Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Shaofei Zhu and E. A. Mccutchan	NDS 175,1 (2021)	1-May-2021

Q(β^-)=−1051 *10*; S(n)=5475 *10*; S(p)=2551 *9*; Q(α)=8589 *4* 2021Wa16
S(2n)=13585 *12*; S(2p)=6908 *9* (2021Wa16).
α: Additional information 1.

^{214}Fr Levels

Cross Reference (XREF) Flags

A ^{218}Ac α decay
B (HI,xnγ)

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$[#]	XREF	Comments
0.0	(1$^-$)	5.5 ms *3*	AB	%α=100 μ=0.241 *16* (2016Fa11) J$^\pi$: based on ε feed from ^{214}Ra (1968To10), on systematics in analogy to the coupling $h_{9/2}$ proton and $g_{9/2}$ neutron orbital in isotone ^{210}Bi (1968To10, 1968Va18, and 1970To18), and on α decay to a state in ^{210}At with J^π=4$^+$. T$_{1/2}$: weighted average of 4.6 ms *7* (2005Li17), 5.0 ms *2* (1968To10), 5.5 ms *5* (1968Va18), 5.9 ms *4* (2015Kh09) and 6.0 ms *2* (2019Mi08). μ: Laser CRIS measurement assuming J$^\pi$=1$^-$; μ=0.288 *20* assuming J$^\pi$=2$^-$ (2016Fa11). Δ<r^2>^{221,214}=−0.949 fm^2 *13* from isotope shift measurement with uncertainty deduced by quadratic addition of statistical uncertainty of 0.009 and systematic uncertainty of 0.010 assuming J$^\pi$=1$^-$; while Δ<r^2>^{221,214}=−0.962 fm^2 *13* assuming J$^\pi$=2$^-$ (2016Fa11).
121 *5*	(8$^-$)[@]	3.38 ms *5*	B	%α=100 E(level): from energy differences of Eα(^{214g}Fr to ^{210g}At)=8427 keV *4* and Eα(^{214m}Fr to ^{210g}At)=8546 keV *3*. J$^\pi$: based on shell-model calculations with J$^\pi$=8$^-$ for 121-keV level and J$^\pi$=9$^-$ for 166-keV level, and being consistent with the 45-keV M1 transition connecting these two states (1994By01). T$_{1/2}$: weighted average of 3.35 ms *5* (1968To10), 3.6 ms *5* (1968Va18) and 3.5 ms *1* (2015Kh09); other: 3.9 ms (1962Gr20, 1966Ro12). Additional information 2.
166 *5*	(9$^-$)[@]		B	J$^\pi$: based on shell-model calculations with J$^\pi$=8$^-$ for 121-keV level and J$^\pi$=9$^-$ for 166-keV level, and being consistent with the 45-keV M1 transition connecting these two states (1994By01).
638 *5*	(11$^+$)[&]	103 ns *4*	B	Q=0.82 *22* (1995Ne06); μ=5.62 *7* (1994By01) μ: from g=0.511 *6* of TDPAD measurement (1994By01). Q: LEMS measurement (1995Ne06). J$^\pi$: M2 to (9$^-$).
937 *5*	(11$^+$,12$^+$)		B	J$^\pi$: M1 to (11$^+$); M1 from (12$^+$).
1080 *5*	(12$^+$)		B	J$^\pi$: M1 to (11$^+$); γ from (13$^-$).
1367 *5*	(12$^+$)[c]		B	J$^\pi$: (E3) to (9$^-$); M1 from (12$^+$).
1544 *5*	(12$^+$)[&]		B	J$^\pi$: M1+E2 to (11$^+$).
1597 *5*	(13$^-$)[@]		B	J$^\pi$: E1 to (12$^+$).
1636 *5*	(11,12)		B	J$^\pi$: (D) to (11$^+$).
1661 *5*	(14$^-$)[b]	11 ns *2*	B	μ=8.5 *4* (1994By01) μ: from g=0.61 *3* of TDPAD measurement; combined value with g(1732,(15$^-$)) (1994By01).

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Adopted Levels, Gammas (continued)

^{214}Fr Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#]	XREF	Comments
				J^π: M1 to (13^-); M2 to (12^+); E3 to (11^+).
1732 *5*	(15^-)[@]	10 ns *2*	B	μ=9.2 *5* μ: from *g*=0.61 *3* of TDPAD measurement; value is combined with *g*(1661,(14^-)) (1994By01). J^π: M1 to (14^-); E2 to (13^-).
1850 *5*	(16^-)[a]		B	J^π: M1 to (15^-).
2163 *5*	(17^+)[&]	≤7 ns	B	J^π: E1 to (16^-).
2163+x	(19^+)[&]		B	E(level),J^π: Proposed based on the comparision of levels above this level and results from shell-model calculations (1994By01). Additional information 3.
2777.6+x *3*	(19)		B	J^π: (D) to (19^+), weakly populated non-yrast state.
2808.82+x *16*	(20^-)[a]		B	J^π: E1 to (19^+).
2901.48+x *18*	(20^-)		B	J^π: E1 to (19^+).
3054.50+x *16*	(21^+)[&]		B	J^π: E1 to (20^-); E2 to (19^+).
3087.07+x *25*	(20,21)		B	J^π: γ to (20^-); γ from (21^-).
3211.62+x *20*	(21^-)		B	J^π: M1 to (20^-).
3263.28+x *23*	(23^+)[&]	4.2 ns *7*	B	J^π: E2 to (21^+).
3328.6+x *3*	(22)		B	J^π: (D) to (21^+).
3338.0+x *3*	(24^+)		B	J^π: M1 to (23^+).
3462.2+x *4*			B	
3518.42+x *24*	(22^-)		B	J^π: M1(+E2) to (21^-).
3563.8+x *3*	(24^+)[d]		B	J^π: M1 to (23^+).
3838.8+x *4*	(24)		B	J^π: D to (23^+).
3895.4+x *4*	(25^+)[d]		B	J^π: M1 to (24^+).
4010.1+x *4*	(24,25)		B	J^π: (Q) to (24^-); weakly populated non-yrast state.
4196.0+x *4*	(25^-)		B	J^π: (E1) to (24^+); E2 from (27^-).
4229.2+x *3*	(25^-)[e]		B	J^π: E1 to (24^+).
4316.5+x *3*	(27^-)[e]	8.0 ns *2*	B	μ=+19.7 *8* (1994By01) μ: from *g*=0.73 *3* of TDPAD measurement (1994By01). J^π: E2 to (25^-); E3 to (24^+).
4575.3+x *4*	(26^+)		B	J^π: M1 to (25^+).
4704.0+x *5*			B	
4925.4+x *4*	(28^-)		B	J^π: M1 to (27^-). Proposed configuration=((π $h_{9/2}$)^3(π $i_{13/2}$)(π $f_{7/2}$)(ν $j_{15/2}$)) or (π $h_{9/2}$)^3(π $i_{13/2}$)^2(ν $i_{13/2}$) (1994By01).
4975.3+x *4*	(27^+)		B	J^π: (M1) to (26^+); γ to (25^+).
5000.3+x *5*			B	
5205.0+x *4*	(27,28,29)		B	Tentatively proposed configuration=((π $h_{9/2}$)$^{+4}$(π $i_{13/2}$) (ν $g_{9/2}$)(ν $i_{13/2}$)(ν $p_{1/2}$)$^{-1}$) (1994By01). J^π: γ to (27^-); γ to (28^-); (D) from (28).
5331.4+x *5*	(28^+)		B	J^π: E1 to (27^-).
5435.4+x *5*	(28)		B	J^π: (D) to (27^+).
5557.2+x *4*	(28^-)		B	J^π: γ to (27^-); γ from (29^-).
5627.4+x *6*			B	
5638.7+x *4*	(28^+)		B	J^π: E1 to (27^-).
5769.2+x *4*	(29^-)		B	J^π: E1 to (28^+).
6089.7+x *4*	(30^-)		B	J^π: M1 to (29^-).
6179.0+x *4*	(30^-)		B	J^π: M1 to (30^-); M1+E2 to (29^-).
6360.6+x *5*	(30^-)		B	J^π: M1+E2 to (29^-).
6475.3+x *5*	(31^-)		B	J^π: M1+E2 to (30^-).
6475+y	(33^+)	108 ns *7*	B	Q=2.2 *5* (1995Ne06); μ=+22 *3* (1994By01) μ: from *g*=0.68 *1* of TDPAD measurement (1994By01). Q: LEMS measurement (1995Ne06).

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Adopted Levels, Gammas (continued)

^{214}Fr Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#]	XREF	Comments
				Jπ: Proposed configuration= $((\pi\ h_{9/2})^{+3}(\pi\ i_{13/2})(\nu\ g_{9/2})(\nu\ i_{11/2})\ (\nu\ p_{1/2})^{-1})$ (1994By01). Additional information 4.
6521.4+x *5*	(29,30,31)		B	Jπ: E2 to (27,28,29).
6812.0+y *3*	(34^+)		B	Jπ: M1 to (33^+).
6915.9+x *6*			B	
7256.0+y *4*			B	
7543.0+y *3*	(36^-)	4.9 ns *14*	B	Jπ: E3 to (33^+). Proposed configuration= $((\pi\ h_{9/2})^{+3}(\pi\ i_{13/2})^{+2}(\nu\ i_{11/2})(\nu\ j_{15/2})\ (\nu\ p_{1/2})^{-1})$ (1994By01).
7547.0+y *5*	(35^+)		B	Jπ: M1 to (34^+).
7846.1+y *5*			B	Proposed configuration= $((\pi\ h_{9/2})^{+3}(\pi\ i_{13/2})^{+2}(\nu\ g_{9/2})^{+2}(\nu\ i_{11/2})\ (\nu\ p_{1/2})^{-2})$, with $J^\pi=36^-$ (1994By01).
8142.0+y *5*	(37)		B	Jπ: (D) to (36^-).
8656.3+y *6*			B	Proposed configuration= $((\pi\ h_{9/2})^{+3}(\pi\ i_{13/2})^{+2}(\nu\ g_{9/2})(\nu\ i_{11/2})^{+2}\ (\nu\ p_{1/2})^{-2})$, with $J^\pi=37^-$ (1994By01).

† From least square fit to adopted Eγ′s by evaluator, unless otherwise noted.
‡ Tentatively assigned using γ multipolarity from (HI,xnγ) on the basis of $J^\pi(121\ \text{level})=(8^-)$ assignment which is not experimentally established, unless otherwise noted.
# From (HI,xnγ) except for the g.s. and the 122-keV level.
@ Configuration=$((\pi\ h_{9/2})^{+5}(\nu\ g_{9/2}))$.
& Configuration=$((\pi\ h_{9/2})^{+4}(\pi\ i_{13/2})(\nu\ g_{9/2}))$.
a Configuration=$((\pi\ h_{9/2})^{+4}(\pi\ f_{7/2})(\nu\ g_{9/2}))$.
b Configuration=$((\pi\ h_{9/2})^{+4}(\pi\ i_{13/2})(\nu\ j_{15/2}))$.
c Configuration=$((\pi\ h_{9/2})^{+5}(\nu\ j_{15/2}))$.
d Configuration=$((\pi\ h_{9/2})^{+3}(\pi\ i_{13/2})(\pi\ f_{7/2})(\nu\ g_{9/2}))$.
e Configuration=$((\pi\ h_{9/2})^{+3}(\pi\ i_{13/2})^{+2}(\nu\ g_{9/2}))$.

Adopted Levels, Gammas (continued)

γ(^{214}Fr)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[†]	δ	α	Comments
166	(9⁻)	44.7 *2*	100	121	(8⁻)	M1+E2	0.09 *10*	33 *10*	α(L)=25 *8*; α(M)=6.0 *21*; α(N)=1.6 *5*; α(O)=0.35 *11*; α(P)=0.055 *14*; α(Q)=0.00281 *8*
638	(11⁺)	471.7 *1*	100 *3*	166	(9⁻)	M2		0.547 *8*	α(K)=0.416 *6*; α(L)=0.0981 *14*; α(M)=0.02424 *34*; α(N)=0.00640 *9*; α(O)=0.001426 *20* α(P)=0.0002259 *32*; α(Q)=1.197×10^{-5} *17* B(M2)(W.u.)=0.227 *10*
		516.6[‡] *2*	3.5[‡] *12*	121	(8⁻)			0.1183 *17*	B(E3)(W.u.)=10 *4*
937	(11⁺,12⁺)	299.3 *2*	100	638	(11⁺)	M1+E2	0.2 *6*	0.64 *18*	α(K)=0.51 *16*; α(L)=0.094 *14*; α(M)=0.0225 *28*; α(N)=0.0059 *7*; α(O)=0.00132 *18* α(P)=0.00021 *4*; α(Q)=1.2×10^{-5} *4*
1080	(12⁺)	143.3 *2*	48 *3*	937	(11⁺,12⁺)	M1		5.15 *7*	α(K)=4.14 *6*; α(L)=0.761 *11*; α(M)=0.1813 *26*; α(N)=0.0475 *7*; α(O)=0.01062 *15* α(P)=0.001704 *25*; α(Q)=9.51×10^{-5} *14*
		442.7 *2*	100 *7*	638	(11⁺)	M1		0.2261 *32*	α(K)=0.1828 *26*; α(L)=0.0328 *5*; α(M)=0.00780 *11*; α(N)=0.002046 *29*; α(O)=0.000457 *6* α(P)=7.34×10^{-5} *10*; α(Q)=4.10×10^{-6} *6*
1367	(12⁺)	1200.8 *3*	100	166	(9⁻)	(E3)		0.01361 *19*	α(K)=0.01005 *14*; α(L)=0.00267 *4*; α(M)=0.000666 *9*; α(N)=0.0001749 *25*; α(O)=3.83×10^{-5} *5* α(P)=5.85×10^{-6} *8*; α(Q)=2.446×10^{-7} *34*
1544	(12⁺)	177.5 *4*	5.7 *14*	1367	(12⁺)	M1		2.81 *4*	α(K)=2.262 *35*; α(L)=0.414 *6*; α(M)=0.0986 *15*; α(N)=0.0258 *4*; α(O)=0.00578 *9* α(P)=0.000927 *14*; α(Q)=5.17×10^{-5} *8*
		607.5 *3*	36 *10*	937	(11⁺,12⁺)	(M1)		0.0972 *14*	α(K)=0.0787 *11*; α(L)=0.01402 *20*; α(M)=0.00333 *5*; α(N)=0.000872 *12* α(O)=0.0001950 *27*; α(P)=3.13×10^{-5} *4*; α(Q)=1.754×10^{-6} *25*
		906.7 *2*	100 *9*	638	(11⁺)	M1+E2	1.01 *15*	0.0220 *19*	α(K)=0.0176 *16*; α(L)=0.00332 *25*; α(M)=0.00079 *6*; α(N)=0.000208 *15*; α(O)=4.62×10^{-5} *34* α(P)=7.3×10^{-6} *6*; α(Q)=3.87×10^{-7} *35*
1597	(13⁻)	52.5 *2*	4.93 *20*	1544	(12⁺)	E1		0.598 *10*	α(L)=0.453 *8*; α(M)=0.1103 *19*; α(N)=0.0283 *5*; α(O)=0.00586 *10*; α(P)=0.000777 *13* α(Q)=2.30×10^{-5} *4*
		516.6[‡] *2*	100[‡] *7*	1080	(12⁺)	(E1)		0.01067 *15*	α(K)=0.00873 *12*; α(L)=0.001478 *21*; α(M)=0.000349 *5*; α(N)=9.08×10^{-5} *13* α(O)=2.005×10^{-5} *28*; α(P)=3.13×10^{-6} *4*; α(Q)=1.590×10^{-7} *22*
1636	(11,12)	998.0 *3*	100	638	(11⁺)	(D)			
1661	(14⁻)	63.9 *2*	2.0 *7*	1597	(13⁻)	M1		10.38 *17*	α(L)=7.88 *13*; α(M)=1.879 *31*; α(N)=0.493 *8*; α(O)=0.1101 *18*; α(P)=0.01767 *30*

$^{214}_{87}Fr_{127}$-4

Adopted Levels, Gammas (continued)

$\gamma(^{214}Fr)$ (continued)

E_i(level)	J_i^π	E_γ †	I_γ †	E_f	J_f^π	Mult. †	α	Comments
								α(Q)=0.000989 *17* B(M1)(W.u.)=0.00011 *4*
1661	(14$^-$)	580.6 *2*	12.4 *13*	1080	(12$^+$)	M2	0.292 *4*	α(K)=0.2256 *32*; α(L)=0.0503 *7*; α(M)=0.01235 *17*; α(N)=0.00326 *5*; α(O)=0.000726 *10* α(P)=0.0001153 *16*; α(Q)=6.17×10^{-6} *9* B(M2)(W.u.)=0.105 *23*
		1023.1 *2*	100 *4*	638	(11$^+$)	E3	0.01944 *27*	α(K)=0.01382 *19*; α(L)=0.00421 *6*; α(M)=0.001062 *15*; α(N)=0.000279 *4*; α(O)=6.09×10^{-5} *9* α(P)=9.17×10^{-6} *13*; α(Q)=3.50×10^{-7} *5* B(E3)(W.u.)=25 *5*
1732	(15$^-$)	71.4 *2*	100 *14*	1661	(14$^-$)	M1	7.50 *12*	α(L)=5.70 *9*; α(M)=1.358 *22*; α(N)=0.356 *6*; α(O)=0.0796 *13*; α(P)=0.01278 *21* α(Q)=0.000715 *12* B(M1)(W.u.)=0.00061 *13*
		135.1 *2*	41 *6*	1597	(13$^-$)	E2	2.50 *4*	α(K)=0.310 *4*; α(L)=1.615 *25*; α(M)=0.437 *7*; α(N)=0.1146 *18*; α(O)=0.0238 *4* α(P)=0.00310 *5*; α(Q)=1.253×10^{-5} *18* B(E2)(W.u.)=0.68 *18*
1850	(16$^-$)	118.5 *1*	100	1732	(15$^-$)	M1	8.84 *13*	α(K)=7.11 *10*; α(L)=1.312 *19*; α(M)=0.313 *4*; α(N)=0.0820 *12*; α(O)=0.01833 *26* α(P)=0.00294 *4*; α(Q)=0.0001642 *23*
2163	(17$^+$)	312.5 *1*	100	1850	(16$^-$)	E1	0.0312 *4*	α(K)=0.02524 *35*; α(L)=0.00453 *6*; α(M)=0.001074 *15*; α(N)=0.000279 *4*; α(O)=6.12×10^{-5} *9* α(P)=9.37×10^{-6} *13*; α(Q)=4.41×10^{-7} *6* B(E1)(W.u.)≥8.6×10^{-7}
2777.6+x	(19)	614.6 *3*	100	2163+x	(19$^+$)	(D)		
2808.82+x	(20$^-$)	645.8 *2*	100	2163+x	(19$^+$)	E1	0.00687 *10*	α(K)=0.00564 *8*; α(L)=0.000935 *13*; α(M)=0.0002199 *31*; α(N)=5.73×10^{-5} *8* α(O)=1.270×10^{-5} *18*; α(P)=1.995×10^{-6} *28*; α(Q)=1.042×10^{-7} *15*
2901.48+x	(20$^-$)	738.5 *2*	100	2163+x	(19$^+$)	E1	0.00533 *7*	α(K)=0.00438 *6*; α(L)=0.000718 *10*; α(M)=0.0001686 *24*; α(N)=4.40×10^{-5} *6* α(O)=9.75×10^{-6} *14*; α(P)=1.537×10^{-6} *22*; α(Q)=8.15×10^{-8} *11*
3054.50+x	(21$^+$)	245.7 *2*	8.7 *5*	2808.82+x	(20$^-$)	E1	0.0542 *8*	α(K)=0.0436 *6*; α(L)=0.00806 *11*; α(M)=0.001917 *27*; α(N)=0.000498 *7* α(O)=0.0001086 *15*; α(P)=1.644×10^{-5} *23*; α(Q)=7.40×10^{-7} *10*
		891.5 *2*	100 *4*	2163+x	(19$^+$)	E2	0.01069 *15*	α(K)=0.00819 *11*; α(L)=0.001890 *26*; α(M)=0.000463 *6*; α(N)=0.0001213 *17* α(O)=2.66×10^{-5} *4*; α(P)=4.06×10^{-6} *6*; α(Q)=1.759×10^{-7} *25*
3087.07+x	(20,21)	185.5 *3*	100	2901.48+x	(20$^-$)			
3211.62+x	(21$^-$)	124.5 *3*	23 *7*	3087.07+x	(20,21)			
		310.2 *2*	100 *17*	2901.48+x	(20$^-$)	M1	0.594 *8*	α(K)=0.479 *7*; α(L)=0.0868 *12*; α(M)=0.02066 *29*; α(N)=0.00542 *8*;

$^{214}_{87}Fr_{127}$-5

Adopted Levels, Gammas (continued)

$\gamma(^{214}Fr)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[†]	δ	α	Comments
									α(O)=0.001211 *17* α(P)=0.0001943 *27*; α(Q)=1.084×10^{-5} *15*
3211.62+x	(21$^-$)	402.7 *3*	50 *10*	2808.82+x	(20$^-$)	(M1)		0.292 *4*	α(K)=0.2359 *33*; α(L)=0.0425 *6*; α(M)=0.01010 *14*; α(N)=0.00265 *4*; α(O)=0.000592 *8* α(P)=9.50×10^{-5} *13*; α(Q)=5.30×10^{-6} *8*
3263.28+x	(23$^+$)	208.8 *2*	100	3054.50+x	(21$^+$)	E2		0.474 *7*	α(K)=0.1497 *21*; α(L)=0.2395 *35*; α(M)=0.0642 *9*; α(N)=0.01684 *25*; α(O)=0.00352 *5* α(P)=0.000468 *7*; α(Q)=3.99×10^{-6} *6* B(E2)(W.u.)=3.0 *5*
3328.6+x	(22)	274.1 *2*	100	3054.50+x	(21$^+$)	(D)			
3338.0+x	(24$^+$)	74.5 *3*	100	3263.28+x	(23$^+$)	M1		6.63 *12*	α(L)=5.03 *9*; α(M)=1.200 *22*; α(N)=0.315 *6*; α(O)=0.0703 *13*; α(P)=0.01129 *21* α(Q)=0.000631 *12*
3462.2+x		250.6[#] *3*	100	3211.62+x	(21$^-$)				
3518.42+x	(22$^-$)	306.8 *2*	100 *10*	3211.62+x	(21$^-$)	M1(+E2)	0.8 *+3−8*	0.43 *19*	α(K)=0.33 *17*; α(L)=0.074 *15*; α(M)=0.0182 *31*; α(N)=0.0048 *8*; α(O)=0.00105 *20* α(P)=0.00016 *4*; α(Q)=7.E−6 *4*
		431.3 *3*	19 *6*	3087.07+x	(20,21)				
3563.8+x	(24$^+$)	(45.3 *3*)		3518.42+x	(22$^-$)				E_γ: from level scheme. Existence of this γ was inferred in (HI,xnγ) from $\gamma\gamma$-coincidence data (1994By01).
		300.6 *2*	100	3263.28+x	(23$^+$)	M1		0.647 *9*	α(K)=0.523 *7*; α(L)=0.0947 *13*; α(M)=0.02254 *32*; α(N)=0.00591 *8*; α(O)=0.001321 *19* α(P)=0.0002119 *30*; α(Q)=1.183×10^{-5} *17*
3838.8+x	(24)	575.5 *3*	100	3263.28+x	(23$^+$)	D			
3895.4+x	(25$^+$)	331.7 *2*	100	3563.8+x	(24$^+$)	M1		0.494 *7*	α(K)=0.399 *6*; α(L)=0.0722 *10*; α(M)=0.01717 *24*; α(N)=0.00450 *6*; α(O)=0.001006 *14* α(P)=0.0001615 *23*; α(Q)=9.02×10^{-6} *13*
4010.1+x	(24,25)	446.3 *3*	100	3563.8+x	(24$^+$)	(Q)			
4196.0+x	(25$^-$)	858.0 *2*	100	3338.0+x	(24$^+$)	(E1)		0.00404 *6*	α(K)=0.00333 *5*; α(L)=0.000539 *8*; α(M)=0.0001264 *18*; α(N)=3.29×10^{-5} *5*; α(O)=7.32×10^{-6} *10* α(P)=1.159×10^{-6} *16*; α(Q)=6.24×10^{-8} *9*
4229.2+x	(25$^-$)	665.4 *2*	100 *4*	3563.8+x	(24$^+$)	E1		0.00649 *9*	α(K)=0.00533 *7*; α(L)=0.000881 *12*; α(M)=0.0002071 *29*; α(N)=5.40×10^{-5} *8* α(O)=1.196×10^{-5} *17*; α(P)=1.881×10^{-6} *26*; α(Q)=9.86×10^{-8} *14*
		891.2[#] *5*	≤24	3338.0+x	(24$^+$)			0.00377 *5*	
4316.5+x	(27$^-$)	87.3 *3*	50 *30*	4229.2+x	(25$^-$)	E2		16.6 *4*	α(L)=12.22 *26*; α(M)=3.31 *7*; α(N)=0.868 *19*; α(O)=0.180 *4*; α(P)=0.0231 *5*; α(Q)=5.06×10^{-5} *9* B(E2)(W.u.)=7.9 *13*
		120.3 *3*	19 *6*	4196.0+x	(25$^-$)	E2		4.06 *7*	α(K)=0.335 *5*; α(L)=2.74 *5*; α(M)=0.742 *13*; α(N)=0.1947

$^{214}_{87}Fr_{127}$-6

Adopted Levels, Gammas (continued)

γ(^{214}Fr) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[†]	α	Comments
								35; α(O)=0.0404 *7* α(P)=0.00523 *9*; α(Q)=1.760×10^{-5} *28* B(E2)(W.u.)=0.6 *4*
4316.5+x	(27$^-$)	752.7 *2*	100 *14*	3563.8+x	(24$^+$)	E3	0.0407 *6*	α(K)=0.0258 *4*; α(L)=0.01115 *16*; α(M)=0.00288 *4*; α(N)=0.000760 *11*; α(O)=0.0001640 *23* α(P)=2.399×10^{-5} *34*; α(Q)=7.23×10^{-7} *10* B(E3)(W.u.)=35 *17*
		978.5 *3*	83 *17*	3338.0+x	(24$^+$)	E3	0.02154 *30*	α(K)=0.01511 *21*; α(L)=0.00481 *7*; α(M)=0.001217 *17*; α(N)=0.000320 *4*; α(O)=6.97×10^{-5} *10* α(P)=1.046×10^{-5} *15*; α(Q)=3.88×10^{-7} *5* B(E3)(W.u.)=4.6 *23*
4575.3+x	(26$^+$)	679.9 *3*	100	3895.4+x	(25$^+$)	M1	0.0722 *10*	α(K)=0.0585 *8*; α(L)=0.01039 *15*; α(M)=0.002466 *35*; α(N)=0.000646 *9* α(O)=0.0001444 *20*; α(P)=2.320×10^{-5} *33*; α(Q)=1.301×10^{-6} *18*
4704.0+x		809[#]	100	3895.4+x	(25$^+$)			
4925.4+x	(28$^-$)	608.9 *2*	100	4316.5+x	(27$^-$)	M1	0.0966 *14*	α(K)=0.0783 *11*; α(L)=0.01394 *20*; α(M)=0.00331 *5*; α(N)=0.000867 *12* α(O)=0.0001939 *27*; α(P)=3.11×10^{-5} *4*; α(Q)=1.744×10^{-6} *24*
4975.3+x	(27$^+$)	400.0 *3*	100 *15*	4575.3+x	(26$^+$)	(M1)	0.297 *4*	α(K)=0.2402 *34*; α(L)=0.0433 *6*; α(M)=0.01028 *15*; α(N)=0.00270 *4*; α(O)=0.000603 *9* α(P)=9.67×10^{-5} *14*; α(Q)=5.40×10^{-6} *8*
		1080.5 *5*	35 *15*	3895.4+x	(25$^+$)			
5000.3+x		683.8 *3*	100	4316.5+x	(27$^-$)			
5205.0+x	(27,28,29)	279.0 *5*	5 *3*	4925.4+x	(28$^-$)			
		888.6 *3*	100 *13*	4316.5+x	(27$^-$)			
5331.4+x	(28$^+$)	1014.9 *3*	100	4316.5+x	(27$^-$)	E1	0.00299 *4*	α(K)=0.002469 *35*; α(L)=0.000395 *6*; α(M)=9.24×10^{-5} *13*; α(N)=2.410×10^{-5} *34* α(O)=5.36×10^{-6} *8*; α(P)=8.52×10^{-7} *12*; α(Q)=4.65×10^{-8} *7*
5435.4+x	(28)	460.2 *3*	100 *28*	4975.3+x	(27$^+$)	(D)		
		509.5 *5*	73 *28*	4925.4+x	(28$^-$)			
5557.2+x	(28$^-$)	352.0 *3*	20 *7*	5205.0+x	(27,28,29)	(D)		
		853.2 *3*	100 *34*	4704.0+x				
		1240.7 *3*	33 *13*	4316.5+x	(27$^-$)			
5627.4+x		1310.9 *5*	100	4316.5+x	(27$^-$)			
5638.7+x	(28$^+$)	1321.9 *3*	100	4316.5+x	(27$^-$)	E1	1.94×10^{-3} *3*	α(K)=0.001564 *22*; α(L)=0.0002462 *34*; α(M)=5.75×10^{-5} *8*; α(N)=1.500×10^{-5} *21* α(O)=3.34×10^{-6} *5*; α(P)=5.34×10^{-7} *7*; α(Q)=2.97×10^{-8} *4*
5769.2+x	(29$^-$)	130.2 *3*	19 *3*	5638.7+x	(28$^+$)	E1	0.249 *4*	α(K)=0.1961 *30*; α(L)=0.0405 *6*; α(M)=0.00971 *15*; α(N)=0.00251 *4*; α(O)=0.000540 *8* α(P)=7.85×10^{-5} *12*; α(Q)=3.06×10^{-6} *5*

$^{214}_{87}Fr_{127}$-7

Adopted Levels, Gammas (continued)

$\gamma(^{214}Fr)$ (continued)

E_i(level)	J_i^π	E_γ †	I_γ †	E_f	J_f^π	Mult. †	δ	α	Comments
5769.2+x	(29$^-$)	211.9 *2*	21 *4*	5557.2+x	(28$^-$)				
		844.0 *2*	100 *7*	4925.4+x	(28$^-$)	M1,E2		0.026 *15*	α(K)=0.021 *12*; α(L)=0.0040 *19*; α(M)=1.0×10^{-3} *4*; α(N)=2.5×10^{-4} *11*; α(O)=5.6×10^{-5} *26* α(P)=9.E−6 *4*; α(Q)=4.7×10^{-7} *27*
		1453.0 *5*	11 *3*	4316.5+x	(27$^-$)	(Q)			
6089.7+x	(30$^-$)	320.5 *3*	100	5769.2+x	(29$^-$)	M1		0.543 *8*	α(K)=0.438 *6*; α(L)=0.0794 *11*; α(M)=0.01888 *27*; α(N)=0.00495 *7*; α(O)=0.001106 *16* α(P)=0.0001775 *25*; α(Q)=9.91×10^{-6} *14*
6179.0+x	(30$^-$)	89.3 *3*	5.6 *8*	6089.7+x	(30$^-$)	M1		3.91 *7*	α(L)=2.97 *5*; α(M)=0.708 *12*; α(N)=0.1857 *32*; α(O)=0.0415 *7*; α(P)=0.00666 *11* α(Q)=0.000372 *6*
		409.8 *2*	100 *10*	5769.2+x	(29$^-$)	M1+E2	1.0 *3*	0.17 *4*	α(K)=0.131 *32*; α(L)=0.029 *4*; α(M)=0.0071 *9*; α(N)=0.00187 *23*; α(O)=0.00041 *5* α(P)=6.4×10^{-5} *9*; α(Q)=3.0×10^{-6} *7*
6360.6+x	(30$^-$)	591.4 *3*	100	5769.2+x	(29$^-$)	M1+E2	2.6 *+7−4*	0.035 *4*	α(K)=0.0262 *30*; α(L)=0.0068 *4*; α(M)=0.00169 *10*; α(N)=0.000444 *26*; α(O)=9.7×10^{-5} *6* α(P)=1.46×10^{-5} *10*; α(Q)=5.9×10^{-7} *7*
6475.3+x	(31$^-$)	114.7 *5*	5.0 *17*	6360.6+x	(30$^-$)	M1+E2	13 *12*	5.0 *23*	α(K)=0 *4*; α(L)=3.4 *10*; α(M)=0.92 *29*; α(N)=0.24 *8*; α(O)=0.050 *15*; α(P)=0.0065 *16* α(Q)=2.E−5 *8*
		296.3 *2*	100 *17*	6179.0+x	(30$^-$)	M1+E2	0.5 *5*	0.57 *16*	α(K)=0.45 *14*; α(L)=0.090 *12*; α(M)=0.0218 *24*; α(N)=0.0057 *6*; α(O)=0.00127 *16* α(P)=0.000200 *31*; α(Q)=1.02×10^{-5} *32*
6521.4+x	(29,30,31)	1316.4 *3*	100	5205.0+x	(27,28,29)	E2		0.00511 *7*	α(K)=0.00406 *6*; α(L)=0.000783 *11*; α(M)=0.0001880 *26*; α(N)=4.92×10^{-5} *7* α(O)=1.089×10^{-5} *15*; α(P)=1.705×10^{-6} *24*; α(Q)=8.49×10^{-8} *12*
6812.0+y	(34$^+$)	337.0 *3*	100	6475+y	(33$^+$)	M1		0.473 *7*	α(K)=0.382 *5*; α(L)=0.0691 *10*; α(M)=0.01644 *23*; α(N)=0.00431 *6*; α(O)=0.000964 *14* α(P)=0.0001546 *22*; α(Q)=8.63×10^{-6} *12*
6915.9+x		394.5 *3*	100	6521.4+x	(29,30,31)				
7256.0+y		781.0 *4*	100	6475+y	(33$^+$)				
7543.0+y	(36$^-$)	1068.0 *3*	100	6475+y	(33$^+$)	E3		0.01764 *25*	α(K)=0.01268 *18*; α(L)=0.00372 *5*; α(M)=0.000934 *13*; α(N)=0.0002455 *34* α(O)=5.36×10^{-5} *8*; α(P)=8.10×10^{-6} *11*; α(Q)=3.18×10^{-7} *4* B(E3)(W.u.)=56 *17*
7547.0+y	(35$^+$)	735.0 *3*	100	6812.0+y	(34$^+$)	M1		0.0588 *8*	α(K)=0.0477 *7*; α(L)=0.00845 *12*; α(M)=0.002004 *28*; α(N)=0.000525 *7* α(O)=0.0001174 *16*; α(P)=1.886×10^{-5} *26*; α(Q)=1.058×10^{-6} *15*

$^{214}_{87}Fr_{127}$-8

Adopted Levels, Gammas (continued)

γ(^{214}Fr) (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.†	Comments
7846.1+y		303.1 *3*	100	7543.0+y	(36$^-$)		
8142.0+y	(37)	599.0 *3*	100	7543.0+y	(36$^-$)	(D)	
8656.3+y		810.2 *3*	100	7846.1+y			

† From (HI,xnγ).

‡ Multiply placed with intensity suitably divided.

Placement of transition in the level scheme is uncertain.

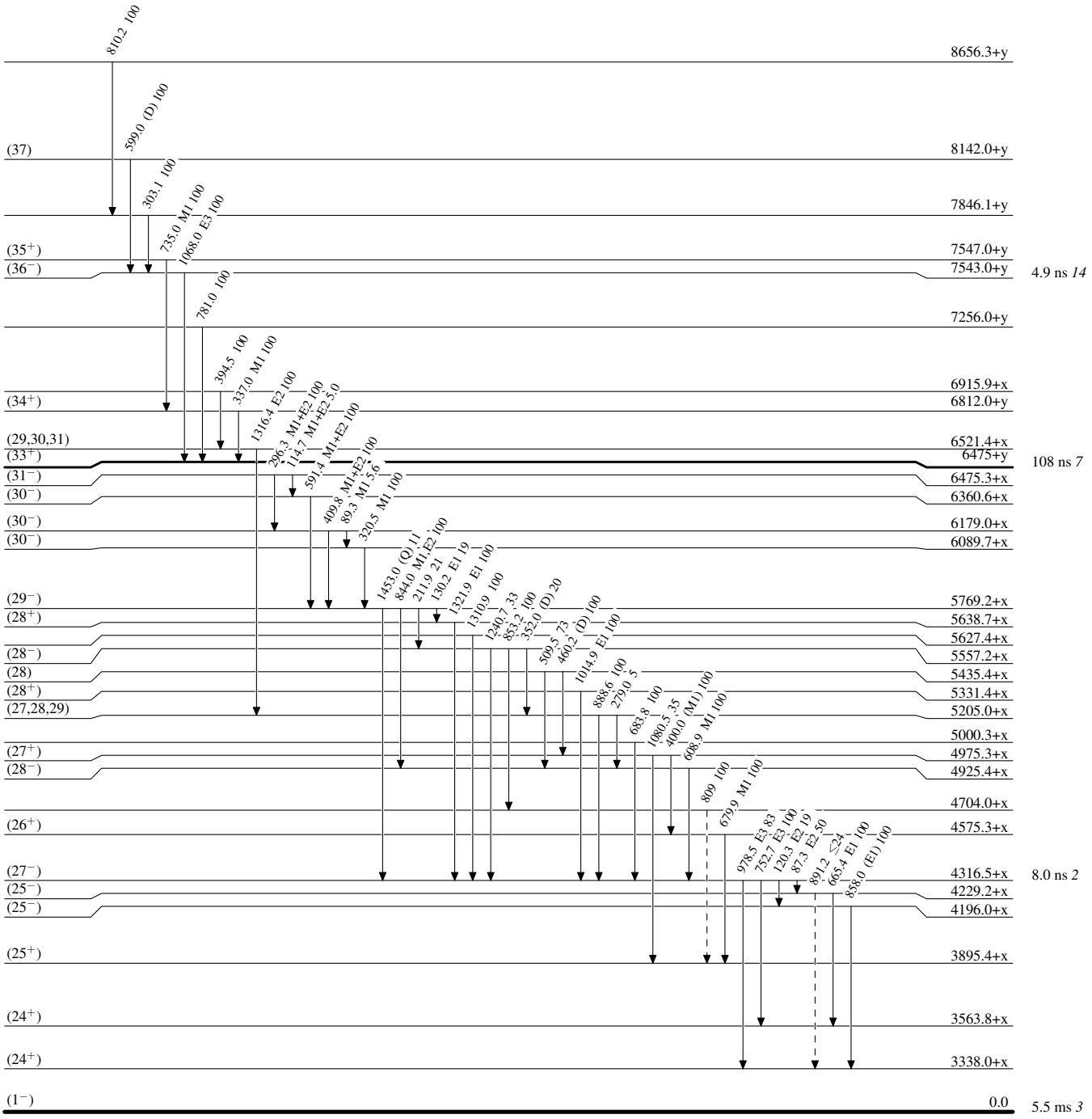
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{214}_{87}Fr_{127}$

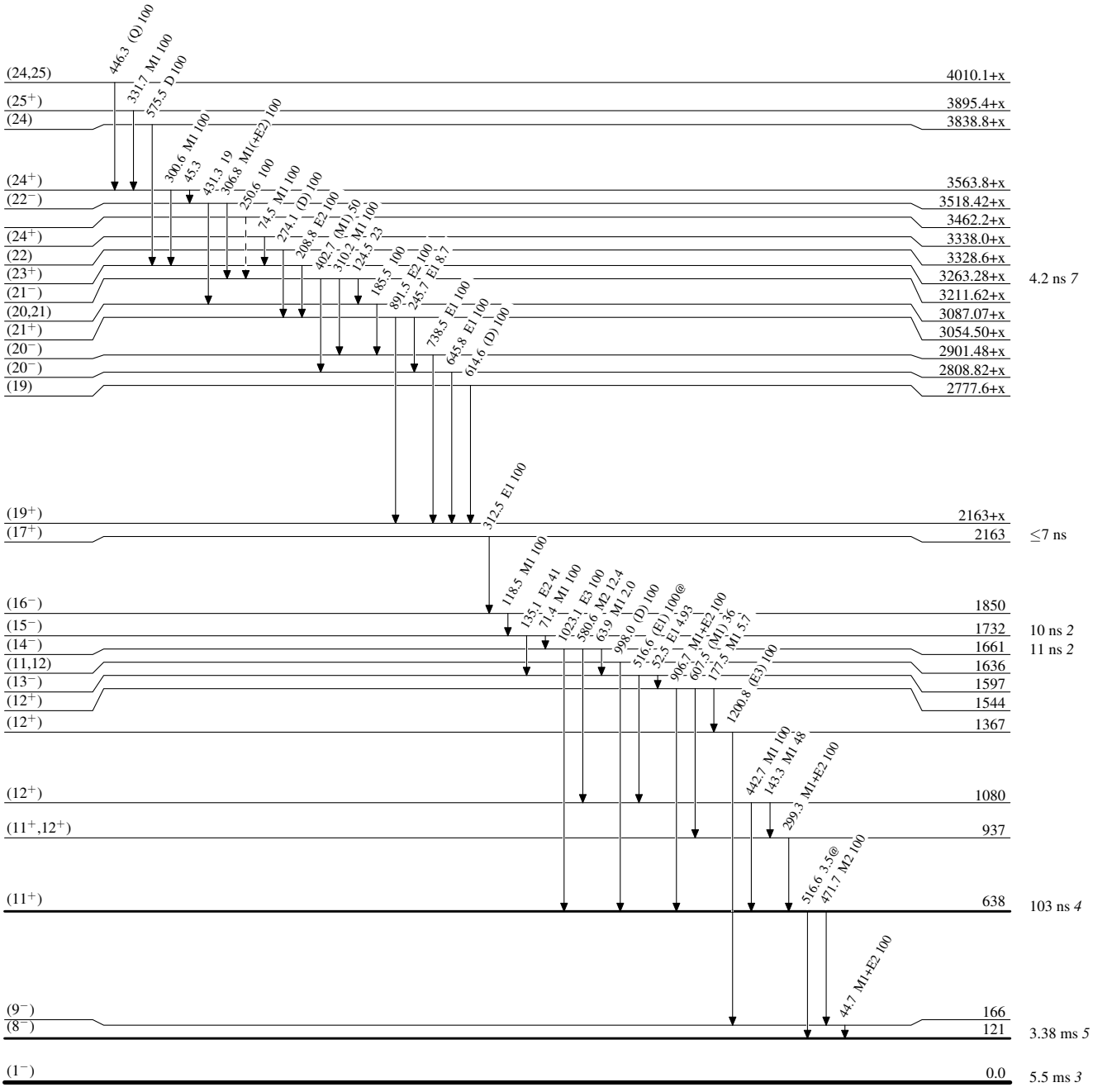
Adopted Levels, Gammas

Legend

Level Scheme (continued)

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

– – – – – – ► γ Decay (Uncertain)



$^{214}_{87}Fr_{127}$