Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	P. K. Joshi, B. Singh, S. Singh, A. K. Jain	NDS 138, 1 (2016)	15-Oct-2016

Q(β^-)=−6982 *17*; S(n)=8954 *16*; S(p)=4729 *30*; Q(α)=1408 *22* 2012Wa38
S(2n)=20500 *40*, S(2p)=7374 *16*, Q(εp)=2349 *16* (2012Wa38).
Mass measurements: 2000Be42, 1997Be63, 1995Ve08.

^{139}Sm Levels

Cross Reference (XREF) Flags

- A ^{139}Eu ε decay (17.9 s)
- B ^{139}Sm IT decay (10.7 s)
- C ^{99}Ru(^{48}Ti,A2P2NG)
- D ^{110}Pd(^{34}S,5nγ)

E(level)†	J$^\pi$‡	T$_{1/2}$#	XREF	Comments
0.0	1/2$^+$	2.57 min *10*	ABCD	%ε+%β^+=100 μ=−0.53 *2* (1992Le09,2014StZZ) RMS charge radius <r^2>$^{1/2}$=4.9556 fm *34* (2013An02 evaluation). J$^\pi$: spin from laser atomic spectroscopy (1992Le09); π=+ from E2 γ from 5/2$^+$. T$_{1/2}$: from 1982De06 (273.7γ,306.7γ). Other: 2.6 min *3* (1973VaYZ). μ: laser resonance ionization mass spectroscopy (1992Le09,1988Al41).
111.92 *14*	3/2$^+$		ABCD	J$^\pi$: M1(+E2) γ to 1/2$^+$; stretched M1 γ from 5/2$^+$.
223.50 *13*	(3/2)$^+$		AB D	J$^\pi$: M1(+E2) γ to 1/2$^+$ and syst of N=77 nuclei.
267.29 *13*	5/2$^+$		ABCD	J$^\pi$: stretched E2 γ to 1/2$^+$; π=+ from E3 γ from 11/2$^-$.
457.38 *23*	11/2$^-$	10.7 s *6*	ABCD	%IT=93.7 *5*; %ε+%β^+=6.3 *5* (1975Va14) μ=1.1 *2* (1992Si22,2014StZZ) J$^\pi$: E3 γ to 5/2$^+$; π=− from allowed ε decay to (11/2)$^-$. T$_{1/2}$: from IT decay. μ: nuclear orientation with γ detected (1992Si22).
531.4 *4*	5/2$^+$		D	J$^\pi$: stretched D γ to 3/2$^+$; Q γ to 1/2$^+$.
589.6 *3*	(9/2)$^-$		A D	J$^\pi$: 9/2$^-$, 13/2$^-$ from DCO; 9/2$^-$ preferred based on available systematics.
686.7 *4*			A	
720.75 *20*	(7/2$^+$)		A D	J$^\pi$: 3/2,7/2 from stretched dipole to 5/2$^+$; ≠3/2,7/2$^-$ from ε decay from (11/2)$^-$.
786.8 *5*			A	
920.1 *8*			A	
1020.2 *6*			A	
1047.4[a] *7*	15/2$^-$		CD	
1065.5 *8*	(13/2$^-$)		D	
1067.1 *9*			D	
1074.7 *8*	(9/2$^+$)		D	
1137.1 *7*	(11/2$^+$)		D	
1158.5 *4*			A	
1176.4 *5*			A	
1346.3 *8*	(9/2$^+$)		D	
1380.3 *3*			A	
1454.5 *9*	(13/2$^+$)		D	
1581.3 *8*	(15/2$^-$)		D	
1779.0 *9*	(17/2$^-$)		D	
1780.7 *8*	(15/2$^+$)		D	
1870.4[a] *9*	(19/2$^-$)		CD	
1879.4 *9*	(13/2$^+$)		D	
1968.5 *10*	(17/2$^+$)		D	
2198.5[b] *13*	(19/2$^+$)	<1 ns	D	T$_{1/2}$: quoted in 1996Ro04 without giving the method used.

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Adopted Levels, Gammas (continued)

^{139}Sm Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#]	XREF	Comments
2249.6 *9*	(19/2⁻)		D	
2290.0 *8*	(17/2⁺)		D	
2550.0 *10*	(19/2⁺)		D	
2566.8 *9*	(19/2⁺)		D	
2582.7[b] *17*	(23/2⁺)		D	
2658.0 *8*	(21/2⁺)		D	
2671.0 *9*	(21/2⁻)		D	
2820.4[a] *10*	(23/2⁻)		CD	
2867.9[d] *11*	(23/2⁺)		D	
2908.8[@] *10*	(21/2⁺)		D	
3100.2 *10*	(25/2⁺)		D	
3254.6 *9*	(23/2⁻)		CD	
3284.3 *19*	(25/2)		D	
3315.1[&] *13*	(27/2)		D	
3327.0[e] *9*	(25/2⁻)		CD	
3331.3 *19*	(25/2)		D	
3348.9[d] *15*	(27/2⁺)		D	
3410.4[b] *19*	(27/2⁺)		D	
3445.4[e] *10*	(27/2⁻)		CD	
3518.2[@] *13*	(25/2⁺)		D	
3554.2 *19*	(29/2)		D	
3710.3[e] *11*	(29/2⁻)	0.69 ps *+42−21*	CD	
3736.2[&] *14*	(31/2)		D	
4014.3 *21*	(33/2)		D	
4047.5[e] *12*	(31/2⁻)	0.59 ps *+15−12*	CD	$T_{1/2}$: other 0.42 ps *15* from DSAM in ^{110}Pd(^{34}S,5nγ).
4119.5 *20*	(29/2)		D	
4124.5[d] *18*	(31/2⁺)		D	
4164.3[@] *15*	(29/2⁺)		D	
4338.6[b] *19*	(31/2⁺)		D	
4362.3 *19*	(31/2⁺)		D	
4444.5[&] *17*	(35/2)		D	
4457.0[e] *13*	(33/2⁻)	0.54 ps *+10−7*	CD	$T_{1/2}$: other: 0.28 ps *10* from DSAM in ^{110}Pd(^{34}S,5nγ).
4582.5 *18*	(33/2)		D	
4695.9 *17*	35/2		D	
4844.2[@] *15*	(33/2⁺)		D	
4856.9 *16*	(33/2⁺)		D	
4881.4 *20*	(33/2)		D	
4929.7[e] *14*	(35/2⁻)	0.34 ps *+8−6*	CD	$T_{1/2}$: other: 0.17 ps *6* from DSAM in ^{110}Pd(^{34}S,5nγ).
5088.5[&] *17*	(39/2)		D	
5145.7[d] *21*	(35/2⁺)		D	
5163.6[f] *21*	(33/2)		D	
5279.9[c] *19*	(37/2)		D	
5322.5 *20*	(35/2)		D	
5407.4[f] *21*	(35/2)		D	
5411.8 *18*	(39/2)		D	
5443.2[e] *14*	(37/2⁻)	0.62 ps *+42−21*	CD	
5483.9 *19*	(39/2)		D	
5578.9[@] *16*	(37/2⁺)		D	
5713.8[&] *19*	(43/2)		D	
5726.4[f] *23*	(37/2)		D	

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Adopted Levels, Gammas (continued)

^{139}Sm Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$#	XREF	E(level)†	Jπ‡	XREF
5934.6[e] *15*	(39/2)	>0.7 ps	CD	7193[f] *3*	(43/2)	D
5962.5[c] *19*	(41/2)		D	7234.5 *23*		D
6103.3 *20*			D	7272.5[@] *22*	(45/2$^+$)	D
6121.6 *25*	(39/2)		D	7367.4 *23*	(51/2)	D
6125.6[f] *25*	(39/2)		D	7406.6[&] *23*	(51/2)	D
6154.5 *20*			D	8031.1[c] *24*	(49/2)	D
6247.5 *20*			D	8068.7 *23*		D
6386.8[@] *19*	(41/2$^+$)		D	8175.1[@] *24*	(49/2$^+$)	D
6489.6[&] *21*	(47/2)		D	8286.7[&] *25*	(55/2)	D
6494.6[e] *16*	(41/2)		D	8524.6 *25*		D
6601.7 *21*			D	9083[@] *3*	(53/2$^+$)	D
6616.2[f] *25*	(41/2)		D	9395[&] *3*	(59/2)	D
6900.1[c] *22*	(45/2)		D	10053[@] *3*	(57/2$^+$)	D
7177 *3*	(43/2)		D	11114[@] *3*	(61/2$^+$)	D

† ΔEγ=0.5 keV assumed in least-squares fit when not given.

‡ From DCO and γ(θ) in ^{110}Pd(^{34}S,5nγ), except as noted. Stretched Q γ′s were assumed to be E2.

From Doppler-shift attenuation method in ^{99}Ru(^{48}Ti,α2p2nγ) (2008Pa36).

@ Band(A): $\nu i_{13/2}$ highly-deformed (intruder) band. Q=3.9 *7* from DSAM analysis of 807.9, 885.7, 902.6, 908.0, 969.9 and 1061.0 transitions in this band (1996Ro04) in ^{110}Pd(^{34}S,5nγ). An 1122γ placed as the top transition in 1994Va15 is not confirmed by 1996Ro04, thus omitted here.

& Band(B): band based on 27/2.

[a] Band(C): Band based on 15/2$^-$.

[b] Band(D): band based on 19/2$^+$.

[c] Band(E): Band based on 37/2.

[d] Band(F): band based on 23/2$^+$.

[e] Band(G): Band based on 25/2$^-$. Possible magnetic-dipole rotational (shears) band with configuration=$\nu h^{-1}_{11/2}\otimes\pi h^{2}_{11/2}$, as interpreted by 1996Br33 based on B(M1)/B(E2) values deduced from their lifetime measurements.

[f] Band(H): band based on 33/2.

Adopted Levels, Gammas (continued)

$\gamma(^{139}Sm)$

See ε decay for unplaced gammas.

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[b]	δ	α[c]	$I_{(\gamma+ce)}$[#]	Comments
111.92	3/2$^+$	111.9[‡] *2*	100[#]	0.0	1/2$^+$	M1(+E2)[#]	<0.50[#]	1.26 *4*		α(K)=1.022 *23*; α(L)=0.19 *4*; α(M)=0.041 *10*; α(N)=0.0092 *21*; α(O)=0.00131 *24* α(P)=6.3×10^{-5} *3*
223.50	(3/2)$^+$	111.6[‡] *2*	26[#] *6*	111.92	3/2$^+$	[M1,E2]		1.41 *18*		α(K)=0.96 *9*; α(L)=0.35 *20*; α(M)=0.08 *5*; α(N)=0.017 *11*; α(O)=0.0023 *13*; α(P)=5.2×10^{-5} *15*
		223.5[‡] *2*	100[#] *11*	0.0	1/2$^+$	(M1+E2)[#]	[#]	0.161 *18*		α(K)=0.129 *23*; α(L)=0.025 *5*; α(M)=0.0056 *11*; α(N)=0.00125 *22*; α(O)=0.000176 *22* α(P)=7.5×10^{-6} *21*
267.29	5/2$^+$	43.8[‡] *1*	≈0.17[#]	223.50	(3/2)$^+$	(E2)[#]		57.7 *11*	8.7 *15*	ce(L)/(γ+ce)=0.762 *9*; ce(M)/(γ+ce)=0.178 *4*; ce(N)/(γ+ce)=0.0387 *10*; ce(O)/(γ+ce)=0.00473 *12*; ce(P)/(γ+ce)=4.96×10^{-6} *12* Particle normalization/$T_{1/2}$=0.0434 *11*
		155.3[‡] *2*	100[#]	111.92	3/2$^+$	M1[@]		0.486		α(K)=0.412 *6*; α(L)=0.0581 *9*; α(M)=0.01247 *18*; α(N)=0.00283 *4*; α(O)=0.000424 *7* α(P)=2.63×10^{-5} *4* Mult.: M1(+E2) with δ<1.6 from αK(exp) in IT decay; stretched D from DCO in ^{110}Pd(^{34}S,5nγ).
		267.3[‡] *2*	100[#] *10*	0.0	1/2$^+$	E2[&]		0.0808		Mult.: E1+M2 or E2 from αK(exp) in IT decay; stretched Q from DCO in ^{110}Pd(^{34}S,5nγ).
457.38	11/2$^-$	190.1[‡] *2*	100[#]	267.29	5/2$^+$	E3[#]		1.516		α(K)=0.650 *10*; α(L)=0.668 *10*; α(M)=0.1588 *24*; α(N)=0.0350 *6*; α(O)=0.00442 *7* α(P)=3.30×10^{-5} *5* B(E3)(W.u.)=0.00411 *24*
531.4	5/2$^+$	263.9	22 *6*	267.29	5/2$^+$	[M1,E2]		0.099 *15*		α(K)=0.080 *17*; α(L)=0.0145 *11*; α(M)=0.0032 *3*; α(N)=0.00071 *6*; α(O)=0.000102 *4* α(P)=4.7×10^{-6} *14*
		420.3	100 *18*	111.92	3/2$^+$	D[@]				
		531.5	25 *6*	0.0	1/2$^+$	(E2)[&]		0.01092		
589.6	(9/2)$^-$	132.2 *2*	100	457.38	11/2$^-$	(M1)[@]		0.764		α(K)=0.648 *10*; α(L)=0.0915 *14*; α(M)=0.0197 *3*; α(N)=0.00446 *7*; α(O)=0.000668 *10* α(P)=4.13×10^{-5} *6*
686.7		419.5 *5*	100 *50*	267.29	5/2$^+$					
		463.4 *5*	75 *35*	223.50	(3/2)$^+$					
720.75	(7/2$^+$)	189.4[‡] *4*	97 *22*	531.4	5/2$^+$	(M1)[@]		0.280 *5*		α(K)=0.238 *4*; α(L)=0.0334 *5*; α(M)=0.00716 *11*; α(N)=0.001624 *25*; α(O)=0.000244 *4* α(P)=1.513×10^{-5} *23*
		453.4[‡] *2*	100	267.29	5/2$^+$	(M1)[@]		0.0276		

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Adopted Levels, Gammas (continued)

γ(^{139}Sm) (continued)

E_i(level)	J_i^π	E_γ †	I_γ †	E_f	J_f^π	Mult. [b]	α [c]	Comments
720.75	(7/2$^+$)	497.2 *3*	58 *12*	223.50	(3/2)$^+$			γ not observed in ^{110}Pd(^{34}S,5nγ).
786.8		197.2 *4*	100	589.6	(9/2)$^-$			
920.1		330.5 *7*	100	589.6	(9/2)$^-$			
1020.2		299.5 *5*	100	720.75	(7/2$^+$)			
1047.4	15/2$^-$	590.0	100	457.38	11/2$^-$	Q&		
1065.5	(13/2$^-$)	608.2	100	457.38	11/2$^-$	D+Q		
1067.1		477.5	100	589.6	(9/2)$^-$			
1074.7	(9/2$^+$)	807.5	100	267.29	5/2$^+$	Q&		
1137.1	(11/2$^+$)	416.5	100 *10*	720.75	(7/2$^+$)	(E2)&	0.0212	
		547.4	75 *8*	589.6	(9/2)$^-$	D@		
1158.5		437.7 *4*	100 *42*	720.75	(7/2$^+$)			
		701.2 *4*	70 *14*	457.38	11/2$^-$			
1176.4		719.0 *4*	100	457.38	11/2$^-$			
1346.3	(9/2$^+$)	271.8	100 *16*	1074.7	(9/2$^+$)	[M1,E2]	0.091 *15*	α(K)=0.074 *16*; α(L)=0.0132 *8*; α(M)=0.00289 *24*; α(N)=0.00065 *5*; α(O)=9.26×10^{-5} *24* α(P)=4.4×10^{-6} *13*
		1079.0	61 *7*	267.29	5/2$^+$	Q&		
1380.3		659.5 *3*	100 *22*	720.75	(7/2$^+$)			
		693.8 *4*	87 *44*	686.7				
1454.5	(13/2$^+$)	108.3	19 *6*	1346.3	(9/2$^+$)	[E2]	1.755	α(K)=0.951 *14*; α(L)=0.624 *9*; α(M)=0.1443 *21*; α(N)=0.0317 *5*; α(O)=0.00401 *6* α(P)=4.11×10^{-5} *6*
		379.7	100 *12*	1074.7	(9/2$^+$)	(E2)&	0.0276	
1581.3	(15/2$^-$)	515.8	100 *11*	1065.5	(13/2$^-$)	D@		
		534	14 *8*	1047.4	15/2$^-$			
1779.0	(17/2$^-$)	713.7	38 *4*	1065.5	(13/2$^-$)	Q&		
		731.6	100 *7*	1047.4	15/2$^-$	D+Q		
1780.7	(15/2$^+$)	643.7	100 *11*	1137.1	(11/2$^+$)	Q&		
		713.5	2.3 *8*	1067.1				
1870.4	(19/2$^-$)	822.9	100	1047.4	15/2$^-$	Q&		
1879.4	(13/2$^+$)	742.1	100	1137.1	(11/2$^+$)	D@		
1968.5	(17/2$^+$)	514.0	100	1454.5	(13/2$^+$)	(E2)&		
2198.5	(19/2$^+$)	419.5	100	1779.0	(17/2$^-$)	(E1)@		B(E1)(W.u.)>3.4×10^{-6}
2249.6	(19/2$^-$)	470.9	48 *17*	1779.0	(17/2$^-$)			
		668.5	100 *15*	1581.3	(15/2$^-$)	Q&		
		1201.7	45 *17*	1047.4	15/2$^-$			
2290.0	(17/2$^+$)	410.4	24.1 *26*	1879.4	(13/2$^+$)	E2&	0.0221	
		509.3	100 *10*	1780.7	(15/2$^+$)			
		708.4	1.9 *6*	1581.3	(15/2$^-$)			

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Adopted Levels, Gammas (continued)

γ(^{139}Sm) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[b]	α[c]	Comments
2290.0	(17/2$^+$)	1242.9	3.4 *8*	1047.4	15/2$^-$	D[@]		
2550.0	(19/2$^+$)	260.1	100	2290.0	(17/2$^+$)	[M1,E2]	0.103 *16*	α(K)=0.084 *17*; α(L)=0.0152 *13*; α(M)=0.0033 *4*; α(N)=0.00075 *7*; α(O)=0.000107 *5* α(P)=4.9×10^{-6} *15*
2566.8	(19/2$^+$)	786.2	100	1780.7	(15/2$^+$)	Q[&]		
2582.7	(23/2$^+$)	384.2	100	2198.5	(19/2$^+$)	E2[&]	0.0267	
2658.0	(21/2$^+$)	91.0	1.8 *7*	2566.8	(19/2$^+$)	[M1,E2]	2.8 *6*	α(K)=1.70 *18*; α(L)=0.8 *6*; α(M)=0.19 *14*; α(N)=0.04 *3*; α(O)=0.005 *4*; α(P)=9.E−5 *3*
		108.2	4.5 *14*	2550.0	(19/2$^+$)	[M1,E2]	1.56 *21*	α(K)=1.05 *10*; α(L)=0.39 *24*; α(M)=0.09 *6*; α(N)=0.020 *12*; α(O)=0.0026 *15*; α(P)=5.7×10^{-5} *16*
		368.0	100 *11*	2290.0	(17/2$^+$)	(E2)[&]	0.0303	
		689.5	61 *7*	1968.5	(17/2$^+$)	Q[&]		
		787.5	6.7 *20*	1870.4	(19/2$^-$)			
2671.0	(21/2$^-$)	800.5	100 *14*	1870.4	(19/2$^-$)	D[@]		
		891.9	70 *11*	1779.0	(17/2$^-$)	Q[&]		
2820.4	(23/2$^-$)	950.1	100	1870.4	(19/2$^-$)	Q[&]		
2867.9	(23/2$^+$)	209.9	100	2658.0	(21/2$^+$)	[M1,E2]	0.195 *18*	α(K)=0.15 *3*; α(L)=0.031 *7*; α(M)=0.0069 *16*; α(N)=0.0016 *4*; α(O)=0.00022 *4* α(P)=8.9×10^{-6} *25*
2908.8	(21/2$^+$)	342.3	14 *4*	2566.8	(19/2$^+$)			
		618.5	100 *13*	2290.0	(17/2$^+$)	Q[&]		
3100.2	(25/2$^+$)	232.3	41 *6*	2867.9	(23/2$^+$)	(M1)[@]	0.1605	α(K)=0.1363 *19*; α(L)=0.0190 *3*; α(M)=0.00408 *6*; α(N)=0.000925 *13*; α(O)=0.0001389 *20* α(P)=8.65×10^{-6} *13*
		441.9	100 *11*	2658.0	(21/2$^+$)	(E2)[&]	0.0180	
3254.6	(23/2$^-$)	434.1	100 *12*	2820.4	(23/2$^-$)			
		583.5	63 *12*	2671.0	(21/2$^-$)	D[@]		
		1005.2	69 *12*	2249.6	(19/2$^-$)	Q[&]		
		1384.2	85 *10*	1870.4	(19/2$^-$)	Q[&]		
3284.3	(25/2)	701.6	100	2582.7	(23/2$^+$)	D[@]		
3315.1	(27/2)	214.8	100	3100.2	(25/2$^+$)	D[@]		
3327.0	(25/2$^-$)	72.2	90 *18*	3254.6	(23/2$^-$)	M1	4.32	α(K)=3.66 *6*; α(L)=0.521 *8*; α(M)=0.1120 *16*; α(N)=0.0254 *4*; α(O)=0.00380 *6* α(P)=0.000234 *4* Mult.: from α(exp) in ^{110}Pd(^{34}S,5nγ).
		227.2	25 *8*	3100.2	(25/2$^+$)	(E1)[@]	0.0302	
		506.4	100 *20*	2820.4	(23/2$^-$)	(M1)[@]	0.0208	
		656	10 *6*	2671.0	(21/2$^-$)			
		669.1	30 *9*	2658.0	(21/2$^+$)			
3331.3	(25/2)	748.6	100	2582.7	(23/2$^+$)	D[@]		

$^{139}_{62}Sm_{77}$-6

Adopted Levels, Gammas (continued)

γ(^{139}Sm) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[b]	α[c]	Comments
3348.9	(27/2$^+$)	481.0	100	2867.9	(23/2$^+$)	[E2]		
3410.4	(27/2$^+$)	827.7	100	2582.7	(23/2$^+$)	Q[&]		
3445.4	(27/2$^-$)	118.6	100 *17*	3327.0	(25/2$^-$)	M1	1.039	α(K)=0.881 *13*; α(L)=0.1246 *18*; α(M)=0.0268 *4*; α(N)=0.00607 *9*; α(O)=0.000909 *13* α(P)=5.62×10^{-5} *8* Mult.: stretched dipole from DCO in ^{110}Pd(^{34}S,5nγ); M1 from α(exp) in ^{110}Pd(^{34}S,5nγ).
		344.5	14 *4*	3100.2	(25/2$^+$)	(E1)[@]		
		625.4	15 *4*	2820.4	(23/2$^-$)	Q[&]		
3518.2	(25/2$^+$)	609.5	100	2908.8	(21/2$^+$)	Q[&]		
3554.2	(29/2)	222.8	20 *7*	3331.3	(25/2)	(E2)[&]	0.1458	
		270.0	100 *18*	3284.3	(25/2)	(E2)[&]	0.0783	
3710.3	(29/2$^-$)	265.0	100 *11*	3445.4	(27/2$^-$)	(M1)[@]	0.1125	B(M1)(W.u.)=1.5 *+5−10*
		383.5	4.4 *17*	3327.0	(25/2$^-$)	[E2]	0.0269	B(E2)(W.u.)=9.E+1 *+5−7*
3736.2	(31/2)	421.0	100	3315.1	(27/2)	E2[&]	0.0206	
4014.3	(33/2)	460.1	100	3554.2	(29/2)	(E2)[&]		
4047.5	(31/2$^-$)	337.3	100 *12*	3710.3	(29/2$^-$)	(M1)[@]	0.0594	B(M1)(W.u.)=0.72 *+19−22*
		601.9	29 *5*	3445.4	(27/2$^-$)	E2[a]		B(E2)(W.u.)=61 *+18−20*
4119.5	(29/2)	835.2	100	3284.3	(25/2)	Q[&]		
4124.5	(31/2$^+$)	775.6	100	3348.9	(27/2$^+$)	Q[&]		
4164.3	(29/2$^+$)	646.2	100	3518.2	(25/2$^+$)	Q[&]		
4338.6	(31/2$^+$)	784.3	40 *8*	3554.2	(29/2)			
		928.1	100 *18*	3410.4	(27/2$^+$)	Q[&]		
4362.3	(31/2$^+$)	808.3	52 *12*	3554.2	(29/2)	D[@]		
		952.1	100 *22*	3410.4	(27/2$^+$)	Q[&]		
4444.5	(35/2)	708.1	100	3736.2	(31/2)	Q[&]		
4457.0	(33/2$^-$)	409.4	100 *14*	4047.5	(31/2$^-$)	(M1)[@]	0.0359	B(M1)(W.u.)=0.43 *+10−12*
		746.6	36 *8*	3710.3	(29/2$^-$)	E2[a]		B(E2)(W.u.)=27 *+8−9*
4582.5	(33/2)	846.3	100	3736.2	(31/2)	D[@]		
4695.9	35/2	251.1	36 *12*	4444.5	(35/2)			
		960.0	100 *24*	3736.2	(31/2)	(Q)[&]		
4844.2	(33/2$^+$)	680.0	100 *14*	4164.3	(29/2$^+$)	Q[&]		
		1108.0	20 *6*	3736.2	(31/2)	D[@]		
4856.9	(33/2$^+$)	1120.7	100	3736.2	(31/2)	D[@]		
4881.4	(33/2)	519.5	100 *28*	4362.3	(31/2$^+$)	D[@]		
		542.5	96 *28*	4338.6	(31/2$^+$)	D[@]		
4929.7	(35/2$^-$)	472.6	100 *19*	4457.0	(33/2$^-$)	(M1)[@]	0.0248	B(M1)(W.u.)=0.35 *+11−12*

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Adopted Levels, Gammas (continued)

γ(^{139}Sm) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[b]	α[c]	Comments
4929.7	(35/2⁻)	882.3	71 *14*	4047.5	(31/2⁻)	E2[a]		B(E2)(W.u.)=30 *+9−10*
5088.5	(39/2)	392.4	9.9 *24*	4695.9	35/2	(E2)[&]	0.0251	
		644.1	100 *11*	4444.5	(35/2)	Q[&]		
5145.7	(35/2⁺)	1021.2	100	4124.5	(31/2⁺)	Q[&]		
5163.6	(33/2)	1044	100	4119.5	(29/2)			
5279.9	(37/2)	835.4	100	4444.5	(35/2)	D		
5322.5	(35/2)	740	100	4582.5	(33/2)	D[@]		
5407.4	(35/2)	243.8	100 *22*	5163.6	(33/2)	D[@]		
		526.0	47 *15*	4881.4	(33/2)	D[@]		
5411.8	(39/2)	967.4	100	4444.5	(35/2)	Q[&]		
5443.2	(37/2⁻)	513.5	100 *21*	4929.7	(35/2⁻)	(M1)[@]	0.0201	B(M1)(W.u.)=0.15 *+8−6*
		986.2	68 *17*	4457.0	(33/2⁻)	[E2]		B(E2)(W.u.)=9 *+5−4*
5483.9	(39/2)	1039.4	100	4444.5	(35/2)	Q[&]		
5578.9	(37/2⁺)	722.0	21 *6*	4856.9	(33/2⁺)	(Q)[&]		
		734.6	100 *15*	4844.2	(33/2⁺)	Q[&]		
5713.8	(43/2)	302.0	6.2 *24*	5411.8	(39/2)	(E2)[&]	0.0551	
		625.3	100 *12*	5088.5	(39/2)	Q[&]		
5726.4	(37/2)	319.0	100	5407.4	(35/2)	D[@]		
5934.6	(39/2)	491.3	44 *12*	5443.2	(37/2⁻)			
		1005.0	100 *30*	4929.7	(35/2⁻)			
5962.5	(41/2)	550.7	53 *12*	5411.8	(39/2)	D[@]		
		682.5	100 *24*	5279.9	(37/2)	Q[&]		
6103.3		1014.8	100	5088.5	(39/2)			
6121.6	(39/2)	395.1	100	5726.4	(37/2)	D[@]		
6125.6	(39/2)	399.3	100	5726.4	(37/2)	D[@]		
6154.5		1066	100	5088.5	(39/2)			
6247.5		1159	100	5088.5	(39/2)			
6386.8	(41/2⁺)	807.9	100	5578.9	(37/2⁺)	Q[&]		
6489.6	(47/2)	775.8	100	5713.8	(43/2)	Q[&]		
6494.6	(41/2)	560.0	80 *27*	5934.6	(39/2)			
		1051.4	100 *34*	5443.2	(37/2⁻)			
6601.7		1189.9	100	5411.8	(39/2)			
6616.2	(41/2)	490.7	100 *20*	6125.6	(39/2)	D[@]		
		494.5	39 *14*	6121.6	(39/2)	D[@]		
6900.1	(45/2)	937.6	100	5962.5	(41/2)	Q[&]		
7177	(43/2)	560.5	100	6616.2	(41/2)	D[@]		
7193	(43/2)	577.2	100	6616.2	(41/2)	D[@]		

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Adopted Levels, Gammas (continued)

$\gamma(^{139}Sm)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[b]
7234.5		987	100	6247.5		
7272.5	(45/2$^+$)	885.7	100	6386.8	(41/2$^+$)	Q[&]
7367.4	(51/2)	877.8	100	6489.6	(47/2)	Q[&]
7406.6	(51/2)	917.0	100	6489.6	(47/2)	Q[&]
8031.1	(49/2)	1131	100	6900.1	(45/2)	
8068.7		662.0	100 *33*	7406.6	(51/2)	
		701.3	100 *33*	7367.4	(51/2)	
8175.1	(49/2$^+$)	902.6	100	7272.5	(45/2$^+$)	Q[&]
8286.7	(55/2)	880.1	100	7406.6	(51/2)	
8524.6		1118	100	7406.6	(51/2)	
9083	(53/2$^+$)	908.0	100	8175.1	(49/2$^+$)	Q[&]
9395	(59/2)	1108.5	100	8286.7	(55/2)	
10053	(57/2$^+$)	969.9	100	9083	(53/2$^+$)	Q[&]
11114	(61/2$^+$)	1061.0	100	10053	(57/2$^+$)	Q[&]

[†] From ^{110}Pd(^{34}S,5nγ), except as noted.
[‡] From ε decay.
[#] From IT decay.
[@] Stretched dipole from DCO in ^{110}Pd(^{34}S,5nγ); $\Delta\pi$ from the level scheme.
[&] Stretched quadrupole from DCO in ^{110}Pd(^{34}S,5nγ); assumed to be E2.
[a] D,E2 from comparison to RUL; ≠D from level scheme.
[b] For high-spin data, assignments are from DCO and $\gamma(\theta)$, except as noted. Mult=Q indicates stretched quadrupole (most likely E2) and mult=D or D+Q indicates ΔJ=1, dipole. For γ transitions up to 600 keV, stretched quadrupoles are assigned (E2) from RUL for E2 and M2, assuming that level half-lives are less than 10 ns.
[c] 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.

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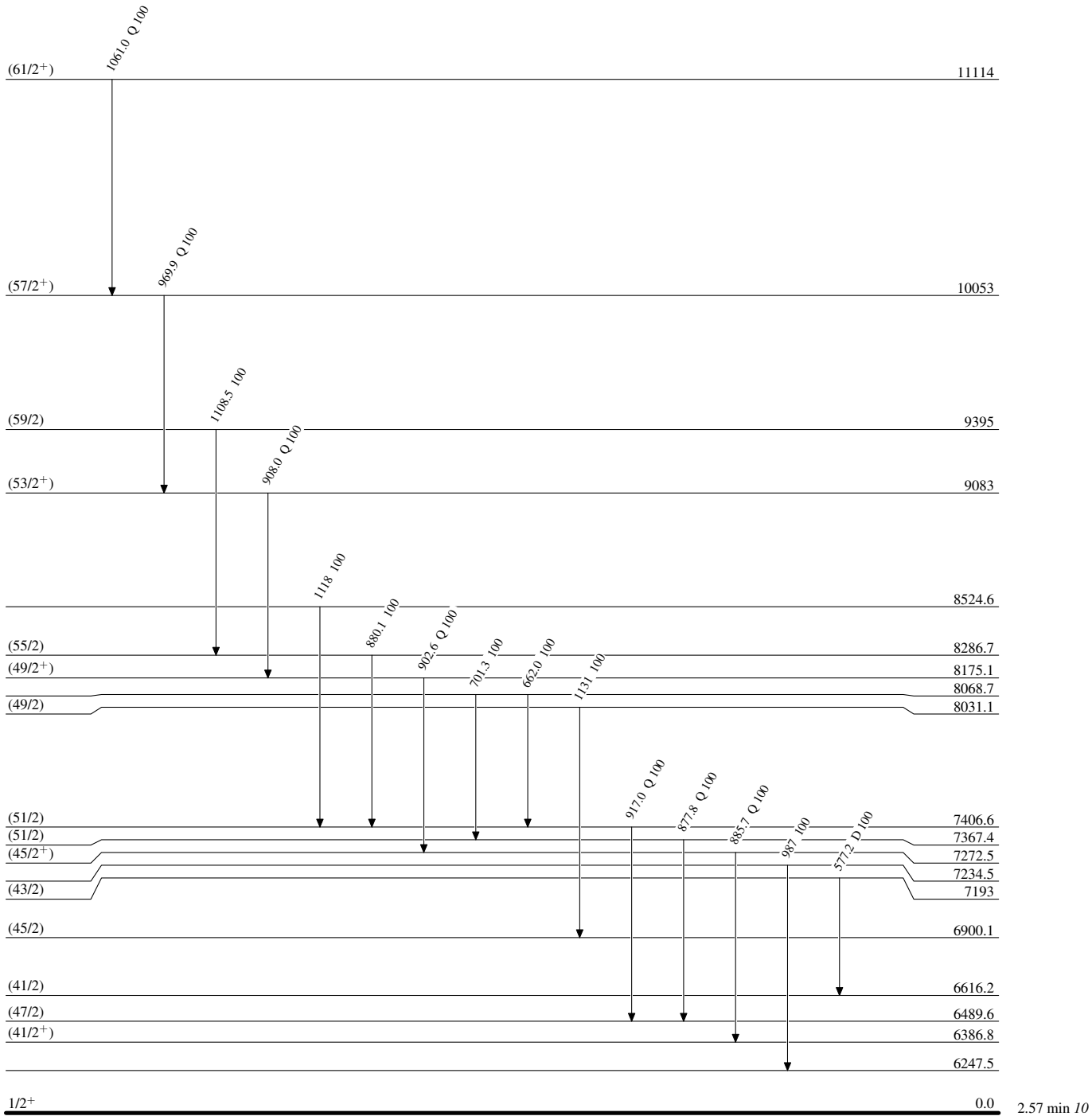
Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level



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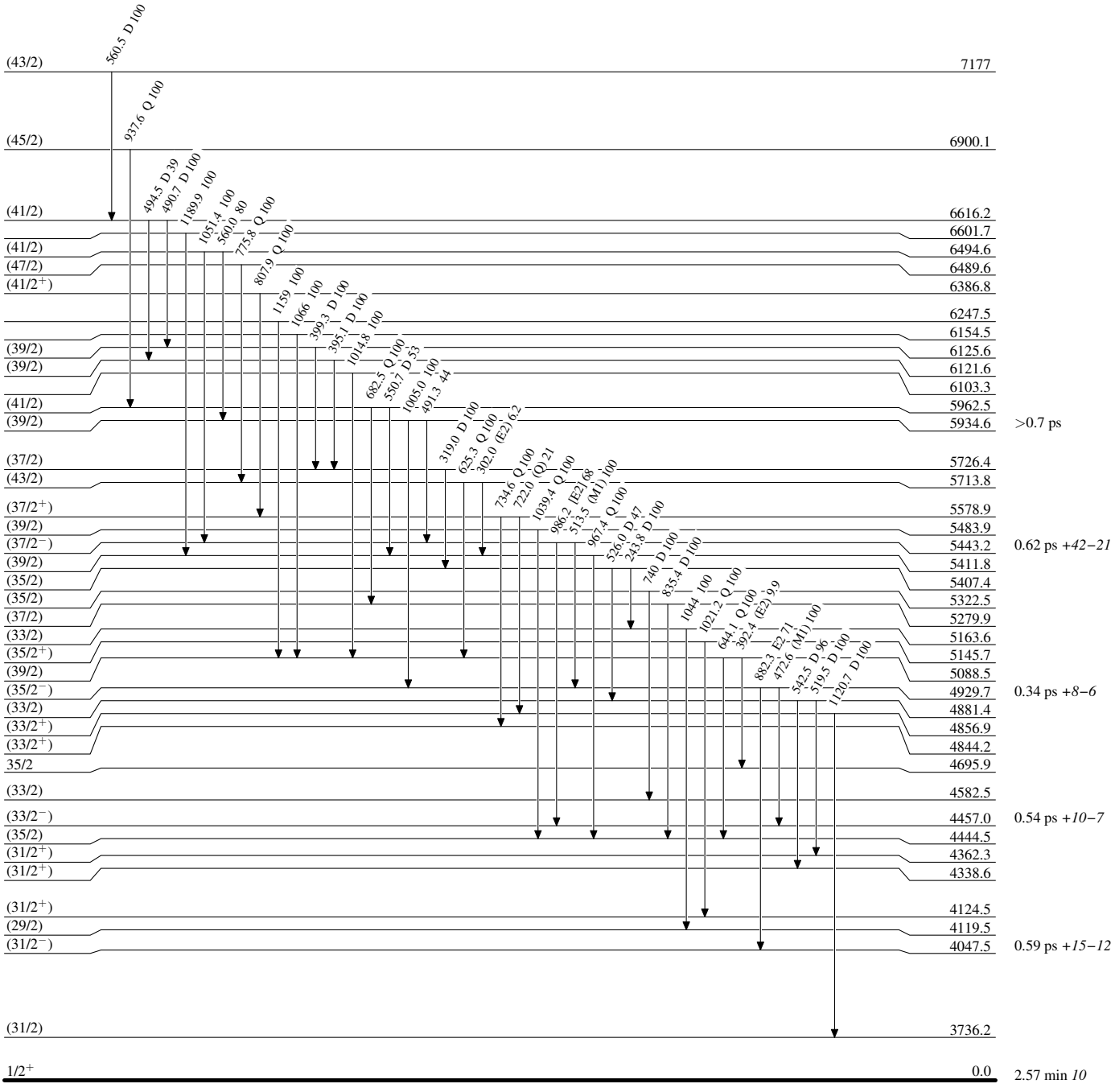
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



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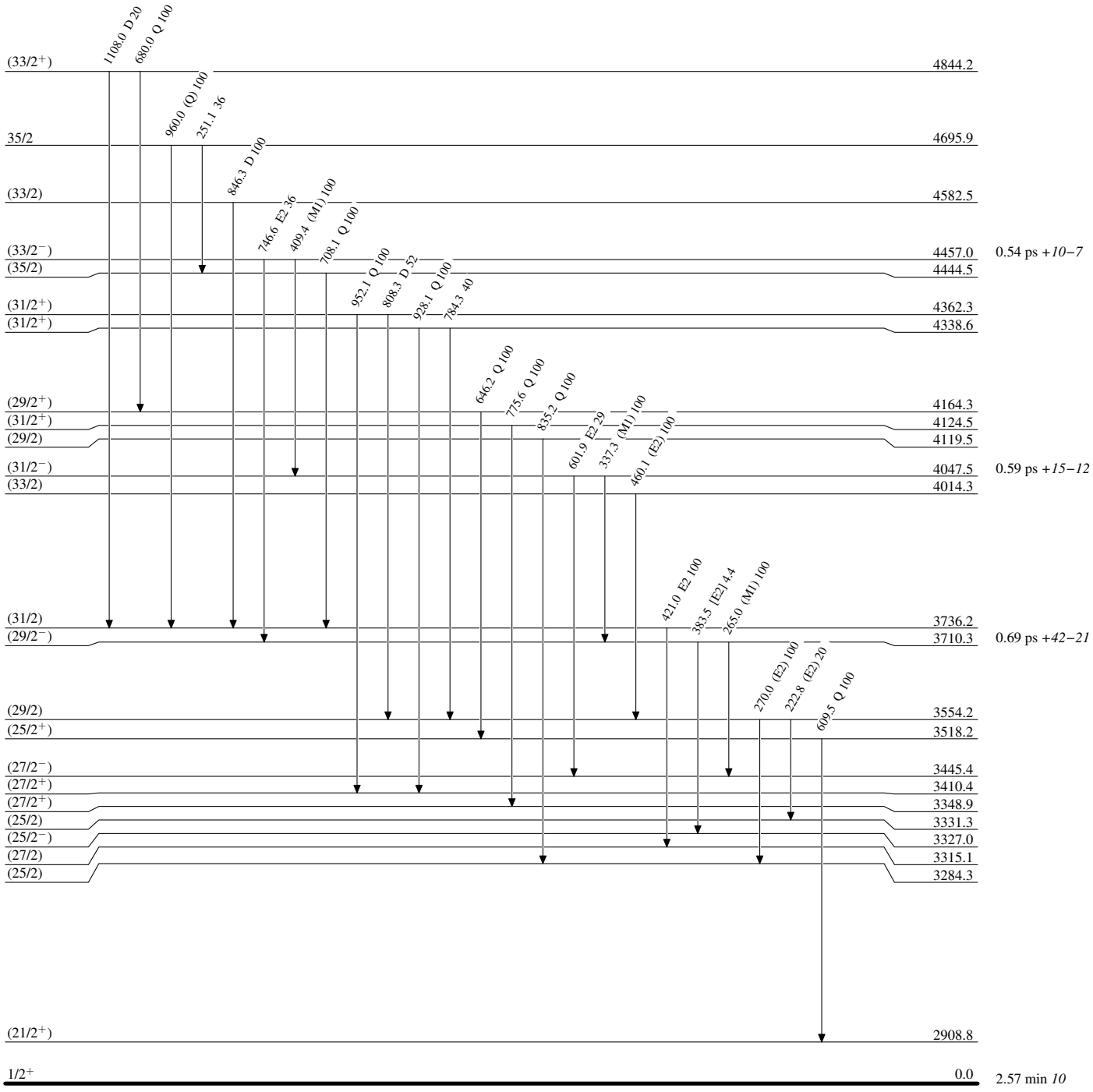
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



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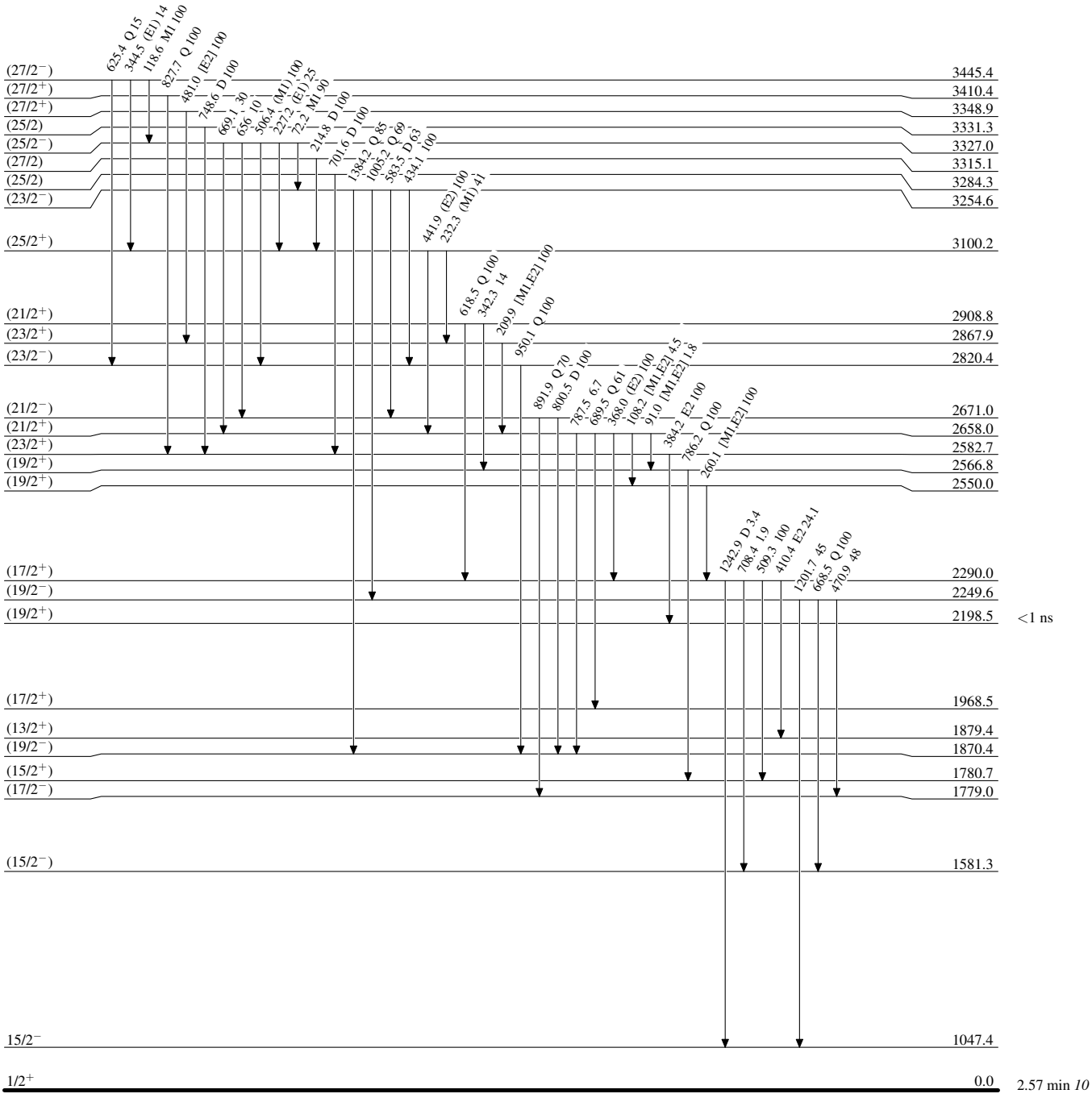
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



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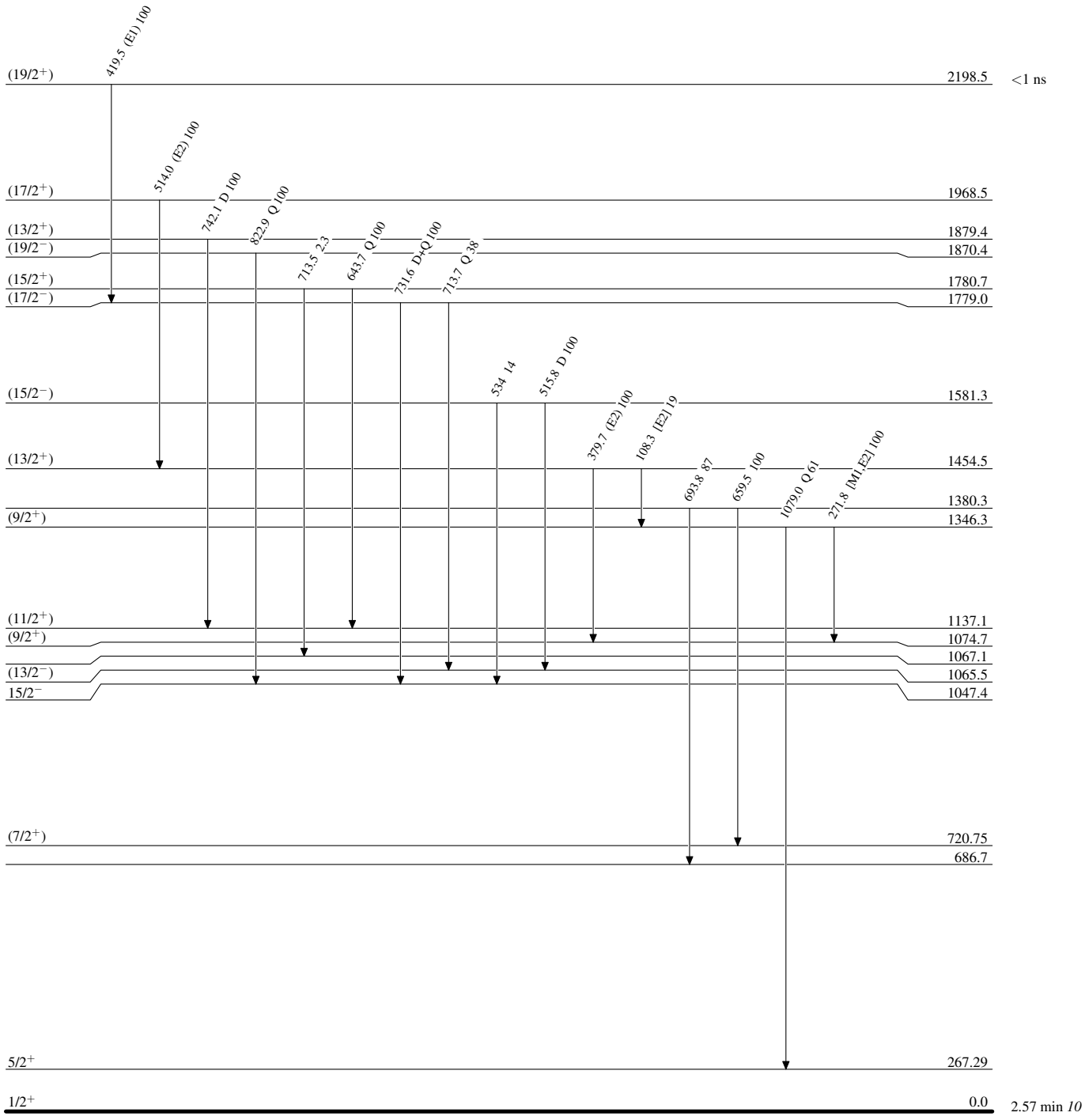
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



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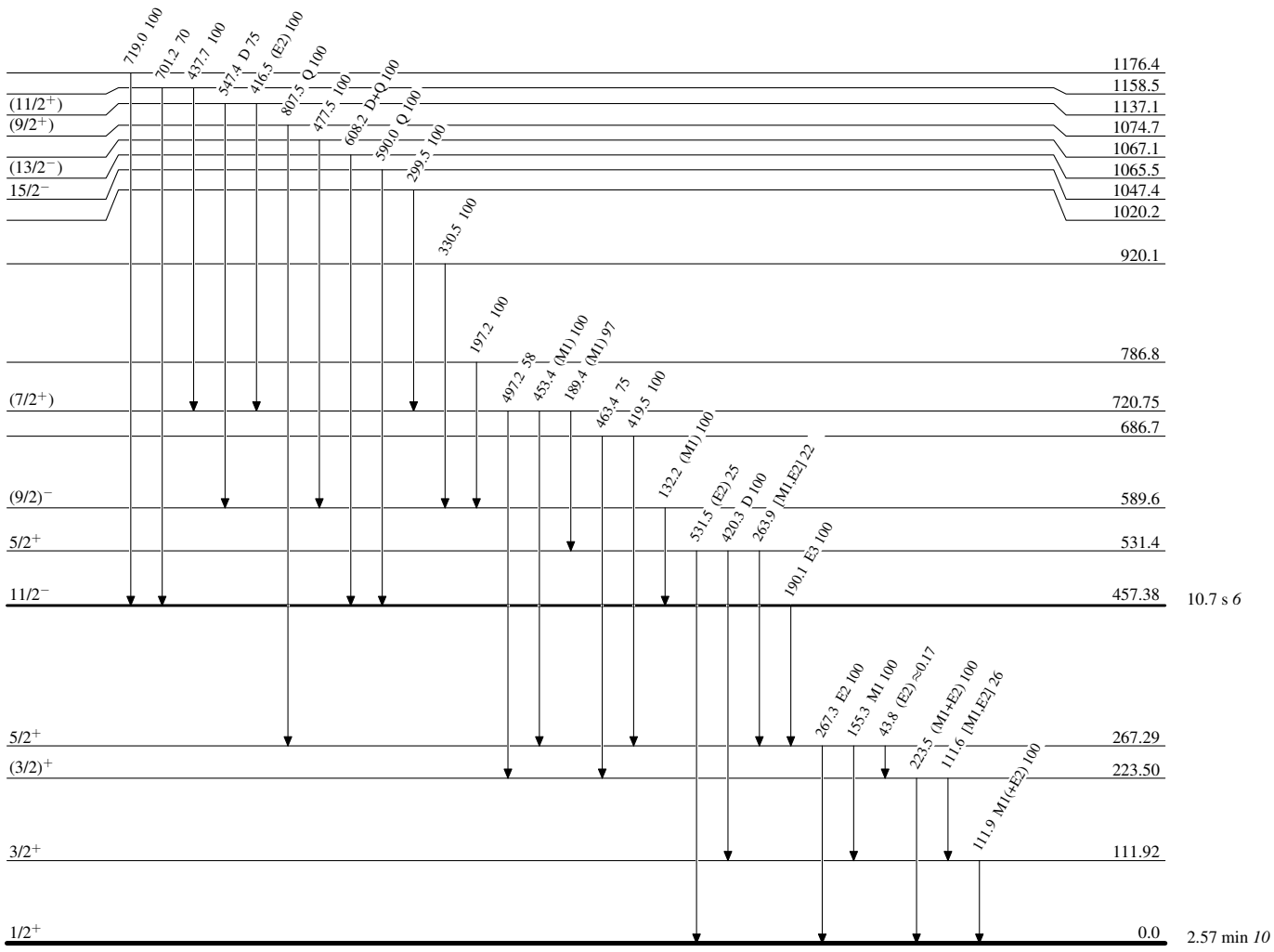
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



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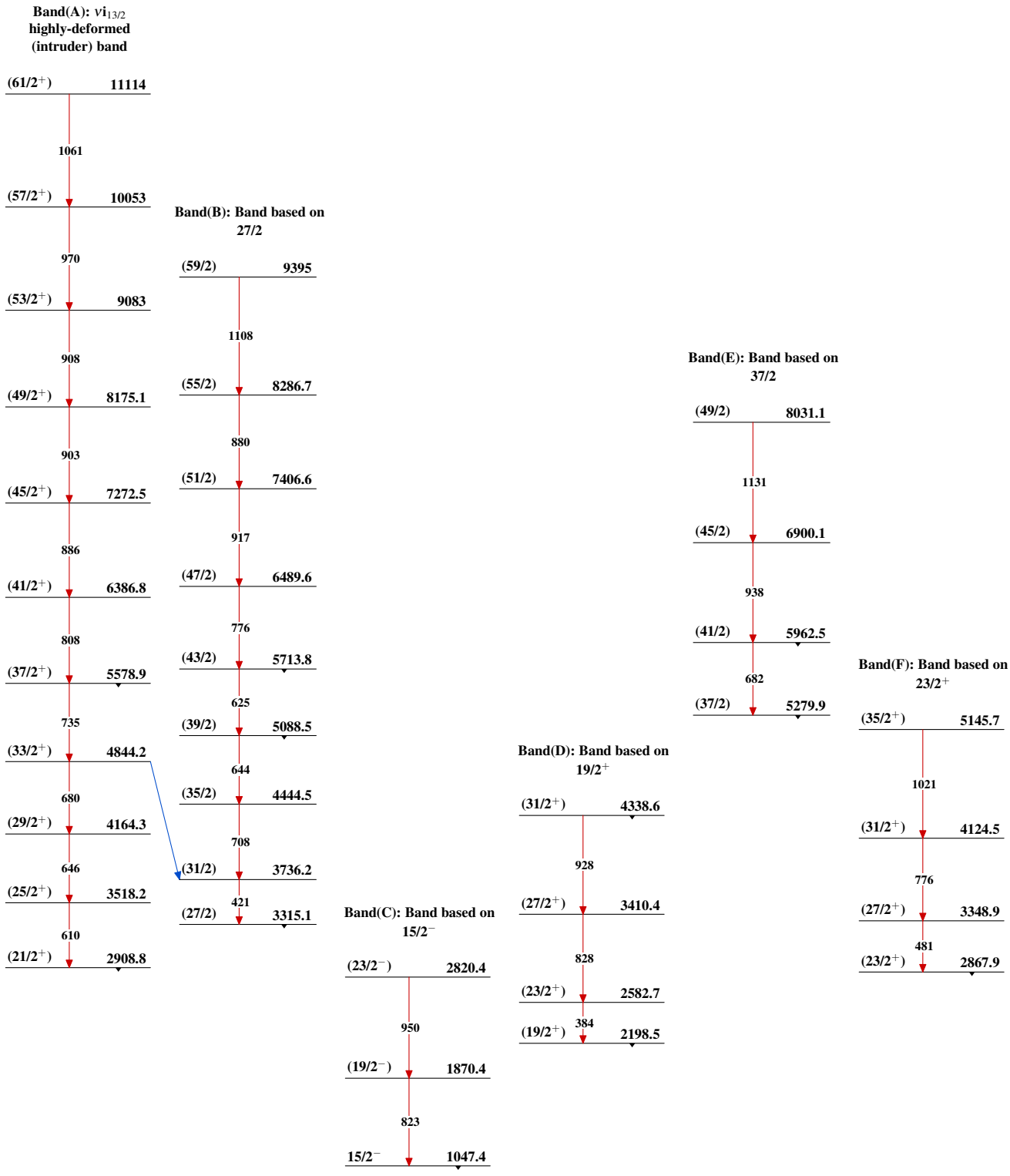
Adopted Levels, Gammas



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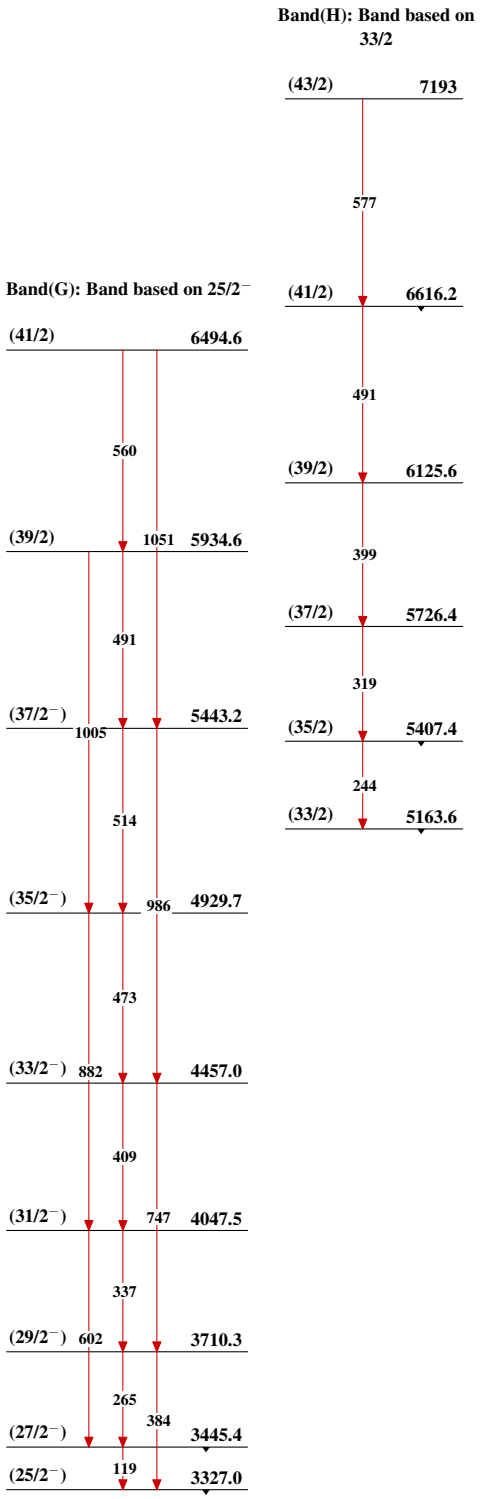
Adopted Levels, Gammas (continued)



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