ms *10*	β−, β−n
		59	(5/2−)	−37.1	97 ms *2*	β−, β−n<3%
		60		−32.6	68 ms *5*	β−
		60m		−32.6	40 ms *15*	β−, β−n
		60m		−32.6	122 ms *18*	β−, β−n
		61	(3/2−)	−29.5s	52.6 ms *42*	β−, β−n≥6%
		62		−24.6s	33.5 ms *20*	β−, β−n
		63	7/2−	−21.1s	19.2 ms *24*	β−, β−n=35%
		64		−15.6s	19 ms *8*	β−
		65		−11.3s	>360 ns	β−, β−n
		66		−5.3s	>360 ns	β−, β−n
24	**Cr**	42	0+	6.5s	13.3 ms *10*	ε, εp 94.4%
		43	(3/2+)	−1.9s	20.6 ms *9*	ε, εp 81%, ε2p 7.1%, ε3p 0.08%
		44	0+	−13.1s	42.8 ms *6*	ε, εp 14%
		45	(7/2−)	−19.4s	60.9 ms *4*	ε, εp 34.4%
		46	0+	−29.47	0.26 s *6*	ε
		47	3/2−	−34.56	500 ms *15*	ε
		48	0+	−42.821	21.56 h *3*	ε
		49	5/2−	−45.332	42.3 m *1*	ε

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
24	**Cr**	50	0+	–50.261	>1.3×10^{18} y **4.345%** ***13***	2ε
		51	7/2–	–51.451	27.7025 d *24*	ε
		52	0+	–55.418	**83.789%** ***18***	
		53	3/2–	–55.285	**9.501%** ***17***	
		54	0+	–56.933	**2.365%** ***7***	
		55	3/2–	–55.108	3.497 m *3*	β–
		56	0+	–55.281	5.94 m *10*	β–
		57	(3/2)–	–52.524	21.1 s *10*	β–
		58	0+	–51.8	7.0 s *3*	β–
		59	(1/2–)	–47.9	1.05 s *9*	β–
		60	0+	–46.5	0.49 s *1*	β–
		61	(5/2–)	–42.2	243 ms *11*	β–, β–n
		62	0+	–40.4	206 ms *12*	β–, β–n
		63	1/2–	–35.6s	129 ms *2*	β–, β–n
		64	0+	–33.3s	42 ms *2*	β–
		65	(1/2–)	–27.8s	28 ms *3*	β–
		66	0+	–24.3s	23 ms *4*	β–
		67		–18.5s		β–?
		68	0+	–14.9s	>360 ns	β–, β–n
25	**Mn**	44	(2–)	6.7s	<105 ns	ε, p
		45		–5.1s		
		46	(4+)	–12.0s	36.2 ms *4*	ε, εp 57%
		47	(5/2–)	–22.3s	88.0 ms *13*	ε, εp<1.7%
		48	4+	–29.3	158.1 ms *22*	ε, εp 0.28%, εα<6.0×10^{-4}%
		49	5/2–	–37.61	382 ms *7*	ε
		50	0+	–42.627	283.19 ms *10*	ε
		50m	5+	–42.402	1.75 m *3*	ε
		51	5/2–	–48.243	46.2 m *1*	ε
		52	6+	–50.706	5.591 d *3*	ε
		52m	2+	–50.328	21.1 m *2*	ε 98.25%, IT 1.75%
		53	7/2–	–54.689	3.74×10^{6} y *4*	ε
		54	3+	–55.556	312.12 d *6*	ε, β–<2.9×10^{-4}%
		55	5/2–	–57.711	**100%**	
		56	3+	–56.910	2.5789 h *1*	β–
		57	5/2–	–57.486	85.4 s *18*	β–
		58	1+	–55.827	3.0 s *1*	β–
		58m	4+	–55.755	65.4 s *5*	β–=90%, IT=10%
		59	(5/2)–	–55.525	4.59 s *5*	β–
		60	1+	–52.967	0.28 s *2*	β–
		60m	4+	–52.695	1.77 s *2*	β– 88.5%, IT 11.5%
		61	(5/2)–	–51.742	0.67 s *4*	β–
		62m	(3+)	–48.180	671 ms *5*	β–, β–n
		62m	(1+)	–48.180	92 ms *13*	β–, β–n
		63	5/2–	–46.886	0.275 s *4*	β–, β–n
		64	(1+)	–42.989	90 ms *4*	β–, β–n 33%
		64m	(4+)	–42.814	0.50 ms *5*	IT
		65	(5/2–)	–40.967	84 ms *8*	β–
		66		–36.75	65 ms *2*	β–
		67	(5/2+)	–32.8s	51 ms *4*	β–, β–n>10%
		68	(>3)	–28.0s	28 ms *3*	β–, β–n

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Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
25	**Mn**	69	5/2−	−24.4s	18 ms *4*	β−
		70		−19.2s	>360 ns	β−, β−n
		71			>637 ns	β−, β−n, β−2n
26	**Fe**	45	(3/2+)	13.8s	1.89 ms *+49−21*	2p 70%, ε≤30%, εp 19%, ε2p 7.8%, ε3p 3.3%
		46	0+	0.8s	13.0 ms *20*	ε, εp 78.7%
		47	(7/2−)	−6.6s	21.9 ms *2*	ε, εp 88.4%, ε2p
		48	0+	−18.16s	45.3 ms *6*	ε, εp 15.9%
		49	(7/2−)	−24.8s	64.7 ms *3*	ε, εp 56.7%
		50	0+	−34.49	155 ms *11*	ε, εp?
		51	5/2−	−40.22	305 ms *5*	ε
		52	0+	−48.332	8.275 h *8*	ε
		52m	12+	−41.374	45.9 s *6*	ε, IT<4.0×10^{-3}%
		53	7/2−	−50.946	8.51 m *2*	ε
		53m	19/2−	−47.906	2.54 m *2*	IT
		54	0+	−56.253	**5.845%** ***35***	
		55	3/2−	−57.480	2.744 y *9*	ε
		56	0+	−60.606	**91.754%** ***36***	
		57	1/2−	−60.181	**2.119%** ***10***	
		58	0+	−62.154	**0.282%** ***4***	
		59	3/2−	−60.664	44.495 d *9*	β−
		60	0+	−61.412	2.62×10^{6} y *4*	β−
		61	3/2−,5/2−	−58.920	5.98 m *6*	β−
		62	0+	−58.877	68 s *2*	β−
		63	(5/2−)	−55.635	6.1 s *6*	β−
		64	0+	−54.969	2.0 s *2*	β−
		65	(1/2−)	−51.221	0.81 s *5*	β−
		65m	(9/2+)	−50.819	1.12 s *15*	β−
		66	0+	−50.067	440 ms *60*	β−
		67	(1/2−)	−45.7	0.40 s *4*	β−
		68	0+	−43.1	180 ms *19*	β−
		69	1/2−	−38.4s	110 ms *6*	β−
		70	0+	−36.3s	71 ms *10*	β−
		71		−31.0s	28 ms *5*	β−, β−n
		72	0+	−28.3s	≥150 ns	β−, β−n 27.6%
		73			>633 ns	β−, β−n, β−2n
		74	0+		>638 ns	β−, β−n, β−2n
27	**Co**	47		10.3s		
		48		1.9s		
		49		−9.6s		
		50	(6+)	−17.2s	38.8 ms *2*	ε, εp 70.5%, ε2p
		51	(7/2−)	−27.3s	>200 ns	ε
		52	(6+)	−33.92s	115 ms *23*	ε
		53	(7/2−)	−42.658	240 ms *9*	ε
		53m	(19/2−)	−39.461	247 ms *12*	ε=98.5%, p=1.5%
		54	0+	−48.009	193.28 ms *7*	ε
		54m	7+	−47.812	1.48 m *2*	ε
		55	7/2−	−54.029	17.53 h *3*	ε
		56	4+	−56.039	77.236 d *26*	ε
		57	7/2−	−59.344	271.74 d *6*	ε
		58	2+	−59.846	70.86 d *6*	ε

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Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
27	**Co**	58m	5+	–59.821	9.10 h *9*	IT
		59	7/2–	–62.229	**100%**	
		60	5+	–61.649	1925.28 d *14*	β–
		60m	2+	–61.590	10.467 m *6*	IT 99.76%, β– 0.24%
		61	7/2–	–62.897	1.650 h *5*	β–
		62	2+	–61.43	1.50 m *4*	β–
		62m	5+	–61.41	13.91 m *5*	β–>99%, IT<1%
		63	7/2–	–61.84	27.4 s *5*	β–
		64	1+	–59.79	0.30 s *3*	β–
		65	(7/2)–	–59.185	1.16 s *3*	β–
		66	(3+)	–56.41	0.20 s *2*	β–
		67	(7/2–)	–55.321	0.425 s *20*	β–
		68	(7–)	–51.9	0.199 s *21*	β–
		68m	(3+)	–51.9	1.6 s *3*	β–
		69	7/2–	–50.0	229 ms *24*	β–
		70	(6–)	–45.6	108 ms *7*	β–
		70m	(3+)	–45.6	0.50 s *18*	β–
		71	(7/2–)	–43.9	80 ms *3*	β–, β–n≤6%
		72	(6–,7–)	–39.7s	59.9 ms *17*	β–, β–n≥6%
		73		–37.2s	41 ms *4*	β–
		74	0+	–32.7s	25 ms *5*	β–, β–n=18%
		75	(7/2–)	–29.4s	>150 ns	β–
		76			>634 ns	β–, β–2n, β–n
28	**Ni**	48	0+	18.0s	2.1 ms *+14–6*	2p=70%, ε
		49		8.7s	7.5 ms *10*	ε , εp 83%
		50	0+	–3.6s	18.5 ms *12*	ε , εp 86.7%, ε2p
		51	(7/2–)	–11.5s	23.8 ms *2*	ε , εp 87.2%
		52	0+	–22.9s	40.8 ms *2*	ε , εp 31.4%
		53	(7/2–)	–29.7s	55.2 ms *7*	ε , εp 23.4%
		54	0+	–39.22	104 ms *7*	ε
		55	7/2–	–45.335	204.7 ms *37*	ε
		56	0+	–53.906	6.075 d *10*	ε
		57	3/2–	–56.083	35.60 h *6*	ε
		58	0+	–60.228	**68.077%** ***9***	
		59	3/2–	–61.156	7.6×10^{4} y *5*	ε
		60	0+	–64.472	**26.223%** ***8***	
		61	3/2–	–64.221	**1.1399%** ***13***	
		62	0+	–66.745	**3.6346%** ***40***	
		63	1/2–	–65.512	101.2 y *15*	β–
		64	0+	–67.098	**0.9255%** ***19***	
		65	5/2–	–65.125	2.5175 h *5*	β–
		66	0+	–66.006	54.6 h *3*	β–
		67	(1/2)–	–63.742	21 s *1*	β–
		68	0+	–63.463	29 s *2*	β–
		68m	5–	–60.614	0.86 ms *5*	IT
		69	9/2+	–59.978	11.2 s *9*	β–
		69m	1/2–	–59.657	3.5 s *9*	β–
		70	0+	–59.213	6.0 s *3*	β–
		71	(9/2+)	–55.405	2.56 s *3*	β–
		71m	(1/2–)	–54.906	2.3 s *3*	β–
		72	0+	–54.225	1.57 s *5*	β–
		73	(9/2+)	–50.107	0.84 s *3*	β–

Nuclear Wallet Cards

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
28	**Ni**	74	0+	–48.7s	0.68 s *18*	β–, β–n
		75	(7/2+)	–44.1s	344 ms *25*	β–, β–n 10%
		76	0+	–41.6s	0.238 s *+15–18*	β–, β–n
		77		–36.7s	128 ms *+36–32*	β–, β–n 30%
		78	0+	–34.1s	0.11 s *+10–6*	β–, β–n
		79			>635 ns	β–, β–n, β–2n
29	**Cu**	52	(3+)	–1.9s		p
		53	(3/2–)	–13.5s	<300 ns	ε , p
		54	(3+)	–21.4s	<75 ns	p
		55	(3/2–)	–31.6s	27 ms *8*	ε , εp 15%
		56	(4+)	–38.2s	93 ms *3*	ε , εp 0.4%
		57	3/2–	–47.308	196.3 ms *7*	ε
		58	1+	–51.667	3.204 s *7*	ε
		59	3/2–	–56.357	81.5 s *5*	ε
		60	2+	–58.344	23.7 m *4*	ε
		61	3/2–	–61.983	3.333 h *5*	ε
		62	1+	–62.786	9.673 m *8*	ε
		63	3/2–	–65.579	**69.15%** ***15***	
		64	1+	–65.424	12.701 h *2*	ε 61.5%, β– 38.5%
		65	3/2–	–67.263	**30.85%** ***15***	
		66	1+	–66.257	5.120 m *14*	β–
		67	3/2–	–67.318	61.83 h *12*	β–
		68	1+	–65.567	30.9 s *6*	β–
		68m	(6–)	–64.845	3.75 m *5*	IT 84%, β– 16%
		69	3/2–	–65.736	2.85 m *15*	β–
		70	(6–)	–62.976	44.5 s *2*	β–
		70m	(3–)	–62.875	33 s *2*	β– 52%, IT 48%
		70m	1+	–62.733	6.6 s *2*	β– 93.2%, IT 6.8%
		71	3/2(–)	–62.711	19.4 s *16*	β–
		72	(2)	–59.782	6.63 s *3*	β–
		73	(3/2–)	–58.987	4.2 s *3*	β–
		74	(1+,3+)	–56.006	1.594 s *10*	β–
		75	(5/2–)	–54.471	1.222 s *8*	β–, β–n 3.5%
		76	(3,4)	–50.975	637 ms *7*	β–, β–n 7.2%
		76m		–50.975	1.27 s *30*	β–
		77	(5/2–)	–48.3	468.1 ms *20*	β–, β–n 30.3%
		78	(4–,5–,6–)	–44.5	335 ms *11*	β–, β–n > 65%
		79		–41.9s	188 ms *25*	β–, β–n 55%
		80		–36.4s	0.17 s *+11–5*	β–
		81			>632 ns	β–, β–2n, β–n
		82			>636 ns	β–, β–n, β–2n
30	**Zn**	54	0+	–6.0s	1.59 ms *+60–35*	2p 92%
		55	(5/2–)	–14.4s	19.8 ms *13*	ε , εp 91%
		56	0+	–25.2s	30.0 ms *17*	ε , εp 86%
		57	(7/2–)	–32.5s	38 ms *4*	ε , εp ≥ 65%
		58	0+	–42.30	86 ms *8*	ε , εp < 3%
		59	3/2–	–47.214	182.0 ms *18*	ε , εp 0.1%
		60	0+	–54.173	2.38 m *5*	ε
		61	3/2–	–56.34	89.1 s *2*	ε
		61m	1/2–	–56.25	<430 ms	IT
		61m	3/2–	–55.92	0.14 s *7*	IT
		61m	5/2–	–55.59	<0.13 s	IT

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
30	**Zn**	62	0+	–61.167	9.186 h *13*	ε
		63	3/2–	–62.213	38.47 m *5*	ε
		64	0+	–66.003	≥7.0×10^{20} y	2ε
					49.17% ***75***	
		65	5/2–	–65.911	243.93 d *9*	ε
		66	0+	–68.899	**27.73%** ***98***	
		67	5/2–	–67.880	**4.04%** ***16***	
		68	0+	–70.006	**18.45%** ***63***	
		69	1/2–	–68.417	56.4 m *9*	β–
		69m	9/2+	–67.978	13.76 h *2*	IT 99.97%, β– 0.03%
		70	0+	–69.564	≥2.3×10^{17} y	2β–
					0.61% ***10***	
		71	1/2–	–67.328	2.45 m *10*	β–
		71m	9/2+	–67.170	3.96 h *5*	β–, IT≤0.05%
		72	0+	–68.145	46.5 h *1*	β–
		73	(1/2)–	–65.593	23.5 s *10*	β–
		73m		–65.593	5.8 s *8*	β–, IT
		73m	(5/2+)	–65.397	13.0 ms *2*	IT
		74	0+	–65.756	95.6 s *12*	β–
		75	(7/2+)	–62.558	10.2 s *2*	β–
		76	0+	–62.303	5.7 s *3*	β–
		77	(7/2+)	–58.789	2.08 s *5*	β–
		77m	(1/2–)	–58.017	1.05 s *10*	IT>50%, β–<50%
		78	0+	–57.483	1.47 s *15*	β–
		79	(9/2+)	–53.432	0.995 s *19*	β–, β–n 1.3%
		80	0+	–51.648	0.54 s *2*	β–, β–n 1%
		81	(5/2+)	–46.199	304 ms *13*	β–, β–n 7.5%
		82	0+	–42.6s	>150 ns	β–
		83		–36.7s	>300 ns	β–, β–n
		84	0+		>633 ns	β–, β–2n, β–n
		85			>637 ns	β–?, β–n?, β–2n?
31	**Ga**	56		–4.2s		p?
		57		–15.6s		p?
		58		–23.8s		p?
		59		–34.0s		p?
		60	(2+)	–39.8s	70 ms *13*	ε 98.4%, εp 1.6%, εα<0.02%
		61	3/2–	–47.09	167 ms *3*	ε, εp<0.25%
		62	0+	–51.986	116.121 ms *21*	ε, εp
		63	3/2–	–56.547	32.4 s *5*	ε
		64	0+	–58.833	2.627 m *12*	ε
		65	3/2–	–62.657	15.2 m *2*	ε
		66	0+	–63.724	9.49 h *3*	ε
		67	3/2–	–66.878	3.2617 d *5*	ε
		68	1+	–67.085	67.71 m *9*	ε
		69	3/2–	–69.327	**60.108%** ***9***	
		70	1+	–68.910	21.14 m *3*	β– 99.59%, ε 0.41%
		71	3/2–	–70.139	**39.892%** ***9***	
		72	3–	–68.588	14.10 h *2*	β–
		73	3/2–	–69.699	4.86 h *3*	β–
		74	(3–)	–68.049	8.12 m *12*	β–
		74m	(0)	–67.989	9.5 s *10*	IT 75%, β–<50%

Nuclear Wallet Cards

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
31	**Ga**	*75*	3/2−	−68.464	126 s *2*	β−
		76	2+	−66.296	32.6 s *6*	β−
		77	3/2−	−65.992	13.2 s *2*	β−
		78	2+	−63.705	5.09 s *5*	β−
		79	3/2−	−62.547	2.847 s *3*	β−, β−n 0.09%
		80	3	−59.223	1.676 s *14*	β−, β−n 0.86%
		81	5/2−	−57.627	1.217 s *5*	β−, β−n 11.9%
		82	(1,2,3)	−52.930	0.599 s *2*	β−, β−n 19.8%
		83		−49.257	308.1 ms *10*	β−, β−n 62.8%
		84	(0−)	−44.3s	0.085 s *10*	β−, β−n 74%
		84m	(3−,4−)	−44.3s	<0.085 s	β−, β−n?
		85	(1/2−,3/2−)	−40.2s	<100 ms	β−, β−n>35%
		86		−34.5s	>150 ns	β−, β−n
		87			>634 ns	β−, β−n, β−2n
32	**Ge**	58	0+	−7.7s		2p?
		59		−16.5s		2p?
		60	0+	−27.6s	>110 ns	εp, ε
		61	(3/2−)	−33.7s	44 ms *6*	ε, εp>58%
		62	0+	−42.2s	129 ms *35*	ε, εp
		63	3/2−	−46.92	150 ms *9*	ε
		64	0+	−54.315	63.7 s *25*	ε
		65	3/2−	−56.480	30.9 s *5*	ε, εp 0.01%
		66	0+	−61.606	2.26 h *5*	ε
		67	1/2−	−62.657	18.9 m *3*	ε
		68	0+	−66.978	270.95 d *16*	ε
		69	5/2−	−67.100	39.05 h *10*	ε
		70	0+	−70.561	**20.57%** ***27***	
		71	1/2−	−69.906	11.43 d *3*	ε
		71m	9/2+	−69.708	20.41 ms *18*	IT
		72	0+	−72.585	**27.45%** ***32***	
		73	9/2+	−71.297	**7.75%** ***12***	
		73m	1/2−	−71.230	0.499 s *11*	IT
		74	0+	−73.422	**36.50%** ***20***	
		75	1/2−	−71.856	82.78 m *4*	β−
		75m	7/2+	−71.716	47.7 s *5*	IT 99.97%, β− 0.03%
		76	0+	−73.212	**7.73%** ***12***	
		77	7/2+	−71.213	11.30 h *1*	β−
		77m	1/2−	−71.053	52.9 s *6*	β− 81%, IT 19%
		78	0+	−71.862	88.0 m *10*	β−
		79	(1/2)−	−69.53	18.98 s *3*	β−
		79m	(7/2+)	−69.34	39.0 s *10*	β− 96%, IT 4%
		80	0+	−69.535	29.5 s *4*	β−
		81	(9/2+)	−66.291	7.6 s *6*	β−
		81m	(1/2+)	−65.612	7.6 s *6*	β−
		82	0+	−65.415	4.56 s *26*	β−
		83	(5/2)+	−60.976	1.85 s *6*	β−
		84	0+	−58.148	0.954 s *14*	β−, β−n 10.2%
		85	(1/2+,5/2+)	−53.123	0.56 s *5*	β−, β−n 14%
		86	0+	−49.8s	>150 ns	β−, β−n
		87	(5/2+)	−44.2s	=0.14 s	β−, β−n
		88	0+	−40.2s	≥300 ns	β−
		89		−33.8s	≥300 ns	β−?

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
32	**Ge**	90	0+		>635 ns	β–, β–n, β–2n
33	**As**	60		–6.1s		p ?
		61		–17.8s		p ?
		62		–24.8s		p ?
		63	3/2–	–33.5s	<43 ns	p
		64		–39.4s	18 ms *+43–7*	ε
		65		–46.94	128 ms *16*	ε
		66	(0+)	–52.03	95.77 ms *23*	ε
		67	(5/2–)	–56.585	42.5 s *12*	ε
		68	3+	–58.894	151.6 s *8*	ε
		69	5/2–	–63.09	15.2 m *2*	ε
		70	4+	–64.34	52.6 m *3*	ε
		71	5/2–	–67.893	65.30 h *7*	ε
		72	2–	–68.229	26.0 h *1*	ε
		73	3/2–	–70.952	80.30 d *6*	ε
		74	2–	–70.859	17.77 d *2*	ε 66%, β– 34%
		75	3/2–	–73.033	**100%**	
		75m	9/2+	–72.729	17.62 ms *23*	IT
		76	2–	–72.290	1.0942 d *7*	β–
		77	3/2–	–73.916	38.83 h *5*	β–
		78	2–	–72.817	90.7 m *2*	β–
		79	3/2–	–73.636	9.01 m *15*	β–
		80	1+	–72.17	15.2 s *2*	β–
		81	3/2–	–72.533	33.3 s *8*	β–
		82	(2–)	–70.103	19.1 s *5*	β–
		82m	(5–)	–69.956	13.6 s *4*	β–
		83	(5/2–,3/2–)	–69.669	13.4 s *3*	β–
		84	(3–)	–65.853	4.2 s *5*	β–, β–n 0.18%
		85	(3/2–)	–63.189	2.021 s *10*	β–, β–n 59.4%
		86		–58.962	0.945 s *8*	β–, β–n 26%
		87	(3/2–)	–55.617	0.56 s *8*	β–, β–n 15.4%
		88		–50.9s	>300 ns	β–
		89		–46.9s	>300 ns	β–?, β–n ?
		90		–41.3s	>300 ns	β–, β–n
		91		–36.9s	>150 ns	β–
		92		–31.0s		β–
34	**Se**	64	0+	–26.9s	>180 ns	ε
		65	(3/2–)	–32.9s	33 ms *4*	ε , εp
		66	0+	–41.7s		
		67		–46.58	136 ms *12*	ε , εp 0.5%
		68	0+	–54.189	35.5 s *7*	ε
		69	(1/2–,3/2–)	–56.30	27.4 s *2*	ε , εp 0.05%
		70	0+	–61.929	41.1 m *3*	ε
		71	(5/2–)	–63.146	4.74 m *5*	ε
		72	0+	–67.868	8.40 d *8*	ε
		73	9/2+	–68.227	7.15 h *8*	ε
		73m	3/2–	–68.201	39.8 m *13*	IT 72.6%, ε 27.4%
		74	0+	–72.212	**0.89% *4***	
		75	5/2+	–72.169	119.79 d *4*	ε
		76	0+	–75.251	**9.37% *29***	
		77	1/2–	–74.599	**7.63% *16***	
		77m	7/2+	–74.437	17.4 s *8*	IT

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
34	**Se**	78	0+	–77.025	**23.77% *28***	
		79	7/2+	–75.917	2.95×10^5 y *38*	β–
		79m	1/2–	–75.821	3.92 m *1*	IT 99.94%, β– 0.06%
		80	0+	–77.759	**49.61% *41***	
		81	1/2–	–76.389	18.45 m *12*	β–
		81m	7/2+	–76.286	57.28 m *2*	IT 99.95%, β– 0.05%
		82	0+	–77.594	**8.73% *22***	
		83	9/2+	–75.340	22.3 m *3*	β–
		83m	1/2–	–75.112	70.1 s *4*	β–
		84	0+	–75.947	3.26 m *10*	β–
		85	(5/2+)	–72.413	32.9 s *3*	β–
		86	0+	–70.503	14.3 s *3*	β–
		87	(5/2+)	–66.426	5.50 s *12*	β–, β–n 0.2%
		88	0+	–63.884	1.53 s *6*	β–, β–n 0.67%
		89	(5/2+)	–58.992	0.41 s *4*	β–, β–n 7.8%
		90	0+	–55.9s	>300 ns	β–, β–n
		91		–50.3s	0.27 s *5*	β–, β–n 21%
		92	0+	–46.7s		β–
		93	(1/2+)	–40.7s		β–
		94	0+	–36.8s	>150 ns	β–
		95			>300 ns	β–?, β–n?, β–2n?
35	**Br**	67		–32.8s		p?
		68		–38.7s	<1.2 µs	p?
		69		–46.5s	<24 ns	p?
		70	0+	–51.42	79.1 ms *8*	ε
		70m	9+	–49.13	2.2 s *2*	ε
		71	(5/2)–	–56.502	21.4 s *6*	ε
		72	1+	–59.067	78.6 s *24*	ε
		72m	(3–)	–58.966	10.6 s *3*	IT, ε
		73	1/2–	–63.647	3.4 m *2*	ε
		74	(0–)	–65.285	25.4 m *3*	ε
		74m	4(+)	–65.271	46 m *2*	ε
		75	3/2–	–69.107	96.7 m *13*	ε
		76	1–	–70.288	16.2 h *2*	ε
		76m	(4)+	–70.185	1.31 s *2*	IT>99.4%, ε<0.6%
		77	3/2–	–73.234	57.036 h *6*	ε
		77m	9/2+	–73.128	4.28 m *10*	IT
		78	1+	–73.452	6.45 m *4*	ε≥99.99%, β–≤0.01%
		79	3/2–	–76.068	**50.69% *7***	
		79m	9/2+	–75.860	5.1 s *4*	IT
		80	1+	–75.889	17.68 m *2*	β– 91.7%, ε 8.3%
		80m	5–	–75.803	4.4205 h *8*	IT
		81	3/2–	–77.975	**49.31% *7***	
		82	5–	–77.497	35.282 h *7*	β–
		82m	2–	–77.451	6.13 m *5*	IT 97.6%, β– 2.4%
		83	3/2–	–79.006	2.40 h *2*	β–
		84	2–	–77.79	31.76 m *8*	β–
		84m	(6)–	–77.47	6.0 m *2*	β–
		85	3/2–	–78.575	2.90 m *6*	β–
		86	(1–)	–75.632	55.1 s *4*	β–
		87	3/2–	–73.891	55.65 s *13*	β–, β–n 2.6%

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
35	**Br**	*88*	(2−)	−70.715	16.29 s *6*	β−, β−n 6.58%
		89	(3/2−,5/2−)	−68.274	4.40 s *3*	β−, β−n 13.8%
		90		−64.000	1.91 s *1*	β−, β−n 25.2%
		91		−61.107	0.541 s *5*	β−, β−n 20%
		92	(2−)	−56.232	0.343 s *15*	β−, β−n 33.1%
		93	(5/2−)	−52.9s	102 ms *10*	β−, β−n 68%
		94		−47.6s	70 ms *20*	β−, β−n 68%
		95		−43.9s	≥150 ns	β−, β−n 34%
		96		−38.3s	≥150 ns	β−, β−n 27.6%
		97		−34.5s	>300 ns	β−
		98			>634 ns	β−, β−n, β−2n
36	**Kr**	69		−32.4s	32 ms *10*	ε
		70	0+	−41.6s	52 ms *17*	ε , εp≤1.3%
		71	(5/2−)	−46.3	100 ms *3*	ε , εp 2.1%
		72	0+	−53.940	17.1 s *2*	ε , εp<1.0×10^{-6}%
		73	3/2−	−56.551	27.3 s *10*	ε , εp 0.25%
		74	0+	−62.331	11.50 m *11*	ε
		75	5/2+	−64.323	4.29 m *17*	ε
		76	0+	−69.014	14.8 h *1*	ε
		77	5/2+	−70.169	74.4 m *6*	ε
		78	0+	−74.179	≥1.5×10^{21} y	2ε
					0.355% *3*	
		79	1/2−	−74.442	35.04 h *10*	ε
		79m	7/2+	−74.312	50 s *3*	IT
		80	0+	−77.892	**2.286% *10***	
		81	7/2+	−77.694	2.29×10^{5} y *11*	ε
		81m	1/2−	−77.503	13.10 s *3*	IT, ε 2.5×10^{-3}%
		82	0+	−80.590	**11.593% *31***	
		83	9/2+	−79.990	**11.500% *19***	
		83m	1/2−	−79.948	1.85 h *3*	IT
		84	0+	−82.439	**56.987% *15***	
		85	9/2+	−81.480	10.752 y *25*	β−
		85m	1/2−	−81.175	4.480 h *8*	β− 78.6%, IT 21.4%
		86	0+	−83.266	**17.279% *41***	
		87	5/2+	−80.709	76.3 m *5*	β−
		88	0+	−79.691	2.84 h *3*	β−
		89	3/2(+)	−76.535	3.15 m *4*	β−
		90	0+	−74.959	32.32 s *9*	β−
		91	5/2(+)	−70.973	8.57 s *4*	β−
		92	0+	−68.769	1.840 s *8*	β−, β−n 0.03%
		93	1/2+	−64.135	1.286 s *10*	β−, β−n 1.95%
		94	0+	−61.35	212 ms *5*	β−, β−n 1.11%
		95	1/2(+)	−56.16	0.114 s *3*	β−, β−n 2.87%
		96	0+	−53.08	80 ms *6*	β−, β−n 3.7%
		97	(3/2+)	−47.4	63 ms *4*	β−, β−n 6.7%
		98	0+	−44.5s	46 ms *8*	β−, β−n 7%
		99		−38.8s	13 ms *+34−6*	β−, β−n 11%
		100	0+	−35.2s	7 ms *+11−3*	β−, β−n
		101			>635 ns	β−, β−n, β−2n
37	**Rb**	71		−32.3s		p?
		72	(3+)	−38.1s	<1.2 µs	p?
		73		−46.1s	<30 ns	ε?, p>0%

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
37	**Rb**	74	(0+)	–51.916	64.9 ms *5*	ε
		75	(3/2–)	–57.218	19.0 s *12*	ε
		76	1(–)	–60.478	36.5 s *6*	ε , εα 3.8×10^{-7}%
		77	3/2–	–64.830	3.77 m *4*	ε
		78	0(+)	–66.936	17.66 m *3*	ε
		78m	4(–)	–66.825	5.74 m *3*	ε 91%, IT 9%
		79	5/2+	–70.802	22.9 m *5*	ε
		80	1+	–72.175	33.4 s *7*	ε
		81	3/2–	–75.456	4.572 h *4*	ε
		81m	9/2+	–75.370	30.5 m *3*	IT 97.6%, ε 2.4%
		82	1+	–76.187	1.2575 m *2*	ε
		82m	5–	–76.118	6.472 h *6*	ε , IT<0.33%
		83	5/2–	–79.070	86.2 d *1*	ε
		84	2–	–79.756	32.82 d *7*	ε 96.1%, β– 3.9%
		84m	6–	–79.292	20.26 m *4*	IT
		85	5/2–	–82.167	**72.17%** *2*	
		86	2–	–82.747	18.642 d *18*	β– 99.99%, ε 5.2×10^{-3}%
		86m	6–	–82.191	1.017 m *3*	IT, β–<0.3%
		87	3/2–	–84.597	4.81×10^{10} y 9	β–
					27.83% *2*	
		88	2–	–82.608	17.773 m *11*	β–
		89	3/2–	–81.712	15.15 m *12*	β–
		90	0–	–79.364	158 s *5*	β–
		90m	3–	–79.257	258 s *4*	β– 97.4%, IT 2.6%
		91	3/2(–)	–77.746	58.4 s *4*	β–
		92	0–	–74.772	4.492 s *20*	β–, β–n 0.01%
		93	5/2–	–72.620	5.84 s *2*	β–, β–n 1.39%
		94	3(–)	–68.561	2.702 s *5*	β–, β–n 10.5%
		95	5/2–	–65.89	377.7 ms *8*	β–, β–n 8.7%
		96	2(–)	–61.354	203 ms *3*	β–, β–n 13.3%
		97	3/2+	–58.518	169.1 ms *6*	β–, β–n 25.5%
		98	(0,1)	–54.03	102 ms *4*	β–, β–n 13.8%, β–2n 0.05%
		98m	(3,4)	–53.76	96 ms *3*	β–
		99	(5/2+)	–51.2	54 ms *4*	β–, β–n 15.8%
		100	(3+,4–)	–46.5s	51 ms *8*	β–, β–n 6%, β–2n 0.16%
		101	(3/2+)	–43.0s	32 ms *5*	β–, β–n 28%
		102		–37.9s	37 ms *3*	β–, β–n 18%
		103			>633 ns	β–, β–n
38	**Sr**	73		–32.0s	>25 ms	ε , εp>0%
		74	0+	–40.8s	>1.2 µs	ε
		75	(3/2–)	–46.6	88 ms *3*	ε , εp 5.2%
		76	0+	–54.25	7.89 s *7*	ε , εp 3.4×10^{-5}%
		77	5/2+	–57.803	9.0 s *2*	ε , εp<0.25%
		78	0+	–63.173	160 s *8*	ε
		79	3/2(–)	–65.476	2.25 m *10*	ε
		80	0+	–70.311	106.3 m *15*	ε
		81	1/2–	–71.528	22.3 m *4*	ε
		82	0+	–76.009	25.34 d *2*	ε
		83	7/2+	–76.797	32.41 h *3*	ε

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
38	**Sr**	83m	1/2−	−76.538	4.95 s *12*	IT
		84	0+	−80.649	**0.56%** ***1***	
		85	9/2+	−81.103	64.850 d *7*	ε
		85m	1/2−	−80.864	67.63 m *4*	IT 86.6%, ε 13.4%
		86	0+	−84.523	**9.86%** ***1***	
		87	9/2+	−84.880	**7.00%** ***1***	
		87m	1/2−	−84.492	2.815 h *12*	IT 99.7%, ε 0.3%
		88	0+	−87.921	**82.58%** ***1***	
		89	5/2+	−86.208	50.53 d *7*	β−
		90	0+	−85.949	28.90 y *3*	β−
		91	5/2+	−83.652	9.63 h *5*	β−
		92	0+	−82.867	2.66 h *4*	β−
		93	5/2+	−80.086	7.43 m *3*	β−
		94	0+	−78.843	75.3 s *2*	β−
		95	1/2+	−75.123	23.90 s *14*	β−
		96	0+	−72.932	1.07 s *1*	β−
		97	1/2+	−68.591	429 ms *5*	β−, β−n≤0.05%
		98	0+	−66.436	0.653 s *2*	β−, β−n 0.25%
		99	3/2+	−62.529	0.269 s *1*	β−, β−n 0.1%
		100	0+	−59.833	202 ms *3*	β−, β−n 0.78%
		101	(5/2−)	−55.56	118 ms *3*	β−, β−n 2.37%
		102	0+	−52.4s	69 ms *6*	β−, β−n 5.5%
		103		−47.5s	68 ms *+48−20*	β−
		104	0+	−43.9s	43 ms *+9−7*	β−
		105		−38.6s	40 ms *+36−13*	β−
		106	0+		>392 ns	β−, β−n, β−2n
		107			>395 ns	β−, β−n, β−2n
39	**Y**	76		−38.6s	>200 ns	ε , p
		77	(5/2+)	−46.78s	57 ms *+22−12*	ε , εp, p
		78	(0+)	−52.5s	53 ms *8*	ε , εp
		78m	(5+)	−52.5s	5.8 s *6*	ε , εp
		79	(5/2+)	−58.4	14.8 s *6*	ε , εp
		80	(4−)	−61.148	30.1 s *5*	ε , εp
		80m	(1−)	−60.919	4.8 s *3*	IT 81%, ε 19%
		81	(5/2+)	−65.713	70.4 s *10*	ε
		82	1+	−68.064	8.30 s *20*	ε
		83	9/2+	−72.21	7.08 m *6*	ε
		83m	3/2−	−72.14	2.85 m *2*	ε 60%, IT 40%
		84	(6+)	−73.894	39.5 m *8*	ε
		84m	1+	−73.827	4.6 s *2*	ε
		85	(1/2)−	−77.84	2.68 h *5*	ε
		85m	9/2+	−77.82	4.86 h *20*	ε , IT<2.0×10^{-3}%
		86	4−	−79.28	14.74 h *2*	ε
		86m	(8+)	−79.06	48 m *1*	IT 99.31%, ε 0.69%
		87	1/2−	−83.018	79.8 h *3*	ε
		87m	9/2+	−82.637	13.37 h *3*	IT 98.43%, ε 1.57%
		88	4−	−84.298	106.626 d *21*	ε
		89	1/2−	−87.709	**100%**	
		89m	9/2+	−86.800	15.663 s *5*	IT
		90	2−	−86.495	64.053 h *20*	β−
		90m	7+	−85.813	3.19 h *6*	IT, β− 1.8×10^{-3}%
		91	1/2−	−86.352	58.51 d *6*	β−

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
39	**Y**	91m	9/2+	–85.796	49.71 m *4*	IT, β–<1.5%
		92	2–	–84.817	3.54 h *1*	β–
		93	1/2–	–84.23	10.18 h *8*	β–
		93m	(9/2)+	–83.47	0.82 s *4*	IT
		94	2–	–82.352	18.7 m *1*	β–
		95	1/2–	–81.213	10.3 m *1*	β–
		96	0–	–78.344	5.34 s *5*	β–
		96m	8+	–77.204	9.6 s *2*	β–
		97	(1/2–)	–76.130	3.75 s *3*	β–, β–n 0.06%
		97m	(9/2)+	–75.463	1.17 s *3*	β–>99.3%, IT<0.7%, β–n<0.08%
		97m	(27/2–)	–72.607	142 ms *8*	IT 98.4%, β– 1.6%
		98	(0)–	–72.303	0.548 s *2*	β–, β–n 0.33%
		98m	(4,5)	–71.893	2.0 s *2*	β–>80%, IT<20%, β–n 3.4%
		99	(5/2+)	–70.658	1.484 s *7*	β–, β–n 1.7%
		100	1–,2–	–67.34	735 ms *7*	β–, β–n 0.92%
		100m	(3,4,5)	–67.19	0.94 s *3*	β–
		101	(5/2+)	–65.070	0.45 s *2*	β–, β–n 1.94%
		102m	HighJ	–61.2s	0.36 s *4*	β–, β–n 4.9%
		102m	LowJ	–61.2s	0.298 s *9*	β–, β–n 4.9%
		103	(5/2+)	–58.50	0.23 s *2*	β–, β–n 8%
		104		–54.1s	197 ms *4*	β–, β–n
		105		–50.8s	85 ms *+5–4*	β–, β–n<82%
		106		–46.1s	62 ms *+25–14*	β–
		107	(5/2+)	–42.4s	41 ms *+15–9*	β–
		108		–37.3s	25 ms *+66–10*	β–, β–n
		109			>393 ns	β–, β–n, β–2n
40	**Zr**	78	0+	–41.3s	>170 ns	ε
		79		–47.1s	56 ms *30*	ε, εp
		80	0+	–56	4.6 s *6*	ε, εp
		81	(3/2–)	–58.4	5.5 s *4*	ε, εp 0.12%
		82	0+	–63.9s	32 s *5*	ε
		83	(1/2–)	–65.911	41.6 s *24*	ε, εp
		84	0+	–71.421	25.8 m *5*	ε
		85	(7/2+)	–73.175	7.86 m *4*	ε
		85m	(1/2–)	–72.883	10.9 s *3*	IT≤92%, ε>8%
		86	0+	–77.969	16.5 h *1*	ε
		87	(9/2)+	–79.347	1.68 h *1*	ε
		87m	(1/2)–	–79.011	14.0 s *2*	IT
		88	0+	–83.629	83.4 d *3*	ε
		89	9/2+	–84.876	78.41 h *12*	ε
		89m	1/2–	–84.288	4.161 m *17*	IT 93.77%, ε 6.23%
		90	0+	–88.774	**51.45%** ***40***	
		90m	5–	–86.455	809.2 ms *20*	IT
		91	5/2+	–87.897	**11.22%** ***5***	
		92	0+	–88.460	**17.15%** ***8***	
		93	5/2+	–87.123	1.61×10^{6} y *5*	β–
		94	0+	–87.272	**17.38%** ***28***	
		95	5/2+	–85.663	64.032 d *6*	β–
		96	0+	–85.447	2.35×10^{19} y *21*	2β–
					2.80% ***9***	

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
40	**Zr**	*97*	1/2+	–82.951	16.749 h *8*	β–
		98	0+	–81.295	30.7 s *4*	β–
		99	(1/2+)	–77.63	2.1 s *1*	β–
		100	0+	–76.384	7.1 s *4*	β–
		101	(3/2+)	–73.173	2.3 s *1*	β–
		102	0+	–71.595	2.9 s *2*	β–
		103	(5/2–)	–67.824	1.32 s *11*	β–, β–n≤1%
		104	0+	–65.733	0.87 s *6*	β–, β–n≤1%
		105		–61.47	0.66 s *7*	β–, β–n≤2%
		106	0+	–59.0s	191 ms *19*	β–, β–n≤7%
		107		–54.3s	138 ms *4*	β–, β–n≤23%
		108	0+	–51.4s	73 ms *4*	β–, β–n
		109		–46.2s	63 ms *+38–17*	β–, β–n
		110	0+	–42.9s	37 ms *+17–9*	β–
		111			>392 ns	β–, β–n, β–2n
		112	0+		>394 ns	β–, β–n, β–2n
41	**Nb**	81		–47.2s	<200 ns	ε
		82	(0+)	–52.2s	50 ms *5*	ε, εp
		83	(5/2+)	–58.4	3.8 s *2*	ε
		84	(1+,2+,3+)	–61.0s	9.8 s *9*	ε, εp
		85	(9/2+)	–66.279	20.5 s *12*	ε
		85m		–66.279	12 s *5*	ε, IT
		85m	(1/2–,3/2–)	–66.279	3.3 s *9*	ε, IT
		86	(6+)	–69.134	88 s *1*	ε
		87	(1/2–)	–73.874	3.75 m *9*	ε
		87m	(9/2+)	–73.870	2.6 m *1*	ε
		88	(8+)	–76.18	14.55 m *6*	ε
		88m	(4–)	–76.18	7.78 m *5*	ε
		89	(9/2+)	–80.65	2.03 h *7*	ε
		89m	(1/2)–	–80.61	66 m *2*	ε
		90	8+	–82.663	14.60 h *5*	ε
		90m	4–	–82.538	18.81 s *6*	IT
		91	9/2+	–86.639	6.8×10^{2} y *13*	ε
		91m	1/2–	–86.534	60.86 d *22*	IT 96.6%, ε 3.4%
		92	(7)+	–86.454	3.47×10^{7} y *24*	ε, β–<0.05%
		92m	(2)+	–86.318	10.15 d *2*	ε
		93	9/2+	–87.214	**100%**	
		93m	1/2–	–87.183	16.12 y *12*	IT
		94	6+	–86.370	2.03×10^{4} y *16*	β–
		94m	3+	–86.329	6.263 m *4*	IT 99.5%, β– 0.5%
		95	9/2+	–86.786	34.991 d *6*	β–
		95m	1/2–	–86.550	3.61 d *3*	IT 94.4%, β– 5.6%
		96	6+	–85.608	23.35 h *5*	β–
		97	9/2+	–85.610	72.1 m *7*	β–
		97m	1/2–	–84.867	58.7 s *18*	IT
		98	1+	–83.533	2.86 s *6*	β–
		98m	(5+)	–83.449	51.3 m *4*	β– 99.9%, IT<0.2%
		99	9/2+	–82.33	15.0 s *2*	β–
		99m	1/2–	–81.96	2.5 m *2*	β–>96.2%, IT<3.8%
		100	1+	–79.806	1.5 s *2*	β–
		100m	(5+)	–79.492	2.99 s *11*	β–
		101	(5/2+)	–78.886	7.1 s *3*	β–

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
41	**Nb**	*102*	(4+)	–76.313	4.3 s *4*	β–
		102m	1+	–76.313	1.3 s *2*	β–
		103	(5/2+)	–75.023	1.5 s *2*	β–
		104	(1+)	–71.828	4.9 s *3*	β–, β–n 0.06%
		104m		–71.613	0.94 s *4*	β–, β–n 0.05%
		105	(5/2+)	–69.910	2.95 s *6*	β–, β–n 1.7%
		106		–66.197	0.93 s *4*	β–, β–n 4.5%
		107		–63.718	300 ms *9*	β–, β–n 8%
		108	(2+)	–59.6	220 ms *18*	β–, β–n 8%
		109	(5/2)	–56.8s	106 ms *9*	β–, β–n<15%
		110		–52.3s	86 ms *6*	β–, β–n 40%
		111	(5/2+)	–49.0s	51 ms *+6–5*	β–
		112	(2+)	–44.4s	33 ms *+9–6*	β–
		113		–40.6s	>300 ns	β–
		114			>392 ns	β–, β–n, β–2n
		115			>394 ns	β–, β–n, β–2n
42	**Mo**	83		–46.7s	6 ms *+30–3*	ε
		84	0+	–54.5s	2.3 s *3*	ε, εp
		85	(1/2–)	–57.51	3.2 s *2*	ε, εp=0.14%
		86	0+	–64.110	19.1 s *3*	ε
		87	7/2+	–66.882	14.02 s *26*	ε, εp 15%
		88	0+	–72.686	8.0 m *2*	ε
		89	(9/2+)	–75.014	2.11 m *10*	ε
		89m	(1/2–)	–74.627	190 ms *15*	IT
		90	0+	–80.174	5.56 h *9*	ε
		91	9/2+	–82.21	15.49 m *1*	ε
		91m	1/2–	–81.56	64.6 s *6*	ε 50%, IT 50%
		92	0+	–86.809	**14.53%** ***30***	
		93	5/2+	–86.807	4.0×10^{3} y *8*	ε
		93m	21/2+	–84.382	6.85 h *7*	IT 99.88%, ε 0.12%
		94	0+	–88.414	**9.15%** ***9***	
		95	5/2+	–87.711	**15.84%** ***11***	
		96	0+	–88.794	**16.67%** ***15***	
		97	5/2+	–87.544	**9.60%** ***14***	
		98	0+	–88.116	**24.39%** ***37***	
		99	1/2+	–85.970	65.976 h *24*	β–
		100	0+	–86.187	7.3×10^{18} y *4*	2β–
					9.82% ***31***	
		101	1/2+	–83.514	14.61 m *3*	β–
		102	0+	–83.572	11.3 m *2*	β–
		103	(3/2+)	–80.970	67.5 s *15*	β–
		104	0+	–80.359	60 s *2*	β–
		105	(5/2–)	–77.346	35.6 s *16*	β–
		106	0+	–76.144	8.73 s *12*	β–
		107	(5/2+)	–72.561	3.5 s *5*	β–
		108	0+	–70.765	1.09 s *2*	β–, β–n<0.5%
		109	(7/2–)	–66.68	660 ms *45*	β–, β–n 1.3%
		110	0+	–64.55	0.27 s *1*	β–, β–n 2%
		111		–60.1s	220 ms *+41–36*	β–, β–n≤12%
		112	0+	–57.6s	120 ms *+13–11*	β–
		113		–52.9s	78 ms *+6–5*	β–
		114	0+	–50.0s	60 ms *+13–9*	β–

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
42	**Mo**	115		–44.7s	51 ms *+79–19*	β–, β–n
		116	0+		>391 ns	β–, β–n
		117			>393 ns	β–?, β–n?, β–2n?
43	**Tc**	85		–46.0s	=0.5 s	p?
		86	(0+)	–51.3s	54 ms *7*	ε, εp
		87	(9/2+)	–57.690	2.2 s *2*	ε
		88m	(3+)	–61.679	5.8 s *2*	ε
		88m	(6+)	–61.679	6.4 s *8*	ε
		89	(9/2+)	–67.394	12.8 s *9*	ε
		89m	(1/2–)	–67.331	12.9 s *8*	ε, IT<0.01%
		90m	1+	–70.723	8.7 s *2*	ε
		90m	(6+)	–70.223	49.2 s *4*	ε
		91	(9/2)+	–75.987	3.14 m *2*	ε
		91m	(1/2)–	–75.848	3.3 m *1*	ε, IT<1%
		92	(8)+	–78.924	4.25 m *15*	ε
		93	9/2+	–83.606	2.75 h *5*	ε
		93m	1/2–	–83.214	43.5 m *10*	IT 77.4%, ε 22.6%
		94	7+	–84.158	293 m *1*	ε
		94m	(2)+	–84.082	52.0 m *10*	ε, IT<0.1%
		95	9/2+	–86.021	20.0 h *1*	ε
		95m	1/2–	–85.982	61 d *2*	ε 96.12%, IT 3.88%
		96	7+	–85.821	4.28 d *7*	ε
		96m	4+	–85.787	51.5 m *10*	IT 98%, ε 2%
		97	9/2+	–87.224	4.21×10^{6} y *16*	ε
		97m	1/2–	–87.127	91.0 d *6*	IT 96.06%, ε 3.94%
		98	(6)+	–86.431	4.2×10^{6} y *3*	β–
		99	9/2+	–87.327	2.111×10^{5} y *12*	β–
		99m	1/2–	–87.184	6.0067 h *5*	IT, β– 3.7×10^{-3}%
		100	1+	–86.020	15.46 s *19*	β–, ε 2.6×10^{-3}%
		101	9/2+	–86.34	14.02 m *1*	β–
		102	1+	–84.569	5.28 s *15*	β–
		102m	(4,5)	–84.569	4.35 m *7*	β– 98%, IT 2%
		103	5/2+	–84.600	54.2 s *8*	β–
		104	(3+)	–82.51	18.3 m *3*	β–
		105	(3/2–)	–82.29	7.6 m *1*	β–
		106	(2+)	–79.77	35.6 s *6*	β–
		107	(3/2–)	–78.746	21.2 s *2*	β–
		108	(2)+	–75.919	5.17 s *7*	β–
		109	(5/2+)	–74.279	0.86 s *4*	β–, β–n 0.08%
		110	(2+)	–71.030	0.92 s *3*	β–, β–n 0.04%
		111	(5/2+)	–69.02	350 ms *21*	β–, β–n 0.85%
		112		–65.253	0.29 s *2*	β–, β–n 4%
		113	>5/2	–62.88	160 ms *+50–40*	β–, β–n 2.1%
		114m	>3	–58.9s	100 ms *20*	β–, β–n?
		114m	(1+)	–58.9s	90 ms *20*	β–, β–n?
		115		–56.1s	83 ms *+20–13*	β–, β–n
		116		–51.5s	56 ms *+15–10*	β–
		117	(5/2+)	–48.4s	85 ms *+95–30*	β–
		118		–43.8s		β–
		119			>392 ns	β–, β–n?, β–2n?
		120			>394 ns	β–, β–n?, β–2n?
44	**Ru**	87		–45.9s	>1.5 µs	ε?

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
44	**Ru**	88	0+	–54.4s	1.2 s *+3–2*	ε
		89	(9/2+)	–58.1s	1.5 s *2*	ε , εp<0.15%
		90	0+	–64.883	11.7 s *9*	ε
		91	(9/2+)	–68.238	7.9 s *4*	ε
		91m	(1/2–)	–68.238	7.6 s *8*	IT, ε>0%, εp>0%
		92	0+	–74.301	3.65 m *5*	ε
		93	(9/2)+	–77.213	59.7 s *6*	ε
		93m	(1/2)–	–76.479	10.8 s *3*	ε 78%, IT 22%, εp 0.03%
		94	0+	–82.579	51.8 m *6*	ε
		95	5/2+	–83.457	1.643 h *13*	ε
		96	0+	–86.080	**5.54%** ***14***	
		97	5/2+	–86.120	2.83 d *23*	ε
		98	0+	–88.224	**1.87%** ***3***	
		99	5/2+	–87.620	**12.76%** ***14***	
		100	0+	–89.222	**12.60%** ***7***	
		101	5/2+	–87.952	**17.06%** ***2***	
		102	0+	–89.101	**31.55%** ***14***	
		103	3/2+	–87.262	39.247 d *13*	β–
		104	0+	–88.092	**18.62%** ***27***	
		105	3/2+	–85.931	4.44 h *2*	β–
		106	0+	–86.320	371.8 d *18*	β–
		107	(5/2)+	–83.859	3.75 m *5*	β–
		108	0+	–83.657	4.55 m *5*	β–
		109	(5/2+)	–80.734	34.5 s *10*	β–
		110	0+	–80.069	11.6 s *6*	β–
		111	5/2+	–76.781	2.12 s *7*	β–
		112	0+	–75.627	1.75 s *7*	β–
		113	(1/2+)	–71.87	0.80 s *5*	β–
		113m	(7/2–)	–71.87	510 ms *30*	β–
		114	0+	–70.21	0.52 s *5*	β–
		115	(3/2+)	–66.19	318 ms *19*	β–
		115m		–66.19	740 ms *80*	β–, β–n
		115m		–66.19	270 ms *38*	β–, β–n
		115m		–66.19	76 ms *6*	β–, β–n
		116	0+	–64.2s	204 ms *+32–29*	β–
		117		–59.6s	142 ms *+18–17*	β–
		118	0+	–57.3s	123 ms *+48–35*	β–, β–n
		119		–52.6s	>300 ns	β–
		120	0+	–50.0s	>150 ns	β–
		121			>390 ns	β–, β–n
		122	0+		>392 ns	β–, β–n
		123			>394 ns	β–, β–n, β–2n
		124	0+		>396 ns	β–, β–n
45	**Rh**	89		–46.0s	>1.5 µs	ε?, p?
		90		–52.0s	12 ms *+9–4*	ε?
		90m		–52.0s	1.0 s *+3–2*	ε?
		91	(9/2+)	–58.8s	1.47 s *22*	ε
		91m	(1/2–)	–58.8s	1.46 s *11*	ε
		92?	(6+)	–62.999	4.66 s *25*	ε
		92m	(2+)	–62.999	0.53 s *37*	ε
		93	(9/2+)	–69.017	12.2 s *7*	ε

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
45	**Rh**	94	(4+)	–72.907	66 s *6*	ε , εp 1.8%
		94m	(8+)	–72.607	25.8 s *2*	ε
		95	9/2+	–78.342	5.02 m *10*	ε
		95m	(1/2)–	–77.799	1.96 m *4*	IT 88%, ε 12%
		96	≥ 6+	–79.69	9.90 m *10*	ε
		96m	3+	–79.64	1.51 m *2*	IT 60%, ε 40%
		97	9/2+	–82.60	30.7 m *6*	ε
		97m	1/2–	–82.34	46.2 m *16*	ε 94.4%, IT 5.6%
		98	(2)+	–83.18	8.72 m *12*	ε
		98m	(5+)	–83.18	3.6 m *2*	IT 89%, ε 11%
		99	1/2–	–85.576	16.1 d *2*	ε
		99m	9/2+	–85.511	4.7 h *1*	ε > 99.84%, IT < 0.16%
		100	1–	–85.59	20.8 h *1*	ε
		100m	(5+)	–85.48	4.6 m *2*	IT = 98.3%, ε = 1.7%
		101	1/2–	–87.411	3.3 y *3*	ε
		101m	9/2+	–87.254	4.34 d *1*	ε 92.8%, IT 7.2%
		102	(1–,2–)	–86.778	207.3 d *17*	ε 78%, β– 22%
		102m	6(+)	–86.637	3.742 y *10*	ε 99.77%, IT 0.23%
		103	1/2–	–88.025	**100%**	
		103m	7/2+	–87.985	56.114 m *9*	IT
		104	1+	–86.953	42.3 s *4*	β– 99.55%, ε 0.45%
		104m	5+	–86.824	4.34 m *3*	IT 99.87%, β– 0.13%
		105	7/2+	–87.848	35.36 h *6*	β–
		105m	1/2–	–87.718	42.9 s *3*	IT
		106	1+	–86.360	30.07 s *35*	β–
		106m	(6)+	–86.223	131 m *2*	β–
		107	7/2+	–86.86	21.7 m *4*	β–
		108	1+	–85.03	16.8 s *5*	β–
		108m	(5+)	–85.03	6.0 m *3*	β–, IT
		109	7/2+	–85.010	80 s *2*	β–
		110m	(≥4)	–82.84	28.5 s *15*	β–
		110m	1+	–82.84	3.2 s *2*	β–
		111	(7/2+)	–82.304	11 s *1*	β–
		112m	1+	–79.73	3.45 s *37*	β–
		112m	(4,5,6)	–79.73	6.73 s *15*	β–
		113	(7/2+)	–78.767	2.80 s *12*	β–
		114	1+	–75.71	1.85 s *5*	β–
		114m	(7–)	–75.51	1.86 s *6*	β–
		115	(7/2+)	–74.229	0.99 s *5*	β–
		116	1+	–70.74	0.68 s *6*	β–
		116m	(6–)	–70.59	0.57 s *5*	β–
		117	(7/2+)	–68.897	0.44 s *4*	β–
		118		–64.89	266 ms *+22–21*	β–, β–n 3.1%
		119	(7/2+)	–62.8s	171 ms *18*	β–, β–n 6.4%
		120		–58.8s	136 ms *+14–13*	β–, β–n < 5.4%
		121		–56.4s	151 ms *+67–58*	β–, β–n
		122		–52.4s	>300 ns	β–, β–n
		123			>403 ns	β–, β–n
		124			>391 ns	β–, β–n, β–2n
		125			>393 ns	β–, β–n
		126			>395 ns	β–, β–2n, β–n

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
46	**Pd**	91		–46.3s	>1 μs	ε ?
		92	0+	–55.1s	0.7 s *+4–2*	ε
		93	(9/2+)	–59.1s	1.00 s *9*	ε , εp
		94	0+	–66.102	9.6 s *2*	ε
		95	(9/2+)	–69.966	5 s *3*	ε
		95m	(21/2+)	–68.091	13.3 s *3*	ε 89%, IT 11%, εp 0.93%
		96	0+	–76.183	122 s *2*	ε
		97	(5/2+)	–77.805	3.10 m *9*	ε
		98	0+	–81.320	17.7 m *3*	ε
		99	(5/2)+	–82.184	21.4 m *2*	ε
		100	0+	–85.23	3.63 d *9*	ε
		101	5/2+	–85.431	8.47 h *6*	ε
		102	0+	–87.928	**1.02%** ***1***	
		103	5/2+	–87.482	16.991 d *19*	ε
		104	0+	–89.393	**11.14%** ***8***	
		105	5/2+	–88.416	**22.33%** ***8***	
		106	0+	–89.905	**27.33%** ***3***	
		107	5/2+	–88.370	6.5×10^{6} y *3*	β–
		107m	11/2–	–88.155	21.3 s *5*	IT
		108	0+	–89.521	**26.46%** ***9***	
		109	5/2+	–87.603	13.7012 h *24*	β–
		109m	11/2–	–87.414	4.696 m *3*	IT
		110	0+	–88.348	**11.72%** ***9***	
		111	5/2+	–86.003	23.4 m *2*	β–
		111m	11/2–	–85.831	5.5 h *1*	IT 73%, β– 27%
		112	0+	–86.323	21.03 h *5*	β–
		113	(5/2+)	–83.590	93 s *5*	β–
		113m	(9/2–)	–83.509	0.3 s *1*	IT
		114	0+	–83.490	2.42 m *6*	β–
		115	(5/2+)	–80.43	25 s *2*	β–
		115m	(11/2–)	–80.34	50 s *3*	β– 92%, IT 8%
		116	0+	–79.831	11.8 s *4*	β–
		117	(5/2+)	–76.424	4.3 s *3*	β–
		118	0+	–75.391	1.9 s *1*	β–
		119		–71.407	0.92 s *1*	β–
		120	0+	–70.309	0.5 s *1*	β–
		121	(3/2+)	–66.3s	285 ms *24*	β–, β–n≤0.8%
		122	0+	–64.7s	175 ms *16*	β–≥97.5%, β–n≤2.5%
		123		–60.6s	174 ms *+38–34*	β–
		124	0+	–58.8s	38 ms *+38–19*	β–
		125			>230 ns	β–, β–n
		126	0+		>230 ns	β–, β–n
		128	0+		>394 ns	β–, β–n
47	**Ag**	93		–46.3s		p , ε , εp
		94	(0+)	–52.4s	26 ms *+26–9*	ε , εp
		94m	(7+)	–52.4s	0.60 s *2*	ε , εp 20%
		94m	(21+)	–45.7s	0.40 s *4*	ε 95.4%, εp 27%, p 4.1%, 2p 0.5%
		95	(9/2+)	–59.6s	1.75 s *12*	ε , εp
		95m	(1/2–)	–59.3s	<500 ms	IT

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
47	**Ag**	96m	(8)+	–64.62	4.40 s *6*	ε , εp 8.5%
		96m	(2+)	–64.62	6.9 s *6*	ε , εp 18%
		97	(9/2+)	–70.8	25.5 s *3*	ε
		98	(6+)	–73.05	47.5 s *3*	ε , εp 1.1×10^{-3}%
		99	(9/2)+	–76.712	124 s *3*	ε
		99m	(1/2–)	–76.206	10.5 s *5*	IT
		100	(5)+	–78.137	2.01 m *9*	ε
		100m	(2)+	–78.121	2.24 m *13*	ε , IT
		101	9/2+	–81.334	11.1 m *3*	ε
		101m	(1/2)–	–81.060	3.10 s *10*	IT
		102	5(+)	–82.246	12.9 m *3*	ε
		102m	2+	–82.237	7.7 m *5*	ε 51%, IT 49%
		103	7/2+	–84.800	65.7 m *7*	ε
		103m	1/2–	–84.665	5.7 s *3*	IT
		104	5+	–85.114	69.2 m *10*	ε
		104m	2+	–85.107	33.5 m *20*	ε 99.93%, IT<0.07%
		105	1/2–	–87.070	41.29 d *7*	ε
		105m	7/2+	–87.045	7.23 m *16*	IT 99.66%, ε 0.34%
		106	1+	–86.940	23.96 m *4*	ε 99.5%, β–<1%
		106m	6+	–86.850	8.28 d *2*	ε
		107	1/2–	–88.405	**51.839%** ***8***	
		107m	7/2+	–88.312	44.3 s *2*	IT
		108	1+	–87.605	2.382 m *11*	β– 97.15%, ε 2.85%
		108m	6+	–87.495	438 y *9*	ε 91.3%, IT 8.7%
		109	1/2–	–88.719	**48.161%** ***8***	
		109m	7/2+	–88.631	39.6 s *2*	IT
		110	1+	–87.457	24.6 s *2*	β– 99.7%, ε 0.3%
		110m	6+	–87.339	249.76 d *4*	β– 98.64%, IT 1.36%
		111	1/2–	–88.217	7.45 d *1*	β–
		111m	7/2+	–88.157	64.8 s *8*	IT 99.3%, β– 0.7%
		112	2(–)	–86.583	3.130 h *9*	β–
		113	1/2–	–87.03	5.37 h *5*	β–
		113m	7/2+	–86.99	68.7 s *16*	IT 64%, β– 36%
		114	1+	–84.930	4.6 s *1*	β–
		115	1/2–	–84.98	20.0 m *5*	β–
		115m	7/2+	–84.94	18.0 s *7*	β– 79%, IT 21%
		116	(0–)	–82.542	237 s *5*	β–
		116m	(3+)	–82.494	20 s *1*	β– 93%, IT 7%
		116m	(6–)	–82.412	9.3 s *3*	β– 92%, IT 8%
		117	(1/2–)	–82.18	72.8 s *+20–7*	β–
		117m	(7/2+)	–82.15	5.34 s *5*	β– 94%, IT 6%
		118	1(–)	–79.553	3.76 s *15*	β–
		118m	4(+)	–79.425	2.0 s *2*	β– 59%, IT 41%
		119m	(1/2–)	–78.64	6.0 s *5*	β–
		119m	(7/2+)	–78.64	2.1 s *1*	β–
		120	3(+)	–75.651	1.23 s *4*	β–, β–n<3.0×10^{-3}%
		120m	6(–)	–75.448	0.40 s *3*	β–=63%, IT=37%
		121	(7/2+)	–74.40	0.78 s *2*	β–, β–n 0.08%
		122	(3+)	–71.11	0.529 s *13*	β– 99.8%, β–n 0.2%
		122m	(1–)	–71.11	0.55 s *5*	β–, IT, β–n
		122m	(9–)	–71.03	0.20 s *5*	β–, β–n
		123	(7/2+)	–69.55	0.300 s *5*	β–, β–n 0.55%

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
47	**Ag**	*124*	≥2	–66.2	0.172 s *5*	β–, β–n 1.3%
		125	(9/2+)	–64.4s	166 ms *7*	β–, β–n
		126		–60.9s	107 ms *12*	β–, β–n
		127		–58.8s	109 ms *25*	β–
		128		–54.9s	58 ms *5*	β–, β–n
		129	(9/2+)	–52.6s	46 ms *+5–9*	β–, β–n
		129m	(1/2–)	–52.6s	=160 ms	β–, β–n
		130		–46.3s	=50 ms	β–, β–n
48	**Cd**	95		–46.6s		εp?, ε?
		96	0+	–55.6s	1.03 s *+24–21*	ε
		97	(9/2+)	–60.5s	1.10 s *7*	ε , εp 12%
		97m	(25/2+)	–60.5s	3.70 s *8*	ε , εp 25%
		98	0+	–67.62	9.2 s *3*	ε , εp<0.03%
		99	(5/2+)	–69.931	16 s *3*	ε , εα<1.0×10^{-4}%, εp 0.17%
		100	0+	–74.194	49.1 s *5*	ε
		101	(5/2+)	–75.836	1.36 m *5*	ε
		102	0+	–79.659	5.5 m *5*	ε
		103	(5/2)+	–80.652	7.3 m *1*	ε
		104	0+	–83.968	57.7 m *10*	ε
		105	5/2+	–84.333	55.5 m *4*	ε
		106	0+	–87.130	>3.6×10^{20} y **1.25% *6***	2ε
		107	5/2+	–86.990	6.50 h *2*	ε
		108	0+	–89.252	>1.9×10^{18} y **0.89% *3***	2ε
		109	5/2+	–88.504	461.4 d *12*	ε
		110	0+	–90.350	**12.49% *18***	
		111	1/2+	–89.254	**12.80% *12***	
		111m	11/2–	–88.858	48.50 m *9*	IT
		112	0+	–90.577	**24.13% *21***	
		113	1/2+	–89.046	8.00×10^{15} y *26* **12.22% *12***	β–
		113m	11/2–	–88.783	14.1 y *5*	β– 99.86%, IT 0.14%
		114	0+	–90.018	>2.1×10^{18} y **28.73% *42***	2β–
		115	1/2+	–88.087	53.46 h *5*	β–
		115m	(11/2)–	–87.906	44.56 d *24*	β–
		116	0+	–88.716	3.3×10^{19} y *4* **7.49% *18***	2β–
		117	1/2+	–86.422	2.49 h *4*	β–
		117m	(11/2)–	–86.286	3.36 h *5*	β–
		118	0+	–86.71	50.3 m *2*	β–
		119	3/2+	–83.98	2.69 m *2*	β–
		119m	(11/2–)	–83.83	2.20 m *2*	β–
		120	0+	–83.957	50.80 s *21*	β–
		121	(3/2+)	–81.06	13.5 s *3*	β–
		121m	(11/2–)	–80.84	8.3 s *8*	β–
		122	0+	–80.616	5.24 s *3*	β–
		123	(3/2+)	–77.32	2.10 s *2*	β–
		123m	(11/2–)	–77.00	1.82 s *3*	β–≤100%, IT
		124	0+	–76.697	1.25 s *2*	β–

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
48	**Cd**	*125*	(3/2+)	–73.35	0.68 s *4*	β–
		125m	(11/2–)	–73.35	0.48 s *3*	β–
		126	0+	–72.256	0.515 s *17*	β–
		127	(3/2+)	–68.43	0.37 s *7*	β–
		128	0+	–67.25	0.28 s *4*	β–
		129	(3/2+)	–63.3s	0.27 s *4*	
		130	0+	–61.5	162 ms *7*	β–, β–n 3.5%
		131	(7/2–)	–55.4s	68 ms *3*	β–, β–n 3.5%
		132	0+	–50.9s	97 ms *10*	β–, β–n 60%
		133	(7/2–)		57 ms *10*	β–, β–n, β–2n
49	**In**	97		–47.2s		ε ?, p ?
		98		–53.9s	32 ms *+32–11*	ε
		98m		–53.9s	1.2 s *+12–4*	ε
		99		–61.4s	3.0 s *8*	ε
		100	(6+,7+)	–64.3	5.9 s *2*	ε , εp 1.6%
		101	(9/2+)	–68.6s	15.1 s *3*	ε , εp
		102	(6+)	–70.694	23.3 s *1*	ε , εp 9.3×10^{-3}%
		103	(9/2)+	–74.629	65 s *7*	ε
		103m	(1/2–)	–73.997	34 s *2*	ε 67%, IT 33%
		104	(6+)	–76.182	1.80 m *3*	ε
		104m	(3+)	–76.089	15.7 s *5*	IT 80%, ε 20%
		105	9/2+	–79.64	5.07 m *7*	ε
		105m	(1/2–)	–78.97	48 s *6*	IT
		106	7+	–80.60	6.2 m *1*	ε
		106m	(2)+	–80.57	5.2 m *1*	ε
		107	9/2+	–83.56	32.4 m *3*	ε
		107m	1/2–	–82.89	50.4 s *6*	IT
		108	7+	–84.116	58.0 m *12*	ε
		108m	2+	–84.086	39.6 m *7*	ε
		109	9/2+	–86.488	4.167 h *18*	ε
		109m	1/2–	–85.838	1.34 m *7*	IT
		109m	(19/2+)	–84.386	0.209 s *6*	IT
		110	7+	–86.47	4.9 h *1*	ε
		110m	2+	–86.41	69.1 m *5*	ε
		111	9/2+	–88.393	2.8047 d *4*	ε
		111m	1/2–	–87.856	7.7 m *2*	IT
		112	1+	–87.992	14.97 m *10*	ε 56%, β– 44%
		112m	4+	–87.835	20.56 m *6*	IT
		113	9/2+	–89.368	**4.29% *5***	
		113m	1/2–	–88.976	99.476 m *23*	IT
		114	1+	–88.570	71.9 s *1*	β– 99.5%, ε 0.5%
		114m	5+	–88.380	49.51 d *1*	IT 96.75%, ε 3.25%
		115	9/2+	–89.536	4.41×10^{14} y *25*	β–
					95.71% *5*	
		115m	1/2–	–89.200	4.486 h *4*	IT 95%, β– 5%
		116	1+	–88.249	14.10 s *3*	β– 99.98%, ε 0.02%
		116m	5+	–88.122	54.29 m *17*	β–
		116m	8–	–87.959	2.18 s *4*	IT
		117	9/2+	–88.943	43.2 m *3*	β–
		117m	1/2–	–88.628	116.2 m *3*	β– 52.9%, IT 47.1%
		118	1+	–87.228	5.0 s *5*	β–
		118m	5+	–87.168	4.45 m *5*	β–

Nuclear Wallet Cards

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
49	**In**	118m	8−	−87.028	8.5 s *3*	IT 98.6%, β− 1.4%
		119	9/2+	−87.699	2.4 m *1*	β−
		119m	1/2−	−87.388	18.0 m *3*	β− 95.6%, IT 4.4%
		120	1+	−85.73	3.08 s *8*	β−
		120m	(8−)	−85.73	47.3 s *5*	β−
		120m	(5)+	−85.66	46.2 s *8*	β−
		121	9/2+	−85.84	23.1 s *6*	β−
		121m	1/2−	−85.52	3.88 m *10*	β− 98.8%, IT 1.2%
		122	1+	−83.57	1.5 s *3*	β−
		122m	5+	−83.53	10.3 s *6*	β−
		122m	(8−)	−83.28	10.8 s *4*	β−
		123	(9/2)+	−83.43	6.17 s *5*	β−
		123m	(1/2)−	−83.10	47.4 s *4*	β−
		124	(1)+	−80.87	3.12 s *9*	β−
		124m	(8−)	−80.82	3.7 s *2*	β−
		125	9/2+	−80.48	2.36 s *4*	β−
		125m	1/2(−)	−80.12	12.2 s *2*	β−
		126	3(+)	−77.81	1.53 s *1*	β−
		126m	(8−)	−77.71	1.64 s *5*	β−
		127	(9/2+)	−76.89	1.09 s *1*	β−, β−n ≤ 0.03%
		127m	(1/2−)	−76.43	3.67 s *4*	β−, β−n 0.69%
		127m	(21/2−)	−75.03	1.04 s *10*	β−
		128	(3)+	−74.36	0.84 s *6*	β−, β−n < 0.05%
		128m	(8−)	−74.02	0.72 s *10*	β−, β−n < 0.05%
		129	(9/2+)	−72.81	0.61 s *1*	β−, β−n 0.25%
		129m	(1/2−)	−72.44	1.23 s *3*	β− > 99.7%, β−n 2.5%, IT < 0.3%
		129m	(23/2−)	−71.18	0.67 s *10*	β−
		130	1(−)	−69.89	0.29 s *2*	β−, β−n 0.93%
		130m	(10−)	−69.84	0.54 s *1*	β−, β−n 1.65%
		130m	(5+)	−69.49	0.54 s *1*	β−, β−n 1.65%
		131	(9/2+)	−68.05	0.28 s *3*	β−, β−n ≤ 2%
		131m	(1/2−)	−67.75	0.35 s *5*	β− ≥ 99.98%, β−n ≤ 2%, IT ≤ 0.02%
		131m	(21/2+)	−64.29	0.32 s *6*	β− > 99%, IT < 1%, β−n = 0.03%
		132	(7−)	−62.41	0.207 s *6*	β−, β−n 6.3%
		133	(9/2+)	−57.8s	165 ms *3*	β−, β−n 85%
		133m	(1/2−)	−57.4s	180 ms *15*	β−, IT, β−n
		134	(4− to 7−)	−52.0s	140 ms *4*	β−, β−n 65%
		135		−47.2s	92 ms *10*	β−, β−n
50	**Sn**	99		−47.7s		ε ?, εp ?
		100	0+	−56.9	0.86 s *+37−20*	ε, εp < 17%
		101	(5/2+)	−59.9s	1.7 s *3*	ε, εp 26%
		102	0+	−64.9	3.8 s *2*	ε
		103	(5/2+)	−66.97	7.0 s *2*	ε, εp 1.2%
		104	0+	−71.624	20.8 s *5*	ε
		105	(5/2+)	−73.337	32.7 s *5*	ε, εp 0.01%
		106	0+	−77.353	115 s *5*	ε
		107	(5/2+)	−78.512	2.90 m *5*	ε
		108	0+	−82.071	10.30 m *8*	ε
		109	5/2+	−82.632	18.0 m *2*	ε

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
50	**Sn**	110	0+	–85.84	4.11 h *10*	ε
		111	7/2+	–85.941	35.3 m *6*	ε
		112	0+	–88.657	$<1.3\times10^{21}$ y	2ε
					0.97% *1*	
		113	1/2+	–88.330	115.09 d *3*	ε
		113m	7/2+	–88.253	21.4 m *4*	IT 91.1%, ε 8.9%
		114	0+	–90.559	**0.66% *1***	
		115	1/2+	–90.033	**0.34% *1***	
		116	0+	–91.525	**14.54% *9***	
		117	1/2+	–90.397	**7.68% *7***	
		117m	11/2–	–90.082	13.76 d *4*	IT
		118	0+	–91.652	**24.22% *9***	
		119	1/2+	–90.065	**8.59% *4***	
		119m	11/2–	–89.976	293.1 d *7*	IT
		120	0+	–91.098	**32.58% *9***	
		121	3/2+	–89.197	27.03 h *4*	β–
		121m	11/2–	–89.191	43.9 y *5*	IT 77.6%, β– 22.4%
		122	0+	–89.942	**4.63% *3***	
		123	11/2–	–87.817	129.2 d *4*	β–
		123m	3/2+	–87.792	40.06 m *1*	β–
		124	0+	–88.237	$>1.2\times10^{21}$ y	2β–
					5.79% *5*	
		125	11/2–	–85.898	9.64 d *3*	β–
		125m	3/2+	–85.870	9.52 m *5*	β–
		126	0+	–86.02	2.30×10^{5} y *14*	β–
		127	(11/2–)	–83.47	2.10 h *4*	β–
		127m	(3/2+)	–83.46	4.13 m *3*	β–
		128	0+	–83.34	59.07 m *14*	β–
		128m	(7–)	–81.24	6.5 s *5*	IT
		129	(3/2+)	–80.59	2.23 m *4*	β–
		129m	(11/2–)	–80.56	6.9 m *1*	β–, IT $<2.0\times10^{-3}$%
		130	0+	–80.137	3.72 m *7*	β–
		130m	(7–)	–78.190	1.7 m *1*	β–
		131	(3/2+)	–77.271	56.0 s *5*	β–
		131m	(11/2–)	–77.271	58.4 s *5*	β–, IT
		132	0+	–76.548	39.7 s *8*	β–
		133	7/2–	–70.85	1.46 s *3*	β–, β–n 0.03%
		134	0+	–66.3	1.050 s *11*	β–, β–n 17%
		135	(7/2–)	–60.6s	530 ms *20*	β–, β–n 21%
		136	0+	–56.3s	0.25 s *3*	β–, β–n 30%
		137		–50.3s	190 ms *60*	β–, β–n 58%
		138	0+		>408 ns	β–, β–n
51	**Sb**	103		–56.2s	>1.5 μs	ε ?
		104		–59.2s	0.44 s *+15–11*	ε , εp < 7%, p < 1%
		105	(5/2+)	–63.85	1.22 s *11*	ε 99%, p 1%
		106	(2+)	–66.473	0.6 s *2*	ε
		107	(5/2+)	–70.653	4.0 s *2*	ε
		108	(4+)	–72.445	7.4 s *3*	ε
		109	(5/2+)	–76.251	17.0 s *7*	ε
		110	(3+,4+)	–77.449	23.0 s *4*	ε
		111	(5/2+)	–80.836	75 s *1*	ε
		112	3+	–81.60	51.4 s *10*	ε

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
51	**Sb**	113	5/2+	–84.42	6.67 m *7*	ε
		114	3+	–84.50	3.49 m *3*	ε
		115	5/2+	–87.00	32.1 m *3*	ε
		116	3+	–86.822	15.8 m *8*	ε
		116m	8–	–86.439	60.3 m *6*	ε
		117	5/2+	–88.642	2.80 h *1*	ε
		118	1+	–87.996	3.6 m *1*	ε
		118m	8–	–87.746	5.00 h *2*	ε
		119	5/2+	–89.474	38.19 h *22*	ε
		119m	(27/2+)	–86.632	0.85 s *9*	IT
		120	1+	–88.417	15.89 m *4*	ε
		120m	8–	–88.417	5.76 d *2*	ε
		121	5/2+	–89.599	**57.21% *5***	
		122	2–	–88.334	2.7238 d *2*	β– 97.59%, ε 2.41%
		122m	(8)–	–88.170	4.191 m *3*	IT
		123	7/2+	–89.226	**42.79% *5***	
		124	3–	–87.622	60.20 d *3*	β–
		124m	5+	–87.611	93 s *5*	IT 75%, β– 25%
		124m	(8)–	–87.585	20.2 m *2*	IT
		125	7/2+	–88.257	2.75856 y *25*	β–
		126	(8–)	–86.40	12.35 d *6*	β–
		126m	(5+)	–86.38	19.15 m *8*	β– 86%, IT 14%
		126m	(3–)	–86.36	=11 s	IT
		127	7/2+	–86.700	3.85 d *5*	β–
		128	8–	–84.61	9.01 h *4*	β–
		128m	5+	–84.61	10.4 m *2*	β– 96.4%, IT 3.6%
		129	7/2+	–84.63	4.40 h *1*	β–
		129m	(19/2–)	–82.78	17.7 m *1*	β– 85%, IT 15%
		130	(8–)	–82.29	39.5 m *8*	β–
		130m	(4,5)+	–82.29	6.3 m *2*	β–
		131	(7/2+)	–81.98	23.03 m *4*	β–
		132	(4)+	–79.67	2.79 m *7*	β–
		132m	(8–)	–79.67	4.10 m *5*	β–
		133	(7/2+)	–78.94	2.34 m *5*	β–
		134	(0–)	–74.17	0.78 s *6*	β–
		134m	(7–)	–73.89	10.07 s *5*	β–, β–n 0.09%
		135	(7/2+)	–69.79	1.679 s *15*	β–, β–n 22%
		136	1–	–64.5s	0.923 s *14*	β–, β–n 16.3%
		137	(7/2+)	–60.4s	492 ms *25*	β–, β–n 49%
		138		–54.8s	350 ms *15*	β–, β–n 72%
		139		–50.3s	93 ms *+14–3*	β–, β–n 90%
		140			>407 ns	β–, β–n, β–2n
52	**Te**	105	(5/2+)	–52.6s	0.62 μs *7*	α
		106	0+	–58.2	70 μs *17*	α
		107		–60.54	3.1 ms *1*	α 70%, ε 30%
		108	0+	–65.783	2.1 s *1*	ε 51%, α 49%, εp 2.4%
		109	(5/2+)	–67.715	4.6 s *3*	ε 96.1%, εp 9.4%, α 3.9%, εα<5.0×10^{-3}%
		110	0+	–72.229	18.6 s *8*	ε , α=3.0×10^{-3}%
		111	(5/2)+	–73.587	19.3 s *4*	ε , εp

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
52	**Te**	112	0+	–77.567	2.0 m *2*	ε
		113	(7/2+)	–78.35	1.7 m *2*	ε
		114	0+	–81.89	15.2 m *7*	ε
		115	7/2+	–82.06	5.8 m *2*	ε
		115m	(1/2)+	–82.04	6.7 m *4*	ε≤100%, IT
		116	0+	–85.27	2.49 h *4*	ε
		117	1/2+	–85.10	62 m *2*	ε
		117m	(11/2–)	–84.80	103 ms *3*	IT
		118	0+	–87.68	6.00 d *2*	ε
		119	1/2+	–87.181	16.05 h *5*	ε
		119m	11/2–	–86.920	4.70 d *4*	ε , IT<8.0×10^{-3}%
		120	0+	–89.369	**0.09%** ***1***	
		121	1/2+	–88.54	19.17 d *4*	ε
		121m	11/2–	–88.25	164.2 d *8*	IT 88.6%, ε 11.4%
		122	0+	–90.315	**2.55%** ***12***	
		123	1/2+	–89.173	>9.2×10^{16} y **0.89%** ***3***	ε
		123m	11/2–	–88.925	119.2 d *1*	IT
		124	0+	–90.526	**4.74%** ***14***	
		125	1/2+	–89.024	**7.07%** ***15***	
		125m	11/2–	–88.879	57.40 d *15*	IT
		126	0+	–90.066	**18.84%** ***25***	
		127	3/2+	–88.283	9.35 h *7*	β–
		127m	11/2–	–88.195	106.1 d *7*	IT 97.6%, β– 2.4%
		128	0+	–88.993	2.41×10^{24} y *39* **31.74%** ***8***	2β–
		129	3/2+	–87.004	69.6 m *3*	β–
		129m	11/2–	–86.898	33.6 d *1*	IT 63%, β– 37%
		130	0+	–87.352	≥3.0×10^{24} y **34.08%** ***62***	2β–
		131	3/2+	–85.211	25.0 m *1*	β–
		131m	11/2–	–85.029	33.25 h *25*	β– 74.1%, IT 25.9%
		131m	(23/2+)	–83.271	93 ms *12*	IT
		132	0+	–85.180	3.204 d *13*	β–
		133	(3/2+)	–82.94	12.5 m *3*	β–
		133m	(11/2–)	–82.61	55.4 m *4*	β– 83.5%, IT 16.5%
		134	0+	–82.56	41.8 m *8*	β–
		135	(7/2–)	–77.90	19.0 s *2*	β–
		136	0+	–74.48	17.63 s *8*	β–, β–n 1.31%
		137	(7/2–)	–69.3	2.49 s *5*	β–, β–n 2.99%
		138	0+	–65.8	1.4 s *4*	β–, β–n 6.3%
		139	(7/2–)	–60.4s	>150 ns	β–, β–n
		140	0+	–56.6s	>300 ns	β–, β–n
		141		–51.0s	>150 ns	β–?, β–n?
		142	0+	–46.9s		
		143			>408 ns	β–, β–n, β–2n
53	**I**	107		–49.6s		
		108	(1)	–52.6s	36 ms *6*	α 91%, ε 9%, p<1%
		109	1/2+	–57.675	93.5 µs *3*	p 99.99%, α 0.01%
		110		–60.46	0.65 s *2*	ε 83%, α 17%, εp 11%, εα 1.1%
		111	(5/2+)	–64.953	2.5 s *2*	ε 99.9%, α=0.1%

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
53	**I**	112		–67.06	3.42 s *11*	ε , α=1.2×10^{-3}%
		113	5/2+	–71.119	6.6 s *2*	ε , α 3.3×10^{-7}%
		114	1+	–72.8s	2.1 s *2*	ε , εp
		114m	(7)	–72.5s	6.2 s *5*	ε 91%, IT 9%
		115	(5/2+)	–76.34	1.3 m *2*	ε
		116	1+	–77.49	2.91 s *15*	ε
		117	(5/2)+	–80.43	2.22 m *4*	ε
		118	2–	–80.97	13.7 m *5*	ε
		118m	(7–)	–80.87	8.5 m *5*	ε<100%, IT
		119	5/2+	–83.76	19.1 m *4*	ε
		120	2–	–83.75	81.6 m *2*	ε
		120m	(7–)	–83.43	53 m *4*	ε
		121	5/2+	–86.253	2.12 h *1*	ε
		122	1+	–86.081	3.63 m *6*	ε
		123	5/2+	–87.945	13.2235 h *19*	ε
		124	2–	–87.367	4.1760 d *3*	ε
		125	5/2+	–88.838	59.407 d *10*	ε
		126	2–	–87.912	12.93 d *5*	ε 52.7%, β– 47.3%
		127	5/2+	–88.984	**100%**	
		128	1+	–87.739	24.99 m *2*	β– 93.1%, ε 6.9%
		129	7/2+	–88.507	1.57×10^{7} y *4*	β–
		130	5+	–86.936	12.36 h *1*	β–
		130m	2+	–86.896	8.84 m *6*	IT 84%, β– 16%
		131	7/2+	–87.442	8.0252 d *6*	β–
		132	4+	–85.698	2.295 h *13*	β–
		132m	(8–)	–85.578	1.387 h *15*	IT 86%, β– 14%
		133	7/2+	–85.886	20.83 h *8*	β–
		133m	(19/2–)	–84.252	9 s *2*	IT
		134	(4)+	–84.072	52.5 m *2*	β–
		134m	(8)–	–83.756	3.52 m *4*	IT 97.7%, β– 2.3%
		135	7/2+	–83.791	6.58 h *3*	β–
		136	(1–)	–79.57	83.4 s *10*	β–
		136m	(6–)	–78.93	46.9 s *10*	β–
		137	(7/2+)	–76.51	24.5 s *2*	β–, β–n 7.14%
		138	(2–)	–71.9s	6.23 s *3*	β–, β–n 5.56%
		139	(7/2+)	–68.5	2.280 s *11*	β–, β–n 10%
		140	(4–)	–63.6	0.86 s *4*	β–, β–n 9.3%
		141		–60.3	0.43 s *2*	β–, β–n 21.2%
		142		–55.0s	222 ms *12*	β–, β–n?
		143		–51.1s	130 ms *45*	β–?
		144		–45.8s	>300 ns	β–?
		145			>407 ns	β–, β–n
54	**Xe**	108	0+	–42.7s		
		109	(7/2+)	–45.9s	13 ms *2*	α
		110	0+	–51.9	93 ms *3*	α 64%, ε , εp
		111	(7/2+)	–54.39	0.81 s *20*	ε 90%, α 10%
		112	0+	–60.028	2.7 s *8*	ε 99.16%, α 0.84%
		113	(5/2+)	–62.203	2.74 s *8*	ε , εp 7%, α=0.01%, εα=7.0×10^{-3}%
		114	0+	–67.08	10.0 s *4*	ε
		115	(5/2+)	–68.66	18 s *4*	ε , εp 0.34%, α 3.0×10^{-4}%

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
54	**Xe**	116	0+	–73.05	59 s *2*	ε
		117	5/2(+)	–74.18	61 s *2*	ε , εp 2.9×10^{-3}%
		118	0+	–78.08	3.8 m *9*	ε
		119	(5/2+)	–78.79	5.8 m *3*	ε
		120	0+	–82.17	40 m *1*	ε
		121	5/2(+)	–82.47	40.1 m *20*	ε
		122	0+	–85.35	20.1 h *1*	ε
		123	(1/2)+	–85.249	2.08 h *2*	ε
		124	0+	–87.661	≥1.6×10^{14} y	2ε
					0.0952% *3*	
		125	1/2(+)	–87.193	16.9 h *2*	ε
		125m	9/2(–)	–86.940	57 s *1*	IT
		126	0+	–89.146	**0.0890% *2***	
		127	1/2+	–88.322	36.346 d *3*	ε
		127m	9/2–	–88.025	69.2 s *9*	IT
		128	0+	–89.860	**1.9102% *8***	
		129	1/2+	–88.696	**26.4006% *82***	
		129m	11/2–	–88.460	8.88 d *2*	IT
		130	0+	–89.880	**4.0710% *13***	
		131	3/2+	–88.413	**21.232% *30***	
		131m	11/2–	–88.249	11.84 d *4*	IT
		132	0+	–89.279	**26.9086% *33***	
		132m	(10+)	–86.527	8.39 ms *11*	IT
		133	3/2+	–87.643	5.2475 d *5*	β–
		133m	11/2–	–87.410	2.198 d *13*	IT
		134	0+	–88.124	>5.8×10^{22} y	2β–
					10.4357% *21*	
		134m	7–	–86.159	290 ms *17*	IT
		135	3/2+	–86.417	9.14 h *2*	β–
		135m	11/2–	–85.890	15.29 m *5*	IT>99.4%, β–<0.6%
		136	0+	–86.429	>2.4×10^{21} y	2β–
					8.8573% *44*	
		137	7/2–	–82.383	3.818 m *13*	β–
		138	0+	–79.975	14.08 m *8*	β–
		139	3/2–	–75.644	39.68 s *14*	β–
		140	0+	–72.986	13.60 s *10*	β–
		141	5/2(–)	–68.197	1.73 s *1*	β–, β–n 0.04%
		142	0+	–65.229	1.23 s *2*	β–, β–n 0.21%
		143	5/2–	–60.202	0.511 s *6*	β–, β–n 1%
		144	0+	–56.872	0.388 s *7*	β–, β–n 3%
		145		–51.49	188 ms *4*	β–, β–n 5%
		146	0+	–47.95	146 ms *6*	β–, β–n 6.9%
		147	(3/2–)	–42.5s	0.10 s *+10–5*	β–, β–n<8%
		148	0+		>408 ns	β–, β–n
55	**Cs**	112	(0+,3+)	–46.29	0.5 ms *1*	p
		113	(3/2+)	–51.765	16.7 μs *7*	p , α
		114	(1+)	–54.68	0.57 s *2*	ε 99.98%, εp 8.7%, εα 0.19%, α 0.02%
		115		–59.7s	1.4 s *8*	ε , εp=0.07%
		116	(1+)	–62.1s	0.70 s *4*	ε , εp 2.8%, εα 0.05%
		116m	4+,5,6	–62.0s	3.85 s *13*	ε , εp 0.51%, εα 8.0×10^{-3}%

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
55	**Cs**	117m	(9/2+)	–66.49	8.4 s *6*	ε
		117m	(3/2+)	–66.49	6.5 s *4*	ε
		118	2	–68.41	14 s *2*	ε , εp < 0.04%, εα < 2.4×10^{-3}%
		118m	6,7,8	–68.41	17 s *3*	ε , εp < 0.04%, εα < 2.4×10^{-3}%
		119	9/2+	–72.31	43.0 s *2*	ε
		119m	3/2(+)	–72.31	30.4 s *1*	ε
		120	2(+)	–73.888	61.3 s *11*	ε , εα 2.0×10^{-5}%, εp 7.0×10^{-6}%
		120m	(7–)	–73.888	57 s *6*	ε
		121	3/2(+)	–77.10	155 s *4*	ε
		121m	9/2(+)	–77.03	122 s *3*	ε 83%, IT 17%
		122	1+	–78.14	21.18 s *19*	ε
		122m	(5)–	–78.01	0.36 s *2*	IT
		122m	8(–)	–78.00	3.70 m *11*	ε
		123	1/2+	–81.04	5.88 m *3*	ε
		123m	(11/2)–	–80.89	1.64 s *12*	IT
		124	1+	–81.731	30.9 s *4*	ε
		124m	(7)+	–81.268	6.3 s *2*	IT
		125	1/2(+)	–84.087	46.7 m *1*	ε
		125m	(11/2–)	–83.821	0.90 ms *3*	IT
		126	1+	–84.34	1.64 m *2*	ε
		127	1/2+	–86.240	6.25 h *10*	ε
		128	1+	–85.931	3.66 m *2*	ε
		129	1/2+	–87.499	32.06 h *6*	ε
		130	1+	–86.899	29.21 m *4*	ε 98.4%, β– 1.6%
		130m	5–	–86.736	3.46 m *6*	IT 99.84%, ε 0.16%
		131	5/2+	–88.058	9.689 d *16*	ε
		132	2+	–87.155	6.480 d *6*	ε 98.13%, β– 1.87%
		133	7/2+	–88.070	**100%**	
		134	4+	–86.891	2.0652 y *4*	β–, ε 3.0×10^{-4}%
		134m	8–	–86.752	2.912 h *2*	IT
		135	7/2+	–87.581	2.3×10^{6} y *3*	β–
		135m	19/2–	–85.948	53 m *2*	IT
		136	5+	–86.339	13.04 d *3*	β–
		136m	8–	–85.821	17.5 s *2*	β–, IT > 0%
		137	7/2+	–86.545	30.08 y *9*	β–
		138	3–	–82.887	33.41 m *18*	β–
		138m	6–	–82.807	2.91 m *8*	IT 81%, β– 19%
		139	7/2+	–80.701	9.27 m *5*	β–
		140	1–	–77.050	63.7 s *3*	β–
		141	7/2+	–74.48	24.84 s *16*	β–, β–n 0.04%
		142	0–	–70.53	1.684 s *14*	β–, β–n 0.09%
		143	3/2+	–67.67	1.791 s *7*	β–, β–n 1.64%
		144	1(–)	–63.27	0.994 s *6*	β–, β–n 3.03%
		144m	(≥4)	–63.27	<1 s	β–
		145	3/2+	–60.06	0.587 s *5*	β–, β–n 14.7%
		146	1–	–55.57	0.321 s *2*	β–, β–n 14.2%
		147	(3/2+)	–52.02	0.230 s *1*	β–, β–n 28.5%
		148		–47.3	146 ms *6*	β–, β–n 25.1%
		149		–43.8s	>50 ms	β–, β–n

Nuclear Wallet Cards

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
55	**Cs**	150		–39.0s	>50 ms	β–, β–n
		151		–35.1s	>50 ms	β–, β–n
56	**Ba**	112	0+	–36.1s		
		113		–39.8s		
		114	0+	–46.0	0.43 s *+30–15*	ε 99.1%, εp 20%, α 0.9%, ^{12}C < 0.0034%
		115	(5/2+)	–49.0s	0.45 s *5*	ε , εp > 15%
		116	0+	–54.6s	1.3 s *2*	ε , εp 3%
		117	(3/2)	–57.5	1.75 s *7*	ε , εα > 0%, εp > 0%
		118	0+	–62.4s	5.5 s *2*	ε , εp
		119	(5/2+)	–64.6	5.4 s *3*	ε , εp < 25%
		120	0+	–68.9	24 s *2*	ε
		121	5/2(+)	–70.7	29.7 s *15*	ε
		122	0+	–74.61	1.95 m *15*	ε
		123	5/2(+)	–75.65	2.7 m *4*	ε
		124	0+	–79.09	11.0 m *5*	ε
		125	1/2(+)	–79.67	3.3 m *3*	ε
		126	0+	–82.67	100 m *2*	ε
		127	1/2+	–82.82	12.7 m *4*	ε
		127m	7/2–	–82.73	1.9 s *2*	IT
		128	0+	–85.379	2.43 d *5*	ε
		129	1/2+	–85.06	2.23 h *11*	ε
		129m	7/2+	–85.06	2.16 h *2*	ε ≤ 100%, IT
		130	0+	–87.261	**0.106%** ***1***	
		130m	8–	–84.786	9.4 ms *4*	IT
		131	1/2+	–86.684	11.50 d *6*	ε
		131m	9/2–	–86.496	14.6 m *2*	IT
		132	0+	–88.434	>3.0×10^{21} y **0.101%** ***1***	2ε
		133	1/2+	–87.553	10.551 y *11*	ε
		133m	11/2–	–87.265	38.93 h *10*	IT 99.99%, ε 0.01%
		134	0+	–88.950	**2.417%** ***18***	
		135	3/2+	–87.850	**6.592%** ***12***	
		135m	11/2–	–87.582	28.7 h *2*	IT
		136	0+	–88.887	**7.854%** ***24***	
		136m	7–	–86.856	0.3084 s *19*	IT
		137	3/2+	–87.721	**11.232%** ***24***	
		137m	11/2–	–87.059	2.552 m *1*	IT
		138	0+	–88.261	**71.698%** ***42***	
		139	7/2–	–84.914	83.06 m *28*	β–
		140	0+	–83.270	12.7527 d *23*	β–
		141	3/2–	–79.733	18.27 m *7*	β–
		142	0+	–77.845	10.6 m *2*	β–
		143	5/2–	–73.937	14.5 s *3*	β–
		144	0+	–71.767	11.5 s *2*	β–, β–n 3.6%
		145	5/2–	–67.516	4.31 s *16*	β–
		146	0+	–64.94	2.22 s *7*	β–
		147	(3/2–)	–60.26	0.894 s *10*	β–, β–n 0.06%
		148	0+	–57.59	0.612 s *17*	β–, β–n 0.4%
		149		–53.2s	0.344 s *7*	β–, β–n 0.43%
		150	0+	–50.3s	0.3 s	β–, β–n

Nuclear Wallet Cards

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
56	**Ba**	151		–45.6s	>300 ns	β–, β–n
		152	0+	–42.4s	>406 ns	β–, β–n
		153		–37.2s		β–?
57	**La**	117	(3/2+,3/2–)	–46.5s	23.5 ms *26*	p 93.9%, ε 6.1%
		117m	(9/2+)	–46.3s	10 ms *5*	p 97.4%, ε 2.6%
		118		–49.6s		ε?
		119		–55.0s		ε?
		120m		–57.7s	2.8 s *2*	ε, εp>0%
		121		–62.4s	5.3 s *2*	ε
		122		–64.5s	8.6 s *5*	ε, εp
		123		–68.7s	17 s *3*	ε
		124m	(8–)	–70.26	29.21 s *17*	ε
		124m		–70.26	21 s *4*	ε
		125	(3/2+)	–73.76	64.8 s *12*	ε
		125m		–73.65	0.39 s *4*	
		126m	(5+)	–74.97	54 s *2*	ε>0%
		126m	(0–,1,2–)	–74.97	<50 s	ε, IT
		127	(11/2–)	–77.89	5.1 m *1*	ε
		127m	(3/2+)	–77.88	3.7 m *4*	ε, IT
		128	(5+)	–78.63	5.18 m *14*	ε
		128m	(1+,2–)	–78.63	<1.4 m	ε
		129	3/2+	–81.33	11.6 m *2*	ε
		129m	11/2–	–81.15	0.56 s *5*	IT
		130	3(+)	–81.63	8.7 m *1*	ε
		131	3/2+	–83.77	59 m *2*	ε
		132	2–	–83.72	4.8 h *2*	ε
		132m	6–	–83.53	24.3 m *5*	IT 76%, ε 24%
		133	5/2+	–85.49	3.912 h *8*	ε
		134	1+	–85.22	6.45 m *16*	ε
		135	5/2+	–86.65	19.5 h *2*	ε
		136	1+	–86.04	9.87 m *3*	ε
		136m	(8+)	–85.81	114 ms *3*	IT
		137	7/2+	–87.11	6×10^{4} y *2*	ε
		138	5+	–86.521	1.02×10^{11} y *1*	ε 65.6%,
					0.08881% *71*	β– 34.4%
		139	7/2+	–87.228	**99.9119% *71***	
		140	3–	–84.317	1.67855 d *12*	β–
		141	(7/2+)	–82.934	3.92 h *3*	β–
		142	2–	–80.022	91.1 m *5*	β–
		143	(7/2)+	–78.171	14.2 m *1*	β–
		144	(3–)	–74.83	40.8 s *4*	β–
		145	(5/2+)	–72.83	24.8 s *20*	β–
		146	2–	–69.05	6.27 s *10*	β–
		146m	(6–)	–69.05	10.0 s *1*	β–
		147	(3/2+)	–66.68	4.06 s *4*	β–, β–n 0.04%
		148	(2–)	–62.71	1.26 s *8*	β–, β–n 0.15%
		149	(3/2–)	–60.2	1.05 s *3*	β–, β–n 1.43%
		150	(3+)	–56.6s	0.86 s *5*	β–, β–n 2.7%
		151		–53.9s	>300 ns	β–, β–n
		152		–49.7s	>150 ns	β–
		153		–46.6s	>100 ns	β–?
		154		–42.0s		β–?

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
57	**La**	155		–38.5s		β–?
58	**Ce**	119		–43.9s		ε?
		120	0+	–49.5s		ε?
		121	(5/2)	–52.5s	1.1 s *1*	ε, εp=1%
		122	0+	–57.7s		ε, εp
		123	(5/2)	–60.1s	3.8 s *2*	ε, εp>0%
		124	0+	–64.6s	6 s *2*	ε
		125	(7/2–)	–66.7s	9.7 s *3*	ε, εp
		126	0+	–70.82	51.0 s *3*	ε
		127	(1/2+)	–71.97	34 s *2*	ε
		127m	(5/2+)	–71.97	28.6 s *7*	ε
		128	0+	–75.53	3.93 m *2*	ε
		129	5/2+	–76.29	3.5 m *5*	ε>0%
		130	0+	–79.42	22.9 m *5*	ε
		131	7/2+	–79.71	10.3 m *3*	ε
		131m	(1/2+)	–79.64	5.4 m *4*	ε, IT
		132	0+	–82.47	3.51 h *11*	ε
		132m	(8–)	–80.13	9.4 ms *3*	IT
		133	1/2+	–82.42	97 m *4*	ε
		133m	9/2–	–82.39	5.1 h *3*	ε, IT
		134	0+	–84.83	3.16 d *4*	ε
		135	1/2(+)	–84.62	17.7 h *3*	ε
		135m	(11/2–)	–84.18	20 s *1*	IT
		136	0+	–86.47	$>0.7\times10^{14}$ y	2ε
					0.185% *2*	
		137	3/2+	–85.88	9.0 h *3*	ε
		137m	11/2–	–85.63	34.4 h *3*	IT 99.21%, ε 0.79%
		138	0+	–87.56	$\geq0.9\times10^{14}$ y	2ε
					0.251% *2*	
		138m	7–	–85.43	8.65 ms *20*	IT
		139	3/2+	–86.949	137.641 d *20*	ε
		139m	11/2–	–86.195	54.8 s *10*	IT
		140	0+	–88.078	**88.450% *51***	
		141	7/2–	–85.435	32.508 d *13*	β–
		142	0+	–84.532	$>5\times10^{16}$ y	2β–
					11.114% *51*	
		143	3/2–	–81.605	33.039 h *6*	β–
		144	0+	–80.431	284.91 d *5*	β–
		145	(5/2–)	–77.09	3.01 m *6*	β–
		146	0+	–75.64	13.52 m *13*	β–
		147	(5/2–)	–72.013	56.4 s *10*	β–
		148	0+	–70.40	56 s *1*	β–
		149	(3/2–)	–66.67	5.3 s *2*	β–
		150	0+	–64.85	4.0 s *6*	β–
		151	(5/2+)	–61.22	1.76 s *6*	β–
		151m		–61.22	1.02 s *6*	β–
		152	0+	–59.3s	1.4 s *2*	β–
		153		–55.2s	>100 ns	β–?
		154	0+	–52.7s	>100 ns	β–
		155		–48.3s	>300 ns	β–?
		156	0+	–45.3s		β–?
		157		–40.4s		β–?

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
59	**Pr**	121	(3/2)	–41.4s	10 ms *+6–3*	p
		122		–44.7s	≈0.5 s	ε ?
		123		–50.1s	≈0.8 s	ε ?
		124		–53.0s	1.2 s *2*	ε , εp > 0%
		125		–57.7s	3.3 s *7*	ε , εp
		126	>3	–60.1s	3.14 s *22*	ε , εp
		127		–64.3s	4.2 s *3*	ε
		128	4,5,6	–66.33	2.84 s *9*	ε
		129	(11/2–)	–69.77	30 s *4*	ε > 0%
		130?	(7,8)	–71.18	40 s *4*	ε
		130?	(4+,5+)	–71.18	40 s *4*	ε
		130?	(2+)	–71.18	40 s *4*	ε
		131	(3/2+)	–74.30	1.51 m *2*	ε
		131m	(11/2–)	–74.15	5.73 s *20*	IT 96.4%, ε 3.6%
		132	(2)+	–75.21	1.6 m *3*	ε
		133	(3/2+)	–77.94	6.5 m *3*	ε
		133m	(11/2–)	–77.74	1.1 s *2*	IT
		134m	(6–)	–78.51	≈11 m	ε
		134m	2–	–78.51	17 m *2*	ε
		135	3/2(+)	–80.93	24 m *1*	ε
		136	2+	–81.33	13.1 m *1*	ε
		137	5/2+	–83.18	1.28 h *3*	ε
		138	1+	–83.13	1.45 m *5*	ε
		138m	7–	–82.76	2.12 h *4*	ε
		139	5/2+	–84.820	4.41 h *4*	ε
		140	1+	–84.690	3.39 m *1*	ε
		141	5/2+	–86.015	**100%**	
		142	2–	–83.787	19.12 h *4*	β– 99.98%, ε 0.02%
		142m	5–	–83.783	14.6 m *5*	IT
		143	7/2+	–83.067	13.57 d *2*	β–
		144	0–	–80.749	17.28 m *5*	β–
		144m	3–	–80.690	7.2 m *3*	IT 99.93%, β– 0.07%
		145	7/2+	–79.626	5.984 h *10*	β–
		146	(2)–	–76.68	24.15 m *18*	β–
		147	(5/2+)	–75.44	13.4 m *3*	β–
		148	1–	–72.54	2.29 m *2*	β–
		148m	(4)	–72.44	2.01 m *7*	β–
		149	(5/2+)	–71.039	2.26 m *7*	β–
		150	(1)–	–68.299	6.19 s *16*	β–
		151	(3/2–)	–66.78	18.90 s *7*	β–
		152	(4+)	–63.76	3.57 s *18*	β–
		153		–61.58	4.28 s *11*	β–
		154	(3+)	–58.2	2.3 s *1*	β–
		155		–55.8s	>300 ns	β– ?
		156		–51.9s	>300 ns	β– ?
		157		–49.0s		β– ?
		158		–44.7s		β– ?
		159		–41.5s		β– ?
60	**Nd**	124	0+	–44.3s		ε ?
		125	(5/2)	–47.4s	0.65 s *15*	ε , εp > 0%
		126	0+	–52.6s	>200 ns	ε , εp
		127		–55.3s	1.8 s *4*	ε , εp

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
60	**Nd**	128	0+	–60.1s	5 s	ε , εp
		129	(5/2+)	–62.2s	4.9 s *2*	ε>0%, εp>0%
		130	0+	–66.60	21 s *3*	ε
		131	(5/2+)	–67.77	25.4 s *9*	ε , εp>0%
		132	0+	–71.43	94 s *8*	ε
		133	(7/2+)	–72.33	70 s *10*	ε
		133m	(1/2+)	–72.20	=70 s	ε , IT
		134	0+	–75.65	8.5 m *15*	ε
		135	9/2(–)	–76.21	12.4 m *6*	ε
		135m	(1/2+)	–76.15	5.5 m *5*	ε>99.97%, IT<0.03%
		136	0+	–79.20	50.65 m *33*	ε
		137	1/2+	–79.58	38.5 m *15*	ε
		137m	11/2–	–79.06	1.60 s *15*	IT
		138	0+	–82.02	5.04 h 9	ε
		139	3/2+	–82.01	29.7 m *5*	ε
		139m	11/2–	–81.78	5.50 h *20*	ε 88.2%, IT 11.8%
		140	0+	–84.25	3.37 d *2*	ε
		140m	7–	–82.03	0.60 ms *5*	IT
		141	3/2+	–84.192	2.49 h *3*	ε
		141m	11/2–	–83.436	62.0 s *8*	IT, ε<0.05%
		142	0+	–85.949	**27.152%** ***40***	
		143	7/2–	–84.001	**12.174%** ***26***	
		144	0+	–83.747	2.29×10^{15} y *16*	α
					23.798% ***19***	
		145	7/2–	–81.431	**8.293%** ***12***	
		146	0+	–80.925	**17.189%** ***32***	
		147	5/2–	–78.146	10.98 d *1*	β–
		148	0+	–77.406	**5.756%** ***21***	
		149	5/2–	–74.374	1.728 h *1*	β–
		150	0+	–73.683	0.79×10^{19} y *7*	
					5.638% ***28***	
		151	3/2+	–70.946	12.44 m *7*	β–
		152	0+	–70.15	11.4 m *2*	β–
		153	(3/2)–	–67.34	31.6 s *10*	β–
		154	0+	–65.7	25.9 s *2*	β–
		155		–62.5s	8.9 s *2*	β–
		156	0+	–60.5	5.06 s *13*	β–
		157		–56.8s	>100 ns	β–?
		158	0+	–54.4s	>50 ns	β–
		159		–50.2s		β–?
		160	0+	–47.4s		β–?
		161		–43.0s		β–?
61	**Pm**	126		–38.8s		ε ?
		127		–44.4s		p ?, ε ?
		128		–47.6s	1.0 s *3*	ε , α, εp
		129	(5/2–)	–52.5s	2.4 s 9	ε
		130	(4,5,6)	–55.2s	2.6 s *2*	ε , εp
		131	(11/2–)	–59.6s	6.3 s *8*	ε
		132	(3+)	–61.6s	6.2 s *6*	ε , εp=5.0×10^{-5}%
		133	(3/2+)	–65.41	13.5 s *21*	ε
		133m	(11/2–)	–65.28	<8.8 s	IT, ε

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
61	**Pm**	134	(2+)	–66.74	=5 s	ε
		134m	(5+)	–66.74	22 s *1*	ε
		135m	(3/2+,5/2+)	–69.98	49 s *3*	ε
		135m	(11/2–)	–69.91	45 s *4*	ε
		136m	(5–)	–71.20	107 s *6*	ε
		136m	(2+)	–71.20	47 s *2*	ε
		137	11/2–	–74.07	2.4 m *1*	ε
		138		–74.94	10 s *2*	ε
		138m		–74.92	3.24 m *5*	ε
		139	(5/2)+	–77.50	4.15 m *5*	ε
		139m	(11/2)–	–77.31	180 ms *20*	IT 99.94%, ε 0.06%
		140	1+	–78.21	9.2 s *2*	ε
		140m	8–	–78.21	5.95 m *5*	ε
		141	5/2+	–80.52	20.90 m *5*	ε
		142	1+	–81.16	40.5 s *5*	ε
		142m	(8)–	–80.27	2.0 ms *2*	IT
		143	5/2+	–82.960	265 d *7*	ε
		144	5–	–81.415	363 d *14*	ε
		145	5/2+	–81.267	17.7 y *4*	ε , α 2.8×10^{-7}%
		146	3–	–79.453	5.53 y *5*	ε 66%, β– 34%
		147	7/2+	–79.041	2.6234 y *2*	β–
		148	1–	–76.865	5.368 d *2*	β–
		148m	5–,6–	–76.727	41.29 d *11*	β– 95.8%, IT 4.2%
		149	7/2+	–76.063	53.08 h *5*	β–
		150	(1–)	–73.60	2.68 h *2*	β–
		151	5/2+	–73.388	28.40 h *4*	β–
		152	1+	–71.25	4.12 m *8*	β–
		152m	(8)	–71.11	13.8 m *2*	β–, IT≥0%
		152m	4–	–71.11	7.52 m *8*	β–
		153	5/2–	–70.68	5.25 m *2*	β–
		154	(3,4)	–68.49	2.68 m *7*	β–
		154m	(0–,1–)	–68.49	1.73 m *10*	β–
		155	5/2–	–66.97	41.5 s *2*	β–
		156m	4–	–64.21	26.70 s *10*	β–
		157	(5/2–)	–62.4	10.56 s *10*	β–
		158		–59.1	4.8 s *5*	β–
		159		–56.8	1.5 s *2*	β–
		160		–53.1s		β–?
		161		–50.4s		β–?
		162		–46.3s		β–?
		163		–43.1s		β–?
62	**Sm**	128	0+	–38.0s		ε?, p?
		129	(1/2+,3/2+)	–41.3s	0.55 s *10*	ε , εp>0%
		130	0+	–46.9s		ε
		131		–49.6s	1.2 s *2*	ε , εp>0%
		132	0+	–54.7s	4.0 s *3*	ε , εp
		133	(5/2+)	–56.8s	2.89 s *16*	ε , εp>0%
		133m	(1/2–)	–56.8s	3.5 s *4*	ε , IT, εp
		134	0+	–61.2s	9.5 s *8*	ε
		135	(3/2+,5/2+)	–62.9	10.3 s *5*	ε , εp 0.02%
		136	0+	–66.81	47 s *2*	ε
		137	(9/2–)	–68.03	45 s *1*	ε

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
62	**Sm**	138	0+	–71.50	3.1 m *2*	ε
		139	1/2+	–72.38	2.57 m *10*	ε
		139m	11/2–	–71.92	10.7 s *6*	IT 93.7%, ε 6.3%
		140	0+	–75.46	14.82 m *12*	ε
		141	1/2+	–75.934	10.2 m *2*	ε
		141m	11/2–	–75.758	22.6 m *2*	ε 99.69%, IT 0.31%
		142	0+	–78.987	72.49 m *5*	ε
		143	3/2+	–79.516	8.75 m *6*	ε
		143m	11/2–	–78.762	66 s *2*	IT 99.76%, ε 0.24%
		143m2	3/2(–)	–76.722	30 ms *3*	IT
		144	0+	–81.965	**3.07%** ***7***	
		145	7/2–	–80.651	340 d *3*	ε
		146	0+	–80.995	10.3×10^{7} y *5*	α
		147	7/2–	–79.265	1.060×10^{11} y *11*	α
					14.99% ***18***	
		148	0+	–79.335	7×10^{15} y *3*	α
					11.24% ***10***	
		149	7/2–	–77.135	**13.82%** ***7***	
		150	0+	–77.050	**7.38%** ***1***	
		151	5/2–	–74.575	90 y *8*	β–
		152	0+	–74.762	**26.75%** ***16***	
		153	3/2+	–72.559	46.284 h *4*	β–
		153m	11/2–	–72.461	10.6 ms *3*	IT
		154	0+	–72.454	**22.75%** ***29***	
		155	3/2–	–70.190	22.3 m *2*	β–
		156	0+	–69.362	9.4 h *2*	β–
		157	(3/2–)	–66.72	8.03 m *7*	β–
		158	0+	–65.21	5.30 m *3*	β–
		159	5/2–	–62.24	11.37 s *15*	β–
		160	0+	–60.4s	9.6 s *3*	β–
		161		–56.8	4.8 s *4*	β–
		162	0+	–54.8s	2.4 s *5*	β–
		163		–50.9s		β–?
		164	0+	–48.2s		β–?
		165		–43.8s		β–?
63	**Eu**	130	(1+)	–33.0s	0.90 ms *+49–29*	p
		131	3/2+	–38.7s	17.8 ms *19*	p 89%, ε 11%
		132		–41.9s		p, ε
		133		–47.1s		ε?
		134		–49.7s	0.5 s *2*	ε, εp>0%
		135		–54.1s	1.5 s *2*	ε, εp
		136m	(7+)	–56.1s	3.3 s *3*	ε, εp 0.09%
		136m	(3+)	–56.1s	3.8 s *3*	ε, εp 0.09%
		137	(11/2–)	–60.0s	11 s *2*	ε
		138	(6–)	–61.75	12.1 s *6*	ε
		139	(11/2)–	–65.40	17.9 s *6*	ε
		140	1+	–66.99	1.51 s *2*	ε
		140m	(5–)	–66.99	125 ms *2*	IT, ε<1%
		141	5/2+	–69.93	40.7 s *7*	ε
		141m	11/2–	–69.83	2.7 s *3*	IT 87%, ε 13%
		142	1+	–71.31	2.34 s *12*	ε
		142m	8–	–71.31	1.223 m *8*	ε

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
63	**Eu**	143	5/2+	–74.24	2.59 m *2*	ε
		144	1+	–75.62	10.2 s *1*	ε
		145	5/2+	–77.991	5.93 d *4*	ε
		146	4–	–77.117	4.61 d *3*	ε
		147	5/2+	–77.544	24.1 d *6*	ε , α 2.2×10^{-3}%
		148	5–	–76.30	54.5 d *5*	ε , α 9.4×10^{-7}%
		149	5/2+	–76.440	93.1 d *4*	ε
		150	5–	–74.791	36.9 y *9*	ε
		150m	0–	–74.749	12.8 h *1*	β– 89%, ε 11%, IT≤5.0×10^{-8}%
		151	5/2+	–74.651	≥1.7×10^{18} y	α
					47.81% *3*	
		152	3–	–72.887	13.528 y *14*	ε 72.1%, β– 27.9%
		152m	0–	–72.841	9.3116 h *13*	β– 72%, ε 28%
		152m	8–	–72.739	96 m *1*	IT
		153	5/2+	–73.366	**52.19% *6***	
		154	3–	–71.736	8.601 y *10*	β– 99.98%, ε 0.02%
		154m	8–	–71.591	46.3 m *4*	IT
		155	5/2+	–71.816	4.753 y *14*	β–
		156	0+	–70.085	15.19 d *8*	β–
		157	5/2+	–69.459	15.18 h *3*	β–
		158	(1–)	–67.20	45.9 m *2*	β–
		159	5/2+	–66.045	18.1 m *1*	β–
		160	1	–63.24	38 s *4*	β–
		161		–61.80	26 s *3*	β–
		162		–58.69	10.6 s *10*	β–
		163		–56.80	7.7 s *4*	β–
		164		–53.4s	4.2 s *2*	β–
		165		–50.8s	2.3 s *2*	β–
		166		–46.8s		β–?
		167		–43.8s		β–?
64	**Gd**	133		–35.6s		
		134	0+	–41.1s		ε?
		135	(5/2+)	–44.0s	1.1 s *2*	ε , εp 18%
		136	0+	–48.9s	≥200 ns	
		137	(7/2)	–51.2s	2.2 s *2*	ε , εp
		138	0+	–55.7s	4.7 s *9*	ε
		139	(9/2–)	–57.6s	5.8 s *9*	εp>0%, ε>0%
		139m		–57.6s	4.8 s *9*	εp>0%, ε>0%
		140	0+	–61.78	15.8 s *4*	ε
		141	1/2+	–63.22	14 s *4*	ε , εp 0.03%
		141m	11/2–	–62.85	24.5 s *5*	ε 89%, IT 11%
		142	0+	–66.96	70.2 s *6*	ε
		143	(1/2)+	–68.2	39 s *2*	ε
		143m	(11/2–)	–68.1	110.0 s *14*	ε
		144	0+	–71.76	4.47 m *6*	ε
		145	1/2+	–72.93	23.0 m *4*	ε
		145m	11/2–	–72.18	85 s *3*	IT 94.3%, ε 5.7%
		146	0+	–76.087	48.27 d *10*	ε
		147	7/2–	–75.356	38.06 h *12*	ε
		148	0+	–76.269	70.9 y *10*	α
		149	7/2–	–75.126	9.28 d *10*	ε , α 4.3×10^{-4}%

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
64	**Gd**	150	0+	–75.763	1.79×10^{6} y *8*	α
		151	7/2–	–74.187	123.9 d *10*	ε , α=8.0×10^{-7}%
		152	0+	–74.706	1.08×10^{14} y *8*	α
					0.20% ***1***	
		153	3/2–	–72.882	240.4 d *10*	ε
		154	0+	–73.705	**2.18%** ***3***	
		155	3/2–	–72.069	**14.80%** ***12***	
		155m	11/2–	–71.948	31.97 ms *27*	IT
		156	0+	–72.534	**20.47%** ***9***	
		157	3/2–	–70.823	**15.65%** ***2***	
		158	0+	–70.689	**24.84%** ***7***	
		159	3/2–	–68.560	18.479 h *4*	β–
		160	0+	–67.940	>3.1×10^{19} y	2β–
					21.86% ***19***	
		161	5/2–	–65.505	3.66 m *5*	β–
		162	0+	–64.279	8.4 m *2*	β–
		163	(5/2–,7/2+)	–61.47	68 s *3*	β–
		164	0+	–59.9s	45 s *3*	β–
		165		–56.6s	10.3 s *16*	β–
		166	0+	–54.5s	4.8 s *10*	β–
		167		–50.8s		β–?
		168	0+	–48.3s		β–?
		169		–44.2s		β–?
65	**Tb**	135	(7/2–)	–32.6s	0.94 ms *+33–22*	p
		136		–35.9s		ε?
		137		–40.7s		p?, ε?
		138m		–43.5s	≥200 ns	ε , p
		139		–48.0s	1.6 s *2*	ε , εp?
		140	(7+)	–50.5	2.0 s *5*	ε , εp 0.26%
		141	(5/2–)	–54.5	3.5 s *2*	ε
		141m		–54.5	7.9 s *6*	ε
		142	1+	–56.6	597 ms *17*	ε , εp 2.2×10^{-3}%
		142m	5–	–56.3	303 ms *17*	IT
		143	(11/2–)	–60.42	12 s *1*	ε
		143m		–60.42	<21 s	ε
		144	1+	–62.37	=1 s	ε
		144m	(6–)	–61.97	4.25 s *15*	IT 66%, ε 34%
		145		–65.88		ε?
		145m	(11/2–)	–65.88	30.9 s *6*	ε
		146	1+	–67.76	8 s *4*	ε
		146m	5–	–67.76	23 s *2*	ε
		146m	(10+)	–66.98	1.18 ms *2*	IT
		147	(1/2+)	–70.742	1.64 h *3*	ε
		147m	(11/2–)	–70.691	1.83 m *6*	ε
		148	2–	–70.54	60 m *1*	ε
		148m	(9)+	–70.45	2.20 m *5*	ε
		149	1/2+	–71.489	4.118 h *25*	ε 83.3%, α 16.7%
		149m	11/2–	–71.453	4.16 m *4*	ε 99.98%, α 0.02%
		150	(2–)	–71.105	3.48 h *16*	ε , α<0.05%
		150m	9+	–70.631	5.8 m *2*	ε
		151	1/2(+)	–71.622	17.609 h *14*	ε 99.99%, α 9.5×10^{-3}%

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
65	**Tb**	151m	(11/2−)	−71.522	25 s *3*	IT 93.4%, ε 6.6%
		152	2−	−70.72	17.5 h *1*	ε, α<7.0×10⁻⁷%
		152m	8+	−70.21	4.2 m *1*	IT 78.8%, ε 21.2%
		153	5/2+	−71.313	2.34 d *1*	ε
		154	0	−70.15	21.5 h *4*	ε, β−<0.1%
		154m	7−	−70.15	22.7 h *5*	ε 98.2%, IT 1.8%
		154m	3−	−70.15	9.4 h *4*	ε 78.2%, IT 21.8%, β−<0.1%
		155	3/2+	−71.25	5.32 d *6*	ε
		156	3−	−70.090	5.35 d *10*	ε
		156m	(7−)	−70.040	24.4 h *10*	IT
		156m	(0+)	−70.002	5.3 h *2*	IT<100%, ε>0%
		157	3/2+	−70.762	71 y *7*	ε
		158	3−	−69.469	180 y *11*	ε 83.4%, β− 16.6%
		158m	0−	−69.359	10.70 s *17*	IT, β−<0.6%, ε<0.01%
		158m	7−	−69.081	0.40 ms *4*	IT
		159	3/2+	−69.531	**100%**	
		160	3−	−67.835	72.3 d *2*	β−
		161	3/2+	−67.460	6.89 d *2*	β−
		162	1−	−65.67	7.60 m *15*	β−
		163	3/2+	−64.594	19.5 m *3*	β−
		164	(5+)	−62.1	3.0 m *1*	β−
		165	(3/2+)	−60.7s	2.11 m *10*	β−
		166	(2−)	−57.88	25.1 s *21*	β−
		167	(3/2+)	−55.9s	19.4 s *27*	β−
		168	(4−)	−52.6s	8.2 s *13*	β−
		169		−50.2s		β−?
		170		−46.5s		β−?
		171		−43.8s		β−?
66	**Dy**	138	0+	−34.8s		ε?
		139	(7/2+)	−37.6s	0.6 s *2*	ε, εp
		140	0+	−42.7s		ε
		141	(9/2−)	−45.2s	0.9 s *2*	ε, εp
		142	0+	−49.9s	2.3 s *3*	ε, εp 0.06%
		143	(1/2+)	−52.17	5.6 s *10*	ε, εp
		143m	(11/2−)	−51.86	3.0 s *3*	ε, εp
		144	0+	−56.570	9.1 s *4*	ε, εp
		145	(1/2+)	−58.242	6 s *2*	ε, εp=50%
		145m	(11/2−)	−58.124	14.1 s *7*	ε, εp=50%
		146	0+	−62.554	29 s *3*	ε
		146m	(10+)	−59.618	150 ms *20*	IT
		147	(1/2+)	−64.194	67 s *7*	ε, εp 0.05%
		147m	(11/2−)	−63.444	55.2 s *5*	ε 68.9%, IT 31.1%
		148	0+	−67.859	3.3 m *2*	ε
		149	(7/2−)	−67.702	4.20 m *14*	ε
		149m	(27/2−)	−65.041	0.490 s *15*	IT 99.3%, ε 0.7%
		150	0+	−69.310	7.17 m *5*	ε 64%, α 36%
		151	7/2(−)	−68.752	17.9 m *3*	ε 94.4%, α 5.6%
		152	0+	−70.118	2.38 h *2*	ε 99.9%, α 0.1%
		153	7/2(−)	−69.142	6.4 h *1*	ε 99.99%, α 9.4×10⁻³%

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
66	**Dy**	154	0+	–70.392	3.0×10^{6} y *15*	α
		155	3/2–	–69.15	9.9 h *2*	ε
		156	0+	–70.522	**0.056%** ***3***	
		157	3/2–	–69.420	8.14 h *4*	ε
		157m	11/2–	–69.221	21.6 ms *16*	IT
		158	0+	–70.404	**0.095%** ***3***	
		159	3/2–	–69.166	144.4 d *2*	ε
		160	0+	–69.671	**2.329%** ***18***	
		161	5/2+	–68.054	**18.889%** ***42***	
		162	0+	–68.179	**25.475%** ***36***	
		163	5/2–	–66.379	**24.896%** ***42***	
		164	0+	–65.966	**28.260%** ***54***	
		165	7/2+	–63.610	2.334 h *1*	β–
		165m	1/2–	–63.502	1.257 m *6*	IT 97.76%, β– 2.24%
		166	0+	–62.583	81.6 h *1*	β–
		167	(1/2–)	–59.93	6.20 m *8*	β–
		168	0+	–58.6	8.7 m *3*	β–
		169	(5/2)–	–55.6	39 s *8*	β–
		170	0+	–53.7s		β–
		171		–50.1s		β–?
		172	0+	–47.8s		β–?
		173		–43.7s		β–?
67	**Ho**	140	(6–,0–,8+)	–29.2s	6 ms *3*	p
		141	7/2–	–34.3s	4.1 ms *3*	p
		142	(7–,8+)	–37.2s	0.4 s *1*	ε , εp > 0%
		143	(11/2–)	–42.0s		ε ?, εp ?
		144	(5–)	–44.609	0.7 s *1*	ε , εp
		145	(11/2–)	–49.120	2.4 s *1*	ε
		146	(10+)	–51.238	3.6 s *3*	ε
		147	(11/2–)	–55.757	5.8 s *4*	ε
		148	(1+)	–57.99	2.2 s *11*	ε
		148m	(6)–	–57.99	9.59 s *15*	ε , εp 0.08%
		148m	(10+)	–57.30	2.35 ms *4*	IT
		149	(11/2–)	–61.66	21.1 s *2*	ε
		149m	(1/2+)	–61.62	56 s *3*	ε
		150	2–	–61.95	72 s *4*	ε
		150m	(9)+	–61.45	24.1 s *5*	ε ,
		151	(11/2–)	–63.622	35.2 s *1*	ε 78%, α 22%
		151m	(1/2+)	–63.581	47.2 s *13*	α 80%, ε 20%
		152	2–	–63.61	161.8 s *3*	ε 88%, α 12%
		152m	9+	–63.45	50.0 s *4*	ε 89.2%, α 10.8%
		153	11/2–	–65.012	2.01 m *3*	ε 99.95%, α 0.05%
		153m	1/2+	–64.943	9.3 m *5*	ε 99.82%, α 0.18%
		154	2–	–64.639	11.76 m *19*	ε 99.98%, α 0.02%
		154m	8+	–64.639	3.10 m *14*	ε , $\alpha < 1.0\times10^{-3}$%
		155	5/2+	–66.04	48 m *1*	ε
		155m	11/2–	–65.90	0.88 ms *8*	IT
		156	4–	–65.47	56 m *1*	ε
		156m	1–	–65.42	9.5 s *15*	IT
		156m	9+	–65.42	7.8 m *3*	ε 75%, IT 25%
		157	7/2–	–66.83	12.6 m *2*	ε
		158	5+	–66.18	11.3 m *4*	ε

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
67	**Ho**	158m	2−	−66.12	28 m *2*	IT>81%, ε<19%
		158m	(9+)	−66.00	21.3 m *23*	ε≥93%, IT≤7%
		159	7/2−	−67.328	33.05 m *11*	ε
		159m	1/2+	−67.122	8.30 s *8*	IT
		160	5+	−66.38	25.6 m *3*	ε
		160m	2−	−66.32	5.02 h *5*	IT 73%, ε 27%
		160m	(9+)	−66.21	3 s	IT
		161	7/2−	−67.195	2.48 h *5*	ε
		161m	1/2+	−66.984	6.76 s *7*	IT
		162	1+	−66.040	15.0 m *10*	ε
		162m	6−	−65.934	67.0 m *7*	IT 62%, ε 38%
		163	7/2−	−66.376	4570 y *25*	ε
		163m	1/2+	−66.078	1.09 s *3*	IT
		164	1+	−64.980	29 m *1*	ε 60%, β− 40%
		164m	6−	−64.840	37.5 m *+15−5*	IT
		165	7/2−	−64.897	**100%**	
		166	0−	−63.070	26.824 h *12*	β−
		166m	7−	−63.064	1.20×10^{3} y *18*	β−
		167	7/2−	−62.279	3.003 h *18*	β−
		168	3+	−60.06	2.99 m *7*	β−
		168m	(6+)	−60.00	132 s *4*	IT≥99.5%, β−≤0.5%
		169	7/2−	−58.80	4.72 m *10*	β−
		170	(6+)	−56.24	2.76 m *5*	β−
		170m	(1+)	−56.12	43 s *2*	β−
		171	(7/2−)	−54.5	53 s *2*	β−
		172		−51.5s	25 s *3*	β−
		173		−49.2s		β−?
		174		−45.7s		β−?
		175		−43.1s		β−?
68	**Er**	142	0+	−28.1s		
		143		−31.2s		ε?
		144	0+	−36.7s	≥200 ns	ε
		145	(1/2+)	−39.4s		ε?
		145m	(11/2−)	−39.2s	1.0 s *3*	ε, εp
		146	0+	−44.322	1.7 s *6*	ε, εp
		147	(1/2+)	−46.61	2.5 s *2*	ε, εp>0%
		147m	(11/2−)	−46.61	1.6 s *2*	ε, εp>0%
		148	0+	−51.48	4.6 s *2*	ε
		149	(1/2+)	−53.74	4 s *2*	ε, εp 7%
		149m	(11/2−)	−53.00	8.9 s *2*	ε 96.5%, IT 3.5%, εp 0.18%
		150	0+	−57.83	18.5 s *7*	ε
		151	(7/2−)	−58.26	23.5 s *20*	ε
		151m	(27/2−)	−55.68	0.58 s *2*	IT 95.3%, ε 4.7%
		152	0+	−60.500	10.3 s *1*	α 90%, ε 10%
		153	(7/2−)	−60.475	37.1 s *2*	α 53%, ε 47%
		154	0+	−62.606	3.73 m *9*	ε 99.53%, α 0.47%
		155	7/2−	−62.209	5.3 m *3*	ε 99.98%, α 0.02%
		156	0+	−64.21	19.5 m *10*	ε, α 1.7×10^{-5}%
		157	3/2−	−63.41	18.65 m *10*	ε
		157m	(9/2+)	−63.26	76 ms *6*	IT
		158	0+	−65.30	2.29 h *6*	ε

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
68	**Er**	159	3/2−	−64.560	36 m *1*	ε
		160	0+	−66.06	28.58 h *9*	ε
		161	3/2−	−65.199	3.21 h *3*	ε
		162	0+	−66.332	**0.139%** ***5***	
		163	5/2−	−65.166	75.0 m *4*	ε
		164	0+	−65.941	**1.601%** ***3***	
		165	5/2−	−64.520	10.36 h *4*	ε
		166	0+	−64.924	**33.503%** ***36***	
		167	7/2+	−63.289	**22.869%** ***9***	
		167m	1/2−	−63.081	2.269 s *6*	IT
		168	0+	−62.989	**26.978%** ***18***	
		169	1/2−	−60.921	9.392 d *18*	β−
		170	0+	−60.108	**14.910%** ***36***	
		171	5/2−	−57.718	7.516 h *2*	β−
		172	0+	−56.482	49.3 h *3*	β−
		173	(7/2−)	−53.7s	1.4 m *1*	β−
		174	0+	−51.9s	3.2 m *2*	β−
		175	(9/2+)	−48.7s	1.2 m *3*	β−
		176	0+	−46.6s		β−?
		177		−42.9s		β−?
69	**Tm**	144	(10+)	−22.2s	1.9 μs *+12−5*	p>0%
		145	(11/2−)	−27.7s	3.17 μs *20*	p
		146	(5−)	−31.2s	80 ms *10*	p, ε
		146m	(8+)	−31.1s	200 ms *10*	p, ε
		147	11/2−	−35.974	0.58 s *3*	ε 85%, p 15%
		147m	3/2+	−35.906	0.36 ms *4*	p
		148m	(10+)	−38.76	0.7 s *2*	ε
		149	(11/2−)	−43.9s	0.9 s *2*	ε, εp 0.2%
		150	(6−)	−46.5s	2.20 s *6*	ε
		150m	(10+)	−45.8s	5.2 ms *3*	IT
		151	(11/2−)	−50.78	4.17 s *11*	ε
		151m	(1/2+)	−50.78	6.6 s *20*	ε
		152	(2)−	−51.77	8.0 s *10*	ε
		152m	(9)+	−51.77	5.2 s *6*	ε
		153	(11/2−)	−53.99	1.48 s *1*	α 91%, ε 9%
		153m	(1/2+)	−53.95	2.5 s *2*	α 92%, ε 8%
		154	(2−)	−54.43	8.1 s *3*	α 54%, ε 46%
		154m	9+	−54.43	3.30 s *7*	α 58%, ε 42%, IT
		155	11/2−	−56.626	21.6 s *2*	ε 99.11%, α 0.89%
		155m	1/2+	−56.585	45 s *3*	ε>98%, α<2%
		156	2−	−56.84	83.8 s *18*	ε 99.94%, α 0.06%
		157	1/2+	−58.71	3.63 m *9*	ε
		158	2−	−58.70	3.98 m *6*	ε
		158m	(5+)	−58.70	≈20 s	ε?
		159	5/2+	−60.57	9.13 m *16*	ε
		160	1−	−60.30	9.4 m *3*	ε
		160m	5	−60.23	74.5 s *15*	IT 85%, ε 15%
		161	7/2+	−61.90	30.2 m *8*	ε
		162	1−	−61.47	21.70 m *19*	ε
		162m	5+	−61.47	24.3 s *17*	IT 81%, ε 19%
		163	1/2+	−62.727	1.810 h *5*	ε
		164	1+	−61.90	2.0 m *1*	ε

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
69	**Tm**	164m	6−	−61.90	5.1 m *1*	IT=80%, ε=20%
		165	1/2+	−62.928	30.06 h *3*	ε
		166	2+	−61.89	7.70 h *3*	ε
		166m	(6−)	−61.78	340 ms *25*	IT
		167	1/2+	−62.542	9.25 d *2*	ε
		168	3+	−61.312	93.1 d *2*	ε 99.99%, β− 0.01%
		169	1/2+	−61.274	**100%**	
		170	1−	−59.795	128.6 d *3*	β− 99.87%, ε 0.13%
		171	1/2+	−59.210	1.92 y *1*	β−
		172	2−	−57.373	63.6 h *2*	β−
		173	(1/2+)	−56.253	8.24 h *8*	β−
		174	(4)−	−53.86	5.4 m *1*	β−
		174m	0+	−53.61	2.29 s *1*	IT 99%, β−<1%
		175	(1/2+)	−52.31	15.2 m *5*	β−
		176	(4+)	−49.4	1.9 m *1*	β−
		177m	(7/2−)	−47.5s	90 s *6*	β−
		178		−44.1s	>300 ns	β−
		179		−41.6s		β−?
70	**Yb**	148	0+	−30.2s		ε?
		149	(1/2+,3/2+)	−33.2s	0.7 s *2*	ε, εp
		150	0+	−38.6s	≥200 ns	ε?
		151	(1/2+)	−41.5	1.6 s *1*	ε, εp>0%
		151m	(11/2−)	−41.5	1.6 s *1*	ε, IT=0.4%, εp
		152	0+	−46.3	3.03 s *6*	ε, εp
		153	7/2−	−47.1s	4.2 s *2*	α 60%, ε 40%
		154	0+	−49.93	0.409 s *2*	α 92.6%, ε 7.4%
		155	(7/2−)	−50.50	1.793 s *19*	α 89%, ε 11%
		156	0+	−53.265	26.1 s *7*	ε 90%, α 10%
		157	7/2−	−53.43	38.6 s *10*	ε 99.5%, α 0.5%
		158	0+	−56.008	1.49 m *13*	α=2.1×10^{-3}%, ε
		159	5/2(−)	−55.84	1.67 m *9*	ε
		160	0+	−58.16	4.8 m *2*	ε
		161	3/2−	−57.84	4.2 m *2*	ε
		162	0+	−59.83	18.87 m *19*	ε
		163	3/2−	−59.30	11.05 m *35*	ε
		164	0+	−61.02	75.8 m *17*	ε
		165	5/2−	−60.29	9.9 m *3*	ε
		166	0+	−61.594	56.7 h *1*	ε
		167	5/2−	−60.588	17.5 m *2*	ε
		168	0+	−61.580	**0.123%** ***3***	
		169	7/2+	−60.376	32.018 d *5*	ε
		169m	1/2−	−60.352	46 s *2*	IT
		170	0+	−60.763	**2.982%** ***39***	
		171	1/2−	−59.306	**14.09%** ***14***	
		171m	7/2+	−59.211	5.25 ms *24*	IT
		172	0+	−59.255	**21.68%** ***13***	
		173	5/2−	−57.551	**16.103%** ***63***	
		174	0+	−56.944	**32.026%** ***80***	
		175	(7/2−)	−54.695	4.185 d *1*	β−
		175m	1/2−	−54.180	68.2 ms *3*	IT
		176	0+	−53.488	**12.996%** ***83***	
		176m	8−	−52.438	11.4 s *3*	IT

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
70	**Yb**	177	(9/2+)	–50.983	1.911 h *3*	β–
		177m	(1/2–)	–50.652	6.41 s *2*	IT
		178	0+	–49.69	74 m *3*	β–
		179	(1/2–)	–46.4s	8.0 m *4*	β–
		180	0+	–44.4s	2.4 m *5*	β–
		181		–40.8s		β–?
71	**Lu**	150	(2+)	–24.6s	45 ms *3*	p 70.9%, ε 29.1%
		151	11/2–	–30.1s	80.6 ms *20*	p 63.4%, ε 36.6%
		152	(4–,5–,6–)	–33.4s	0.7 s *1*	ε , εp 15%
		153	11/2–	–38.4	0.9 s *2*	α=70%, ε=30%
		154	(2–)	–39.6s		
		154m	(9+)	–39.6s	1.12 s *8*	ε
		155	11/2–	–42.55	68 ms *1*	α 90%, ε 10%
		155m	1/2+	–42.53	138 ms *8*	α 76%, ε 24%
		155m	(25/2–)	–40.77	2.69 ms *3*	α
		156	(2)–	–43.75	494 ms *12*	α=95%, ε=5%
		156m	9+	–43.75	198 ms *2*	α
		157	(1/2+,3/2+)	–46.46	6.8 s *18*	α>0%
		157m	(11/2–)	–46.43	4.79 s *12*	ε 94%, α 6%
		158		–47.21	10.6 s *3*	ε 99.09%, α 0.91%
		159		–49.71	12.1 s *10*	ε , α 0.1%
		160		–50.27	36.1 s *3*	ε , α≤1.0×10^{-4}%
		160m		–50.27	40 s *1*	ε≤100%, α
		161	1/2+	–52.56	77 s *2*	ε
		161m	(9/2–)	–52.40	7.3 ms *4*	IT
		162	1–	–52.84	1.37 m *2*	ε≤100%
		162m		–52.84	1.9 m	ε≤100%
		162m	(4–)	–52.84	1.5 m	ε≤100%
		163	1/2(+)	–54.79	3.97 m *13*	ε
		164	1(–)	–54.64	3.14 m *3*	ε
		165	1/2+	–56.44	10.74 m *10*	ε
		166	6–	–56.02	2.65 m *10*	ε
		166m	3(–)	–55.99	1.41 m *10*	ε 58%, IT 42%
		166m	0–	–55.98	2.12 m *10*	ε>80%, IT<20%
		167	7/2+	–57.50	51.5 m *10*	ε
		167m	1/2+	–57.50	≥1 m	ε , IT
		168	6(–)	–57.07	5.5 m *1*	ε
		168m	3+	–56.87	6.7 m *4*	ε>99.6%, IT<0.8%
		169	7/2+	–58.083	34.06 h *5*	ε
		169m	1/2–	–58.054	160 s *10*	IT
		170	0+	–57.30	2.012 d *20*	ε
		170m	(4)–	–57.21	0.67 s *10*	IT
		171	7/2+	–57.828	8.24 d *3*	ε
		171m	1/2–	–57.757	79 s *2*	IT
		172	4–	–56.736	6.70 d *3*	ε
		172m	1–	–56.694	3.7 m *5*	IT
		173	7/2+	–56.881	1.37 y *1*	ε
		174	(1)–	–55.570	3.31 y *5*	ε
		174m	(6)–	–55.399	142 d *2*	IT 99.38%, ε 0.62%
		175	7/2+	–55.166	**97.401% *13***	
		176	7–	–53.382	3.76×10^{10} y *7*	β–
					2.599% *13*	

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
71	**Lu**	176m	1−	−53.259	3.664 h *19*	β− 99.9%, ε 0.09%
		177	7/2+	−52.384	6.647 d *4*	β−
		177m	23/2−	−51.414	160.44 d *6*	β− 78.6%, IT 21.4%
		177m	(39/2−)	−49.644	6 m *+3−2*	β−, IT?
		178	1(+)	−50.338	28.4 m *2*	β−
		178m	(9−)	−50.214	23.1 m *3*	β−
		179	7/2+	−49.059	4.59 h *6*	β−
		179m	1/2+	−48.467	3.1 ms *9*	IT
		180	5+	−46.68	5.7 m *1*	β−
		181	(7/2+)	−44.7s	3.5 m *3*	β−
		182		−41.9s	2.0 m *2*	β−
		183	(7/2+)	−39.5s	58 s *4*	β−
		184	(3+)	−36.4s	19 s *2*	β−
72	**Hf**	153		−27.3s	>60 ns	ε?
		154	0+	−32.7s	2 s *1*	ε, α?
		155		−34.1s	0.84 s *3*	ε
		156	0+	−37.9	23 ms *1*	α
		156m	8+	−35.9	0.52 ms *1*	α
		157	7/2−	−38.8s	110 ms *6*	α 86%, ε 14%
		158	0+	−42.10	2.85 s *7*	ε 55.7%, α 44.3%
		159	7/2−	−42.85	5.6 s *4*	ε 65%, α 35%
		160	0+	−45.938	13.6 s *2*	ε 99.3%, α 0.7%
		161		−46.32	18.2 s *5*	ε>99.87%, α<0.13%
		162	0+	−49.166	39.4 s *9*	ε 99.99%, α 8.0×10^{-3}%
		163		−49.29	40.0 s *6*	ε, α $<1.0\times10^{-4}$%
		164	0+	−51.83	111 s *8*	ε
		165	(5/2−)	−51.63	76 s *4*	ε
		166	0+	−53.86	6.77 m *30*	ε
		167	(5/2)−	−53.47	2.05 m *5*	ε
		168	0+	−55.36	25.95 m *20*	ε
		169	5/2−	−54.72	3.24 m *4*	ε
		170	0+	−56.25	16.01 h *13*	ε
		171	7/2+	−55.43	12.1 h *4*	ε
		171m	1/2−	−55.41	29.5 s *9*	IT≤100%, ε
		172	0+	−56.40	1.87 y *3*	ε
		173	1/2−	−55.41	23.6 h *1*	ε
		174	0+	−55.845	2.0×10^{15} y *4* **0.16%** ***1***	α
		175	5/2(−)	−54.482	70 d *2*	ε
		176	0+	−54.576	**5.26%** ***7***	
		177	7/2−	−52.885	**18.60%** ***9***	
		177m	23/2+	−51.569	1.09 s *5*	IT
		177m	37/2−	−50.145	51.4 m *5*	IT
		178	0+	−52.439	**27.28%** ***7***	
		178m	8−	−51.292	4.0 s *2*	IT
		178m	16+	−49.993	31 y *1*	IT
		179	9/2+	−50.467	**13.62%** ***2***	
		179m	1/2−	−50.092	18.67 s *4*	IT
		179m	25/2−	−49.361	25.05 d *25*	IT
		180	0+	−49.783	**35.08%** ***16***	
		180m	8−	−48.641	5.47 h *4*	IT 99.7%, β− 0.3%

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
72	Hf	181	1/2−	−47.407	42.39 d *6*	β−
		181m	(25/2−)	−45.665	1.5 ms *5*	IT
		182	0+	−46.053	8.90×10^{6} y *9*	β−
		182m	(8−)	−44.880	61.5 m *15*	β− 54%, IT 46%
		183	(3/2−)	−43.29	1.018 h *2*	β−
		184	0+	−41.50	4.12 h *5*	β−
		184m	(8−)	−40.23	48 s *10*	IT
		185		−38.4s	3.5 m *6*	β−
		186	0+	−36.4s	2.6 m *12*	β−
		187m		−32.8s	0.27 µs *8*	β−
		188	0+	−30.9s		β−
		189				
73	Ta	155m	11/2−	−24.0s	2.9 ms *+15−11*	p
		156	(2−)	−25.8s	144 ms *24*	p , ε
		156m	9+	−25.7s	0.36 s *4*	ε 95.8%, p 4.2%
		157	1/2+	−29.6	10.1 ms *4*	α 96.6%, p 3.4%
		157m	11/2−	−29.6	4.3 ms *1*	α
		157m	(25/2−)	−28.0	1.7 ms *1*	α
		158	(2−)	−31.0s	55 ms *15*	α=91%, ε=9%
		158m	(9+)	−30.9s	36.7 ms *15*	α 95%, ε 5%
		159	1/2+	−34.44	0.83 s *18*	ε 66%, α 34%
		159m	11/2−	−34.38	0.56 s *6*	α 55%, ε 45%
		160		−35.87	1.55 s *4*	ε 66%, α 34%
		160m		−35.87	1.7 s *2*	
		161	(1/2+)	−38.71		ε , α
		161m	(11/2−)	−38.71	3.08 s *11*	ε , α
		162		−39.78	3.57 s *12*	ε 99.93%, α 0.07%
		163		−42.54	10.6 s *18*	ε=99.8%, α=0.2%
		164	(3+)	−43.28	14.2 s *3*	ε
		165		−45.85	31.0 s *15*	ε
		166	(2)+	−46.10	34.4 s *5*	ε
		167	(3/2+)	−48.35	80 s *4*	ε
		168	(2−,3+)	−48.39	2.0 m *1*	ε
		169	(5/2+)	−50.29	4.9 m *4*	ε
		170	(3+)	−50.14	6.76 m *6*	ε
		171	(5/2−)	−51.72	23.3 m *3*	ε
		172	(3+)	−51.33	36.8 m *3*	ε
		173	5/2−	−52.40	3.14 h *13*	ε
		174	3+	−51.74	1.14 h *8*	ε
		175	7/2+	−52.41	10.5 h *2*	ε
		176	(1)−	−51.37	8.09 h *5*	ε
		177	7/2+	−51.719	56.56 h *6*	ε
		178m	(1+)	−50.50	9.31 m *3*	ε
		178m	7−	−50.50	2.36 h *8*	ε
		178m	15−	−49.03	58 ms *4*	IT
		178m	(21−)	−47.60	290 ms *12*	IT
		179	7/2+	−50.361	1.82 y *3*	ε
		179m	(25/2+)	−49.044	9.0 ms *2*	IT
		179m	(37/2+)	−47.722	54.1 ms *17*	IT
		180	1+	−48.936	8.154 h *6*	ε 86%, β− 14%
		180m	9−	−48.859	$>1.2\times10^{15}$ y	ε ?
					0.01201% *32*	

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
73	**Ta**	180m	9−	−48.859	$>1.2\times10^{15}$ y	β−?
					0.01201% *32*	
		181	7/2+	−48.441	**99.98799% *32***	
		182	3−	−46.433	114.74 d *12*	β−
		182m	5+	−46.417	283 ms *3*	IT
		182m	10−	−45.913	15.84 m *10*	IT
		183	7/2+	−45.296	5.1 d *1*	β−
		184	(5−)	−42.84	8.7 h *1*	β−
		185	(7/2+)	−41.40	49.4 m *15*	β−
		185m	(21/2)	−40.14	>1 ms	
		186	(2−,3−)	−38.61	10.5 m *3*	β−
		186m		−38.61	1.54 m *5*	β−
		187	(7/2+)	−36.8s	2.3 m *6*	β−
		187m	(27/2−)	−35.0s	22 s *9*	β−?, IT?
		187m	(41/2+)	−33.8s	>5 m	β−?, IT?
		188		−33.7s	19.6 s *20*	β−
		189?		−31.8s	1.6 μs *2*	β−?
		190		−28.7s	5.3 s *7*	β−
		191		−26.5s	>300 ns	β−?
		192	(1,2)	−23.1s	2.2 s *7*	β−
74	**W**	157	(7/2−)	−19.3s	275 ms *40*	ε
		158	0+	−23.7s	1.25 ms *21*	α
		158m	(8+)	−21.8s	0.143 ms *19*	IT, α
		159		−25.2s	7.3 ms *27*	α=99.9%, ε=0.1%
		160	0+	−29.4	91 ms *5*	α 87%
		161		−30.4s	409 ms *18*	α 73%, ε 27%
		162	0+	−34.00	1.36 s *7*	ε 54.8%, α 45.2%
		163	7/2−	−34.91	2.67 s *10*	ε 86%, α 14%
		164	0+	−38.235	6.3 s *2*	ε 96.2%, α 3.8%
		165	(5/2−)	−38.86	5.1 s *5*	ε, α<0.2%
		166	0+	−41.88	19.2 s *6*	ε 99.96%, α 0.04%
		167	(+)	−42.09	19.9 s *5*	ε 99.96%, α 0.04%
		168	0+	−44.90	50.9 s *19*	ε, $\alpha\ 3.2\times10^{-3}$%
		169	(5/2−)	−44.92	74 s *6*	ε
		170	0+	−47.29	2.42 m *4*	ε
		171	(5/2−)	−47.09	2.38 m *4*	ε
		172	0+	−49.10	6.6 m *9*	ε
		173	5/2−	−48.73	7.6 m *2*	ε
		174	0+	−50.23	33.2 m *21*	ε
		175	(1/2−)	−49.63	35.2 m *6*	ε
		176	0+	−50.64	2.5 h *1*	ε
		177	1/2−	−49.70	132 m *2*	ε
		178	0+	−50.41	21.6 d *3*	ε
		179	7/2−	−49.29	37.05 m *16*	ε
		179m	1/2−	−49.07	6.40 m *7*	IT 99.71%, ε 0.29%
		180	0+	−49.636	$\geq6.6\times10^{17}$ y	2ε
					0.12% *1*	
		181	9/2+	−48.253	121.2 d *2*	ε
		182	0+	−48.247	**26.50% *16***	
		183	1/2−	−46.367	$>1.3\times10^{19}$ y	α
					14.31% *4*	
		183m	11/2+	−46.057	5.2 s *3*	IT

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
74	**W**	184	0+	–45.707	**30.64%** *2*	
		185	3/2–	–43.389	75.1 d *3*	β–
		185m	11/2+	–43.192	1.67 m *3*	IT
		186	0+	–42.510	$>2.3\times10^{19}$ y	2β–
					28.43% *19*	
		186m	(16+)	–38.967	>3 ms	IT
		187	3/2–	–39.906	24.000 h *4*	β–
		188	0+	–38.669	69.78 d *5*	β–
		189	(3/2–)	–35.5	10.7 m *5*	β–
		190	0+	–34.3	30.0 m *15*	β–
		190m	(10–)	–31.9	≤3.1 ms	IT
		191		–31.1s	>300 ns	β–?
		192	0+	–29.6s		β–?
		193		–26.2s	>300 ns	β–?
		194	0+	–24.4s	>300 ns	β–?
75	**Re**	159	(1/2+)	–14.8s		
		160	(2–)	–16.7s	0.82 ms *+15–9*	p 91%, α 9%
		161	1/2+	–20.9	0.44 ms *1*	p , α≤1.4%
		161m	11/2–	–20.8	14.7 ms *3*	α 93%, p 7%
		162	(2–)	–22.4s	107 ms *13*	α 94%, ε 6%
		162m	(9+)	–22.2s	77 ms 9	α 91%, ε 9%
		163	1/2+	–26.01	390 ms *72*	ε 68%, α 32%
		163m	11/2–	–25.89	214 ms *5*	α 66%, ε 34%
		164		–27.52	0.85 s *+14–11*	α=58%, ε=42%
		164m		–27.45	0.86 s *+15–11*	IT, α=3%
		165	(1/2+)	–30.65	=1 s	α, ε
		165m	(11/2–)	–30.60	2.1 s *3*	ε 87%, α 13%
		166		–31.89	2.25 s *21*	ε>76%, α<24%
		167	(9/2–)	–34.84s	5.9 s *3*	ε=99%, α=1%
		167m		–34.84s	3.4 s *4*	α
		168	(7+)	–35.79	4.4 s *1*	ε , $\alpha=5.0\times10^{-3}$%
		169	(9/2–)	–38.41	8.1 s *5*	ε , α<0.01%
		169m	(5/2+,3/2+)	–38.41	15.1 s *15*	ε , IT, α=0.2%
		170	(5+)	–38.92	9.2 s *2*	ε
		171	(9/2–)	–41.25	15.2 s *4*	ε
		172m	(2)	–41.52	55 s *5*	ε
		172m	(5)	–41.52	15 s *3*	ε
		173	(5/2–)	–43.55	1.98 m *26*	ε
		174	(≤ 4)	–43.67	2.40 m *4*	ε
		175	(5/2–)	–45.29	5.89 m *5*	ε
		176	(3+)	–45.06	5.3 m *3*	ε
		177	5/2–	–46.27	14 m *1*	ε
		178	(3+)	–45.65	13.2 m *2*	ε
		179	5/2+	–46.58	19.5 m *1*	ε
		179m	7/2,49/2+	–41.18	0.466 ms *15*	IT
		180	(1)–	–45.84	2.44 m *6*	ε
		181	5/2+	–46.52	19.9 h *7*	ε
		182	7+	–45.4	64.0 h *5*	ε
		182m	2+	–45.4	12.7 h *2*	ε
		183	5/2+	–45.811	70.0 d *14*	ε
		183m	(25/2)+	–43.903	1.04 ms *4*	IT
		184	3(–)	–44.224	35.4 d *7*	ε

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
75	**Re**	184m	8(+)	–44.036	169 d *8*	IT 74.5%, ε 25.5%
		185	5/2+	–43.822	**37.40% *2***	
		186	1–	–41.930	3.7186 d *5*	β– 92.53%, ε 7.47%
		186m	(8+)	–41.781	2.0×10^{5} y	IT
		187	5/2+	–41.218	4.33×10^{10} y *7* **62.60% *2***	β–, α<1.0×10^{-4}%
		188	1–	–39.018	17.003 h *3*	β–
		188m	(6)–	–38.846	18.59 m *4*	IT
		189	5/2+	–37.980	24.3 h *4*	β–
		190	(2)–	–35.6	3.1 m *3*	β–
		190m	(6–)	–35.4	3.2 h *2*	β– 54.4%, IT 45.6%
		191	(3/2+,1/2+)	–34.35	9.8 m *5*	β–
		192		–31.8s	16 s *1*	β–
		193?		–30.2s		
		194m		–27.4s	5 s *1*	β–
		194m		–27.4s	25 s *8*	β–
		194m		–27.4s	100 s *10*	β–
		195		–25.6s	6 s *1*	β–
		196		–22.5s	3 s *+1–2*	β–
		198				
76	**Os**	161	(7/2–)	–9.9s	0.64 ms *6*	α
		162	0+	–14.5s	2.1 ms *1*	α=99%
		163	(7/2–)	–16.1s	5.5 ms *6*	α, ε
		164	0+	–20.5	21 ms *1*	α 98%, ε 2%
		165	(7/2–)	–21.6s	71 ms *3*	α>60%, ε<40%
		166	0+	–25.44	199 ms *3*	α 72%, ε 18%
		167	(7/2–)	–26.50	0.81 s *6*	α 57%, ε 43%
		168	0+	–29.992	2.1 s *1*	ε 57%, α 43%
		169	(5/2–)	–30.72	3.43 s *14*	ε 86.3%, α 13.7%
		170	0+	–33.92	7.37 s *18*	ε 90.5%, α 9.5%
		171	(5/2–)	–34.29	8.3 s *2*	ε 98.2%, α 1.8%
		172	0+	–37.24	19.2 s 9	ε 99.8%, α 0.2%
		173	(5/2–)	–37.44	22.4 s *9*	ε , α 0.4%
		174	0+	–40.00	44 s *4*	ε 99.98%, α 0.02%
		175	(5/2–)	–40.11	1.4 m *1*	ε
		176	0+	–42.10	3.6 m *5*	ε
		177	1/2–	–41.95	3.0 m *2*	ε
		178	0+	–43.55	5.0 m *4*	ε , α
		179	1/2–	–43.02	6.5 m *3*	ε
		180	0+	–44.35	21.5 m *4*	ε
		181	1/2–	–43.55	105 m *3*	ε
		181m	7/2–	–43.50	2.7 m *1*	ε , IT≤3%
		182	0+	–44.61	21.84 h *20*	ε
		182m	(8)–	–42.78	0.78 ms *7*	IT
		183	9/2+	–43.66	13.0 h *5*	ε
		183m	1/2–	–43.49	9.9 h *3*	ε 85%, IT 15%
		184	0+	–44.256	$>5.6\times10^{13}$ y **0.02% *1***	α
		185	1/2–	–42.809	93.6 d *5*	ε
		186	0+	–43.002	2.0×10^{15} y *11* **1.59% *3***	α
		187	1/2–	–41.220	**1.96% *2***	

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
76	**Os**	188	0+	–41.139	**13.24%** ***8***	
		189	3/2–	–38.988	**16.15%** ***5***	
		189m	9/2–	–38.957	5.81 h *6*	IT
		190	0+	–38.709	**26.26%** ***2***	
		190m	(10)–	–37.004	9.9 m *1*	IT
		191	9/2–	–36.396	15.4 d *1*	β–
		191m	3/2–	–36.322	13.10 h *5*	IT
		192	0+	–35.883	**40.78%** ***19***	
		192m	(10–)	–33.868	5.9 s *1*	IT>87%, β–<13%
		193	3/2–	–33.395	30.11 h *1*	β–
		194	0+	–32.437	6.0 y *2*	β–
		195		–29.7	≈9 m	β–
		196	0+	–28.28	34.9 m *2*	β–
		197		–25.3s	2.8 m *6*	β–
		198	0+	–23.8s		β–
		199		–20.5s	5 s *+4–2*	β–
		200	0+	–18.9s	6 s *+4–3*	β–
		201			>300 ns	β–?
		202	0+		>300 ns	β–?
77	**Ir**	164m	(9+)	–7.3s	94 μs *27*	p>0%, α, ε
		165	(1/2+)	–11.6s	<1 μs	p?, α?
		165m	11/2–	–11.4s	0.30 ms *6*	p 87%, α 13%
		166	(2–)	–13.2s	10.5 ms *22*	α 93%, p 7%
		166m	(9+)	–13.0s	15.1 ms *9*	α 98.2%, p 1.8%
		167	1/2+	–17.08	35.2 ms *20*	α 48%, p 32%, ε 20%
		167m	11/2–	–16.90	25.7 ms *8*	α 80%, ε 20%, p 0.4%
		168		–18.72	222 ms *+60–40*	α≤100%, ε, p
		168m		–18.72	159 ms *+16–13*	α 77%, ε≤23%, p
		169	(1/2+)	–22.08	0.353 s *4*	α 45%, ε, p
		169m	(11/2–)	–21.93	0.281 s *4*	α 72%, ε, p
		170	(3–)	–23.36s	0.87 s *+18–12*	ε 94.8%, α 5.2%
		170m	(8+)	–23.36s	811 ms *18*	IT≤62%, ε≤62%, α 38%
		171	(1/2+)	–26.43	3.2 s *+13–7*	α>0%, p, ε
		171m	(11/2–)	–26.43	1.40 s *10*	α 58%, p≤42%, ε≤42%
		172	(3+)	–27.38	4.4 s *3*	ε 98%, α=2%
		172m	(7+)	–27.24	2.0 s *1*	ε 77%, α 23%
		173	(3/2+,5/2+)	–30.27	9.0 s *8*	ε>93%, α<7%
		173m	(11/2–)	–30.04	2.4 s *9*	ε, α 7%
		174	(3+)	–30.87	7.9 s *6*	ε 99.5%, α 0.5%
		174m	(7+)	–30.67	4.9 s *3*	ε 97.5%, α 2.5%
		175	(5/2–)	–33.39	9 s *2*	ε 99.15%, α 0.85%
		176		–33.86	8.7 s *5*	ε 96.9%, α 3.1%
		177	5/2–	–36.05	30 s *2*	ε 99.94%, α 0.06%
		178		–36.25	12 s *2*	ε
		179	(5/2)–	–38.08	79 s *1*	ε
		180	(4,5)	–37.98	1.5 m *1*	ε
		181	5/2–	–39.47	4.90 m *15*	ε
		182	3+	–39.05	15 m *1*	ε
		183	5/2–	–40.20	57 m *4*	ε
		184	5–	–39.61	3.09 h *3*	ε

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
77	**Ir**	185	5/2−	−40.33	14.4 h *1*	ε
		186	5+	−39.17	16.64 h *3*	ε
		186m	2−	−39.17	1.90 h *5*	ε=75%, IT=25%
		187	3/2+	−39.532	10.5 h *3*	ε
		187m	9/2−	−39.346	30.3 ms *6*	IT
		188	1−	−38.351	41.5 h *5*	ε
		188m		−37.428	4.2 ms *2*	ε?, IT
		189	3/2+	−38.46	13.2 d *1*	ε
		189m	11/2−	−38.08	13.3 ms *3*	IT
		189m	(25/2)+	−36.12	3.7 ms *2*	IT
		190	4−	−36.755	11.78 d *10*	ε
		190m	(1−)	−36.729	1.120 h *3*	IT
		190m	(11)−	−36.379	3.087 h *12*	ε 91.4%, IT 8.6%
		191	3/2+	−36.710	**37.3% *2***	
		191m	11/2−	−36.539	4.899 s *23*	IT
		191m		−34.663	5.5 s *7*	IT
		192	4+	−34.837	73.829 d *11*	β− 95.24%, ε 4.76%
		192m	1−	−34.780	1.45 m *5*	IT 99.98%, β− 0.02%
		192m	(11−)	−34.669	241 y *9*	IT
		193	3/2+	−34.538	**62.7% *2***	
		193m	11/2−	−34.458	10.53 d *4*	IT
		194	1−	−32.533	19.28 h *13*	β−
		194m	4+	−32.386	31.85 ms *24*	IT
		194m	(10,11)	−32.343	171 d *11*	β−
		195	3/2+	−31.694	2.5 h *2*	β−
		195m	11/2−	−31.594	3.8 h *2*	β− 95%, IT 5%
		196	(0−)	−29.44	52 s *1*	β−
		196m	(10,11−)	−29.03	1.40 h *2*	β−, IT<0.3%
		197	3/2+	−28.26	5.8 m *5*	β−
		197m	11/2−	−28.15	8.9 m *3*	β− 99.75%, IT 0.25%
		198		−25.8s	8 s *1*	β−
		199		−24.40	6 s *+5−4*	β−
		200		−21.6s	>300 ns	β−
		201		−19.9s	>300 ns	β−
		202	(1−,2−)	−17.0s	11 s *3*	β−
		203			>300 ns	β−?
		204				
78	**Pt**	166	0+	−4.8s	300 μs *100*	α
		167		−6.5s	0.9 ms *3*	α
		168	0+	−11.0	2.02 ms *10*	α
		169	(7/2−)	−12.4s	7.0 ms *2*	α
		170	0+	−16.30	13.8 ms *5*	α 98%, ε
		171	(7/2−)	−17.47	45.5 ms *25*	α 90%, ε 10%
		172	0+	−21.10	97.6 ms *13*	α 94%, ε 6%
		173	(5/2−)	−21.94	382 ms *2*	α, ε?
		174	0+	−25.31	0.889 s *17*	α 76%, ε 24%
		175	7/2−	−25.69	2.53 s *6*	α 64%, ε 36%
		176	0+	−28.93	6.33 s *15*	ε 60%, α 40%
		177	5/2−	−29.37	10.6 s *4*	ε 94.3%, α 5.7%
		178	0+	−32.00	20.7 s *7*	ε 92.3%, α 7.7%
		179	1/2−	−32.270	21.2 s *4*	ε 99.76%, α 0.24%
		180	0+	−34.44	56 s *2*	ε, α=0.3%

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
78	**Pt**	181	1/2−	−34.37	52.0 s *22*	ε , α=0.08%
		182	0+	−36.17	2.67 m *12*	ε 99.96%, α 0.04%
		183	1/2−	−35.77	6.5 m *10*	ε , α=1.3×10^{-3}%
		183m	(7/2)−	−35.74	43 s *5*	ε , α<4.0×10^{-4}%, IT
		184	0+	−37.33	17.3 m *2*	ε , α=1.0×10^{-3}%
		184m	8−	−35.49	1.01 ms *5*	IT
		185	9/2+	−36.68	70.9 m *24*	ε<100%
		185m	1/2−	−36.58	33.0 m *8*	ε 99%, IT<2%
		186	0+	−37.86	2.08 h *5*	ε , α=1.4×10^{-4}%
		187	3/2−	−36.71	2.35 h *3*	ε
		188	0+	−37.828	10.2 d *3*	ε , α 2.6×10^{-5}%
		189	3/2−	−36.49	10.87 h *12*	ε
		190	0+	−37.325	6.5×10^{11} y *3*	α
					0.012% ***2***	
		191	3/2−	−35.701	2.83 d *2*	ε
		192	0+	−36.292	**0.782%** ***24***	
		193	1/2−	−34.481	50 y *6*	ε
		193m	13/2+	−34.331	4.33 d *3*	IT
		194	0+	−34.762	**32.86%** ***40***	
		195	1/2−	−32.796	**33.78%** ***24***	
		195m	13/2+	−32.537	4.010 d *5*	IT
		196	0+	−32.646	**25.21%** ***34***	
		197	1/2−	−30.421	19.8915 h *19*	β−
		197m	13/2+	−30.021	95.41 m *18*	IT 96.7%, β− 3.3%
		198	0+	−29.905	**7.36%** ***13***	
		199	5/2−	−27.390	30.80 m *21*	β−
		199m	(13/2)+	−26.966	13.6 s *4*	IT
		200	0+	−26.60	12.6 h *3*	β−
		201	(5/2−)	−23.74	2.5 m *1*	β−
		202	0+	−22.6s	44 h *15*	β−
		202m	(7−)	−20.8s	0.28 ms *+42−19*	IT
		203	(1/2−)	−19.7s	10 s *3*	β−
		204	0+	−18.1s	10.3 s *14*	β−
		205		−12.8s	>300 ns	β−
79	**Au**	169		−1.8s		p ?, α ?
		170	(2−)	−3.6s	286 µs *+50−40*	p 89%, α 11%
		170m	(9+)	−3.6s	617 µs *+50−40*	p 58%, α 42%
		171	(1/2+)	−7.57	17 µs *+9−5*	p , α
		171m	(11/2−)	−7.32	1.02 ms *10*	α 54%, p 46%
		172		−9.37	22 ms *+6−4*	α , ε , p
		172m		−9.37	7.7 ms *14*	α , p<0.02%, ε
		173	(1/2+)	−12.82	25 ms *1*	α 94%, ε , p
		173m	(11/2−)	−12.61	14.0 ms *9*	α 92%, p , ε
		174		−14.24s	139 ms *3*	α>0%
		175	(1/2+)	−17.44		ε ?, α ?
		175m	(11/2−)	−17.44	156 ms *5*	α 94%, ε 6%
		176		−18.40		
		176m	(3−)	−18.40	1.05 s *1*	ε , α
		176m	(9+)	−18.40	1.36 s *2*	
		177	(1/2+,3/2+)	−21.55	1.53 s *7*	α 40%, ε
		177m	11/2−	−21.39	1.00 s *20*	α 66%, ε
		178		−22.33	2.6 s *5*	ε≤60%, α≥40%

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
79	**Au**	179	(1/2+,3/2+)	–24.98	7.1 s *3*	ε 78%, α 22%
		180		–25.60	8.1 s *3*	ε ≤ 98.2%, α ≥ 1.8%
		181	(3/2–)	–27.87	13.7 s *14*	ε 97.3%, α 2.7%
		182	(2+)	–28.30	15.5 s *4*	ε 99.87%, α 0.13%
		183	(5/2)–	–30.19	42.8 s *10*	ε 99.45%, α 0.55%
		184	5+	–30.32	20.6 s *9*	ε , α ≤ 0.02%
		184m	2+	–30.25	47.6 s *14*	ε 70%, IT 30%, α ≤ 0.02%
		185	5/2–	–31.87	4.25 m *6*	ε 99.74%, α 0.26%
		185m		–31.87	6.8 m *3*	ε < 100%, IT
		186	3–	–31.71	10.7 m *5*	ε , α 8.0×10^{-4}%
		187	1/2(+)	–33.01	8.3 m *2*	ε , α 3.0×10^{-3}%
		187m	9/2(–)	–32.88	2.3 s *1*	IT
		188	1(–)	–32.30	8.84 m *6*	ε
		189	1/2+	–33.58	28.7 m *3*	ε , α < 3.0×10^{-5}%
		189m	11/2–	–33.33	4.59 m *11*	ε
		190	1–	–32.88	42.8 m *10*	ε , α < 1.0×10^{-6}%
		190m	(11–)	–32.88	125 ms *20*	IT
		191	3/2+	–33.81	3.18 h *8*	ε
		191m	(11/2–)	–33.54	0.92 s *11*	IT
		192	1–	–32.78	4.94 h *9*	ε
		192m	(5)+	–32.64	29 ms	IT
		192m	(11–)	–32.34	160 ms *20*	IT
		193	3/2+	–33.405	17.65 h *15*	ε
		193m	11/2–	–33.115	3.9 s *3*	IT 99.97%, ε = 0.03%
		194	1–	–32.26	38.02 h *10*	ε
		194m	(5+)	–32.15	600 ms *8*	IT
		194m	(11–)	–31.79	420 ms *10*	IT
		195	3/2+	–32.569	186.098 d *47*	ε
		195m	11/2–	–32.250	30.5 s *2*	IT
		196	2–	–31.139	6.1669 d *6*	ε 93%, β– 7%
		196m	5+	–31.054	8.1 s *2*	IT
		196m	12–	–30.543	9.6 h *1*	IT
		197	3/2+	–31.140	**100%**	
		197m	11/2–	–30.731	7.73 s *6*	IT
		198	2–	–29.581	2.6948 d *12*	β–
		198m	(12–)	–28.769	2.272 d *16*	IT
		199	3/2+	–29.094	3.139 d *7*	β–
		199m	(11/2)–	–28.545	0.44 ms *3*	IT
		200	(1–)	–27.27	48.4 m *3*	β–
		200m	12–	–26.31	18.7 h *5*	β– 84%, IT 16%
		201	3/2+	–26.401	26.0 m *8*	β–
		202	(1–)	–24.4	28.4 s *12*	β–
		203	3/2+	–23.143	60 s *6*	β–
		204	(2–)	–20.8s	39.8 s *9*	β–
		205	(3/2+)	–18.9s	32.5 s *14*	β–
		205m	(11/2–)	–18.0s	6 s *2*	β–, IT
		206		–14.3s	>300 ns	β–
		207		–10.8s	>300 ns	β–, β–n
		208		–6.1s	>300 ns	β–, β–n
		209		–2.5s	>300 ns	β–, β–n
		210		2.3s	>300 ns	β–, β–n

Nuclide Z El A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
80 Hg 171		3.5s	59 µs *+36–16*	α
172	0+	–1.1	231 µs *9*	α
173		–2.6s	0.6 ms *+5–2*	α
174	0+	–6.65	2.1 ms *+18–7*	α 99.6%
175	(7/2–)	–7.97	10.6 ms *4*	α
176	0+	–11.78	20.3 ms *14*	α 94%
177	(7/2–)	–12.78	118 ms *8*	α
178	0+	–16.31	266.5 ms *24*	α=70%, ε=30%
179	(7/2–)	–16.92	1.05 s *3*	α 55%, ε 45%, εp=0.15%
180	0+	–20.25	2.58 s *1*	ε 52%, α 48%
181	1/2–	–20.66	3.6 s *1*	ε 73%, α 27%, εp 0.01%, εα 9.0×10^{-6}%
182	0+	–23.576	10.83 s *6*	ε 84.8%, α 15.2%
183	1/2–	–23.806	9.4 s *7*	ε 88.3%, α 11.7%, εp 2.6×10^{-4}%
184	0+	–26.35	30.87 s *26*	ε 98.89%, α 1.11%
185	1/2–	–26.17	49.1 s *10*	ε 94%, α 6%
185m	13/2+	–26.08	21.6 s *15*	IT 54%, ε 46%, α=0.03%
186	0+	–28.54	1.38 m *6*	ε 99.98%, α 0.02%
187	3/2(–)	–28.12	2.4 m *3*	ε, α<3.7×10^{-4}%
187m	13/2(+)	–28.12	1.9 m *3*	ε, α<3.7×10^{-4}%
188	0+	–30.20	3.25 m *15*	ε, α 3.7×10^{-5}%
189	3/2–	–29.63	7.6 m *1*	ε, α<3.0×10^{-5}%
189m	13/2+	–29.63	8.6 m *1*	ε, α<3.0×10^{-5}%
190	0+	–31.37	20.0 m *5*	ε, α<3.4×10^{-7}%
191	3/2(–)	–30.59	49 m *10*	ε, α 5.0×10^{-6}%
191m	13/2(+)	–30.59	50.8 m *15*	ε
192	0+	–32.01	4.85 h *20*	ε
193	3/2(–)	–31.06	3.80 h *15*	ε
193m	13/2(+)	–30.92	11.8 h *2*	ε 92.8%, IT 7.2%
194	0+	–32.19	444 y *77*	ε
195	1/2–	–31.00	10.53 h *3*	ε
195m	13/2+	–30.82	41.6 h *8*	IT 54.2%, ε 45.8%
196	0+	–31.826	**0.15% *1***	
197	1/2–	–30.540	64.14 h *5*	ε
197m	13/2+	–30.241	23.8 h *1*	IT 91.4%, ε 8.6%
198	0+	–30.954	**9.97% *20***	
199	1/2–	–29.546	**16.87% *22***	
199m	13/2+	–29.014	42.67 m *9*	IT
200	0+	–29.503	**23.10% *19***	
201	3/2–	–27.662	**13.18% *9***	
202	0+	–27.345	**29.86% *26***	
203	5/2–	–25.269	46.594 d *12*	β–
204	0+	–24.690	**6.87% *15***	
205	1/2–	–22.287	5.14 m *9*	β–
205m	13/2+	–20.731	1.09 ms *4*	IT
206	0+	–20.95	8.32 m *7*	β–
207	(9/2+)	–16.2	2.9 m *2*	β–
208	0+	–13.27	41 m *+5–4*	β–

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
80	Hg	209		–8.5s	35 s *+9–6*	β–
		210	0+	–5.4s	>300 ns	β–?
		211		–0.5s	>300 ns	β–, β–n
		212	0+	2.8s	>300 ns	β–, β–n
		213		7.8s	>300 ns	β–, β–n
		214	0+	11.2s	>300 ns	β–, β–n
		215		16.3s	>300 ns	β–, β–n
		216	0+	19.9s	>300 ns	β–, β–n
81	Tl	176	(3–,4–,5–)	0.58	5.2 ms *+30–14*	p
		177	(1/2+)	–3.33	18 ms *5*	α 73%, p 27%
		178		–4.8s	254 ms *+11–9*	α=53%, ε=47%
		179	(1/2+)	–8.30	0.23 s *4*	α<100%, ε, p
		179m	(11/2–)	–8.30	1.5 ms *3*	α≤100%, p, ε, IT
		180	(4–,5–)	–9.26	1.09 s *1*	ε 94%, α 6%, εSF=1.0×10^{-4}%
		181	(1/2+)	–12.799	3.2 s *3*	ε, α≤10%
		181m	(9/2–)	–11.963	1.40 ms *3*	IT 99.6%, α 0.4%
		182	(7+)	–13.35	3.1 s *10*	ε 97.5%, α<5%
		183	(1/2+)	–16.589	6.9 s *7*	α, ε>0%
		183m	(9/2–)	–15.959	53.3 ms *3*	IT, ε, α 2%
		184		–16.89	10.1 s *5*	ε 97.9%, α 2.1%
		185	(1/2+)	–19.75	19.5 s *5*	ε
		185m	(9/2–)	–19.30	1.93 s *8*	α, IT
		186m	(7+)	–19.87	27.5 s *10*	ε, α=6.0×10^{-3}%
		186m	(10–)	–19.50	2.9 s *2*	IT
		187	(1/2+)	–22.443	=51 s	ε, α=0.03%
		187m	(9/2–)	–22.109	15.60 s *12*	ε<99.9%, IT<99.9%, α 0.15%
		188m	(2–)	–22.35	71 s *2*	ε
		188m	(7+)	–22.35	71 s *1*	ε
		188m	(9–)	–22.08	41 ms *4*	IT, ε
		189	(1/2+)	–24.60	2.3 m *2*	ε
		189m	(9/2–)	–24.34	1.4 m *1*	ε<100%, IT<4%
		190m	2(–)	–24.31	2.6 m *3*	ε
		190m	7(+)	–24.31	3.7 m *3*	ε
		190m	(8–)	–24.15	0.75 ms *4*	IT
		191	(1/2+)	–26.282		
		191m	9/2(–)	–26.282	5.22 m *16*	
		192	(2–)	–25.87	9.6 m *4*	ε
		192m	(7+)	–25.72	10.8 m *2*	ε
		193	1/2(+)	–27.30	21.6 m *8*	ε
		193m	(9/2–)	–26.93	2.11 m *15*	IT≤75%, ε≥25%
		194	2–	–26.8	33.0 m *5*	ε, α<1.0×10^{-7}%
		194m	(7+)	–26.8	32.8 m *2*	ε
		195	1/2+	–28.16	1.16 h *5*	ε
		195m	9/2–	–27.67	3.6 s *4*	IT
		196	2–	–27.50	1.84 h *3*	ε
		196m	(7+)	–27.10	1.41 h *2*	ε 96.2%, IT 3.8%
		197	1/2+	–28.34	2.84 h *4*	ε
		197m	9/2–	–27.73	0.54 s *1*	IT
		198	2–	–27.49	5.3 h *5*	ε
		198m	7+	–26.95	1.87 h *3*	ε 55.9%, IT 44.1%

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
81	**Tl**	198m	(10−)	−26.75	32.1 ms *10*	IT
		199	1/2+	−28.06	7.42 h *8*	ε
		199m	9/2−	−27.31	28.4 ms *2*	IT
		200	2−	−27.047	26.1 h *1*	ε
		200m	7+	−26.293	34.0 ms *9*	IT
		201	1/2+	−27.18	3.0421 d *17*	ε
		201m	(9/2−)	−26.26	2.01 ms *7*	IT
		202	2−	−25.99	12.31 d *8*	ε
		203	1/2+	−25.762	**29.524% *1***	
		204	2−	−24.346	3.783 y *12*	β− 97.08%, ε 2.92%
		205	1/2+	−23.821	**70.48% *1***	
		206	0−	−22.254	4.202 m *11*	β−
		206m	(12−)	−19.611	3.74 m *3*	IT
		207	1/2+	−21.034	4.77 m *3*	β−
		207m	11/2−	−19.686	1.33 s *11*	IT
		208	5+	−16.752	3.053 m *4*	β−
		209	(1/2+)	−13.637	2.161 m *7*	β−
		210	(5+)	−9.25	1.30 m *3*	β−, β−n 7.0×10^{-3}%
		211		−5.9s	>300 ns	β−?
		212		−1.5s	>300 ns	β−?
		213		1.76	101 s *+486−46*	β−
		214		6.5s	>300 ns	β−, β−n
		215		10.1s	>300 ns	β−, β−n
		216		14.7s	>300 ns	β−, β−n
		217		18.4s	>300 ns	β−, β−n
82	**Pb**	178	0+	3.57	0.12 ms *+22−5*	α
		179	(9/2−)	2.05	3.5 ms *+14−8*	α
		180	0+	−1.93	4.2 ms *5*	α
		181	(9/2−)	−3.10	36 ms *2*	α
		181m	(13/2+)	−3.10	45 ms *20*	α<100%
		182	0+	−6.82	55 ms *5*	α=98%, ε=2%
		183	(3/2−)	−7.57	535 ms *30*	α=90%
		183m	(13/2+)	−7.47	415 ms *20*	α
		184	0+	−11.05	490 ms *25*	α 80%, ε 20%
		185	3/2−	−11.54	6.3 s *4*	ε, α 34%
		185m	13/2+	−11.54	4.3 s *2*	α 50%, ε
		186	0+	−14.68	4.82 s *3*	ε 60%, α 40%
		187	(13/2+)	−14.990	18.3 s *3*	ε 88%, α 12%
		187m	(3/2−)	−14.957	15.2 s *3*	ε 90.5%, α 9.5%
		188	0+	−17.82	25.1 s *1*	ε 90.7%, α 9.3%
		189	(3/2−)	−17.88	39 s *8*	ε, α<1%
		189m	(13/2+)	−17.84	50 s *3*	ε, α<1%
		190	0+	−20.42	71 s *1*	ε 99.6%, α 0.4%
		191	(3/2−)	−20.25	1.33 m *8*	ε 99.99%, α 0.01%
		191m	(13/2+)	−20.25	2.18 m *8*	ε, α=0.02%
		192	0+	−22.56	3.5 m *1*	ε 99.99%, α 5.9×10^{-3}%
		193	(3/2−)	−22.19		ε
		193m	(13/2+)	−22.19	5.8 m *2*	ε
		194	0+	−24.21	10.7 m *6*	ε, α 7.3×10^{-6}%
		195	3/2−	−23.71	=15 m	ε
		195m	13/2+	−23.51	15.0 m *12*	ε

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
82	**Pb**	196	0+	–25.36	37 m *3*	ε , α≤3.0×10^{-5}%
		197	3/2–	–24.748	8.1 m *17*	ε
		197m	13/2+	–24.429	42.9 m *9*	ε 81%, IT 19%
		198	0+	–26.05	2.4 h *1*	ε
		199	3/2–	–25.231	90 m *10*	ε
		199m	(13/2+)	–24.806	12.2 m *3*	IT=93%, ε=7%
		200	0+	–26.25	21.5 h *4*	ε
		201	5/2–	–25.26	9.33 h *3*	ε
		201m	13/2+	–24.63	60.8 s *18*	IT
		202	0+	–25.937	52.5×10^{3} y *28*	ε
		202m	9–	–23.767	3.54 h *2*	IT 90.5%, ε 9.5%
		203	5/2–	–24.787	51.92 h *3*	ε
		203m	13/2+	–23.962	6.21 s *11*	IT
		203m	29/2–	–21.838	480 ms *7*	IT
		204	0+	–25.110	≥1.4×10^{17} y **1.4%** ***1***	α
		204m	9–	–22.924	66.93 m *10*	IT
		205	5/2–	–23.770	1.73×10^{7} y *7*	ε
		205m	13/2+	–22.756	5.55 ms *2*	IT
		206	0+	–23.786	**24.1%** ***1***	
		207	1/2–	–22.452	**22.1%** ***1***	
		207m	13/2+	–20.819	0.806 s *5*	IT
		208	0+	–21.749	**52.4%** ***1***	
		209	9/2+	–17.615	3.253 h *14*	β–
		210	0+	–14.729	22.20 y *22*	β–, α 1.9×10^{-6}%
		211	9/2+	–10.491	36.1 m *2*	β–
		212	0+	–7.553	10.64 h *1*	β–
		213	(9/2+)	–3.200	10.2 m *3*	β–
		214	0+	–0.181	26.8 m *9*	β–
		215		4.5s	147 s *12*	β–
		216	0+	7.7s	>300 ns	β–
		217		12.4s	>300 ns	β–
		218	0+	15.6s	>300 ns	β–
		219		20.5s	>300 ns	β–
		220	0+	23.9s	>300 ns	β–
83	**Bi**	184m		1.19	13 ms *2*	α
		184m		1.19	6.6 ms *15*	α
		185	1/2+	–2.3s	58 μs 4	p 90%, α 10%
		186	(3+)	–3.17	15.0 ms *17*	α
		186m	(10–)	–3.17	9.8 ms *13*	α
		187	(9/2–)	–6.39	37 ms *2*	α
		187m	(1/2+)	–6.27	0.370 ms *20*	α
		188m	(10–)	–7.20	265 ms *15*	α, ε?
		188m	(3+)	–7.20	60 ms *3*	α, ε?
		189	(9/2–)	–10.06	674 ms *11*	α>50%, ε<50%
		189m	(1/2+)	–9.88	5.0 ms *1*	α>50%, ε<50%
		190m	(3+)	–10.59	6.3 s *1*	α 90%, ε 10%
		190m	(10–)	–10.59	6.2 s *1*	α 70%, ε 30%
		191	(9/2–)	–13.240	12.4 s *3*	α 51%, ε 49%
		191m	(1/2+)	–12.999	125 ms *13*	α 68%, IT 32%, ε
		192	(3+)	–13.55	34.6 s *9*	ε 88%, α 12%
		192m	(10–)	–13.40	39.6 s *4*	ε 90%, α 10%

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
83	**Bi**	193	(9/2−)	−15.872	63.6 s *30*	ε 96.5%, α 3.5%
		193m	(1/2+)	−15.564	3.2 s *5*	α 84%, ε 16%
		194	(3+)	−15.97	95 s *3*	ε 99.54%, α 0.46%
		194m	(6+,7+)	−15.97	125 s *2*	ε
		194m	(10−)	−15.97	115 s *4*	ε 99.8%, α 0.2%
		195	(9/2−)	−18.025	183 s *4*	ε 99.97%, α 0.03%
		195m	(1/2+)	−17.624	87 s *1*	ε 67%, α 33%
		196	(3+)	−18.01	308 s *12*	ε , α 1.2×10^{-3}%
		196m	(7+)	−17.84	0.6 s *5*	ε , IT
		196m	(10−)	−17.74	240 s *3*	ε 74.2%, IT 25.8%, α 3.8×10^{-4}%
		197	(9/2−)	−19.686	9.33 m *50*	ε , α 1.0×10^{-4}%
		197m	(1/2+)	−19.186	5.04 m *16*	α 55%, ε 45%, IT<0.3%
		198	(2+,3+)	−19.37	10.3 m *3*	ε
		198m	(7+)	−19.37	11.6 m *3*	ε
		198m	10−	−19.12	7.7 s *5*	IT
		199	9/2−	−20.80	27 m *1*	ε
		199m	(1/2+)	−20.13	24.70 m *15*	ε 99%, IT≤2%, α=0.01%
		200	7+	−20.37	36.4 m *5*	ε
		200m	(2+)	−20.37	31 m *2*	ε≤100%
		200m	(10−)	−19.94	0.40 s *5*	IT
		201	9/2−	−21.42	103 m *3*	ε
		201m	1/2+	−20.57	57.5 m *21*	ε>91.1%, IT≤8.6%, α=0.3%
		202	5+	−20.74	1.71 h *4*	ε
		203	9/2−	−21.52	11.76 h *5*	ε
		203m	1/2+	−20.43	305 ms *5*	IT
		204	6+	−20.645	11.22 h *10*	ε
		204m	10−	−19.840	13.0 ms *1*	IT
		204m	17+	−17.812	1.07 ms *3*	IT
		205	9/2−	−21.064	15.31 d *4*	ε
		206	6+	−20.028	6.243 d *3*	ε
		206m	10−	−18.983	0.89 ms *1*	IT
		207	9/2−	−20.055	31.55 y *4*	ε
		208	5+	−18.870	3.68×10^{5} y *4*	ε
		208m	10−	−17.299	2.58 ms *4*	IT
		209	9/2−	−18.259	**100%**	
		210	1−	−14.792	5.012 d *5*	β−, α 1.3×10^{-4}%
		210m	9−	−14.521	3.04×10^{6} y *6*	α
		211	9/2−	−11.858	2.14 m *2*	α 99.72%, β− 0.28%
		212	1(−)	−8.120	60.55 m *6*	β− 64.06%, α 35.94%
		212m	(8−,9−)	−7.870	25.0 m *2*	α 67%, β− 33%, β−α 30%
		212m	≥16	−6.210	7.0 m *3*	β−
		213	9/2−	−5.230	45.59 m *6*	β− 97.8%, α 2.2%
		214	1−	−1.20	19.9 m *4*	β− 99.98%, α 0.02%
		215	(9/2−)	1.65	7.6 m *2*	β−
		215m	>23/2−	3.00	36.9 s *6*	IT 76.2%, β− 23.8%
		216	(6−,7−)	5.87	2.25 m *5*	β−≤100%
		216m	(3)	5.87	6.6 m *21*	β−≤100%

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
83	Bi	217	(9/2−)	8.9s	98.5 s *8*	β−
		218		13.2s	33 s *1*	β−
		219		16.3s	>300 ns	β−
		220		20.7s	>300 ns	β−
		221		24.0s	>300 ns	β−, β−n
		222		28.4s	>300 ns	β−
		223		31.9s	>300 ns	β−, β−n
		224		36.4s	>300 ns	β−, β−n
84	Po	186	0+	4.10		
		187	(1/2−,5/2−)	2.83	1.40 ms *25*	α
		188	0+	−0.54	0.275 ms *30*	ε, α
		189	(7/2−)	−1.42	3.5 ms *5*	α
		190	0+	−4.56	2.46 ms *5*	α
		191	(3/2−)	−5.05	22 ms *1*	α 99%
		191m	(13/2+)	−5.01	93 ms *3*	α 96%
		192	0+	−8.07	32.2 ms *3*	α=99.5%, ε=0.5%
		193m	(13/2+)	−8.36	245 ms *22*	α≤100%
		193m	(3/2−)	−8.36	370 ms *+46−40*	α≤100%
		194	0+	−11.01	0.392 s *4*	α, ε
		195	(3/2−)	−11.07	4.64 s *9*	α 75%, ε 25%
		195m	(13/2+)	−10.84	1.92 s *2*	α=90%, ε=10%, IT<0.01%
		196	0+	−13.47	5.8 s *2*	α=98%, ε=2%
		197	(3/2−)	−13.36	84 s *16*	ε 56%, α 44%
		197m	(13/2+)	−13.15	32 s *2*	α 84%, ε 16%, IT 0.01%
		198	0+	−15.47	1.77 m *3*	α 57%, ε 43%
		199	(3/2−)	−15.21	5.47 m *15*	ε 92.5%, α 7.5%
		199m	(13/2+)	−14.90	4.17 m *5*	ε 73.5%, α 24%, IT 2.5%
		200	0+	−16.95	11.51 m *8*	ε 88.9%, α 11.1%
		201	3/2−	−16.524	15.6 m *1*	ε 98.87%, α 1.13%
		201m	13/2+	−16.100	8.96 m *12*	IT 56.2%, ε 41.4%, α 2.4%
		202	0+	−17.92	44.6 m *4*	ε 98.08%, α 1.92%
		203	5/2−	−17.310	36.7 m *5*	ε 99.89%, α 0.11%
		203m	13/2+	−16.668	45 s *2*	IT, ε
		204	0+	−18.34	3.519 h *12*	ε 99.33%, α 0.67%
		205	5/2−	−17.51	1.74 h *8*	ε 99.96%, α 0.04%
		205m	13/2+	−16.63	0.645 ms *20*	IT
		205m	19/2−	−16.05	57.4 ms *9*	IT
		206	0+	−18.185	8.8 d *1*	ε 94.55%, α 5.45%
		207	5/2−	−17.146	5.80 h *2*	ε 99.98%, α 0.02%
		207m	19/2−	−15.763	2.79 s *8*	IT
		208	0+	−17.470	2.898 y *2*	α, ε 4.0×10^{-3}%
		209	1/2−	−16.366	102 y *5*	α 99.52%, ε 0.48%
		210	0+	−15.953	138.376 d *2*	α
		211	9/2+	−12.433	0.516 s *3*	α
		211m	(25/2+)	−10.971	25.2 s *6*	α 99.98%, IT 0.02%
		212	0+	−10.370	0.299 µs *2*	α
		212m	(18+)	−7.448	45.1 s *6*	α 99.93%, IT 0.07%
		213	9/2+	−6.654	3.72 µs *2*	α

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
84	**Po**	214	0+	−4.470	164.3 µs *20*	α
		215	9/2+	−0.540	1.781 ms *4*	α, β− 2.3×10⁻⁴%
		216	0+	1.778	0.145 s *2*	α
		217	(9/2+)	5.886	1.53 s *5*	α
		218	0+	8.357	3.098 m *12*	α 99.98%, β− 0.02%
		219		12.6s	>300 ns	β−
		220	0+	15.3s	>300 ns	β−
		221		19.78	112 s *+58−28*	β−?
		222	0+	22.48	550 s *430*	β−?
		223		26.8s	>300 ns	β−
		224	0+	29.7s	>300 ns	β−
		225		34.3s	>300 ns	β−
		226	0+	37.3s	>300 ns	β−
		227		42.0s	>300 ns	β−
85	**At**	191	(1/2+)	3.86	1.7 ms *+11−5*	α
		191m	(7/2−)	3.92	2.1 ms *+4−3*	α
		192m		2.92	11.5 ms *6*	α
		192m	(9−,10−)	2.92	88 ms *6*	α
		193	(1/2+)	−0.06	28 ms *+5−4*	α
		193m	(7/2−)	−0.06	21 ms *5*	α
		193m	(13/2+)	−0.03	27 ms *+4−3*	IT 76%, α 24%
		194m	(9−10−)	−0.70	310 ms *8*	α
		194m		−0.70	253 ms *10*	α
		195	1/2+	−3.476	328 ms *20*	α
		195m	7/2−	−3.476	147 ms *5*	α
		196	(3+)	−3.92	0.388 s *7*	α=95.1%, ε=4.9%
		197	(9/2−)	−6.34	0.388 s *6*	α 96.1%, ε 3.9%
		197m	(1/2+)	−6.29	2.0 s *2*	α≤100%, ε, IT≤4.0×10⁻³%
		198	(3+)	−6.65	3.8 s *4*	α 90%, ε 10%
		198m	(10−)	−6.55	1.04 s *15*	α 84%, ε 16%
		199	(9/2−)	−8.822	7.03 s *15*	α 90%, ε 10%
		200	(3+)	−8.99	43 s *1*	α 52%, ε 48%
		200m	(7+)	−8.88	47 s *1*	ε≤57%, α 43%
		200m	(10−)	−8.64	7.3 s *+26−15*	ε<89.5%, IT<89.5%, α=10.5%
		201	(9/2−)	−10.789	85.2 s *16*	α 71%, ε 29%
		202	(2+,3+)	−10.59	184 s *1*	ε 63%, α 37%
		202m	(7+)	−10.59	182 s *2*	ε 91.3%, α 8.7%
		202m	(10−)	−10.20	0.46 s *5*	IT 99.9%, α 0.1%
		203	9/2−	−12.16	7.4 m *2*	ε 69%, α 31%
		204	7+	−11.88	9.12 m *11*	ε 96.09%, α 3.91%
		204m	10−	−11.29	108 ms *10*	IT
		205	9/2−	−12.97	26.9 m *8*	ε 90%, α 10%
		206	(5)+	−12.43	30.6 m *8*	ε 99.1%, α 0.9%
		207	9/2−	−13.23	1.81 h *3*	ε 91.4%, α 8.6%
		208	6+	−12.469	1.63 h *3*	ε 99.45%, α 0.55%
		209	9/2−	−12.882	5.41 h *5*	ε 95.9%, α 4.1%
		210	(5)+	−11.972	8.1 h *4*	ε 99.82%, α 0.18%
		211	9/2−	−11.648	7.214 h *7*	ε 58.2%, α 41.8%
		212	(1−)	−8.628	0.314 s *2*	α, ε<0.03%, β−<2.0×10⁻⁶%

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
85	**At**	212m	(9−)	−8.405	0.119 s *3*	α>99%, IT<1%
		213	9/2−	−6.580	125 ns *6*	α
		214	1−	−3.380	558 ns *10*	α
		215	9/2−	−1.255	0.10 ms *2*	α
		216	1−	2.254	0.30 ms *3*	α, β−<6.0×10^{-3}%, ε<3.0×10^{-7}%
		217	9/2−	4.395	32.3 ms *4*	α 99.99%, β− 7.0×10^{-3}%
		218		8.10	1.5 s *3*	α 99.9%, β− 0.1%
		219		10.397	56 s *3*	α=97%, β−=3%
		220	3	14.35	3.71 m *4*	β− 92%, α 8%
		221		16.8s	2.3 m *2*	β−
		222		20.6s	54 s *10*	β−
		223		23.4s	50 s *7*	β−
		224		27.71	76 s *+138−23*	β−?
		225		30.2s	>300 ns	β−
		226		34.2s	>300 ns	β−
		227		37.2s	>300 ns	β−
		228		41.4s	>300 ns	β−
		229		44.6s	>300 ns	β−, β−n
86	**Rn**	193	(3/2−)	9.05	1.15 ms *27*	α
		194	0+	5.72	0.78 ms *16*	α
		195	3/2−	5.06	6 ms *+3−2*	α
		195m	13/2+	5.12	5 ms *+3−2*	α
		196	0+	1.97	4.4 ms *+13−9*	α 99.9%, ε=0.1%
		197	(3/2−)	1.48	53 ms *+7−5*	α
		197m	(13/2+)	1.48	25 ms *+3−2*	α
		198	0+	−1.23	65 ms *3*	α, ε
		199	(3/2−)	−1.51	0.59 s *3*	α 94%, ε 6%
		199m	(13/2+)	−1.33	0.31 s *2*	α 97%, ε 3%
		200	0+	−4.01	1.03 s *+20−11*	α 86%, ε 14%
		201	(3/2−)	−4.07	7.0 s *4*	α, ε
		201m	(13/2+)	−4.07	3.8 s *1*	ε, α
		202	0+	−6.28	9.7 s *1*	α 78%, ε 22%
		203	(3/2−)	−6.16	44 s *2*	α 66%, ε 34%
		203m	(13/2+)	−5.80	26.9 s *5*	α 75%, ε 25%
		204	0+	−7.98	74.5 s *14*	α 72.4%, ε 27.6%
		205	5/2−	−7.71	170 s *4*	ε 75.4%, α 24.6%
		206	0+	−9.12	5.67 m *17*	α 62%, ε 38%
		207	5/2−	−8.634	9.25 m *17*	ε 79%, α 21%
		208	0+	−9.66	24.35 m *14*	α 62%, ε 38%
		209	5/2−	−8.93	28.5 m *10*	ε 83%, α 17%
		210	0+	−9.601	2.4 h *1*	α 96%, ε 4%
		211	1/2−	−8.756	14.6 h *2*	ε 72.6%, α 27.4%
		212	0+	−8.660	23.9 m *12*	α
		213	(9/2+)	−5.699	19.5 ms *1*	α
		214	0+	−4.320	0.27 μs *2*	α
		215	9/2+	−1.169	2.30 μs *10*	α
		216	0+	0.254	45 μs *5*	α
		217	9/2+	3.657	0.54 ms *5*	α
		218	0+	5.216	35 ms *5*	α
		219	5/2+	8.831	3.96 s *1*	α

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Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
86	**Rn**	220	0+	10.607	55.6 s *1*	α
		221	7/2+	14.473	25 m *2*	β− 78%, α 22%
		222	0+	16.373	3.8235 d *3*	α
		223	7/2	20.40	24.3 m *4*	β−
		224	0+	22.43	107 m *3*	β−
		225	7/2−	26.56	4.66 m *4*	β−
		226	0+	28.74	7.4 m *1*	β−
		227		32.87	20.8 s *7*	β−
		228	0+	35.25	65 s *2*	β−
		229		39.36	12.0 s *+12−13*	β−
		230	0+	42.1s	>300 ns	β−
		231		46.5s	>300 ns	β−
87	**Fr**	199		6.76	12 ms *+10−4*	α>0%, ε
		200	(3+)	6.12	49 ms *4*	α
		201	(9/2−)	3.60	62 ms *5*	α
		201m	(1/2+)	3.60	19 ms *+19−6*	α
		202	(3+)	3.16	0.30 s *5*	α
		202m	(10−)	3.16	0.29 s *5*	α
		203	(9/2−)	0.877	0.55 s *1*	α≤100%
		204	(3+)	0.61	1.8 s *3*	α 92%, ε 8%
		204m	(7+)	0.65	1.6 s *+5−3*	α 90%, ε 10%
		204m	(10−)	0.92	0.8 s *2*	α 74%, ε 26%
		205	(9/2−)	−1.309	3.97 s *4*	α 98.5%, ε 1.5%
		206	(2+,3+)	−1.24	=16 s	α=84%, ε=16%
		206m	(7+)	−1.24	=16 s	α=84%, ε=16%
		206m	(10−)	−0.71	0.7 s *1*	IT 95%, α 5%
		207	9/2−	−2.84	14.8 s *1*	α 95%, ε 5%
		208	7+	−2.67	59.1 s *3*	α 89%, ε 11%
		209	9/2−	−3.77	50.5 s *7*	α 89%, ε 11%
		210	6+	−3.33	3.18 m *6*	α 71%, ε 29%
		211	9/2−	−4.14	3.10 m *2*	α 87%, ε 13%
		212	5+	−3.515	20.0 m *6*	ε 57%, α 43%
		213	9/2−	−3.553	34.82 s *14*	α 99.44%, ε 0.56%
		214	(1−)	−0.959	5.0 ms *2*	α
		214m	(8−)	−0.837	3.35 ms *5*	α
		215	9/2−	0.317	86 ns *5*	α
		216	(1−)	2.970	700 ns *20*	α
		217	9/2−	4.313	19 μs *3*	α
		218	1−	7.058	1.0 ms *6*	α
		218m		7.144	22.0 ms *5*	α≤100%, IT
		219	9/2−	8.617	20 ms *2*	α
		220	1+	11.480	27.4 s *3*	α 99.65%, β− 0.35%
		221	5/2−	13.278	286.1 s *10*	α, β−<0.1%
		222	2−	16.35	14.2 m *3*	β−
		223	3/2(−)	18.384	22.00 m *7*	β− 99.99%, α 6.0×10^{-3}%
		224	1−	21.65	3.33 m *10*	β−
		225	3/2−	23.82	3.95 m *14*	β−
		226	1−	27.4	49 s *1*	β−
		227	1/2+	29.7	2.47 m *3*	β−
		228	2−	33.3s	38 s *1*	β−≤100%
		229	(1/2+)	35.82	50.2 s *20*	β−

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
87	Fr	230		39.50	19.1 s *5*	β–
		231	(1/2+)	42.3s	17.6 s *6*	β–
		232	(5)	46.1s	5.5 s *6*	β–
		233		49.2s	>300 ns	β–
88	Ra	201m	(13/2+)	11.8s	1.6 ms *+77–7*	α, ε
		202	0+	9.09	16 ms *+30–7*	α
		203	(3/2–)	8.66	31 ms *+17–9*	α
		203m	(13/2+)	8.66	24 ms *+6–4*	α
		204	0+	6.06	57 ms *+11–5*	α
		205	(3/2–)	5.84	210 ms *+60–40*	α≤100%, ε
		205m	(13/2+)	5.84	170 ms *+60–40*	α≤100%, ε
		206	0+	3.56	0.24 s *2*	α
		207	(3/2–,5/2–)	3.54	1.35 s *–13+22*	α=86%, ε=14%
		207m	(13/2+)	4.09	59 ms *4*	IT≥85%, α≤15%
		208	0+	1.71	1.3 s *2*	α 95%, ε 5%
		209	5/2–	1.85	4.6 s *2*	α=90%, ε=10%
		210	0+	0.46	3.7 s *2*	α=96%, ε=4%
		211	5/2(–)	0.832	13 s *2*	α>93%, ε<7%
		212	0+	–0.20	13.0 s *2*	α=85%, ε=15%
		213	1/2–	0.36	2.73 m *5*	α 80%, ε 20%
		213m	(17/2–)	2.13	2.20 ms *5*	IT=99.4%, α=0.6%
		214	0+	0.095	2.46 s *3*	α 99.94%, ε 0.06%
		215	(9/2+)	2.532	1.55 ms *7*	α
		216	0+	3.290	182 ns *10*	α, ε<1.0×10^{-8}%
		217	(9/2+)	5.886	1.6 µs *2*	α
		218	0+	6.65	25.2 µs *3*	α
		219	(7/2)+	9.393	10 ms *3*	α
		220	0+	10.272	18 ms *2*	α
		221	5/2+	12.963	28 s *2*	α, ^{14}C 1×10^{-12}%
		222	0+	14.320	38.0 s *5*	α, ^{14}C 3.0×10^{-8}%
		223	3/2+	17.234	11.43 d *5*	α, ^{14}C 8.9×10^{-8}%
		224	0+	18.821	3.6319 d *23*	α, ^{14}C 4.0×10^{-9}%
		225	1/2+	21.995	14.9 d *2*	β–
		226	0+	23.668	1600 y *7*	α, ^{14}C 3.2×10^{-9}%
		227	3/2+	27.178	42.2 m *5*	β–
		228	0+	28.946	5.75 y *3*	β–
		229	5/2+	32.56	4.0 m *2*	β–
		230	0+	34.52	93 m *2*	β–
		231	(5/2+)	38.22	104.1 s *8*	β–
		232	0+	40.50	4.2 m *8*	β–
		233		44.6s	30 s *5*	β–
		234	0+	47.2s	30 s *10*	β–
		235		51.4s		
89	Ac	206	(3+)	13.53	22 ms *+9–5*	α
		206m	(10–)	13.53	33 ms *+22–9*	α
		207	(9/2–)	11.15	27 ms *+11–6*	α
		208	(3+)	10.76	95 ms *+24–16*	α=99%, ε=1%
		208m	(10–)	11.27	25 ms *+9–5*	α=90%, ε=10%
		209	(9/2–)	8.84	0.10 s *5*	α=99%, ε=1%
		210		8.79	0.35 s *5*	α 91%, ε=9%
		211		7.20	0.21 s *3*	α
		212		7.27	0.93 s *5*	α=57%, ε=43%

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
89	**Ac**	213		6.16	738 ms *16*	α≤100%
		214	(5+)	6.44	8.2 s *2*	α≥89%, ε≤11%
		215	9/2−	6.03	0.17 s *1*	α 99.91%, ε 0.09%
		216	(1−)	8.14	440 µs *16*	α
		216m	(9−)	8.19	441 µs *7*	α
		217	9/2−	8.70	69 ns *4*	α, ε≤2%
		218	(1−)	10.84	1.08 µs *9*	α
		219	9/2−	11.57	11.8 µs *15*	α
		220	(3−)	13.742	26.4 ms *2*	α, ε 5.0×10^{-4}%
		221	(3/2−)	14.52	52 ms *2*	α
		222	1−	16.620	5.0 s *5*	α 99%, ε 1%
		222m		16.620	63 s *3*	α≥88%, IT≤10%, ε≥0.7%
		223	(5/2−)	17.826	2.10 m *5*	α 99%, ε 1%
		224	0−	20.231	2.78 h *17*	ε 90.9%, α 9.1%, β−<1.6%
		225	(3/2−)	21.638	10.0 d *1*	α, ^{14}C 4×10^{-12}%
		226	(1)	24.309	29.37 h *12*	β− 83%, ε 17%, α 6.0×10^{-3}%
		227	3/2−	25.851	21.772 y *3*	β− 98.62%, α 1.38%
		228	3+	28.900	6.15 h *2*	β−
		229	(3/2+)	30.75	62.7 m *5*	β−
		230	(1+)	33.8	122 s *3*	β−, β−F 1.2×10^{-6}%
		231	(1/2+)	35.9	7.5 m *1*	β−
		232	(1+)	39.2	119 s *5*	β−
		233	(1/2+)	41.5s	145 s *10*	β−
		234		45.0s	44 s *7*	β−
		235		47.6s	60 s *4*	β−
		236		51.27		β−?
		237		54.3s		
90	**Th**	208	0+	16.68	1.7 ms *+17−6*	α
		209	(5/2−)	16.54	2.5 ms *+17−7*	α
		210	0+	14.06	16 ms *4*	α 99%, ε=1%
		211		13.90	0.04 s *+3−1*	α
		212	0+	12.10	31.7 ms *13*	α, ε=0.3%
		213		12.12	144 ms *21*	α≤100%
		214	0+	10.71	87 ms *10*	α
		215	(1/2−)	10.921	1.2 s *2*	α
		216	0+	10.29	26.0 ms *2*	α, ε=0.01%
		216m	8+	12.33	134 µs *4*	α 2.8%, IT
		217	(9/2+)	12.22	0.241 ms *5*	α
		218	0+	12.37	117 ns *9*	α
		219		14.47	1.05 µs *3*	α
		220	0+	14.67	9.7 µs *6*	α, ε 2.0×10^{-7}%
		221	(7/2+)	16.937	1.68 ms *6*	α
		222	0+	17.20	2.8 ms *3*	α
		223	(5/2)+	19.384	0.60 s *2*	α
		224	0+	20.00	0.81 s *10*	α
		225	(3/2+)	22.309	8.75 m *4*	α=90%, ε=10%
		226	0+	23.196	30.57 m *10*	α
		227	1/2+	25.806	18.68 d *9*	α
		228	0+	26.766	1.9116 y *16*	α, ^{20}O 1×10^{-11}%

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
90	**Th**	229	5/2+	29.587	7932 y *28*	α
		229m	(3/2+)	29.587	2 m *1*	IT?
		230	0+	30.863	7.54×10^{4} y *3*	α, ^{24}Ne 6×10^{-11}% , SF ≤ 4×10^{-12}%
		231	5/2+	33.816	25.52 h *1*	β−, α = 4×10^{-11}%
		232	0+	35.452	1.40×10^{10} y *1* **100%**	α, SF 1.1×10^{-9}%
		233	1/2+	38.737	21.83 m *4*	β−
		234	0+	40.615	24.10 d *3*	β−
		235	(1/2+)	44.26	7.2 m *1*	β−
		236	0+	46.5s	37.3 m *15*	β−
		237	(5/2+)	50.2s	4.7 m *6*	β−
		238	0+	52.6s	9.4 m *20*	β−
		239		56.6s		
91	**Pa**	212		21.61	5.1 ms *+61−19*	α
		213		19.66	5.3 ms *+40−16*	α
		214		19.49	17 ms *3*	α ≤ 100%
		215		17.87	14 ms *2*	α
		216		17.80	0.15 s *+6−4*	α = 98%, ε = 2%
		217		17.07	3.6 ms *8*	α
		217m		18.92	1.2 ms *2*	α 73%, IT 27%
		218		18.68	113 µs *10*	α
		219m	9/2−	18.54	53 ns *10*	α
		220m		20.40	0.78 µs *16*	α, ε 3.0×10^{-7}%
		221	9/2−	20.38	5.9 µs *17*	α
		222		22.11s	2.9 ms *+6−4*	α
		223		22.32	5.1 ms *6*	α
		224		23.861	0.85 s *2*	α
		225		24.34	1.7 s *2*	α
		226		26.03	1.8 m *2*	α 74%, ε 26%
		227	(5/2−)	26.831	38.3 m *3*	α 85%, ε 15%
		228	3+	28.921	22.4 h *10*	ε 98.15%, α 1.85%
		229	(5/2+)	29.898	1.50 d *5*	ε 99.52%, α 0.48%
		230	(2−)	32.173	17.4 d *5*	ε 92.2%, β− 7.8%, α 3.2×10^{-3}%
		231	3/2−	33.425	3.276×10^{4} y *11*	α, SF ≤ 2×10^{-11}%
		232	(2−)	35.941	1.32 d *2*	β−, ε
		233	3/2−	37.491	26.975 d *13*	β−
		234	4+	40.342	6.70 h 5	β−
		234m	(0−)	40.416	1.159 m *11*	β− 99.84%, IT 0.16%
		235	(3/2−)	42.33	24.44 m *11*	β−
		236	1(−)	45.3	9.1 m *1*	β−
		237	(1/2+)	47.6	8.7 m *2*	β−
		238	(3−)	50.77	2.27 m *9*	β−
		239	(3/2)	53.3s	1.8 h *5*	β−
		240		56.8s		β−?
		241		59.7s		
92	**U**	217		22.71	16 ms *+21−6*	α ≤ 100%
		218	0+	21.91	0.51 ms *+17−10*	α
		218m	(8+)	24.02	0.56 ms *+26−14*	α
		219		23.30	42 µs *+34−13*	α
		220	0+	23.0s		α?, ε?

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
92	**U**	221	(9/2+)	24.6s	700 ns	
		222	0+	24.3s	1.0 µs *+12–4*	α
		223		25.84	18 µs *+10–5*	α, ε 0.2%
		224	0+	25.71	0.9 ms *3*	α
		225		27.38	95 ms *15*	α
		226	0+	27.33	0.35 s *15*	α
		227	(3/2+)	29.02	1.1 m *1*	α
		228	0+	29.22	9.1 m *2*	α>95%, ε<5%
		229	(3/2+)	31.209	58 m *3*	ε=80%, α=20%
		230	0+	31.613	20.8 d	α, SF<1×10^{-10}%, ^{22}Ne 5×10^{-12}%
		231	(5/2–)	33.807	4.2 d *1*	ε, α=4.0×10^{-3}%
		232	0+	34.604	68.9 y *4*	α, SF 3×10^{-12}%
		233	5/2+	36.921	1.592×10^{5} y *2*	α, ^{24}Ne 9×10^{-10}%, SF<6×10^{-11}%, ^{28}Mg<1.×10^{-13}%
		234	0+	38.148	2.455×10^{5} y *6* **0.0054% *5***	α, SF 1.6×10^{-9}%, Mg 1×10^{-11}%, Ne 9×10^{-12}%
		235	7/2–	40.921	7.04×10^{8} y *1* **0.7204% *6***	α, SF 7.0×10^{-9}%, ^{28}Mg 8.×10^{-10}%, Ne=8.×10^{-10}%
		235m	1/2+	40.921	=26 m	IT
		236	0+	42.447	2.342×10^{7} y *4*	α, SF 9.4×10^{-8}%
		237	1/2+	45.393	6.75 d *1*	β–
		238	0+	47.310	4.468×10^{9} y *3* **99.2742% *10***	α, SF 5.5×10^{-5}%
		239	5/2+	50.575	23.45 m *2*	β–
		240	0+	52.716	14.1 h *1*	β–
		241		56.2s		β–?
		242	0+	58.6s	16.8 m *5*	β–
		243		62.4s		
93	**Np**	225	(9/2–)	31.59		α
		226		32.74s	35 ms *10*	α
		227		32.56	0.51 s *6*	α
		228		33.59	61.4 s *14*	ε 60%, α 40%
		229		33.78	4.0 m *2*	α 68%, ε 32%
		230		35.24	4.6 m *3*	ε≤97%, α≥3%
		231	(5/2)	35.62	48.8 m *2*	ε 98%, α 2%
		232	(4+)	37.4s	14.7 m *3*	ε, α 2.0×10^{-4}%
		233	(5/2+)	37.95	36.2 m *1*	ε, α≤1.0×10^{-3}%
		234	(0+)	39.957	4.4 d *1*	ε
		235	5/2+	41.045	396.1 d *12*	ε, α 2.6×10^{-3}%
		236	(6–)	43.37	153×10^{3} y *5*	ε 86.3%, β– 13.5%, α 0.16%
		236m	1	43.37	22.5 h *4*	β– 50%, ε 50%
		237	5/2+	44.874	2.144×10^{6} y *7*	α, SF≤2×10^{-10}%
		238	2+	47.457	2.117 d *2*	β–
		239	5/2+	49.313	2.356 d *3*	β–
		240	(5+)	52.32	61.9 m *2*	β–

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
93	**Np**	240m	(1+)	52.32	7.22 m *2*	β− 99.88%, IT 0.12%
		241	5/2+	54.26	13.9 m *2*	β−
		242	(1+)	57.4	2.2 m *2*	β−
		242m	(6+)	57.4	5.5 m *1*	β−
		243	(5/2−)	59.88s	1.85 m *15*	β−
		244	(7−)	63.2s	2.29 m *16*	β−
		245		65.9s		
94	**Pu**	228	0+	36.08	1.1 s *+20−5*	α
		229	(3/2+)	37.39	67 s *+41−19*	ε 50%, α 50%, SF < 7%
		230	0+	36.93	102 s *10*	α ≤ 100%
		231	(3/2+)	38.28	8.6 m *5*	ε ≤ 99.8%, α > 0.2%
		232	0+	38.36	33.8 m *7*	ε 90%, α 10%
		233		40.05	20.9 m *4*	ε 99.88%, α 0.12%
		234	0+	40.348	8.8 h *1*	ε = 94%, α = 6%
		235	(5/2+)	42.18	25.3 m *5*	ε , α 2.8×10^{-3}%
		236	0+	42.896	2.858 y *8*	α, SF 1.9×10^{-7}%
		237	7/2−	45.094	45.64 d *4*	ε , α 4.2×10^{-3}%
		237m	1/2+	45.240	0.18 s *2*	IT
		238	0+	46.166	87.7 y *1*	α, SF 1.9×10^{-7}%
		239	1/2+	48.591	24110 y *30*	α, SF $3.\times10^{-10}$%
		240	0+	50.128	6561 y *7*	α, SF 5.7×10^{-6}%
		241	5/2+	52.958	14.325 y *6*	β−, α 2.5×10^{-3}%, SF < 2×10^{-14}%
		242	0+	54.719	3.75×10^{5} y *2*	α, SF 5.5×10^{-4}%
		243	7/2+	57.756	4.956 h *3*	β−
		244	0+	59.806	8.00×10^{7} y *9*	α 99.88%, SF 0.12%
		245	(9/2−)	63.18	10.5 h *1*	β−
		246	0+	65.40	10.84 d *2*	β−
		247		69.1s	2.27 d *23*	β−
95	**Am**	230			≈17 s	ε
		231		42.4s		α?, ε ?
		232		43.4s	79 s *2*	ε = 97%, α = 3%
		233		43.2s	3.2 m *8*	α > 3%, ε
		234		44.5s	2.32 m *8*	ε , α
		235	5/2−	44.62	10.3 m *6*	ε 99.6%, α 0.4%
		236	5−	46.0s	3.6 m *2*	α, ε
		236m	(1−)	46.0s	2.9 m *2*	α, ε
		237	5/2(−)	46.57s	73.6 m *8*	ε 99.97%, α 0.03%
		238	1+	48.42	98 m *2*	ε , α 1.0×10^{-4}%
		239	(5/2)−	49.393	11.9 h *1*	ε 99.99%, α 0.01%
		240	(3−)	51.51	50.8 h *3*	ε , α 1.9×10^{-4}%
		240m		54.51	0.94 ms *4*	SF ≤ 100%
		241	5/2−	52.937	432.6 y *6*	α, SF 4×10^{-10}%
		242	1−	55.471	16.02 h *2*	β− 82.7%, ε 17.3%
		242m	5−	55.520	141 y *2*	IT 99.55%, α 0.45%, SF < 4.7×10^{-9}%
		242m	(2+,3−)	57.671	14.0 ms *10*	SF, IT, α < 5.0×10^{-3}%
		243	5/2−	57.177	7370 y *40*	α, SF 3.7×10^{-9}%
		244	(6−)	59.882	10.1 h *1*	β−
		244m		59.882	0.90 ms *15*	SF ≤ 100%
		244m	1+	59.968	26 m *1*	β− 99.96%, ε 0.04%

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
95	**Am**	245	(5/2)+	61.901	2.05 h *1*	β–
		246	(7–)	65.00	39 m *3*	β–
		246m	2(–)	65.00	25.0 m *2*	β–, IT<0.02%
		247	(5/2)	67.2s	23.0 m *13*	β–
		248		70.6s	=10 m	β–
		249		73.1s		β–?
96	**Cm**	233	(3/2+)	47.29	23 s *+13–6*	ε 80%, α 20%
		234	0+	46.72	51 s *12*	α=40%, SF=40%, ε=20%
		235		47.9s		α?, ε?
		236	0+	47.86		ε, α
		237		49.25		ε, α<1%
		238	0+	49.44	2.4 h *1*	ε≥90%, α≤10%
		239	(7/2–)	51.15	=2.9 h	ε, α<0.1%
		240	0+	51.719	27 d *1*	SF 3.9×10^{-6}%, α>99.5%, ε<0.5%
		241	1/2+	53.704	32.8 d *2*	ε 99%, α 1%
		242	0+	54.806	162.8 d *2*	α, SF 6.2×10^{-6}%, ^{34}Si $1.\times10^{-14}$%
		243	5/2+	57.184	29.1 y *1*	α 99.71%, ε 0.29%, SF 5.3×10^{-9}%
		244	0+	58.455	18.1 y *1*	α, SF 1.4×10^{-4}%
		244m	6+	59.495	34 ms *2*	IT
		245	7/2+	61.006	8423 y *74*	α, SF 6.1×10^{-7}%
		246	0+	62.619	4706 y *40*	α 99.97%, SF 0.03%
		247	9/2–	65.535	1.56×10^{7} y *5*	α
		248	0+	67.393	3.48×10^{5} y *6*	α 91.61%, SF 8.39%
		249	1/2+	70.751	64.15 m *3*	β–
		250	0+	72.99	$=8.3\times10^{3}$ y	SF=74%, α=18%, β–=8%
		251	(1/2+)	76.65	16.8 m *2*	β–
		252	0+	79.1s	<2 d	
97	**Bk**	234			1.4×10^{2} s *+14–5*	α≥80%, ε≤20%
		235		52.7s		ε?, α?
		236		53.4s		
		237		53.1s	=1 m	ε?, α?
		238		54.3s	144 s *5*	ε, εSF 0.048%
		239m	(7/2+,3/2–)	54.3s		ε>99%, α<1%, SF<1%
		240		55.7s	4.8 m *8*	ε, εSF 2.0×10^{-3}%
		241	(7/2+)	56.1s	4.6 m *4*	α, ε
		242		57.7s	7.0 m *13*	ε≤100%
		243	(3/2–)	58.692	4.5 h *2*	ε=99.85%, α=0.15%
		244	(4–)	60.72	4.35 h *15*	ε 99.99%, α 6.0×10^{-3}%
		245	3/2–	61.816	4.95 d *3*	ε 99.88%, α 0.12%
		246m	2(–)	63.97	1.80 d *2*	ε
		247	(3/2–)	65.491	1380 y *250*	α≤100%
		248		68.08s	>9 y	α
		248m	1(–)	68.08s	23.7 h *2*	β– 70%, ε 30%
		249	7/2+	69.850	330 d *4*	β–, α 1.4×10^{-3}%, SF 4.7×10^{-8}%

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
97	**Bk**	250	2−	72.952	3.212 h *5*	β−
		251	(3/2−)	75.23	55.6 m *11*	β−
		252		78.5s		
		253		80.9s		β−?
		254		84.4s		
98	**Cf**	237	(3/2+)	57.94	0.8 s *2*	SF 70%, α 30%
		238	0+	57.2s	21 ms *2*	SF
		239		58.1s	39 s *+37−12*	ε, α
		240	0+	58.01	64 s *9*	α 98.5%, SF 1.5%
		241	(7/2−)	59.3s	3.78 m *70*	ε=75%, α=25%
		242	0+	59.38	3.7 m *5*	α 80%, ε 20%, SF≤0.01%
		243	(1/2+)	60.9s	10.7 m *5*	ε=86%, α=14%
		244	0+	61.473	19.4 m *6*	α≤100%
		245	1/2+	63.388	45.0 m *15*	ε 64.7%, α 35.3%
		246	0+	64.093	35.7 h *5*	α, ε<4.0×10^{-3}%, SF 2.4×10^{-4}%
		246m		66.593	45 ns *10*	SF≤100%
		247	(7/2+)	66.10	3.11 h *3*	ε 99.97%, α 0.04%
		248	0+	67.241	333.5 d *28*	α, SF 2.9×10^{-3}%
		249	9/2−	69.726	351 y *2*	α, SF 5.0×10^{-7}%
		250	0+	71.173	13.08 y *9*	α 99.92%, SF 0.08%
		251	1/2+	74.137	898 y *44*	α, SF
		252	0+	76.035	2.645 y *8*	α 96.91%, SF 3.09%
		253	(7/2+)	79.302	17.81 d *8*	β− 99.69%, α 0.31%
		254	0+	81.34	60.5 d *2*	SF 99.69%, α 0.31%
		255	(7/2+)	84.8s	85 m *18*	β−
		256	0+	87.0s	12.3 m *12*	SF, β−<1%, α=1.0×10^{-6}%
99	**Es**	240		64.2s		α?, ε?
		241		63.8s	8 s *+6−5*	ε, α
		242		64.9s	17.8 s *16*	α 57%, ε 43%
		243	(7/2+)	64.7s	23 s *3*	α 61%, ε 39%, SF<1%
		244		66.0s	37 s *4*	ε 96%, α 4%
		245	(3/2−)	66.4s	1.1 m *1*	ε 60%, α 40%
		246m		67.9s	7.5 m *5*	ε 90.1%, α 9.9%
		247	(7/2+)	68.58	4.55 m *26*	ε=93%, α=7%
		247m		68.58	625 d *84*	α
		248	(2−,0+)	70.30s	27 m *5*	ε 99.7%, α=0.25%
		249	7/2+	71.18s	102.2 m *6*	ε 99.43%, α 0.57%
		250	(6+)	73.2s	8.6 h *1*	ε>97%, α<3%
		250m	1(−)	73.2s	2.22 h *5*	ε≤100%
		251	(3/2−)	74.513	33 h *1*	ε 99.5%, α 0.5%
		252	(5−)	77.29	471.7 d *19*	α 78%, ε 22%
		253	7/2+	79.015	20.47 d *3*	SF 8.7×10^{-6}%, α
		254	(7+)	81.993	275.7 d *5*	α, β− 1.7×10^{-4}%, SF<3.0×10^{-6}%
		254m	2+	82.077	39.3 h *2*	β− 98%, IT<3%, α 0.32%, ε 0.08%, SF<0.05%
		255	(7/2+)	84.09	39.8 d *12*	β− 92%, α 8%, SF 4.1×10^{-3}%

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
99	**Es**	256	(1+,0−)	87.2s	25.4 m *24*	β−
		256m	(8+)	87.2s	7.6 h	β−
		257		89.4s	7.7 d *2*	β−, SF
		258		92.7s		α?, ε?
100	**Fm**	241			0.73 ms *6*	SF>78%, α<14%, ε<12%
		242	0+	68.4s	<4 µs	SF≤100%
		243	(7/2+)	69.3s	231 ms *9*	α 91%, SF 9%, ε<10%
		244	0+	69.0s	3.12 ms *8*	SF>97%, ε<2%, α<1%
		245		70.2s	4.2 s *13*	α≤100%
		246	0+	70.19	1.54 s *4*	α 93.2%, SF 6.8%, ε≤1.3%
		247	(7/2+)	71.6s	31 s *1*	α≥84%, ε≤16%
		247m	(1/2+)	71.6s	5.1 s *2*	α 84%
		248	0+	71.894	36 s *2*	α 93%, ε 7%, SF 0.1%
		249	(7/2+)	73.521	2.6 m *7*	ε 67%, α 33%
		250	0+	74.074	30 m *3*	α>90%, ε<10%, SF 6.9×10^{-3}%
		250m		74.074	1.93 s *15*	IT
		251	(9/2−)	75.95	5.30 h *8*	ε 98.2%, α 1.8%
		252	0+	76.818	25.39 h *4*	SF 2.3×10^{-3}%, α
		253	(1/2)+	79.349	3.00 d *12*	ε 88%, α 12%
		254	0+	80.905	3.240 h *2*	α 99.94%, SF 0.06%
		255	7/2+	83.801	20.07 h *7*	α, SF 2.4×10^{-5}%
		256	0+	85.487	157.6 m *13*	SF 91.9%, α 8.1%
		257	(9/2+)	88.590	100.5 d *2*	α 99.79%, SF 0.21%
		258	0+	90.4s	370 µs *43*	SF≤100%
		259		93.7s	1.5 s *3*	SF
		260	0+	95.8s	=4 ms	SF
101	**Md**	245	(1/2−)	75.3s	0.90 ms *25*	α, SF
		245m	(7/2)	75.6s	0.35 s *+23−16*	ε, α
		246m		76.2s	0.9 s *2*	α
		246m		76.2s	4.4 s *8*	ε>77%, α<23%
		246m		76.2s	0.9 s *2*	SF?, ε?
		247	(7/2−)	75.9s	1.2 s *1*	α 99.9%, SF<0.1%
		247m	(1/2−)	75.9s	0.25 s *4*	α 79%, SF 21%
		248		77.1s	13 s *+15−4*	α 58%, ε 42%
		249	(7/2−)	77.3s	21.7 s *20*	α>60%, ε≤40%
		249m	(1/2−)	77.3s	1.9 s *9*	α?
		250		78.6s	25 s *+10−5*	ε 93%, α 7%
		251	(7/2−)	78.97	4.3 m *6*	ε 90%, α 10%
		252		80.5s	2.3 m *8*	ε≤100%
		253	(7/2−)	81.18s	6 m *+12−3*	ε≤100%, α
		254m		83.5s	28 m *8*	ε≤100%
		254m		83.5s	10 m *3*	ε≤100%
		255	(7/2−)	84.844	27 m *2*	ε 92%, α 8%, SF<0.15%
		256	(1−)	87.61	77 m *2*	ε 90.8%, α 9.2%, SF<3%
		257	(7/2−)	88.997	5.52 h *5*	ε 85%, α 15%, SF<1%
		258		91.689	51.5 d *3*	α, SF

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
101	**Md**	258m		91.689	57.0 m *9*	ε≥70%, SF
		259		93.6s	96 m *3*	SF, α<1.3%
		260		96.6s	31.8 d *5*	SF≥42%, α≤25%, ε≤23%, β−≤10%
		261		98.6s		α?
		262		101.6s		SF?, α?
102	**No**	248	0+	80.6s	<2 µs	SF?
		249		81.8s		
		250	0+	81.6s	4.2 µs *+12−9*	SF, α<2%
		251	(7/2+)	82.8s	0.80 s *1*	α 84%, SF<0.3%, ε
		251m	(1/2+)	82.9s	1.02 s *3*	α
		252	0+	82.867	2.47 s *2*	α 70.7%, SF 29.3%, ε<1.1%
		252m	(8−)	82.867	110 ms *10*	IT
		253	(9/2−)	84.360	1.62 m *15*	α=80%, ε
		254	0+	84.72	51 s *10*	α 90%, ε 10%, SF 0.17%
		254m	0+	84.72	0.28 s *4*	IT>80%
		255	1/2+	86.81	3.52 m *21*	ε 70%, α 30%
		256	0+	87.825	2.91 s *5*	α 99.47%, SF 0.53%
		257	(7/2+)	90.251	25 s *3*	α≤100%, SF≤1.5%
		258	0+	91.5s	1.2 ms *2*	SF≤100%
		259		94.1s	58 m *5*	α 75%, ε 25%, SF<10%
		260	0+	95.6s	106 ms *8*	SF
		261	(3/2+)	98.5s		α?
		262	0+	100.1s	=5 ms	SF
		263		103.1s		α?, SF?
		264	0+	105.2s		α?
103	**Lr**	251		87.9s		ε?, α?
		252		88.7s	0.27 s *+18−8*	α, ε
		253	(7/2−)	88.7s	0.57 s *+7−6*	α=98.7%, SF=1.3%
		253m	(1/2−)	88.7s	1.49 s *+30−21*	α 92%, SF 8%
		254		89.9s	18.4 s *18*	α 71.7%, ε 28.3%
		255	1/2−	89.95	31.1 s *13*	α 85%, ε 15%
		255m	7/2−	89.98	2.53 s *13*	IT 60%, α 40%
		256		91.75	27 s *3*	α 85%, ε 15%, SF<0.03%
		257		92.61s	=4 s	α≤100%
		258		94.8s	4.1 s *3*	α>95%, SF<5%
		259		95.85s	6.2 s *3*	α 78%, SF 22%
		260		98.3s	180 s *30*	α 80%, ε<40%, SF<10%
		261		99.6s	39 m *12*	SF
		262		102.0s	=4 h	SF<10%, ε, α
		263		103.7s		α?
		264		106.4s		SF?, α?
		265		108.3s		SF?, α?
		266		111.4s		α?, SF?
104	**Rf**	253m		93.8s	48 µs *+17−10*	SF≤100%, α
		253m		93.8s	=1.8 s	α=50%, SF=50%

Nuclear Wallet Cards

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
104	**Rf**	254	0+	93.2s	23 µs *3*	SF≤100%
		255	(9/2−)	94.2s	2.3 s *+8−5*	α 52%, SF 48%, ε ?1%
		256	0+	94.22	6.4 ms *2*	SF 99.68%, α 0.32%
		257	(1/2+)	95.87	4.7 s *3*	α<100%, SF≤1.4%, ε>0%
		257m	(11/2−)	95.87	4.1 s *7*	α<100%, SF≤1.4%, ε>0%
		258	0+	96.34	14.7 ms *+12−10*	SF 69%, α 31%
		259		98.36s	3.2 s *6*	α 92%, SF 8%
		259m		98.36s	2.5 s *+4−3*	ε 15%
		260	0+	99.2s	21 ms *1*	SF≤100%, α?
		261m		101.32	1.9 s *4*	SF 73%, α 27%
		261m		101.32	78 s *+11−6*	α>74%, ε<15%, SF<11%
		262	0+	102.4s	2.3 s *4*	SF≤100%, α<3%
		263		104.8s	10 m *2*	SF, α
		264	0+	106.2s		α?
		265m		108.8s		SF
		266	0+	110.2s		SF?, α?
		267		113.4s		
		268	0+	115.4s		α?, SF?
105	**Db**	255		99.7s	1.6 s *+6−4*	α 80%, SF=20%
		256		100.5s	1.9 s *4*	α=70%, ε=30%, SF=0.02%
		257	(9/2+)	100.3s	1.82 s *+27−21*	α 94%, SF=6%
		257m		100.3s	0.58 s *+13−9*	α, SF
		258		101.8s	4.2 s *+4−3*	α 65%, ε 35%, SF<1%
		258m		101.8s	20 s *10*	ε
		259		101.99	0.51 s *16*	α
		260		103.36	1.52 s *13*	α≥90.4%, SF≤9.6%, ε<2.5%
		261		104.2s	1.8 s *4*	α≥82%, SF≤18%
		262		106.3s	35 s *5*	α=67%, SF
		263		107.1s	27 s *+10−7*	SF 55%, α 41%, ε 3%
		264		109.4s		α?
		265		110.5s		α?
		266		112.7s		α?, SF?
		267m		114.2s	73 m *+350−33*	SF
		268m		117.0s	32 h *+11−7*	SF
		269		119.1s		α?, SF?
		270m		122.0s	23 h	SF, α
106	**Sg**	258	0+	105.3s	2.9 ms *+13−7*	SF≤100%, α?
		259	(1/2+)	106.5s	0.32 s *+8−6*	α 96%, SF 4%
		259m		106.5s	0.28 s *5*	
		260	0+	106.54	3.6 ms *9*	SF 50%, α 50%
		260m		106.54	4.95 ms *33*	SF 71%, α 29%
		261		108.01	0.23 s *6*	α, SF<1%
		262	0+	108.4s	6.9 ms *+38−18*	SF≥78%, α≤22%
		263		110.19s	1.0 s *2*	α>70%, SF<30%
		263m		110.19s	0.12 s	IT, α
		264	0+	110.8s	37 ms *+27−11*	SF, α<36%
		265m		112.8s	16.2 s *+47−35*	α≥65%, SF≤35%

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
106	**Sg**	265m		113.0s	8.9 s *+27–19*	
		266	0+	113.7s	21 s *+20–12*	SF>50%, α>18%
		267		115.9s		
		268	0+	116.9s		SF?, α?
		269		120.0s		
		270	0+	121.3s		α?, SF?
		271m		124.4s	2.4 m *+43–10*	α=50%, SF=50%
		272	0+	126.4s		α?, SF?
		273		129.8s		SF?
107	**Bh**	260		113.3s	35 ms *+19–9*	α≤100%
		261		113.2s	11.8 ms *+39–24*	α
		262m		114.5s	22 ms *4*	α<100%
		262m		114.5s	83 ms *14*	α<100%
		263		114.5s		α?
		264		115.7s	0.44 s *+60–16*	α≤100%
		265		116.4s	0.9 s *+7–3*	α
		266m		118.2s	1.7 s *+82–8*	α
		267m		118.9s	17 s *+14–6*	α
		268		120.9s		
		269		121.7s		
		270?		124.2s	6×10^{1} s *+29–3*	α
		271?		125.8s		α?
		272m		128.6s	10 s *+12–4*	α
		273		130.5s		α?, SF?
		274		133.3s	0.9 m *+42–4*	α, SF
		275		135.4s		SF?
108	**Hs**	263		120.0s	0.74 ms *+48–21*	α≤100%, SF<8.4%
		264	0+	119.56	=0.8 ms	SF=50%, α=50%
		265		121.17	1.9 ms *2*	α<100%, SF≤1%
		265m		121.47	0.3 ms *+2–1*	α<100%
		266	0+	121.1s	2.3 ms *+13–6*	α, SF<1.4%
		267	(3/2+)	122.65s	52 ms *+13–8*	α≥80%, SF<20%
		267m		122.65s	0.8 s *+38–4*	α
		268	0+	122.8s	0.4 s *+18–2*	α
		269		124.6s	3.6 s *+8–14*	α
		269m		124.6s	9.7 s *+97–33*	α
		270	0+	125.1s	22 s	α
		271		127.8s		α?, SF?
		272	0+	129.1s		SF?, α?
		273		132.1s		α
		274	0+	133.3s		SF?, α?
		275m		136.3s	0.15 s *+27–6*	α
		276	0+	138.0s		α?, SF?
		277		141.1s		
109	**Mt**	265		126.6s		α?
		266m		128.0s	1.7 ms *+18–16*	α≤100%
		267		127.8s		α?
		268m		128.9s	21 ms *+8–5*	α
		269		129.3s		
		270m		130.8s	5.0 ms *+24–3*	α
		271		131.5s		α?

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
109	**Mt**	272		133.7s		α?, SF?
		273		134.8s		α?, SF?
		274m		137.1s	0.44 s *+81–17*	α, SF
		275?		138.4s	9.7 ms *+460–44*	α
		276m		140.9s	0.72 s *+87–25*	α
		277		142.5s		
		278m		145.1s	8 s *+37–4*	α, SF
		279		146.8s		α?, SF?
110	**Ds**	267m		134.3s	2.8 µs *+133–12*	α
		268?	0+	133.6s	1	α
		269m		135.03	179 µs *+245–66*	α
		270	0+	134.7s	0.10 ms *+14–4*	α, SF<0.2%
		270m		135.9s	6.0 ms *+82–22*	α>70%, IT≤30%
		271		135.95s	1.63 ms *+44–29*	α
		271m		135.95s	69 ms *+56–21*	α>0%, IT?
		272	0+	136.0s		SF
		273		138.4s	0.17 ms *+17–6*	α
		274?	0+	138.9s		SF?, α?
		275?		141.2s		α?
		276?	0+	142.2s		SF?, α?
		277?		145.3s		α?
		278?	0+	145.8s		SF?, α?
		279m		148.6s	0.18 s *+5–3*	SF=90%, α=10%
		280	0+	149.6s		
		281		152.4s	20 s *+20–7*	SF 85%, α 15%
		281m		152.4s	9.6 s *+50–25*	SF
111	**Rg**	272m		142.8s	3.8 ms *+14–8*	α
		273		143.1s		α?
		274m		144.7s	6.4 ms *+307–29*	α
		275?		145.4s		α?
		276?		147.4s		α?, SF?
		277?		148.4s		SF?, α?
		278m		150.4s	4.2 ms *+76–17*	α, SF
		279m		151.3s	0.17 s *+81–8*	α
		280m		153.4s	3.6 s *+43–13*	α
		281m		154.6s	26 s *+25–8*	SF, α
		282m		156.7s	0.5 s *+25–2*	α, SF
		283?		158.1s		SF?, α?
112	**Cn**	276	0+	150.6s		
		277		152.4s		
		278?	0+	152.7s		α?, SF?
		279?		154.7s		SF?, α?
		280?	0+	155.4s		α?, SF?
		281m		158.1s		α
		282m		158.2s	0.50 ms *+33–14*	SF
		283m		160.7s	4.0 s *+13–7*	α≥90%, SF≤10%
		283m		160.7s	6.9 s *+69–23*	SF 50%, α 50%
		284m		161.5s	101 ms *+41–22*	SF
		285		164.1s	30 s *+30–10*	α
113		278m		159.0s	0.24 ms *+114–11*	α
		279		159.5s		

Nuclide Z	El	A	Jπ	Δ (MeV)	T½, Γ, or Abundance	Decay Mode
113		280		161.2s		
		281		161.9s		
		282m		163.6s	0.07 s *+13–3*	α
		283m		164.0s	100 ms *+490–45*	α
		284m		166.0s	0.48 s *+58–17*	α
		285m		166.9s	5.5 s *+50–18*	α, SF
		286m		168.9s	20 s *+94–9*	α, SF
		287?		170.1s		α?, SF?
114		285m		171.2s		α
		286m	0+	171.0s	0.16 s *+7–3*	SF=60%, α=40%
		287		173.2s	0.51 s *+18–10*	α
		288	0+	174.0s	0.52 s *+22–13*	α
		289		176.5s	0.97 s *+97–32*	α
		289m		176.5s	2.7 s *+14–7*	α
115		287?		177.2s	32 ms *+155–14*	α
		288m		179.0s	87 ms *+105–30*	α
		289		179.8s	0.22 s *+26–8*	α, SF
		290		181.6s	16 ms *+76–7*	α, SF
		291?		182.8s		α?, SF?
116		289		184.8s		
		290	0+	184.4s	15 ms *+26–6*	α
		291		186.6s	6.3 ms *+116–25*	α
		292	0+	187.2s	18 ms *+16–6*	α
		293		189.6s	53 ms *+62–19*	α
117		291?		191.0s		SF?, α?
		292?		192.7s		SF?, α?
		293		193.4s	14 ms *+11–4*	α, SF
		294		195.1s	0.08 s *+37–4*	α
118		294		198.7s	0.9 ms *+11–3*	α, SF≤50%
		295		200.7s		