^{208}Fr ε decay 1981Ri02

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	M. J. Martin	NDS 108,1583 (2007)	1-Jun-2007

Parent: ^{208}Fr: E=0; $J^\pi=7^+$; $T_{1/2}$=59.1 s *3*; Q(ε)=6983 *48*; %ε+%$β^+$ decay=11 *3*

^{208}Rn Levels

E(level)	Jπ‡	E(level)	Jπ‡	T1/2†	E(level)	Jπ‡
0	0^+	1825.2 *3*	6^+		2330.3 *3*	$(5^-,6,7^+)$
635.8 *2*	2^+	1828.4 *4*	8^+	0.35 μs *22*	2356.8 *3*	$(5^-,6^+)$
1188.9 *2*	4^+	1905.7 *3*	6^+		2459.1 *4*	$6^+,7^+,8^+$
1414.3 *2*	4^+	2128.8 *5*	$6^+,7^+$		2546.0 *3*	$(6,7^+)$
1578.2 *11*	$(4,5,6)^+$	2163.4 *5*	$7^+,8^+$		2619.0 *4*	$6^+,7^+,8^+$
1658.7 *3*	$4^+,5^+$	2179.0 *3*	$(5^-,6^+)$			
1739.5 *3*	6^+	2320.3 *4*	$6^+,7^+,8^+$			

† From γγ(t).
‡ From Adopted Levels.

ε,$β^+$ radiations

E(decay)	E(level)	Iβ+ †	Iε†	Log *ft*	I(ε+β+)†	Comments
(4.36×10^3 *5*)	2619.0	0.034 *10*	0.11 *3*	7.7 *2*	0.14 *4*	av Eβ=1505 *36*; εK=0.603 *10*; εL=0.1140 *20*; εM+=0.0382 *7*
(4.44×10^3 *5*)	2546.0	0.049 *18*	0.14 *5*	7.6 *2*	0.19 *7*	av Eβ=1537 *36*; εK=0.593 *10*; εL=0.1122 *20*; εM+=0.0376 *7*
(4.52×10^3 *5*)	2459.1	0.20 *6*	0.53 *15*	7.0 *2*	0.73 *21*	av Eβ=1576 *36*; εK=0.582 *11*; εL=0.1100 *20*; εM+=0.0369 *7*
(4.63×10^3 *5*)	2356.8	0.15 *4*	0.36 *10*	7.2 *2*	0.51 *14*	av Eβ=1622 *36*; εK=0.569 *11*; εL=0.1074 *20*; εM+=0.0360 *7*
(4.65×10^3 *5*)	2330.3	0.04 *3*	0.10 *7*	7.8 *4*	0.14 *10*	av Eβ=1634 *36*; εK=0.566 *11*; εL=0.1068 *20*; εM+=0.0358 *7*
(4.66×10^3 *5*)	2320.3	0.053 *18*	0.13 *4*	7.7 *2*	0.18 *6*	av Eβ=1638 *36*; εK=0.564 *11*; εL=0.1065 *20*; εM+=0.0357 *7*
(4.80×10^3 *5*)	2179.0	0.14 *5*	0.31 *10*	7.3 *2*	0.45 *15*	av Eβ=1702 *36*; εK=0.546 *11*; εL=0.1030 *20*; εM+=0.0345 *7*
(4.82×10^3 *5*)	2163.4	0.6 *3*	1.3 *7*	6.7 *3*	1.9 *10*	av Eβ=1709 *36*; εK=0.544 *11*; εL=0.1026 *20*; εM+=0.0344 *7*
(4.85×10^3 *5*)	2128.8	0.2 *1*	0.5 *2*	7.1 *2*	0.7 *3*	av Eβ=1725 *36*; εK=0.540 *11*; εL=0.1017 *20*; εM+=0.0341 *7*
(5.08×10^3 *5*)	1905.7	0.1 *1*	0.3 *2*	7.4 *4*	0.4 *3*	av Eβ=1825 *36*; εK=0.511 *11*; εL=0.0962 *20*; εM+=0.0322 *7*
(5.15×10^3 *5*)	1828.4	0.2 *2*	0.3 *3*	≥6.9	0.5 *5*	av Eβ=1860 *36*; εK=0.501 *10*; εL=0.0943 *20*; εM+=0.0316 *7*
(5.16×10^3 *5*)	1825.2	0.3 *1*	0.4 *3*	7.2 *3*	0.7 *4*	av Eβ=1862 *36*; εK=0.501 *10*; εL=0.0942 *20*; εM+=0.0315 *7*
(5.24×10^3 *5*)	1739.5	1.2 *6*	2.0 *9*	6.6 *3*	3.2 *15*	av Eβ=1900 *36*; εK=0.490 *10*; εL=0.0921 *20*; εM+=0.0308 *7*
(5.40×10^3‡ *5*)	1578.2	≤0.2	≤0.3	≥7.4	≤0.5	av Eβ=1974 *36*; εK=0.470 *10*; εL=0.0882 *19*; εM+=0.0295 *7*

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

γ(^{208}Rn)

Iγ normalization: from Ti(γ's to g.s.)=Ti(635.8γ)=100.

E_γ	I_γ[#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ	α[@]	$I_{(\gamma+ce)}$[#]	Comments
80.8		1739.5	6^+	1658.7	$4^+,5^+$				3.8 *11*	E_γ: from energy level difference. Not seen but presence inferred from coincidence data In (^{16}O,4nγ). $I_{(\gamma+ce)}$: from intensity balance At the 1659 level.
88.9 *1*	1.5 *3*	1828.4	8^+	1739.5	6^+	E2		14.03		α(L)=10.35 *16*; α(M)=2.79 *5*; α(N+..)=0.888 *14* α(N)=0.726 *11*; α(O)=0.1463 *22*; α(P)=0.01616 *25* Mult.: α(L)exp=11.9 *17*.
161.6	2.9 *6*	1739.5	6^+	1578.2	$(4,5,6)^+$	[M1,E2]		2.3 *11*		α(K)=1.5 *13*; α(L)=0.58 *9*; α(M)=0.15 *4*; α(N+..)=0.048 *10* α(N)=0.039 *9*; α(O)=0.0081 *15*; α(P)=0.00102 *6* E_γ: from (^{16}O,4nγ). Not seen In ε decay. I_γ: from Iγ/Iγ(325γ)=0.054 *11* In (^{16}O,4nγ).
163.7	2.0 *12*	1578.2	$(4,5,6)^+$	1414.3	4^+	[M1,E2]		2.2 *11*		α(K)=1.4 *12*; α(L)=0.55 *8*; α(M)=0.14 *3*; α(N+..)=0.045 *9* α(N)=0.037 *8*; α(O)=0.0077 *13*; α(P)=0.00097 *5* E_γ: from (^{16}O,4nγ). Not seen In ε decay. I_γ: from Iγ/Iγ(389γ)=1.0 *+8−6* In (^{16}O,4nγ).
225.5 *2*	0.77 *10*	1414.3	4^+	1188.9	4^+	M1		1.315		α(K)=1.064 *16*; α(L)=0.191 *3*; α(M)=0.0454 *7*; α(N+..)=0.01481 *21* α(N)=0.01184 *17*; α(O)=0.00259 *4*; α(P)=0.000378 *6* Mult.: α(K)exp=1.22 *12*.
298.7 *1*	0.95 *10*	2619.0	$6^+,7^+,8^+$	2320.3	$6^+,7^+,8^+$	M1+E2	1.0 *1*	0.372 *25*		α(K)=0.279 *23*; α(L)=0.0699 *21*; α(M)=0.0172 *5*; α(N+..)=0.00558 *15* α(N)=0.00449 *12*; α(O)=0.00096 *3*; α(P)=0.000131 *5* Mult.: α(K)exp=0.29 *4*.
325.2 *2*	53 *4*	1739.5	6^+	1414.3	4^+	E2		0.1088		α(K)=0.0579 *9*; α(L)=0.0378 *6*; α(M)=0.00990 *14*; α(N+..)=0.00317 *5* α(N)=0.00258 *4*; α(O)=0.000532 *8*; α(P)=6.44×10^{-5} *10* Mult.: α(K)exp=0.044 *2*.
335.0 *3*	12 *5*	2163.4	$7^+,8^+$	1828.4	8^+	M1		0.442		α(K)=0.358 *5*; α(L)=0.0639 *9*; α(M)=0.01515 *22*; α(N+..)=0.00494 *7* α(N)=0.00395 *6*; α(O)=0.000864 *13*; α(P)=0.0001262 *18* Mult.: α(K)exp=0.40 *16*.
389.3[†]	2.0 *12*	1578.2	$(4,5,6)^+$	1188.9	4^+					
389.3[†] *3*	4.8 *12*	2128.8	$6^+,7^+$	1739.5	6^+					
469.8 *1*	5.7 *4*	1658.7	$4^+,5^+$	1188.9	4^+	M1		0.1771		α(K)=0.1437 *21*; α(L)=0.0254 *4*; α(M)=0.00603 *9*;

$^{208}_{86}Rn_{122}$-2

^{208}Fr ε decay 1981Ri02 (continued)

γ(^{208}Rn) (continued)

E_γ	I_γ[#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	α[@]	Comments
								α(N+..)=0.00196 *3* α(N)=0.001571 *22*; α(O)=0.000344 *5*; α(P)=5.02×10^{-5} *7* Mult.: α(K)exp=0.146 *15*.
491.9 *1*	2.8 *2*	2320.3	6$^+$,7$^+$,8$^+$	1828.4	8$^+$	E2	0.0366	α(K)=0.0244 *4*; α(L)=0.00910 *13*; α(M)=0.00231 *4*; α(N+..)=0.000745 *11* α(N)=0.000603 *9*; α(O)=0.0001264 *18*; α(P)=1.620×10^{-5} *23* Mult.: α(K)exp=0.025 *5*.
553.1 *1*	31.0 *22*	1188.9	4$^+$	635.8	2$^+$	E2	0.0278	α(K)=0.0193 *3*; α(L)=0.00635 *9*; α(M)=0.001601 *23*; α(N+..)=0.000516 *8* α(N)=0.000417 *6*; α(O)=8.78×10^{-5} *13*; α(P)=1.144×10^{-5} *16* Mult.: α(K)exp=0.017 *1*.
635.8 *2*	100	635.8	2$^+$	0	0$^+$	E2	0.0204	α(K)=0.01475 *21*; α(L)=0.00424 *6*; α(M)=0.001059 *15*; α(N+..)=0.000342 *5* α(N)=0.000276 *4*; α(O)=5.84×10^{-5} *9*; α(P)=7.75×10^{-6} *11* Mult.: α(K)exp=0.014 *1*.
636.3 *2*	6.4 *28*	1825.2	6$^+$	1188.9	4$^+$	E2	0.0204	α(K)=0.01473 *21*; α(L)=0.00423 *6*; α(M)=0.001056 *15*; α(N+..)=0.000341 *5* α(N)=0.000275 *4*; α(O)=5.83×10^{-5} *9*; α(P)=7.73×10^{-6} *11* Mult.: α(K)exp=0.014 *1*.
671.6 *1*	1.3 *9*	2330.3	(5$^-$,6,7$^+$)	1658.7	4$^+$,5$^+$			
716.8 *1*	4.0 *28*	1905.7	6$^+$	1188.9	4$^+$	E2	0.01581	α(K)=0.01175 *17*; α(L)=0.00306 *5*; α(M)=0.000757 *11*; α(N+..)=0.000245 *4* α(N)=0.000197 *3*; α(O)=4.20×10^{-5} *6*; α(P)=5.65×10^{-6} *8* Mult.: α(K)exp=0.025 *10*.
719.6 *1*	6.6 *5*	2459.1	6$^+$,7$^+$,8$^+$	1739.5	6$^+$	E2	0.01568	α(K)=0.01166 *17*; α(L)=0.00303 *5*; α(M)=0.000749 *11*; α(N+..)=0.000242 *4* α(N)=0.000195 *3*; α(O)=4.15×10^{-5} *6*; α(P)=5.59×10^{-6} *8* Mult.: α(K)exp=0.011 *2*.
778.5 *1*	69 *5*	1414.3	4$^+$	635.8	2$^+$	E2	0.01334	α(K)=0.01006 *14*; α(L)=0.00247 *4*; α(M)=0.000608 *9*; α(N+..)=0.000196 *3* α(N)=0.0001581 *23*; α(O)=3.38×10^{-5} *5*; α(P)=4.59×10^{-6} *7* Mult.: α(K)exp=0.010 *1*.
887.3 *1*	1.7 *4*	2546.0	(6,7$^+$)	1658.7	4$^+$,5$^+$			
942.5 *1*	4.6 *3*	2356.8	(5$^-$,6$^+$)	1414.3	4$^+$			
990.1 *1*	4.1 *8*	2179.0	(5$^-$,6$^+$)	1188.9	4$^+$			

† Unresolved doublet. Intensity obtained from coincidence data. Values shown are from a private communication from the first author. Values In authors′ table II are misprints.

‡ From relative Iγ and Ice normalized to known α(K) values In ^{133}Ba and ^{207}Bi decays.

For absolute intensity per 100 decays, multiply by 0.11 *3*.

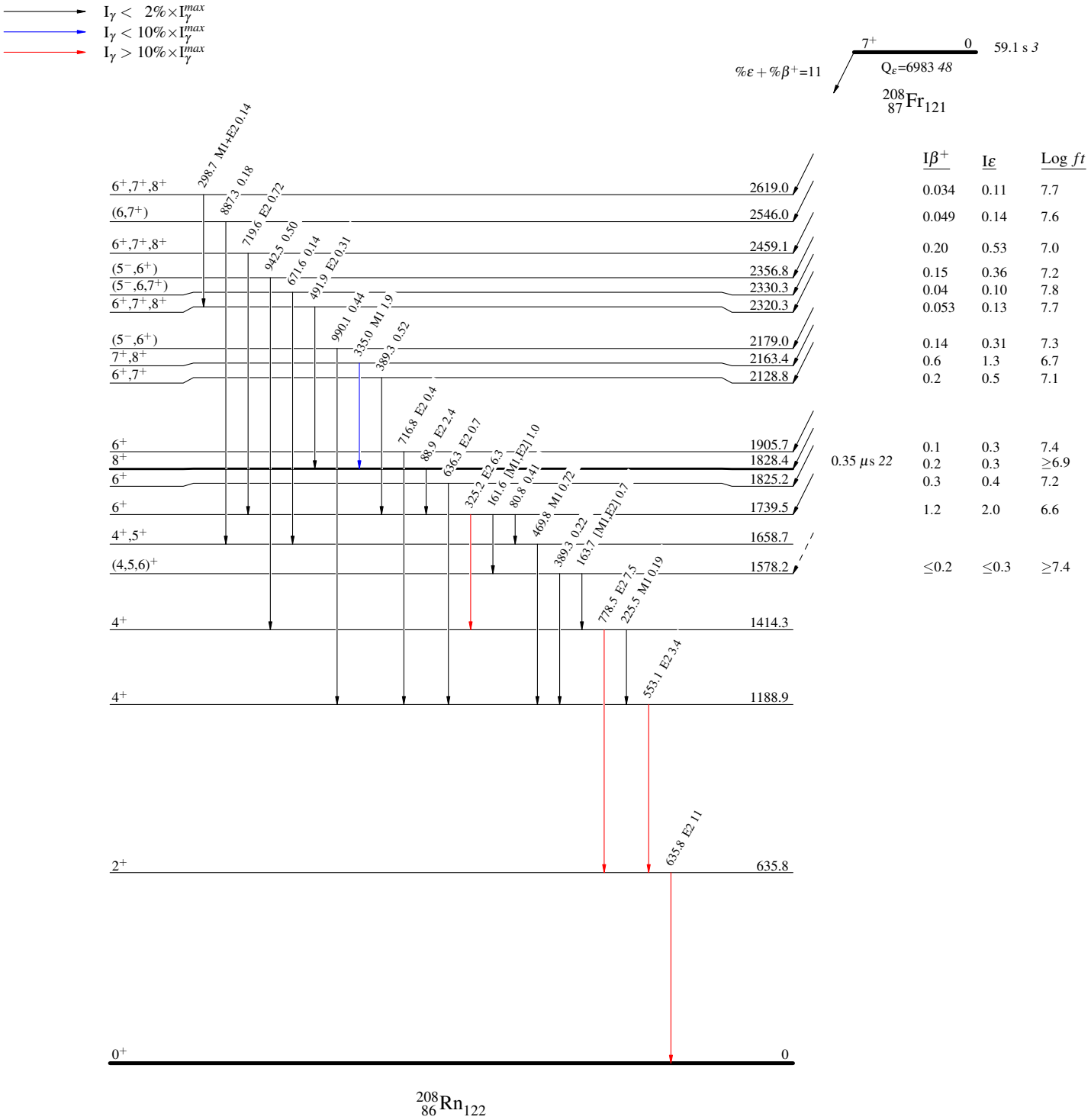
@ Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

$^{208}_{86}Rn_{122}$-3

^{208}Fr ε decay 1981Ri02

Decay Scheme

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



$^{208}_{86}Rn_{122}$