Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation		NDS 114, 2023 (2013)	23-Sep-2013

Q(β^-)=−2216 *10*; S(n)=6795 *11*; S(p)=2651 *11*; Q(α)=9540 *7* 2012Wa38
S(2n)=12272 *9*, S(2p)=7680 *8* (2012Wa38).

^{215}Ac evaluated by A.K. Jain, S. Singh, B. Singh, N. Kaur, S. Lakshami, B. Maheshwari.

Additional information 1.
^{215}Fr identified (1961Gr43) in excitation function measurements in ^{208}Pb(^{11}B,4n)^{215}Fr reaction. 1970Bo13 identified ^{215}Fr as descendent of ^{223}Pa, and estimated its half-life.
All γ-ray and excited-state data are from the ^{208}Pb(^{11}B,4nγ) dataset.

^{215}Fr Levels

The low-lying states of ^{215}Fr result from the coupling of an $h_{9/2}$ proton to the 0^+, 2^+, 4^+, 6^+, and 8^+ states of the even-even core (^{214}Rn). The energies of these even-spin states are similar to those of the 9/2, and (11/2,13/2), (15/2,17/2), (21/2,19/2) doublets in ^{215}Fr. The long-range α particle groups emitted from these states in ^{215}Fr are analogous to those emitted from the g.s., 4^+, 6^+, and 8^+ states in ^{216}Ra.
First level scheme of ^{215}Fr with four excited states was reported by 1982GoZU (also 1983GoZX). 1984De16 extended the level scheme up to 3068 level with 20 gamma rays. A contemporary study by 1984Sc25 produced a level scheme up to 3462 level with 26 gamma rays; the level scheme up to 3068-keV level almost the same as in 1984De16. 1985Dr04 measured polarization asymmetries for several of the gamma rays, establishing definite multipolarities. They reported 21 gamma rays and essentially confirmed the earlier level schemes of 1984De16 and 1984Sc25. In the opinion of the evaluators, further work is needed to define the ordering of the cascades above 2251 level.

Cross Reference (XREF) Flags

A ^{219}Ac α decay (11.8 μs)
B ^{208}Pb(^{11}B,4nγ)

E(level)†	J$^\pi$#	$T_{1/2}$	XREF	Comments
0.0	9/2$^-$	86 ns *5*	AB	%α=100 RMS charge radius <r^2>$^{1/2}$=5.620 fm *20*; deduced from interpolation of evaluated rms charge radii of ^{212}Fr to ^{228}Fr (2013An02), with slope k_z=0.36 in formula 9 of 2004An14. Value has been adjusted upward by 0.004 fm to account for slight difference in the systematics trend of deduced rms radii for A=215, and evaluated values in 2013An02 for A=210 isotopes. J$^\pi$: favored α decay (HF≈1) to ^{211}At (J$^\pi$=9/2$^-$). $T_{1/2}$: from slope of α-decay time spectrum fitted to two components: 86 ns and 30 ns (1984De16). Others: 104 ns *16* (1984Sc25, slope of time spectrum); 0.12 μs *2* (1974No02, measured for ≈90 ns only), <0.5 μs (1970Bo13). Weighted average of all results is 89 ns *6*. Configuration=$\pi 1h_{9/2}\otimes 0^+$. No ε decay. Evaluators calculated %ε+%β^+=1.0×10^{-08} for logft=5.0. %ε+%β^+<1.0×10^{-8}, theory (1973Ta30).
670.34 *13*	(13/2)$^-$		B	J$^\pi$: 670γ E2 to 9/2$^-$. Configuration=$\pi 1h_{9/2}\otimes 2^+$.
699.97 *13*	(11/2)$^-$		B	J$^\pi$: 700γ M1+E2 to 9/2$^-$. Configuration=$\pi 1h_{9/2}\otimes 2^+$.
835.43 *14*	(13/2)$^+$		B	%α=4.3 *15* J$^\pi$: 135γ E1 to (11/2)$^-$. %α: deduced by evaluators from Iα(10160)/Iα(total)= 3.8% *15* (1984Sc25), and renormalizing g.s. α branch from 87.7% to 100%.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{215}Fr Levels (continued)

E(level)[†]	J$^{\pi}$[#]	$T_{1/2}$	XREF	Comments
1121.51 *17*	(17/2)$^-$		B	%α=0.9 *1* J$^{\pi}$: 451γ E2 to (13/2)$^-$. Configuration=$\pi 1h_{9/2}\otimes 4^+$. %α: for 1121 and/or 1149 levels; deduced by evaluators from Iα(10460)/Iα(total)=0.8% *1* (1984Sc25), and renormalizing g.s. α branch from 87.7% to 100%.
1149.04 *14*	(15/2)$^-$		B	%α=0.9 *1* J$^{\pi}$: 479γ M1+E2 to (13/2)$^-$. Configuration=$\pi 1h_{9/2}\otimes 4^+$. %α: for 1121 and/or 1149 levels; deduced by evaluators from Iα(10460)/Iα(total)=0.8% *1* (1984Sc25), and renormalizing g.s. α branch from 87.7% to 100%.
1440.02 *18*	(19/2)$^-$	4 ns *2*	B	%α=4.7 *4* μ=3.1 *9* (1984De16) J$^{\pi}$: 318γ M1+E2 to (17/2)$^-$. Configuration=$\pi 1h_{9/2}\otimes 6^+$. μ: from g factor=0.33 *10*, DPAD of γ rays (1984De16), value is for 1440 and/or 1573 level. %α: deduced by evaluators from Iα(10740)/Iα(total)=4.1% *3* (1984Sc25), and renormalizing g.s. α branch from 87.7% to 100%. $T_{1/2}$: $\gamma\gamma$(t) (1984De16), value is for 1440 and/or 1573 level 10789 (1984De16).
1457.36 *21*	(21/2)$^-$		B	J$^{\pi}$: 336γ E2 to (17/2)$^-$. Configuration=$\pi 1h_{9/2}\otimes 6^+$.
1573.10 *21*	(23/2)$^-$	3.5 ns *14*	B	%α=4.1 *4* μ=3.8 *12* (1984Sc25) J$^{\pi}$: 115.8γ M1 to (21/2)$^-$. Configuration=$\pi 1h^5_{9/2}\otimes\nu 2g^1_{9/2}\otimes\nu 1i^1_{11/2}$. Theoretical g-factor=0.12 (1984Sc25) for the assigned shell-model configuration. μ: from g factor=0.33 *10*, DPAD of γ rays (1984De16), value is for 1440 and/or 1573 level. %α: deduced by evaluators from Iα(10890)/Iα(total)=3.6% *3* (1984Sc25), and renormalizing g.s. α branch from 87.7% to 100%. $T_{1/2}$: $\gamma\gamma$(t) centroid shift method (1984Sc25). Other value: 4 ns *2*, $\gamma\gamma$(t) centroid shift method (1984De16) for 1440 and/or 1573 level.
1680.6?[‡] *3*	(25/2$^-$)		B	J$^{\pi}$: 107.4γ M1(+E2) to (23/2)$^-$. Configuration=$\pi 1h^5_{9/2}\otimes\nu 2g^1_{9/2}\otimes\nu(1i^1_{11/2})$.
1813.62 *25*	(27/2)$^-$	2.1 ns *14*	B	J$^{\pi}$: 133γ M1+E2 to (25/2)$^-$; 240.5γ E2 to (23/2)$^-$. Configuration=$\pi(1h^4_{9/2},2f^1_{7/2})\otimes\ \nu(2g^1_{9/2},1i^1_{11/2})$. Theoretical g-factor=0.35 (1984Sc25) for assigned configuration. $T_{1/2}$: $\gamma\gamma$(t), $\alpha\gamma$(t) centroid shift method (1984Sc25).
2015.9 *3*	(29/2)$^+$	4.7 ns *14*	B	μ=6.8 *29* (1984De16,1989Ra17,2011StZZ) J$^{\pi}$: 202γ E1 to (27/2)$^-$. Theoretical g-factor=0.43 (1984Sc25) for configuration=$\pi(1h^4_{9/2},1i^1_{13/2})\otimes\nu(2g^1_{9/2})$ agrees with experimental value. μ: from g factor=0.47 *20*, DPAD of γ rays (1984De16). $T_{1/2}$: $\gamma\gamma$(t) and/or $\alpha\gamma$(t) with centroid-shift method. Weighted average of 5.5 ns *14* (1984Sc25), and 3 ns *2* (1984De16). Other: 9.8 ns *14* (1982GoZU) tentatively assigned to a 1612 level decaying by 202γ, but this γ now deexcites a level at 2016 keV; also this half-life may have contribution from higher-lying isomers at 3068 and 3462 keV with half-lives of 14.6 ns and 22.9 ns, respectively.
2251.3 *4*	(33/2)$^+$	5.3 ns *14*	B	μ=7.8 *17* (1984De16,1989Ra17,2011StZZ) J$^{\pi}$: 235.4γ E2 to (29/2)$^+$. Theoretical g-factor=0.49 (1984Sc25) for configuration=$\pi(1h^4_{9/2},1i^1_{13/2})\otimes\ \nu(2g^1_{9/2},1i^1_{11/2})$ agrees with experimental value. μ: from g factor=0.47 *10*, DPAD of γ rays (1984De16). $T_{1/2}$: $\gamma\gamma$(t) and/or $\alpha\gamma$(t) with centroid-shift method. Weighted average of 5.5 ns *14* (1984Sc25), and 5 ns *2* (1984De16).
2806.8?[‡] *4*	(35/2)$^-$		B	J$^{\pi}$: 555.5γ E1 to (33/2)$^+$. Configuration=$\pi(1h^5_{9/2})\otimes\nu(2g^1_{9/2},1i^1_{11/2})$.
2900.4?[‡] *4*	(35/2$^-$)		B	J$^{\pi}$: predicted by shell model (1984Sc25) with configuration=$\pi(1h^4_{9/2},2f^1_{7/2})\otimes\nu(2g^1_{9/2},1i^1_{11/2})$. J$^{\pi}$=33/2$^{(+)}$ proposed in 1985Dr04.
3014.0?[‡] *5*	(37/2$^-$)		B	J$^{\pi}$: 113.7γ to (35/2$^-$). Shell-model configuration=$\pi(1h^5_{9/2})\otimes\nu(2g^1_{9/2},1i^1_{11/2})$.
3068.9 *4*	(39/2)$^-$	14.6 ns *14*	B	μ=9.2 *4* (1984De16,1989Ra17,2011StZZ)

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{215}Fr Levels (continued)

E(level)[†]	J^{π}[#]	$T_{1/2}$	XREF	Comments
				J^{π}: 818γ E3 to $(33/2)^+$. Theoretical g-factor=0.41 (1984Sc25) for configuration=$\pi(1h^4_{9/2},1i^1_{13/2})\otimes\nu(1i^1_{11/2},1j^1_{15/2})$ agrees with experimental value. μ: from g factor=0.47 *2*, DPAD of γ rays (1984De16, corrected for diamagnetism and Knight shift). Other: g=0.48 *2*, DPAD of α particles (1984De16). $T_{1/2}$: $\gamma\gamma$(t) (262γ-555γ time curves fitted to a two-level decay formula) (1984Sc25). Other: 33 ns *5* or 30 ns *5* (1984De16), which may correspond to the half-life of the isomer at 3462 keV.
3207.5 *5*	$(41/2^-)$		B	J^{π}: 193.6γ (E2) to $(37/2^-)$. Shell-model configuration=$\pi(1h^5_{9/2})\otimes\nu(2g^1_{9/2},1i^1_{11/2})$.
3409.1 *4*	(41/2)		B	J^{π}: ΔJ=1, dipole 340γ to $(39/2)^-$.
3417.1?[‡] *5*	$(45/2^-)$		B	J^{π}: 210γ (E2) to $(41/2^-)$.
3462.3 *6*	$(47/2^+)$	22.9 ns *21*	B	J^{π}: 45γ (E1) to $(45/2^-)$. Configuration= $\pi(1h^4_{9/2},1i^1_{13/2})\otimes\nu(2g^1_{9/2},1i^1_{11/2})$. Theoretical g-factor=0.61 (1984Sc25). $T_{1/2}$: $\gamma\gamma$(t) (262γ-555γ time curves fitted to a two-level decay formula), and from 210γ time spectrum (1984Sc25). Other: 33 ns *5*, $\gamma\gamma$(t) for all γ rays; 30 ns *5*, time spectrum of g.s. α transition fitted to a two-component decay (1984De16); where this half-life is assigned to 3068 level.

[†] From a least-squares fit of γ-ray energies.

[‡] The orderings of 133-107 cascade from 1813 level; 262-55 cascade from 3069-keV level; 194-114-649 cascade from 3207 level; and 45-210 cascade from 3462 level are not established. The level energies for the intermediate levels can be different for alternate orderings.

[#] As proposed in 1985Dr04, 1984Sc25 and 1984De16 based on $\gamma(\theta)$, γ(lin pol), ce, and transition probabilities. Multiple quasi-particle shell model configurations presented here are from 1984Sc25.

Adopted Levels, Gammas (continued)

$\gamma(^{215}Fr)$

All data are from $^{208}Pb(^{11}B,4n\gamma)$.

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.	δ	$\alpha^\ddagger$	Comments
670.34	$(13/2)^-$	670.35 *15*	100	0.0	$9/2^-$	E2		0.0191	α(K)=0.01387 *20*; α(L)=0.00394 *6*; α(M)=0.000984 *14*; α(N)=0.000258 *4*; α(O)=5.60×10^{-5} *8* α(P)=8.34×10^{-6} *12*; α(Q)=3.06×10^{-7} *5*
699.97	$(11/2)^-$	699.95 *15*	100	0.0	$9/2^-$	M1+E2	−3.8 *5*	0.0206 *10*	α(K)=0.0155 *9*; α(L)=0.00390 *13*; α(M)=0.00096 *3*; α(N)=0.000252 *8*; α(O)=5.51×10^{-5} *18* α(P)=8.3×10^{-6} *3*; α(Q)=3.41×10^{-7} *19*
835.43	$(13/2)^+$	135.41 *15*	100 *4*	699.97	$(11/2)^-$	(E1)		0.227	α(K)=0.179 *3*; α(L)=0.0366 *6*; α(M)=0.00876 *13*; α(N)=0.00227 *4*; α(O)=0.000488 *7* α(P)=7.12×10^{-5} *10*; α(Q)=2.80×10^{-6} *4*
		164.96 *15*	56.8 *25*	670.34	$(13/2)^-$	(E1)		0.1402	α(K)=0.1113 *16*; α(L)=0.0219 *3*; α(M)=0.00523 *8*; α(N)=0.001357 *20*; α(O)=0.000293 *5* α(P)=4.34×10^{-5} *7*; α(Q)=1.79×10^{-6} *3*
1121.51	$(17/2)^-$	451.23 *15*	100	670.34	$(13/2)^-$	E2		0.0473	α(K)=0.0300 *5*; α(L)=0.01294 *19*; α(M)=0.00333 *5*; α(N)=0.000873 *13*; α(O)=0.000187 *3* α(P)=2.67×10^{-5} *4*; α(Q)=6.88×10^{-7} *10*
1149.04	$(15/2)^-$	(27.5 *2*)		1121.51	$(17/2)^-$	(M1)		124 *4*	E_γ: from level-energy difference.
		313.41 *15*	16.7 *7*	835.43	$(13/2)^+$	E1		0.031	α(K)=0.0251 *4*; α(L)=0.00450 *7*; α(M)=0.001067 *15*; α(N)=0.000277 *4*; α(O)=6.08×10^{-5} *9* α(P)=9.31×10^{-6} *13*; α(Q)=4.38×10^{-7} *7* I_γ: from 1984Sc25. Others: 24 *4* (1984De16), 45.4 *17* (1985Dr04); the latter in severe disagreement.
		449.11 *15*	100.0 *24*	699.97	$(11/2)^-$	E2		0.0479	α(K)=0.0302 *5*; α(L)=0.01314 *19*; α(M)=0.00338 *5*; α(N)=0.000887 *13*; α(O)=0.000190 *3* α(P)=2.71×10^{-5} *4*; α(Q)=6.95×10^{-7} *10*
		478.80 *15*	76 *5*	670.34	$(13/2)^-$	M1+E2	−3.8 *+5−4*	0.050 *3*	α(K)=0.0345 *24*; α(L)=0.0117 *4*; α(M)=0.00297 *8*; α(N)=0.000778 *22*; α(O)=0.000168 *5* α(P)=2.45×10^{-5} *8*; α(Q)=7.8×10^{-7} *6* I_γ: other: 100 *12* (1984De16) is in disagreement.
1440.02	$(19/2)^-$	290.93 *15*	100 *3*	1149.04	$(15/2)^-$	E2		0.1590	α(K)=0.0746 *11*; α(L)=0.0625 *9*; α(M)=0.01653 *24*; α(N)=0.00434 *6*; α(O)=0.000914 *13* α(P)=0.0001248 *18*; α(Q)=1.81×10^{-6} *3* B(E2)(W.u.)=0.6 *4*
		318.52 *15*	22 *3*	1121.51	$(17/2)^-$	M1+E2	+10 *+6−2*	0.125 *4*	α(K)=0.0654 *25*; α(L)=0.0446 *7*; α(M)=0.01171 *17*; α(N)=0.00307 *5*; α(O)=0.000650 *10* α(P)=8.97×10^{-5} *14*; α(Q)=1.56×10^{-6} *6* B(M1)(W.u.)=3.E−7 *+4−3*; B(E2)(W.u.)=0.09 *5* I_γ: unweighted average of values in 1984Sc25 and 1985Dr04.
1457.36	$(21/2)^-$	335.88 *15*	100	1121.51	$(17/2)^-$	E2		0.1039	α(K)=0.0550 *8*; α(L)=0.0363 *5*; α(M)=0.00952 *14*;

$^{215}_{87}Fr_{128}$-4

Adopted Levels, Gammas (continued)

$\gamma(^{215}Fr)$ (continued)

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.	δ	$\alpha^{\ddagger}$	Comments
									α(N)=0.00250 *4*; α(O)=0.000529 *8* α(P)=7.31×10^{-5} *11*; α(Q)=1.309×10^{-6} *19*
1573.10	(23/2)$^-$	115.8 *2*	5.3 *6*	1457.36	(21/2)$^-$	[M1]		9.43	α(K)=7.59 *12*; α(L)=1.402 *21*; α(M)=0.334 *5*; α(N)=0.0876 *13*; α(O)=0.0196 *3* α(P)=0.00314 *5*; α(Q)=0.000175 *3* B(M1)(W.u.)=5.1×10^{-5} *22*
		133.05$^{\#}$ *15*	100$^{\#}$ *9*	1440.02	(19/2)$^-$	E2		2.67	α(K)=0.315 *5*; α(L)=1.734 *25*; α(M)=0.469 *7*; α(N)=0.1230 *18*; α(O)=0.0256 *4* α(P)=0.00332 *5*; α(Q)=1.310×10^{-5} *19* B(E2)(W.u.)=12 *5*
1680.6?	(25/2$^-$)	107.4† *3*	100	1573.10	(23/2)$^-$	M1(+E2)		11.66 *19*	α(K)=9.37 *15*; α(L)=1.74 *3*; α(M)=0.415 *7*; α(N)=0.1089 *18*; α(O)=0.0243 *4*; α(P)=0.00390 *7* α(Q)=0.000218 *4* α: for M1.
1813.62	(27/2)$^-$	133.05$^{\#\dagger}$ *15*	41$^{\#}$ *11*	1680.6?	(25/2$^-$)	M1+E2	+0.50 *+13−18*	5.6 *4*	α(K)=4.2 *5*; α(L)=1.10 *8*; α(M)=0.273 *24*; α(N)=0.072 *7*; α(O)=0.0156 *13*; α(P)=0.00235 *13* α(Q)=9.7×10^{-5} *11* B(M1)(W.u.)=0.0004 *3*; B(E2)(W.u.)=1.7 *15*
		240.53 *15*	100 *4*	1573.10	(23/2)$^-$	E2		0.292	α(K)=0.1117 *16*; α(L)=0.1332 *19*; α(M)=0.0355 *5*; α(N)=0.00932 *14*; α(O)=0.00196 *3* α(P)=0.000263 *4*; α(Q)=2.83×10^{-6} *4* B(E2)(W.u.)=1.1 *8*
2015.9	(29/2)$^+$	202.32 *15*	100	1813.62	(27/2)$^-$	E1		0.0858	α(K)=0.0686 *10*; α(L)=0.01305 *19*; α(M)=0.00311 *5*; α(N)=0.000807 *12* α(O)=0.0001754 *25*; α(P)=2.63×10^{-5} *4*; α(Q)=1.136×10^{-6} *16* B(E1)(W.u.)=4.5×10^{-6} *14*
2251.3	(33/2)$^+$	235.39 *15*	100	2015.9	(29/2)$^+$	E2		0.314	α(K)=0.1168 *17*; α(L)=0.1454 *21*; α(M)=0.0388 *6*; α(N)=0.01019 *15*; α(O)=0.00214 *3* α(P)=0.000286 *4*; α(Q)=2.98×10^{-6} *5* B(E2)(W.u.)=1.5 *4*
2806.8?	(35/2)$^-$	555.48† *15*	100	2251.3	(33/2)$^+$	E1		0.00922 *13*	α(K)=0.00755 *11*; α(L)=0.001270 *18*; α(M)=0.000299 *5*; α(N)=7.80×10^{-5} *11* α(O)=1.724×10^{-5} *25*; α(P)=2.70×10^{-6} *4*; α(Q)=1.383×10^{-7} *20*
2900.4?	(35/2$^-$)	649.09† *15*	100	2251.3	(33/2)$^+$	D+Q			
3014.0?	(37/2$^-$)	113.7† *3*	100	2900.4?	(35/2$^-$)	[M1]		9.94 *16*	α(K)=7.99 *13*; α(L)=1.478 *24*; α(M)=0.352 *6*; α(N)=0.0924 *15*; α(O)=0.0206 *4* α(P)=0.00331 *6*; α(Q)=0.000185 *3*
3068.9	(39/2)$^-$	262.01† *15*	100 *3*	2806.8?	(35/2)$^-$	E2		0.220	α(K)=0.0931 *13*; α(L)=0.0941 *14*; α(M)=0.0250 *4*; α(N)=0.00656 *10*; α(O)=0.001380 *20*

$^{215}_{87}Fr_{128}$-5

Adopted Levels, Gammas (continued)

$\gamma(^{215}Fr)$ (continued)

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.	α[‡]	Comments
								α(P)=0.000187 *3*; α(Q)=2.31×10^{-6} *4* B(E2)(W.u.)=0.26 *3*
3068.9	(39/2)$^-$	817.53 *15*	34.4 *16*	2251.3	(33/2)$^+$	(E3)	0.0331	α(K)=0.0217 *3*; α(L)=0.00846 *12*; α(M)=0.00217 *3*; α(N)=0.000572 *8*; α(O)=0.0001238 *18* α(P)=1.83×10^{-5} *3*; α(Q)=5.92×10^{-7} *9* B(E3)(W.u.)=27 *3*
3207.5	(41/2$^-$)	138.5 *3*	52 *10*	3068.9	(39/2)$^-$	[M1]	5.67	α(K)=4.56 *7*; α(L)=0.838 *13*; α(M)=0.200 *3*; α(N)=0.0524 *8*; α(O)=0.01171 *18* α(P)=0.00188 *3*; α(Q)=0.0001049 *16*
		193.6[†] *2*	100 *20*	3014.0?	(37/2$^-$)	(E2)	0.622	α(K)=0.1740 *25*; α(L)=0.330 *5*; α(M)=0.0887 *13*; α(N)=0.0233 *4*; α(O)=0.00486 *8* α(P)=0.000643 *10*; α(Q)=4.81×10^{-6} *7*
3409.1	(41/2)	340.25 *15*	100	3068.9	(39/2)$^-$	D		
3417.1?	(45/2$^-$)	209.6[†] *2*	100	3207.5	(41/2$^-$)	E2	0.468	α(K)=0.1485 *21*; α(L)=0.236 *4*; α(M)=0.0632 *10*; α(N)=0.01657 *25*; α(O)=0.00347 *5* α(P)=0.000461 *7*; α(Q)=3.95×10^{-6} *6*
3462.3	(47/2$^+$)	45.2[†] *3*	100	3417.1?	(45/2$^-$)	(E1)	0.894 *21*	α(L)=0.676 *16*; α(M)=0.165 *4*; α(N)=0.0423 *10*; α(O)=0.00869 *20*; α(P)=0.001128 *25* α(Q)=3.15×10^{-5} *7* B(E1)(W.u.)=4.7×10^{-5} *5*

[†] The orderings of 133-107 cascade from 1813 level; 262-55 cascade from 3069 level; 194-114-649 cascade from 3207 level; and 45-210 cascade from 3462 level are not established.

[‡] 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.

[#] Multiply placed with intensity suitably divided.

$^{215}_{87}Fr_{128}$-6

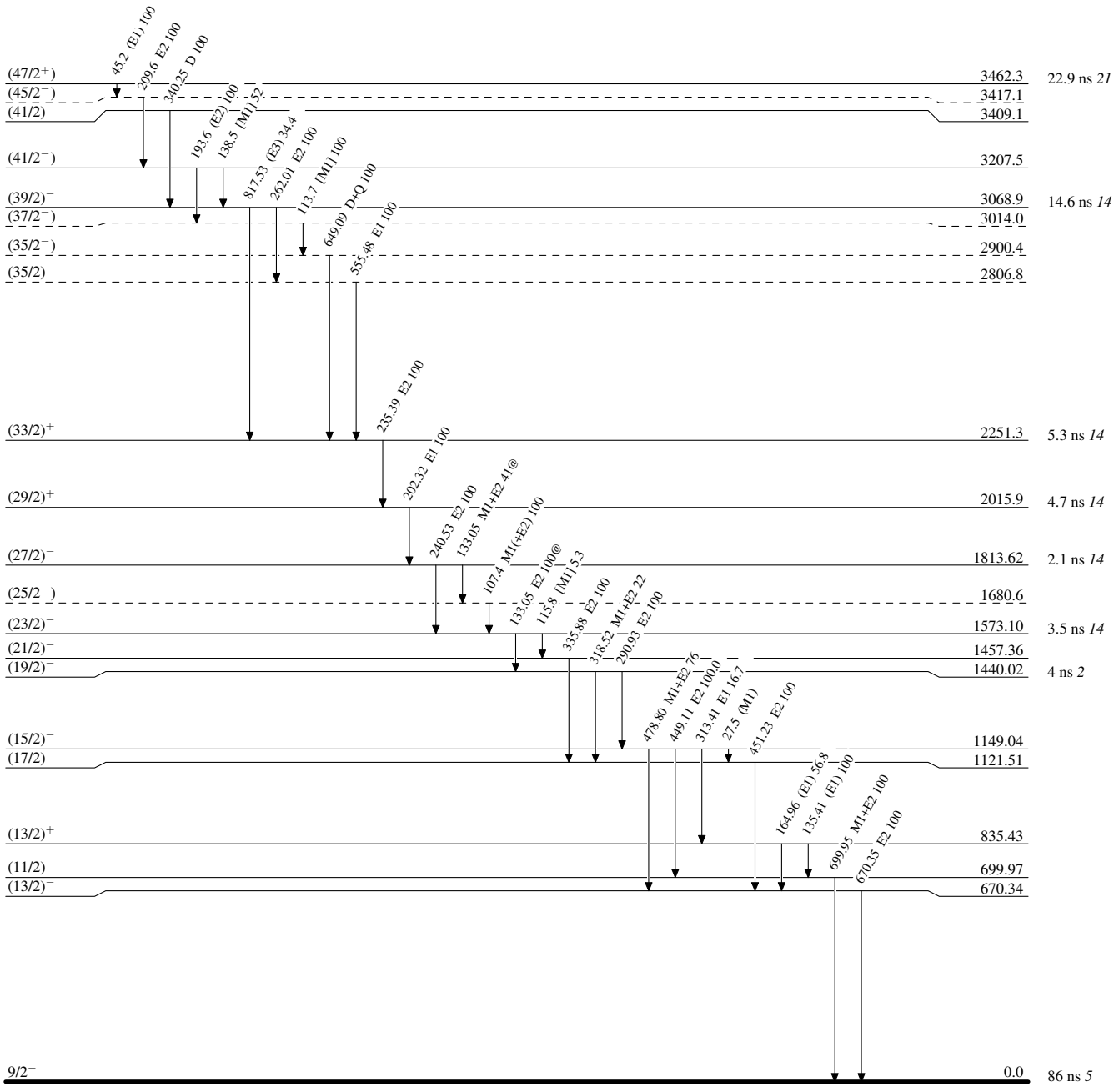
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level
@ Multiply placed: intensity suitably divided

γ Decay (Uncertain)



$^{215}_{87}Fr_{128}$