^{225}Rn β^- decay 1997Bu03

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	A. K. Jain (a), R. Raut (b), J. K. Tuli	NDS 110, 1409 (2009)	1-Dec-2008

Parent: ^{225}Rn: E=0.0; J$^\pi$=7/2$^-$; $T_{1/2}$=4.66 min *4*; Q(β^-)=2.68×10^3 *SY*; %β^- decay=100.0

1997Bu03: ^{225}Fr sources from Isolde mass separator following spallation of UC_2 target by 600 MeV protons; two HPGe detectors (FWHM=1.8 keV at 1333); one HPGe x-ray detector (FWHM=0.70 keV at 122 keV); mini-Orange electron spectrometer; measured Eγ, Iγ, E(ce), I(ce), γγ coin, γ-ce coin, parent $T_{1/2}$. Supersedes 1987BoZP.

The decay scheme is taken from 1997Bu03. Note, however, that negative β^- feeding of the 28 level is implied unless δ(28γ)=0.6, significantly larger than measured values (0.32 *2* and 0.44 *2*). Also, the measured multipolarity of the 202γ is inconsistent with its placement.

^{225}Fr Levels

E(level)†	J$^\pi$‡	Comments
0.0	3/2$^-$	
28.545 *23*	5/2$^-$	Apparent %β^- feeding to level of −22 *21* may indicate that δ(29γ) is significantly larger than α(M)exp and α(N)exp imply.
82.515 *24*	7/2$^-$	
128.06 *4*	9/2$^-$	
142.59 *3*	(3/2)$^+$	
151.63 *3*	5/2$^+$	
181.66 *3*	(9/2)$^+$	
198.23 *3*	(7/2)$^+$	
203.40 *4*	(9/2)$^-$	
207.20 *3*	(5/2)$^-$	
228.36 *5*	(7/2,9/2)$^-$	
241.37 *3*	(5/2)$^+$	
293.23 *4*	(7/2)$^+$	
303.25 *5*	7/2$^+$,9/2$^+$,11/2$^+$	
330.10 *4*	(5/2,7/2)$^-$	
346.03 *4*	(9/2)$^+$	
409.04 *4*	5/2,7/2$^{(+)}$	
424.97 *8*	(5/2$^-$,7/2$^-$)	
480.09 *6*	(5/2,7/2,9/2)$^+$	
502.96 *5*	(5/2)$^-$	
559.68 *4*	7/2$^-$	
571.51 *5*	(7/2)$^-$	
618.66 *6*	(5/2,7/2,9/2)$^+$	
635.60 *5*	(3/2,5/2,7/2)$^+$	
665.18 *4*	(7/2)$^+$	
721.06 *5*	(5/2)$^-$	
744.26 *4*	(5/2,7/2)$^+$	
754.53 *5*		
778.64 *4*	7/2$^-$	
832.18 *7*	(5/2$^+$,7/2,9/2$^+$)	
839.09 *5*	(5/2,7/2,9/2)$^+$	
865.74 *4*	(7/2)$^-$	
885.95 *5*	(3/2,5/2)$^+$	
935.68 *8*	(5/2$^-$,7/2,9/2$^+$)	
979.66 *5*	(3/2$^-$,5/2)	
1047.44 *5*		
1063.03 *5*		
1101.84 *8*	(7/2,9/2,11/2)$^+$	
1185.18 *5*	(5/2$^-$,7/2)	
1226.03 *7*		

Continued on next page (footnotes at end of table)

^{225}Rn β^- decay 1997Bu03 (continued)

^{225}Fr Levels (continued)

E(level)[†]	J$^\pi$[‡]	E(level)[†]	E(level)[†]	J$^\pi$[‡]	E(level)[†]	J$^\pi$[‡]
1392.17 *6*	(5/2,7/2$^-$)	1519.42 *6*	1577.88 *7*	(5/2$^+$,7/2)	1655.35 *5*	(5/2,7/2$^+$)
1479.63 *5*	(7/2)	1526.13 *10*	1614.26 *7*	(5/2,7/2$^+$)	1749.84 *6*	(5/2,7/2$^+$)

† From least-squares adjustment of Eγ, omitting the 136.0γ, 668.05γ and 1421.0γ each of which fits its placement very poorly (at least 5σ from least-squares adjusted value), and all unresolved or multiply-placed lines.

‡ From Adopted Levels.

β^- radiations

E(decay)	E(level)	Iβ^-[†#]	Log *ft*[‡]	Comments
(930 *SY*)	1749.84	1.53 *9*	6.4 *6*	av Eβ=3.0×10^2 *12*
(1024 *SY*)	1655.35	1.32 *8*	6.6 *6*	av Eβ=3.3×10^2 *12*
(1065 *SY*)	1614.26	0.84 *6*	6.9 *5*	av Eβ=3.5×10^2 *12*
(1102 *SY*)	1577.88	1.04 *6*	6.8 *5*	av Eβ=3.6×10^2 *12*
(1153 *SY*)	1526.13	0.58 *7*	7.2 *5*	av Eβ=3.8×10^2 *12*
(1160 *SY*)	1519.42	0.93 *8*	7.0 *5*	av Eβ=3.9×10^2 *12*
(1200 *SY*)	1479.63	2.58 *15*	6.5 *5*	av Eβ=4.0×10^2 *12*
(1287 *SY*)	1392.17	0.66 *5*	7.2 *5*	av Eβ=4.4×10^2 *12*
(1453 *SY*)	1226.03	0.44 *5*	7.6 *4*	av Eβ=5.0×10^2 *12*
(1494 *SY*)	1185.18	1.73 *10*	7.1 *4*	av Eβ=5.2×10^2 *13*
(1578 *SY*)	1101.84	0.58 *5*	7.6 *4*	av Eβ=5.5×10^2 *13*
(1616 *SY*)	1063.03	1.06 *7*	7.4 *4*	av Eβ=5.7×10^2 *13*
(1632 *SY*)	1047.44	1.00 *8*	7.5 *4*	av Eβ=5.7×10^2 *13*
(1700 *SY*)	979.66	1.15 *16*	7.4 *4*	av Eβ=6.0×10^2 *13*
(1744[@] *SY*)	935.68	0.01 *3*	8.6 *5*	av Eβ=6.2×10^2 *13*
(1794 *SY*)	885.95	2.41 *22*	7.2 *3*	av Eβ=6.4×10^2 *13*
(1814 *SY*)	865.74	5.4 *3*	6.9 *3*	av Eβ=6.5×10^2 *13*
(1840 *SY*)	839.09	1.35 *10*	7.6 *3*	av Eβ=6.6×10^2 *13*
(1847 *SY*)	832.18	0.30 *6*	8.2 *3*	av Eβ=6.6×10^2 *13*
(1901 *SY*)	778.64	27.0 *15*	6.2 *3*	av Eβ=6.8×10^2 *13*
(1925[@] *SY*)	754.53	0.47 *5*	8.2 *4*	av Eβ=6.9×10^2 *13*
(1935[@] *SY*)	744.26	1.06 *19*	7.8 *3*	av Eβ=7.0×10^2 *13*
(1958 *SY*)	721.06	3.97 *24*	7.1 *3*	av Eβ=7.1×10^2 *13*
(2014 *SY*)	665.18	1.11 *9*	7.8 *3*	av Eβ=7.3×10^2 *13*
(2108 *SY*)	571.51	1.11 *8*	7.8 *3*	av Eβ=7.7×10^2 *13*
(2120 *SY*)	559.68	6.2 *4*	7.1 *3*	av Eβ=7.7×10^2 *13*
(2177 *SY*)	502.96	0.69 *7*	8.1 *3*	av Eβ=8.0×10^2 *13*
(2199 *SY*)	480.09	1.43 *18*	7.75 *25*	av Eβ=8.1×10^2 *13*
(2255[@] *SY*)	424.97	0.64 *18*	8.1 *3*	av Eβ=8.3×10^2 *13*
(2333 *SY*)	346.03	3.0 *7*	7.51 *25*	av Eβ=8.6×10^2 *13*
(2349[@] *SY*)	330.10	0.8 *4*	8.1 *4*	av Eβ=8.7×10^2 *13*
(2386 *SY*)	293.23	2.88 *25*	7.58 *23*	av Eβ=8.8×10^2 *13*
(2451 *SY*)	228.36	2.8 *11*	7.6 *3*	av Eβ=9.1×10^2 *13*
(2476[@] *SY*)	203.40	3.2 *18*	7.6 *4*	av Eβ=9.2×10^2 *13*
(2481 *SY*)	198.23	3.3 *6*	7.60 *24*	av Eβ=9.2×10^2 *13*
(2498[@] *SY*)	181.66	5.1 *14*	7.41 *25*	av Eβ=9.3×10^2 *13*
(2528 *SY*)	151.63	2.4 *5*	7.79 *23*	av Eβ=9.4×10^2 *13*

Continued on next page (footnotes at end of table)

^{225}Rn β^- decay 1997Bu03 (continued)

β^- radiations (continued)

E(decay)	E(level)	Iβ^- [†#]	Log *ft* [‡]	Comments
(2537 *SY*)	142.59	2.4 *3*	9.0^{1u} *4*	av Eβ=9.1×10^2 *13*
(2551 [@] *SY*)	128.06	6 *3*	7.3 *3*	av Eβ=9.5×10^2 *13*

† From intensity balance at level, assigning (1/2)Iγ±(1/2)Iγ at each placement for doubly-placed transitions whose intensity division has not been determined.
‡ Calculated assuming an uncertainty of 300 keV in Q value.
# Absolute intensity per 100 decays.
@ Existence of this branch is questionable.

$\gamma(^{225}$Fr)

Iγ normalization: From [Σ(I(γ+ce) to g.s. and 29 level) omitting I(γ+ce)(29)]=100; this assumes negligible β^- feeding from the 7/2[743] parent to the 3/2[532] g.s. (ΔK=ΔN=ΔJ=2, $\Delta\pi$=no) and the 5/2 3/2[532] 28 level. Note that Iγ normalization becomes 0.0071 *19* if δ(28γ)=0.45 *15* (assuming Σ(I(γ+ce) to g.s.)=100), but this δ(28γ) implies negative β^- feeding to the 29 level.

E_γ	I_γ[b]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[‡]	δ	α[†]	$I_{(\gamma+ce)}$[b]	Comments
21.72 *10*	12.2 *26*	203.40	(9/2)$^-$	181.66	(9/2)$^+$	[E1]		6.22 *12*		α(L)=4.66 *9*; α(M)=1.197 *23*; α(N+..)=0.367 *7* α(N)=0.302 *6*; α(O)=0.0586 *11*; α(P)=0.00653 *12*; α(Q)=0.0001379 *23*
28.51 *5*	12.2 *22*	28.545	5/2$^-$	0.0	3/2$^-$	M1+E2	0.45 *15*	7.×10^2 *4*		α(L)=5.E2 3; α(M)=1.4×10^2 *7*; α(N+..)=46 *23* α(N)=37 *19*; α(O)=8 *4*; α(P)=1.0 *5*; α(Q)=0.0099 *5* Mult.: α(M)exp=89 *6*, α(N)exp=35.7 *26*. δ: 0.32 *2* from α(M)exp; 0.44 *2* from α(N)exp, assuming no contribution from higher shells and α(N)(M1)=5.31, α(N)(E2)=195 from 2002Ba85. However, intensity balance at the 29 keV level implies a lower limit for α(exp) of 1.1×10^3 *2* and this corresponds to $\delta\approx$0.6, so the evaluators adopt δ=0.45 *15*.
30.0[a]	[a]	181.66	(9/2)$^+$	151.63	5/2$^+$	[E2]		2.94×10^3	400	ce(L)/(γ+ce)=0.738 *8*; ce(M)/(γ+ce)=0.198 *4*; ce(N+)/(γ+ce)=0.0637 *13* ce(N)/(γ+ce)=0.0517 *10*; ce(O)/(γ+ce)=0.01066 *21*; ce(P)/(γ+ce)=0.00135 *3*; ce(Q)/(γ+ce)=1.68×10^{-6} *4*
45.5[&] *1*	32 *5*	128.06	9/2$^-$	82.515	7/2$^-$	[M1]		28.1		α(L)=21.3 *4*; α(M)=5.09 *8*; α(N+..)=1.68 *3* α(N)=1.335 *21*; α(O)=0.299 *5*; α(P)=0.0479 *8*; α(Q)=0.00268 *5* Mult.: (α(L1)exp+α(L2)exp)$\leq$37.
46.6[d] *1*	6[d] *2*	198.23	(7/2)$^+$	151.63	5/2$^+$	[M1]		26.2		α(L)=19.9 *3*; α(M)=4.75 *8*; α(N+..)=1.570 *25* α(N)=1.245 *20*; α(O)=0.278 *5*; α(P)=0.0446 *7*; α(Q)=0.00250 *4* Mult.: (α(L1)exp+α(L2)exp)$\leq$196, α(M)exp$\leq$10.0 for doubly-placed γ.
46.6[d] *1*	29[d] *2*	228.36	(7/2,9/2)$^-$	181.66	(9/2)$^+$	(E1)		0.823 *13*		α(L)=0.623 *10*; α(M)=0.1522 *23*; α(N+..)=0.0480 *8* α(N)=0.0389 *6*; α(O)=0.00802 *13*; α(P)=0.001046 *16*; α(Q)=2.96×10^{-5} *5* Mult.: (α(L1)exp+α(L2)exp)$\leq$40.5, α(M)exp$\leq$2.1 for doubly-placed γ dominated by this transition; not M1 from level scheme.
53.6[@] *1*	30[@] *10*	181.66	(9/2)$^+$	128.06	9/2$^-$	[E1]		0.566		α(L)=0.429 *7*; α(M)=0.1043 *16*;

γ(^{225}Fr) (continued)

E_γ	I_γ[b]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[‡]	δ	α[†]	Comments
									α(N+..)=0.0330 *5* α(N)=0.0267 *4*; α(O)=0.00555 *9*; α(P)=0.000738 *11*; α(Q)=2.20×10^{-5} *4*
53.93[&] *5*	210 *12*	82.515	7/2$^-$	28.545	5/2$^-$	M1+E2	0.18 *3*	21.8 *17*	α(L)=16.4 *13*; α(M)=4.0 *4*; α(N+..)=1.33 *11* α(N)=1.06 *9*; α(O)=0.232 *18*; α(P)=0.0353 *23*; α(Q)=0.00159 *3* Mult.: (α(L1)exp+α(L2)exp)=13.4 *10*, α(L3)exp=3.5 *3*, α(M)exp=4.3 *3*, α(N)exp<1.8. δ: from δ=0.17 *3* from α(L)exp=16.9 *10* and 0.19 *3* from α(M)exp. Note that δ<0.13 from α(L12)exp and δ=0.250 *12* from α(L3)exp. 1997Bu03, however, adopted δ=0.31 *4* from these data. %Iγ=1.16 *7* assuming adopted normalization.
[x]58.0 *1*	13.6 *17*								
[x]62.48 *5*	30.3 *15*								
64.6 *1*	10.0 *19*	207.20	(5/2)$^-$	142.59	(3/2)$^+$	[E1]		0.343	α(L)=0.260 *4*; α(M)=0.0630 *10*; α(N+..)=0.0201 *3* α(N)=0.01620 *24*; α(O)=0.00339 *5*; α(P)=0.000462 *7*; α(Q)=1.466×10^{-5} *22*
69.12[&] *5*	136 *7*	151.63	5/2$^+$	82.515	7/2$^-$	E1		0.287	α(L)=0.217 *3*; α(M)=0.0525 *8*; α(N+..)=0.01675 *24* α(N)=0.01351 *19*; α(O)=0.00284 *4*; α(P)=0.000390 *6*; α(Q)=1.264×10^{-5} *18* Mult.: (α(L1)exp+α(L2)exp)≤1.8.
70.15[&] *5*	54 *3*	198.23	(7/2)$^+$	128.06	9/2$^-$	[E1]		0.275	α(L)=0.209 *3*; α(M)=0.0505 *8*; α(N+..)=0.01610 *23* α(N)=0.01298 *19*; α(O)=0.00273 *4*; α(P)=0.000376 *6*; α(Q)=1.224×10^{-5} *18*
71.16 *10*	20.1 *23*	480.09	(5/2,7/2,9/2)$^+$	409.04	5/2,7/2$^{(+)}$	[M1]		7.58	α(L)=5.75 *9*; α(M)=1.372 *20*; α(N+..)=0.454 *7* α(N)=0.360 *6*; α(O)=0.0804 *12*; α(P)=0.01290 *19*; α(Q)=0.000722 *11*
82.55[@] *5*	80[@] *20*	82.515	7/2$^-$	0.0	3/2$^-$	E2		21.6	α(L)=15.93 *23*; α(M)=4.31 *7*; α(N+..)=1.394 *20* α(N)=1.130 *17*; α(O)=0.234 *4*; α(P)=0.0300 *5*; α(Q)=6.20×10^{-5} *9* Mult.: (α(L1)exp+α(L2)exp)=8 *3*, α(L3)exp=6.1 *23*, α(M)exp=5.4 *20*. %Iγ=0.44 *10* assuming adopted normalization.
89.7[@] *1*	26[@] *3*	241.37	(5/2)$^+$	151.63	5/2$^+$	M1		3.86	α(L)=2.93 *5*; α(M)=0.699 *10*; α(N+..)=0.231 *4* α(N)=0.183 *3*; α(O)=0.0410 *6*; α(P)=0.00658 *10*; α(Q)=0.000368 *6* Mult.: (α(L1)exp+α(L2)exp)=2.0 *3*.
94.9[@] *1*	14[@] *3*	293.23	(7/2)$^+$	198.23	(7/2)$^+$	M1		3.28	α(L)=2.49 *4*; α(M)=0.594 *9*; α(N+..)=0.196 *3* α(N)=0.1557 *23*; α(O)=0.0348 *5*; α(P)=0.00558 *8*; α(Q)=0.000312 *5* Mult.: (α(L1)exp+α(L2)exp)=1.8 *5*.

From ENSDF

$^{225}_{87}$Fr$_{138}$-5

γ(^{225}Fr) (continued)

E_γ	I_γ[b]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[‡]	α[†]	Comments
99.15 *5*	1.50×10^3 *20*	181.66	(9/2)$^+$	82.515	7/2$^-$	E1	0.1095	α(L)=0.0831 *12*; α(M)=0.0200 *3*; α(N+..)=0.00642 *9* α(N)=0.00516 *8*; α(O)=0.001098 *16*; α(P)=0.0001564 *22*; α(Q)=5.67×10^{-6} *8* Mult.: (α(L1)exp+α(L2)exp)≤0.62, α(L3)exp≤0.31, α(M)exp≤0.21.
99.4[@] *1*	150[@] *50*	128.06	9/2$^-$	28.545	5/2$^-$	E2	9.02	α(L)=6.64 *10*; α(M)=1.80 *3*; α(N+..)=0.582 *9* α(N)=0.472 *7*; α(O)=0.0977 *15*; α(P)=0.01259 *19*; α(Q)=3.22×10^{-5} *5* Mult.: (α(L1)exp+α(L2)exp)=4.8 *16*, α(L3)exp≤3.1, α(M)exp≤2.1.
104.72 *10*	16 *3*	346.03	(9/2)$^+$	241.37	(5/2)$^+$	[E2]	7.37	α(K)=0.301 *5*; α(L)=5.21 *8*; α(M)=1.410 *21*; α(N+..)=0.456 *7* α(N)=0.370 *6*; α(O)=0.0767 *12*; α(P)=0.00989 *15*; α(Q)=2.72×10^{-5} *4*
105.29 *10*	24 *3*	665.18	(7/2)$^+$	559.68	7/2$^-$	[E1]	0.415	α(K)=0.321 *5*; α(L)=0.0709 *10*; α(M)=0.01702 *25*; α(N+..)=0.00547 *8* α(N)=0.00440 *7*; α(O)=0.000938 *14*; α(P)=0.0001343 *19*; α(Q)=4.95×10^{-6} *7*
114.03[&] *5*	157 *8*	142.59	(3/2)$^+$	28.545	5/2$^-$	E1	0.344	α(K)=0.268 *4*; α(L)=0.0574 *8*; α(M)=0.01377 *20*; α(N+..)=0.00444 *7* α(N)=0.00356 *5*; α(O)=0.000762 *11*; α(P)=0.0001097 *16*; α(Q)=4.13×10^{-6} *6* Mult.: (α(L1)exp+α(L2)exp)≤0.2, α(M)exp≤0.29.
115.75[&] *5*	116 *6*	198.23	(7/2)$^+$	82.515	7/2$^-$	E1	0.332	α(K)=0.259 *4*; α(L)=0.0552 *8*; α(M)=0.01324 *19*; α(N+..)=0.00426 *6* α(N)=0.00342 *5*; α(O)=0.000733 *11*; α(P)=0.0001057 *15*; α(Q)=4.00×10^{-6} *6* Mult.: (α(L1)exp+α(L2)exp)≤0.54.
120.83[&] *5*	139 *7*	203.40	(9/2)$^-$	82.515	7/2$^-$	M1+E2	6.2 *22*	α(K)=4 *4*; α(L)=2.0 *8*; α(M)=0.51 *22*; α(N+..)=0.17 *7* α(N)=0.13 *6*; α(O)=0.028 *12*; α(P)=0.0040 *12*; α(Q)=9.E−5 *7* Mult.: α(K)exp=6 *2*, (α(L1)exp+α(L2)exp)=1.6 *1*.
123.06[&] *5*	453 *23*	151.63	5/2$^+$	28.545	5/2$^-$	E1	0.286	α(K)=0.224 *4*; α(L)=0.0470 *7*; α(M)=0.01126 *16*; α(N+..)=0.00363 *5* α(N)=0.00291 *4*; α(O)=0.000625 *9*; α(P)=9.05×10^{-5} *13*; α(Q)=3.48×10^{-6} *5* Mult.: (α(L1)exp+α(L2)exp)≤0.34, α(L3)exp≤0.10, α(M)exp≤0.25.
126.80 *10*	26.2 *14*	330.10	(5/2,7/2)$^-$	203.40	(9/2)$^-$	[M1,E2]	5.3 *21*	α(K)=3 *3*; α(L)=1.6 *6*; α(M)=0.42 *17*; α(N+..)=0.14 *6* α(N)=0.11 *5*; α(O)=0.023 *9*; α(P)=0.0033 *9*; α(Q)=8.E−5 *6*
127.31[c] *10*	17[c] *3*	1063.03		935.68	(5/2$^-$,7/2,9/2$^+$)			
127.31[c] *10*	17[c] *3*	1519.42		1392.17	(5/2,7/2$^-$)			
131.84[@&] *10*	74[@] *4*	330.10	(5/2,7/2)$^-$	198.23	(7/2)$^+$	E1	0.242	α(K)=0.190 *3*; α(L)=0.0392 *6*; α(M)=0.00939 *14*;

From ENSDF

γ(^{225}Fr) (continued)

E_γ	I_γ [b]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [‡]	α [†]	Comments
								α(N+..)=0.00303 *5* α(N)=0.00243 *4*; α(O)=0.000522 *8*; α(P)=7.61×10^{-5} *11*; α(Q)=2.98×10^{-6} *5* Mult.: (α(L1)exp+α(L2)exp)≤0.07.
136.06[&#] *5*	47.5 *24*	754.53		618.66	(5/2,7/2,9/2)$^+$			
141.65[d] *10*	7[d] *3*	293.23	(7/2)$^+$	151.63	5/2$^+$	[M1]	5.32	α(K)=4.28 *6*; α(L)=0.786 *12*; α(M)=0.187 *3*; α(N+..)=0.0620 *9* α(N)=0.0491 *7*; α(O)=0.01098 *16*; α(P)=0.001762 *25*; α(Q)=9.84×10^{-5} *14*
141.65[d] *10*	8[d] *6*	885.95	(3/2,5/2)$^+$	744.26	(5/2,7/2)$^+$	[M1,E2]	3.7 *17*	α(K)=2.3 *20*; α(L)=1.0 *3*; α(M)=0.27 *9*; α(N+..)=0.09 *3* α(N)=0.071 *22*; α(O)=0.015 *5*; α(P)=0.0021 *4*; α(Q)=5.E−5 *5*
142.60[d&] *5*	547[d] *28*	142.59	(3/2)$^+$	0.0	3/2$^-$	E1	0.200	α(K)=0.1578 *23*; α(L)=0.0319 *5*; α(M)=0.00765 *11*; α(N+..)=0.00247 *4* α(N)=0.00198 *3*; α(O)=0.000426 *6*; α(P)=6.25×10^{-5} *9*; α(Q)=2.49×10^{-6} *4* Mult.: α(K)exp≤0.11, (α(L1)exp+α(L2)exp)≤0.04, α(M)exp≤0.07.
142.60[d] *10*	40[d] *5*	346.03	(9/2)$^+$	203.40	(9/2)$^-$	[E1]	0.200	α(K)=0.1578 *23*; α(L)=0.0319 *5*; α(M)=0.00765 *11*; α(N+..)=0.00247 *4* α(N)=0.00198 *3*; α(O)=0.000426 *6*; α(P)=6.25×10^{-5} *9*; α(Q)=2.49×10^{-6} *4*
145.80[&] *5*	116 *6*	228.36	(7/2,9/2)$^-$	82.515	7/2$^-$	M1+E2	3.4 *16*	α(K)=2.1 *19*; α(L)=0.93 *22*; α(M)=0.24 *7*; α(N+..)=0.079 *22* α(N)=0.063 *18*; α(O)=0.013 *4*; α(P)=0.0019 *3*; α(Q)=5.E−5 *4* Mult.: α(K)exp≤2.0, (α(L1)exp+α(L2)exp)=1.0 *5*.
147.96 *10*	33 *6*	346.03	(9/2)$^+$	198.23	(7/2)$^+$	M1,E2	3.2 *15*	α(K)=2.0 *18*; α(L)=0.88 *19*; α(M)=0.23 *7*; α(N+..)=0.074 *20* α(N)=0.060 *17*; α(O)=0.013 *3*; α(P)=0.0018 *3*; α(Q)=5.E−5 *4* Mult.: (α(L1)exp+α(L2)exp)=1.3 *4*.
151.65[&] *5*	1000	151.63	5/2$^+$	0.0	3/2$^-$	E1	0.1721	α(K)=0.1362 *20*; α(L)=0.0272 *4*; α(M)=0.00651 *10*; α(N+..)=0.00211 *3* α(N)=0.001687 *24*; α(O)=0.000364 *6*; α(P)=5.36×10^{-5} *8*; α(Q)=2.17×10^{-6} *3* Mult.: α(K)exp≤1.1, (α(L1)exp+α(L2)exp)=≤0.05, α(L3)exp≤0.01, α(M)exp≤0.10. %Iγ=5.5 *11* assuming adopted normalization.
164.41[&] *5*	79 *4*	346.03	(9/2)$^+$	181.66	(9/2)$^+$	M1+E2	2.3 *12*	α(K)=1.5 *13*; α(L)=0.59 *8*; α(M)=0.15 *3*; α(N+..)=0.050 *10* α(N)=0.040 *8*; α(O)=0.0085 *14*; α(P)=0.00122 *8*; α(Q)=4.E−5 *3* Mult.: α(K)exp=2.2 *5*, (α(L1)exp+α(L2)exp)≤1.3.
165.20[&] *5*	255 *13*	293.23	(7/2)$^+$	128.06	9/2$^-$	[E1]	0.1398	α(K)=0.1110 *16*; α(L)=0.0218 *3*; α(M)=0.00522 *8*; α(N+..)=0.001690 *24* α(N)=0.001353 *19*; α(O)=0.000292 *5*; α(P)=4.33×10^{-5} *6*; α(Q)=1.79×10^{-6} *3* Mult.: α(K)exp≤4.5, (α(L1)exp+α(L2)exp)≤0.41, α(M)exp≤0.47.

γ(^{225}Fr) (continued)

E_γ	I_γ[b]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ	α[†]	Comments
169.73 *5*	932 *56*	198.23	(7/2)$^+$	28.545	5/2$^-$	E1		0.1309	α(K)=0.1041 *15*; α(L)=0.0204 *3*; α(M)=0.00487 *7*; α(N+..)=0.001577 *23* α(N)=0.001262 *18*; α(O)=0.000273 *4*; α(P)=4.05×10^{-5} *6*; α(Q)=1.683×10^{-6} *24* Mult.: α(K)exp≤0.66, (α(L1)exp+α(L2)exp)≤0.02, α(M)exp≤0.04.
174.90[@] *10*	100[@] *30*	203.40	(9/2)$^-$	28.545	5/2$^-$	E2		0.906	α(K)=0.211 *3*; α(L)=0.512 *8*; α(M)=0.1379 *20*; α(N+..)=0.0447 *7* α(N)=0.0362 *6*; α(O)=0.00754 *11*; α(P)=0.000993 *15*; α(Q)=6.23×10^{-6} *9* Mult.: α(K)exp=0.33 *13*.
175.17[&] *5*	136 *32*	303.25	7/2$^+$,9/2$^+$,11/2$^+$	128.06	9/2$^-$	E1		0.1213	α(K)=0.0965 *14*; α(L)=0.0188 *3*; α(M)=0.00449 *7*; α(N+..)=0.001455 *21* α(N)=0.001164 *17*; α(O)=0.000252 *4*; α(P)=3.74×10^{-5} *6*; α(Q)=1.568×10^{-6} *22* Mult.: α(K)exp≤0.92, (α(L1)exp+α(L2)exp)≤0.60, α(M)exp≤0.03.
178.66[&] *5*	367 *18*	207.20	(5/2)$^-$	28.545	5/2$^-$	M1+E2	1.47 *+18−14*	1.44 *10*	α(K)=0.84 *10*; α(L)=0.448 *7*; α(M)=0.1165 *22*; α(N+..)=0.0380 *7* α(N)=0.0306 *6*; α(O)=0.00649 *11*; α(P)=0.000907 *13*; α(Q)=2.01×10^{-5} *22* Mult.: α(K)exp=0.88 *10*, (α(L1)exp+α(L2)exp)=0.27 *5*, α(M)exp≤0.12. δ: from α(K)exp.
186.6[@] *3*	20[@] *4*	480.09	(5/2,7/2,9/2)$^+$	293.23	(7/2)$^+$	M1+E2		1.6 *9*	α(K)=1.1 *9*; α(L)=0.373 *15*; α(M)=0.095 *10*; α(N+..)=0.031 *3* α(N)=0.0249 *25*; α(O)=0.0054 *4*; α(P)=0.00078 *3*; α(Q)=2.5×10^{-5} *20* Mult.: α(K)exp=0.54 *15*.
202.02[&] *5*	48.2 *24*	409.04	5/2,7/2$^{(+)}$	207.20	(5/2)$^-$	(E1)		0.0860	α(K)=0.0688 *10*; α(L)=0.01309 *19*; α(M)=0.00312 *5*; α(N+..)=0.001014 *15* α(N)=0.000810 *12*; α(O)=0.0001760 *25*; α(P)=2.64×10^{-5} *4*; α(Q)=1.139×10^{-6} *16* Mult.: α(K)exp=2.4 *9*, (α(L1)exp+α(L2)exp)≤0.37 suggest an M1 transition. It is inconsistent with the placement from this level unless, perhaps, the 202γ feeds the (3/2$^+$) level at E=205 *3* seen in (t,α);this would not, however, explain observed $\gamma\gamma$ coin data or absence of strong enough transition(s) to deexcite that (3/2$^+$) level. 1997Bu03 suggest that the 409 keV level may be a doublet with levels of either parity. Therefore, at present E1 seems to be a better choice.

γ(^{225}Fr) (continued)

E_γ	I_γ[b]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ	α[†]	Comments
203.4[@] *3*	10[@] *3*	839.09	(5/2,7/2,9/2)$^+$	635.60	(3/2,5/2,7/2)$^+$	[M1,E2]		1.2 *7*	α(K)=0.9 *7*; α(L)=0.275 *9*; α(M)=0.069 *3*; α(N+..)=0.0227 *7* α(N)=0.0182 *7*; α(O)=0.00393 *6*; α(P)=0.00058 *6*; α(Q)=2.0×10^{-5} *16*
207.21[&] *5*	132 *7*	207.20	(5/2)$^-$	0.0	3/2$^-$	M1+E2	1.4 *+4−3*	0.94 *16*	α(K)=0.60 *15*; α(L)=0.254 *5*; α(M)=0.0654 *10*; α(N+..)=0.0214 *3* α(N)=0.0172 *3*; α(O)=0.00367 *6*; α(P)=0.000522 *15*; α(Q)=1.4×10^{-5} *4* Mult.: α(K)exp=0.62 *15*, (α(L1)exp+α(L2)exp)≤0.43, α(M)exp≤0.08. δ: from α(K)exp.
210.70[@] *10*	15[@] *2*	409.04	5/2,7/2$^{(+)}$	198.23	(7/2)$^+$	M1(+E2)		1.1 *7*	α(K)=0.8 *7*; α(L)=0.243 *13*; α(M)=0.0613 *11*; α(N+..)=0.0201 *3* α(N)=0.0161 *3*; α(O)=0.00347 *10*; α(P)=0.00051 *6*; α(Q)=1.8×10^{-5} *14* Mult.: α(K)exp=1.4 *3*.
212.85[&] *5*	51.2 *26*	241.37	(5/2)$^+$	28.545	5/2$^-$	(E1)		0.0760	α(K)=0.0609 *9*; α(L)=0.01149 *16*; α(M)=0.00274 *4*; α(N+..)=0.000890 *13* α(N)=0.000711 *10*; α(O)=0.0001546 *22*; α(P)=2.32×10^{-5} *4*; α(Q)=1.015×10^{-6} *15* Mult.: α(K)exp≤0.18 consistent with E1 or E2; $\Delta\pi$=yes from level scheme.
218.60 *10*	18.4 *13*	778.64	7/2$^-$	559.68	7/2$^-$	[M1,E2]		1.0 *6*	α(K)=0.7 *6*; α(L)=0.214 *17*; α(M)=0.0538 *12*; α(N+..)=0.0176 *6* α(N)=0.0141 *4*; α(O)=0.00306 *16*; α(P)=0.00045 *7*; α(Q)=1.6×10^{-5} *13*
229.45[&] *5*	51.8 *26*	559.68	7/2$^-$	330.10	(5/2,7/2)$^-$	M1		1.366	α(K)=1.102 *16*; α(L)=0.201 *3*; α(M)=0.0478 *7*; α(N+..)=0.01581 *23* α(N)=0.01253 *18*; α(O)=0.00280 *4*; α(P)=0.000449 *7*; α(Q)=2.51×10^{-5} *4* Mult.: α(K)exp=1.0 *3* or 1.8 *7*.
240.6[@] *3*	6[@] *2*	721.06	(5/2)$^-$	480.09	(5/2,7/2,9/2)$^+$	[E1]		0.0569	α(K)=0.0457 *7*; α(L)=0.00848 *13*; α(M)=0.00202 *3*; α(N+..)=0.000657 *10* α(N)=0.000524 *8*; α(O)=0.0001143 *17*; α(P)=1.728×10^{-5} *25*; α(Q)=7.74×10^{-7} *11*
241.34[&] *5*	99 *5*	241.37	(5/2)$^+$	0.0	3/2$^-$	(E1)		0.0565	α(K)=0.0454 *7*; α(L)=0.00842 *12*; α(M)=0.00200 *3*; α(N+..)=0.000652 *10* α(N)=0.000520 *8*; α(O)=0.0001135 *16*; α(P)=1.716×10^{-5} *24*; α(Q)=7.69×10^{-7} *11* Mult.: α(K)exp≤0.37, (α(L1)exp+α(L2)exp)≤0.11 consistent with E1 or E2. $\Delta\pi$=yes from level scheme.

$^{225}_{87}$Fr$_{138}$-9

γ(^{225}Fr) (continued)

E_γ	I_γ[b]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[‡]	α[†]	Comments
247.60[&] *5*	66 *3*	330.10	(5/2,7/2)$^-$	82.515	7/2$^-$	[M1,E2]	0.7 *5*	α(K)=0.5 *4*; α(L)=0.140 *22*; α(M)=0.035 *4*; α(N+..)=0.0115 *13* α(N)=0.0092 *10*; α(O)=0.0020 *3*; α(P)=0.00030 *7*; α(Q)=1.1×10^{-5} *9* Mult.: α(K)exp≤1.6, (α(L1)exp+α(L2)exp)≤0.19.
251.65 *10*	12.0 *12*	480.09	(5/2,7/2,9/2)$^+$	228.36	(7/2,9/2)$^-$			
256.20 *10*	14.6 *15*	665.18	(7/2)$^+$	409.04	5/2,7/2$^{(+)}$	[M1,E2]	0.6 *4*	α(K)=0.5 *4*; α(L)=0.125 *23*; α(M)=0.031 *4*; α(N+..)=0.0103 *14* α(N)=0.0082 *11*; α(O)=0.0018 *3*; α(P)=0.00027 *7*; α(Q)=1.0×10^{-5} *8*
257.38[&] *5*	62 *3*	409.04	5/2,7/2$^{(+)}$	151.63	5/2$^+$	M1+E2	0.6 *4*	α(K)=0.4 *4*; α(L)=0.123 *23*; α(M)=0.031 *4*; α(N+..)=0.0101 *14* α(N)=0.0081 *11*; α(O)=0.0018 *3*; α(P)=0.00026 *7*; α(Q)=1.0×10^{-5} *8* Mult.: α(K)exp=0.65 *10*, (α(L1)exp+α(L2)exp)≤0.19.
263.56[&] *5*	152 *7*	346.03	(9/2)$^+$	82.515	7/2$^-$			Mult.: α(K)exp≤0.23, (α(L1)exp+α(L2)exp)≤0.05; consistent with E1 or E2.
264.67[&] *5*	292 *14*	293.23	(7/2)$^+$	28.545	5/2$^-$	E1	0.0456	α(K)=0.0367 *6*; α(L)=0.00672 *10*; α(M)=0.001598 *23*; α(N+..)=0.000521 *8* α(N)=0.000415 *6*; α(O)=9.08×10^{-5} *13*; α(P)=1.378×10^{-5} *20*; α(Q)=6.29×10^{-7} *9* Mult.: α(K)exp≤0.12, (α(L1)exp+α(L2)exp)≤0.03.
273.07 *10*	12.8 *11*	618.66	(5/2,7/2,9/2)$^+$	346.03	(9/2)$^+$	[M1,E2]	0.5 *4*	α(K)=0.4 *3*; α(L)=0.102 *22*; α(M)=0.025 *5*; α(N+..)=0.0083 *15* α(N)=0.0066 *11*; α(O)=0.0014 *3*; α(P)=0.00022 *6*; α(Q)=9.E−6 *7*
275.65 *10*	11.6 *12*	778.64	7/2$^-$	502.96	(5/2)$^-$	[M1]	0.822	α(K)=0.663 *10*; α(L)=0.1204 *17*; α(M)=0.0287 *4*; α(N+..)=0.00948 *14* α(N)=0.00751 *11*; α(O)=0.001679 *24*; α(P)=0.000269 *4*; α(Q)=1.503×10^{-5} *21*
288.80[&] *10*	27.9 *16*	618.66	(5/2,7/2,9/2)$^+$	330.10	(5/2,7/2)$^-$	[E1]	0.0373	α(K)=0.0301 *5*; α(L)=0.00545 *8*; α(M)=0.001295 *19*; α(N+..)=0.000422 *6* α(N)=0.000337 *5*; α(O)=7.37×10^{-5} *11*; α(P)=1.124×10^{-5} *16*; α(Q)=5.21×10^{-7} *8*
292.80 *10*	7.0 *10*	1047.44		754.53				
295.55[&] *10*	53 *4*	502.96	(5/2)$^-$	207.20	(5/2)$^-$	M1	0.678	α(K)=0.547 *8*; α(L)=0.0992 *14*; α(M)=0.0236 *4*; α(N+..)=0.00781 *11* α(N)=0.00619 *9*; α(O)=0.001384 *20*; α(P)=0.000222 *4*; α(Q)=1.239×10^{-5} *18* Mult.: α(K)exp=0.48 *13*, (α(L1)exp+α(L2)exp)≤0.27.
296.80[&] *10*	104 *5*	424.97	(5/2$^-$,7/2$^-$)	128.06	9/2$^-$	[M1+E2]	0.4 *3*	α(K)=0.31 *24*; α(L)=0.078 *21*; α(M)=0.019 *4*; α(N+..)=0.0063 *14* α(N)=0.0051 *11*; α(O)=0.0011 *3*; α(P)=0.00017 *6*; α(Q)=7.E−6 *6* Mult.: α(K)exp≤0.35, (α(L1)exp+α(L2)exp)≤0.13.
298.35[&] *10*	95 *5*	480.09	(5/2,7/2,9/2)$^+$	181.66	(9/2)$^+$	[M1]	0.661	α(K)=0.533 *8*; α(L)=0.0967 *14*; α(M)=0.0230 *4*; α(N+..)=0.00761 *11* α(N)=0.00603 *9*; α(O)=0.001348 *19*; α(P)=0.000216 *3*;

From ENSDF

γ(^{225}Fr) (continued)

E_γ	I_γ[b]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[‡]	α[†]	Comments
								α(Q)=1.207×10^{-5} *17* Mult.: α(K)exp=0.51 *13* and 0.60 *6*, (α(L1)exp+α(L2)exp)=0.12 *2*.
299.6 *2*	8.9 *14*	502.96	(5/2)$^-$	203.40	(9/2)$^-$	[E2]	0.1454	α(K)=0.0701 *10*; α(L)=0.0558 *8*; α(M)=0.01473 *21*; α(N+..)=0.00479 *7* α(N)=0.00386 *6*; α(O)=0.000815 *12*; α(P)=0.0001116 *16*; α(Q)=1.696×10^{-6} *24*
301.5 *2*	8.8 *14*	330.10	(5/2,7/2)$^-$	28.545	5/2$^-$	[M1,E2]	0.39 *25*	α(K)=0.29 *23*; α(L)=0.074 *20*; α(M)=0.018 *4*; α(N+..)=0.0060 *14* α(N)=0.0048 *11*; α(O)=0.0011 *3*; α(P)=0.00016 *5*; α(Q)=7.E−6 *5*
304.7 *2*	10.2 *12*	502.96	(5/2)$^-$	198.23	(7/2)$^+$			
308.8 *2*	10.5 *12*	1063.03		754.53				
318.32[&] *10*	64 *3*	559.68	7/2$^-$	241.37	(5/2)$^+$			Mult.: α(K)exp≤0.22, (α(L1)exp+α(L2)exp)≤0.08.
319.61[&] *10*	29.6 *15*	1185.18	(5/2$^-$,7/2)	865.74	(7/2)$^-$			
326.47[c&] *10*	49.5[c] *25*	409.04	5/2,7/2$^{(+)}$	82.515	7/2$^-$			
326.47[c] *10*	49.5[c] *25*	885.95	(3/2,5/2)$^+$	559.68	7/2$^-$			
326.47[c] *10*	49.5[c] *25*	1047.44		721.06	(5/2)$^-$			
330.10[&] *10*	30.0 *15*	330.10	(5/2,7/2)$^-$	0.0	3/2$^-$		0.32 *21*	α(K)=0.24 *19*; α(L)=0.058 *19*; α(M)=0.014 *4*; α(N+..)=0.0050 *14*
335.45[&] *10*	26.0 *13*	744.26	(5/2,7/2)$^+$	409.04	5/2,7/2$^{(+)}$	M1	0.479	α(K)=0.387 *6*; α(L)=0.0700 *10*; α(M)=0.01665 *24*; α(N+..)=0.00551 *8* α(N)=0.00437 *7*; α(O)=0.000976 *14*; α(P)=0.0001566 *22*; α(Q)=8.74×10^{-6} *13* Mult.: α(K)exp=0.37 *4*.
351.3[@] *2*	20[@] *5*	502.96	(5/2)$^-$	151.63	5/2$^+$			
352.30[&] *10*	309 *15*	559.68	7/2$^-$	207.20	(5/2)$^-$	M1	0.419	α(K)=0.339 *5*; α(L)=0.0612 *9*; α(M)=0.01455 *21*; α(N+..)=0.00481 *7* α(N)=0.00382 *6*; α(O)=0.000853 *12*; α(P)=0.0001369 *20*; α(Q)=7.64×10^{-6} *11* Mult.: α(K)exp=0.33 *2* and 0.34 *5*, (α(L1)exp+α(L2)exp)=0.070 *3*.
356.30[&] *10*	162 *8*	559.68	7/2$^-$	203.40	(9/2)$^-$	M1	0.407	α(K)=0.329 *5*; α(L)=0.0593 *9*; α(M)=0.01411 *20*; α(N+..)=0.00467 *7* α(N)=0.00370 *6*; α(O)=0.000827 *12*; α(P)=0.0001327 *19*; α(Q)=7.41×10^{-6} *11* Mult.: α(K)exp=0.36 *2*, (α(L1)exp+α(L2)exp)=0.09 *1*.
360.45 *10*	30 *3*	502.96	(5/2)$^-$	142.59	(3/2)$^+$			Mult.: α(K)exp≤0.06; consistent with E1 or E2.
361.55 *10*	34.4 *21*	559.68	7/2$^-$	198.23	(7/2)$^+$			
362.75 *10*	20.0 *16*	865.74	(7/2)$^-$	502.96	(5/2)$^-$	[M1]	0.387	α(K)=0.313 *5*; α(L)=0.0565 *8*; α(M)=0.01343 *19*; α(N+..)=0.00444 *7* α(N)=0.00352 *5*; α(O)=0.000787 *11*; α(P)=0.0001263 *18*; α(Q)=7.05×10^{-6} *10*
364.10[&] *10*	52.1 *26*	571.51	(7/2)$^-$	207.20	(5/2)$^-$	M1	0.383	α(K)=0.310 *5*; α(L)=0.0559 *8*; α(M)=0.01330 *19*; α(N+..)=0.00440 *7* α(N)=0.00349 *5*; α(O)=0.000779 *11*; α(P)=0.0001250 *18*;

$^{225}_{87}$Fr$_{138}$-11

γ(^{225}Fr) (continued)

E_γ	I_γ[b]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[‡]	α[†]	Comments
								α(Q)=6.98×10^{-6} *10* Mult.: α(K)exp=0.50 *4*, (α(L1)exp+α(L2)exp)≤0.14.
[x]366.92[&] *10*	57 *3*					M1	0.375	α(K)=0.303 *5*; α(L)=0.0547 *8*; α(M)=0.01302 *19*; α(N+..)=0.00430 *6* α(N)=0.00341 *5*; α(O)=0.000763 *11*; α(P)=0.0001224 *18*; α(Q)=6.84×10^{-6} *10* Mult.: α(K)exp=0.54 *4*.
368.2 *2*	17.0 *17*	571.51	(7/2)$^-$	203.40	(9/2)$^-$	[M1]	0.372	α(K)=0.301 *5*; α(L)=0.0542 *8*; α(M)=0.01290 *19*; α(N+..)=0.00426 *6* α(N)=0.00338 *5*; α(O)=0.000756 *11*; α(P)=0.0001213 *17*; α(Q)=6.77×10^{-6} *10*
369.65[&] *10*	34.0 *19*	778.64	7/2$^-$	409.04	5/2,7/2$^{(+)}$			
373.40[&] *10*	44.6 *22*	571.51	(7/2)$^-$	198.23	(7/2)$^+$			Mult.: α(K)exp≤0.32, (α(L1)exp+α(L2)exp)≤0.09.
378.05[&] *10*	64 *3*	559.68	7/2$^-$	181.66	(9/2)$^+$			Mult.: α(K)exp≤0.22, (α(L1)exp+α(L2)exp)≤0.06.
388.50 *10*	34.3 *17*	1614.26	(5/2,7/2$^+$)	1226.03				
389.90[&] *10*	24.9 *16*	571.51	(7/2)$^-$	181.66	(9/2)$^+$			
394.50 *10*	14.8 *15*	635.60	(3/2,5/2,7/2)$^+$	241.37	(5/2)$^+$	[M1,E2]	0.19 *12*	α(K)=0.14 *11*; α(L)=0.033 *13*; α(M)=0.008 *3*; α(N+..)=0.0026 *9* α(N)=0.0021 *7*; α(O)=0.00046 *17*; α(P)=7.E−5 *3*; α(Q)=3.3×10^{-6} *24*
397.6 *2*	14.8 *25*	1063.03		665.18	(7/2)$^+$			
398.5 *2*	11.5 *26*	744.26	(5/2,7/2)$^+$	346.03	(9/2)$^+$			
405.6[&] *2*	45 *5*	885.95	(3/2,5/2)$^+$	480.09	(5/2,7/2,9/2)$^+$			
408.10[d] *10*	70[d] *5*	559.68	7/2$^-$	151.63	5/2$^+$			Mult.: α(K)exp≤0.16.
408.10[d] *10*	34[d] *7*	979.66	(3/2$^-$,5/2)	571.51	(7/2)$^-$			Mult.: α(K)exp≤0.34.
409.1 *2*	17.2 *23*	409.04	5/2,7/2$^{(+)}$	0.0	3/2$^-$			
412.30 *10*	20.7 *18*	1392.17	(5/2,7/2$^-$)	979.66	(3/2$^-$,5/2)			
414.1[c] *2*	9.3[c] *14*	744.26	(5/2,7/2)$^+$	330.10	(5/2,7/2)$^-$			
414.1[c] *2*	9.3[c] *14*	839.09	(5/2,7/2,9/2)$^+$	424.97	(5/2$^-$,7/2$^-$)			
419.8[@&] *2*	57[@] *6*	571.51	(7/2)$^-$	151.63	5/2$^+$			Mult.: α(K)exp≤0.16.
420.15[@] *20*	21[@] *5*	618.66	(5/2,7/2,9/2)$^+$	198.23	(7/2)$^+$	M1	0.260	α(K)=0.210 *3*; α(L)=0.0378 *6*; α(M)=0.00900 *13*; α(N+..)=0.00297 *5* α(N)=0.00236 *4*; α(O)=0.000527 *8*; α(P)=8.46×10^{-5} *12*; α(Q)=4.73×10^{-6} *7* Mult.: α(K)exp=0.41 *13*.
423.65[&] *10*	41.3 *21*	665.18	(7/2)$^+$	241.37	(5/2)$^+$	M1	0.254	α(K)=0.206 *3*; α(L)=0.0370 *6*; α(M)=0.00879 *13*; α(N+..)=0.00291 *4* α(N)=0.00231 *4*; α(O)=0.000515 *8*; α(P)=8.27×10^{-5} *12*; α(Q)=4.62×10^{-6} *7* Mult.: α(K)exp=0.33 *7*.

γ(^{225}Fr) (continued)

E_γ	I_γ[b]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[‡]	α[†]	Comments
424.9 *2*	12.5 *24*	424.97	(5/2$^-$,7/2$^-$)	0.0	3/2$^-$			
427.65[&] *10*	38.3 *22*	1063.03		635.60	(3/2,5/2,7/2)$^+$			
431.63[&] *10*	39 *4*	559.68	7/2$^-$	128.06	9/2$^-$	M1	0.242	α(K)=0.196 *3*; α(L)=0.0352 *5*; α(M)=0.00836 *12*; α(N+..)=0.00276 *4* α(N)=0.00219 *3*; α(O)=0.000490 *7*; α(P)=7.86×10^{-5} *11*; α(Q)=4.39×10^{-6} *7* Mult.: α(K)exp=0.40 *5*.
432.54[&] *10*	55 *4*	778.64	7/2$^-$	346.03	(9/2)$^+$			Mult.: α(K)exp≤0.29.
448.65[&] *10*	55 *3*	778.64	7/2$^-$	330.10	(5/2,7/2)$^-$			Mult.: α(K)exp≤0.10.
451.00 *10*	22.0 *16*	744.26	(5/2,7/2)$^+$	293.23	(7/2)$^+$			
461.55 *10*	18.2 *16*	665.18	(7/2)$^+$	203.40	(9/2)$^-$			
466.90 *10*	43.3 *22*	665.18	(7/2)$^+$	198.23	(7/2)$^+$	M1	0.196	α(K)=0.1585 *23*; α(L)=0.0284 *4*; α(M)=0.00676 *10*; α(N+..)=0.00223 *4* α(N)=0.001771 *25*; α(O)=0.000396 *6*; α(P)=6.35×10^{-5} *9*; α(Q)=3.55×10^{-6} *5* Mult.: α(K)exp=0.19 *3*.
470.2 *2*	10.4 *22*	1655.35	(5/2,7/2$^+$)	1185.18	(5/2$^-$,7/2)			
472.1[c] *2*	11.0[c] *22*	1226.03		754.53				
472.1[c] *2*	11.0[c] *22*	1519.42		1047.44				
476.9[c] *2*	18.7[c] *19*	559.68	7/2$^-$	82.515	7/2$^-$			
476.9[c] *2*	18.7[c] *19*	885.95	(3/2,5/2)$^+$	409.04	5/2,7/2$^{(+)}$			
[x]482.1 *2*	15 *5*							
483.80[d] *10*	36[d] *5*	635.60	(3/2,5/2,7/2)$^+$	151.63	5/2$^+$	M1	0.1781	α(K)=0.1441 *21*; α(L)=0.0258 *4*; α(M)=0.00614 *9*; α(N+..)=0.00203 *3* α(N)=0.001608 *23*; α(O)=0.000360 *5*; α(P)=5.77×10^{-5} *8*; α(Q)=3.23×10^{-6} *5* Mult.: α(K)exp=0.52 if entire I(ce) for doublet is assigned to this placement. α(K)exp=0.18 for doublet.
483.80[d&] *10*	70[d] *5*	665.18	(7/2)$^+$	181.66	(9/2)$^+$	M1	0.1781	α(K)=0.1441 *21*; α(L)=0.0258 *4*; α(M)=0.00614 *9*; α(N+..)=0.00203 *3* α(N)=0.001608 *23*; α(O)=0.000360 *5*; α(P)=5.77×10^{-5} *8*; α(Q)=3.23×10^{-6} *5* Mult.: α(K)exp=0.27 if entire I(ce) for doublet is assigned to this placement. α(K)exp=0.18 for doublet.
[x]484.7 *2*	22 *5*							
486.1 *2*	28 *8*	832.18	(5/2$^+$,7/2,9/2$^+$)	346.03	(9/2)$^+$			
503.00[c] *10*	25.2[c] *20*	502.96	(5/2)$^-$	0.0	3/2$^-$			
503.00[c] *10*	25.2[c] *20*	744.26	(5/2,7/2)$^+$	241.37	(5/2)$^+$			
514.2 *2*	50 *8*	721.06	(5/2)$^-$	207.20	(5/2)$^-$	M1	0.1514	α(K)=0.1225 *18*; α(L)=0.0219 *3*; α(M)=0.00521 *8*; α(N+..)=0.001721 *25*

From ENSDF

$^{225}_{87}$Fr$_{138}$-13

$\gamma(^{225}$Fr) (continued)

E_γ	I_γ[b]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[‡]	α[†]	Comments
								α(N)=0.001365 *20*; α(O)=0.000305 *5*; α(P)=4.90×10^{-5} *7*; α(Q)=2.74×10^{-6} *4* Mult.: α(K)exp=0.26 *6*.
517.8 *2*	9.6 *23*	721.06	(5/2)$^-$	203.40	(9/2)$^-$			
^{x}521.0 *2*	15.7 *19*							
531.10[&] *10*	180 *9*	559.68	7/2$^-$	28.545	5/2$^-$	M1	0.1389	α(K)=0.1124 *16*; α(L)=0.0201 *3*; α(M)=0.00477 *7*; α(N+..)=0.001578 *23* α(N)=0.001251 *18*; α(O)=0.000280 *4*; α(P)=4.49×10^{-5} *7*; α(Q)=2.51×10^{-6} *4* Mult.: α(K)exp=0.13 *1*, (α(L1)exp+α(L2)exp)=0.02 *1*.
^{x}534.25 *10*	25.0 *18*							
535.80[&] *10*	71 *4*	839.09	(5/2,7/2,9/2)$^+$	303.25	7/2$^+$,9/2$^+$,11/2$^+$	M1	0.1356	α(K)=0.1098 *16*; α(L)=0.0196 *3*; α(M)=0.00466 *7*; α(N+..)=0.001541 *22* α(N)=0.001222 *18*; α(O)=0.000273 *4*; α(P)=4.38×10^{-5} *7*; α(Q)=2.45×10^{-6} *4* Mult.: α(K)exp=0.15 *2*.
537.15[c] *10*	40.5[c] *21*	665.18	(7/2)$^+$	128.06	9/2$^-$			Mult.: α(K)exp≤0.05.
537.15[c&] *10*	40.5[c] *21*	744.26	(5/2,7/2)$^+$	207.20	(5/2)$^-$			
537.15[c] *10*	40.5[c] *21*	778.64	7/2$^-$	241.37	(5/2)$^+$			
543.05[&] *10*	26.8 *20*	571.51	(7/2)$^-$	28.545	5/2$^-$			
545.85[d&] *10*	50.0[d] *20*	744.26	(5/2,7/2)$^+$	198.23	(7/2)$^+$	M1	0.1291	α(K)=0.1045 *15*; α(L)=0.0187 *3*; α(M)=0.00443 *7*; α(N+..)=0.001466 *21* α(N)=0.001162 *17*; α(O)=0.000260 *4*; α(P)=4.17×10^{-5} *6*; α(Q)=2.33×10^{-6} *4* Mult.: α(K)exp=0.19, α(L12)exp=0.04 if entire I(ce) for doublet is assigned to this placement. α(K)exp=0.14 for doublet.
545.85[d] *10*	20.0[d] *20*	839.09	(5/2,7/2,9/2)$^+$	293.23	(7/2)$^+$	M1	0.1291	α(K)=0.1045 *15*; α(L)=0.0187 *3*; α(M)=0.00443 *7*; α(N+..)=0.001466 *21* α(N)=0.001162 *17*; α(O)=0.000260 *4*; α(P)=4.17×10^{-5} *6*; α(Q)=2.33×10^{-6} *4* Mult.: α(K)exp=0.47 if entire I(ce) for doublet is assigned to this placement. α(K)exp=0.14 for doublet.
551.10[c] *10*	22.5[c] *21*	754.53		203.40	(9/2)$^-$			
551.10[c] *10*	22.5[c] *21*	1614.26	(5/2,7/2$^+$)	1063.03				
^{x}561.3 *2*	12 *3*							
562.50 *10*	10 *3*	744.26	(5/2,7/2)$^+$	181.66	(9/2)$^+$			
562.50 *10*	15 *3*	865.74	(7/2)$^-$	303.25	7/2$^+$,9/2$^+$,11/2$^+$			
566.3 *2*	17.9 *22*	1185.18	(5/2$^-$,7/2)	618.66	(5/2,7/2,9/2)$^+$			
571.40[&] *10*	272 *13*	778.64	7/2$^-$	207.20	(5/2)$^-$	M1	0.1143	α(K)=0.0926 *13*; α(L)=0.01652 *24*; α(M)=0.00392 *6*; α(N+..)=0.001297 *19* α(N)=0.001028 *15*; α(O)=0.000230 *4*; α(P)=3.69×10^{-5} *6*;

From ENSDF

$^{225}_{87}$Fr$_{138}$-14

$\gamma(^{225}Fr)$ (continued)

E_γ	I_γ[b]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[‡]	α[†]	Comments
								α(Q)=2.07×10^{-6} 3 Mult.: α(K)exp=0.10 1 and 0.11 3, (α(L1)exp+α(L2)exp)=0.021 2.
572.70[c] 10	46[c] 5	754.53		181.66	(9/2)$^+$			
572.70[c] 10	46[c] 5	865.74	(7/2)$^-$	293.23	(7/2)$^+$			
[x]587.7 2	11.4 20							
590.6 2	11.5 20	832.18	(5/2$^+$,7/2,9/2$^+$)	241.37	(5/2)$^+$			
600.9 2	16.6 19	744.26	(5/2,7/2)$^+$	142.59	(3/2)$^+$			
602.2 2	12.0 19	754.53		151.63	5/2$^+$			
605.6 2	17.0 23	935.68	(5/2$^-$,7/2,9/2$^+$)	330.10	(5/2,7/2)$^-$			
[x]614.8 2	15.3 21							
624.3 2	13.4 17	865.74	(7/2)$^-$	241.37	(5/2)$^+$			
627.10[&] 10	94 5	778.64	7/2$^-$	151.63	5/2$^+$			Mult.: α(K)exp≤0.023.
634.0 2	12.3 19	832.18	(5/2$^+$,7/2,9/2$^+$)	198.23	(7/2)$^+$			
635.60[c] 10	23.9[c] 20	635.60	(3/2,5/2,7/2)$^+$	0.0	3/2$^-$			
635.60[c] 10	23.9[c] 20	839.09	(5/2,7/2,9/2)$^+$	203.40	(9/2)$^-$			
638.50[c&] 10	29.6[c] 22	721.06	(5/2)$^-$	82.515	7/2$^-$	M1	0.0852	α(K)=0.0690 10; α(L)=0.01228 18; α(M)=0.00291 4; α(N+..)=0.000963 14 α(N)=0.000764 11; α(O)=0.0001708 24; α(P)=2.74×10^{-5} 4; α(Q)=1.537×10^{-6} 22 Mult.: α(K)exp=0.10 3.
638.50[c] 10	29.6[c] 22	1047.44		409.04	5/2,7/2$^{(+)}$			
640.8 2	15 5	839.09	(5/2,7/2,9/2)$^+$	198.23	(7/2)$^+$			
644.40[&] 10	28.4 23	885.95	(3/2,5/2)$^+$	241.37	(5/2)$^+$			
650.65[d&] 10	260[d] 14	778.64	7/2$^-$	128.06	9/2$^-$	M1	0.0811	α(K)=0.0657 10; α(L)=0.01168 17; α(M)=0.00277 4; α(N+..)=0.000916 13 α(N)=0.000726 11; α(O)=0.0001624 23; α(P)=2.61×10^{-5} 4; α(Q)=1.462×10^{-6} 21 Mult.: α(K)exp=0.071 6, (α(L1)exp+α(L2)exp)≤0.012.
650.65[d] 10	30[d] 5	832.18	(5/2$^+$,7/2,9/2$^+$)	181.66	(9/2)$^+$			Mult.: α(K)exp≤0.69.
658.30[&] 10	71 4	865.74	(7/2)$^-$	207.20	(5/2)$^-$	M1	0.0786	α(K)=0.0637 9; α(L)=0.01132 16; α(M)=0.00269 4; α(N+..)=0.000888 13 α(N)=0.000704 10; α(O)=0.0001574 22; α(P)=2.53×10^{-5} 4; α(Q)=1.417×10^{-6} 20 Mult.: α(K)exp=0.10 1.
662.30[&] 10	80 5	865.74	(7/2)$^-$	203.40	(9/2)$^-$			
668.05[#] 10	31.7 16	865.74	(7/2)$^-$	198.23	(7/2)$^+$			
679.1[c] 2	11.1[c] 22	885.95	(3/2,5/2)$^+$	207.20	(5/2)$^-$			
679.1[c] 2	11.1[c] 22	1614.26	(5/2,7/2$^+$)	935.68	(5/2$^-$,7/2,9/2$^+$)			
680.9 2	16.1 18	832.18	(5/2$^+$,7/2,9/2$^+$)	151.63	5/2$^+$			

γ(^{225}Fr) (continued)

E_γ	I_γ[b]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[‡]	α[†]	Comments
683.9 *2*	16.8 *19*	865.74	(7/2)$^-$	181.66	(9/2)$^+$			
692.60[&] *10*	202 *10*	721.06	(5/2)$^-$	28.545	5/2$^-$	M1	0.0687	α(K)=0.0557 *8*; α(L)=0.00989 *14*; α(M)=0.00235 *4*; α(N+..)=0.000776 *11* α(N)=0.000615 *9*; α(O)=0.0001375 *20*; α(P)=2.21×10^{-5} *3*; α(Q)=1.238×10^{-6} *18* Mult.: α(K)exp=0.077 *9*.
696.20[&] *10*	1.51×10^3 *7*	778.64	7/2$^-$	82.515	7/2$^-$	M1	0.0678	α(K)=0.0550 *8*; α(L)=0.00976 *14*; α(M)=0.00231 *4*; α(N+..)=0.000765 *11* α(N)=0.000607 *9*; α(O)=0.0001356 *19*; α(P)=2.18×10^{-5} *3*; α(Q)=1.222×10^{-6} *18* Mult.: α(K)exp=0.052 *2*, (α(L1)exp+α(L2)exp)≤0.009.
702.40 *10*	22.3 *24*	1749.84	(5/2,7/2$^+$)	1047.44				
705.10[&] *10*	64 *3*	1185.18	(5/2$^-$,7/2)	480.09	(5/2,7/2,9/2)$^+$			
711.0[&] *2*	16.7 *17*	839.09	(5/2,7/2,9/2)$^+$	128.06	9/2$^-$			
714.00 *10*	29.7 *17*	865.74	(7/2)$^-$	151.63	5/2$^+$			
^{x}718.0 *2*	19.9 *20*							
721.10[&] *10*	475 *23*	721.06	(5/2)$^-$	0.0	3/2$^-$	M1	0.0618	α(K)=0.0501 *7*; α(L)=0.00889 *13*; α(M)=0.00211 *3*; α(N+..)=0.000697 *10* α(N)=0.000552 *8*; α(O)=0.0001235 *18*; α(P)=1.98×10^{-5} *3*; α(Q)=1.113×10^{-6} *16* Mult.: α(K)exp=0.046 *7*, (α(L1)exp+α(L2)exp)=0.008 *1*. %Iγ=2.62 *17* assuming adopted normalization.
723.00[&] *10*	85 *4*	865.74	(7/2)$^-$	142.59	(3/2)$^+$			Mult.: α(K)exp≤0.08. Transition omitted from level scheme in fig. 6 of 1997Bu03.
727.4 *2*	14.1 *20*	1392.17	(5/2,7/2$^-$)	665.18	(7/2)$^+$			
^{x}729.9 *2*	12.5 *20*							
734.40[&] *10*	56 *3*	885.95	(3/2,5/2)$^+$	151.63	5/2$^+$			
737.70[&] *10*	98 *5*	865.74	(7/2)$^-$	128.06	9/2$^-$	M1	0.0582	α(K)=0.0472 *7*; α(L)=0.00837 *12*; α(M)=0.00198 *3*; α(N+..)=0.000656 *10* α(N)=0.000520 *8*; α(O)=0.0001163 *17*; α(P)=1.87×10^{-5} *3*; α(Q)=1.048×10^{-6} *15* Mult.: α(K)exp=0.041 *9*.
743.35[&] *10*	102 *5*	885.95	(3/2,5/2)$^+$	142.59	(3/2)$^+$	M1	0.0571	α(K)=0.0463 *7*; α(L)=0.00820 *12*; α(M)=0.00195 *3*; α(N+..)=0.000643 *9* α(N)=0.000510 *8*; α(O)=0.0001140 *16*; α(P)=1.83×10^{-5} *3*; α(Q)=1.027×10^{-6} *15* Mult.: α(K)exp=0.04 *1*.
750.15[&] *10*	2.15×10^3 *11*	778.64	7/2$^-$	28.545	5/2$^-$	M1	0.0557	α(K)=0.0452 *7*; α(L)=0.00800 *12*; α(M)=0.00190 *3*; α(N+..)=0.000628 *9* α(N)=0.000497 *7*; α(O)=0.0001112 *16*; α(P)=1.79×10^{-5} *3*;

From ENSDF

γ(^{225}Fr) (continued)

E_γ	I_γ[b]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[‡]	α[†]	Comments
								α(Q)=1.003×10^{-6} *14* Mult.: α(K)exp=0.040 *2*, (α(L1)exp+α(L2)exp)=0.007, α(M)exp≤0.002.
756.70[c] *10*	22.9[c] *23*	839.09	(5/2,7/2,9/2)$^+$	82.515	7/2$^-$			
756.70[c] *10*	22.9[c] *23*	1392.17	(5/2,7/2$^-$)	635.60	(3/2,5/2,7/2)$^+$			
758.5 *2*	14.9 *20*	1479.63	(7/2)	721.06	(5/2)$^-$			
759.6 *2*	22.4 *22*	1063.03		303.25	7/2$^+$,9/2$^+$,11/2$^+$			
[x]768.60[&] *10*	71 *5*							
778.70[&] *10*	127 *6*	778.64	7/2$^-$	0.0	3/2$^-$	E2	0.01401	α(K)=0.01049 *15*; α(L)=0.00265 *4*; α(M)=0.000654 *10*; α(N+..)=0.000215 *3* α(N)=0.0001714 *24*; α(O)=3.74×10^{-5} *6*; α(P)=5.65×10^{-6} *8*; α(Q)=2.28×10^{-7} *4* Mult.: α(K)exp=0.004 *3*.
783.40[&] *10*	72 *4*	865.74	(7/2)$^-$	82.515	7/2$^-$	M1	0.0497	α(K)=0.0404 *6*; α(L)=0.00714 *10*; α(M)=0.001693 *24*; α(N+..)=0.000559 *8* α(N)=0.000443 *7*; α(O)=9.92×10^{-5} *14*; α(P)=1.593×10^{-5} *23*; α(Q)=8.94×10^{-7} *13* Mult.: α(K)exp=0.052 *9*.
784.0[@] *2*	[@]	935.68	(5/2$^-$,7/2,9/2$^+$)	151.63	5/2$^+$			
[x]788.8 *2*	17.3 *24*							
[x]790.70 *10*	30 *3*							
[x]795.3 *2*	19.7 *20*							
798.7[c] *2*	18.4[c] *17*	1519.42		721.06	(5/2)$^-$			
798.7[c] *2*	18.4[c] *17*	1577.88	(5/2$^+$,7/2)	778.64	7/2$^-$			
801.0 *2*	19.7 *22*	1226.03		424.97	(5/2$^-$,7/2$^-$)			
[x]804.6 *2*	24.0 *18*							
806.2 *2*	21.7 *17*	1047.44		241.37	(5/2)$^+$			
808.0 *2*	13.5 *18*	935.68	(5/2$^-$,7/2,9/2$^+$)	128.06	9/2$^-$			
808.0 *2*		1101.84	(7/2,9/2,11/2)$^+$	293.23	(7/2)$^+$			
[x]812.6 *2*	14.5 *16*							
814.1 *2*	18.6 *22*	1479.63	(7/2)	665.18	(7/2)$^+$			
[x]815.5 *2*	16.2 *26*							
[x]817.70 *10*	38.0 *24*							
821.1 *2*	13.0 *23*	1392.17	(5/2,7/2$^-$)	571.51	(7/2)$^-$			
823.40 *10*	32.8 *21*	1655.35	(5/2,7/2$^+$)	832.18	(5/2$^+$,7/2,9/2$^+$)			
[x]826.25 *10*	31.5 *21*							
828.05 *10*	27 *3*	979.66	(3/2$^-$,5/2)	151.63	5/2$^+$			
834.6 *2*	18 *3*	1063.03		228.36	(7/2,9/2)$^-$			
837.00[d&] *10*	386[d] *25*	865.74	(7/2)$^-$	28.545	5/2$^-$	M1	0.0418	α(K)=0.0339 *5*; α(L)=0.00599 *9*; α(M)=0.001421 *20*; α(N+..)=0.000470 *7*

From ENSDF

$^{225}_{87}$Fr$_{138}$-17

γ(^{225}Fr) (continued)

E_γ	I_γ[b]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[‡]	α[†]	Comments
								α(N)=0.000372 *6*; α(O)=8.32×10^{-5} *12*; α(P)=1.337×10^{-5} *19*; α(Q)=7.51×10^{-7} *11* Mult.: α(K)exp=0.045 *4*.
837.00[d] *10*	100[d] *25*	979.66	(3/2$^-$,5/2)	142.59	(3/2)$^+$			Mult.: α(K)exp≤0.17.
839.2[c] *2*	32[c] *7*	839.09	(5/2,7/2,9/2)$^+$	0.0	3/2$^-$			
839.2[c] *2*	32[c] *7*	1185.18	(5/2$^-$,7/2)	346.03	(9/2)$^+$			
[x]844.90 *10*	32.5 *24*							
855.5[c] *2*	10.8[c] *26*	1063.03		207.20	(5/2)$^-$			
855.5[c] *2*	10.8[c] *26*	1185.18	(5/2$^-$,7/2)	330.10	(5/2,7/2)$^-$			
857.5 *2*	23 *3*	885.95	(3/2,5/2)$^+$	28.545	5/2$^-$			
859.2 *2*	13.5 *21*	1063.03		203.40	(9/2)$^-$			
864.5 *2*	33.1 *22*	1063.03		198.23	(7/2)$^+$			
866.0[c] *2*	10.4[c] *25*	865.74	(7/2)$^-$	0.0	3/2$^-$			
866.0[c] *2*	10.4[c] *25*	1047.44		181.66	(9/2)$^+$			
876.7 *2*	16.9 *22*	1655.35	(5/2,7/2$^+$)	778.64	7/2$^-$			
881.40 *10*	36.4 *22*	1063.03		181.66	(9/2)$^+$			
885.85[&] *10*	59 *3*	885.95	(3/2,5/2)$^+$	0.0	3/2$^-$			
891.7 *2*	23.3 *20*	1185.18	(5/2$^-$,7/2)	293.23	(7/2)$^+$			
895.7 *2*	54 *8*	1047.44		151.63	5/2$^+$			
899.0 *2*	11.9 *13*	1101.84	(7/2,9/2,11/2)$^+$	203.40	(9/2)$^-$			
901.8 *2*	15 *4*	1655.35	(5/2,7/2$^+$)	754.53				
903.2 *2*	14 *4*	1101.84	(7/2,9/2,11/2)$^+$	198.23	(7/2)$^+$			
[x]915.70 *10*	30.8 *19*							
917.4 *2*	9.9 *19*	1749.84	(5/2,7/2$^+$)	832.18	(5/2$^+$,7/2,9/2$^+$)			
920.30 *10*	76 *4*	1101.84	(7/2,9/2,11/2)$^+$	181.66	(9/2)$^+$	M1	0.0326	α(K)=0.0265 *4*; α(L)=0.00467 *7*; α(M)=0.001106 *16*; α(N+..)=0.000366 *6* α(N)=0.000290 *4*; α(O)=6.48×10^{-5} *9*; α(P)=1.041×10^{-5} *15*; α(Q)=5.86×10^{-7} *9* Mult.: α(K)exp=0.06 *3*.
[x]937.4 *2*	17.0 *17*							
[x]941.0 *2*	11.6 *16*							
942.8 *2*	10.5 *18*	1577.88	(5/2$^+$,7/2)	635.60	(3/2,5/2,7/2)$^+$			
948.9 *2*	21.3 *21*	1614.26	(5/2,7/2$^+$)	665.18	(7/2)$^+$			
951.00 *10*	54.8 *27*	979.66	(3/2$^-$,5/2)	28.545	5/2$^-$			
[x]956.1 *2*	12.9 *20*							
959.8 *2*	11.0 *20*	1519.42		559.68	7/2$^-$			
[x]974.6 *2*	28.1 *22*							
978.1 *2*	12.6 *20*	1185.18	(5/2$^-$,7/2)	207.20	(5/2)$^-$			
979.6 *2*	14.1 *20*	979.66	(3/2$^-$,5/2)	0.0	3/2$^-$			
981.5 *2*	23.2 *23*	1185.18	(5/2$^-$,7/2)	203.40	(9/2)$^-$			
990.0 *2*	13.8 *15*	1655.35	(5/2,7/2$^+$)	665.18	(7/2)$^+$			
[x]997.20 *10*	33.7 *25*							
999.5 *2*	20.4 *20*	1479.63	(7/2)	480.09	(5/2,7/2,9/2)$^+$			

γ(^{225}Fr) (continued)

E_γ	I_γ[b]	E_i(level)	J_i^π	E_f	J_f^π
^{x}1002.5 *2*	24.4 *24*				
^{x}1011.1 *2*	13.0 *23*				
^{x}1015.45 *10*	48 *3*				
1017.6 *2*	16.5 *26*	1577.88	$(5/2^+,7/2)$	559.68	$7/2^-$
1019.40 *10*	39 *3*	1655.35	$(5/2,7/2^+)$	635.60	$(3/2,5/2,7/2)^+$
1027.4 *2*	20 *4*	1226.03		198.23	$(7/2)^+$
1028.8 *2*	23 *4*	1749.84	$(5/2,7/2^+)$	721.06	$(5/2)^-$
1033.5 *2*	79 *4*	1185.18	$(5/2^-,7/2)$	151.63	$5/2^+$
1044.7 *2*	12.3 *25*	1226.03		181.66	$(9/2)^+$
1047.32 *10*	41.8 *26*	1047.44		0.0	$3/2^-$
^{x}1067.52 *10*	29.0 *18*				
1070.48 *10*	34.9 *24*	1479.63	(7/2)	409.04	$5/2,7/2^{(+)}$
1084.2 *2*	18.9 *24*	1749.84	$(5/2,7/2^+)$	665.18	$(7/2)^+$
^{x}1093.3 *2*	13 *3*				
1095.1 *2*	16 *3*	1655.35	$(5/2,7/2^+)$	559.68	$7/2^-$
^{x}1099.2 *2*	14.1 *21*				
1102.55 *10*	32.3 *26*	1185.18	$(5/2^-,7/2)$	82.515	$7/2^-$
^{x}1104.2 *2*	16.0 *26*				
1111.2 *2*	11 *4*	1614.26	$(5/2,7/2^+)$	502.96	$(5/2)^-$
^{x}1115.8 *2*	18.5 *18*				
^{x}1126.6 *2*	11.7 *26*				
^{x}1129.6 *2*	26 *5*				
1130.9 *2*	15 *5*	1749.84	$(5/2,7/2^+)$	618.66	$(5/2,7/2,9/2)^+$
^{x}1141.23 *10*	35.4 *25*				
1143.65 *10*	51 *3*	1226.03		82.515	$7/2^-$
1169.2 *2*	25.9 *24*	1577.88	$(5/2^+,7/2)$	409.04	$5/2,7/2^{(+)}$
1173.3 *2*	24 *3*	1519.42		346.03	$(9/2)^+$
1176.2 *2*	14.2 *21*	1479.63	(7/2)	303.25	$7/2^+,9/2^+,11/2^+$
1194.1 *2*	32 *3*	1392.17	$(5/2,7/2^-)$	198.23	$(7/2)^+$
1195.7 *2*	25 *5*	1526.13		330.10	$(5/2,7/2)^-$
^{x}1215.2 *2*	34 *3*				
^{x}1219.8 *2*	21.7 *26*				
1226.7 *2*	12.4 *25*	1519.42		293.23	$(7/2)^+$
1229.9 *2*	12.3 *22*	1655.35	$(5/2,7/2^+)$	424.97	$(5/2^-,7/2^-)$
1232.2 *2*	14.3 *22*	1577.88	$(5/2^+,7/2)$	346.03	$(9/2)^+$
^{x}1257.8 *2*	17.8 *21*				
^{x}1261.5 *2*	12.7 *17*				
^{x}1273.00 *10*	43 *5*				
1281.3 *2*	15.2 *20*	1479.63	(7/2)	198.23	$(7/2)^+$
^{x}1291.8 *2*	31 *3*				
1298.03 *10*	74 *4*	1479.63	(7/2)	181.66	$(9/2)^+$
^{x}1301.6 *2*	13.7 *18*				
^{x}1308.42 *10*	33.7 *26*				
^{x}1314.88 *10*	76 *4*				

$^{225}_{87}$Fr$_{138}$-19

γ(^{225}Fr) (continued)

E_γ	I_γ[b]	E_i(level)	J^π_i	E_f	J^π_f
^{x}1317.3 *2*	23.2 *19*				
1321.4 *2*	24.6 *19*	1519.42		198.23	$(7/2)^+$
1328.1[d] *2*	75[d] *10*	1479.63	(7/2)	151.63	$5/2^+$
1328.1[d] *2*	30[d] *10*	1526.13		198.23	$(7/2)^+$
1337.40[d] *10*	30[d] *10*	1479.63	(7/2)	142.59	$(3/2)^+$
1337.40[d] *10*	50[d] *10*	1519.42		181.66	$(9/2)^+$
1351.40 *10*	56 *4*	1479.63	(7/2)	128.06	$9/2^-$
^{x}1361.0 *2*	14.3 *19*				
1363.3 *2*	22.4 *18*	1392.17	$(5/2,7/2^-)$	28.545	$5/2^-$
^{x}1371.6 *2*	24.1 *19*				
1374.6[c] *2*	14.7[c] *18*	1526.13		151.63	$5/2^+$
1374.6[c] *2*	14.7[c] *18*	1577.88	$(5/2^+,7/2)$	203.40	$(9/2)^-$
1385.3 *2*	18.9 *19*	1614.26	$(5/2,7/2^+)$	228.36	$(7/2,9/2)^-$
^{x}1389.3 *2*	17.1 *20*				
1392.0 *2*	11.3 *22*	1392.17	$(5/2,7/2^-)$	0.0	$3/2^-$
1397.00 *10*	25.5 *21*	1479.63	(7/2)	82.515	$7/2^-$
1416.3 *2*	17.0 *15*	1614.26	$(5/2,7/2^+)$	198.23	$(7/2)^+$
1421.0[#] *2*	16.2 *16*	1749.84	$(5/2,7/2^+)$	330.10	$(5/2,7/2)^-$
^{x}1423.2 *2*	18.4 *16*				
1443.2 *2*	14.6 *22*	1526.13		82.515	$7/2^-$
1451.16 *10*	89 *5*	1479.63	(7/2)	28.545	$5/2^-$
1457.10 *10*	24 *3*	1655.35	$(5/2,7/2^+)$	198.23	$(7/2)^+$
^{x}1466.5 *2*	28 *3*				
1471.2 *2*	15.5 *26*	1614.26	$(5/2,7/2^+)$	142.59	$(3/2)^+$
^{x}1478.2 *2*	19.1 *22*				
^{x}1483.16 *10*	39.0 *22*				
^{x}1487.24 *10*	23.8 *20*				
1495.30 *10*	72 *4*	1577.88	$(5/2^+,7/2)$	82.515	$7/2^-$
1498.0 *2*	20.6 *21*	1526.13		28.545	$5/2^-$
^{x}1502.1 *2*	20.2 *21*				
1504.4 *2*	23.1 *21*	1655.35	$(5/2,7/2^+)$	151.63	$5/2^+$
1508.6 *2*	23.5 *21*	1749.84	$(5/2,7/2^+)$	241.37	$(5/2)^+$
1512.8 *2*	24.7 *22*	1655.35	$(5/2,7/2^+)$	142.59	$(3/2)^+$
^{x}1522.83 *10*	47 *3*				
^{x}1525.3 *2*	12.7 *15*				
1549.3 *2*	15.7 *21*	1577.88	$(5/2^+,7/2)$	28.545	$5/2^-$
1551.4 *2*	25.4 *21*	1749.84	$(5/2,7/2^+)$	198.23	$(7/2)^+$

E_γ	I_γ[b]	E_i(level)	J^π_i	E_f	J^π_f
^{x}1553.9 *2*	23 *4*				
^{x}1555.6 *2*	17 *4*				
^{x}1563.7 *2*	10.0 *20*				
1568.10 *10*	87 *5*	1749.84	$(5/2,7/2^+)$	181.66	$(9/2)^+$
^{x}1582.90 *10*	37 *4*				
^{x}1601.8 *2*	15.9 *16*				
1607.3 *3*	10.6 *11*	1749.84	$(5/2,7/2^+)$	142.59	$(3/2)^+$
^{x}1609.8 *2*	25.3 *20*				
^{x}1623.5 *2*	7.2 *19*				
1626.8 *2*	10.3 *16*	1655.35	$(5/2,7/2^+)$	28.545	$5/2^-$
^{x}1635.2 *2*	15.7 *16*				
^{x}1642.4 *2*	27.2 *20*				
^{x}1646.5 *2*	17.5 *16*				
^{x}1654.3 *2*	8.4 *15*				
^{x}1663.5 *5*	6.0 *13*				
1667.4 *2*	25.9 *19*	1749.84	$(5/2,7/2^+)$	82.515	$7/2^-$
^{x}1672.5 *2*	14.9 *15*				
^{x}1682.5 *5*	10.9 *14*				
^{x}1692.0 *2*	8.1 *19*				
^{x}1694.5 *2*	27.0 *20*				
^{x}1698.2 *5*	9.1 *19*				
^{x}1700.2 *5*	11.8 *19*				
^{x}1703.5 *5*	12.2 *18*				
^{x}1734.1 *5*	8.9 *19*				
^{x}1794.0 *5*	7.1 *14*				
^{x}1796.1 *5*	6.3 *12*				
^{x}1809.7 *5*	7.6 *15*				
^{x}1814.7 *5*	5.0 *10*				
^{x}1818.3 *5*	7.5 *15*				
^{x}1828.6 *5*	7.8 *17*				
^{x}1831.2 *5*	10.2 *18*				
^{x}1842.9 *5*	9.0 *19*				
^{x}1849.3 *5*	9.0 *19*				
^{x}1859.7 *5*	6.0 *12*				
^{x}1883.1 *5*	9.2 *19*				
^{x}1894.3 *5*	6.0 *12*				
^{x}1926.0 *5*	6.0 *12*				

† Additional information 1.

‡ From Iγ and I(ce) data measured using systems with known absolute efficiency calibrations.

From ENSDF

$^{225}_{87}$Fr$_{138}$-20

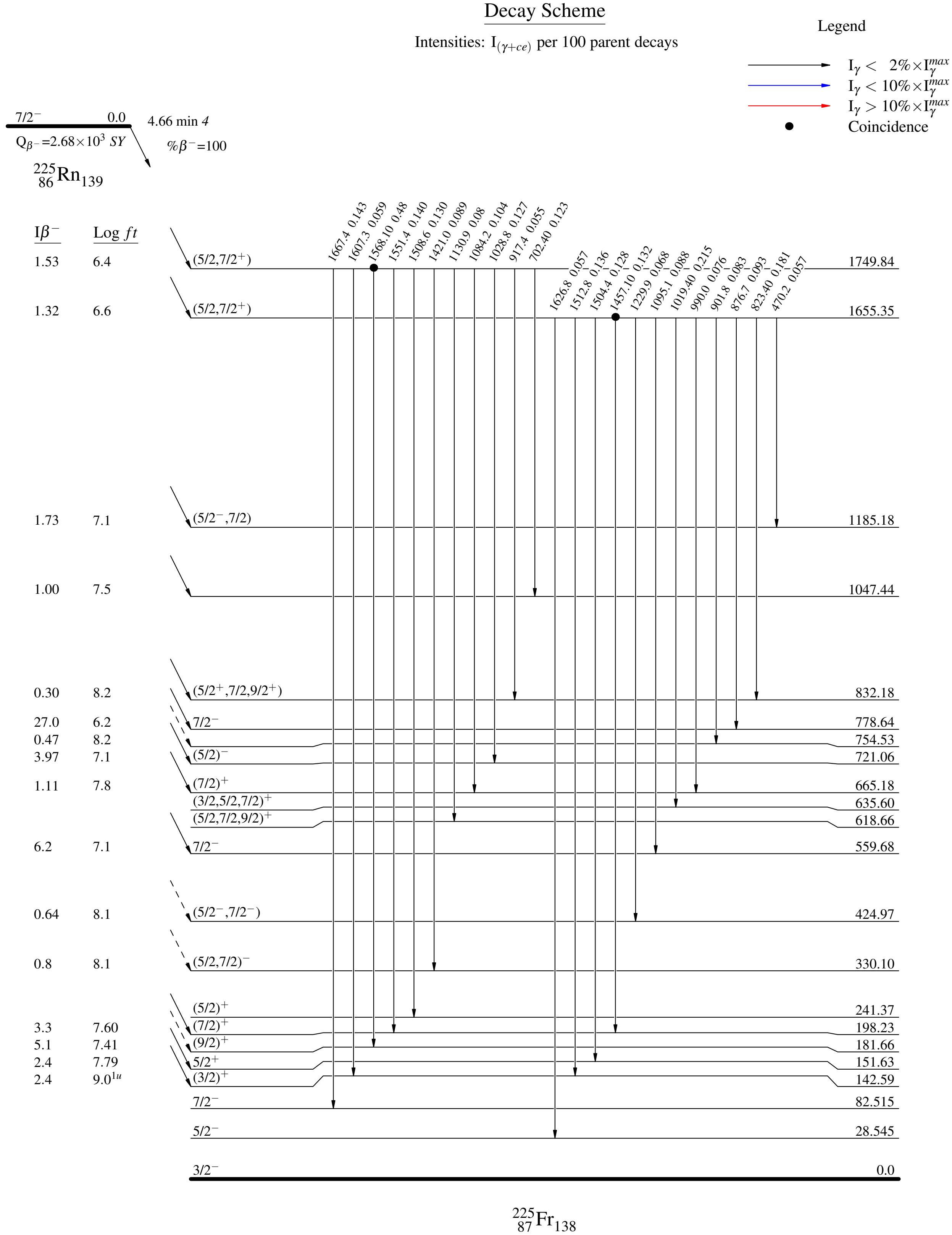
γ(^{225}Fr) (continued)

Eγ values for 136.0γ, 668.05γ and 1421.0γ are at least 5σ from expected least-squares adjusted value for placements indicated.
@ Peak obscured or unresolved in singles spectrum; most of information was obtained from coincidence experiments.
& A multiscaling experiment indicates that this line has the correct half-life for ^{225}Rn decay.
a Transition not observed, but its existence and total intensity was deduced from coincidences between lines feeding the 182 level and those depopulating the 152 and 182 levels.
b For absolute intensity per 100 decays, multiply by 0.00552 *25*.
c Multiply placed with undivided intensity.
d Multiply placed with intensity suitably divided.
x γ ray not placed in level scheme.

^{225}Rn β^- decay 1997Bu03

Decay Scheme

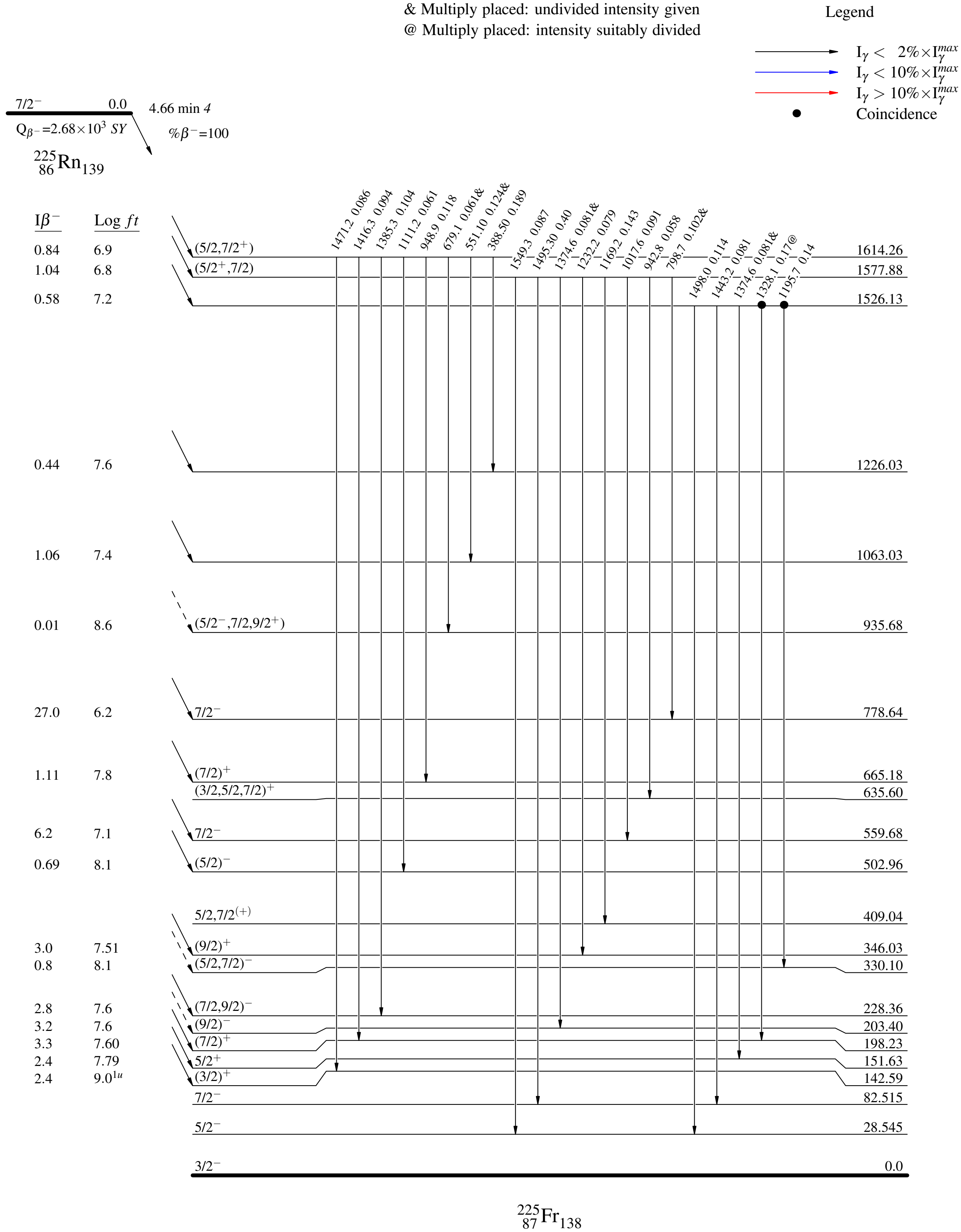
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays



$^{225}Rn\ \beta^-$ decay 1997Bu03

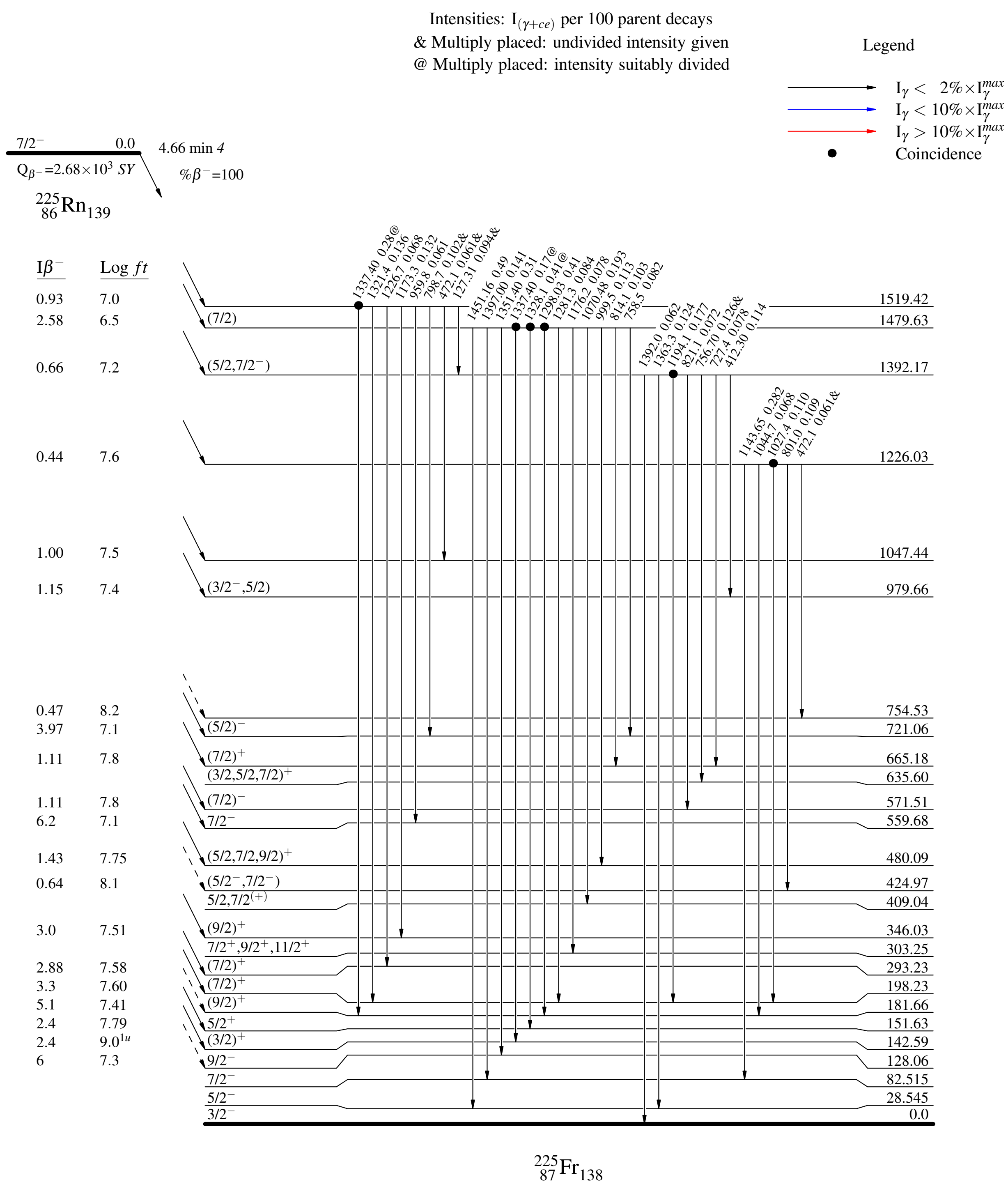
Decay Scheme (continued)

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



^{225}Rn β^- decay 1997Bu03

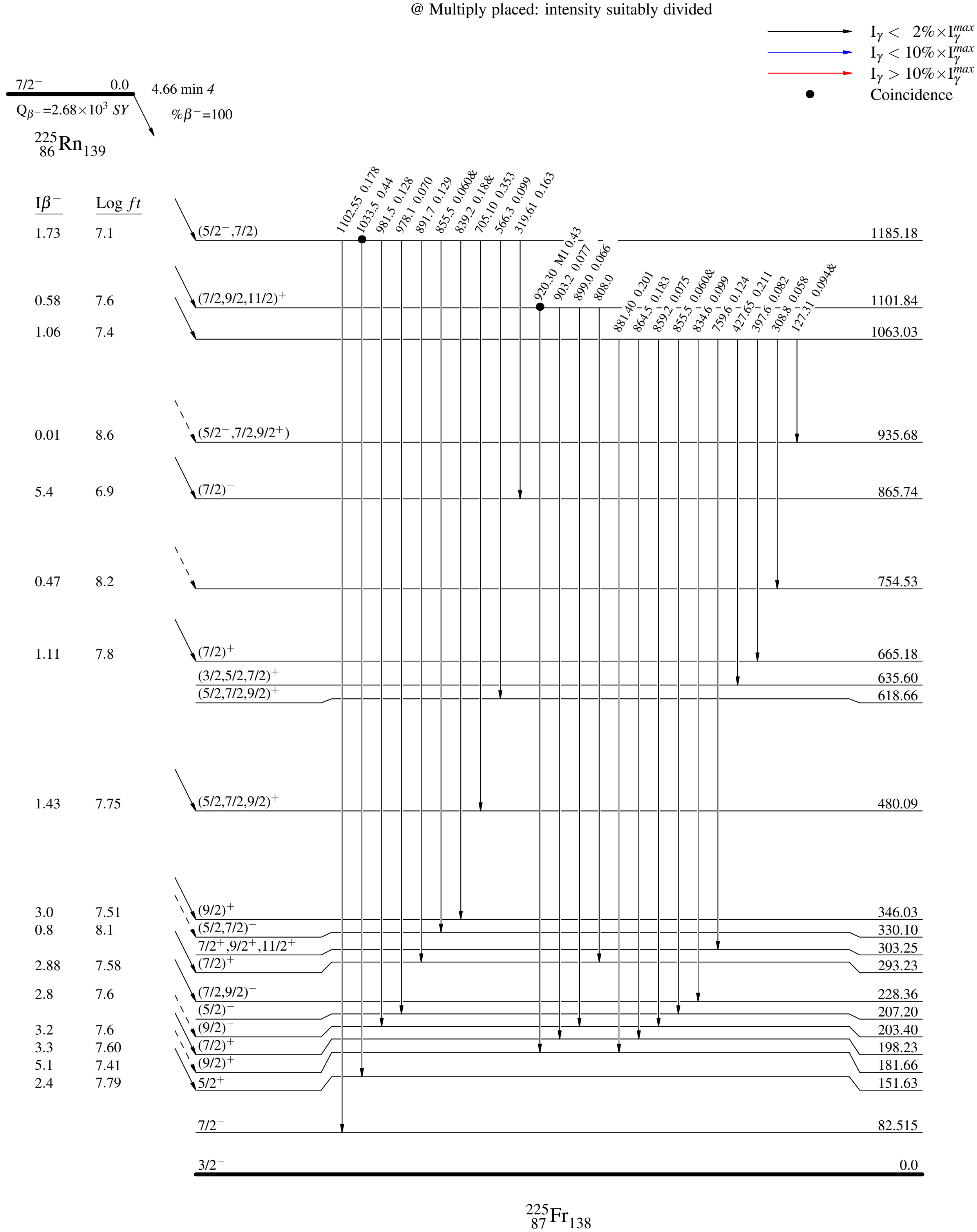
Decay Scheme (continued)



^{225}Rn β^- decay 1997Bu03

Decay Scheme (continued)

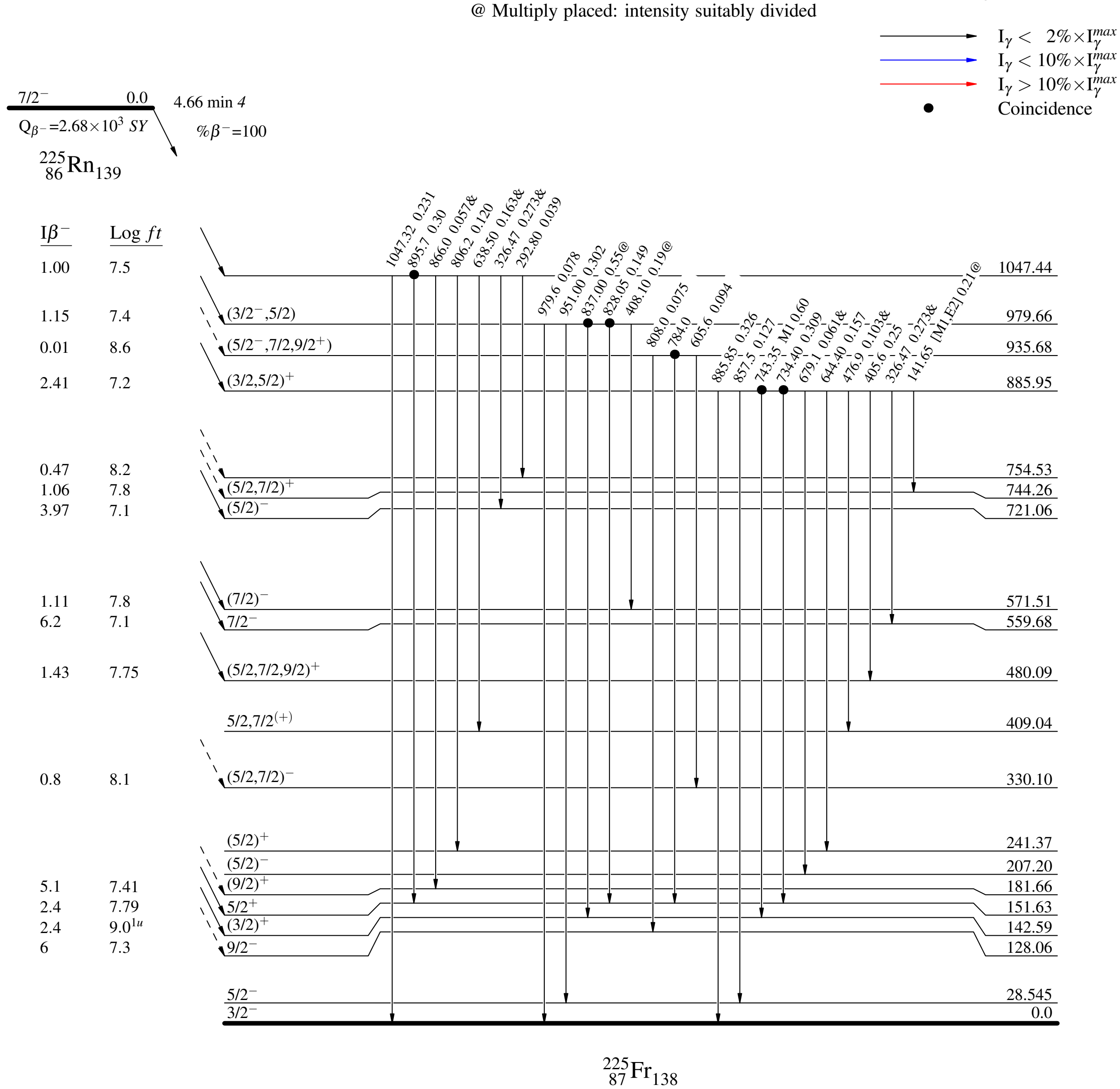
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided



^{225}Rn β^- decay 1997Bu03

Decay Scheme (continued)

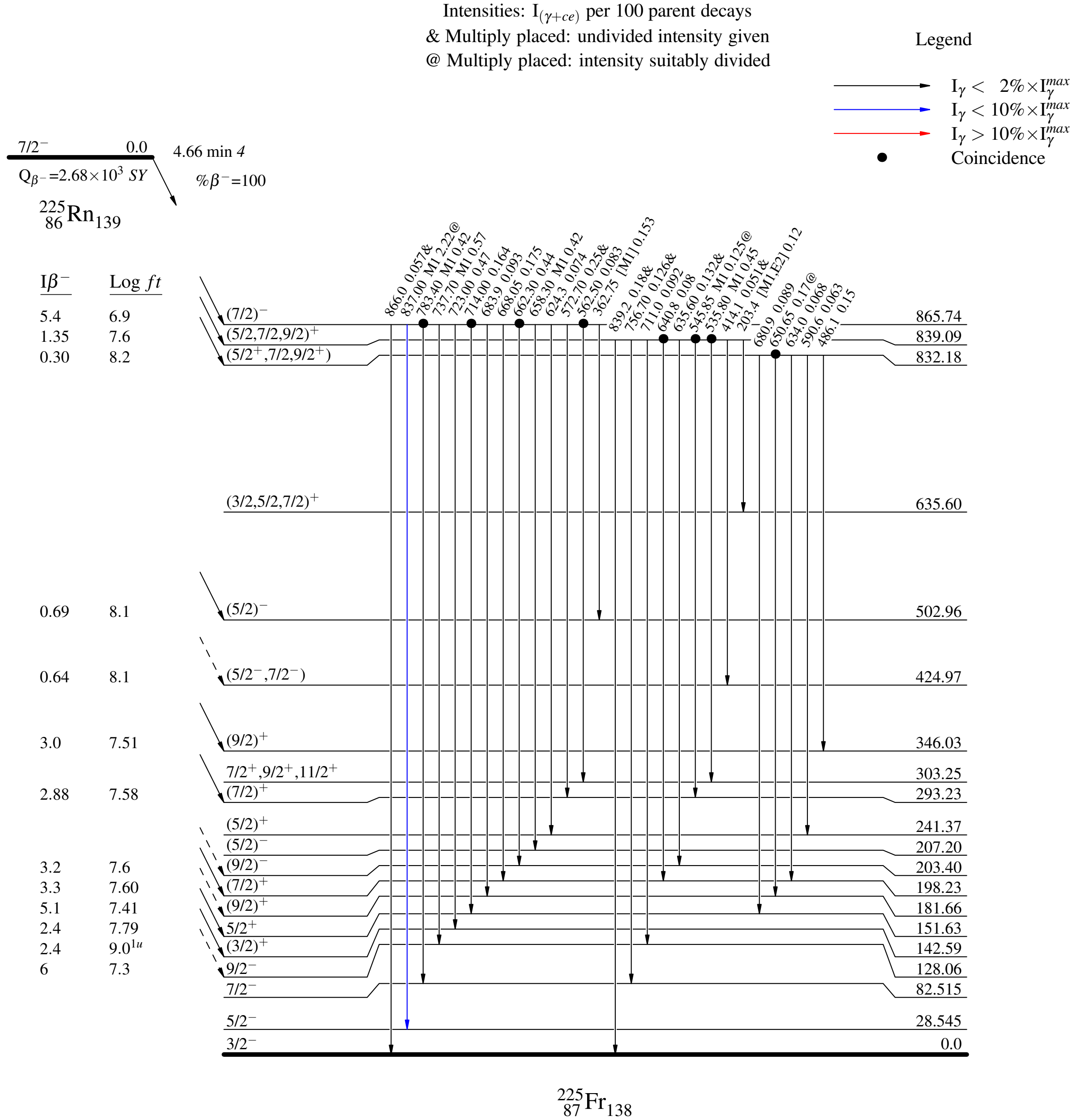
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

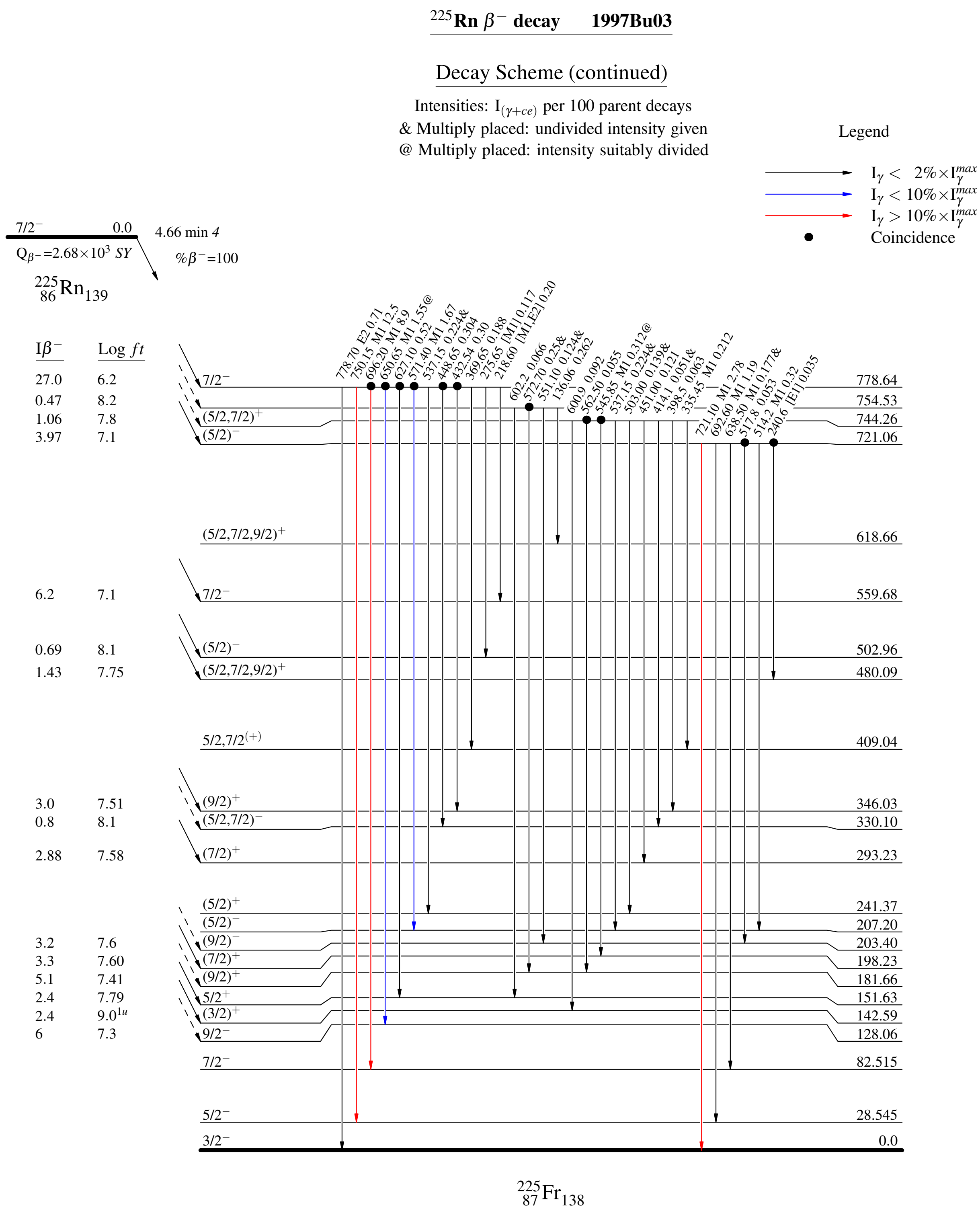


^{225}Rn β^- decay 1997Bu03

Decay Scheme (continued)

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

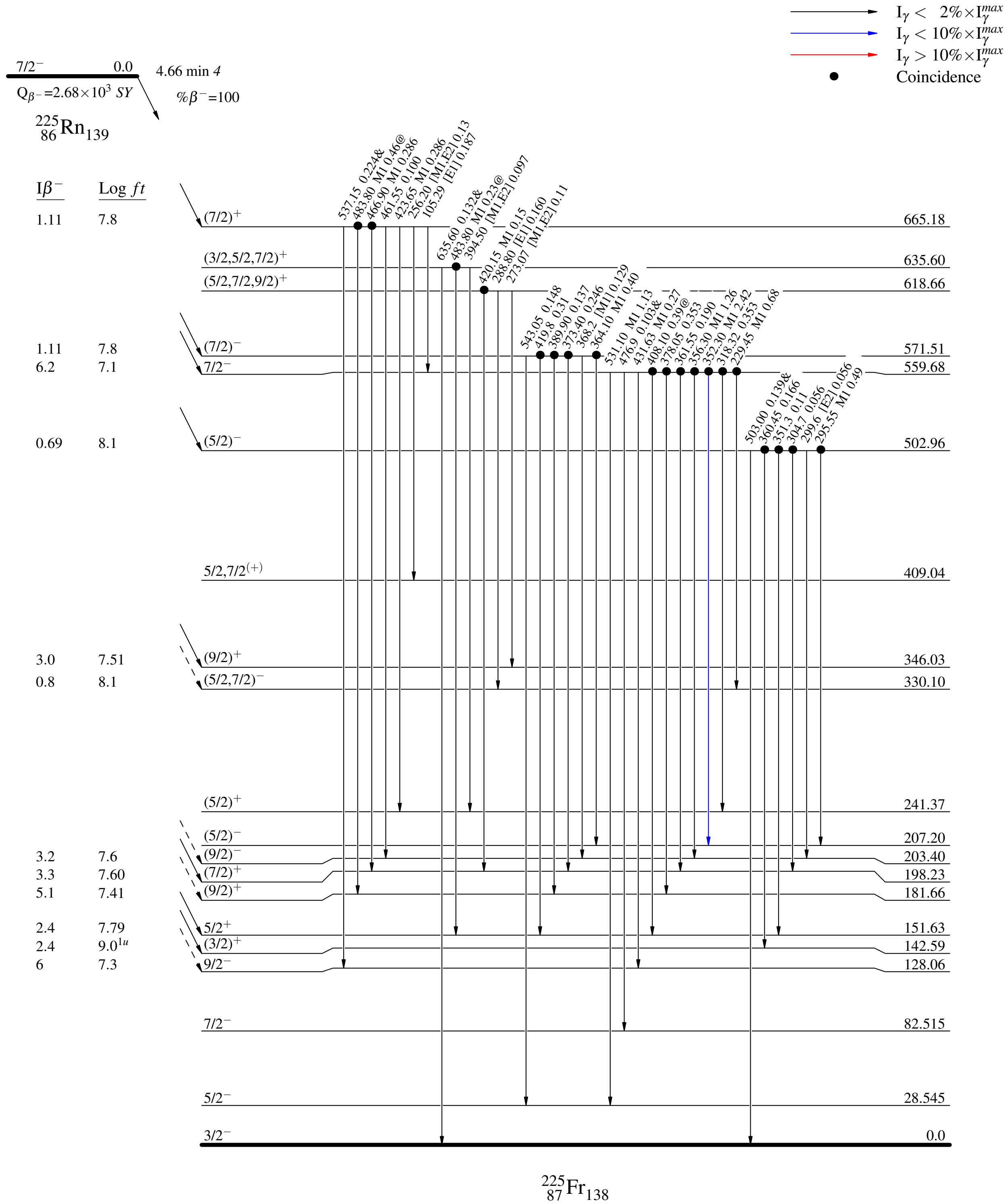



^{225}Rn β^- decay 1997Bu03
Decay Scheme (continued)
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided
Legend
$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$
Coincidence
7/2$^-$ 0.0
4.66 min 4
Q_{β^-}=2.68×10^3 SY
%β^-=100
$^{225}_{86}Rn_{139}$
Iβ^- Log ft
27.0 6.2 7/2$^-$ 778.64
0.47 8.2 754.53
1.06 7.8 (5/2,7/2)$^+$ 744.26
3.97 7.1 (5/2)$^-$ 721.06
(5/2,7/2,9/2)$^+$ 618.66
6.2 7.1 7/2$^-$ 559.68
0.69 8.1 (5/2)$^-$ 502.96
1.43 7.75 (5/2,7/2,9/2)$^+$ 480.09
5/2,7/2$^{(+)}$ 409.04
3.0 7.51 (9/2)$^+$ 346.03
0.8 8.1 (5/2,7/2)$^-$ 330.10
2.88 7.58 (7/2)$^+$ 293.23
(5/2)$^+$ 241.37
(5/2)$^-$ 207.20
3.2 7.6 (9/2)$^-$ 203.40
3.3 7.60 (7/2)$^+$ 198.23
5.1 7.41 (9/2)$^+$ 181.66
2.4 7.79 5/2$^+$ 151.63
2.4 9.0^{1u} (3/2)$^+$ 142.59
6 7.3 9/2$^-$ 128.06
7/2$^-$ 82.515
5/2$^-$ 28.545
3/2$^-$ 0.0
778.70 E2 0.71
750.15 M1 12.5
696.20 M1 8.9
650.65 M1 1.55@
627.10 0.52
571.40 M1 1.67
537.15 0.224&
448.65 0.304
432.54 0.30
369.65 0.188
275.65 [M1] 0.117
218.60 [M1,E2] 0.20
602.2 0.066
572.70 0.25&
551.10 0.124&
136.06 0.262
600.9 0.092
562.50 0.055
545.85 M1 0.312@
537.15 0.224&
503.00 0.139&
451.00 0.121
414.1 0.051&
398.5 0.063
335.45 M1 0.212
721.10 M1 2.78
692.60 M1 1.19
638.50 M1 0.177&
517.8 0.053
514.2 M1 0.32
240.6 [E1] 0.035
$^{225}_{87}Fr_{138}$

^{225}Rn β^- decay 1997Bu03

Decay Scheme (continued)

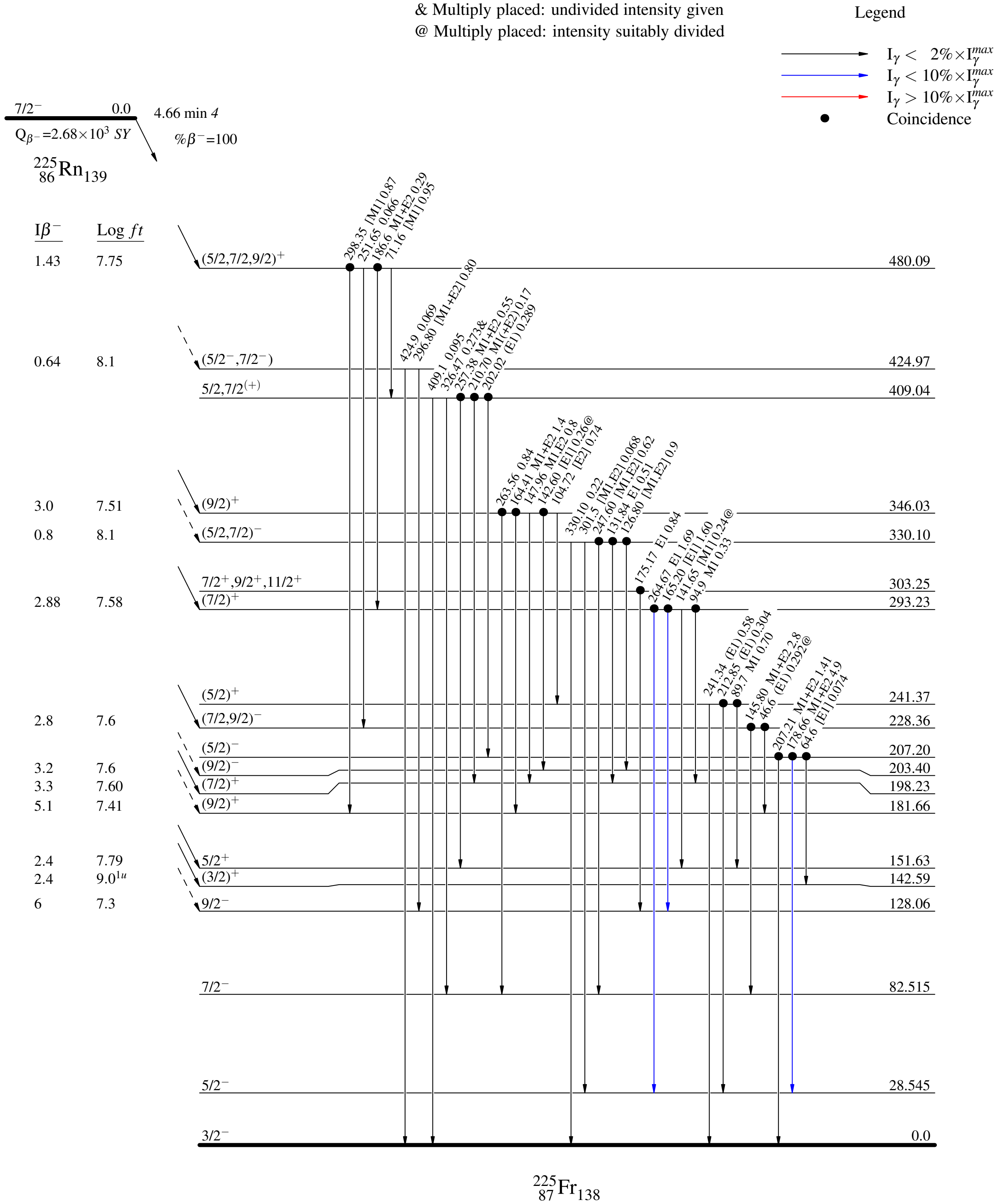
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided



^{225}Rn β^- decay 1997Bu03

Decay Scheme (continued)

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



^{225}Rn β^- decay 1997Bu03

Decay Scheme (continued)

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