^{227}Fr β^- decay (2.47 min) 1981Vo03,1987Bo04,1996Aa01

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Ictp-2014 Workshop Group	NDS 132, 257 (2016)	15-Jan-2016

Parent: ^{227}Fr: E=0.0; J$^\pi$=1/2$^+$; T$_{1/2}$=2.47 min *3*; Q(β^-)=2506 *13*; %β^- decay=100.0

^{227}Fr-J$^\pi$,T$_{1/2}$: From ^{227}Fr Adopted Levels.

^{227}Fr-Q(β^-): From 2012Wa38.

1981Vo03: ^{227}Fr activity produced by spallation of 600-MeV protons on a UC_2 target. Mass-separated sources measured on-line at ISOLDE (CERN). Detectors: 2 Ge(Li) with active volumes of 32 and 74 cm^3. 30 s collecting and 30 s measuring cycle was used. Measured: Eγ and Iγ, γ-γ coin. Deduced: level scheme.

1987Bo04: ^{227}Fr activity produced by spallation of 600-MeV protons on a UC_2 target. Mass-separated sources measured on-line at ISOLDE (CERN). Detectors: a mini-orange magnetic focusing spectrometer comprising of a cooled 300 mm^2 Si(Li), 2 mm thick (FWHM=2 keV) and 2 Ge(Li) with active volumes of 68 and 88 cm^3. 50 s collecting and 200 s measuring cycle was used. Measured: Eγ, Iγ, E(e$^-$), I(e$^-$), γ-γ, and e$^-$-γ coin. Deduced: level scheme, conversion electron coefficients.

1996Aa01: ^{227}Fr activity produced by spallation of 1-GeV protons on a ThC_2 target. Mass-separated sources measured on-line at ISOLDE (CERN). Detectors: 3 mm thick NE111A plastic scintillator, small BaF_2 and two Ge(Li) with γ detection efficiencies of 40% and 70%. Measured: Eγ, Iγ, β-γ(Ge)-t, β-γ(BaF_2)-t, β-γ(Ge)-γ(Ge)-t coin., β-γ(BaF_2)-γ(Ge)-t coin. Deduced: level scheme, levels lifetimes. Other from the same collaboration: 1994MaZO.

Others: 1975We23: Mass-separated sources measured on-line at ISOLDE (CERN); Measured: β^- spectra, singles, and in coincidence with individual γ rays. Detectors: Ge(Li), plastic scintillator. 1984LE04: discussion of a stable octupole deformation in ^{227}Ra.

^{227}Ra Levels

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$[#]	Comments
0.0[@]	3/2$^+$	42.2 min *5*	T$_{1/2}$: from Adopted Levels.
1.733[&] *12*	(5/2)$^+$		
25.768[@] *3*	5/2$^+$		
64.077[@] *10*	7/2$^+$		
90.0343[a] *17*	3/2$^-$	254 ps *9*	T$_{1/2}$: from β-BaF_2(64γ + 90γ)(Δt). Other: 262 ps *50*, earlier analysis in 1994MaZO.
101.8942[a] *18*	5/2$^-$	236 ps *30*	T$_{1/2}$: from β-BaF_2(sum of 84-115 keV energy region)(Δt).
120.711[b] *4*	1/2$^+$	≤47 ps	
153.275 *12*	(1/2,3/2)$^+$		
161.051[b] *5*	3/2$^+$	≤39 ps	
176.973[b] *5*	(5/2)$^+$	≤58 ps	
284.280[c] *5*	3/2$^-$	≤29 ps	
296.576[c] *4*	1/2$^-$	≤41 ps	
384.355 *8*	1/2$^+$,3/2$^+$	≤21 ps	
438.795 *9*	(3/2)$^+$		
471.567 *7*	3/2$^-$	≤6 ps	
475.033 *14*	3/2$^+$		
523.851 *9*	(3/2)$^-$	≤20 ps	
598.51 *4*	(3/2$^+$)		
675.863[d] *7*	1/2$^-$	≤10 ps	
731.650 *15*	3/2$^+$		
1094.9 *3*	1/2,3/2		
1318.84 *17*	1/2,3/2		
1432.22 *21*	1/2,3/2		
1444.1 *5*	1/2,3/2		
1455.2 *3*	1/2,3/2		
1468.14 *16*	1/2,3/2		
1474.84 *21*	1/2,3/2		

Continued on next page (footnotes at end of table)

^{227}Fr β^- decay (2.47 min) 1981Vo03,1987Bo04,1996Aa01 (continued)

^{227}Ra Levels (continued)

† From a least-squares fit to γ-ray energies, by evaluators.
‡ From Adopted Levels.
\# From βγ(t) and the centroid-shift technique in 1996Aa01, unless otherwise stated.
@ Band(A): 3/2[631] rotational band.
& Band(B): 5/2[633] rotational band.
[a] Band(C): 3/2[761] rotational band.
[b] Band(D): 1/2[631] rotational band.
[c] Band(E): 1/2[631]⊗0⁻ (octupole vibration).
[d] Band(F): 1/2[501] rotational band.

β^- radiations

E(decay)	E(level)	Iβ⁻†	Log *ft*	Comments
(1031 *13*)	1474.84	0.47 *4*	6.79 *5*	av Eβ=336.0 *49*
(1038 *13*)	1468.14	2.07 *9*	6.15 *3*	av Eβ=338.5 *49*
(1051 *13*)	1455.2	0.31 *3*	7.00 *5*	av Eβ=343.4 *49*
(1062 *13*)	1444.1	0.074 *17*	7.64 *11*	av Eβ=347.5 *50*
(1074 *13*)	1432.22	0.61 *4*	6.74 *4*	av Eβ=352.1 *50*
(1187 *13*)	1318.84	0.13 *3*	7.56 *11*	av Eβ=395.3 *50*
(1411 *13*)	1094.9	0.28 *3*	7.50 *5*	av Eβ=482.5 *52*
(1774 *13*)	731.650	0.40 *5*	7.71 *6*	av Eβ=628.0 *53*
(1830 *13*)	675.863	48.6 *20*	5.677 *22*	av Eβ=650.7 *53* E(decay): 1800 keV *100* measured in coincidence with 585.8γ (1975We23).
(1907 *13*)	598.51	0.70 *16*	7.59 *10*	av Eβ=682.2 *54*
(1982 *13*)	523.851	6.4 *4*	6.69 *3*	av Eβ=712.8 *54* E(decay): 1950 keV *230* measured in coincidence with 433.8γ (1975We23).
(2031 *13*)	475.033	0.92 *11*	7.57 *6*	av Eβ=732.9 *54*
(2034 *13*)	471.567	≤0.8	≥7.6	av Eβ=734.3 *54* E(decay): 1970 keV *240* measured in coincidence with 369.7γ (1975We23).
(2067 *13*)	438.795	0.20 *16*	8.3 *4*	av Eβ=747.8 *54*
(2122 *13*)	384.355	1.12 *22*	7.56 *9*	av Eβ=770.3 *54*
(2209 *13*)	296.576	3.0 *6*	7.19 *9*	av Eβ=806.5 *54*
(2222‡ *13*)	284.280	≤0.9	≥7.7	av Eβ=811.6 *54*
(2329 *13*)	176.973			Iβ⁻: The intensity imbalance implies Iβ⁻=4.8 *18*, but the low-energy decay branches from this level are not well defined.
(2345 *13*)	161.051	5.0 *17*	7.07 *15*	av Eβ=862.8 *55*
(2353 *13*)	153.275	1.00 *14*	7.78 *7*	av Eβ=866.0 *55*
(2385 *13*)	120.711	4.9 *16*	7.11 *15*	av Eβ=879.6 *55*
(2404 *13*)	101.8942	2.3 *10*	8.64[1u] *19*	av Eβ=851.9 *53*
(2416 *13*)	90.0343	18 *5*	6.56 *13*	av Eβ=892.4 *55*

† Absolute intensity per 100 decays.
‡ Existence of this branch is questionable.

$\gamma(^{227}Ra)$

Iγ normalization: From the decay scheme by assuming no direct β^- feeding to the g.s. (3/2$^+$), 1.74-keV (5/2$^+$), 25.8-keV (5/2$^+$), and 64.1-keV (7/2$^+$) levels of ^{227}Ra, and by setting Σ I(γ+ce)=100% to these levels. No significant β^- feeding is expected to the 3/2$^+$, 3/2[631] g.s. of ^{227}Ra in the β^- decay of ^{227}Fr (1/2$^+$,1/2[400]), since such a transition would be hindered (ΔN=2). Similarly, no β^- decay branch to the 221-keV (3/2[631]) level of ^{231}Th is observed in the β^- decay of ^{231}Ac (1/2[400]) (1986Gi08). Possible mixing of the parent state (1/2[400]) with the 1/2[660] orbital would also lead to a hindered decay, since Δn_z=3. An experimental value of 4% 1 for the absolute intensity of the 369.7γ, reported by 1981Vo03, seems to be in error, since it would lead to≈125% feeding to the ground state and the 1.74-keV state.

E_γ[†]	I_γ[†c]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[‡]	α[a]	Comments
(1.733[&] *12*)	3.07×10^{-7}	1.733	(5/2)$^+$	0.0	3/2$^+$	[M1+E2]	3.0×10^7 *3*	I$_\gamma$: from intensity balance by assuming no direct β^- decay feeding to this level.
(11.860[&] *3*)	≤0.0054[@]	101.8942	5/2$^-$	90.0343	3/2$^-$	[M1+E2]		α(M)=303 *5* α(N)=80.0 *12*; α(O)=18.3 *3*; α(P)=3.18 *5*; α(Q)=0.251 *4*
(12.296[&] *6*)	≤0.0025[@]	296.576	1/2$^-$	284.280	3/2$^-$	[M1+E2]		α(M)=272 *4* α(N)=71.9 *11*; α(O)=16.40 *23*; α(P)=2.86 *4*; α(Q)=0.225 *4*
(15.922[&] *7*)	≤0.011[@]	176.973	(5/2)$^+$	161.051	3/2$^+$	[M1+E2]		
(25.768[&] *3*)	0.012	25.768	5/2$^+$	0.0	3/2$^+$	[M1+E2]	3.0×10^3 *4*	I$_\gamma$: from intensity balance by assuming no direct β^- decay feeding to this level.
37.9 *1*	0.82 *19*	101.8942	5/2$^-$	64.077	7/2$^+$	E1	1.466 *23*	α(L)=1.105 *18*; α(M)=0.273 *5* α(N)=0.0702 *11*; α(O)=0.01462 *23*; α(P)=0.00203 *4*; α(Q)=7.20×10^{-5} *11* Mult.: from α(M)exp≤1.5 (1987Bo04).
(40.340[&] *6*)	≤0.045[@]	161.051	3/2$^+$	120.711	1/2$^+$	[M1+E2]	44.2	α(L)=33.5 *5*; α(M)=8.02 *12* α(N)=2.12 *3*; α(O)=0.483 *7*; α(P)=0.0842 *12*; α(Q)=0.00663 *10*
(56.262[&] *6*)	≤0.011[@]	176.973	(5/2)$^+$	120.711	1/2$^+$	[E2]	147.5	α(L)=108.5 *16*; α(M)=29.4 *5* α(N)=7.76 *11*; α(O)=1.645 *23*; α(P)=0.236 *4*; α(Q)=0.000524 *8*
64.085[#] *10*	0.046 *9*	64.077	7/2$^+$	0.0	3/2$^+$	[E2]	78.8	α(L)=57.9 *9*; α(M)=15.72 *22* α(N)=4.15 *6*; α(O)=0.880 *13*; α(P)=0.1265 *18*; α(Q)=0.000301 *5* I$_\gamma$: from intensity balance by assuming no direct β^- decay feeding to this level. Note that Iγ≈0.4 is reported by 1981Vo03, but it results in a significant feeding to this level, which seem highly unlikely given the ΔL=3 nature of the transition.
64.267[#] *2*	18.3 *19*	90.0343	3/2$^-$	25.768	5/2$^+$	E1	0.358	α(L)=0.271 *4*; α(M)=0.0659 *10* α(N)=0.01704 *24*; α(O)=0.00365 *6*; α(P)=0.000546 *8*; α(Q)=2.36×10^{-5} *4* Mult.: from α(L1)exp+α(L2)exp≤0.20 and α(L3)exp≤0.10 (1987Bo04). Other value: α(L)exp + α(M)exp≤2.6, from γ-ray intensity balance in ^{226}Ra(n,γ) E=thermal (1981Vo03).
76.1 *1*	0.19 *3*	101.8942	5/2$^-$	25.768	5/2$^+$	[E1]	0.228	α(L)=0.1727 *25*; α(M)=0.0419 *6*

$^{227}_{88}Ra_{139}$-3

γ(^{227}Ra) (continued)

E_γ[†]	I_γ[†c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[‡b]	α[a]	Comments
									α(N)=0.01084 16; α(O)=0.00234 4; α(P)=0.000357 6; α(Q)=1.629×10^{-5} 24 Mult.: α(L1)exp+α(L2)exp≤13; α(L3)exp≤4.8 (1987Bo04).
88.301[&e] 12	≤1.6[@]	90.0343	3/2$^-$	1.733	(5/2)$^+$	[E1]		0.1536	α(L)=0.1163 17; α(M)=0.0281 4 α(N)=0.00729 11; α(O)=0.001583 23; α(P)=0.000245 4; α(Q)=1.173×10^{-5} 17
90.035[#] 2	49 5	90.0343	3/2$^-$	0.0	3/2$^+$	E1		0.1458	α(L)=0.1105 16; α(M)=0.0267 4 α(N)=0.00693 10; α(O)=0.001504 21; α(P)=0.000233 4; α(Q)=1.123×10^{-5} 16 Mult.: from (α(L1)exp + α(L2)exp)≤0.09, α(L3)exp≤0.03, and α(M)exp=0.026 5 (1987Bo04). Other: (α(L)exp + α(M)exp)≤0.9, from γ-ray intensity balance in ^{226}Ra(n,γ) E=thermal (1981Vo03).
100.1 2	3.4 7	101.8942	5/2$^-$	1.733	(5/2)$^+$	E1		0.1101 17	α(L)=0.0834 13; α(M)=0.0201 3 α(N)=0.00523 8; α(O)=0.001139 17; α(P)=0.000178 3; α(Q)=8.87×10^{-6} 13 Mult.: from α(L)exp≤0.08 (1987Bo04).
101.894[#] 2	4.5 7	101.8942	5/2$^-$	0.0	3/2$^+$	E1		0.1051	α(L)=0.0796 12; α(M)=0.0192 3 α(N)=0.00499 7; α(O)=0.001088 16; α(P)=0.0001704 24; α(Q)=8.52×10^{-6} 12 Mult.: from α(L)exp≤0.07 (1987Bo04). Other: (α(L)exp + α(M)exp)≤2.6, from γ-ray intensity balance in ^{226}Ra(n,γ) E=thermal (1981Vo03).
107.306[#] 4	0.75 7	284.280	3/2$^-$	176.973	(5/2)$^+$	E1		0.401	α(K)=0.309 5; α(L)=0.0694 10; α(M)=0.01674 24 α(N)=0.00435 6; α(O)=0.000950 14; α(P)=0.0001494 21; α(Q)=7.59×10^{-6} 11 Mult.: from α(L)exp≤0.35 (1987Bo04).
113.03[#] 5	0.11 4	176.973	(5/2)$^+$	64.077	7/2$^+$	[M1+E2]		11.01	α(K)=8.82 13; α(L)=1.655 24; α(M)=0.396 6 α(N)=0.1044 15; α(O)=0.0238 4; α(P)=0.00415 6; α(Q)=0.000326 5
120.709[#] 8	1.76 19	120.711	1/2$^+$	0.0	3/2$^+$	M1(+E2)	<0.3	8.94 24	α(K)=7.0 3; α(L)=1.43 7; α(M)=0.347 20 α(N)=0.092 6; α(O)=0.0207 11; α(P)=0.00356 14; α(Q)=0.000260 11 Mult.: from α(K)exp=6.6 13 (γ-K x ray coin) (1981Vo03), and α(L)exp=1.0 3 (coincidence measurement) (1987Bo04).
123.17 5	0.17 2	284.280	3/2$^-$	161.051	3/2$^+$	[E1]		0.290	α(K)=0.226 4; α(L)=0.0483 7; α(M)=0.01163 17 α(N)=0.00303 5; α(O)=0.000664 10; α(P)=0.0001055 15; α(Q)=5.57×10^{-6} 8
131.0 1	0.14 2	284.280	3/2$^-$	153.275	(1/2,3/2)$^+$	[E1]		0.250	α(K)=0.196 3; α(L)=0.0411 6; α(M)=0.00989 14 α(N)=0.00258 4; α(O)=0.000566 8; α(P)=9.03×10^{-5} 13; α(Q)=4.85×10^{-6} 7

γ(^{227}Ra) (continued)

E_γ[†]	I_γ[†c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	α[a]	Comments
135.280[#] *8*	0.90 *26*	161.051	3/2+	25.768	5/2+	[M1+E2]	6.61	α(K)=5.31 *8*; α(L)=0.988 *14*; α(M)=0.236 *4* α(N)=0.0623 *9*; α(O)=0.01421 *20*; α(P)=0.00248 *4*; α(Q)=0.000194 *3*
135.525[#] *5*	1.3 *5*	296.576	1/2−	161.051	3/2+	(E1)	0.230	α(K)=0.181 *3*; α(L)=0.0377 *6*; α(M)=0.00905 *13* α(N)=0.00236 *4*; α(O)=0.000518 *8*; α(P)=8.29×10^{-5} *12*; α(Q)=4.49×10^{-6} *7* Mult.: from α(L)exp(135.5γ + 135.3γ)=0.3 *1* either 135.5γ or 135.3γ must be E1. Decay scheme requires E1 multipolarity for 135.5γ (1987Bo04).
139.65 *10*	0.09 *2*	523.851	(3/2)−	384.355	1/2+,3/2+	[E1]	0.214	α(K)=0.1683 *24*; α(L)=0.0348 *5*; α(M)=0.00837 *12* α(N)=0.00218 *3*; α(O)=0.000480 *7*; α(P)=7.69×10^{-5} *11*; α(Q)=4.20×10^{-6} *6*
x145.139[#] *16*	0.09 *1*							
149.3 *1*	0.19 *2*	1468.14	1/2,3/2	1318.84	1/2,3/2			
151.177[#] *21*	0.38[#] *26*	176.973	(5/2)+	25.768	5/2+	[M1,E2]	4.82	α(K)=3.87 *6*; α(L)=0.719 *10*; α(M)=0.1718 *24* α(N)=0.0453 *7*; α(O)=0.01034 *15*; α(P)=0.00180 *3*; α(Q)=0.0001413 *20*
151.553[#] *25*	0.16 *2*	153.275	(1/2,3/2)+	1.733	(5/2)+	[M1,E2]	4.79	α(K)=3.84 *6*; α(L)=0.714 *10*; α(M)=0.1706 *24* α(N)=0.0450 *7*; α(O)=0.01027 *15*; α(P)=0.00179 *3*; α(Q)=0.0001403 *20*
153.272[#] *15*	0.14 *2*	153.275	(1/2,3/2)+	0.0	3/2+	[M1,E2]	4.63	α(K)=3.72 *6*; α(L)=0.691 *10*; α(M)=0.1652 *24* α(N)=0.0436 *7*; α(O)=0.00994 *14*; α(P)=0.001733 *25*; α(Q)=0.0001359 *19*
159.37 *5*	0.28 *3*	161.051	3/2+	1.733	(5/2)+	[M1+E2]	4.15	α(K)=3.33 *5*; α(L)=0.619 *9*; α(M)=0.1478 *21* α(N)=0.0390 *6*; α(O)=0.00890 *13*; α(P)=0.001551 *22*; α(Q)=0.0001216 *17*
159.742[#] *41*	0.09[#] *4*	598.51	(3/2+)	438.795	(3/2)+	[M1,E2]	4.12	α(K)=3.31 *5*; α(L)=0.614 *9*; α(M)=0.1469 *21* α(N)=0.0387 *6*; α(O)=0.00884 *13*; α(P)=0.001540 *22*; α(Q)=0.0001208 *17*
161.052[#] *13*	0.54 *5*	161.051	3/2+	0.0	3/2+	M1,E2	4.03	α(K)=3.24 *5*; α(L)=0.600 *9*; α(M)=0.1435 *20* α(N)=0.0378 *6*; α(O)=0.00863 *12*; α(P)=0.001505 *21*; α(Q)=0.0001180 *17* Mult.: from α(K)exp≤4.5 and α(L)exp≤0.65 (1987Bo04).
163.563[#] *7*	1.98 *19*	284.280	3/2−	120.711	1/2+	E1	0.1462	α(K)=0.1156 *17*; α(L)=0.0232 *4*; α(M)=0.00556 *8* α(N)=0.001449 *21*; α(O)=0.000320 *5*; α(P)=5.18×10^{-5} *8*; α(Q)=2.94×10^{-6} *5* Mult.: from α(K)exp≤0.5 and α(L)exp≤0.04 (1987Bo04).
x173.9 *3*	0.09 *2*							
175.228[#] *14*	0.6 *4*	176.973	(5/2)+	1.733	(5/2)+	M1,E2	3.17	α(K)=2.55 *4*; α(L)=0.472 *7*; α(M)=0.1129 *16* α(N)=0.0298 *5*; α(O)=0.00679 *10*; α(P)=0.001184 *17*; α(Q)=9.28×10^{-5} *13*

γ(^{227}Ra) (continued)

E_γ[†]	I_γ[†c]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[‡]	δ[‡b]	α[a]	Comments
									Mult.: α(K)exp≤5.6, α(L)exp≤0.4 and α(M)exp≤0.13 (1987Bo04).
175.867[#] *4*	1.3 *3*	296.576	1/2$^-$	120.711	1/2$^+$	(E1)		0.1227	α(K)=0.0974 *14*; α(L)=0.0192 *3*; α(M)=0.00461 *7* α(N)=0.001203 *17*; α(O)=0.000266 *4*; α(P)=4.33×10^{-5} *6*; α(Q)=2.50×10^{-6} *4* Mult.: from α(K)exp≤2.6, α(L)exp≤0.18, and α(M)exp≤0.06 (1987Bo04).
178.47 *10*	0.28 *4*	475.033	3/2$^+$	296.576	1/2$^-$	E1		0.1185	α(K)=0.0940 *14*; α(L)=0.0185 *3*; α(M)=0.00444 *7* α(N)=0.001159 *17*; α(O)=0.000257 *4*; α(P)=4.17×10^{-5} *6*; α(Q)=2.42×10^{-6} *4* Mult.: from α(L)exp≤0.28 (1987Bo04).
182.394[#] *15*	0.34 *4*	284.280	3/2$^-$	101.8942	5/2$^-$	M1+E2	0.6 *3*	2.3 *4*	α(K)=1.7 *4*; α(L)=0.433 *10*; α(M)=0.107 *5* α(N)=0.0283 *13*; α(O)=0.00633 *21*; α(P)=0.001054 *15*; α(Q)=6.3×10^{-5} *14* Mult.: from α(K)exp=1.8 *4* and α(L)exp=0.52 *10* (1987Bo04).
187.274[#] *35*	0.09 *3*	471.567	3/2$^-$	284.280	3/2$^-$	[M1,E2]		2.63	α(K)=2.12 *3*; α(L)=0.391 *6*; α(M)=0.0935 *14* α(N)=0.0247 *4*; α(O)=0.00563 *8*; α(P)=0.000981 *14*; α(Q)=7.69×10^{-5} *11*
194.255[#] *10*	0.19 *2*	284.280	3/2$^-$	90.0343	3/2$^-$	M1,E2		2.37	α(K)=1.91 *3*; α(L)=0.353 *5*; α(M)=0.0843 *12* α(N)=0.0222 *4*; α(O)=0.00507 *8*; α(P)=0.000884 *13*; α(Q)=6.93×10^{-5} *10* Mult.: α(K)exp≤3.3 α(L)exp≤0.7 (1987Bo04).
200.85 *5*	0.75 *7*	675.863	1/2$^-$	475.033	3/2$^+$	[E1]		0.0893	α(K)=0.0712 *10*; α(L)=0.01376 *20*; α(M)=0.00329 *5* α(N)=0.000860 *12*; α(O)=0.000191 *3*; α(P)=3.12×10^{-5} *5*; α(Q)=1.86×10^{-6} *3*
^{x}202.394[#] *4*	0.10 *2*								
204.30 *1*	3.7 *3*	675.863	1/2$^-$	471.567	3/2$^-$	M1(+E2)	≤0.7	1.8 *3*	α(K)=1.41 *25*; α(L)=0.303 *6*; α(M)=0.0737 *12* α(N)=0.0195 *4*; α(O)=0.00439 *7*; α(P)=0.000747 *23*; α(Q)=5.1×10^{-5} *9* Mult.: from α(K)exp=1.5 *3* (coincidence measurement), α(L)exp=0.34 *4* and α(M)exp=0.076 *1* (1987Bo04). Other value: α(K)exp=1.5 *3* (γ-K x ray coin) (1981Vo03).
206.539[#] *5*	0.67 *7*	296.576	1/2$^-$	90.0343	3/2$^-$	[M1+E2]		2.00	α(K)=1.607 *23*; α(L)=0.297 *5*; α(M)=0.0709 *10* α(N)=0.0187 *3*; α(O)=0.00427 *6*; α(P)=0.000744 *11*; α(Q)=5.83×10^{-5} *9*
207.852[#] *20*	0.08[#] *2*	731.650	3/2$^+$	523.851	(3/2)$^-$	[E1]		0.0823	α(K)=0.0657 *10*; α(L)=0.01263 *18*; α(M)=0.00302 *5* α(N)=0.000789 *11*; α(O)=0.0001752 *25*; α(P)=2.87×10^{-5} *4*; α(Q)=1.727×10^{-6} *25*
^{x}225.469[#] *39*	0.09 *2*								
237.2 *2*	0.07 *2*	675.863	1/2$^-$	438.795	(3/2)$^+$	[E1]		0.0603	α(K)=0.0483 *7*; α(L)=0.00911 *13*; α(M)=0.00218 *3* α(N)=0.000569 *8*; α(O)=0.0001266 *18*; α(P)=2.09×10^{-5} *3*; α(Q)=1.292×10^{-6} *19*

$^{227}_{88}$Ra$_{139}$-6

γ(^{227}Ra) (continued)

E_γ [†]	I_γ [†c]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [‡]	δ [‡b]	α [a]	Comments
[x]249.3 *1*	0.08 *2*								
[x]251.9 *1*	0.08 *2*								
263.7 *1*	0.06 *2*	384.355	1/2$^+$,3/2$^+$	120.711	1/2$^+$	[M1,E2]		1.012	α(K)=0.814 *12*; α(L)=0.1498 *21*; α(M)=0.0358 *5* α(N)=0.00943 *14*; α(O)=0.00215 *3*; α(P)=0.000375 *6*; α(Q)=2.94×10^{-5} *5*
[x]270.6[e] *1*	0.06 *1*								E_γ: Tentative assignment to 296 level by 1981Vo03 is not consistent with adopted level scheme.
284.314[#] *30*	0.19 *4*	284.280	3/2$^-$	0.0	3/2$^+$	(E1)		0.0397	α(K)=0.0320 *5*; α(L)=0.00588 *9*; α(M)=0.001402 *20* α(N)=0.000367 *6*; α(O)=8.19×10^{-5} *12*; α(P)=1.364×10^{-5} *19*; α(Q)=8.74×10^{-7} *13* Mult.: α(K)exp≤0.5 (1987Bo04).
291.55 *5*	0.93 *7*	675.863	1/2$^-$	384.355	1/2$^+$,3/2$^+$	(E1)		0.0375	α(K)=0.0302 *5*; α(L)=0.00554 *8*; α(M)=0.001320 *19* α(N)=0.000345 *5*; α(O)=7.72×10^{-5} *11*; α(P)=1.286×10^{-5} *18*; α(Q)=8.28×10^{-7} *12* Mult.: E1 or E2 from α(K)exp≤0.18 (1987Bo04). Decay scheme requires E1. α(K)exp=0.54 *24*, a less reliable value measured by γ-K x ray coin, suggests M1 multipolarity (1981Vo03).
294.52[#] *11*	0.30 *4*	471.567	3/2$^-$	176.973	(5/2)$^+$	(E1)		0.0367	α(K)=0.0295 *5*; α(L)=0.00541 *8*; α(M)=0.001289 *18* α(N)=0.000337 *5*; α(O)=7.54×10^{-5} *11*; α(P)=1.257×10^{-5} *18*; α(Q)=8.11×10^{-7} *12* Mult.: E1 or E2 from α(K)exp≤0.06 (1987Bo04). Decay scheme requires E1.
296.7 *1*	0.04 *2*	296.576	1/2$^-$	0.0	3/2$^+$	[E1]		0.0361	α(K)=0.0291 *4*; α(L)=0.00532 *8*; α(M)=0.001266 *18* α(N)=0.000331 *5*; α(O)=7.41×10^{-5} *11*; α(P)=1.235×10^{-5} *18*; α(Q)=7.98×10^{-7} *12*
[x]306.2 *2*	0.04 *2*								
321.763[#] *25*	0.12 *2*	475.033	3/2$^+$	153.275	(1/2,3/2)$^+$	M1(+E2)	<0.6	0.52 *7*	α(K)=0.42 *6*; α(L)=0.081 *6*; α(M)=0.0195 *12* α(N)=0.0051 *3*; α(O)=0.00117 *8*; α(P)=0.000202 *15*; α(Q)=1.50×10^{-5} *20* Mult.: from α(K)exp=0.6 *2* (1987Bo04).
347.251[#] *18*	0.26 *2*	731.650	3/2$^+$	384.355	1/2$^+$,3/2$^+$	M1(+E2)	<0.4	0.45 *3*	α(K)=0.360 *24*; α(L)=0.068 *3*; α(M)=0.0162 *6* α(N)=0.00427 *15*; α(O)=0.00097 *4*; α(P)=0.000169 *7*; α(Q)=1.29×10^{-5} *9* Mult.: from α(K)exp=0.46 *8* (1987Bo04).
348.803[#] *25*	0.10 *1*	438.795	(3/2)$^+$	90.0343	3/2$^-$	[E1]		0.0252	α(K)=0.0204 *3*; α(L)=0.00365 *6*; α(M)=0.000868 *13* α(N)=0.000227 *4*; α(O)=5.09×10^{-5} *8*; α(P)=8.55×10^{-6} *12*; α(Q)=5.69×10^{-7} *8*
350.85 *5*	0.25 *2*	471.567	3/2$^-$	120.711	1/2$^+$	[E1]		0.0249	α(K)=0.0201 *3*; α(L)=0.00360 *5*; α(M)=0.000856 *12* α(N)=0.000224 *4*; α(O)=5.03×10^{-5} *7*; α(P)=8.44×10^{-6} *12*; α(Q)=5.62×10^{-7} *8*

$^{227}_{88}Ra_{139}$-7

γ(^{227}Ra) (continued)

E_γ[†]	I_γ[†c]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[‡]	δ[‡b]	α[a]	Comments
362.86 *5*	0.28 *2*	523.851	(3/2)$^-$	161.051	3/2$^+$	(E1)		0.0231	α(K)=0.0187 *3*; α(L)=0.00334 *5*; α(M)=0.000793 *12* α(N)=0.000208 *3*; α(O)=4.66×10^{-5} *7*; α(P)=7.83×10^{-6} *11*; α(Q)=5.24×10^{-7} *8* Mult.: E1 or E2 from α(K)exp≤0.07 (1987Bo04). Decay scheme requires E1.
369.669[#] *8*	4.00 *22*	471.567	3/2$^-$	101.8942	5/2$^-$	M1(+E2)	<0.2	0.394 *9*	α(K)=0.317 *7*; α(L)=0.0584 *11*; α(M)=0.01394 *24* α(N)=0.00367 *7*; α(O)=0.000838 *15*; α(P)=0.000146 *3*; α(Q)=1.138×10^{-5} *25* Mult.: from α(K)exp=0.34 *2* and α(L)exp=0.056 *6* (1987Bo04).
373.122[#] *61*	0.09 *2*	475.033	3/2$^+$	101.8942	5/2$^-$	[E1]		0.0217	α(K)=0.01762 *25*; α(L)=0.00313 *5*; α(M)=0.000744 *11* α(N)=0.000195 *3*; α(O)=4.37×10^{-5} *7*; α(P)=7.36×10^{-6} *11*; α(Q)=4.95×10^{-7} *7*
379.15 *10*	0.12 *2*	675.863	1/2$^-$	296.576	1/2$^-$	M1+E0		3.0 *10*	Mult.: from α(K)exp=2.4 *8* (1987Bo04). α: From EKC=2.4 8 (1987BO04) and CC/KC=1.24 3 from BRICC.
381.556[#] *15*	2.54 *19*	471.567	3/2$^-$	90.0343	3/2$^-$	M1(+E2)	<0.22	0.361 *9*	α(K)=0.290 *8*; α(L)=0.0534 *10*; α(M)=0.01275 *24* α(N)=0.00336 *7*; α(O)=0.000767 *15*; α(P)=0.000134 *3*; α(Q)=1.04×10^{-5} *3* Mult.: from α(K)exp=0.36 *5* and α(L)exp=0.067 *10* (1987Bo04).
384.348[#] *8*	2.28 *19*	384.355	1/2$^+$,3/2$^+$	0.0	3/2$^+$	M1+E2	0.5 *3*	0.30 *6*	α(K)=0.24 *5*; α(L)=0.047 *6*; α(M)=0.0114 *13* α(N)=0.0030 *4*; α(O)=0.00068 *8*; α(P)=0.000117 *15*; α(Q)=8.6×10^{-6} *17* Mult.: from α(K)exp=0.24 *4* and α(L)exp≤0.08 (1987Bo04).
391.57 *2*	3.29 *22*	675.863	1/2$^-$	284.280	3/2$^-$	M1(+E2)	<0.3	0.331 *13*	α(K)=0.266 *11*; α(L)=0.0492 *14*; α(M)=0.0118 *3* α(N)=0.00310 *8*; α(O)=0.000707 *19*; α(P)=0.000123 *4*; α(Q)=9.5×10^{-6} *4* Mult.: from α(K)exp=0.29 *3* and α(L)exp≤0.08 (1987Bo04).
403.19 *10*	0.42 *3*	523.851	(3/2)$^-$	120.711	1/2$^+$	E1		0.0184	α(K)=0.01495 *21*; α(L)=0.00263 *4*; α(M)=0.000625 *9* α(N)=0.0001637 *23*; α(O)=3.68×10^{-5} *6*; α(P)=6.21×10^{-6} *9*; α(Q)=4.23×10^{-7} *6* Mult.: from α(K)exp≤0.02 (1987Bo04).
411.140[#] *80*	0.15[#] *4*	475.033	3/2$^+$	64.077	7/2$^+$	[E2]		0.0628	α(K)=0.0372 *6*; α(L)=0.0191 *3*; α(M)=0.00497 *7* α(N)=0.001312 *19*; α(O)=0.000286 *4*; α(P)=4.47×10^{-5} *7*; α(Q)=1.399×10^{-6} *20*
413.029[#] *11*	0.39 *3*	438.795	(3/2)$^+$	25.768	5/2$^+$	M1(+E2)	<0.4	0.280 *17*	α(K)=0.225 *15*; α(L)=0.0418 *18*; α(M)=0.0100 *4* α(N)=0.00264 *11*; α(O)=0.00060 *3*; α(P)=0.000105 *5*; α(Q)=8.1×10^{-6} *5* Mult.: from α(K)exp=0.29 *5* (1987Bo04).
422.0[e] *2*	0.09 *2*	523.851	(3/2)$^-$	101.8942	5/2$^-$	[M1+E2]		0.280	α(K)=0.226 *4*; α(L)=0.0411 *6*; α(M)=0.00980 *14* α(N)=0.00258 *4*; α(O)=0.000589 *9*; α(P)=0.0001028 *15*; α(Q)=8.06×10^{-6} *12*

γ(^{227}Ra) (continued)

E_γ[†]	I_γ[†c]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[‡]	δ[‡b]	α[a]	Comments
433.824[#] 9	6.4 4	523.851	(3/2)$^-$	90.0343	3/2$^-$	M1(+E2)	<0.4	0.246 15	α(K)=0.197 13; α(L)=0.0366 17; α(M)=0.0087 4 α(N)=0.00231 10; α(O)=0.000525 23; α(P)=9.1×10^{-5} 5; α(Q)=7.0×10^{-6} 5 Mult.: from α(K)exp=0.22 2, α(L)exp=0.037 6 and α(M)exp=0.012 3 (1987Bo04).
434.92[#] 13	0.09[#] 3	731.650	3/2$^+$	296.576	1/2$^-$	[E1]		0.01571	α(K)=0.01277 18; α(L)=0.00223 4; α(M)=0.000529 8 α(N)=0.0001385 20; α(O)=3.12×10^{-5} 5; α(P)=5.27×10^{-6} 8; α(Q)=3.64×10^{-7} 5
437.071[#] 28	0.13 2	438.795	(3/2)$^+$	1.733	(5/2)$^+$	(M1,E2)		0.255	α(K)=0.205 3; α(L)=0.0373 6; α(M)=0.00891 13 α(N)=0.00235 4; α(O)=0.000536 8; α(P)=9.34×10^{-5} 13; α(Q)=7.33×10^{-6} 11 Mult.: from α(K)exp(437.1γ + 438.8γ)=0.21 5 (1987Bo04).
438.768[#] 18	0.19 3	438.795	(3/2)$^+$	0.0	3/2$^+$	(M1,E2)		0.252	α(K)=0.203 3; α(L)=0.0370 6; α(M)=0.00881 13 α(N)=0.00232 4; α(O)=0.000530 8; α(P)=9.24×10^{-5} 13; α(Q)=7.25×10^{-6} 11 Mult.: from α(K)exp(438.8γ + 437.1γ)=0.21 5 (1987Bo04).
445.76 10	0.13 3	471.567	3/2$^-$	25.768	5/2$^+$	[E1]		0.01492	α(K)=0.01214 17; α(L)=0.00211 3; α(M)=0.000501 7 α(N)=0.0001313 19; α(O)=2.95×10^{-5} 5; α(P)=5.00×10^{-6} 7; α(Q)=3.46×10^{-7} 5
449.263[#] 29	0.46 4	475.033	3/2$^+$	25.768	5/2$^+$	M1(+E2)	<0.5	0.218 19	α(K)=0.175 17; α(L)=0.0326 21; α(M)=0.0078 5 α(N)=0.00206 13; α(O)=0.00047 3; α(P)=8.1×10^{-5} 6; α(Q)=6.2×10^{-6} 6 Mult.: from α(K)exp=0.21 4 (1987Bo04).
469.8 3	0.13 3	471.567	3/2$^-$	1.733	(5/2)$^+$	[E1]		0.01339	α(K)=0.01091 16; α(L)=0.00189 3; α(M)=0.000447 7 α(N)=0.0001171 17; α(O)=2.64×10^{-5} 4; α(P)=4.47×10^{-6} 7; α(Q)=3.12×10^{-7} 5
473.330[#] 64	0.17 4	475.033	3/2$^+$	1.733	(5/2)$^+$	[M1+E2]		0.205	α(K)=0.1657 24; α(L)=0.0301 5; α(M)=0.00717 10 α(N)=0.00189 3; α(O)=0.000432 6; α(P)=7.53×10^{-5} 11; α(Q)=5.91×10^{-6} 9
475.016[#] 23	0.62 6	475.033	3/2$^+$	0.0	3/2$^+$	(M1,E2)		0.203	α(K)=0.1642 23; α(L)=0.0298 5; α(M)=0.00711 10 α(N)=0.00187 3; α(O)=0.000427 6; α(P)=7.45×10^{-5} 11; α(Q)=5.85×10^{-6} 9 Mult.: from α(K)exp≈0.15 (1987Bo04).
[x]497.0 2	0.10 2								
498.4 3	0.09 2	523.851	(3/2)$^-$	25.768	5/2$^+$	[E1]		0.01187	α(K)=0.00968 14; α(L)=0.001665 24; α(M)=0.000394 6 α(N)=0.0001032 15; α(O)=2.33×10^{-5} 4; α(P)=3.95×10^{-6} 6; α(Q)=2.79×10^{-7} 4
514.8 2	2.4 4	675.863	1/2$^-$	161.051	3/2$^+$	E1		0.01112	α(K)=0.00907 13; α(L)=0.001555 22; α(M)=0.000368 6 α(N)=9.64×10^{-5} 14; α(O)=2.17×10^{-5} 3; α(P)=3.70×10^{-6} 6; α(Q)=2.62×10^{-7} 4 Mult.: from α(K)exp≤0.01 (1987Bo04).

$\gamma(^{227}Ra)$ (continued)

E_γ[†]	I_γ[†c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[‡b]	α[a]	Comments
523.75 *10*	0.15 *2*	523.851	(3/2)$^-$	0.0	3/2$^+$	[E1]		0.01074	α(K)=0.00877 *13*; α(L)=0.001500 *21*; α(M)=0.000355 *5* α(N)=9.30×10^{-5} *13*; α(O)=2.10×10^{-5} *3*; α(P)=3.57×10^{-6} *5*; α(Q)=2.53×10^{-7} *4*
534.335[#] *88*	0.15[#] *4*	598.51	(3/2$^+$)	64.077	7/2$^+$	[E2]		0.0331	α(K)=0.0222 *4*; α(L)=0.00816 *12*; α(M)=0.00209 *3* α(N)=0.000550 *8*; α(O)=0.0001212 *17*; α(P)=1.94×10^{-5} *3*; α(Q)=8.06×10^{-7} *12*
555.15 *10*	3.78 *26*	675.863	1/2$^-$	120.711	1/2$^+$	E1		0.00957	α(K)=0.00782 *11*; α(L)=0.001330 *19*; α(M)=0.000314 *5* α(N)=8.24×10^{-5} *12*; α(O)=1.86×10^{-5} *3*; α(P)=3.17×10^{-6} *5*; α(Q)=2.27×10^{-7} *4* Mult.: from α(K)exp≤0.007 (1987Bo04).
572.71[#] *17*	0.12[#] *3*	598.51	(3/2$^+$)	25.768	5/2$^+$	[M1+E2]		0.1235	α(K)=0.0997 *14*; α(L)=0.0180 *3*; α(M)=0.00429 *6* α(N)=0.001131 *16*; α(O)=0.000258 *4*; α(P)=4.50×10^{-5} *7*; α(Q)=3.54×10^{-6} *5*
573.84 *10*	0.58 *4*	675.863	1/2$^-$	101.8942	5/2$^-$	(E2)		0.0282	α(K)=0.0193 *3*; α(L)=0.00659 *10*; α(M)=0.001674 *24* α(N)=0.000442 *7*; α(O)=9.75×10^{-5} *14*; α(P)=1.571×10^{-5} *22*; α(Q)=6.96×10^{-7} *10* Mult.: E1 or E2 from α(K)exp≤0.025 (1987Bo04). Decay scheme requires E2.
585.804[#] *49*	37.4 *19*	675.863	1/2$^-$	90.0343	3/2$^-$	M1(+E2)	≤0.4	0.110 *7*	α(K)=0.089 *6*; α(L)=0.0162 *8*; α(M)=0.00387 *18* α(N)=0.00102 *5*; α(O)=0.000232 *11*; α(P)=4.05×10^{-5} *20*; α(Q)=3.15×10^{-6} *19* Mult.: from α(K)exp=0.095 *10*, α(L)exp=0.018 *2*, α(M)exp=0.0046 *8* and α(N)exp=0.0011 *5* (1987Bo04).
596.76[#] *21*	0.09 *2*	598.51	(3/2$^+$)	1.733	(5/2)$^+$	[M1+E2]		0.1107	α(K)=0.0894 *13*; α(L)=0.01614 *23*; α(M)=0.00384 *6* α(N)=0.001013 *15*; α(O)=0.000231 *4*; α(P)=4.03×10^{-5} *6*; α(Q)=3.17×10^{-6} *5*
598.43[#] *18*	0.09[#] *2*	598.51	(3/2$^+$)	0.0	3/2$^+$	[M1,E2]		0.1099	α(K)=0.0888 *13*; α(L)=0.01602 *23*; α(M)=0.00382 *6* α(N)=0.001006 *15*; α(O)=0.000229 *4*; α(P)=4.00×10^{-5} *6*; α(Q)=3.15×10^{-6} *5*
[x]600.4 *5*	0.07 *2*								
629.755[#] *73*	0.14 *2*	731.650	3/2$^+$	101.8942	5/2$^-$	(E1)		0.00748	α(K)=0.00613 *9*; α(L)=0.001029 *15*; α(M)=0.000243 *4* α(N)=6.37×10^{-5} *9*; α(O)=1.439×10^{-5} *21*; α(P)=2.46×10^{-6} *4*; α(Q)=1.79×10^{-7} *3* Mult.: E1 or E2 from α(K)exp≤0.04 (1987Bo04). Decay scheme requires E1.
641.77[#] *11*	0.09 *2*	731.650	3/2$^+$	90.0343	3/2$^-$	[E1]		0.00721	α(K)=0.00591 *9*; α(L)=0.000991 *14*; α(M)=0.000234 *4* α(N)=6.13×10^{-5} *9*; α(O)=1.385×10^{-5} *20*; α(P)=2.37×10^{-6} *4*; α(Q)=1.728×10^{-7} *25* Mult.: α(L)exp≤0.06 (1987Bo04).
(675.863[&] *7*)	≤0.52[@]	675.863	1/2$^-$	0.0	3/2$^+$	[E1]		0.00654	α(K)=0.00536 *8*; α(L)=0.000894 *13*; α(M)=0.000211 *3*

$^{227}_{88}Ra_{139}$-10

$\gamma(^{227}Ra)$ (continued)

E_γ [†]	I_γ [†c]	E_i(level)	J_i^π	E_f	J_f^π	Comments
						α(N)=5.53×10^{-5} *8*; α(O)=1.250×10^{-5} *18*; α(P)=2.14×10^{-6} *3*; α(Q)=1.571×10^{-7} *22* I_γ: From Iγ(676γ)/Iγ(585γ)≤0.014 in 1996Aa01 and Iγ(585γ)=37.4 *19* in 1981Vo03.
736.9 *5*	0.17 *2*	1468.14	1/2,3/2	731.650	3/2$^+$	
743.4 *5*	0.08 *2*	1474.84	1/2,3/2	731.650	3/2$^+$	
[x]789.2 *5*	0.15 *2*					
795.3 *5*	0.09 *2*	1318.84	1/2,3/2	523.851	(3/2)$^-$	
810.4 *5*	0.09 *2*	1094.9	1/2,3/2	284.280	3/2$^-$	
846.8 *5*	0.13 *2*	1318.84	1/2,3/2	471.567	3/2$^-$	
[x]889.3 *5*	0.18 *3*					
908.5 *5*	0.07 *2*	1432.22	1/2,3/2	523.851	(3/2)$^-$	
[x]937.0 *5*	0.12 *2*					
944.6 *5*	0.10 *3*	1468.14	1/2,3/2	523.851	(3/2)$^-$	
[x]981.3 *5*	0.04 *1*					
983.5 *5*	0.05 *1*	1455.2	1/2,3/2	471.567	3/2$^-$	
993.0[d] *5*	0.20[d] *2*	1094.9	1/2,3/2	101.8942	5/2$^-$	
993.0[d] *5*	0.20[d] *2*	1432.22	1/2,3/2	438.795	(3/2)$^+$	
993.0[d] *5*	0.20[d] *2*	1468.14	1/2,3/2	475.033	3/2$^+$	
996.1 *5*	0.07 *2*	1468.14	1/2,3/2	471.567	3/2$^-$	
1005.0 *5*	0.09 *2*	1094.9	1/2,3/2	90.0343	3/2$^-$	
[x]1013.4 *5*	0.09 *2*					
1048.4 *5*	0.12 *2*	1432.22	1/2,3/2	384.355	1/2$^+$,3/2$^+$	
1147.4[d] *5*	0.06[d] *2*	1432.22	1/2,3/2	284.280	3/2$^-$	
1147.4[d] *5*	0.06[d] *2*	1444.1	1/2,3/2	296.576	1/2$^-$	
1178.2 *5*	0.09 *2*	1474.84	1/2,3/2	296.576	1/2$^-$	
1190.3 *5*	0.08 *2*	1474.84	1/2,3/2	284.280	3/2$^-$	
1217.0 *5*	0.15 *2*	1318.84	1/2,3/2	101.8942	5/2$^-$	
[x]1247.4 *5*	0.04 *1*					
[x]1272.4 *5*	0.03 *1*					
1307.1 *5*	0.56 *6*	1468.14	1/2,3/2	161.051	3/2$^+$	
1313.7 *5*	0.11 *2*	1474.84	1/2,3/2	161.051	3/2$^+$	
1342.4 *5*	0.31 *3*	1432.22	1/2,3/2	90.0343	3/2$^-$	
1347.4 *5*	0.67 *7*	1468.14	1/2,3/2	120.711	1/2$^+$	
1354.3 *8*	0.04 *1*	1444.1	1/2,3/2	90.0343	3/2$^-$	
1365.1 *5*	0.12 *2*	1455.2	1/2,3/2	90.0343	3/2$^-$	
1378.1 *5*	0.49 *5*	1468.14	1/2,3/2	90.0343	3/2$^-$	
1384.9 *5*	0.24 *3*	1474.84	1/2,3/2	90.0343	3/2$^-$	
1432.3 *5*	0.07 *1*	1432.22	1/2,3/2	0.0	3/2$^+$	
1455.3 *5*	0.25 *3*	1455.2	1/2,3/2	0.0	3/2$^+$	
1468.1 *5*	0.35 *4*	1468.14	1/2,3/2	0.0	3/2$^+$	
1474.9 *5*	0.04 *1*	1474.84	1/2,3/2	0.0	3/2$^+$	

γ(^{227}Ra) (continued)

[†] From 1981Vo03, unless otherwise stated.

[‡] From measured conversion coefficients in 1987Bo04, deduced by using Iγ from 1981Vo03 and α(K)exp(586γ)=0.095 *10* (1987Bo04). Uncertainties in the conversion coefficients are statistical. Additional systematic uncertainties of≈10% and≈50% for values deduced from singles and coincidence measurements, respectively, should also be expected.

[#] From ^{226}Ra(n,γ) E=thermal (1981Vo03).

[@] From 1996Aa01.

[&] From level energy differences.

[a] From BrIcc v2.3a (30-Jun-2013) 2008Ki07, "Frozen Orbitals" appr.

[b] If No value given it was assumed δ=1.00 for E2/M1.

[c] For absolute intensity per 100 decays, multiply by 0.74 *4*.

[d] Multiply placed with undivided intensity.

[e] Placement of transition in the level scheme is uncertain.

[x] γ ray not placed in level scheme.

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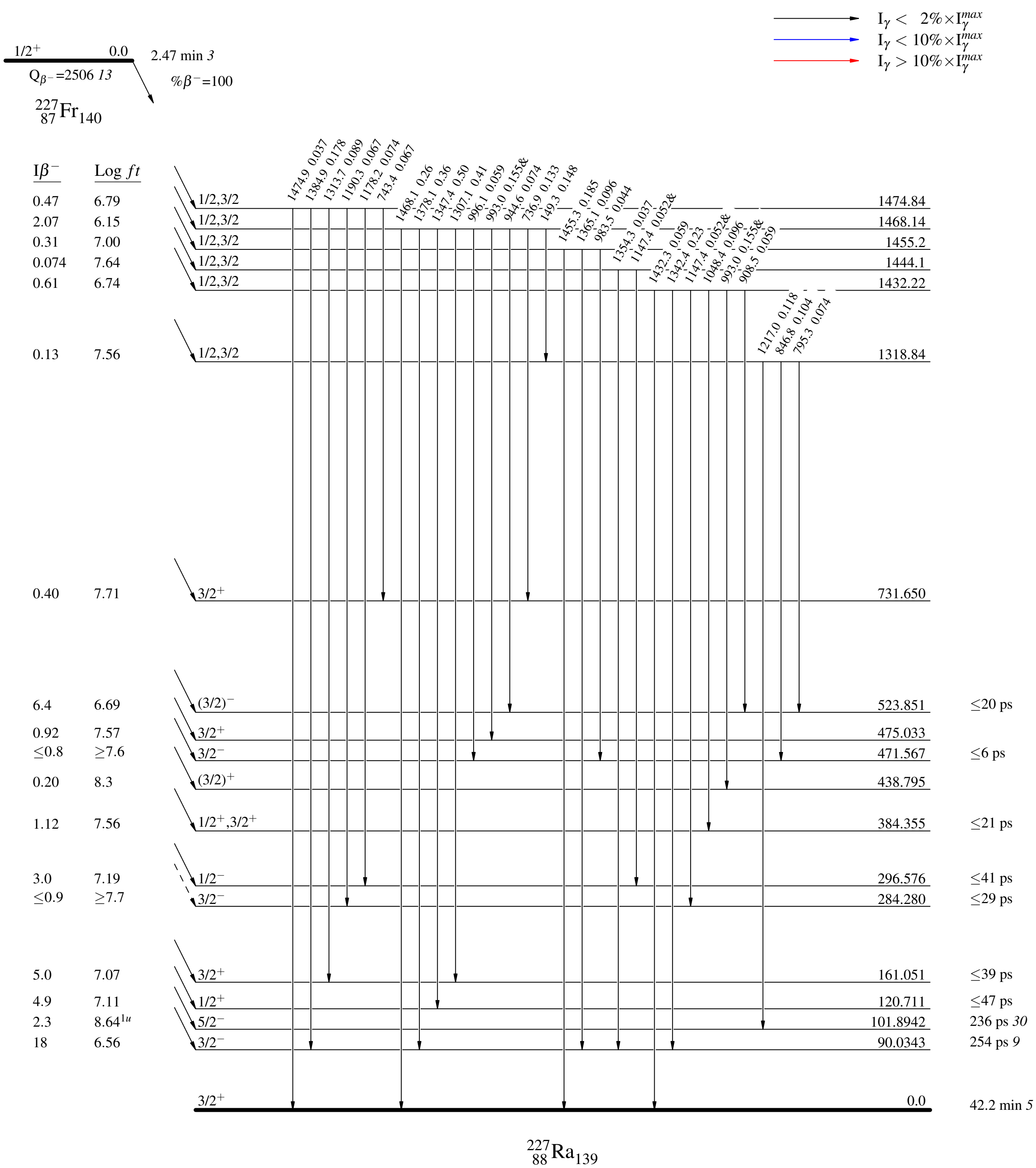
^{227}Fr β^- decay (2.47 min) 1981Vo03,1987Bo04,1996Aa01

Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given

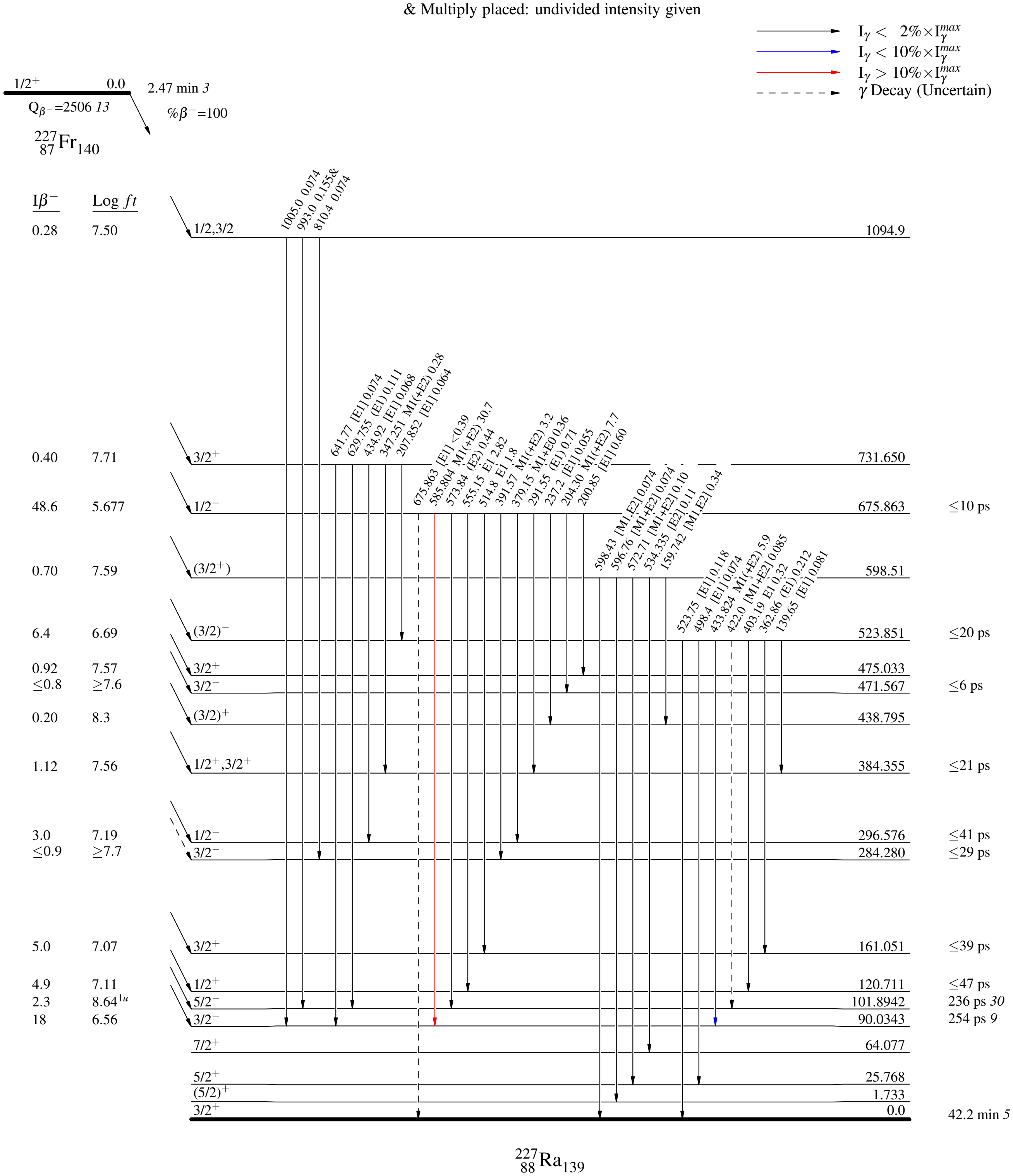
Legend



^{227}Fr β^- decay (2.47 min) 1981Vo03,1987Bo04,1996Aa01

Decay Scheme (continued)

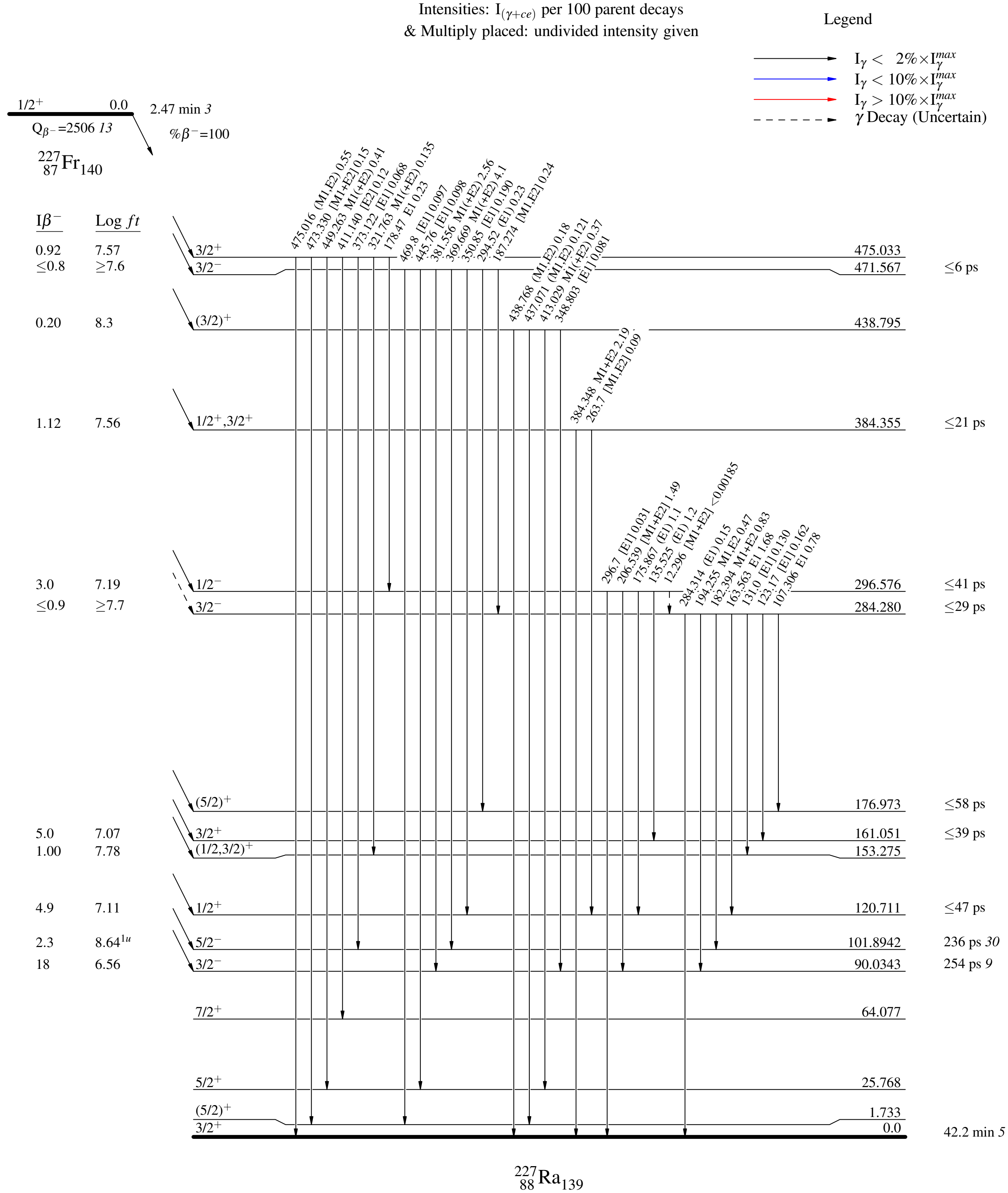
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given



^{227}Fr β^- decay (2.47 min) 1981Vo03,1987Bo04,1996Aa01

Decay Scheme (continued)

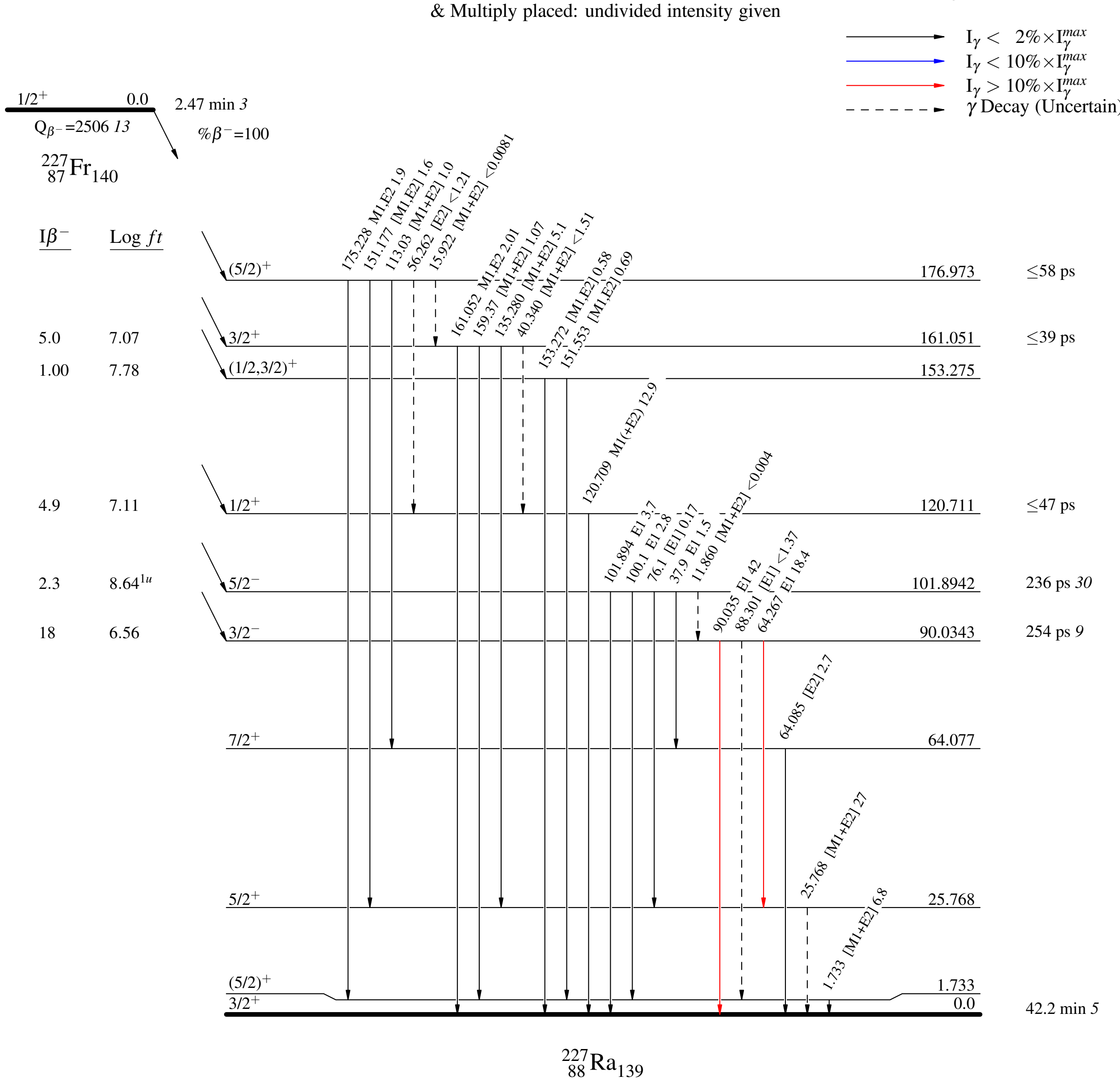
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given



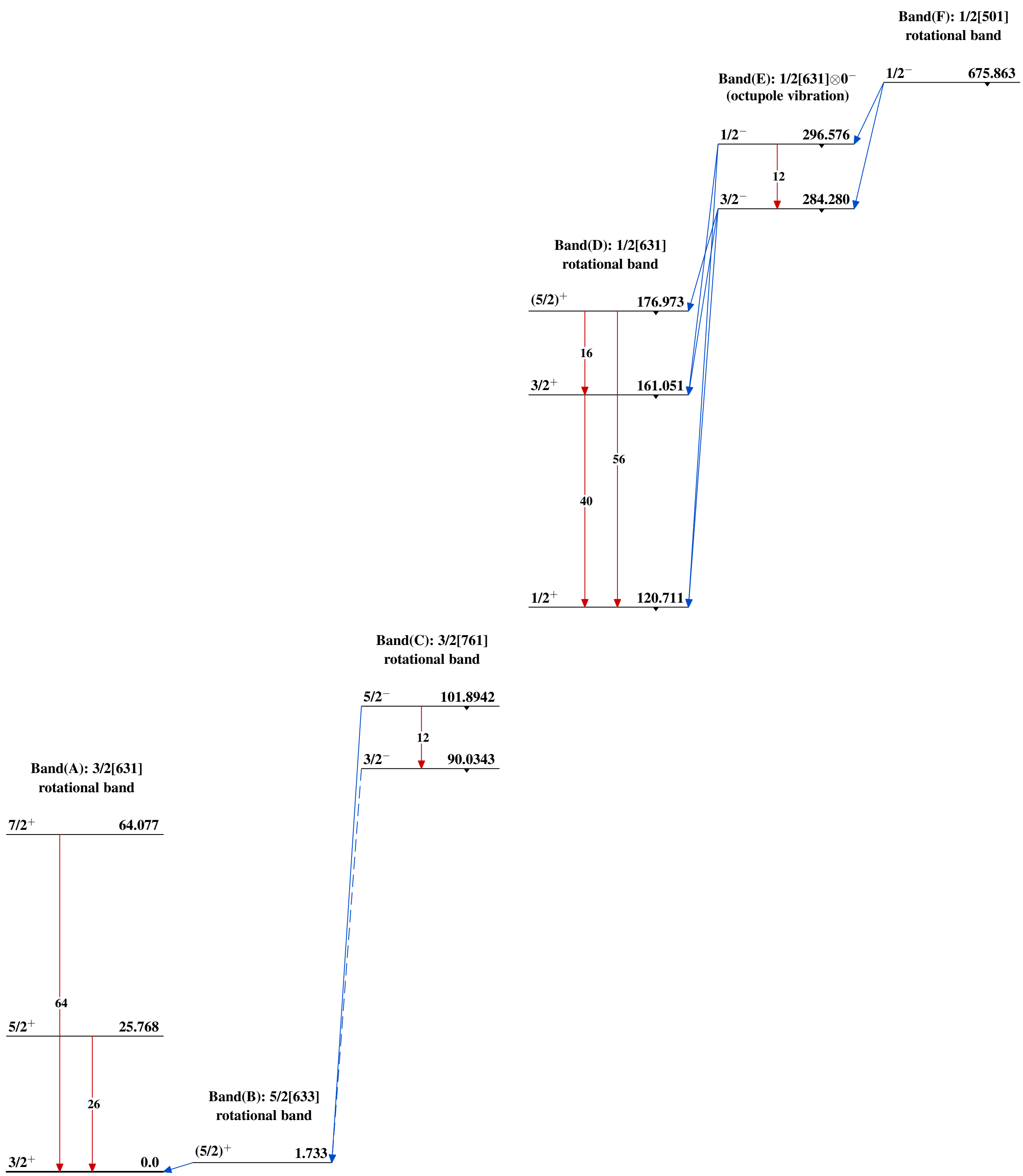
^{227}Fr β^- decay (2.47 min) 1981Vo03,1987Bo04,1996Aa01

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given



^{227}Fr β^- decay (2.47 min) 1981Vo03,1987Bo04,1996Aa01



$^{227}_{88}Ra_{139}$