Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	T. D. Johnson, Balraj Singh	NDS 142, 1 (2017)	15-Apr-2017

Q(β^-)=−2887 *22*; S(n)=6720 *11*; S(p)=5413 *14*; Q(α)=3912 *10* 2017Wa10
S(2n)=15927 *26*, S(2p)=9828 *10* (2017Wa10).
^{189}Pt produced and identified by 1955Sm42 in Ir(p,xn),E=50-130 MeV. Measured β, γ and half-life of the activity. Later studies of this decay: 1960Po07, 1960Ma28, 1961Kr02, 1961An02, 1962Kr04, 1962Ha24, 1962Gr27, 1963Th07, 1964Le07, 1964Kr03, 1965Ja12, 1967Na02, 1970Ba10, 1970Ba56, 1971Pl08, 1972Ba21, 1972He05, 1975Ru06, 1980Be27, 2000Mo05, 2000Zi04.

^{189}Pt Levels

Cross Reference (XREF) Flags

A	^{189}Au ε decay (28.7 min)	D	^{188}Os(α,3nγ),^{191}Ir(p,3nγ)
B	^{189}Au ε decay (4.59 min)	E	^{190}Pt(p,d)
C	^{176}Yb(^{18}O,5nγ)		

E(level)†	J$^\pi$‡	$T_{1/2}$	XREF	Comments
0.0[e]	3/2$^-$	10.87 h *12*	ABCDE	%ε+%β^+=100 μ=−0.422 *7* (1989Du01,2000SaZZ,2014StZZ) Q=−0.95 *4* (1992Hi07,1989Du01,2016St14) RMS charge radius <r^2>$^{1/2}$=5.4060 fm *35* (2013An02 evaluation). J$^\pi$: spin from atomic beam (1975Ru06), parity from M1+E2 γ from 3/2$^-$. $T_{1/2}$: from 1964Le07. Other values: 12.1 h *15* (2000Mo05,2000Zi04), 11 h (1975Ru06), 10.9 h (1967Na02), 10.9 h *10* (1963Th07), 11.1 h *4* (1961An02), 11.5 h (1960Po07), 10.5 h *10* (1955Sm42). μ: laser resonance ionization mass spectroscopy (1989Du01,2000SaZZ). Other values: −0.440 *8* (1992Hi07, laser ionization mass spectroscopy), 0.439 *9* (1985Ed05,1985Ed03,nuclear magnetic resonance on oriented nuclei), 0.433 *9*, (1985Oh05, nuclear magnetic resonance on oriented nuclei), 0.42 *3* (1980Be27, static nuclear orientation with gamma detection). Q: laser resonance ionization mass spectroscopy (1992Hi07,1989Du01). Others: −1.03 *5* (1989Du01, laser spectroscopy), −1.21 *6* from Q(^{189}Pt)/Q(^{191}Pt)=1.235 *8* (1998Hi08) and Q(^{191}Pt)=−0.89 *5* (1988Ro20,1989Du01); −1.27 *3* (1993HaZU, NMR-ON), −1.1 *2* (1992Hi07), −0.7 *3* (1985Ed05).
6.40[e] *3*	5/2$^-$#		ABCD	
45.78 *25*	(1/2)$^-$		A E	J$^\pi$: L=1 in (p,d), M1+E2 to 3/2$^-$, E2 to 5/2$^-$.
88.30 *3*	3/2$^-$#		A E	
172.79 *6*	9/2$^-$#	464 ns *25*	BCDE	%IT=100 $T_{1/2}$: from $\gamma\gamma$(t) (1970Fi16) in ^{189}Au ε decay (4.59 min).
191.4[a] *2*	(13/2$^+$)	143 μs *5*	BCDE	%IT=100 J$^\pi$: L(d,p)=6,5 and systematics of odd-A Pt isotopes. $T_{1/2}$: from 1976Pi03 in ^{188}Os(α,3nγ),^{191}Ir(p,3nγ).
202.2 *5*	(11/2$^+$)		D	
222.30 *4*	(3/2,5/2)$^-$		A	J$^\pi$: M1+E2 to 3/2$^-$ and 5/2$^-$.
237.4[e] *1*	(9/2)$^-$		A CD	J$^\pi$: stretched E2 to 5/2$^-$. J$^\pi$=7/2$^-$ in (α,3nγ) conflicts with stretched E2 to 5/2$^-$.
261 *5*	1/2$^-$,3/2$^-$		E	J$^\pi$: L=1 in (p,d).
285 *5*			E	
348.45 *5*	(5/2,3/2)$^-$		A E	XREF: E(340). J$^\pi$: M1+E2 to 3/2$^-$; possible γ to (9/2)$^-$ makes 3/2 less likely.
356.72 *23*	(9/2$^-$)		CD	
447.67 *8*	(3/2,5/2)$^-$		A E	J$^\pi$: M1+E2 to 3/2$^-$,5/2$^-$.

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Adopted Levels, Gammas (continued)

^{189}Pt Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$	XREF	Comments
493.3 *4*	11/2$^-$[#]		B DE	
499.2[a] *2*	(17/2$^+$)	211.4[@] ps *55*	CD	Q(transition)=11.05 *29* (2013He25).
529.62 *11*	(1/2,3/2,5/2)$^-$		A	Jπ: M1(+E2) to 3/2$^-$.
531.3[b] *3*	(15/2$^+$)		CD	
574 *5*	1/2$^-$,3/2$^-$		E	Jπ: L=1 in (p,d).
608.6[e] *2*	(13/2$^-$)		CD	Jπ: in (α,3nγ) this was assigned 11/2$^-$. In (^{18}O,5nγ) this is tentatively assigned as (13/2$^-$) based on a DCO measurement and expectation of yrast levels being more strongly populated in that reaction.
653.8 *2*	(15/2$^+$)		CD	
712.0 *2*	(13/2$^-$)		CD	
843.7 *6*	(13/2$^-$)		D	
902.9 *7*			D	
944.0[c] *2*	(17/2$^+$)		CD	
955.0[a] *2*	(21/2$^+$)	175.4[@] ps *49*	CD	Q(transition)=2.49 *7* (2013He25).
983.5[b] *3*	(19/2$^+$)		CD	
1048.5 *7*	(15/2$^-$)		D	
1081.1[e] *2*	(17/2$^-$)		CD	Jπ: in (α,3nγ) this was assigned 15/2$^-$. In (^{18}O,5nγ) this is tentatively assigned as (17/2$^-$) based on a DCO measurement and expectation of yrast levels being more strongly populated in that reaction.
1160.87 *14*	(3/2$^+$)		A	Jπ: E1 to 3/2$^-$, strongly populated by ε decay from 1/2$^+$.
1185.31 *20*	(19/2$^+$)		CD	
1361.5 *2*	(17/2$^-$)		CD	
1414.0 *6*			D	
1415.9 *8*	(17/2$^-$)		D	
1444.0[c] *3*	(21/2$^+$)		CD	
1490.4[e] *2*	(19/2$^-$)		CD	
1512.1 *2*	(21/2$^-$)		CD	
1529.3[a] *3*	(25/2$^+$)		CD	
1555.7[b] *3*	(23/2$^+$)		CD	
1695.7 *3*	(23/2$^-$)		C	
1714.3[f] *3*	(25/2$^-$)		CD	
1727.4 *4*	(23/2$^+$)		D	
2009.5[c] *3*	(25/2$^+$)		C	
2055.2 *3*	(27/2$^-$)		CD	
2189.5[a] *3*	(29/2$^+$)		CD	
2219.4[b] *4*	(27/2$^+$)		CD	
2291.4[g] *3*	(29/2$^-$)		CD	
2303.7[f] *3*	(29/2$^-$)		C	
2539.7 *4*	(27/2$^+$)		C	
2620.4 *3*	(31/2$^-$)		C	
2635.5[c] *3*	(29/2$^+$)		C	
2688.4 *3*	(31/2$^-$)		CD	
2729.4 *3*	(29/2$^+$)		C	
2818.6 *5*			C	
2839.8[f] *3*	(33/2$^-$)		C	
2864.7[a] *3*	(33/2$^+$)		CD	
2874.2[g] *3*	(33/2$^-$)		C	
2931.6[b] *4*	(31/2$^+$)		C	
2979.3 *3*	(31/2$^+$)		C	
3066.2 *4*	(33/2$^+$)		C	
3201.0[c] *3*	(33/2$^+$)		C	
3292.4 *3*	(35/2$^-$)		C	

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Adopted Levels, Gammas (continued)

^{189}Pt Levels (continued)

E(level)†	Jπ‡	XREF	E(level)†	Jπ‡	XREF	E(level)†	Jπ‡	XREF
3376.4[a] 4	(37/2+)	C	4168.6[f] 6	(41/2−)	C	5502.1[d] 4	(53/2−)	C
3420.1 3	(35/2+)	C	4367.8[&] 3	(47/2+)	C	6474.8[d] 5	(57/2−)	C
3452.7[f] 4	(37/2−)	C	4437.2 3	(43/2−)	C	6476.5[&] 4	(55/2+)	C
3455.4 3	(35/2+)	C	4647.4[a] 7	(45/2+)	C	6761.9[d] 7		C
3574.1[g] 4	(37/2−)	C	4686.2 3	(45/2+)	C	6841.6[&] 5	(57/2+)	C
3582.3[c] 3	(37/2+)	C	4688.1 3	(45/2−)	C	7272.3[&] 7		C
3640.7[&] 3	(39/2+)	C	4708.4 3	(47/2+)	C	7358.0[d] 9		C
3648.7 3	(39/2−)	C	4795.3 3	(45/2−)	C	7582.5 7		C
3672.9 6		C	4848.7 4	(45/2−)	C	7764.8[&] 9		C
3809.3 3	(41/2−)	C	4879.3[&] 3	(49/2+)	C	8135.3[d] 10		C
3848.6[&] 3	(43/2+)	C	5042.3[d] 3	(49/2−)	C	8843.1[d] 11		C
3947.0[a] 5	(41/2+)	C	5353.7[&] 3	(53/2+)	C			
3976.0[c] 6		C	5464.5[a] 9	(49/2+)	C			

† From least square fit to Eγ values.

‡ Suggested values from ^{188}Os(α,3nγ),^{191}Ir(p,3nγ), up to 2865 keV, except where noted. These values are derived from γγ(θ), excitation functions, and Nilsson model assumptions. These are in general agreement with J^π values suggested from multipolarity assignments and yrast arguments from (^{18}O,5nγ), which were used for J^π assignments beyond 2865 keV.

The 6.4 level is populated by an M1+E2 γ from the 88.4 level which is 1/2−,3/2− from L=1 in (p,d). The 172.8 and 493 levels are populated with low log *ft* (≈5) from ^{189}Au ε decay (4.59 min) indicating J^π=9/2−,11/2−,13/2−. An E2 γ from 172.6 to 6.2 thus establishes J^π(6.2)=5/2−, J^π(88.4)=3/2−, and J^π(172.6)=9/2−. From γ(θ) on oriented nuclei the 493 level is uniquely determined as 11/2−.

@ From ^{176}Yb(^{18}O,5nγ), using the recoil-distance method (2013He25).

& Band(A): γ cascade based on (39/2+). Structure #3 in 2009Hu12.

a Band(B): 13/2+ band, α=+1/2.

b Band(b): 13/2+ band, α=−1/2.

c Band(C): Band based on (17/2+). Structure #2 in 2009Hu12.

d Band(D): γ cascade based on (49/2−). Structure #4 in 2009Hu12.

e Band(E): The g.s. band.

f Band(F): ΔJ=2 band based on (25/2−). Part of structure #1 in 2009Hu12 interpreted as pair of pseudospin partners with configuration=$\nu i^{-2}_{13/2}\otimes \nu(f_{5/2}/p_{3/2})$.

g Band(G): ΔJ=2 band based on (29/2−). Part of structure #1 in 2009Hu12 interpreted as pair of pseudospin partners with configuration=$\nu i^{-2}_{13/2}\otimes \nu(f_{5/2}/p_{3/2})$.

Adopted Levels, Gammas (continued)

γ(^{189}Pt)

E_i(level)	J_i^π	E_γ[&]	I_γ[d]	E_f	J_f^π	Mult.[#]	δ[#]	α[c]	Comments
6.40	5/2$^-$	(6.40[†] *4*)	100	0.0	3/2$^-$	[M1]		924 *22*	α(M)=714 *17*; α(N)=177 *5*; α(O)=31.8 *8*; α(P)=2.13 *5*
45.78	(1/2)$^-$	39.47[a] *3*	14.4[e] *23*	6.40	5/2$^-$	E2[‡]	[‡]	369	α(L)=277 *4*; α(M)=71.2 *11* α(N)=17.3 *3*; α(O)=2.67 *4*; α(P)=0.00221 *4*
		45.69[a] *3*	100[e] *25*	0.0	3/2$^-$	M1+E2[‡]	0.32[‡] *3*	27 *3*	α(L)=20.7 *21*; α(M)=5.1 *6* α(N)=1.25 *13*; α(O)=0.205 *20*; α(P)=0.00575 *12*
88.30	3/2$^-$	42.75[ag] *5*		45.78	(1/2)$^-$	M1+E2[‡]	0.14[‡] *2*	18.7 *14*	α(L)=14.3 *11*; α(M)=3.4 *3* α(N)=0.84 *7*; α(O)=0.145 *10*; α(P)=0.00745 *12*
		82.2[a] *5*		6.40	5/2$^-$	M1+E2[‡]	0.21[‡] *2*	11.6 *3*	α(K)=9.17 *22*; α(L)=1.88 *7*; α(M)=0.443 *18* α(N)=0.109 *5*; α(O)=0.0191 *7*; α(P)=0.00107 *3*
		88.41[a] *3*		0.0	3/2$^-$	M1+E2[‡]	0.21[‡] *2*	9.43	α(K)=7.49 *12*; α(L)=1.49 *4*; α(M)=0.350 *11* α(N)=0.086 *3*; α(O)=0.0152 *4*; α(P)=0.000870 *14*
172.79	9/2$^-$	166.40 *5*	100	6.40	5/2$^-$	E2[‡]	[‡]	0.684	B(E2)(W.u.)=0.088 *5* α(K)=0.267 *4*; α(L)=0.314 *5*; α(M)=0.0805 *12* α(N)=0.0197 *3*; α(O)=0.00310 *5*; α(P)=2.53×10^{-5} *4* E_γ: Using the higher precision value from 4.59 min ε decay.
191.4	(13/2$^+$)	(18.7[†] *9*)	100	172.79	9/2$^-$	[M2]		3.8×10^4 *10*	α(L)=2.77×10^4 *73*; α(M)=7.6×10^3 *21* α(N)=1.92×10^3 *52*; α(O)=3.28×10^2 *88*; α(P)=15.8 *42* B(M2)(W.u.)=0.08 *3*
202.2	(11/2$^+$)	(11.3[†])		191.4	(13/2$^+$)				
222.30	(3/2,5/2)$^-$	134.26[a] *4*	24[e] *4*	88.30	3/2$^-$	M1+E2[‡]	0.8[‡] *3*	2.3 *3*	α(K)=1.6 *4*; α(L)=0.56 *8*; α(M)=0.137 *23* α(N)=0.034 *6*; α(O)=0.0056 *8*; α(P)=0.00018 *5*
		176.1[a] *5*		45.78	(1/2)$^-$				
		215.68[a] *5*	62[e] *9*	6.40	5/2$^-$	M1+E2[‡]	0.9[‡] *4*	0.54 *12*	α(K)=0.41 *12*; α(L)=0.1032 *15*; α(M)=0.0249 *8* α(N)=0.00614 *18*; α(O)=0.001046 *16*; α(P)=4.5×10^{-5} *15*
		221.95[a] *16*	100 *12*	0.0	3/2$^-$	E2[‡]	[‡]	0.253	α(K)=0.1306 *19*; α(L)=0.0926 *14*; α(M)=0.0235 *4* α(N)=0.00575 *9*; α(O)=0.000921 *14*; α(P)=1.263×10^{-5} *18*
237.4	(9/2)$^-$	231.0 *1*	100	6.40	5/2$^-$	E2[‡]	[‡]	0.222	α(K)=0.1180 *17*; α(L)=0.0786 *11*; α(M)=0.0200 *3* α(N)=0.00488 *7*; α(O)=0.000783 *11*; α(P)=1.147×10^{-5} *17* E_γ: Weighted average from (^{18}O,4nγ) and 28.7 min ε decay.
348.45	(5/2,3/2)$^-$	110.8[ag] *5*	4[e] *1*	237.4	(9/2)$^-$	(E2)[‡]	[‡]	3.22 *8*	α(K)=0.622 *10*; α(L)=1.95 *5*; α(M)=0.505 *13* α(N)=0.123 *4*; α(O)=0.0192 *5*; α(P)=6.75×10^{-5} *12*
		126.31 *5*	8.8[e] *12*	222.30	(3/2,5/2)$^-$	M1+E2[‡]	0.54[‡] *9*	3.08 *10*	α(K)=2.29 *14*; α(L)=0.60 *4*; α(M)=0.146 *10* α(N)=0.0359 *25*; α(O)=0.0061 *4*; α(P)=0.000261 *17*

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Adopted Levels, Gammas (continued)

γ(^{189}Pt) (continued)

E_i(level)	J_i^π	E_γ[&]	I_γ[d]	E_f	J_f^π	Mult.[#]	δ[#]	α[c]	Comments
348.45	(5/2,3/2)$^-$	259.68[a] *10*	13[e] *4*	88.30	3/2$^-$	M1+E2[‡]	1.4[‡] *+8–4*	0.25 *5*	α(K)=0.184 *48*; α(L)=0.0533 *22*; α(M)=0.0130 *4* α(N)=0.00320 *9*; α(O)=0.000538 *25*; α(P)=2.01×10^{-5} *57*
		302.4[ag] *5*		45.78	(1/2)$^-$				
		342.0[a] *5*	20[e] *4*	6.40	5/2$^-$				
		348.15[a] *15*	100 *7*	0.0	3/2$^-$	M1(+E2)[‡]	<0.7[‡]	0.181 *24*	α(K)=0.148 *21*; α(L)=0.0256 *19*; α(M)=0.0060 *4* α(N)=0.00147 *10*; α(O)=0.000262 *20*; α(P)=1.67×10^{-5} *25*
356.72	(9/2$^-$)	350.3 *3*	100	6.40	5/2$^-$				
447.67	(3/2,5/2)$^-$	225.7[a] *5*	20[e] *4*	222.30	(3/2,5/2)$^-$	M1(+E2)[‡]	<0.8[‡]	0.58 *9*	α(K)=0.47 *9*; α(L)=0.0895 *16*; α(M)=0.0211 *4* α(N)=0.00520 *9*; α(O)=0.000915 *20*; α(P)=5.3×10^{-5} *10*
		359.4[a] *5*	8 *3*	88.30	3/2$^-$				
		441.04[a] *14*	69[e] *8*	6.40	5/2$^-$	M1+E2[‡]	1.3[‡] *+20–6*	0.062 *23*	α(K)=0.049 *20*; α(L)=0.0100 *22*; α(M)=0.0024 *5* α(N)=0.00058 *12*; α(O)=0.000102 *23*; α(P)=5.3×10^{-6} *23*
		447.77[a] *9*	100[e] *13*	0.0	3/2$^-$	M1(+E2)[‡]	<0.7[‡]	0.092 *12*	α(K)=0.076 *11*; α(L)=0.0128 *12*; α(M)=0.0030 *3* α(N)=0.00073 *7*; α(O)=0.000131 *12*; α(P)=8.5×10^{-6} *12*
493.3	11/2$^-$	321.1[b] *5*	100	172.79	9/2$^-$	M1+E2	−16.2 *+17–21*	0.0817	α(K)=0.0525 *8*; α(L)=0.0222 *4*; α(M)=0.00553 *9* α(N)=0.001356 *20*; α(O)=0.000222 *4*; α(P)=5.34×10^{-6} *8*
499.2	(17/2$^+$)	307.8 *1*	100	191.4	(13/2$^+$)	E2[@]		0.0913	α(K)=0.0573 *8*; α(L)=0.0257 *4*; α(M)=0.00643 *9* α(N)=0.001575 *23*; α(O)=0.000257 *4*; α(P)=5.79×10^{-6} *9* B(E2)(W.u.)=13.8 *4*
529.62	(1/2,3/2,5/2)$^-$	484.2[a] *5*	13[e] *4*	45.78	(1/2)$^-$				
		523.4[a] *5*	13[e] *7*	6.40	5/2$^-$				
		529.59[a] *11*	100[e] *18*	0.0	3/2$^-$	M1(+E2)[‡]	<1.4[‡]	0.052 *15*	α(K)=0.042 *13*; α(L)=0.0073 *16*; α(M)=0.0017 *4* α(N)=0.00042 *9*; α(O)=7.5×10^{-5} *17*; α(P)=4.7×10^{-6} *15*
531.3	(15/2$^+$)	329.2 *5*		202.2	(11/2$^+$)				E_γ: Only in (α,3nγ).
		339.9 *1*	100	191.4	(13/2$^+$)	D+Q[@]			
608.6	(13/2$^-$)	251.9 *3*	11 *4*	356.72	(9/2$^-$)				
		371.2 *1*	100 *5*	237.4	(9/2)$^-$	(E2)[@]		0.0536	α(K)=0.0363 *5*; α(L)=0.01308 *19*; α(M)=0.00324 *5* α(N)=0.000794 *12*; α(O)=0.0001313 *19*; α(P)=3.75×10^{-6} *6*

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Adopted Levels, Gammas (continued)

γ(^{189}Pt) (continued)

E_i(level)	J_i^π	E_γ[&]	I_γ[d]	E_f	J_f^π	Mult.[#]	α[c]	Comments
653.8	(15/2$^+$)	462.4 *1*	100	191.4	(13/2$^+$)	D+Q[@]		
712.0	(13/2$^-$)	539.5 *3*	100	172.79	9/2$^-$	(E2)[@]	0.0206	α(K)=0.01546 *22*; α(L)=0.00393 *6*; α(M)=0.000950 *14* α(N)=0.000234 *4*; α(O)=3.97×10^{-5} *6*; α(P)=1.632×10^{-6} *23*
843.7	(13/2$^-$)	487.0 *5*	100	356.72	(9/2$^-$)			
902.9		409.6 *5*		493.3	11/2$^-$			
944.0	(17/2$^+$)	290.2 *5*		653.8	(15/2$^+$)			
		412.7 *1*	100 *15*	531.3	(15/2$^+$)	D+Q[@]		
		444.8 *5*	30 *9*	499.2	(17/2$^+$)	(E2)[@]	0.0332	α(K)=0.0238 *4*; α(L)=0.00714 *10*; α(M)=0.001746 *25* α(N)=0.000429 *6*; α(O)=7.18×10^{-5} *10*; α(P)=2.49×10^{-6} *4*
955.0	(21/2$^+$)	455.8 *1*	100	499.2	(17/2$^+$)	(E2)[@]	0.0312	α(K)=0.0225 *4*; α(L)=0.00660 *10*; α(M)=0.001612 *23* α(N)=0.000396 *6*; α(O)=6.65×10^{-5} *10*; α(P)=2.36×10^{-6} *4* B(E2)(W.u.)=2.47 *7*
983.5	(19/2$^+$)	452.2 *1*	100 *15*	531.3	(15/2$^+$)	(E2)[@]	0.0318	α(K)=0.0229 *4*; α(L)=0.00677 *10*; α(M)=0.001654 *24* α(N)=0.000406 *6*; α(O)=6.82×10^{-5} *10*; α(P)=2.40×10^{-6} *4*
		484.3 *3*	51 *8*	499.2	(17/2$^+$)	D+Q[@]		
1048.5	(15/2$^-$)	555.2 *5*	100	493.3	11/2$^-$			
1081.1	(17/2$^-$)	472.4 *1*	100	608.6	(13/2$^-$)	(E2)[@]		α(K)=0.0207 *3*; α(L)=0.00589 *9*; α(M)=0.001436 *21* α(N)=0.000353 *5*; α(O)=5.94×10^{-5} *9*; α(P)=2.18×10^{-6} *3*
1160.87	(3/2$^+$)	631.2[a] *9*	12.1[e] *23*	529.62	(1/2,3/2,5/2)$^-$	E1[‡]	0.00511	α(K)=0.00427 *6*; α(L)=0.000646 *10*; α(M)=0.0001477 *22* α(N)=3.64×10^{-5} *6*; α(O)=6.46×10^{-6} *10*; α(P)=4.12×10^{-7} *6*
		713.24[a] *17*	100[e] *14*	447.67	(3/2,5/2)$^-$	E1[‡]	0.00401	α(K)=0.00335 *5*; α(L)=0.000503 *7*; α(M)=0.0001149 *17* α(N)=2.83×10^{-5} *4*; α(O)=5.04×10^{-6} *7*; α(P)=3.25×10^{-7} *5*
		812.8[a] *3*	63[e] *9*	348.45	(5/2,3/2)$^-$	E1[‡]	0.00311	α(K)=0.00261 *4*; α(L)=0.000388 *6*; α(M)=8.86×10^{-5} *13* α(N)=2.18×10^{-5} *3*; α(O)=3.90×10^{-6} *6*; α(P)=2.55×10^{-7} *4*
		1071.5[a] *6*	27[e] *5*	88.30	3/2$^-$	E1[‡]	0.00187	α(K)=0.001572 *22*; α(L)=0.000230 *4*; α(M)=5.24×10^{-5} *8* α(N)=1.290×10^{-5} *19*; α(O)=2.31×10^{-6} *4*; α(P)=1.546×10^{-7} *22*
		1160.6[a] *3*	35[e] *5*	0.0	3/2$^-$	E1[‡]	1.63×10^{-3}	α(K)=0.001364 *20*; α(L)=0.000199 *3*; α(M)=4.52×10^{-5} *7* α(N)=1.115×10^{-5} *16*; α(O)=2.00×10^{-6} *3*; α(P)=1.344×10^{-7} *19*; α(IPF)=7.06×10^{-6} *12*
1185.31	(19/2$^+$)	531.5 *1*	40 *6*	653.8	(15/2$^+$)	(E2)[@]	0.0214	α(K)=0.01597 *23*; α(L)=0.00411 *6*; α(M)=0.000994 *14* α(N)=0.000244 *4*; α(O)=4.15×10^{-5} *6*; α(P)=1.685×10^{-6} *24*
		686.1 *1*	100 *5*	499.2	(17/2$^+$)	D+Q[@]		
1361.5	(17/2$^-$)	280.4 *3*	17 *5*	1081.1	(17/2$^-$)	(E2)[@]	0.1207	α(K)=0.0723 *11*; α(L)=0.0366 *6*; α(M)=0.00919 *14* α(N)=0.00225 *4*; α(O)=0.000365 *6*; α(P)=7.22×10^{-6} *11*
		649.5 *1*	56 *9*	712.0	(13/2$^-$)	Q[@]		
		707.7 *1*	64 *10*	653.8	(15/2$^+$)	D		
		862.3 *1*	100 *15*	499.2	(17/2$^+$)	D[@]		

$^{189}_{78}Pt_{111}$-6

Adopted Levels, Gammas (continued)

γ(^{189}Pt) (continued)

E_i(level)	J_i^π	E_γ[&]	I_γ[d]	E_f	J_f^π	Mult.[#]	α[c]	Comments
1414.0		470.0 *5*		944.0	(17/2$^+$)			
1415.9	(17/2$^-$)	572.2 *5*		843.7	(13/2$^-$)			
1444.0	(21/2$^+$)	460.5 *3*	30 *10*	983.5	(19/2$^+$)	D+Q[@]		
		500.0 *1*	100 *16*	944.0	(17/2$^+$)	(E2)[@]	0.0248	α(K)=0.0183 *3*; α(L)=0.00494 *7*; α(M)=0.001200 *17* α(N)=0.000295 *5*; α(O)=4.98×10^{-5} *7*; α(P)=1.92×10^{-6} *3*
		944.8 *5*	10 *4*	499.2	(17/2$^+$)	Q[@]		
1490.4	(19/2$^-$)	128.9 *1*	35 *6*	1361.5	(17/2$^-$)	(E2)[@]	1.77	α(K)=0.473 *7*; α(L)=0.977 *15*; α(M)=0.252 *4* α(N)=0.0615 *9*; α(O)=0.00963 *14*; α(P)=4.68×10^{-5} *7*
		409.3 *1*	100 *5*	1081.1	(17/2$^-$)	(E2)[@]	0.0412	α(K)=0.0288 *4*; α(L)=0.00938 *14*; α(M)=0.00231 *4* α(N)=0.000566 *8*; α(O)=9.43×10^{-5} *14*; α(P)=3.00×10^{-6} *5*
		536 *1*		955.0	(21/2$^+$)			E_γ: only in (α,3nγ). Uncertainty assumed by evaluators.
1512.1	(21/2$^-$)	(21.7)		1490.4	(19/2$^-$)			
		150.6 *3*	10 *4*	1361.5	(17/2$^-$)	(E2)[@]	0.985 *16*	α(K)=0.338 *5*; α(L)=0.486 *8*; α(M)=0.1251 *21* α(N)=0.0305 *5*; α(O)=0.00480 *8*; α(P)=3.22×10^{-5} *5*
		326.8 *1*	84 *5*	1185.31	(19/2$^+$)	D[@]		
		557.1 *1*	100 *5*	955.0	(21/2$^+$)	D		
1529.3	(25/2$^+$)	574.3 *1*	100	955.0	(21/2$^+$)	(E2)[@]	0.01780	α(K)=0.01351 *19*; α(L)=0.00328 *5*; α(M)=0.000789 *11* α(N)=0.000194 *3*; α(O)=3.31×10^{-5} *5*; α(P)=1.428×10^{-6} *20*
1555.7	(23/2$^+$)	572.2 *3*	100 *16*	983.5	(19/2$^+$)	(E2)[@]	0.0180	α(K)=0.01362 *20*; α(L)=0.00331 *5*; α(M)=0.000797 *12* α(N)=0.000196 *3*; α(O)=3.35×10^{-5} *5*; α(P)=1.440×10^{-6} *21*
		600.7 *5*	22 *7*	955.0	(21/2$^+$)	D+Q[@]		
1695.7	(23/2$^-$)	183.6 *1*	100 *6*	1512.1	(21/2$^-$)	D+Q[@]		
		740.7 *3*	4 *2*	955.0	(21/2$^+$)			
1714.3	(25/2$^-$)	(18.6[†])		1695.7	(23/2$^-$)			E_γ: in (α,3nγ) and the previous evaluation, this γ was placed from a 1530 keV level with (23/2$^-$). In (^{18}O,5nγ), coincidence relations found the 740.7 feeding the 945 keV level. This matches the 184 γ feeding the 1512 keV level followed by the 557 γ populating the 954 keV level. The 18.6 keV and and 184 γ′s match and are parallel to the 202 γ feeding the 1512 keV level but with the order of the 18.6 and 184 γ rays now reversed. See 2009Hu12 for further discussion.
		202.2 *1*	100	1512.1	(21/2$^-$)	(E2)[@]	0.346	α(K)=0.1653 *24*; α(L)=0.1362 *20*; α(M)=0.0347 *5* α(N)=0.00849 *12*; α(O)=0.001353 *20*; α(P)=1.581×10^{-5} *23*
1727.4	(23/2$^+$)	542.1 *5*		1185.31	(19/2$^+$)			
		772.4 *5*		955.0	(21/2$^+$)			
2009.5	(25/2$^+$)	565.5[f] *1*	<100[f]	1444.0	(21/2$^+$)			
		1054.5 *5*	14 *5*	955.0	(21/2$^+$)	Q[@]		
2055.2	(27/2$^-$)	340.9 *1*	100	1714.3	(25/2$^-$)	D+Q[@]		
2189.5	(29/2$^+$)	660.2 *1*	100	1529.3	(25/2$^+$)	Q[@]		
2219.4	(27/2$^+$)	663.7 *3*	100	1555.7	(23/2$^+$)	Q[@]		

$^{189}_{78}Pt_{111}$-7

Adopted Levels, Gammas (continued)

γ(^{189}Pt) (continued)

E_i(level)	J_i^π	E_γ[&]	I_γ[d]	E_f	J_f^π	Mult.[#]	α[c]	Comments
2291.4	(29/2⁻)	236.2 *3*	15 *3*	2055.2	(27/2⁻)	D+Q[@]		
		577.1 *1*	100 *6*	1714.3	(25/2⁻)	(E2)[@]	0.01760	α(K)=0.01337 *19*; α(L)=0.00323 *5*; α(M)=0.000778 *11* α(N)=0.000191 *3*; α(O)=3.27×10^{-5} *5*; α(P)=1.414×10^{-6} *20*
2303.7	(29/2⁻)	248.5 *3*	22 *4*	2055.2	(27/2⁻)	D+Q[@]		
		589.4 *1*	100 *6*	1714.3	(25/2⁻)	(E2)[@]	0.01677	α(K)=0.01278 *18*; α(L)=0.00304 *5*; α(M)=0.000731 *11* α(N)=0.000180 *3*; α(O)=3.08×10^{-5} *5*; α(P)=1.352×10^{-6} *19*
2539.7	(27/2⁺)	1010.4 *5*	100	1529.3	(25/2⁺)	D+Q[@]		
2620.4	(31/2⁻)	316.7 *1*	100 *15*	2303.7	(29/2⁻)	D+Q[@]		
		329.0 *3*	42 *7*	2291.4	(29/2⁻)	D+Q[@]		
		565.2 *1*	87 *13*	2055.2	(27/2⁻)	(E2)[@]	0.0185	α(K)=0.01398 *20*; α(L)=0.00343 *5*; α(M)=0.000827 *12* α(N)=0.000203 *3*; α(O)=3.47×10^{-5} *5*; α(P)=1.478×10^{-6} *21*
2635.5	(29/2⁺)	626.0 *1*	100 *5*	2009.5	(25/2⁺)	Q[@]		
		1106.2 *3*	17 *6*	1529.3	(25/2⁺)	Q[@]		
2688.4	(31/2⁻)	397.0 *3*	63 *10*	2291.4	(29/2⁻)	D+Q[@]		E_γ: Observed only in ^{176}Yb(^{18}O,5nγ).
		633.2 *1*	100 *15*	2055.2	(27/2⁻)	Q[@]		
2729.4	(29/2⁺)	189.7 *5*		2539.7	(27/2⁺)			
		539.9[f] *3*	100[f] *32*	2189.5	(29/2⁺)	(E2)[@]	0.0206	α(K)=0.01543 *22*; α(L)=0.00392 *6*; α(M)=0.000948 *14* α(N)=0.000233 *4*; α(O)=3.96×10^{-5} *6*; α(P)=1.629×10^{-6} *23*
		1200.1 *5*	41 *14*	1529.3	(25/2⁺)	Q[@]		
2818.6		763.4 *5*	100	2055.2	(27/2⁻)			
2839.8	(33/2⁻)	536.1 *1*	100 *15*	2303.7	(29/2⁻)	(E2)[@]	0.0209	α(K)=0.01567 *22*; α(L)=0.00401 *6*; α(M)=0.000968 *14* α(N)=0.000238 *4*; α(O)=4.04×10^{-5} *6*; α(P)=1.654×10^{-6} *24*
		548.4 *3*	46 *8*	2291.4	(29/2⁻)	(E2)[@]	0.0198	α(K)=0.01492 *21*; α(L)=0.00375 *6*; α(M)=0.000904 *13* α(N)=0.000222 *4*; α(O)=3.78×10^{-5} *6*; α(P)=1.576×10^{-6} *23*
2864.7	(33/2⁺)	675.2 *1*	100	2189.5	(29/2⁺)	Q[@]		
2874.2	(33/2⁻)	582.8 *1*	100	2291.4	(29/2⁻)	(E2)[@]	0.01721	α(K)=0.01309 *19*; α(L)=0.00314 *5*; α(M)=0.000756 *11* α(N)=0.000186 *3*; α(O)=3.18×10^{-5} *5*; α(P)=1.385×10^{-6} *20*
2931.6	(31/2⁺)	712.2 *3*	100	2219.4	(27/2⁺)	Q[@]		
2979.3	(31/2⁺)	249.9 *3*	<100	2729.4	(29/2⁺)			
		439.6 *5*		2539.7	(27/2⁺)			
		759.9 *5*	19 *6*	2219.4	(27/2⁺)	Q[@]		
3066.2	(33/2⁺)	876.7 *3*	100	2189.5	(29/2⁺)	Q[@]		
3201.0	(33/2⁺)	134.8 *5*		3066.2	(33/2⁺)			
		565.5[f] *1*	100[f]	2635.5	(29/2⁺)	(E2)[@]	0.0185	α(K)=0.01396 *20*; α(L)=0.00343 *5*; α(M)=0.000825 *12* α(N)=0.000203 *3*; α(O)=3.46×10^{-5} *5*; α(P)=1.476×10^{-6} *21*
3292.4	(35/2⁻)	91.4 *3*	15 *5*	3201.0	(33/2⁺)	D[@]		
		418.2 *3*	15 *5*	2874.2	(33/2⁻)	D+Q[@]		

$^{189}_{78}Pt_{111}$-8

Adopted Levels, Gammas (continued)

γ(^{189}Pt) (continued)

E_i(level)	J_i^π	E_γ[&]	I_γ[d]	E_f	J_f^π	Mult.[#]	α[c]	Comments
3292.4	(35/2⁻)	452.6 *3*	20 *7*	2839.8	(33/2⁻)	D+Q[@]		
		473.8 *5*		2818.6				
		604.0 *1*	54 *8*	2688.4	(31/2⁻)	Q[@]		
		672.0 *1*	100 *5*	2620.4	(31/2⁻)	Q[@]		
3376.4	(37/2⁺)	511.7 *3*	100	2864.7	(33/2⁺)	(E2)[@]	0.0234	α(K)=0.01736 *25*; α(L)=0.00460 *7*; α(M)=0.001117 *16* α(N)=0.000275 *4*; α(O)=4.65×10^{-5} *7*; α(P)=1.83×10^{-6} *3*
3420.1	(35/2⁺)	219.1 *3*	100 *16*	3201.0	(33/2⁺)	D+Q[@]		
		353.9 *5*	42 *14*	3066.2	(33/2⁺)			
		440.8 *5*		2979.3	(31/2⁺)			
		580.3 *3*	74 *23*	2839.8	(33/2⁻)	D[@]		
3452.7	(37/2⁻)	612.9 *3*	100	2839.8	(33/2⁻)	Q[@]		
3455.4	(35/2⁺)	163.0 *5*	37 *11*	3292.4	(35/2⁻)			
		254.4 *3*	55 *16*	3201.0	(33/2⁺)	D+Q[@]		
		476.1 *3*	100 *15*	2979.3	(31/2⁺)			
		523.8 *5*	27 *8*	2931.6	(31/2⁺)	(E2)[@]	0.0221	α(K)=0.01649 *24*; α(L)=0.00429 *7*; α(M)=0.001039 *15* α(N)=0.000255 *4*; α(O)=4.33×10^{-5} *7*; α(P)=1.739×10^{-6} *25*
3574.1	(37/2⁻)	699.9 *3*	100	2874.2	(33/2⁻)	Q[@]		
3582.3	(37/2⁺)	381.3 *1*	100 *16*	3201.0	(33/2⁺)	(E2)[@]	0.0498	α(K)=0.0341 *5*; α(L)=0.01192 *17*; α(M)=0.00295 *5* α(N)=0.000723 *11*; α(O)=0.0001197 *17*; α(P)=3.52×10^{-6} *5*
		717.6 *3*	41 *13*	2864.7	(33/2⁺)			
3640.7	(39/2⁺)	(58.4)		3582.3	(37/2⁺)			
		185.3 *1*	100 *15*	3455.4	(35/2⁺)	(E2)[@]	0.467	α(K)=0.206 *3*; α(L)=0.197 *3*; α(M)=0.0504 *8* α(N)=0.01232 *18*; α(O)=0.00195 *3*; α(P)=1.95×10^{-5} *3*
		188.0 *3*	25 *8*	3452.7	(37/2⁻)	D[@]		
		220.6 *1*	67 *11*	3420.1	(35/2⁺)	(E2)[@]	0.259	α(K)=0.1326 *19*; α(L)=0.0949 *14*; α(M)=0.0241 *4* α(N)=0.00590 *9*; α(O)=0.000944 *14*; α(P)=1.282×10^{-5} *18*
3648.7	(39/2⁻)	356.3 *1*	100	3292.4	(35/2⁻)	(E2)[@]	0.0600	α(K)=0.0401 *6*; α(L)=0.01510 *22*; α(M)=0.00375 *6* α(N)=0.000919 *13*; α(O)=0.0001515 *22*; α(P)=4.12×10^{-6} *6*
3672.9		808.2 *5*		2864.7	(33/2⁺)			
3809.3	(41/2⁻)	160.6 *1*	100	3648.7	(39/2⁻)	D+Q[@]		
3848.6	(43/2⁺)	207.9 *1*	100	3640.7	(39/2⁺)	(E2)[@]	0.315	α(K)=0.1541 *22*; α(L)=0.1213 *18*; α(M)=0.0309 *5* α(N)=0.00756 *11*; α(O)=0.001205 *17*; α(P)=1.478×10^{-5} *21*
3947.0	(41/2⁺)	570.6 *3*	100	3376.4	(37/2⁺)	(E2)[@]	0.0181	α(K)=0.01370 *20*; α(L)=0.00334 *5*; α(M)=0.000804 *12* α(N)=0.000198 *3*; α(O)=3.37×10^{-5} *5*; α(P)=1.448×10^{-6} *21*
3976.0		393.7 *5*		3582.3	(37/2⁺)			
4168.6	(41/2⁻)	715.9 *5*	100	3452.7	(37/2⁻)	Q[@]		
4367.8	(47/2⁺)	519.2 *1*	100	3848.6	(43/2⁺)	(E2)[@]	0.0226	α(K)=0.01681 *24*; α(L)=0.00441 *7*; α(M)=0.001068 *15* α(N)=0.000262 *4*; α(O)=4.45×10^{-5} *7*; α(P)=1.772×10^{-6} *25*

$^{189}_{78}Pt_{111}$-9

Adopted Levels, Gammas (continued)

$\gamma(^{189}Pt)$ (continued)

E_i(level)	J_i^π	E_γ[&]	I_γ[d]	E_f	J_f^π	Mult.[#]	α[c]	Comments
4437.2	(43/2$^-$)	627.9 *1*	100 *15*	3809.3	(41/2$^-$)	D+Q[@]		
		788.5 *5*	16 *5*	3648.7	(39/2$^-$)	Q[@]		
4647.4	(45/2$^+$)	700.4 *5*	100	3947.0	(41/2$^+$)	Q[@]		
4686.2	(45/2$^+$)	318.4 *3*	19 *6*	4367.8	(47/2$^+$)			
		837.6 *1*	100 *15*	3848.6	(43/2$^+$)	D+Q[@]		
4688.1	(45/2$^-$)	250.9 *1*	100	4437.2	(43/2$^-$)	D+Q[@]		
4708.4	(47/2$^+$)	340.6 *3*	49 *8*	4367.8	(47/2$^+$)			
		859.8 *1*	100 *16*	3848.6	(43/2$^+$)	Q[@]		
4795.3	(45/2$^-$)	986.0 *1*	100	3809.3	(41/2$^-$)	Q[@]		
4848.7	(45/2$^-$)	1039.4 *3*	100	3809.3	(41/2$^-$)	Q[@]		
4879.3	(49/2$^+$)	170.9 *3*	41 *13*	4708.4	(47/2$^+$)	D+Q[@]		
		193.1 *1*	100 *16*	4686.2	(45/2$^+$)	(E2)[@]	0.405	α(K)=0.185 *3*; α(L)=0.1654 *24*; α(M)=0.0423 *6* α(N)=0.01033 *15*; α(O)=0.001641 *24*; α(P)=1.767×10^{-5} *25*
		511.5 *3*	58 *9*	4367.8	(47/2$^+$)	D+Q[@]		
5042.3	(49/2$^-$)	193.6 *5*	23 *7*	4848.7	(45/2$^-$)	(E2)[@]	0.402 *7*	α(K)=0.184 *3*; α(L)=0.164 *3*; α(M)=0.0418 *8* α(N)=0.01021 *19*; α(O)=0.00162 *3*; α(P)=1.76×10^{-5} *3*
		247.0 *3*	100 *15*	4795.3	(45/2$^-$)	(E2)[@]	0.179	α(K)=0.0996 *15*; α(L)=0.0601 *9*; α(M)=0.01520 *23* α(N)=0.00372 *6*; α(O)=0.000598 *9*; α(P)=9.77×10^{-6} *14*
		333.9 *3*	90 *14*	4708.4	(47/2$^+$)	D[@]		
		354.2 *3*	98 *15*	4688.1	(45/2$^-$)	(E2)[@]	0.0610	α(K)=0.0406 *6*; α(L)=0.01542 *22*; α(M)=0.00383 *6* α(N)=0.000939 *14*; α(O)=0.0001547 *23*; α(P)=4.17×10^{-6} *6*
5353.7	(53/2$^+$)	474.4 *1*	100	4879.3	(49/2$^+$)	(E2)[@]	0.0282	α(K)=0.0205 *3*; α(L)=0.00581 *9*; α(M)=0.001417 *20* α(N)=0.000348 *5*; α(O)=5.86×10^{-5} *9*; α(P)=2.16×10^{-6} *3*
5464.5	(49/2$^+$)	817.1 *5*	100	4647.4	(45/2$^+$)	Q[@]		
5502.1	(53/2$^-$)	459.8 *1*	100	5042.3	(49/2$^-$)	(E2)[@]	0.0305	α(K)=0.0220 *3*; α(L)=0.00642 *9*; α(M)=0.001567 *22* α(N)=0.000385 *6*; α(O)=6.46×10^{-5} *9*; α(P)=2.31×10^{-6} *4*
6474.8	(57/2$^-$)	972.7 *3*	100	5502.1	(53/2$^-$)	Q[@]		
6476.5	(55/2$^+$)	1122.8 *1*	100	5353.7	(53/2$^+$)	D+Q[@]		
6761.9		287.1 *5*	100	6474.8	(57/2$^-$)			
6841.6	(57/2$^+$)	365.1 *3*	100	6476.5	(55/2$^+$)	D+Q[@]		
7272.3		430.7 *5*	100	6841.6	(57/2$^+$)			
7358.0		596.1 *5*		6761.9				
7582.5		740.9 *5*		6841.6	(57/2$^+$)			
7764.8		492.5 *5*		7272.3				
8135.3		777.3 *5*		7358.0				
8843.1		707.8 *5*		8135.3				

$^{189}_{78}Pt_{111}$-10

Adopted Levels, Gammas (continued)

$\gamma(^{189}Pt)$ (continued)

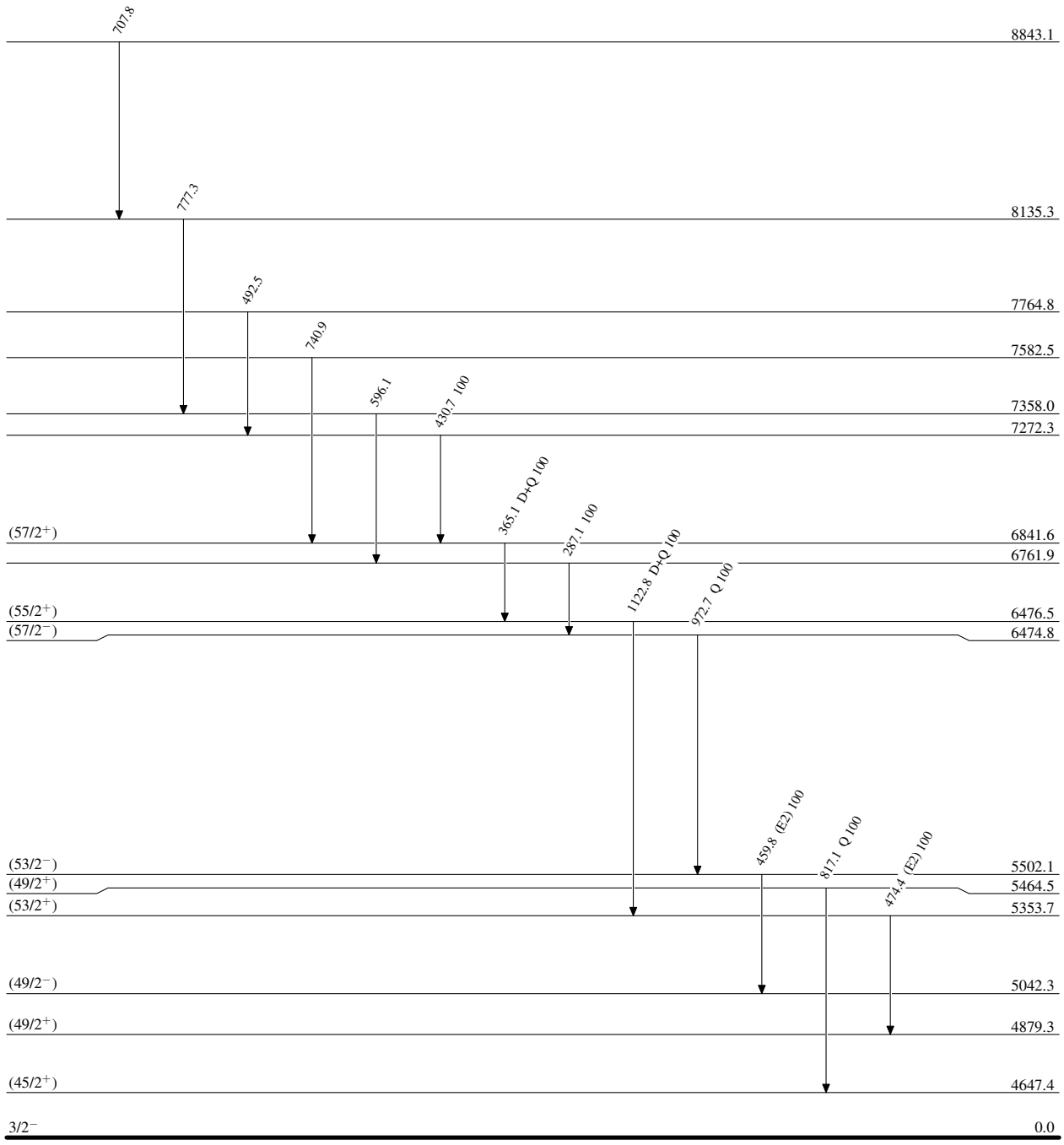
† Transition unobserved. Energy from energy level differences.
‡ From Ice data in ^{189}Au ε decay (28.7 min) and ^{189}Au ε decay (4.59 min).
# From (^{18}O, 5nγ), except where noted.
@ From directional correlation of oriented nuclei (DCO) ratios from (^{18}O,5nγ), assuming quadrupole transitions are E2, stretched dipoles are E1 or M1, and mixed multipolarity are M1+E2. Where J^{π} values were already tentatively assigned, level scheme placement based on corroborating transitions, was used to distinguish between M1 or E1.
& From (^{18}O,5nγ) (2009Hu12) except where noted.
a From ^{189}Au ε decay (28.7 min).
b From ^{189}Au ε decay (4.59 min).
c From BrIcc v2.3b (16-Dec-2014) 2008Ki07, "Frozen Orbitals" appr.
d From ^{176}Yb(^{18}O,5nγ) unless otherwise noted.
e From ^{189}Au ε decay (28.7 min).
f Multiply placed with intensity suitably divided.
g Placement of transition in the level scheme is uncertain.

$^{189}_{78}Pt_{111}$-11

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level



$^{189}_{78}Pt_{111}$

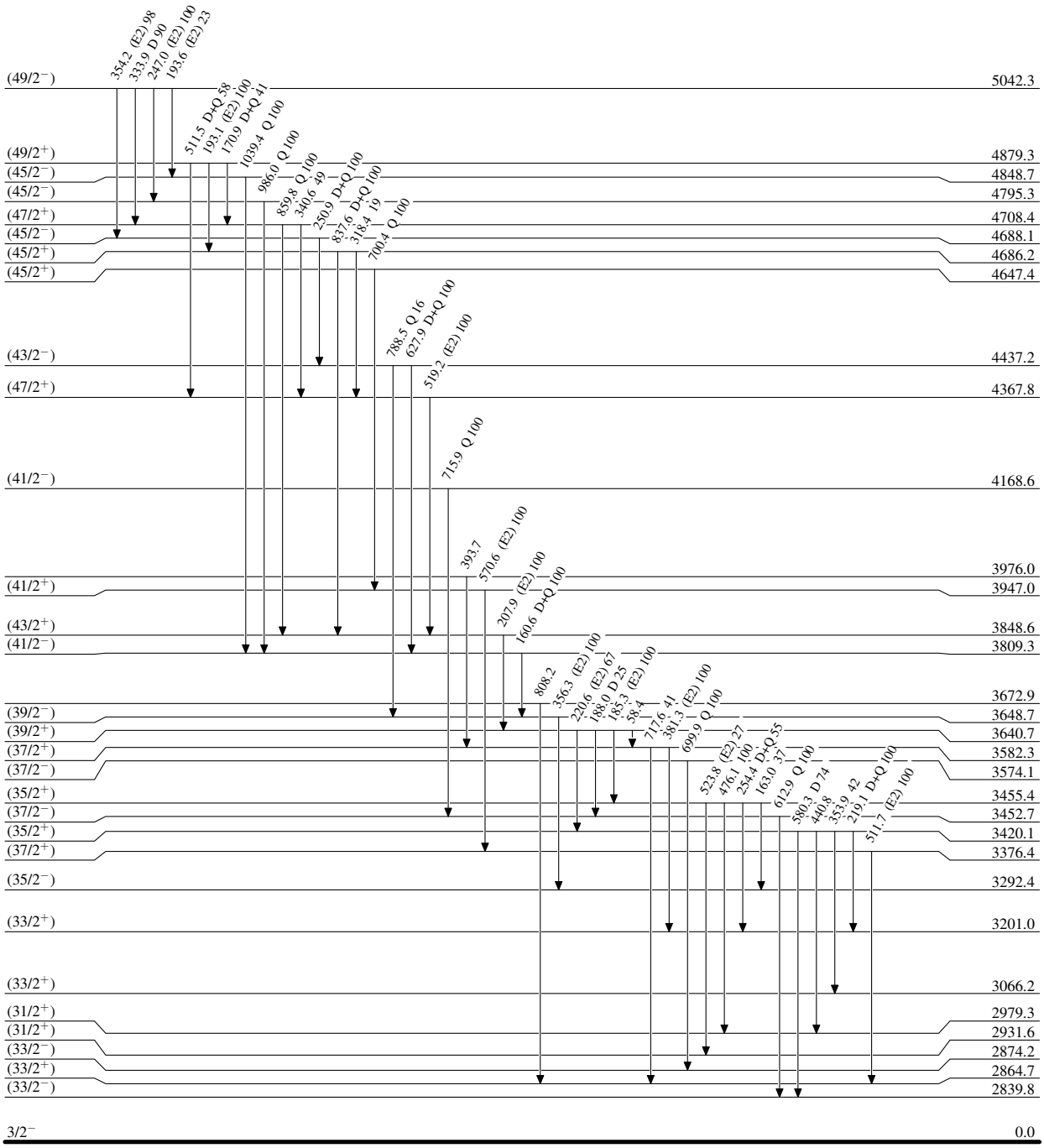
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)

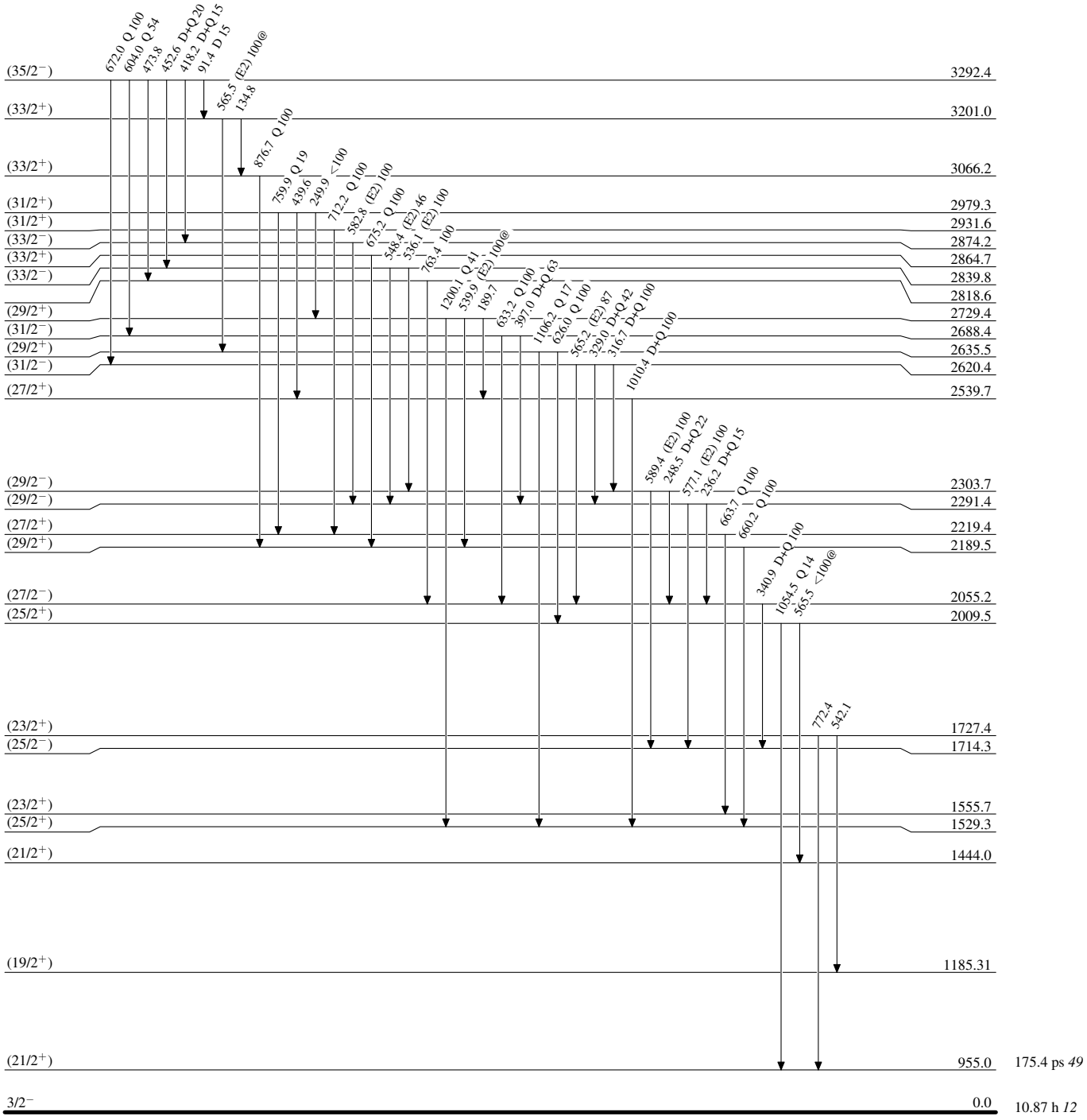


$^{189}_{78}Pt_{111}$

Adopted Levels, Gammas

Level Scheme (continued)

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



$^{189}_{78}Pt_{111}$

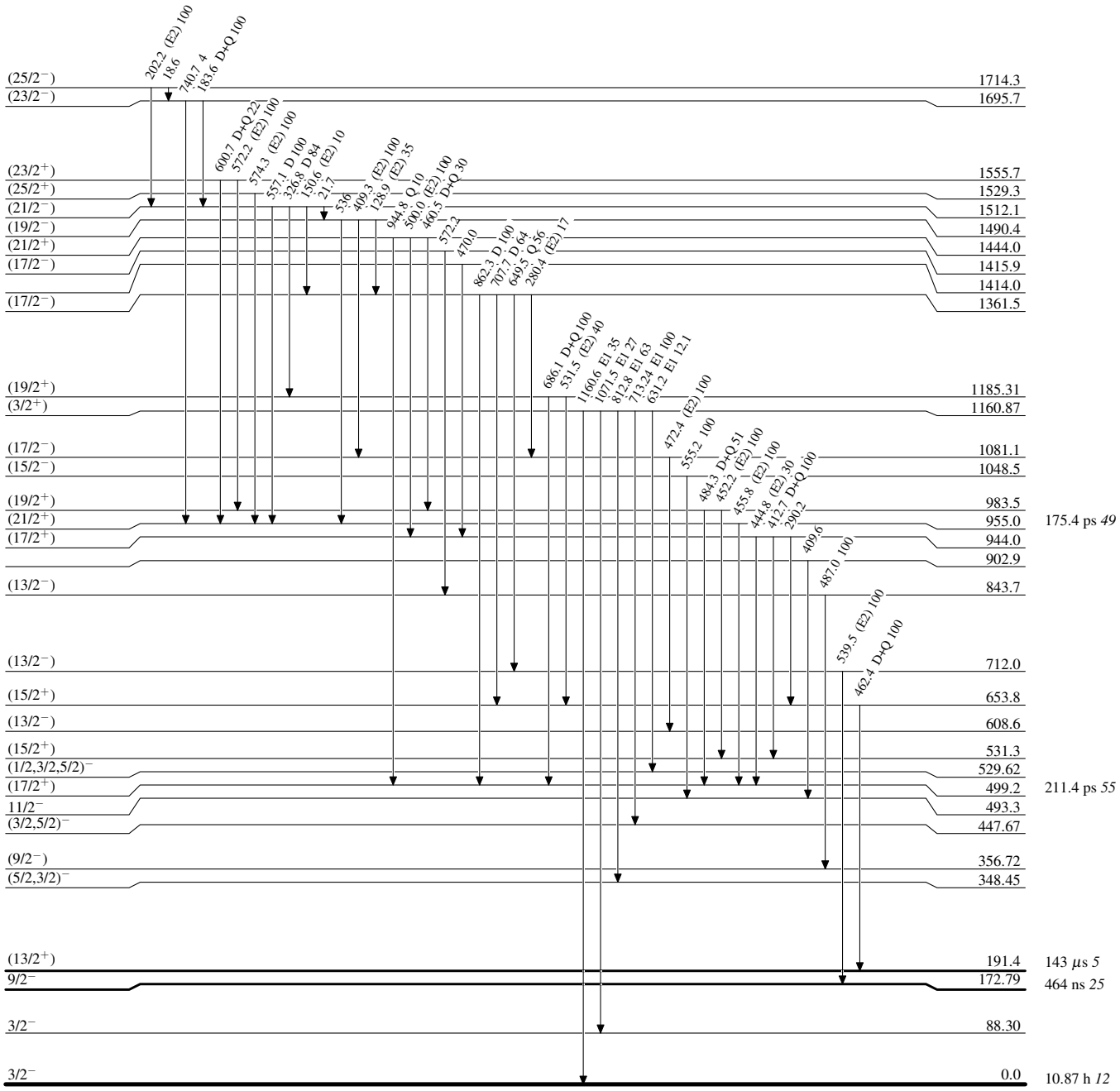
Adopted Levels, Gammas

Legend

Level Scheme (continued)

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

– – – – – – ► γ Decay (Uncertain)



$^{189}_{78}Pt_{111}$

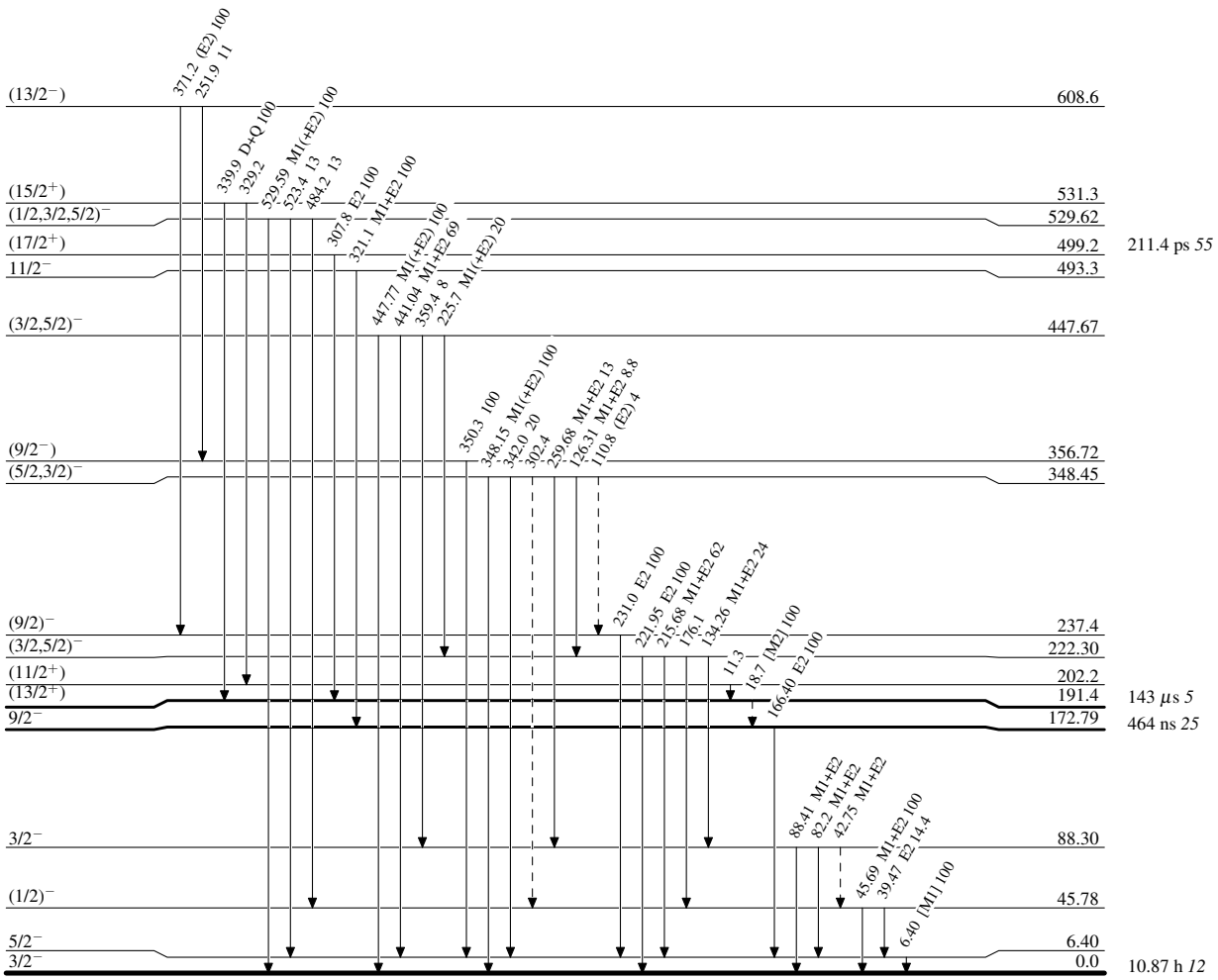
Adopted Levels, Gammas

Legend

Level Scheme (continued)

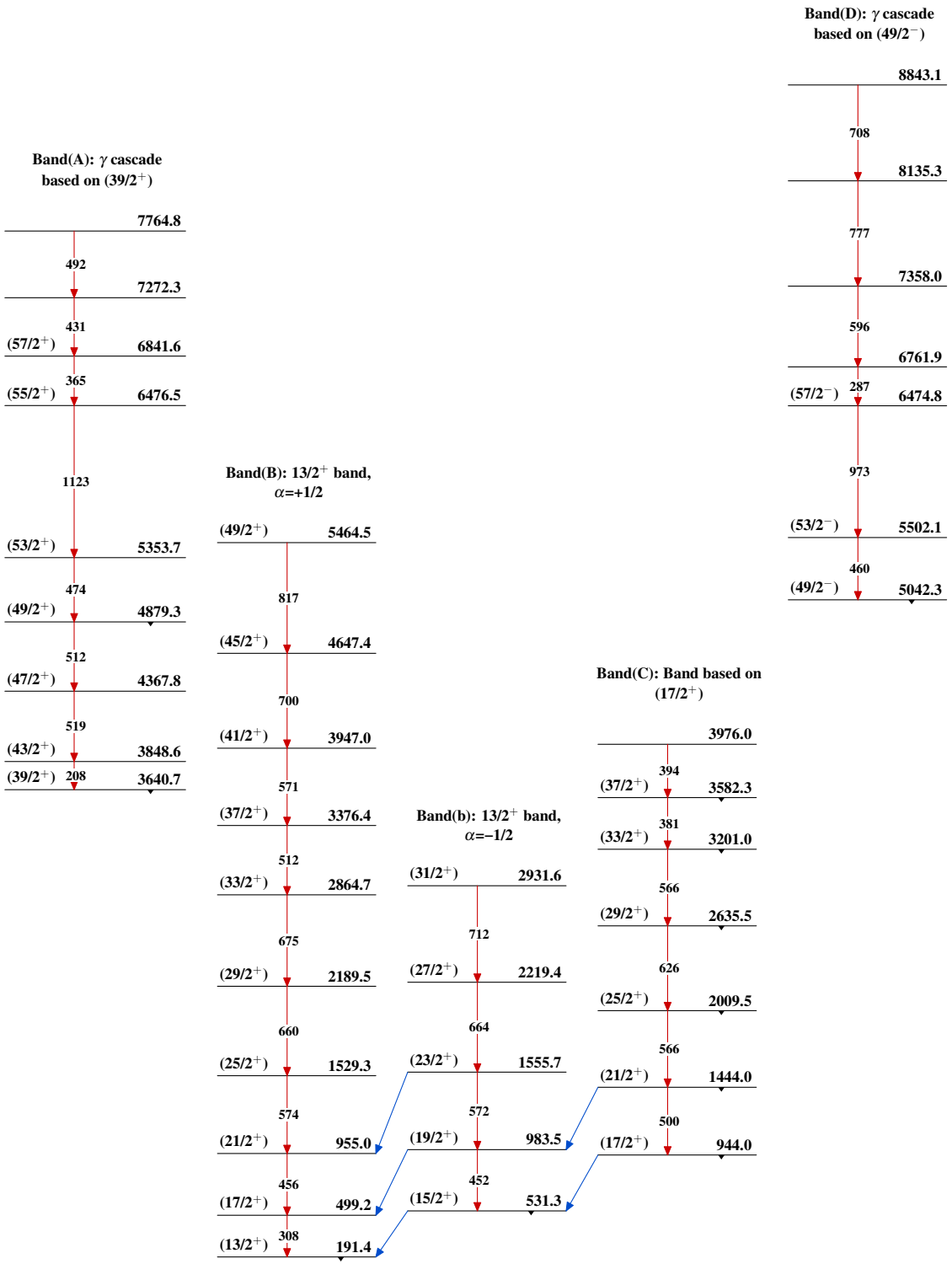
Intensities: Relative photon branching from each level
@ Multiply placed: intensity suitably divided

- - - - - - ► γ Decay (Uncertain)



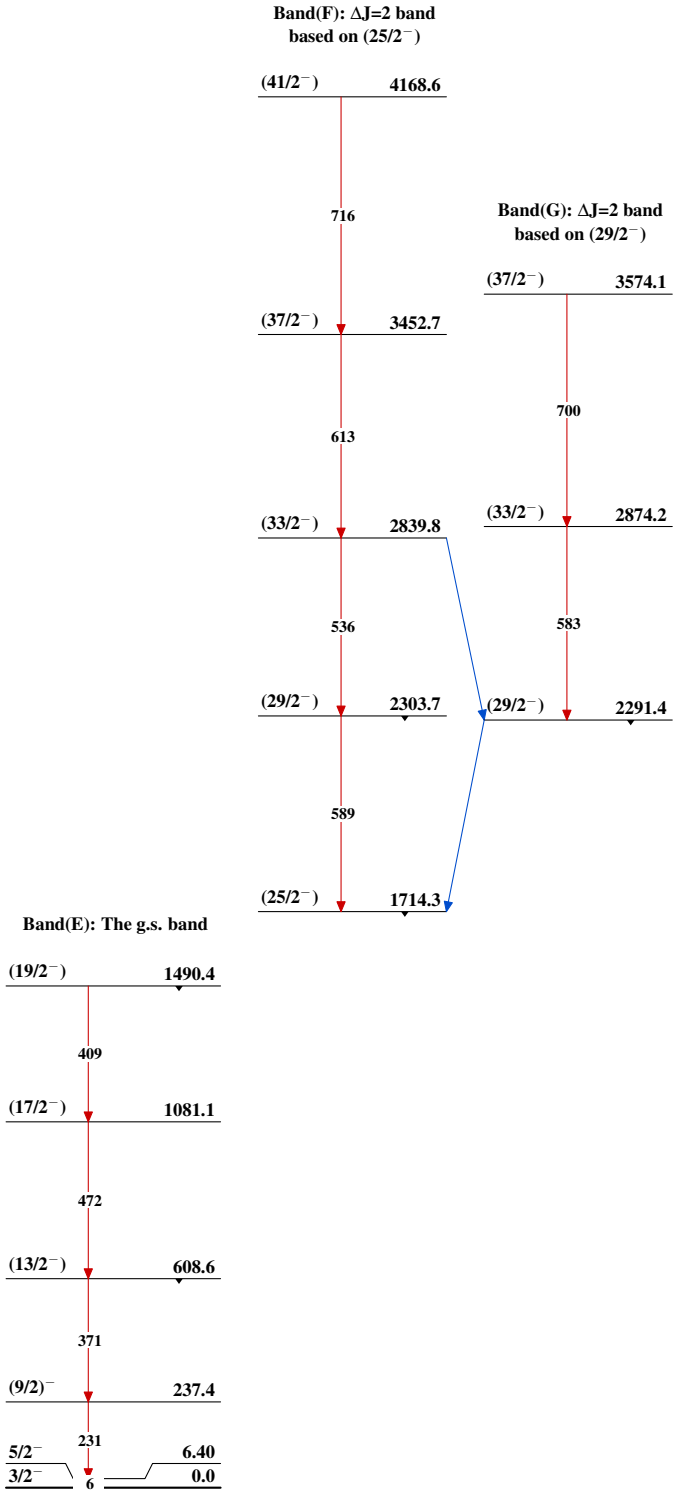
$^{189}_{78}Pt_{111}$

Adopted Levels, Gammas



$^{189}_{78}Pt_{111}$

Adopted Levels, Gammas (continued)



$^{189}_{78}Pt_{111}$