Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	T. D. Johnson, D. Symochko(a), M. Fadil(b), and J. K. Tuli	NDS 112,1949 (2011)	1-Jun-2010

Q(β^-)=−7.67×10^3 *3*; S(n)=11124 *9*; S(p)=5753 *15*; Q(α)=607 *12* 2012Wa38
Note: Current evaluation has used the following Q record −7.67E+3 3 *11124* 9 *5753* 14600 12 2011AuZZ.
Q(εp)=−2082 *5* (2011AuZZ).
Values in 2003Au03: Q(β^-)=−7670 *3*, S(n)=11126 *10* ; S(p)=5759 *15*, Q(α)=600 *13*, Q(β^-n)=−17138 *14*, ; Q(εp)=−2084 *6*.
Some recent nuclear structure, Theory, Calculations:
1999Pr03, 1998La12, 1998Ka41, 1994Ta05, 1993Pi13.
1992Le09: measured optical isotope shift, derived Δ<r^2>.

^{142}Sm Levels

Cross Reference (XREF) Flags

A	^{142}Eu ε decay (2.34 s)	D	^{144}Sm(p,t)
B	^{142}Eu ε decay (1.223 min)	E	^{124}Sn(^{24}Mg,6nγ):SD
C	(HI,xnγ)		

E(level)	J$^\pi$‡	T$_{1/2}$	XREF	Comments
0.0	0$^+$	72.49 min *5*	ABCD	%ε+%β^+=100 T$_{1/2}$: from 1966Ma15; others: 72.4 min *1* (1968Bl13), 72.5 min *1* (1972De23).
768.08 *19*	2$^+$		ABCD	J$^\pi$: L=2 in (p,t).
1450.6 *6*	(0$^+$)		A D	J$^\pi$: L=(0) in (p,t).
1572 *6*			D	
1657.79 *24*	(2)$^+$		A D	J$^\pi$: L=(2) in (p,t), log *ft*=5.4 via 1$^+$ parent.
1784.2 *3*	3$^-$		BC	J$^\pi$: log *ft*=5.1 from 8$^-$ to the 2371 level, E2 γ from 2371 to 2347, E2 γ from 2347 to 1784, and γ from 1784 to 2$^+$ uniquely establishes J$^\pi$(2371)=7$^-$, J$^\pi$(2347)=5$^-$, and J$^\pi$(1784)=3$^-$.
1791.4 *3*	4$^+$		BCD	J$^\pi$: L=4 in (p,t), γ to 2$^+$ is stretched E2.
2055.5 *4*	2$^+$		A D	J$^\pi$: L=2 in (p,t).
2173.3 *5*	0$^+$		A D	J$^\pi$: L=0 in (p,t).
2280 *3*	0$^+$		D	J$^\pi$: L=0 in (p,t).
2347.9 *3*	5$^-$		BCD	J$^\pi$: see comment on the 1784 level.
2353.7? *3*	(2$^+$)		A	
2372.1 *4*	7$^-$	170 ns *2*	BCD	Q=+1.12 *27* (2005St24,1986Da22,1985Be23) J$^\pi$: see comment on the 1784 level. T$_{1/2}$: from $\beta\gamma$(t) in ε decay of ^{142}Eu (1975Ke08); other: 175 ns *5* (HI,xnγ) (1984LaZU).
2373.9? *3*	(2$^+$)		A	
2416.0 *11*	(4)		CD	J$^\pi$: L=(4) in (p,t), J$^\pi$=(4$^-$) in (HI,xnγ).
2420.1 *3*	6$^+$	<2 ns	BC	T$_{1/2}$: from ^{142}Eu(2.4 s) ε decay (1975Ke08).
2439.4? *11*	(0$^+$)		A	
2497 *2*			D	
2522.19 *21*	(0$^+$)		A	
2582 *2*	4$^+$		D	J$^\pi$: L=4 in (p,t).
2656 *2*			D	
2747 *6*	(2$^+$)		D	J$^\pi$: L=(2) in (p,t).
2867 *1*	4$^+$		D	J$^\pi$: L=4 in (p,t).
2912.1 *4*	7$^-$		BC	J$^\pi$: γ to 7$^-$ ΔJ=0 M1+(E2), log *ft*=6.5 via 8$^-$ parent.
2955 *2*	4$^+$		D	J$^\pi$: L=4 in (p,t).
3003.1 *11*	(6$^+$)		C	
3007 *5*			D	
3031.8? *5*	(0$^+$)		A	
3052 *3*			D	

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Adopted Levels, Gammas (continued)

^{142}Sm Levels (continued)

E(level)	J^{π}[‡]	$T_{1/2}$	XREF	Comments
3113.2 *4*	8^-[†]		BC	
3118 *4*			D	
3182 *1*			D	
3187.8? *3*	(0^+)		A	
3220.1? *5*			B	
3245 *4*			D	
3326.5 *4*	8^+		BC	
3386.9 *5*	9^-[†]		BC	J^{π}: γ to 8^- is $\Delta J=1$ M1,E2.
3571.0 *4*			B	
3640.0 *11*	11^-[†]		C	
3662.2 *7*	10^+[†]	480 ns *60*	C	$T_{1/2}$: from (HI,xnγ) (1984LaZU); others: >150 (1981Me09), >100 ns (1979BeZK).
3714.0 *4*			B	
3798.9 *4*			B	
3826.0 *8*	10^+[†]		C	
3974.7 *7*	10^-		C	
4072.2 *4*	(7^-)		B	J^{π}: γ to 5^-; log *ft*=6.3 via 8^- parent.
4210.7 *5*			B	
4294.1 *9*	11^-		C	
4309.3 *4*	(7^-)		B	J^{π}: γ to (6^+); log *ft*=6.3 via 8^- parent.
4371.9 *9*	11^-		C	
4541.6 *11*	11^+		C	
4547.0 *10*	13^-	2.6 ns *6*	C	$T_{1/2}$: from 1984LaZU (HI,xnγ); others: 2.5 ns (HI,4nγ) (1981Me09), ≈3 ns (α,4nγ) (1979BeZK).
4630.5 *4*			B	
4746.0 *10*	12^+		C	
4970.4 *10*	(11^+)		C	
5048.4 *10*	12		C	
5133.7 *11*	13		C	
5224.2 *11*	14		C	
5418.0 *15*	15		C	
5763.7 *18*	16		C	
5803.2 *18*	16		C	
6090.1 *21*			C	
x[#]	J1		E	Additional information 1. J^{π}: ≈(25) relative spin predicted according to the method given by 1993Ra07 and priv comm from I. Ragnarsson to G. Hackman (August 1993).
679.70+x[#] *20*	J1+2		E	
1419.10+x[#] *23*	J1+4		E	
2218.81+x[#] *25*	J1+6		E	
3078.8+x[#] *3*	J1+8		E	
3999.2+x[#] *3*	J1+10		E	
4979.8+x[#] *3*	J1+12		E	
6021.1+x[#] *4*	J1+14		E	
7122.9+x[#] *4*	J1+16		E	
8285.8+x[#] *4*	J1+18		E	
9510.2+x[#] *4*	J1+20		E	
10796.4+x[#] *4*	J1+22		E	
12144.6+x[#] *4*	J1+24		E	
13555.6+x[#] *4*	J1+26		E	

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Adopted Levels, Gammas (continued)

^{142}Sm Levels (continued)

E(level)	$J^{\pi\ddagger}$	XREF	Comments
15030.1+x# *5*	J1+28	E	
16568.4+x# *5*	J1+30	E	
18171.2+x# *5*	J1+32	E	
19838.8+x# *5*	J1+34	E	
21571.6+x# *5*	J1+36	E	
23369.9+x# *7*	J1+38	E	
y@	J2	E	Additional information 2.
726.2+y@ *3*	J2+2	E	
1512.6+y@ *4*	J2+4	E	
2357.0+y@ *5*	J2+6	E	
3258.3+y@ *5*	J2+8	E	
4216.2+y@ *5*	J2+10	E	
5228.8+y@ *6*	J2+12	E	
6302.5+y@ *6*	J2+14	E	
7431.5+y@ *6*	J2+16	E	
8617.6+y@ *7*	J2+18	E	
9861.1+y@ *7*	J2+20	E	
11163.0+y@ *8*	J2+22	E	
12523.4+y@ *8*	J2+24	E	
13942.0+y@ *9*	J2+26	E	
15419.8+y@ *10*	J2+28	E	
16955.2+y@ *11*	J2+30	E	
18544.8+y@ *12*	J2+32	E	
20180.1+y@ *13*	J2+34	E	

† Based on $\gamma(\theta)$, α and yield in (HI,xnγ); however, these data were not given by 1984La29, 1984LaZU, 1981Me09, 1974LuZS.

‡ ε transitions to levels seen in 2.34-s ^{142}Eu decay are allowed giving $J^{\pi}=0^{+},1^{+},2^{+}$. Levels decaying directly to g.s. are assigned by 1991Fi03 as 2^{+} as low-lying 1^{+} are not expected. Levels decaying to 2^{+} and not the g.s. are assigned by them to be 0^{+}.

Band(A): SD-1 band (1998Ha06,1995Ha29,1993Ha03). Proposed intruder configuration=$\pi 6^{1}\nu 7^{0}$. Q(intrinsic)=11.7 *1* (1998Ha06). The quoted uncertainty is statistical. Additional systematic uncertainty due to stopping powers=10-15%. Percent population=0.5 *1* (1993Ha03).

@ Band(B): SD-2 band (1998Ha06,1993Ha03). Proposed intruder configuration=$\pi 6^{2}\nu 7^{1}$. Q(intrinsic)=13.2 *+8−7* (1998Ha06). The quoted uncertainty is statistical. Additional systematic uncertainty due to stopping powers=10-15%. Percent population=0.09 *2* (1995Ha29) of ^{142}Sm channel or 17% *3* of the SD-1 population.

$\gamma(^{142}Sm)$

E_i(level)	J^π_i	E_γ	I_γ[‡]	E_f	J^π_f	Mult.[@]	α[†]	$I_{(\gamma+ce)}$	Comments
768.08	2^+	768.0 *2*	100	0.0	0^+	E2	0.00444 *7*		α(K)=0.00373 *6*; α(L)=0.000557 *8*; α(M)=0.0001202 *17*; α(N+..)=3.13×10^{-5} *5* α(N)=2.71×10^{-5} *4*; α(O)=3.97×10^{-6} *6*; α(P)=2.20×10^{-7} *3*
1450.6	(0^+)	682.2 *7*	100	768.08	2^+				
		(1451.1)		0.0	0^+	(E0)			Mult.: from ^{142}Eu (2.34 s) ε decay.
1657.79	$(2)^+$	889.6 *3*	100 *9*	768.08	2^+				
		1658.1 *5*	98 *23*	0.0	0^+				
1784.2	3^-	1016.1 *2*	100	768.08	2^+	(E1)	0.001001 *14*		α(K)=0.000861 *12*; α(L)=0.0001106 *16*; α(M)=2.35×10^{-5} *4*; α(N+..)=6.16×10^{-6} α(N)=5.31×10^{-6} *8*; α(O)=7.96×10^{-7} *12*; α(P)=4.99×10^{-8} *7*
1791.4	4^+	1023.3 *2*	100	768.08	2^+	E2	0.00237 *4*		α(K)=0.00201 *3*; α(L)=0.000282 *4*; α(M)=6.06×10^{-5} *9*; α(N+..)=1.583×10^{-5} *23* α(N)=1.368×10^{-5} *20*; α(O)=2.03×10^{-6} *3*; α(P)=1.195×10^{-7} *17*
2055.5	2^+	1287.4 *3*	100 *9*	768.08	2^+				
		2055.5 *10*	37 *5*	0.0	0^+				
2173.3	0^+	1405.2 *4*	100	768.08	2^+				
2347.9	5^-	556.6 *2*	100 *3*	1791.4	4^+	E1	0.00340 *5*		α(K)=0.00291 *4*; α(L)=0.000383 *6*; α(M)=8.17×10^{-5} *12*; α(N+..)=2.13×10^{-5} *3* α(N)=1.84×10^{-5} *3*; α(O)=2.74×10^{-6} *4*; α(P)=1.658×10^{-7} *24*
		563.7 *2*	9.6 *5*	1784.2	3^-	E2,(M1)	0.013 *4*		α(K)=0.011 *3*; α(L)=0.0016 *3*; α(M)=0.00034 *6*; α(N+..)=8.8×10^{-5} *16* α(N)=7.6×10^{-5} *14*; α(O)=1.12×10^{-5} *23*; α(P)=6.5×10^{-7} *20*
2353.7?	(2^+)	2353.7 *3*	100	0.0	0^+				
2372.1	7^-	24.1 *3*		2347.9	5^-	E2	1.11×10^3 *8*	95.0	B(E2)(W.u.)=8.2 *6* ce(L)/(γ+ce)=0.78 *4*; ce(M)/(γ+ce)=0.179 *16*; ce(N+)/(γ+ce)=0.044 *4* ce(N)/(γ+ce)=0.039 *4*; ce(O)/(γ+ce)=0.0047 *5*; ce(P)/(γ+ce)=1.06×10^{-6} *10*
		580.7[&] *4*		1791.4	4^+			≈0.5	
2373.9?	(2^+)	2373.9 *3*	7.5 *9*	0.0	0^+				
2416.0	(4)	631.8		1784.2	3^-				
2420.1	6^+	628.7 *2*	100	1791.4	4^+				
2439.4?	(0^+)	1671.3	12.6	768.08	2^+				
2522.19	(0^+)	864.4 *2*	5.8 *12*	1657.79	$(2)^+$				
		1754.1 *1*	100 *8*	768.08	2^+				
2912.1	7^-	491.8		2420.1	6^+				
		540.0 *2*	100	2372.1	7^-	M1	0.01773		α(K)=0.01512 *22*; α(L)=0.00205 *3*; α(M)=0.000439 *7*; α(N+..)=0.0001156 *17*

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Adopted Levels, Gammas (continued)

$\gamma(^{142}\mathrm{Sm})$ (continued)

E_i(level)	J_i^π	E_γ	I_γ‡	E_f	J_f^π	Mult.@	α†	Comments
								α(N)=9.96×10^{-5} *14*; α(O)=1.499×10^{-5} *21*; α(P)=9.46×10^{-7} *14*
3003.1	(6^+)	1211.7	100	1791.4	4^+			
3031.8?	(0^+)	2263.7 *4*	100	768.08	2^+			
3113.2	8^-	200.9 *5*	65 *12*	2912.1	7^-	E2,M1	0.222 *17*	α(K)=0.18 *3*; α(L)=0.037 *9*; α(M)=0.0081 *21*; α(N+..)=0.0021 *5* α(N)=0.0018 *5*; α(O)=0.00025 *5*; α(P)=1.0×10^{-5} *3*
		741.2 *2*	100 *12*	2372.1	7^-			
3187.8?	(0^+)	2419.7 *2*	100	768.08	2^+			
3220.1?		848.0 *3*	100	2372.1	7^-			
3326.5	8^+	906.4 *3*	86 *21*	2420.1	6^+			
		954.3 *2*	100 *14*	2372.1	7^-			
3386.9	9^-	273.8 *5*	100 *17*	3113.2	8^-	E2,M1	0.089 *15*	α(K)=0.073 *16*; α(L)=0.0129 *8*; α(M)=0.00282 *22*; α(N+..)=0.00073 *5* α(N)=0.00063 *5*; α(O)=9.05×10^{-5} *21*; α(P)=4.3×10^{-6} *13*
		474.4 *5*	63 *8*	2912.1	7^-			
3571.0		1151.0 *3*	90 *18*	2420.1	6^+			
		1198.8 *3*	100 *26*	2372.1	7^-			
3640.0	11^-	253.1	100	3386.9	9^-			
3662.2	10^+	275.1		3386.9	9^-	[E1]	0.0183	B(E1)(W.u.)=7.0×10^{-9} *10* α(K)=0.01564 *22*; α(L)=0.00213 *3*; α(M)=0.000455 *7*; α(N+..)=0.0001182 *17* α(N)=0.0001024 *15*; α(O)=1.500×10^{-5} *21*; α(P)=8.54×10^{-7} *12*
		336.0		3326.5	8^+	[E2]	0.0397	B(E2)(W.u.)=1.3×10^{-3} *2* α(K)=0.0314 *5*; α(L)=0.00651 *10*; α(M)=0.001444 *21*; α(N+..)=0.000369 *6* α(N)=0.000322 *5*; α(O)=4.47×10^{-5} *7*; α(P)=1.720×10^{-6} *24*
		1290.3		2372.1	7^-	[E3]	0.00294 *5*	B(E3)(W.u.)=0.18 *2* α(K)=0.00246 *4*; α(L)=0.000371 *6*; α(M)=8.02×10^{-5} *12*; α(N+..)=2.68×10^{-5} *4* α(N)=1.81×10^{-5} *3*; α(O)=2.67×10^{-6} *4*; α(P)=1.522×10^{-7} *22*; α(IPF)=5.84×10^{-6} *9*
3714.0		1341.9 *2*	100	2372.1	7^-			
3798.9		886.7 *2*	88 *9*	2912.1	7^-			
		1426.8 *3*	100 *19*	2372.1	7^-			
3826.0	10^+	163.9		3662.2	10^+			
		438.9	100	3386.9	9^-			
3974.7	10^-	587.7		3386.9	9^-			
		861.6		3113.2	8^-			
4072.2	(7^-)	1652.1 *3*	35 *7*	2420.1	6^+			
		1700.1 *3*	100 *8*	2372.1	7^-			
		1724.5 *4*	14 *5*	2347.9	5^-			
4210.7		1838.6 *3*	100 *11*	2372.1	7^-			
4294.1	11^-	319.4		3974.7	10^-			
		907.2		3386.9	9^-			
4309.3	(7^-)	982.0 *5*	47 *10*	3326.5	8^+			
		1889.0 *4*	29 *6*	2420.1	6^+			
		1937.6 *3*	100 *12*	2372.1	7^-			

From ENSDF

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$\gamma(^{142}Sm)$ (continued)

E_i(level)	J^π_i	E_γ	I_γ[‡]	E_f	J^π_f
4371.9	11^-	397.1		3974.7	10^-
		985		3386.9	9^-
4541.6	11^+	715.6		3826.0	10^+
4547.0	13^-	175.1		4371.9	11^-
		252.9		4294.1	11^-
4630.5		2258.4 *2*	100 *9*	2372.1	7^-
4746.0	12^+	920.0	100	3826.0	10^+
4970.4	(11^+)	1308.4		3662.2	10^+
5048.4	12	78.1		4970.4	(11^+)
		302.5		4746.0	12^+
		506.7		4541.6	11^+
5133.7	13	85.5		5048.4	12
		387.7		4746.0	12^+
5224.2	14	90.5		5133.7	13
		677.1		4547.0	13^-
5418.0	15	193.8	100	5224.2	14
5763.7	16	345.7	100	5418.0	15
5803.2	16	385.2		5418.0	15
6090.1		286.9		5803.2	16
679.70+x	J1+2	679.7 *2*	0.30[#] *17*	x	J1
1419.10+x	J1+4	739.4 *1*	0.84[#] *19*	679.70+x	J1+2
2218.81+x	J1+6	799.7 *1*	0.85[#] *5*	1419.10+x	J1+4
3078.8+x	J1+8	860.0 *1*	1.09[#] *6*	2218.81+x	J1+6
3999.2+x	J1+10	920.4 *1*	1.02[#] *9*	3078.8+x	J1+8
4979.8+x	J1+12	980.6 *1*	0.95[#] *5*	3999.2+x	J1+10
6021.1+x	J1+14	1041.3 *1*	1.11[#] *6*	4979.8+x	J1+12
7122.9+x	J1+16	1101.8 *1*	0.93[#] *5*	6021.1+x	J1+14
8285.8+x	J1+18	1162.9 *1*	0.94[#] *5*	7122.9+x	J1+16
9510.2+x	J1+20	1224.4 *1*	1.06[#] *6*	8285.8+x	J1+18
10796.4+x	J1+22	1286.2 *1*	0.82[#] *5*	9510.2+x	J1+20
12144.6+x	J1+24	1348.2 *1*	0.66[#] *4*	10796.4+x	J1+22
13555.6+x	J1+26	1410.9 *1*	0.58[#] *4*	12144.6+x	J1+24
15030.1+x	J1+28	1474.5 *1*	0.52[#] *4*	13555.6+x	J1+26
16568.4+x	J1+30	1538.3 *1*	0.31[#] *3*	15030.1+x	J1+28
18171.2+x	J1+32	1602.8 *1*	0.21[#] *3*	16568.4+x	J1+30
19838.8+x	J1+34	1667.6 *1*	0.12[#] *2*	18171.2+x	J1+32
21571.6+x	J1+36	1732.8 *2*	0.06[#] *2*	19838.8+x	J1+34

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Adopted Levels, Gammas (continued)

$\gamma(^{142}Sm)$ (continued)

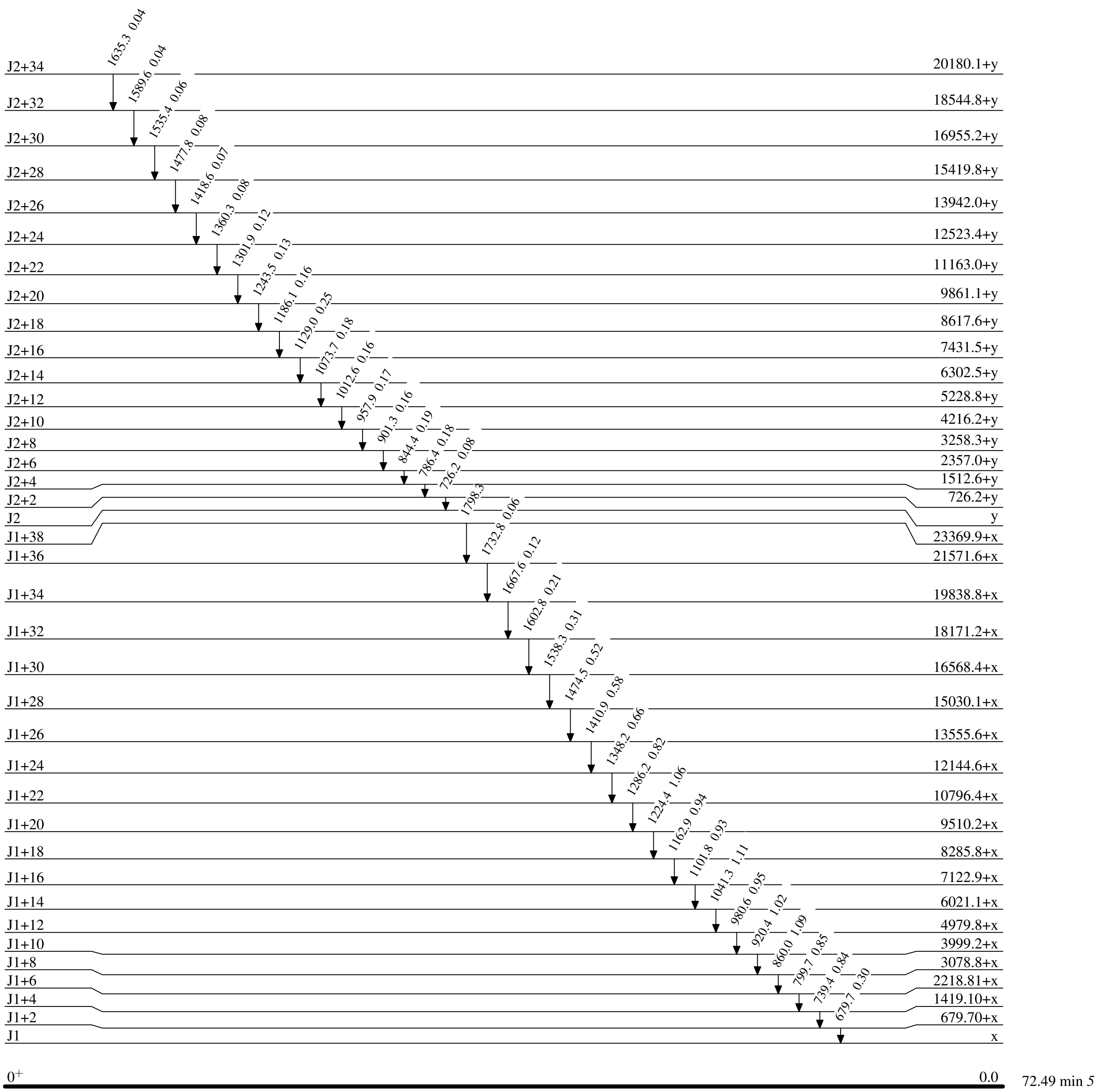
E_i(level)	J_i^π	E_γ	I_γ ‡	E_f	J_f^π	Comments
23369.9+x	J1+38	1798.3 *4*		21571.6+x	J1+36	E_γ: no evidence for 1782.9γ as reported in 1993Ha03.
726.2+y	J2+2	726.2 *3*	0.08# *3*	y	J2	
1512.6+y	J2+4	786.4 *2*	0.18# *3*	726.2+y	J2+2	
2357.0+y	J2+6	844.4 *2*	0.19# *3*	1512.6+y	J2+4	
3258.3+y	J2+8	901.3 *2*	0.16# *3*	2357.0+y	J2+6	
4216.2+y	J2+10	957.9 *2*	0.17# *3*	3258.3+y	J2+8	
5228.8+y	J2+12	1012.6 *2*	0.16# *3*	4216.2+y	J2+10	
6302.5+y	J2+14	1073.7 *2*	0.18# *3*	5228.8+y	J2+12	
7431.5+y	J2+16	1129.0 *2*	0.25# *6*	6302.5+y	J2+14	
8617.6+y	J2+18	1186.1 *2*	0.16# *3*	7431.5+y	J2+16	
9861.1+y	J2+20	1243.5 *2*	0.13# *3*	8617.6+y	J2+18	
11163.0+y	J2+22	1301.9 *3*	0.12# *3*	9861.1+y	J2+20	
12523.4+y	J2+24	1360.3 *3*	0.08# *3*	11163.0+y	J2+22	
13942.0+y	J2+26	1418.6 *3*	0.07# *5*	12523.4+y	J2+24	
15419.8+y	J2+28	1477.8 *4*	0.08# *2*	13942.0+y	J2+26	
16955.2+y	J2+30	1535.4 *4*	0.06# *2*	15419.8+y	J2+28	
18544.8+y	J2+32	1589.6 *6*	0.04# *2*	16955.2+y	J2+30	
20180.1+y	J2+34	1635.3 *5*	0.04# *2*	18544.8+y	J2+32	

† Additional information 3.
‡ Relative branching ratios, unless otherwise stated.
# Relative intensities within the two SD bands.
@ From ce in ^{142}Eu (1.223 min) ε decay, unless given otherwise.
& Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level

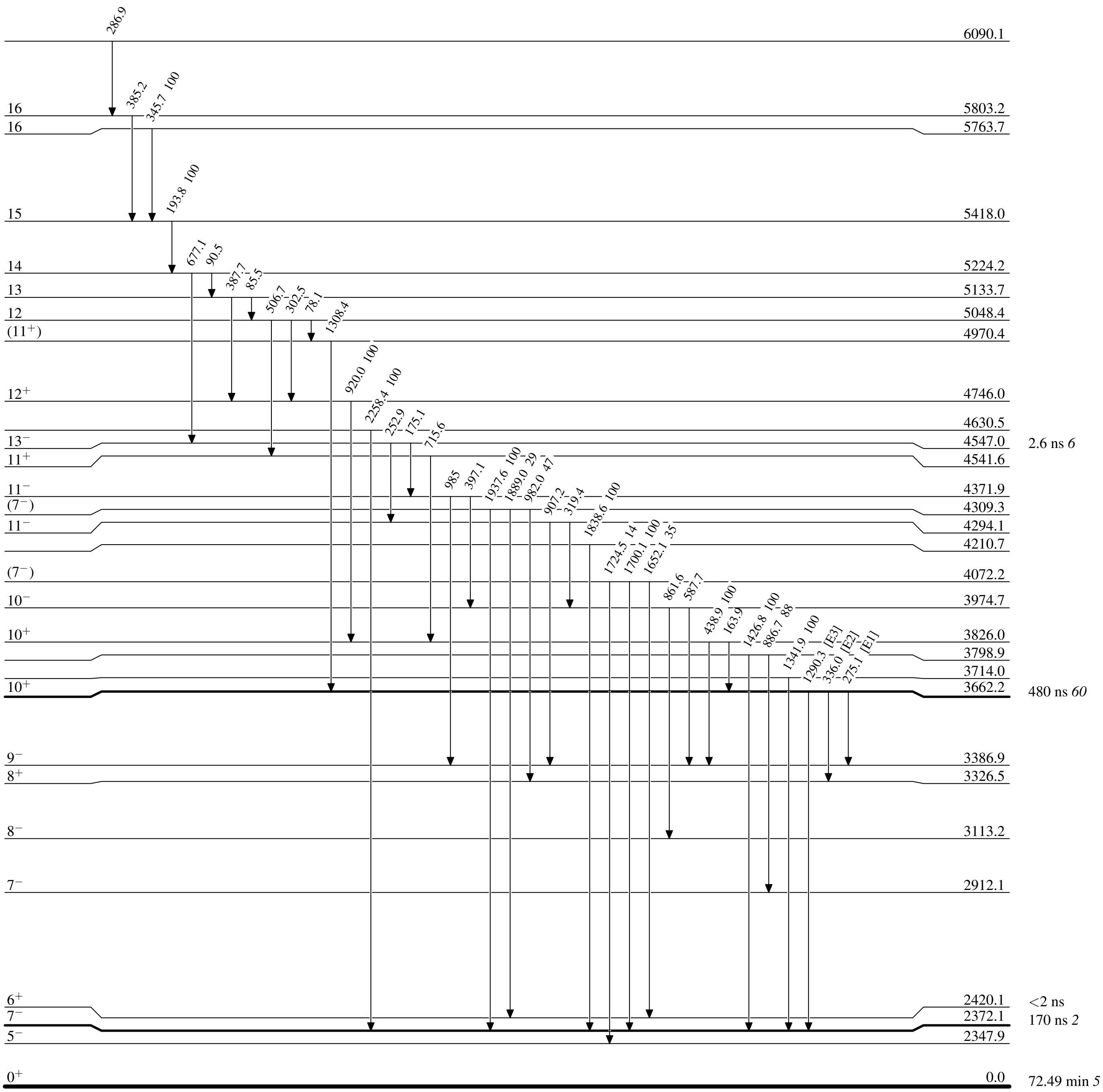


$^{142}_{62}Sm_{80}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

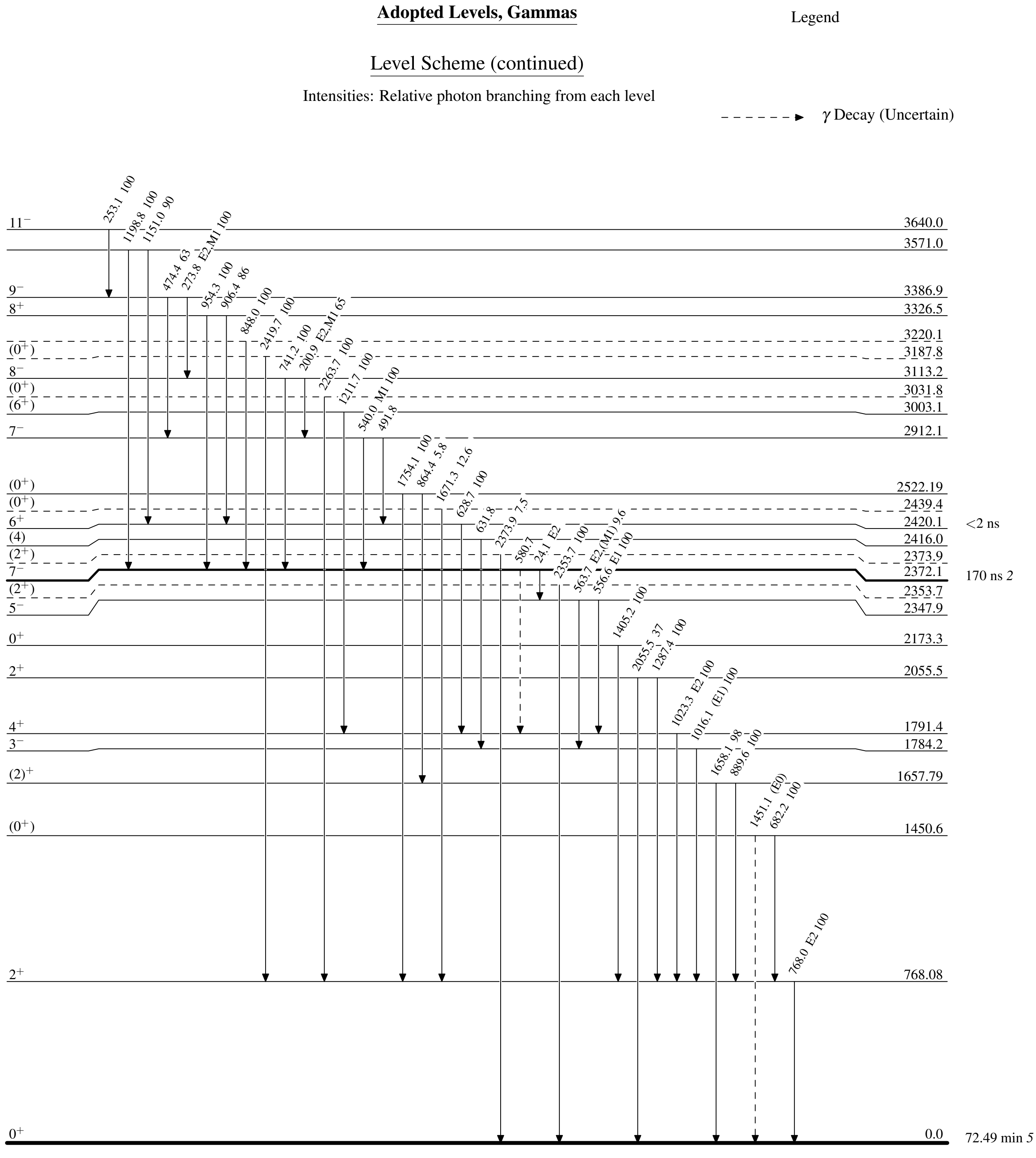


$^{142}_{62}Sm_{80}$

Adopted Levels, Gammas

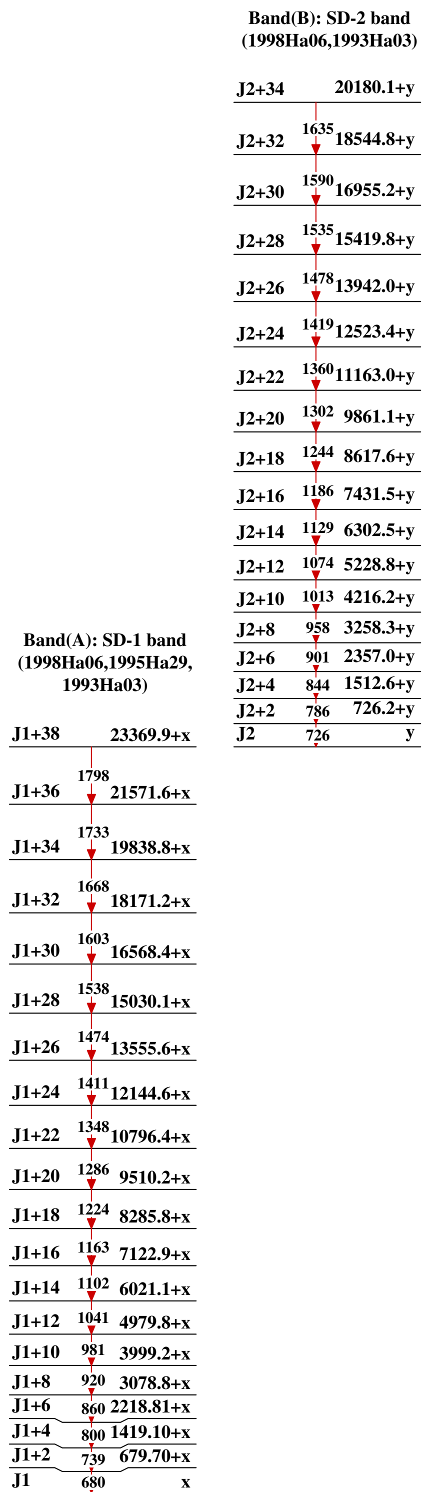
Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{142}_{62}Sm_{80}$

Adopted Levels, Gammas



$^{142}_{62}Sm_{80}$

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	A. A. Sonzogni	NDS 93,599 (2001)	1-Dec-2000

Q(β^-)=−6346 *11*; S(n)=10520.1 *24*; S(p)=6294 *3*; Q(α)=−1.4×10^2 *3* 2012Wa38

Note: Current evaluation has used the following Q record −6315 17 *10520*.024 *6295* 3 *76* 19 1995Au04.

Theory and calculations: The following is a partial list of references, for complete list see recent references (published every four months in Nuclear Data Sheets) or NSR WWW database: 1997Ho05, 1996La03, 1995Pi12, 1994Lo09, 1991Ga17, 1988Wi19, 1987Ar05, 1987Du04, 1987Ic01, 1987Sa03, 1987Va10, 1986An10, 1986Fr08, 1986Ma32, 1986Si05, 1985Ar16, 1985Vo15, 1985Ze01, 1984Ab01, 1984Do01, 1984Fr14, 1984Ja11.

Giant resonance studies: 1999Yo01, 1992Zi02, 1989Bo13, 1987Va10, 1986Ad02, 1986Di13, 1986MaZO, 1986Si05, 1984Bu43.

Isotope shift, Δ<r^2>: 1999GaZX, 1997Ko33, 1995Be19, 1994Ji08, 1993Ba55, 1992Le09, 1990En01, 1990Wa25, 1988Ga17.

^{144}Sm Levels

Cross Reference (XREF) Flags

A	^{144}Eu ε decay	E	^{146}Sm(p,t)	I	(HI,xnγ)
B	^{144}Sm(γ,γ')	F	Coulomb excitation	J	^{144}Sm(p,p'γ)
C	^{144}Sm(n,n'γ)	G	^{142}Nd(α,2nγ),^{144}Nd(α,4nγ)	K	^{142}Nd(α,2nγ)
D	^{144}Sm(p,p')	H	^{142}Nd(^{16}O,^{14}C)		

E(level)[†]	J$^\pi$	T$_{1/2}$[‡]	XREF	Comments
0.0	0$^+$	stable	ABCDEFGHI	
1660.027 *10*	2$^+$	84.4 fs *25*	ABCDEFGHIJK	μ=+1.52 *22* (1991Ba38) T$_{1/2}$: from adopted B(E2)=0.266 *8* (1987Ra01). Others: 0.38 ps *+21−10* (1993Ga16), 89 fs *21* ^{144}Sm(γ,γ'). J$^\pi$: E2 γ to 0$^+$ g.s.
1810.172 *25*	3$^-$	25 ps *4*	CDEFGHIJK	T$_{1/2}$: from 1996Wi07. Other: >0.62 ps (1993Ga16). J$^\pi$: E1 γ to 2$^+$.
2120? *7*			B	
2167? *7*			B	
2190.891 *25*	4$^+$	>0.14 ps	CDE GHI K	J$^\pi$: E1 γ to 3$^-$ and E2 γ to 2$^+$.
2323.60 *8*	6$^+$	880 ns *25*	CDE G I K	T$_{1/2}$: from 1972Ko42. Other: 890 ns *60* (1973BaXQ). J$^\pi$: E2 γ to 4$^+$.
2423.208 *24*	2$^+$	37 fs *+5−4*	ABCDE K	J$^\pi$: E2 γ to 0$^+$ g.s. T$_{1/2}$: from 1993Ga16. Other: 29 fs *4* in (γ,γ').
2477.651 *23*	0$^+$	>1.2 ps	ABCDE G	J$^\pi$: from $\sigma(\theta)$ in (p,p').
2587.78 *3*	4$^+$	>0.12 ps	CD G	J$^\pi$: from $\sigma(\theta)$ in (p,p').
2644.695 *14*	1$^{(+)}$	0.19 ps *+6−4*	CD K	
2660.691 *14*	2$^{(+)}$	0.5 ps *+5−2*	CD K	
2688.394 *14*	3$^{(+)}$	0.5 ps *+9−2*	CD K	
2707.04 *11*	(5$^+$)	>36 fs	CD G	
2729			E	
2799.65 *3*	2$^+$	69 fs *14*	BCDE K	J$^\pi$: E2 γ to 0$^+$ g.s. T$_{1/2}$: from 1993Ga16. Other: 96 fs *19* in (γ,γ').
2804	(2)		E	
2822.52 *4*	0$^+$	>0.76 ps	CD	J$^\pi$: E2 γ to 2$^+$ and $\sigma(\theta)$ in (p,p').
2825.71 *3*	(5$^-$)	>0.51 ps	CDE GH K	
2827	0		EF H	
2883.008 *21*	(4$^+$)	0.4 ps *+8−2*	BCDE G	
2976? *9*			B	
3019.316 *21*	4$^+$	0.4 ps *+5−1*	CDE K	J$^\pi$: M3+E2 γ to 2$^+$ and from $\sigma(\theta)$ in (p,p').
3079.34 *15*	(5,6$^+$,7)	>7 ps	CD K	
3118.63 *4*	(3,4$^-$)	0.24 ps *+17−8*	CD G	

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Adopted Levels, Gammas (continued)

^{144}Sm Levels (continued)

E(level)[†]	J^π	$T_{1/2}$[‡]	XREF	Comments
3124.07 *7*	7^-	>55 fs	CD G I K	J^π: E1 γ to 6^+.
3134.17 *5*	0^+	0.14 ps *+16−6*	CD	J^π: E2 γ to 2^+ and $\sigma(\theta)$ in (p,p′).
3142			E	
3195.77 *4*	$(3,4^+,5^-)$	0.06 ps *+3−2*	CD K	
3205			E	
3225.54 *22*	1^-	2.0 fs *7*	BCD J	$T_{1/2}$: weighted average of 7.6 fs *21* (1993Ga16) and 1.94 fs *26* (1996Wi07). J^π: E1 γ to 0^+ g.s.
3240			H	
3266.19 *8*	$(4^+,6)$	>15 fs	CD K	
3307.90 *4*	$(2^+,3)$	40 fs *+10−8*	C	
3307.97 *4*	$(2,3^-,4^-)$	0.08 ps *+4−2*	CD K	
3308.27 *10*	(6^+)	>38 fs	CD	
3318	(2^+)		E	
3343.57 *5*	(3,4,5,6)	>190 fs	CD	
3360.67 *4*	3^-	0.26 ps *+20−8*	CD G	J^π: M2+E1 γ to 2^+.
3376.8 *7*	8^-	1.54 ns *17*	DE G I K	$T_{1/2}$: weighted average of 1.6 ns *2* (1986Ko25) and 1.4 ns *3* (1979PeZS). J^π: M1 γ to 7^-.
3391.05 *3*	(2^-)	32 fs *+6−5*	CD	
3404.60 *4*	$(2^+,3^-)$	0.16 ps *+12−6*	CD K	
3413.827 *21*	2^+	53 fs *+9−7*	CD	J^π: E2 γ to 0^+ g.s.
3426	(2^+)		E	
3444	(7^-)		D K	
3460.8 *7*	9^-	0.5 ns *2*	D G I K	$T_{1/2}$: from 1986Ko25. J^π: E2 γ to 7^-.
3469	(5^-)		D K	
3481			E	
3493.96 *4*	(4^+)	0.01 ps *+3−2*	CD G	
3519.5 *8*	(8^-)		G I	
3523.56 *4*	$(2^+,4)$	62 fs *+12−10*	CD K	
3529.48 *4*	(3^-)	30 fs *+8−6*	CD	
3535	(6^-)		K	
3544			B E	
3559.63 *5*	2^+	27 fs *+6−5*	CD	J^π: E2 γ to 0^+ g.s.
3564.19 *5*	(3^-)	32 fs *+12−9*	CD	
3579 *5*			E	
3596.78 *8*	(4^-)	0.10 ps *+10−3*	CD K	
3626.65 *5*	(2,3,4,5)	44 fs *+23−14*	CD	
3647.07 *5*	(4^+)	0.12 ps *+9−4*	CD	
3661			E	
3668.68 *3*	5^-	25 fs *+26−13*	CD K	
3688.59 *5*	$(3^+,4^+)$	21 fs *+4−3*	CDE	
3698	$7^{(-)}$		K	
3708 *5*			E	
3714.38 *6*	$(1^+,2^+,3)$	12 fs *+5−3*	CD	
3722.70 *5*	$(2^+,3^+,4^+)$	5.5 fs *+23−21*	CD	
3724	(8^-)		K	
3731.93 *5*	$(2^+,3^+,4^+)$	15 fs *3*	BCD	
3740.10 *5*	(1,2,3,4)	0.10 ps *+5−3*	CDE	
3778.46 *9*	(3^-)	13 fs *+8−6*	CD	
3786.30 *18*	(2,4)	0.2 ps *+5−1*	CD	
3817.93 *15*	$1^{(-)}$	10 fs *+7−6*	BCD	
3823.39 *6*	$(0^+,1,2,3)$	24 fs *+8−6*	CD	
3846.20 *11*	(4^-)		CD	
3855.97 *10*	$(2^-,3^-,4^-)$	32 fs *+20−12*	CD	

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Adopted Levels, Gammas (continued)

^{144}Sm Levels (continued)

E(level)[†]	J^π	$T_{1/2}$[‡]	XREF	Comments
3867.89 *11*	5^-	0.08 ps *+11−3*	CD	J^π: M2+E1 γ to 4^+.
3877.90 *6*	$(1^+,2^+,3)$	40 fs *+16−11*	CD	
3884.86 *20*	$(1,2^+)$	8 fs *+11−7*	CD	
3886.77 *8*	$5^{(+)}$	28 fs *+21−12*	CD	
3890.52 *17*	(1^-)	<5.9 fs	BCD	
3906.987 *20*	$1^{(+)}$	19 fs *+14−9*	BCD	
3913.98 *8*	(3,4)	23 fs *+16−10*	CD	
3939.88 *12*	(5^-)	0.04 ps *+6−2*	CD	
3949.40 *6*	(3,4,5)	34 fs *+12−8*	CD	
3965.67 *19*	$1^{(+)}$	<5 fs	BCD	
3983	(3^-)		D	
3985.96 *21*	2^+	33 fs *+25−14*	CD	J^π: E2 γ to 0^+ g.s.
3986.00 *6*	(3^+)	21 fs *+8−6*	C	
4072.08 *14*	(2,3,4)	0.03 ps *+4−2*	C	
4082.84 *19*		0.03 ps *+5−2*	CD	
4124.1 *3*	$1^{(-)}$	11 fs *+18−10*	C	
4157.37 *18*		<24 fs	CD	
4210			H	
4262.1 *20*	1		B	
4410.8 *10*			I	
4427.7 *10*			I	
4674.8 *14*			I	
4700.8 *8*	(10^-)		G I	
4758.7 *9*	(10^-)		G I	
4907.8 *10*	(11^-)		G I	
4960.8 *9*	(11^-)		G I	
5015 *5*	(1)		B	
5015.8 *13*			I	
5077.6 *13*	(12^-)			
5103.1 *10*	1,2		B	
5150.8 *9*	(12^-)	<0.3 ns	G I	$T_{1/2}$: from 1986Ko25.
5151 *3*	(1)		B	
5340			H	
5350.8 *10*	(12^-)		I	
5360.8 *10*	(13^-)		G I	
5520.8 *9*	(13^-)		G I	
5720.7 *10*	(14^-)		G I	
5769.8 *14*			I	
5855.8 *14*	(13^+)		I	
6004.8 *14*	(14^+)		I	
6061.8 *17*	(14^+)		I	
6126.7 *11*	(14^+)		G I	
6301.2 *11*	(14^+)		G I	
6315.8 *17*			I	
6411.9 *11*	(15^+)		G I	
6431.6 *12*	(14^+)		I	
6651.4 *11*	(15^+)		G I	
6771.7 *12*			I	
6792.3 *11*			I	
6824.2 *11*	(16^+)		G I	
7000.7 *14*			I	
7160.7 *18*			I	
7237.7 *12*			I	
7397.7 *15*			I	
7524.7 *13*			I	
7572.8 *12*			I	

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Adopted Levels, Gammas (continued)

^{144}Sm Levels (continued)

E(level)†	J^π	$T_{1/2}$‡	XREF	Comments
7604.7 *20*			I	
7650			H	
7660.5 *11*			I	
7690.9 *11*			I	
7870.7 *16*			I	
7910.5 *12*			I	
7938.4 *14*			I	
7950.1 *13*			I	
8084.5 *14*			I	
8282.4 *14*			I	
8325.7 *19*	(18)		I	
8426.1 *16*			I	
8626.8 *15*			I	
8997.9 *14*	1		B	J^π: D γ to 0^+ g.s.
9000			H	
9232.8 *16*		2.6 ns *5*	I	$T_{1/2}$: from 1998Je05. Possible configuration relative to ^{146}Gd: [π ($h^2_{11/2}$ $(d^{-4}_{5/2})_0$), $\nu(f_{7/2}i_{13/2}(d^{-2}_{3/2})_0)$ $]_{20-}$ (1998Je05).
9312.1 *16*			I	
9419.9 *17*			I	
9441.8 *18*			I	
9589.9 *18*			I	
9985.8 *20*			I	
10036.0 *17*			I	
10583.8 *18*			I	
10698.0 *18*			I	
10935.4 *19*			I	
11000			H	
11719.4 *21*			I	
11768.4 *21*			I	
11903.4 *24*			I	
12284.4 *24*			I	
12739 *3*			I	

† From least-squares fit to Eγ if γ information is available.
‡ From 1993Ga16, unless indicated otherwise.

Adopted Levels, Gammas (continued)

$\gamma(^{144}Sm)$

E_i(level)	J^π_i	E_γ	I_γ	E_f	J^π_f	Mult.	δ†	α‡	Comments
1660.027	2^+	1660.01 *1*	100	0.0	0^+	E2			B(E2)(W.u.)=11.9 *4* E_γ: weighted average of 1993Ga16 and 1976Ke01 values.
1810.172	3^-	150.21 *10*	100.0 *2*	1660.027	2^+	E1		0.092	B(E1)(W.u.)=0.0025 *4* α(K)=0.0777 *24*; α(L)=0.0110 *4*; α(M)=0.00233 *7*; α(N+..)=0.00065 *2* E_γ,I_γ: weighted average of 1993Ga16 and 1996Wi07 values.
		1810.3 *3*	7.0 *6*	0.0	0^+				E_γ,I_γ: weighted average of 1993Ga16 and 1996Wi07 values.
2190.891	4^+	380.66 *7*	100.0 *13*	1810.172	3^-	E1		0.00818	B(E1)(W.u.)<0.020 α(K)=0.00699 *21*; α(L)=0.00094 *3*; α(M)=0.00020 *1* E_γ,I_γ: from 1993Ga16.
		530.76 *5*	58.7 *7*	1660.027	2^+	E2		0.0111	B(E2)(W.u.)<7.9×10^2 α(K)=0.0090 *3*; α(L)=0.00152 *5* E_γ,I_γ: from 1993Ga16.
2323.60	6^+	132.6 *1*	100.0	2190.891	4^+	E2		0.86	B(E2)(W.u.)=0.188 *6* α(K)=0.531 *16*; α(L)=0.257 *8*; α(M)=0.0587 *18*; α(N+..)=0.0161 *5* E_γ: from 1993Ga16.
2423.208	2^+	763.11 *4*	5.1 *3*	1660.027	2^+	E2+M1		0.0061 *16*	α(K)=0.0052 *14*; α(L)=0.00072 *16*
		2423.24 *3*	100.0 *3*	0.0	0^+	E2			B(E2)(W.u.)=3.9 *6*
2477.651	0^+	817.62 *2*	100	1660.027	2^+				
		2477.8 *20*	0	0.0	0^+	(E0)			
2587.78	4^+	396.91 *7*	100.0 *9*	2190.891	4^+				
		777.59 *2*	22.6 *5*	1810.172	3^-				
2644.695	$1^{(+)}$	984.66 *1*	100.0 *14*	1660.027	2^+	E2+M1		0.0034 *8*	α(K)=0.0029 *7*; α(L)=0.00039 *9*
		2644.78 *6*	20.6 *8*	0.0	0^+	M1			B(M1)(W.u.)=0.0011 *4*
2660.691	$2^{(+)}$	237.62 *11*	6.5 *4*	2423.208	2^+	E2+M1	−0.1 *+4−3*	0.153 *7*	B(M1)(W.u.)=0.19 *19*; B(E2)(W.u.)=2.E+1 *+16−2* α(K)=0.130 *6*; α(L)=0.0182 *10*; α(M)=0.0039 *3*; α(N+..)=0.00109 *5*
		850.41 *7*	5.0 *6*	1810.172	3^-	M2+E1		0.008 *7*	α(K)=0.007 *6*; α(L)=0.0010 *9*
		1000.66 *1*	100.0 *9*	1660.027	2^+	E2+M1		0.0033 *8*	α(K)=0.0028 *7*; α(L)=0.00038 *8*
2688.394	$3^{(+)}$	497.56 *5*	100 *5*	2190.891	4^+	E2+M1	+0.09 *+7−6*	0.0221 *2*	B(M1)(W.u.)=0.2 *+4−2*; B(E2)(W.u.)=4 *+9−4* α(K)=0.0188 *1*; α(L)=0.00257 *1*; α(M)=0.00055; α(N+..)=0.00015
		1028.36 *1*	75 *1*	1660.027	2^+	E2+M1		0.0031 *7*	α(K)=0.0026 *6*; α(L)=0.00035 *8*
2707.04	(5^+)	383.44 *7*	100	2323.60	6^+				
2799.65	2^+	2799.62 *3*	100	0.0	0^+	E2			B(E2)(W.u.)=1.06 *22* E_γ: from 1993Ga16.
2822.52	0^+	1162.49 *3*	100	1660.027	2^+			0.00183	α(K)=0.00155 *5*; α(L)=0.00021 *1*
2825.71	(5^-)	1015.53 *1*	100	1810.172	3^-				E_γ: from 1993Ga16. Other: 1014.4 (1979PeZS).
2883.008	(4^+)	1072.85 *5*	66 *2*	1810.172	3^-	M2+E1	−0.07 *+7−9*	0.00095 *11*	B(E1)(W.u.)=0.0002 *+4−2*; B(M2)(W.u.)=4 *+11−4* α(K)=0.00081 *13*; α(L)=0.00010 *1*
		1222.97 *2*	100 *2*	1660.027	2^+	M3+E2	−0.12 *+12−14*	0.0018 *4*	α(K)=0.0015 *4*; α(L)=0.00021 *5*

$^{144}_{62}Sm_{82}$-5

$\gamma(^{144}Sm)$ (continued)

E_i(level)	J^π_i	E_γ	I_γ	E_f	J^π_f	Mult.	δ†	α‡	Comments
									B(E2)(W.u.)=7 +14−7; B(M3)(W.u.)=5.E+5 +13−5 Additional information 1.
3019.316	4^+	828.31 4	14.3 6	2190.891	4^+	E2+M1		0.0050 13	α(K)=0.0043 11; α(L)=0.00059 13
		1209.10 6	12.3 6	1810.172	3^-	M2+E1	+0.05 11	0.00075 12	B(E1)(W.u.)=3.E−5 +5−3; B(M2)(W.u.)=0.3 +18−3 α(K)=0.00064 11
		1359.31 2	100 3	1660.027	2^+	M3+E2	−0.09 +15−17	0.0014 4	α(K)=0.0012 4; α(L)=0.00016 4 B(E2)(W.u.)=5 +7−5; B(M3)(W.u.)=2.E+5 +6−2 Additional information 2.
3079.34	$(5,6^+,7)$	372.3 1	100	2707.04	(5^+)				
3118.63	$(3,4^-)$	1308.44 2	100	1810.172	3^-				
3124.07	7^-	800.42 7	100	2323.60	6^+	E1		0.00159	B(E1)(W.u.)<0.0087 α(K)=0.00136 4; α(L)=0.00018 1 E_γ: from 1993Ga16.
3134.17	0^+	1474.13 4	100	1660.027	2^+	E2		0.00115	B(E2)(W.u.)=13 +15−13 α(K)=0.00097 3; α(L)=0.00013
3195.77	$(3,4^+,5^-)$	1004.87 3	100	2190.891	4^+				
3225.54	1^-	1414.9 5	1.5 3	1810.172	3^-				Branching and Eγ from 1996Wi07.
		1565.8 4	1.9 3	1660.027	2^+				Branching and Eγ from 1996Wi07.
		3225.5 3	100	0.0	0^+	E1			B(E1)(W.u.)=0.0035 13 Branching and Eγ from 1996Wi07.
3266.19	$(4^+,6)$	440.48 7	100	2825.71	(5^-)				
3307.90	$(2^+,3)$	1647.86 3	100	1660.027	2^+				
3307.97	$(2,3^-,4^-)$	1497.79 3	100	1810.172	3^-				
3308.27	(6^+)	482.56 9	100	2825.71	(5^-)				
3343.57	(3,4,5,6)	755.79 4	100	2587.78	4^+				
3360.67	3^-	1700.63 3	100	1660.027	2^+	M2+E1	−0.04 +9−10		B(E1)(W.u.)=0.00019 15; B(M2)(W.u.)=0.5 +23−5
3376.8	8^-	253	100	3124.07	7^-	M1		0.129	B(M1)(W.u.)=0.00078 9 α(K)=0.110 4; α(L)=0.0153 5; α(M)=0.00326 10; α(N+..)=0.00092 3 E_γ: from 1994Ot02, Iγ from 1979PeZS.
3391.05	(2^-)	1580.87 4	49.5 19	1810.172	3^-	E2+M1	+1.2 +15−6		B(M1)(W.u.)=0.02 +4−2; B(E2)(W.u.)=8 +9−8
		1731.01 3	100 6	1660.027	2^+	M2+E1	−0.1 +5−4		B(E1)(W.u.)=0.00098 22; B(M2)(W.u.)=2.E+1 +15−2
3404.60	$(2^+,3^-)$	1213.71 3	100 3	2190.891	4^+				
		1744.51 8	33.7 22	1660.027	2^+				
3413.827	2^+	1603.46 11	16.2 21	1810.172	3^-	M2+E1			
		1753.80 2	100.0 21	1660.027	2^+	E2+M1	−1.4 +6−17		B(M1)(W.u.)=0.013 8; B(E2)(W.u.)=4.7 16
		3413.69 6	85 4	0.0	0^+	E2			B(E2)(W.u.)=0.22 4
3460.8	9^-	84	100	3376.8	8^-	(M1)		2.84	B(M1)(W.u.)=0.018 8 α(K)=2.40 8; α(L)=0.341 11; α(M)=0.0729 22; α(N+..)=0.0208 7 E_γ: from 1994Ot02, M and Iγ from 1979PeZS.

$^{144}_{62}Sm_{82}$-6

Adopted Levels, Gammas (continued)

$\gamma(^{144}Sm)$ (continued)

E_i(level)	J^π_i	E_γ	I_γ	E_f	J^π_f	Mult.	δ†	α‡	Comments
3460.8	9^-	337	25	3124.07	7^-	E2		0.0395	B(E2)(W.u.)=0.35 15 α(K)=0.0313 10; α(L)=0.00648 20; α(M)=0.00143 5; α(N+..)=0.00039 1 E_γ: from 1994Ot02, M and Iγ from 1979PeZS.
3493.96	(4^+)	1683.77 3	100	1810.172	3^-	M2+E1	−0.22 +13−18		B(E1)(W.u.)=0.005 +15−5; B(M2)(W.u.)=4.E+2 +13−4
3519.5	(8^-)	395	100	3124.07	7^-	M1		0.0400	α(K)=0.0340 11; α(L)=0.00467 14; α(M)=0.00100 3; α(N+..)=0.00028 1 E_γ: from 1994Ot02, M from 1979PeZS.
3523.56	$(2^+,4)$	1713.37 3	100	1810.172	3^-	M2+E1	+0.20 +12−9		B(E1)(W.u.)=0.00076 16; B(M2)(W.u.)=5.E+1 +6−5
3529.48	(3^-)	1719.32 6	59 3	1810.172	3^-	E2+M1			B(M1)(W.u.)=0.05 4; B(E2)(W.u.)=1 +8−1
		1869.42 5	100.0 4	1660.027	2^+	M2+E1	−0.11 9		B(E1)(W.u.)=0.00078 21; B(M2)(W.u.)=12 +21−12
3559.63	2^+	1899.59 5	70 4	1660.027	2^+	E2+M1			
		3559.59 8	100 3	0.0	0^+	E2			B(E2)(W.u.)=0.48 11
3564.19	(3^-)	1904.15 5	100	1660.027	2^+	M2+E1	+0.08 13		B(E1)(W.u.)=0.0011 5; B(M2)(W.u.)=1.E+1 +3−1
3596.78	(4^-)	770.74 17	47 3	2825.71	(5^-)	E2+M1		0.0060 16	α(K)=0.0051 14; α(L)=0.00070 16
		1786.67 8	100 3	1810.172	3^-	E2+M1			
3626.65	(2,3,4,5)	502.54 7	24 2	3124.07	7^-				
		1435.77 4	100 7	2190.891	4^+				
3647.07	(4^+)	1987.03 4	100	1660.027	2^+	M3+E2	−0.2 +2−3		B(E2)(W.u.)=3.3 25; B(M3)(W.u.)=2.E+5 +5−2
3668.68	5^-	1477.5 1	100 10	2190.891	4^+	M2+E1	+0.11 16	0.00055 18	B(E1)(W.u.)=0.0019 +20−19; B(M2)(W.u.)=5.E+1 +15−5 α(K)=0.00047 15
		1858.49 2	60 10	1810.172	3^-	M3+E2			
3688.59	$(3^+,4^+)$	2028.55 4	100	1660.027	2^+				
3714.38	$(1^+,2^+,3)$	2054.34 6	100	1660.027	2^+				
3722.70	$(2^+,3^+,4^+)$	2062.65 4	100	1660.027	2^+				
3731.93	$(2^+,3^+,4^+)$	2071.89 4	100	1660.027	2^+				
3740.10	(1,2,3,4)	1929.90 5	100 5	1810.172	3^-				
		2080.07 8	77 4	1660.027	2^+				
3778.46	(3^-)	2118.42 9	100	1660.027	2^+	(M2+)E1	−0.04 12		B(E1)(W.u.)=0.0020 13; B(M2)(W.u.)=3 +20−3
3786.30	(2,4)	1976.11 17	100	1810.172	3^-				
3817.93	$1^{(-)}$	3817.88 15	100	0.0	0^+	E1			B(E1)(W.u.)=0.0004 3
3823.39	$(0^+,1,2,3)$	2163.35 6	100	1660.027	2^+				
3846.20	(4^-)	2036.0 1	100	1810.172	3^-				
3855.97	$(2^-,3^-,4^-)$	2045.78 9	100	1810.172	3^-				
3867.89	5^-	2057.7 1	100	1810.172	3^-	M3+E2			
3877.90	$(1^+,2^+,3)$	2217.86 6	100	1660.027	2^+				B(E1)(W.u.)=0.00056 23; B(M2)(W.u.)=1 +4−1
3884.86	$(1,2^+)$	3884.8 2	100	0.0	0^+				
3886.77	$5^{(+)}$	1563.07 19	44 6	2323.60	6^+	E2+M1			
		1695.88 8	100 9	2190.891	4^+	E2+M1			
3890.52	(1^-)	3890.46 17	100	0.0	0^+	E1			B(E1)(W.u.)>0.00071

$\gamma(^{144}Sm)$ (continued)

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.	δ†	α‡	Comments
3906.987	$1^{(+)}$	3906.93 *2*	100	0.0	0^+	(M1)			B(M1)(W.u.)=0.019 *15*
3913.98	(3,4)	1723.2 *1*	100 *8*	2190.891	4^+				
		2253.8 *1*	77 *8*	1660.027	2^+				
3939.88	(5^-)	1748.98 *11*	100	2190.891	4^+	(M2+)E1	−0.03 +*16*−*14*		B(E1)(W.u.)=0.0011 +*18*−*11*; B(M2)(W.u.)=2 +*14*−*2*
3949.40	(3,4,5)	1758.50 *5*	100	2190.891	4^+				
3965.67	$1^{(+)}$	3965.61 *19*	100	0.0	0^+	(M1)			B(M1)(W.u.)>0.071 E_γ: from 1993Ga16.
3985.96	2^+	3985.90 *21*	100	0.0	0^+	E2			B(E2)(W.u.)=0.4 *3*
3986.00	(3^+)	1795.09 *5*	100 *4*	2190.891	4^+	E2+M1			
		2325.97 *12*	72 *4*	1660.027	2^+	E2+M1	−0.5 +*2*−*9*		B(M1)(W.u.)=0.028 *12*; B(E2)(W.u.)=0.7 *6*
4072.08	(2,3,4)	1881.18 *15*	100 *10*	2190.891	4^+				
		2412.0 *3*	41 *10*	1660.027	2^+				
4082.84		1891.94 *18*	100	2190.891	4^+				
4124.1	$1^{(-)}$	4124.0 *3*	100	0.0	0^+	(E1)			B(E1)(W.u.)=0.0003 +*6*−*3*
4157.37		1966.46 *17*	100	2190.891	4^+				
4262.1	1	4262 *2*	100	0.0	0^+	D			
4410.8		1034		3376.8	8^-				
4427.7		908		3519.5	(8^-)				
4674.8		264		4410.8					
4700.8	(10^-)	1181		3519.5	(8^-)				γ observed by 1994Ot02 only.
		1240		3460.8	9^-				E_γ: from 1994Ot02.
		1324		3376.8	8^-				E_γ: from 1994Ot02.
4758.7	(10^-)	348		4410.8					γ observed by 1994Ot02 only.
		1239		3519.5	(8^-)				γ observed by 1994Ot02 only.
		1382		3376.8	8^-				E_γ: from 1994Ot02.
4907.8	(11^-)	1447		3460.8	9^-				E_γ: from 1994Ot02.
4960.8	(11^-)	533		4427.7					γ observed by 1994Ot02 only.
		1500		3460.8	9^-				E_γ: from 1994Ot02.
5015	(1)	5015 *5*		0.0	0^+	(D)			
5015.8		315		4700.8	(10^-)				
5077.6	(12^-)	169.8	100	4907.8	(11^-)				
5103.1	1,2	5103		0.0	0^+	D,Q			
5150.8	(12^-)	190		4960.8	(11^-)	M1		0.282	α(K)=0.240 *8*; α(L)=0.0336 *10*; α(M)=0.00715 *22*; α(N+..)=0.00203 *6* E_γ: from 1994Ot02, M from 1979PeZS.
		243		4907.8	(11^-)	M1		0.144	α(K)=0.122 *4*; α(L)=0.0171 *6*; α(M)=0.00364 *11*; α(N+..)=0.00102 *3* E_γ: from 1994Ot02, M from 1979PeZS.
		392		4758.7	(10^-)	E2		0.0253	α(K)=0.0203 *6*; α(L)=0.00388 *12*; α(M)=0.00085 *3*; α(N+..)=0.00023 *1* E_γ: from 1994Ot02, M from 1979PeZS.
		450		4700.8	(10^-)	E2		0.0171	α(K)=0.0139 *5*; α(L)=0.00249 *8*; α(M)=0.00055 *2*; α(N+..)=0.00015 *1* E_γ: from 1994Ot02, M from 1979PeZS.

$^{144}_{62}Sm_{82}$-8

Adopted Levels, Gammas (continued)

$\gamma(^{144}Sm)$ (continued)

E_i(level)	J^{π}_i	E_γ	E_f	J^{π}_f	Mult.	α‡	Comments
5151	(1)	5151 *3*	0.0	0^+	(D)		
5350.8	(12^-)	443	4907.8	(11^-)			
		650	4700.8	(10^-)			
5360.8	(13^-)	210	5150.8	(12^-)	M1	0.214	α(K)=0.182 *6*; α(L)=0.0255 *8*; α(M)=0.00543 *17*; α(N+..)=0.00154 *5*
		400	4960.8	(11^-)			γ observed by 1994Ot02 only.
5520.8	(13^-)	160. *1*	5360.8	(13^-)			γ not observed by 1994Ot02.
		170	5350.8	(12^-)			γ observed by 1994Ot02 only.
		370	5150.8	(12^-)	M1	0.0474	α(K)=0.0403 *13*; α(L)=0.00554 *17*; α(M)=0.00118 *4*; α(N+..)=0.00033 *1* E_γ: from 1994Ot02, M from 1979PeZS.
		443. *3*	5077.6	(12^-)	M1	0.0298	α(K)=0.0254 *8*; α(L)=0.00347 *11*; α(M)=0.00074 *2*; α(N+..)=0.00020 *1* γ not observed by 1994Ot02.
		560	4960.8	(11^-)			γ observed by 1994Ot02 only.
5720.7	(14^-)	200	5520.8	(13^-)	M1	0.245	α(K)=0.208 *7*; α(L)=0.0292 *9*; α(M)=0.00621 *19*; α(N+..)=0.00176 *6* E_γ: from 1994Ot02, M from 1979PeZS.
		360	5360.8	(13^-)	M1	0.0509	α(K)=0.0433 *13*; α(L)=0.00596 *18*; α(M)=0.00127 *4*; α(N+..)=0.00035 *1* E_γ: from 1994Ot02, M from 1979PeZS.
		570	5150.8	(12^-)	E2	0.0092	α(K)=0.00756 *23*; α(L)=0.00124 *4* E_γ: from 1994Ot02, M from 1979PeZS.
5769.8		409	5360.8	(13^-)			
5855.8	(13^+)	505	5350.8	(12^-)			
6004.8	(14^+)	644	5360.8	(13^-)			
6061.8	(14^+)	292	5769.8				
6126.7	(14^+)	766	5360.8	(13^-)	E1	0.00174	α(K)=0.00148 *5*; α(L)=0.00019 *1* E_γ: from 1994Ot02, M from 1979PeZS.
6301.2	(14^+)	940	5360.8	(13^-)			E_γ: from 1994Ot02.
6315.8		311	6004.8	(14^+)			
6411.9	(15^+)	111	6301.2	(14^+)			E_γ: from 1994Ot02.
		285	6126.7	(14^+)			E_γ: from 1994Ot02, observed by 1994Ot02 only.
		691	5720.7	(14^-)			E_γ: from 1994Ot02.
6431.6	(14^+)	1071	5360.8	(13^-)			
6651.4	(15^+)	350	6301.2	(14^+)			E_γ: from 1994Ot02, observed by 1994Ot02 only.
		525	6126.7	(14^+)			E_γ: from 1994Ot02, observed by 1994Ot02 only.
		931	5720.7	(14^-)			E_γ: from 1994Ot02.
6771.7		1051	5720.7	(14^-)			
6792.3		141	6651.4	(15^+)			
		361	6431.6	(14^+)			
		491	6301.2	(14^+)			
6824.2	(16^+)	173	6651.4	(15^+)			E_γ: from 1994Ot02.
		412	6411.9	(15^+)			E_γ: from 1994Ot02.
		523	6301.2	(14^+)			E_γ: from 1994Ot02, observed by 1994Ot02 only.
7000.7		1280	5720.7	(14^-)			
7160.7		160	7000.7				

$^{144}_{62}Sm_{82}$-9

Adopted Levels, Gammas (continued)

$\gamma(^{144}\mathrm{Sm})$ (continued)

E_i(level)	J_i^π	E_γ	E_f	J_f^π
7237.7		466	6771.7	
		826	6411.9	(15^+)
7397.7		1271	6126.7	(14^+)
7524.7		1093	6431.6	(14^+)
7572.8		1852	5720.7	(14^-)
7604.7		444	7160.7	
7660.5		889	6771.7	
		1009	6651.4	(15^+)
		1229	6431.6	(14^+)
		1359	6301.2	(14^+)
		1534	6126.7	(14^+)
7690.9		118	7572.8	
		166	7524.7	
		867	6824.2	(16^+)
		899	6792.3	
		919	6771.7	
		1390	6301.2	(14^+)
		1564	6126.7	(14^+)
7870.7		633	7237.7	
7910.5		220	7690.9	
		250	7660.5	
		673	7237.7	
		1086	6824.2	(16^+)
		1118	6792.3	
7938.4		1146	6792.3	
7950.1		1126	6824.2	(16^+)
		1158	6792.3	
8084.5		1260	6824.2	(16^+)
8282.4		344	7938.4	
		372	7910.5	
8325.7	(18)	455	7870.7	
8426.1		476	7950.1	
8626.8		542	8084.5	

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.
8626.8		677		7950.1		
8997.9	1	5264[#] *8*	10 *5*	3731.93	$(2^+,3^+,4^+)$	
		5452[#] *8*	17 *9*	3544		
		6022[#] *8*	28 *7*	2976?		
		6116[#] *8*	9 *5*	2883.008	(4^+)	
		6199 *3*	24 *7*	2799.65	2^+	D
		6520 *3*	91 *8*	2477.651	0^+	D
		6574 *3*	58 *7*	2423.208	2^+	D
		6831[#] *6*	19 *2*	2167?		D
		6878[#] *6*	20 *5*	2120?		
		7337 *3*	70 *6*	1660.027	2^+	D
		8998 *3*	100 *7*	0.0	0^+	D
9232.8		950		8282.4		
9312.1		1030		8282.4		
9419.9		108		9312.1		
		187		9232.8		
9441.8		815		8626.8		
9589.9		357		9232.8		
9985.8		544		9441.8		
10036.0		616		9419.9		
		724		9312.1		
10583.8		1164		9419.9		
10698.0		114		10583.8		
		662		10036.0		
		1108		9589.9		
10935.4		237		10698.0		
		352		10583.8		
11719.4		784		10935.4		
11768.4		833		10935.4		
11903.4		135		11768.4		
12284.4		565		11719.4		
12739		455		12284.4		

† From 1993Ga16, unless indicated otherwise.

‡ 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.

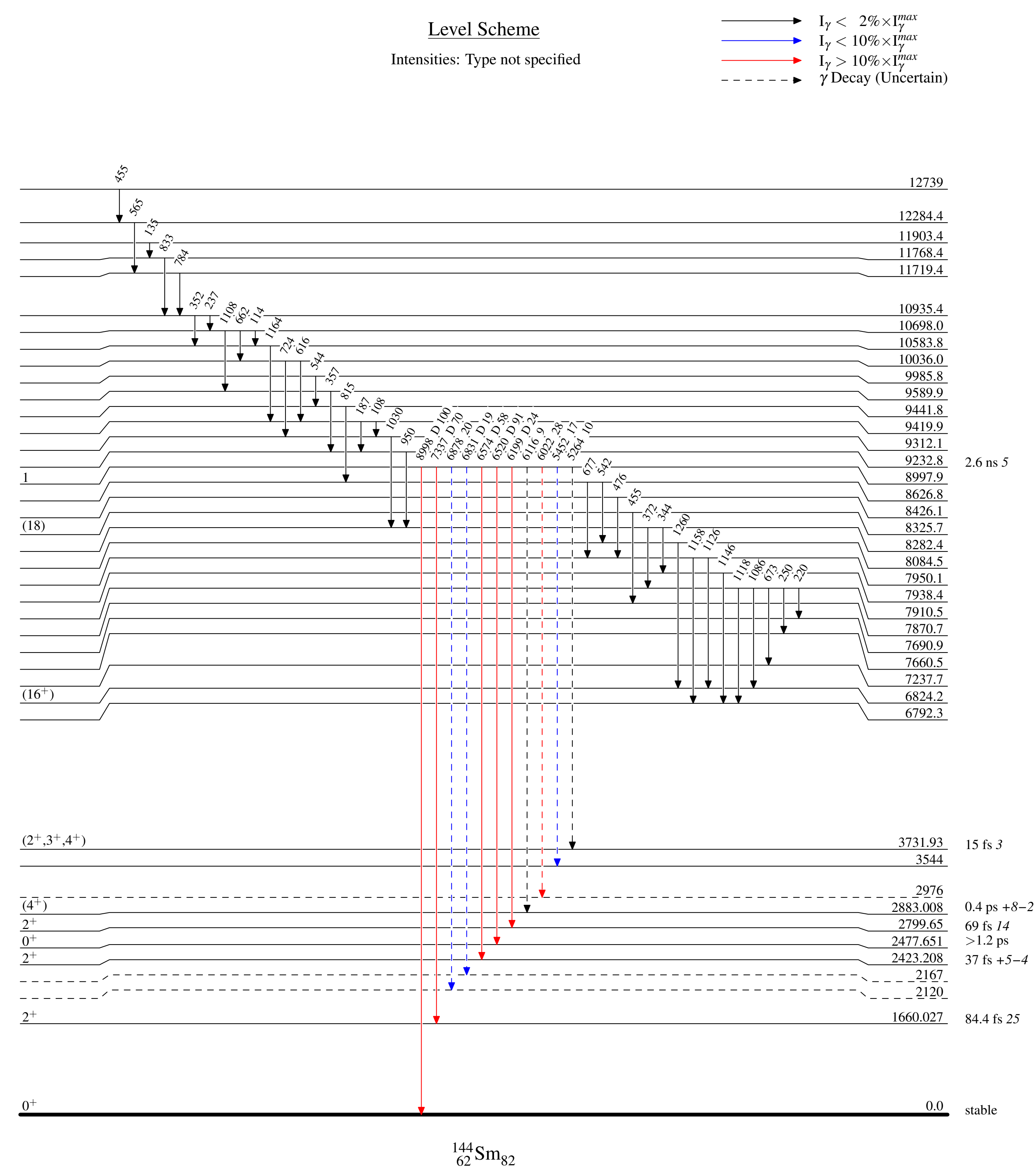
Placement of transition in the level scheme is uncertain.

$^{144}_{62}\mathrm{Sm}_{82}$-10

Adopted Levels, Gammas

Level Scheme

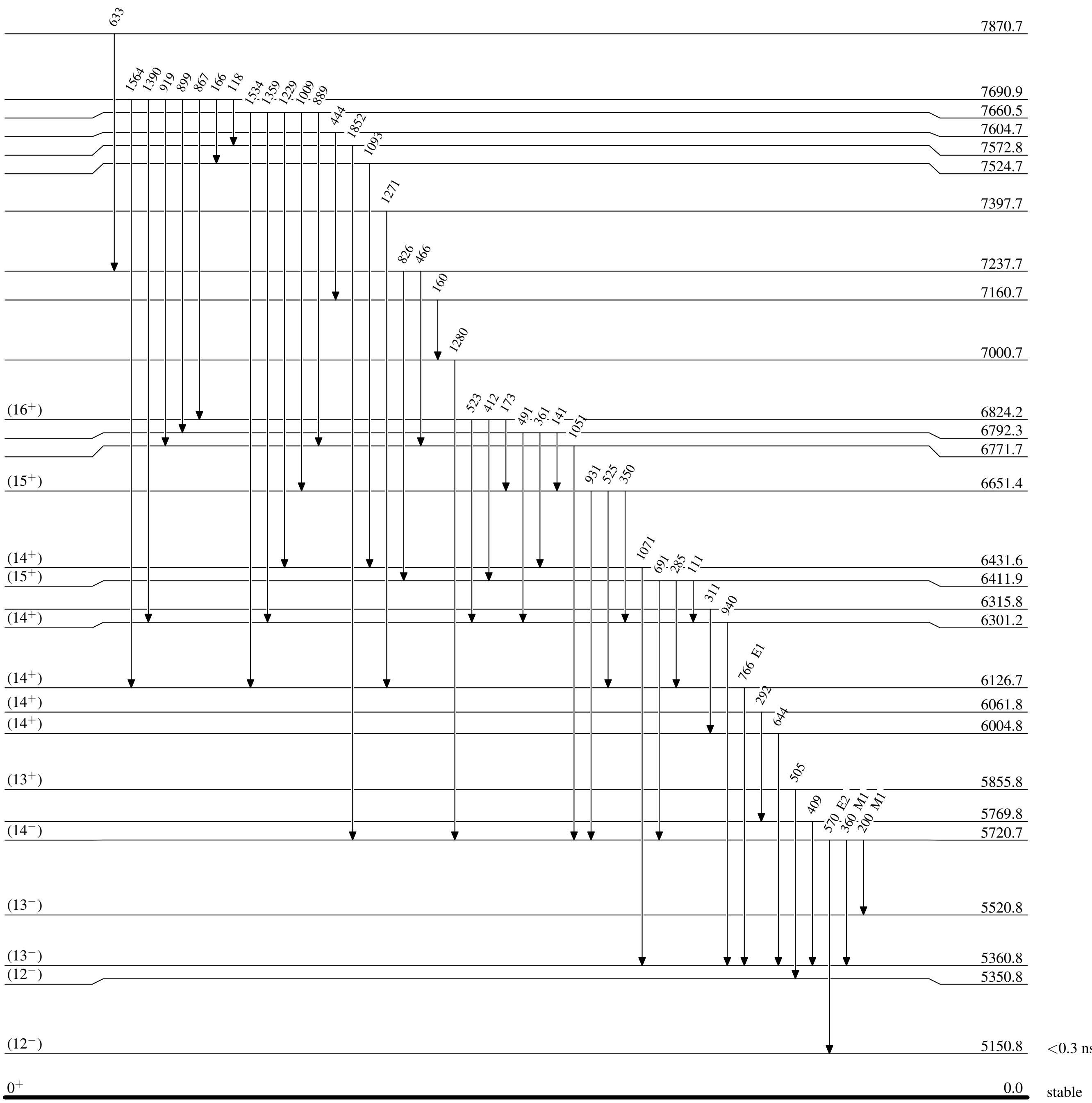
Intensities: Type not specified



Adopted Levels, Gammas

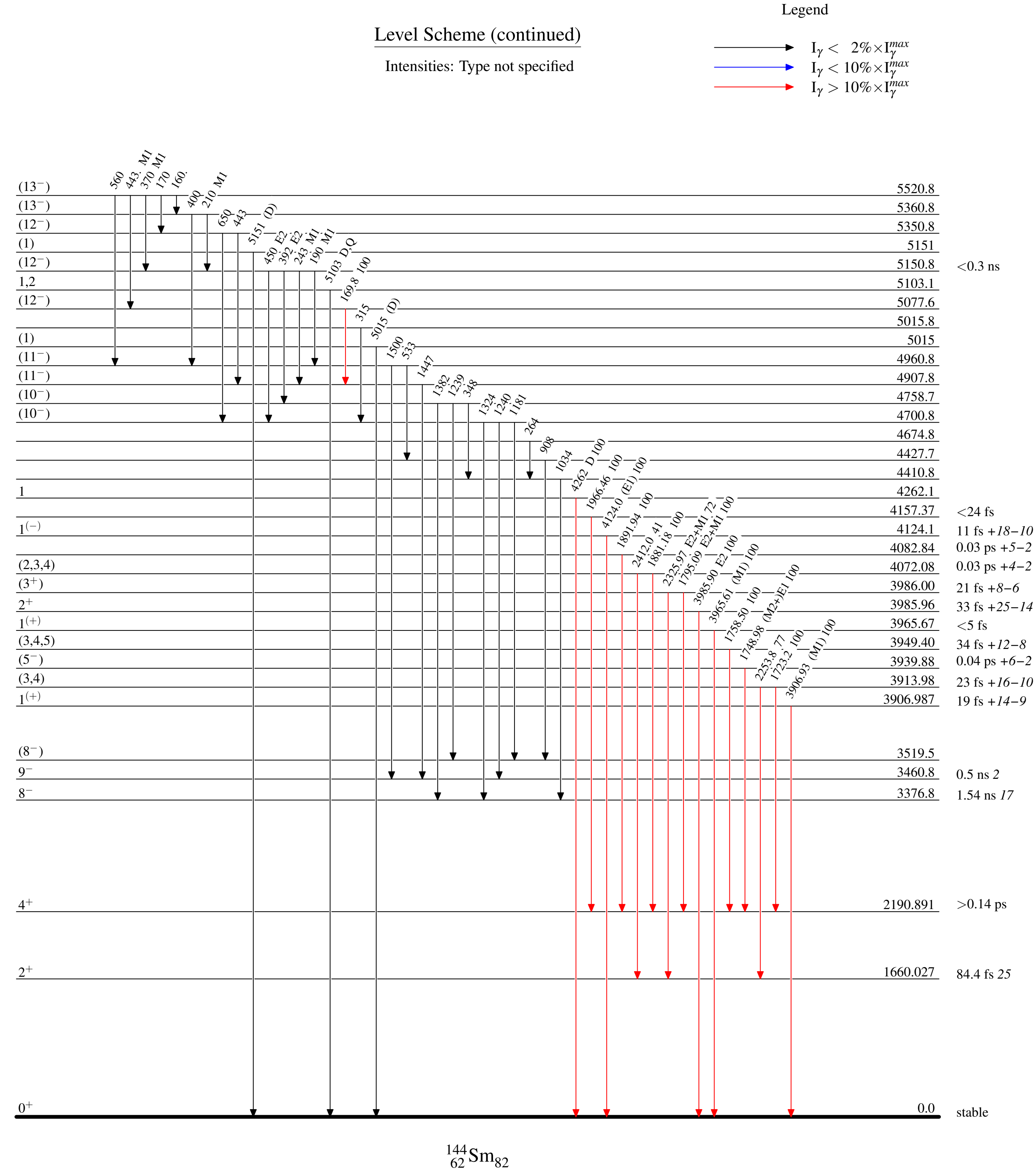
Level Scheme (continued)

Intensities: Type not specified



$^{144}_{62}Sm_{82}$

Adopted Levels, Gammas



Adopted Levels, Gammas

Level Scheme (continued)

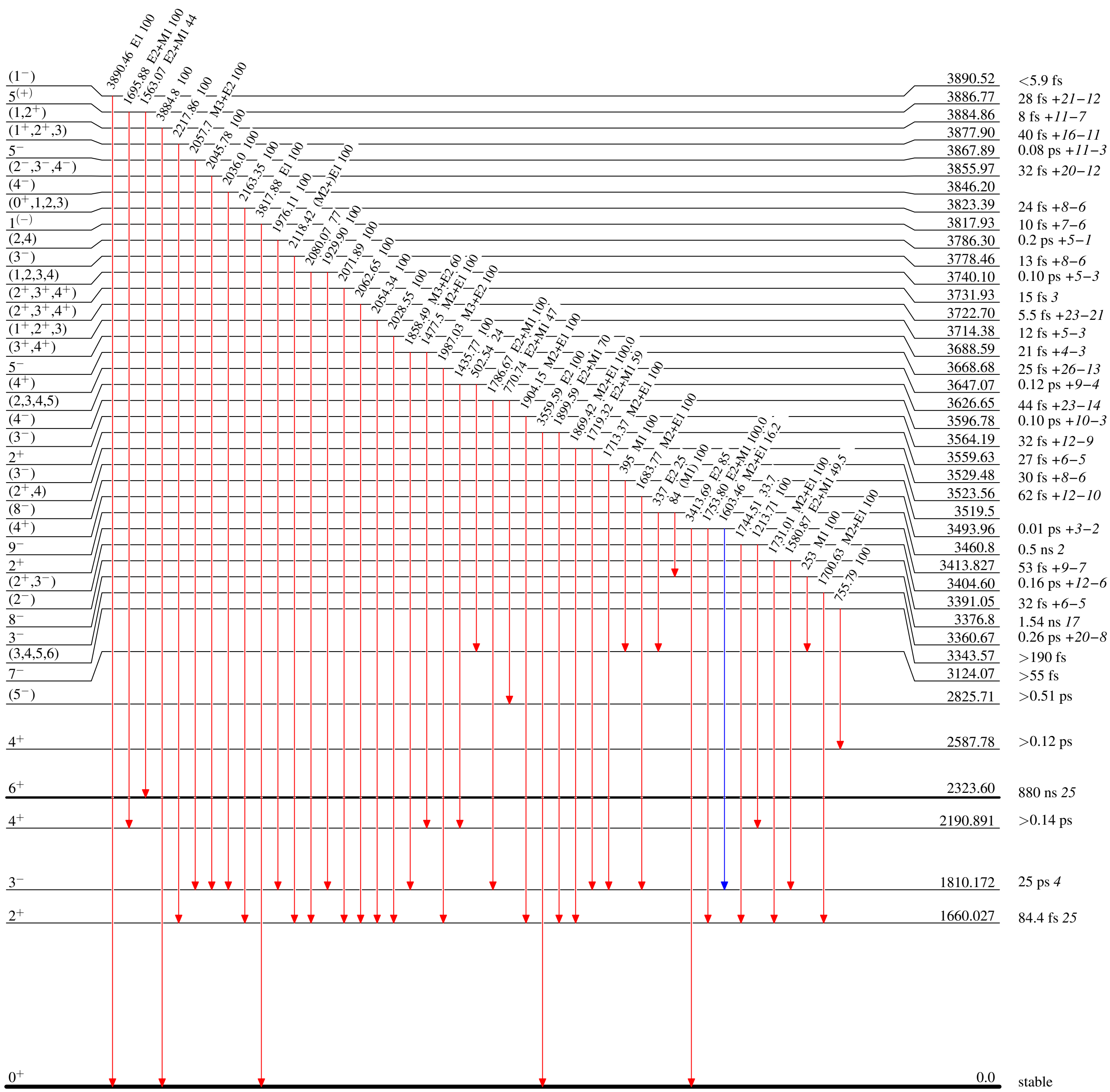
Intensities: Type not specified

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$

$I_\gamma < 10\% \times I_\gamma^{max}$

$I_\gamma > 10\% \times I_\gamma^{max}$

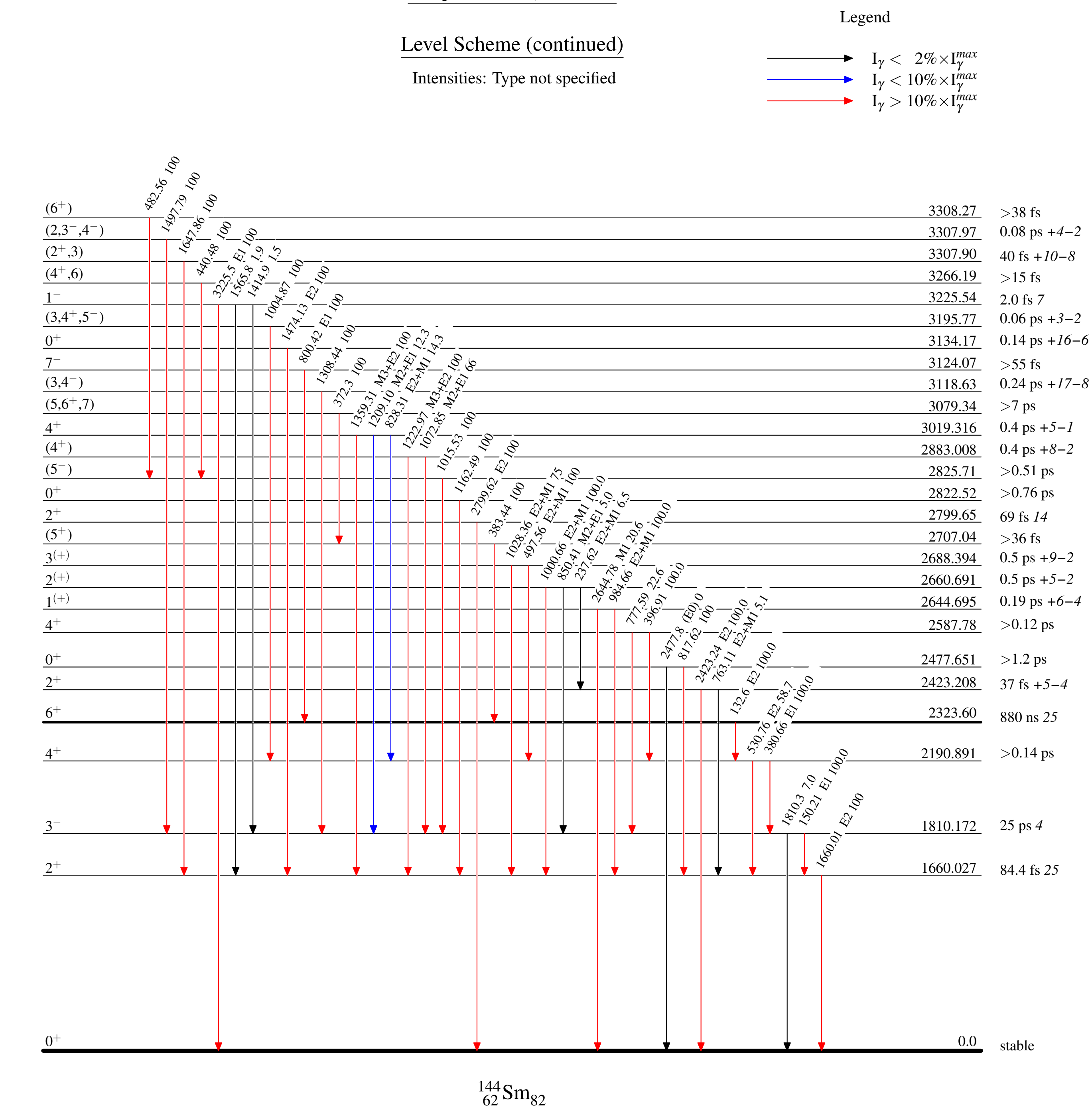


$^{144}_{62}$Sm$_{82}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified



Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Yu. Khazov, A. Rodionov and G. Shulyak	NDS 136, 163 (2016)	14-Jul-2016

Q(β^-)=−3879 *6*; S(n)=8416.3 *29*; S(p)=7018 *4*; Q(α)=2528.8 *28* 2012Wa38

Produced and identified by 1953Du21, irradiation of Nd target by 40 MeV ^{4}He.

The ^{146}Sm scheme is built on the basis of data on ε decay and in-beam reaction study. It contains more than 210 levels and about 500 γ transitions. Six Eγ energies differ greater than 3σ from corresponding level energy differences, they were not taken in to account in a least-square fitting. Band sequences are from 1995Ba57.

^{146}Sm Levels

Cross Reference (XREF) Flags

A	^{146}Pm β^- decay	F	^{144}Sm(t,p)
B	^{146}Eu ε decay	G	^{147}Sm(d,t)
C	^{150}Gd α decay	H	^{147}Sm(^{3}He,α)
D	^{139}La(^{11}B,4nγ)	I	^{148}Sm(p,t)
E	Nd(α,xnγ)		

E(level)[†‡]	J$^\pi$	T$_{1/2}$[#]	XREF	Comments
0.0[@]	0$^+$	6.8×10^7 y *7*	ABCDEFGHI	%α=100 T$_{1/2}$: from 2012Ki16. Others: 5×10^7 y (1953Du21), 7.4×10^7 y *15* (1964Nu02), 10.26×10^7 y *48* (1966Fr11), 8.5×10^7 y *12* (1963Fr06), 10.31×10^7 y *45* (1987Me08). Observed α decay with Eα=2455 *4* (1987Me08), 2460 *20* (1964Nu02), 2550 *30* (1966Fr11), 2550 *50* (1960Ma39, 1953Du21), retardation factor=0.34 (1993Bu09). Isotope shift, mean square radii differences (2013An02 (compilation nuclear radii of Z=0-96), 1999GaZX, 1990En01, 1986Al33).
747.174[@] *11*	2$^+$	≤7.2 ps	AB DEFGHI	J$^\pi$: 747.2γ E2 to 0$^+$; assigned to level sequence built on g.s., 0$^+$.
1380.301[&] *15*	3$^-$		AB DEf h	XREF: f(1387), h(1376). J$^\pi$: 633.1γ E1 to 2$^+$; direct population in ^{146}Eu ε decay (J^π=4$^-$); bandhead of one octupole phonon coupled level sequence.
1381.287[@] *14*	4$^+$	≤9 ps	B DEfGhI	XREF: f(1387), h(1376). J$^\pi$: 634.1γ E2 to 2$^+$; direct population in ^{146}Eu ε decay (J^π=4$^-$); assigned to level sequence based on g.s.
1647.980 *14*	2$^+$		B EFGHI	J$^\pi$: 1648.0γ E2 to 0$^+$, 791.1γ from 4$^+$.
1792 *2*			G	J$^\pi$: from L(d,t)=3,5.
1811.674[@] *18*	6$^+$	0.09 ns +*10*−*5*	B DEFGHI	XREF: H(1820). J$^\pi$: 430.4γ E2 to 4$^+$, 986.0γ E3 from 9$^-$; assigned to the level sequence based on g.s.
1913 *2*			G	
2024 *2*			G	
2045.715 *16*	4$^-$		B E G	J$^\pi$: 665.4γ M1+E2 (ΔJ=1) to 3$^-$; direct population in ^{146}Eu ε decay (J^π=4$^-$).
2083.432[&] *15*	5$^-$		B DEFGHI	J$^\pi$: 271.7γ E1 to 6$^+$, 702.1γ E1 to 4$^+$.
2155.824 *16*	2$^+$		B EFGHI	J$^\pi$: 2155.8γ E2 to 0$^+$, 1470.2γ from 4$^+$. L(d,t)=0 is incompatible with the J=2$^+$ assignment.
2211 *1*	0$^+$		I	J$^\pi$: from L(p,t)=0.
2222.438[c] *24*	6$^+$		B DE g I	XREF: g(2224). J$^\pi$: 410.8γ M1+E2 (ΔJ=0) to 6$^+$, 820.7γ E2 from 8$^+$. Bandhead of level sequence with ΔJ=1.
2225.00 *7*	(2$^+$)		B Fg	XREF: F(2231).

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Adopted Levels, Gammas (continued)

^{146}Sm Levels (continued)

E(level)[†‡]	J^π	$T_{1/2}$[#]	XREF	Comments
				XREF: g(2224). J^π: 2225.0γ to 0^+, 844.7γ to 3^-; log *ft*=9.8 in population in ^{146}Eu ε decay (J^π=4^-).
2269.885 *16*	3^+		B E GH	J^π: 1522.7γ M1+E2 to 2^+, 888.4γ M1+E2 to 4^+.
2280.902 *16*	4^+		B EFG I	J^π: 1533.7γ E2 to 2^+; L(p,t)=4, (J^π=4^-).
2329 *2*			G	
2331 *1*	0^+		G I	J^π: from L(p,t)=0.
2398.7 *10*			E	
2400.92 *3*	2^+		B E I	J^π: 2400.9γ E2 to 0^+, L(p,t)=(2).
2401.6 *3*	3^-,4^-		G	J^π: from L(d,t)=0.
2439.071 *19*	4^+		B EFG I	J^π: 791.1γ E2 to 2^+; L(p,t)=(4).
2513.448 *19*	3^-		B E G I	J^π: 1766.3γ E1 to 2^+, L(p,t)=(3), L(d,t)=0.
2531.934 *15*	4^+		B E GHI	J^π: 1150.6γ M1+E2 to 4^+, 1784.8γ E2 to 2^+; direct population in ^{146}Eu ε decay (J^π=4^-), L(p,t)=(4).
2544.18 *5*	2^+		B F I	J^π: 2544.2γ E2 to 0^+; L(p,t)=(2).
2551.97 *18*			B	
2589.26 *15*			E h	XREF: h(2593).
2600 *1*	0^+		F I	XREF: F(2611). J^π: from L(p,t)=0 and L(t,p)=0.
2600.38[&] *3*	7^-	11 ps *4*	DE Gh	XREF: h(2593). J^π: 788.8γ E1 (ΔJ=1, stretched) to 6^+, 516.9γ E2 to 5^-.
2605.11 *6*			B	
2636.03 *7*			B h	
2649.59 *6*	(2^+)		B EfGh	XREF: f(2653), h(2643). J^π: 2650.4γ to 0^+, 210.5γ to 4^+.
2652 *3*			fGh	XREF: f(2653), h(2643).
2667.19 *3*	4^-		B E	J^π: 621.4γ E0+M1+E2 to 4^-, 583.8γ M1 to 5^-.
2678.287 *16*	4^+		B Efg	XREF: f(2681), g(2682). J^π: 1931.1γ E2 to 2^+, 1297.0γ E2+M1 to 4^+.
2684.714 *24*	(2^+)		B Efg	XREF: f(2681), g(2682). J^π: 1303.5γ to 4^+, 1036.7γ to 2^+; log $f^{1u}t$=10.4 in ^{146}Eu ε decay population (J^π=4^-) (1964Ta11).
2737.16[@] *8*	8^+	11 ps *4*	DEF H	J^π: 136.9γ E1 to 7^-, 925.5γ E2 to 6^+; assigned to level sequence.
2740.7 *5*			B	
2744.28 *12*	(4^+,5,6^+)		E	J^π: 463.4γ to 4^+, 521.9γ to 6^+.
2782.92 *19*	(4^+,5^-)		Ef	XREF: f(2786). J^π: 1402.9γ to 3^-, 971.3γ to 6^+.
2788.224 *20*	5^-		B EfGHI	XREF: f(2786). J^π: from L(p,t)=5.
2797.67[&] *6*	9^-	0.83 ns *+20−13*	DE	J^π: 60.7γ E1 to 8^+, 197.4γ E2 to 7^-; assigned to one octupole phonon coupled state sequence. $T_{1/2}$: Others: from (α,xnγ): 1.0 ns *5* ($\gamma\gamma$(t) in (α,2nγ) (1980Ko07)), 1.1 ns *5* ($\alpha\gamma$ delay coin. in (α,4nγ) (1978Ki11)).
2799.89 *4*	3^+		B Ef I	XREF: F(2808). J^π: 2052.7γ M1+E2 to 2^+, 715.1γ to 5^-.
2824 *1*	2^+		f I	XREF: f(2808). J^π: from L(p,t)=2.
2826.3 *7*	6^-		E	J^π: 1014.6γ E1 (ΔJ=0) to 6^+.
2829 *3*	3^-,4^-		G	J^π: from L(d,t)=0.
2829.24 *16*	(2^+)		B	J^π: 1448.1γ to 4^+, 2081.7γ to 2^+; no population in ^{146}Eu ε decay (J^π=4^-).
2850.317 *23*	4^+		B EFg I	XREF: g(2856). J^π: 2103.2γ E2 to 2^+; L(p,t)=(4).
2859 *1*	2^+		g I	XREF: g(2856). J^π: from L(p,t)=2.

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Adopted Levels, Gammas (continued)

^{146}Sm Levels (continued)

E(level)[†‡]	J$^\pi$	XREF	Comments
2879.11 7		B	
2898.309 22	5$^+$	B E G	J$^\pi$: 1517.0γ M1+E2 to 4$^+$, 1086.6γ M1 to 6$^+$.
2905.97 8	(4$^+$)	B G	J$^\pi$: 2158.9γ to 2$^+$, 1094.1γ to 6$^+$.
2921 1	0$^+$	I	J$^\pi$: from L(p,t)=0.
2932.33 6	(4$^+$)	B EFG I	J$^\pi$: 1552.0γ to 3$^-$, 1120.8γ to 6$^+$; 848.7γ from 2$^+$.
2968.83 4	2$^+$,3$^+$	B E I	J$^\pi$: 2221.6γ M1 to 2$^+$, 1587.5γ to 4$^+$; L(p,t)=(4) is incompatible with the (J$^\pi$=4$^-$) assignment.
2973.34 3	3$^+$,4$^+$	B Ef i	XREF: f(2979),i(2976). J$^\pi$: 1592.0γ (M1+E2) to 4$^+$, 1325.4γ to 2$^+$.
2974.39 15	3$^-$	B G i	XREF: i(2976). J$^\pi$: 2227.2γ to 2$^+$, 891.3 γ to 5$^-$; L(d,t)=0.
2978.0 10		Ef	XREF: f(2979).
2984.5 3		Ef	XREF: f(2979).
2991 2	(4$^+$)	FG I	J$^\pi$: from L(p,t)=(4).
3011.24 11		E	
3014.624 22	3$^+$	B E g	XREF: g(3017). J$^\pi$: 2267.5γ M1 to 2$^+$, 1633.3γ M1 to 4$^+$.
3019.54 21		E g	XREF: g(3017).
3020.6 11	0$^+$	B F I	J$^\pi$: from L(p,t)=0.
3039.5 10		B	
3043.13[c] 4	8$^+$	DE	J$^\pi$: 1231.4γ E2 to 6$^+$, 731.6γ from 10$^+$, 524.3γ M1 from 9$^+$; assigned to the level sequence.
3058.09 6		B F	
3067.703 20	3$^+$	B EFg I	XREF: g(3069). J$^\pi$: 1686.4γ M1+E2 to 4$^+$, 2320.5γ M1+E2 to 2$^+$; L(d,t)=1.
3072.933 22	5$^+$	B EFg	XREF: g(3069). J$^\pi$: 222.1γ M1 to 4$^+$, 850.5 γ M1 to 6$^+$; L(d,t)=1.
3092.39 11	(4$^+$,5,6$^+$)	E I	J$^\pi$: 811.4γ to 4$^+$, 1280.8γ to 6$^+$.
3093.122 17	3$^+$	B E	J$^\pi$: 2345.9γ M1+E2 to 2$^+$, 1711.8γ M1+E2 to 4$^+$.
3099.49 8	7$^-$	E	J$^\pi$: 1288.1γ E1+(M2) to 6$^+$, 362.3γ to 8$^+$.
3105.38 5	(2$^+$,3,4$^+$)	B G I	J$^\pi$: 2358.2γ to 2$^+$, 1724.1γ to 4$^+$.
3123.29 22	(2$^+$,3,4$^+$)	B	J$^\pi$: 1475.3γ to 2$^+$, 445.0γ to 4$^+$.
3126 1	0$^+$	I	J$^\pi$: from L(p,t)=0.
3129.8 3		B f	XREF: f(3140).
3136.38 3	3$^-$	B EfG I	XREF: f(3140). J$^\pi$: 2389γ E1+M2 to 2$^+$, 1090.8γ M1 to 4$^-$; L(p,t)=(3).
3151.44 3		B f	XREF: f(3140).
3166.91 5	8$^-$	DE	J$^\pi$: 566.6γ M1 (ΔJ=1, stretched) to 7$^-$, 369.6γ to 9$^-$.
3176 1	2$^+$	f h	XREF: f(3187), h(3180). J$^\pi$: from L(p,t)=2.
3183.28 8	8$^-$	E	J$^\pi$: 385.6γ M1 9$^-$, 582.9γ D+Q (ΔJ=1) to 7$^-$.
3183.928 19	3$^+$	B Efgh	XREF: f(3187), g(3188), h(3180). J$^\pi$: 2436.7γ M1+E2 to 2$^+$, 1802.8γ M1+E2 to 4$^+$.
3185.67 9		Efg	XREF: g(3188), f(3187).
3198.84 21		Ef	XREF: f(3187).
3200.019 18	4$^-$	B E	J$^\pi$: 1116.6γ M1+E2 to 5$^-$, 930.4γ to 3$^+$, 686.5γ to 3$^-$.
3205 1	2$^+$	I	J$^\pi$: from L(p,t)=2.
3208.31 4	(8$^+$)	E	J$^\pi$: 985.9γ (E2, stretched) to 6$^+$.
3220.87 5	(3$^-$,4,5$^-$)	B E	J$^\pi$: 1840.5γ to 3$^-$, 1137.7γ to 5$^-$.
3223.9 15	(2$^+$,3$^+$,4$^+$)	B G	J$^\pi$: 394.7γ to (2$^+$); log *ft*=8.98 in ^{146}Eu ε decay (J$^\pi$=4$^-$) population. L(d,t)=(5).
3231.63 6	4$^+$	B f i	XREF: f(3240), i(3236). J$^\pi$: 2484.4γ to 2$^+$, 1009.3γ to 6$^+$; L(p,t)=(4).
3238.646 22	4$^+$	B Ef i	XREF: f(3240), i(3236). J$^\pi$: 2491.5γ E2 to 2$^+$, 1427.6γ to 6$^+$; L(p,t)=(4).
3244.65 4	(2$^+$,3,4$^+$)	B fG	XREF: f(3240). J$^\pi$: 2497.5γ to 2$^+$, 1863.3γ to 4$^+$.

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Adopted Levels, Gammas (continued)

^{146}Sm Levels (continued)

E(level)[†‡]	J^π	$T_{1/2}$[#]	XREF	Comments
3259.934 *18*	5^-		B Ef I	XREF: f(3264). J^π: 1214.2γ M1+E2 to 4^-, 1448.2γ to 6^+.
3268 *2*			fG I	XREF: f(3264).
3278.14 *21*			E	
3278.18 *13*	2^+		B F I	XREF: F(3264). J^π: from L(p,t)=2.
3288.60 *17*	$(2^+,3,4^+)$		B	J^π: 459.4γ to 2^+, log *ft*=8.62 in ^{146}Eu ε decay ($J^\pi=4^-$) population.
3290.7 *3*	8^+		E	J^π: 1479.0γ E2(+M3) to 6^+, 492.7γ to 9^-.
3308 *1*	2^+		I	J^π: from L(p,t)=2.
3327.0 *4*			E	
3329.90 *5*	$(2^+,3,4^+)$		B	J^π: 1681.9γ to 2^+, 1948.7γ to 4^+.
3338.27 *4*	3^+		B G	J^π: 2591.1γ M1+(E2) to 2^+, 550.4γ to 5^-.
3340.26 *8*	$(5^-,6^-)$		E	J^π: 672.9γ to 4^-, 739.9γ to 7^-.
3354.64[b] *6*	9^-	28 ps *+5−4*	DE	J^π: 754.2γ E2 to 7^-, 556.9γ M1 (ΔJ=0) to 9^-; systematics of N=84 isotones (1978Ki11). Bandhead of level sequence with ΔJ=1.
3361.08 *3*	$3^-,4^-$		B E G	XREF: G(3367). J^π: 1980.8γ M1 to 3^-, 1277.6γ to 5^-; L(d,t)=0.
3368.76 *8*	(4^+)		B hI	XREF: h(3375). J^π: 2621.6γ to 2^+; L(p,t)=(4).
3376.78 *4*	4^+		B h	XREF: h(3375). J^π: 2629.5γ E2 to 2^+, 1995.8 M1+E2 to 4^+; L(p,t)=(4).
3377.14 *15*			E h	XREF: h(3375).
3378.45 *5*	$(3^-,4,5^-)$		B E h	XREF: h(3375). J^π: 1332.7γ D+Q to 4^-, 1998.0γ to 3^-, 1294.3γ to 5^-.
3388 *1*			I	J^π: from L(p,t)=(3).
3391.1 *5*			E	
3391.678 *22*	3^-		B G I	J^π: 2644.4γ E1 to 2^+; L(p,t)=(3), L(d,t)=0.
3397.62 *9*	(4^+)		B	J^π: 1175.0γ to 6^+, 2650.4γ to 2^+.
3412.7 *7*	$(4^+,5,6^-)$		E	J^π: 1190.2γ to 6^+, 1367.1γ to 4^-.
3418.98 *4*	3^+		B E h	XREF: h(3425). J^π: 2671.7γ M1+E2 to 2^+; log *ft*=8.3 in direct population in ^{146}Eu ε decay ($J^\pi=4^-$).
3427.77 *7*			B Gh	XREF: G(3425). XREF: h(3425).
3431.28 *4*	$3^-,4^-$		B Gh	XREF: G(3438). XREF: h(3425). J^π: 2051.0γ to 3^-, 1347.8γ to 5^-; L(d,t)=0.
3461.572 *20*	5^-		B E	J^π: 1415.9γ M1+E2 to 4^-, 2081.1γ E2 to 3^-, 2080.1γ E1 to 4^+.
3465.84 *4*			B	
3471.90 *5*	$(2^+),3^+$		B g	XREF: g(3473). J^π: 2724.7γ M1 to 2^+, 1191.0γ to 4^+.
3475.09 *6*	$5^+,(6^+)$		B E	J^π: 1663.4γ M1(+E2) to 6^+, 624.7γ to 4^+; log *ft*=8.45 in ^{146}Eu ε decay ($J^\pi=4^-$) population.
3476.95 *15*	$(2^+,3,4,5^-)$		B g	XREF: g(3473). J^π: 2096.6γ to 3^-, 2095.6γ to 4^+; log *ft*=8.95 in ^{146}Eu ε decay ($J^\pi=4^-$) population.
3484.3 *3*	$(4^+,5,6^-)$		E h	XREF: h(3493). J^π: 818.3γ to 4^-, 1672.5γ to 6^+.
3489 *1*			hI	XREF: h(3493).
3496 *4*			Gh	XREF: h(3493). J^π: L(d,t)=2.
3509.34 *6*	(3^+)		B h	XREF: h(3493). J^π: 2762.0 (M1+E2) γ to 2^+, 721.2γ to 5^- requires mult=M2 or E3.
3517.37 *3*	3^+		B E	J^π: 2770.1γ M1+E2 to 2^+, 1471.6γ to 4^-, 1078.3γ to 4^+.
3526 *4*	$3^-,4^-$		G	J^π: from L(d,t)=0.
3530.59 *5*	4^+		B	J^π: 1484.7γ E1 to 4^-, 1447.1 γ to 5^-, 845.8γ to (2^+).

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Adopted Levels, Gammas (continued)

^{146}Sm Levels (continued)

E(level)[†‡]	J^π	$T_{1/2}$[#]	XREF	Comments
3546.17 *4*	$2^+,3^+$		B G	XREF: G(3551). J^π: 2799.0γ M1+E2 to 2^+, 2164.9γ to 4^+; log *ft*=8.4 in ^{146}Eu ε decay ($J^\pi=4^-$) population.
3560.28 *21*			E	
3565.4 *4*			E	
3567.47[c] *5*	9^+		DE	J^π: 524.3γ M1 (ΔJ=1) to 8^+; assigned to the level sequence based on g.s.
3568.4 *10*			E	
3580.2 *3*	(4^+)		E hI	XREF: I(3582). XREF: h(3585). J^π: from L(p,t)=(4).
3583.85 *3*	4^-		B E GhI	XREF: G(3588). XREF: h(3585). J^π: 1500.4γ M1+E2 to 5^-, 2203.7γ M1+E2 to 3^-; L(d,t)=0.
3591.74 *6*	(4^+)		B hI	XREF: h(3585). J^π: 2845.0γ to 2^+, 2210.4 γ to 4^+; log *ft*=8.45 in ^{146}Eu ε decay ($J^\pi=4^-$) population; L(p,t)=(4).
3593.2 *10*			E h	XREF: h(3585).
3594.89 *20*			E h	XREF: h(3585).
3605.83 *7*	3^-		B G I	XREF: G(3603)I(3608). J^π: 2858.2γ to 2^+; L(d,t)=0, L(p,t)=(2,3).
3618 *3*	0^+		G I	XREF: G(3615). J^π: from L(p,t)=0.
3620.0 *3*			E g	XREF: g(3615).
3626.046 *16*	4^+		B E	J^π: 1356.1γ M1+E2 to 3^+, 2244.7γ M1+E2 to 4^+, 1542.6γ to 5^-.
3633.5 *10*			E G	XREF: G(3639).
3646.99 *4*	$(2^+,3,4^+)$		B	J^π: 1491.2γ to 2^+; direct population in ^{146}Eu ε decay ($J^\pi=4^-$).
3652.22 *5*	$(3^-),4^+$		B	J^π: 2904.9γ E2 to 2^+, 1568.9γ to 5^-.
3654.19 *7*	$(2^+,3,4^+)$		B	J^π: 2907.0γ to 2^+, 1373.3γ to 4^+; direct population in ^{146}Eu ε decay ($J^\pi=4^-$).
3669.78 *21*			E	
3677 *4*			G	
3685.3 *10*			E	
3686 *3*	0^+		I	J^π: from L(p,t)=0.
3693.44 *9*	$(2^+,3,4^+)$		B I	J^π: 2946.1γ to 2^+, 1161.8γ 4^+; direct population in ^{146}Eu ε decay ($J^\pi=4^-$).
3701.09 *12*	$(7^-,8,9)$		E	J^π: 346.5γ to 9^-, 534.0γ to 8^-, 657.9γ to 8^+.
3715.62 *18*			B	
3720.53 *13*	3^-		B G	J^π: from L(d,t)=0; 2973.3γ to 2^+.
3740.78 *7*	$(3,4^+)$		B	J^π: 2993.6γ to 2^+, 2360.5γ to 3^-; log *ft*=7.7 in ^{146}Eu ε decay ($J^\pi=4^-$) population.
3749.43 *11*	$(3^-,4^+)$		B	J^π: 3002.2γ to 2^+, 1667.0γ to 5^-.
3753.57 *7*	10^-		DE	J^π: 955.9γ M1 (stretched) to 9^-. $J^\pi=10^+$ in ^{139}La(^{11}B,4nγ).
3766 *4*	$3^-,4^-$		Gh	XREF: h(3767). J^π: from L(d,t)=0.
3766.9 *10*			E	
3770.32 *11*	2^+		B h	XREF: h(3767). J^π: 749.8 γ to 0^+, 2389.0γ to 4^+.
3774.66[c] *7*	10^+		DE	J^π: 207.2γ E2+M1 to 9^+; assignment to the level sequence based on g.s.
3783.47[&] *9*	11^-	10 ps *+4−3*	DE	J^π: 985.9γ E2 (stretched) to 9^- and assignment to level sequence.
3786.03 *14*	$(2^+,3,4^+)$		B	J^π: 3038.5γ to 2^+, 2404.7γ to 4^+; direct population in ^{146}Eu ε decay ($J^\pi=4^-$).
3790.06 *8*	$3^-,4^-$		B G	J^π: from L(d,t)=0.
3800.7 *10*			E	
3804.25 *9*	$(3^-,4,5^+)$		B	J^π: 736.6γ to 3^+, 544.3γ to 5^-.
3809.6 *10*			E	
3810 *15*			H	

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Adopted Levels, Gammas (continued)

^{146}Sm Levels (continued)

E(level)[†‡]	J^π	$T_{1/2}$[#]	XREF	Comments
3815.2 *10*			E	
3825.5 *10*			E	
3835	$3^-,4^-$		G	J^π: from L(d,t)=0.
3869.7 *10*			E G	XREF: G(3873).
3891 *3*	0^+		I	J^π: from L(p,t)=0.
3901 *4*			G I	XREF: G(3896).
3917 *4*	$3^-,4^-$		G I	XREF: G(3922). J^π: from L(d,t)=0.
3924.49 *8*	(9^-)		DE	J^π: 569.83γ D (ΔJ=0) to 9^-, 757.6γ D+Q (ΔJ=1) to 8^-, 167.0γ from 11^-. $J^\pi=10^-$ in ^{139}La(^{11}B,4nγ).
3952 *4*			G	
3963.4 *10*			E	
3970.25 *16*			E	
3990.3 *10*	$(3^-),4^-$		E G	J^π: from L(d,t)=0, 650.0γ to $(5^-,6^-)$.
4005.7 *7*			E	
4014 *3*	(4^+)		I	J^π: from L(p,t)=(4).
4021 *3*	0^+		I	J^π: from L(p,t)=0.
4031 *4*	2^+		G I	J^π: from L(p,t)=2.
4032.4 *3*			E h	XREF: h(4035).
4033.5[c] *3*	(11^+)		D	J^π: 259.0γ to 10^+, 466.0γ to 9^+; assigned to level sequence.
4038 *3*			hI	XREF: h(4035).
4058 *4*			G	
4080.14 *21*			E	
4087 *4*	$3^-,4^-$		G	J^π: L(d,t)=0.
4091.25[b] *7*	11^-	4.9 ps *+15−13*	DE h	XREF: h(4101). J^π: 1293.6γ E2 (stretched) to 9^-; assigned to level sequence.
4116 *4*			Gh	XREF: h(4101).
4125.99 *12*			E	
4127.8 *10*			E	
4135.7 *10*			E	
4143.89 *18*	$(10^-,11^-)$		DE	J^π: 1346.17γ to 9^-, 436.0γ from (12^-).
4145.3[@] *5*	(10^+)		DE	J^π: 1408.1γ to 8^+; assigned to level sequence with ΔJ=2.
4149			G	
4164.5 *10*			E h	XREF: h(4168).
4174 *4*			Gh	XREF: h(4168). J^π: L(d,t)=(5).
4194.90[a] *15*	12^+	10.4 ps *14*	DE	J^π: 411.4γ (E1) (stretched) to 11^-, 1397γ E3 to 9^-, 1011.4γ E2 from 14^+. Two octupole phonon coupled state, bandhead of level sequence.
4202.21 *7*	(11^+)		E	J^π: 427.5γ D(M1) (ΔJ=1 stretched) to 10^+, no γ's to J<10 and decay pattern.
4239.3 *4*			E	
4250 *4*			Gh	XREF: h(4267).
4282.32 *17*			E h	XREF: h(4267).
4291 *4*			G	
4331 *4*			G	
4341 *4*			G	
4341.15 *11*	(11^-)		DE	J^π: 250.0γ D (ΔJ=0) to 11^-, 1543.0γ to 9^-, no γ's to J<9 and decay pattern.
4360 *4*			G	
4374 *4*			G	
4407 *4*			G	
4415 *4*			G	
4443 *4*			G	
4461.34 *7*	(12^-)	≤5.8 ps	DE	J^π: 120.4γ (M1+E2) to 11^-, 259.1γ E1 to (11^+), no γ's to J<11; J=12^+ in (^{11}B,4nγ).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{146}Sm Levels (continued)

E(level)[†‡]	J^π	$T_{1/2}$[#]	XREF	Comments
4579.75 *12*	(12⁻)		DE	J^π: 238.6γ D (stretched ΔJ=1) to (11⁻), no γ's to J<11.
4628.77[b] *8*	13⁻	5.3 ps *+23−20*	DE	J^π: 537.5γ E2 (stretched) to 11⁻, 167.4γ (M1+E2) (ΔJ=1) to 12⁻ 433.0γ (E1) to 12⁺; assigned to the level sequence.
4663 *15*			H	
4752.24 *10*	(13⁻)		DE	J^π: 172.5γ (M1+E2, ΔJ=1) to (12⁻), 217.3γ D (stretched) from (14⁻). J^π=13⁺ in ^{139}La(^{11}B,4nγ).
4969.51 *10*	(14⁻)		DE	J^π: 340.7γ D (stretched) to 13⁻, no γ's to J<13.
5129.47 *14*	13⁻		E	J^π: 1346.0γ E2 (stretched) to 11⁻, no γ's to J<11.
5144.2 *5*			D	
5206.29[a] *15*	14⁺		DE	J^π: 1011.4γ E2 (stretched) to 12⁺, no γ's to J<12; assigned to level sequence.
5218.03[b] *12*	(15⁻)		DE	J^π: 248.5γ D(M1) (stretched) to (14⁻), 589.3γ to 13⁻; assigned to level sequence.
5517.42 *14*	(16⁻)		DE	J^π: 547.9γ E2 (stretched) to (14⁻), 299.4γ (M1+E2) to (15⁻).
5613.93 *16*	(15⁻)		DE	J^π: 644.4γ (M1+E2) to (14⁻), no γ's to J<14.
5697.18[a] *17*	(16⁺)		DE	J^π: 490.1γ E2 (stretched) to 14⁺, no γ's to J<14; assigned to level sequence.
5800.2 *8*			D	
5873.0 *13*			DE	
5972.3 *4*			E	
6176.9[a] *3*	(18⁺)		DE	J^π: assigned by 1995Ba07 to two octupole phonon coupled level sequence.

† From a least-squares fit to Eγ, normalized χ^2=1.3. Eight Eγ's are ignored when fitting (see comment for corresponding transitions).

‡ Levels weakly populated in (d,t) and undetermined in other studies are not shown (detail in 1975Oe01).

From recoil distance measurement in ^{139}La(^{11}B,4nγ) reaction (1982Ro05), except as noted. The levels populated with significant strength in ^{146}Nd(α,4nγ) reaction (1978Ki11) have T<0.6 ns.

@ Band(A): Sequence of levels with ΔJ=2 based on ground state J^π=0⁺.

& Band(B): Sequence of levels with ΔJ=2 based on J^π=3⁻ state. One octupole phonon coupled state sequence.

a Band(C): Sequence of levels with ΔJ=2 based on J^π=12⁺ state. Two octupole phonon coupled states sequence.

b Band(D): Sequence of levels with ΔJ=1 based on J^π=9⁻ state.

c Band(E): Sequence of levels with ΔJ=1 based on J^π=6⁺ state.

$\gamma(^{146}Sm)$

E_i(level)	J_i^π	E_γ[†]	I_γ[b]	E_f	J_f^π	Mult.[c]	δ[df]	α[e]	Comments
747.174	2^+	747.168 *13*	100	0.0	0^+	E2		0.00473	B(E2)(W.u.)>7.4
1380.301	3^-	633.077 *22*	100	747.174	2^+	E1		0.00257	
1381.287	4^+	634.134 *20*	100	747.174	2^+	E2		0.00699	B(E2)(W.u.)>13
1647.980	2^+	267.60 *3*	3.3 *3*	1380.301	3^-				
		900.797 *18*	100 *7*	747.174	2^+	E2+M1	−1.19 +*21*−*26*	0.00391 *20*	
		1648.00[#] *3*	19.5 *6*	0.0	0^+	E2		1.05×10^{-3}	
1811.674	6^+	430.385 *17*	100 *2*	1381.287	4^+	E2		0.0193	B(E2)(W.u.)>14
2045.715	4^-	664.65[#] *14*	6.0 *4*	1381.287	4^+	[E1]		0.00232	
		665.423 *15*	100 *14*	1380.301	3^-	M1+E2	−2.7 *5*	0.00674 *24*	
2083.432	5^-	271.688 *28*	22.8 *5*	1811.674	6^+	E1		0.0189	
		702.106 *19*	100 *3*	1381.287	4^+	E1		0.00207	
		703.090 *18*	98 *3*	1380.301	3^-	E2		0.00545	
2155.824	2^+	775.533[#] *25*	7.8 *2*	1380.301	3^-				
		1408.66 *3*	100 *2*	747.174	2^+	M1+E2		0.0016 *3*	
		2155.76[#] *3*	42.3 *10*	0.0	0^+	E2		9.24×10^{-4}	
2222.438	6^+	410.772 *18*	100 *2*	1811.674	6^+	M1+E2	0.14 *3*	0.0353	
		840.94 *10*	3.1 *2*	1381.287	4^+				
2225.00	(2^+)	844.72[#] *15*	1.0×10^2 *4*	1380.301	3^-				
		1477.83[#] *17*	55 *19*	747.174	2^+				
		2224.98[#] *15*	95 *6*	0.0	0^+				
2269.885	3^+	224.0[@] *10*	[@]	2045.715	4^-				
		621.84 *4*	50.5 *14*	1647.980	2^+	M1+E2		0.010 *3*	
		888.44[#] *15*	100 *23*	1381.287	4^+	M1+E2	−0.36 +*11*−*18*	0.00499 *24*	
		889.41 *13*	54 *15*	1380.301	3^-	[E1]		1.29×10^{-3}	
		1522.713 *19*	81.6 *17*	747.174	2^+	M1+E2		0.00136 *21*	
2280.902	4^+	234.9[#] *2*	0.36 *2*	2045.715	4^-				
		632.889[#] *40*	21.1 *3*	1647.980	2^+				
		899.487[‡i] *22*	22.4 *16*	1381.287	4^+	M1+E2	0.12 *10*	0.00504 *10*	E_γ: poor fit; the level energy difference equals 899.611 *13*.
		900.6[@] *10*	24[@] *7*	1380.301	3^-				
		1533.714 *27*	100 *2*	747.174	2^+	E2		1.14×10^{-3}	
2398.7		1651.5 *10*	100	747.174	2^+				
2400.92	2^+	1653.72[#] *8*	23.4 *8*	747.174	2^+				
		2400.94[#] *4*	100 *3*	0.0	0^+	E2		9.42×10^{-4}	
2439.071	4^+	158.5[#] *8*	0.45 *25*	2280.902	4^+	E2+M1		0.459 *10*	
		791.107[#] *19*	11.6 *3*	1647.980	2^+	E2		0.00415	
		1057.62[#] *10*	58 *10*	1381.287	4^+	E2(+M1)		0.0028 *7*	
		1058.68[#] *9*	100 *10*	1380.301	3^-	[E1]		9.28×10^{-4}	

$^{146}_{62}Sm_{84}$-8

$\gamma(^{146}Sm)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[b]	E_f	J^π_f	Mult.[c]	δ[df]	α[e]	Comments
2439.071	4+	1691.6[@] 10	13[@] 3	747.174	2+				
2513.448	3−	467.762[#] 25	9.7 6	2045.715	4−				
		865.343[‡] 44	19.9 4	1647.980	2+	E1+(M2)	−0.10 +20−26	0.0015 14	
		1132.06[#] 7	17 4	1381.287	4+	[E1]		8.26×10^{-4}	
		1133.12[#] 7	100 4	1380.301	3−	M1+E2	+0.07 +9−7	0.00293 5	δ: from 1992Ad04; the 2nd value +1.14 18.
		1766.278 21	97 2	747.174	2+	E1		7.89×10^{-4}	
2531.934	4+	251.2[#] 4		2280.902	4+				
		376.11[#] 4	2.6 4	2155.824	2+				
		1150.626[#] 15	100 2	1381.287	4+	M1+E2	−0.42 5	0.00268 5	
		1784.762[#] 13	33.6 7	747.174	2+	E2		9.83×10^{-4}	
2544.18	2+	1796.89[#] 8	71 4	747.174	2+				
		2544.21[#] 6	100 3	0.0	0+	E2		9.64×10^{-4}	
2551.97		903.98[#] 25	100 25	1647.980	2+				
		1804.79[#] 24	73 22	747.174	2+				
2589.26		1208.95[@] 15	100[@]	1380.301	3−				
2600.38	7−	516.88[@] 3	9.9[@] 11	2083.432	5−	E2		0.01175	B(E2)(W.u.)=2.7 11
		788.76 3	100[@] 13	1811.674	6+	E1		1.63×10^{-3}	B(E1)(W.u.)=4.1×10^{-5} 17
2605.11		1857.92[#] 5	100	747.174	2+				
2636.03		1255.72[#] 6	100	1380.301	3−				E_γ: doublet line is assumed by 1995Va40, $\Delta E\gamma$ in coincidence measurement can not identify what level of 1380-1381 doublet is populated.
2649.59	(2+)	210.5[#] 5	15 5	2439.071	4+				
		1902.45[#] 6	100 4	747.174	2+				
		2650.35[g‡#i] 17	19.9[g] 15	0.0	0+				E_γ: poor fit; the level energy difference equals 2649.57 6.
2667.19	4−	397.31[#] 6	≈100	2269.885	3+				
		583.76 3	100[@] 6	2083.432	5−	M1		0.01459	
		621.4[@] 1	26[@] 4	2045.715	4−	E0+M1+E2		0.010 3	α: for M1+E2.
		855.45[@] 10	18[@] 2	1811.674	6+	(M2+E3)	0.05 +20−29	0.0149 5	
		1287.6[@] 6	20[@]	1380.301	3−				
2678.287	4+	397.327[#] 26	12.3 13	2280.902	4+	E2+M1		0.031 8	
		522.2[#] 2	2.54 7	2155.824	2+				
		1030.274[#] 37	0.24 4	1647.980	2+				
		1297.029[#] 16	100 2	1381.287	4+	E2+(M1)	−1.25 25	0.00175 8	
		1931.087[#] 20	22.1 6	747.174	2+	E2		9.42×10^{-4}	

$^{146}_{62}Sm_{84}$-9

Adopted Levels, Gammas (continued)

γ(^{146}Sm) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[b]	E_f	J^π_f	Mult.[c]	δ[df]	α[e]	Comments
2684.714	(2$^+$)	403.73 *4*	94 *10*	2280.902	4$^+$				
		1036.66 *8*	66 *4*	1647.980	2$^+$				
		1303.47 *5*	100 *5*	1381.287	4$^+$				
		1937.57 *11*	96 *6*	747.174	2$^+$				
2737.16	8$^+$	136.86 *22*	2.6[@] *3*	2600.38	7$^-$	E1		0.1175	B(E1)(W.u.)=0.00021 *9*
		515.3[@] *8*	1.6[@] *16*	2222.438	6$^+$	[E2]		0.01184	B(E2)(W.u.)=0.5 *5*
		925.52[@] *19*	100[@] *10*	1811.674	6$^+$	E2		0.00293	B(E2)(W.u.)=1.6 *7*
2740.7		1994.0[#] *10*	100	747.174	2$^+$				
2744.28	(4$^+$,5,6$^+$)	463.35[@] *15*	28[@] *5*	2280.902	4$^+$				
		521.9[@] *2*	100[@] *20*	2222.438	6$^+$				
2782.92	(4$^+$,5$^-$)	699.6[@] *10*	[@]	2083.432	5$^-$				
		971.3[@] *2*	100[@] *28*	1811.674	6$^+$				
		1400.8[@] *7*	18[@] *8*	1381.287	4$^+$				
		1402.9[@] *10*	26[@] *13*	1380.301	3$^-$				
2788.224	5$^-$	704.772[#] *19*	100.0 *21*	2083.432	5$^-$	M1		0.00915	
		742.55 *11*	38 *5*	2045.715	4$^-$	E2+M1	−1.2 *+6−11*	0.0061 *11*	
		976.51 *5*	10 *4*	1811.674	6$^+$				
		1406.98 *3*	91.6 *21*	1381.287	4$^+$	(E1)		7.01×10^{-4}	
		1407.2[@] *2*	42 *10*						
2797.67	9$^-$	60.68 *16*	100[@] *10*	2737.16	8$^+$	E1		1.051 *17*	B(E1)(W.u.)=0.00044 *+9−12*
		197.36 *13*	69[@] *11*	2600.38	7$^-$	E2		0.218	B(E2)(W.u.)=12 *+3−4*
		986.0[&] *5*	7.4[@] *8*	1811.674	6$^+$	E3		0.00550	B(E3)(W.u.)=32 *+7−9*
2799.89	3$^+$	715.1[#] *11*		2083.432	5$^-$				
		753.80[‡#i] *8*	4.0 *5*	2045.715	4$^-$			0.00107 *2*	E_γ: poor fit; the level energy difference equals 754.17 *4*.
		2052.71[#] *5*	100 *3*	747.174	2$^+$	M1+E2	+0.501 *+25−23*	1.07×10^{-3} *2*	δ: from 1992Ad04; the 2nd value +4.4 *+5−3*.
2826.3	6$^-$	1014.6[@] *7*	100[@]	1811.674	6$^+$	E1		1.00×10^{-3}	
2829.24	(2$^+$)	549.1[#] *10*	78 *17*	2280.902	4$^+$				
		1448.1[#] *2*	1.0×10^2 *4*	1381.287	4$^+$				
		2081.7[#] *3*	≈56	747.174	2$^+$				
2850.317	4$^+$	172.1[#] *3*		2678.287	4$^+$				
		411.1[@] *10*	[@]	2439.071	4$^+$				
		569.54 *5*	100 *6*	2280.902	4$^+$	M1		0.01551	
		766.838[#] *23*	78 *2*	2083.432	5$^-$				
		804.61 *10*	80.5 *25*	2045.715	4$^-$	(E1+M2)	0.79 *+29−24*	0.0078 *25*	
		1038.35[#] *20*	20.3 *25*	1811.674	6$^+$				

$^{146}_{62}$Sm$_{84}$-10

$\gamma(^{146}Sm)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[b]	E_f	J^π_f	Mult.[c]	α[e]	Comments
2850.317	4+	1469.93 15	83.1 34	1380.301	3−			
		2103.16[#] 5	63.6 25	747.174	2+	E2	9.25×10^{-4}	
2879.11		833.1[#] 2	50 4	2045.715	4−			
		1231.03[#] 10	70 7	1647.980	2+			
		2132.09[#] 10	100 5	747.174	2+			
2898.309	5+	459.6[@] 10	[@]	2439.071	4+			
		814.70[#] 25	1.29 24	2083.432	5−			
		852.2[@] 10	[@]	2045.715	4−			
		1086.636 17	84 2	1811.674	6+	M1	0.00323	
		1517.00 3	100 2	1381.287	4+	M1+E2	0.00137 22	
2905.97	(4+)	636.22[#] 13	1.0×10^2 4	2269.885	3+			
		1094.10[#] 11	14.5 13	1811.674	6+			
		2158.92[#] 13	2.7 12	747.174	2+			
2932.33	(4+)	848.70[ha] 15	100[h] 21	2083.432	5−			
		1120.77[#] 9	19 1	1811.674	6+			
		1551.01 14	93 15	1381.287	4+			
		1552.00 11	61 15	1380.301	3−			
2968.83	2+,3+	1587.53[#] 8	12 8	1381.287	4+			
		1588.53[#] 8	15 8	1380.301	3−			
		2221.64 5	100 4	747.174	2+	M1	1.08×10^{-3}	
2973.34	3+,4+	534.26[#] 9	76 24	2439.071	4+			
		703.46 6	64 12	2269.885	3+			
		1325.35[#] 4	52.9 18	1647.980	2+			
		1592.04[#] 6	100 18	1381.287	4+	(M1+E2)	0.00127 19	
		1593.05[#] 6	100 18	1380.301	3−	[E1]	7.31×10^{-4}	
2974.39	3−	295.59[#] 25	18 4	2678.287	4+			
		891.29[#] 20	100 25	2083.432	5−			
		2227.2[#] 4	≈8.3	747.174	2+			
2978.0		1596.7[@] 10	100[@]	1381.287	4+			
2984.5		1172.8[@] 3	100[@]	1811.674	6+			
3011.24		788.8[h@] 1	100[h@]	2222.438	6+			
3014.624	3+	575.64[#] 16	4.7 14	2439.071	4+			
		733.97[#] 13	10.8 14	2280.902	4+			
		968.83 9	10.6 7	2045.715	4−			
		1202.75 21	1.6 5	1811.674	6+			Mult.: would be M3/E4.
		1366.69[#] 8	7.9 23	1647.980	2+			

$^{146}_{62}Sm_{84}$-11

Adopted Levels, Gammas (continued)

$\gamma(^{146}Sm)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[b]	E_f	J^π_f	Mult.[c]	δ[df]	α[e]
3014.624	3^+	1633.30[#] *3*	94 *2*	1381.287	4^+	M1		1.40×10^{-3}
		2267.49[#] *4*	100 *3*	747.174	2^+	M1		1.08×10^{-3}
3019.54		797.1[@] *2*	[@]	2222.438	6^+			
3020.6	0^+	2273.4[#] *15*	100	747.174	2^+			
3039.5		600.4[#] *10*	100	2439.071	4^+			
3043.13	8^+	305.5[@] *5*	3[@] *3*	2737.16	8^+			
		442.4[@] *3*	7[@] *4*	2600.38	7^-			
		820.68 *3*	100[@] *10*	2222.438	6^+	E2		0.00382
		1231.42 *18*	10.0[@] *11*	1811.674	6^+	E2		1.63×10^{-3}
3058.09		833.11[#] *9*	12.2 *13*	2225.00	(2^+)			
		974.9[#] *1*	100 *5*	2083.432	5^-			
		2310.81[#] *8*	20.8 *10*	747.174	2^+			
3067.703	3^+	1022.05[#] *9*	3.6 *11*	2045.715	4^-			
		1419.70[#] *3*	20.6 *8*	1647.980	2^+			
		1686.397[#] *21*	100.0 *21*	1381.287	4^+	M1+E2	−0.52 *+7−10*	0.00127 *3*
		2320.54[#] *4*	15.2 *4*	747.174	2^+	M1+E2		0.00100 *8*
3072.933	5^+	222.33[#] *10*	3.5 *2*	2850.317	4^+	M1		0.181
		850.49 *10*	56 *3*	2222.438	6^+	M1		0.00580
		989.49[#] *4*	15.8 *5*	2083.432	5^-			
		1027.26[#] *5*	17.4 *7*	2045.715	4^-			
		1691.643[#] *22*	100 *2*	1381.287	4^+	E2+M1	−0.17 *5*	1.32×10^{-3} *2*
3092.39	$(4^+,5,6^+)$	811.35[@] *15*	34[@] *6*	2280.902	4^+			
		1009.1[@] *2*	100[@] *7*	2083.432	5^-			
		1280.8[@] *2*	13.5[@] *18*	1811.674	6^+			
3093.122	3^+	812.21[#] *3*	20.1 *6*	2280.902	4^+	M1		0.00648
		823.21[#] *3*	14.1 *5*	2269.885	3^+	E2		0.00379
		937.29[#] *4*	8.5 *10*	2155.824	2^+			
		1047.36[#] *5*	12.4 *4*	2045.715	4^-			
		1445.136[#] *23*	93.0 *25*	1647.980	2^+	M1+(E2)		0.00149 *25*
		1711.844[#] *22*	53 *1*	1381.287	4^+	M1+E2		0.00116 *15*
		2345.91[#] *30*	100 *2*	747.174	2^+	M1+E2		0.00100 *7*
3099.49	7^-	362.25[@] *15*	6[@] *4*	2737.16	8^+			
		499.1[@] *1*	50[@] *7*	2600.38	7^-			
		877.1[@] *2*	68[@] *8*	2222.438	6^+			

$\gamma(^{146}Sm)$ (continued)

E_i(level)	J^π_i	E_γ [†]	I_γ [b]	E_f	J^π_f	Mult. [c]	δ [df]	α [e]	Comments
3099.49	7⁻	1014.65[@i] *45*	7[@] *5*	2083.432	5⁻				E_γ: poor fit; the level energy difference equals 1016.09 *8*.
		1288.05[@] *15*	100[@] *10*	1811.674	6⁺	E1(+M2)	+0.016 *64*	0.00072 *3*	
3105.38	(2⁺,3,4⁺)	1724.07[#] *6*	100 *14*	1381.287	4⁺				
		1725.08[#] *6*	86 *14*	1380.301	3⁻				
		2358.17[#] *13*	44 *3*	747.174	2⁺				
3123.29	(2⁺,3,4⁺)	445.0[#] *3*	100 *20*	2678.287	4⁺				
		1475.3[#] *3*	5.5 *15*	1647.980	2⁺				
3129.8		848.85[h#] *30*	100[h]	2280.902	4⁺				
3136.38	3⁻	1090.844[‡#i] *21*	23.4 *5*	2045.715	4⁻	M1		0.00321	E_γ: poor fit; the level energy difference equals 1090.660 *25*.
		1488.48[#] *13*	3.8 *4*	1647.980	2⁺				
		1756.08[#] *3*	100 *3*	1380.301	3⁻	M1+E2	−0.10 *4*	1.27×10^{-3}	
		2389.13[#] *4*	16.8 *7*	747.174	2⁺	E1+M2	−0.05 *+4−5*	1.08×10^{-3} *2*	
3151.44		870.55[#] *6*	31 *11*	2280.902	4⁺				
		881.55[#] *3*	100 *5*	2269.885	3⁺				
3166.91	8⁻	369.58 *15*	16[@] *4*	2797.67	9⁻				
		566.54 *4*	100[@] *6*	2600.38	7⁻	M1		0.01572	
3183.28	8⁻	385.60[@] *6*	25[@] *6*	2797.67	9⁻	M1		0.0419	
		445.9[@] *10*	[@]	2737.16	8⁺				
		582.95[@] *19*	100[@] *6*	2600.38	7⁻	D+Q			
3183.928	3⁺	914.031[#] *16*	66.6 *15*	2269.885	3⁺	M1		0.00488	
		1028.10[#] *5*	2.2 *3*	2155.824	2⁺				
		1535.93[#] *5*	18.6 *16*	1647.980	2⁺				
		1802.76[#] *7*	16.5 *9*	1381.287	4⁺	M1+E2		0.00110 *13*	
		2436.74[#] *4*	100.0 *21*	747.174	2⁺	M1+E2	0.35 *10*	1.06×10^{-3} *2*	
3185.67		1102.15[@] *10*	100[@] *10*	2083.432	5⁻				
		1374.3[@] *2*	71[@] *11*	1811.674	6⁺				
3198.84		976.4[@] *2*	100[@]	2222.438	6⁺				
3200.019	4⁻	686.54[#] *10*	7.5 *6*	2513.448	3⁻				
		760.963[#] *23*	21.9 *7*	2439.071	4⁺				
		918.94[#] *6*	16.6 *7*	2280.902	4⁺				
		930.39[#] *11*	4.7 *12*	2269.885	3⁺				
		1116.566[#] *15*	100 *2*	2083.432	5⁻	M1+E2	−0.30 *+9−12*	0.00295 *9*	
		1818.78[#] *3*	29.1 *7*	1381.287	4⁺				

$^{146}_{62}Sm_{84}$-13

$\gamma(^{146}$Sm) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[b]	E_f	J^π_f	Mult.[c]	δ[df]	α[e]
3208.31	(8$^+$)	985.87[@] *3*	100[@]	2222.438	6$^+$	(E2)		0.00256
3220.87	(3$^-$,4,5$^-$)	1137.66[#] *13*	30.7 *21*	2083.432	5$^-$			
		1175.09[#] *11*	100 *21*	2045.715	4$^-$			
		1840.52[#] *6*	14 *6*	1380.301	3$^-$			
3223.9	(2$^+$,3$^+$,4$^+$)	394.7[#] *15*	100	2829.24	(2$^+$)			
3231.63	4$^+$	553.35[#] *11*	100 *18*	2678.287	4$^+$			
		1009.27[#] *11*	3.1 *3*	2222.438	6$^+$			
		2484.39[#] *8*	5.32 *21*	747.174	2$^+$			
3238.646	4$^+$	224.05[#] *3*	22.4 *16*	3014.624	3$^+$			
		837.72[#] *8*	3.2 *4*	2400.92	2$^+$			
		1155.09 *4*	100 *3*	2083.432	5$^-$			
		1427.55[@] *25*	≈100[@]	1811.674	6$^+$			
		1857.33[#] *5*	27 *5*	1381.287	4$^+$			
		1858.34[#] *5*	31 *5*	1380.301	3$^-$			
		2491.51[#] *4*	94.8 *26*	747.174	2$^+$	E2		9.55×10^{-4}
3244.65	(2$^+$,3,4$^+$)	843.72[#] *9*	2.2 *5*	2400.92	2$^+$			
		974.77[#] *8*	100 *15*	2269.885	3$^+$			
		1088.83[#] *8*	21.2 *20*	2155.824	2$^+$			
		1596.66[#] *7*	66 *3*	1647.980	2$^+$			
		1863.29[#] *17*	9.7 *9*	1381.287	4$^+$			
		2497.46[#] *5*	42.4 *11*	747.174	2$^+$			
3259.934	5$^-$	202.2[#] *4*	0.61 *12*	3058.09				
		471.67[#] *4*	2.23 *11*	2788.224	5$^-$			
		658.3[@] *10*		2600.38	7$^-$			
		820.0[@] *10*		2439.071	4$^+$			
		979.09[#] *10*	2.74 *18*	2280.902	4$^+$			
		1176.522[#] *24*	100.0 *24*	2083.432	5$^-$	M1+E2	0.77 *10*	0.00235 *7*
		1214.209[#] *21*	19.5 *4*	2045.715	4$^-$	M1+E2	0.75 *+26−13*	0.00220 *13*
		1448.21[#] *6*	5.7 *2*	1811.674	6$^+$			
		1878.62[#] *3*	9.2 *6*	1381.287	4$^+$	E1		8.36×10^{-4}
		1879.63[#] *3*	4.9 *6*	1380.301	3$^-$	[E2]		9.53×10^{-4}
3278.14		1055.7[@] *2*	100[@]	2222.438	6$^+$			
3278.18	2$^+$	449.2[#] *5*	1.0×10^2 *4*	2829.24	(2$^+$)			
		1896.85[#] *19*	6 *3*	1381.287	4$^+$			
		1897.85[#] *19*	6 *3*	1380.301	3$^-$			

$^{146}_{62}$Sm$_{84}$-14

γ(^{146}Sm) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[b]	E_f	J^π_f	Mult.[c]	δ[df]	α[e]	Comments
3288.60	(2+,3,4+)	459.35[#] *6*	1.0×10² *3*	2829.24	(2+)				
		548.4[#] *10*	6.7 *19*	2740.7					
3290.7	8+	492.7[@] *10*	29[@] *11*	2797.67	9−				
		690.2[@] *10*	20[@] *10*	2600.38	7−				
		1479.0[@] *3*	100[@] *26*	1811.674	6+	E2(+M3)	−0.11 *+12−13*	0.00126 *23*	
3327.0		1243.6[@] *4*	100[@]	2083.432	5−				
3329.90	(2+,3,4+)	1681.94[#] *13*	29 *2*	1647.980	2+				
		1948.65[#] *6*	100 *4*	1381.287	4+				
		2582.51[#] *11*	13.2 *9*	747.174	2+				
3338.27	3+	550.4[#] *3*	28 *5*	2788.224	5−				
		937.33[#] *8*	1.8 *3*	2400.92	2+				
		1068.32[#] *7*	27.5 *14*	2269.885	3+				
		1956.97[#] *4*	100 *24*	1381.287	4+				
		2591.11[#] *8*	15.4 *5*	747.174	2+	M1+(E2)		0.00103 *7*	
3340.26	(5−,6−)	552.0[@] *10*	[@]	2788.224	5−				
		672.9[@] *10*	[@]	2667.19	4−				
		739.85[@] *10*	86[@] *14*	2600.38	7−				
		1117.95[@] *15*	100[@] *18*	2222.438	6+				
		1256.7[@] *2*	29[@] *4*	2083.432	5−				
		1528.3[@] *10*	[@]	1811.674	6+				
3354.64	9−	187.75 *5*	5.6 *3*	3166.91	8−	[M1]		0.287	B(M1)(W.u.)=0.0053 *+9−11*
		556.9 *1*	100[@] *6*	2797.67	9−	M1+E2	−0.35 *+19−17*	0.0157 *8*	B(M1)(W.u.)=0.0032 *+7−8*; B(E2)(W.u.)<1.4
		617.46 *13*	10[@] *3*	2737.16	8+	[E1]		0.00271	B(E1)(W.u.)=2.9×10^{-6} *+10−11*
		754.17 *18*	6.7[@] *6*	2600.38	7−	E2		0.00463	B(E2)(W.u.)=0.097 *+18−20*
3361.08	3−,4−	847.5[@] *10*		2513.448	3−				
		1277.55[#] *6*	29.3 *13*	2083.432	5−				
		1980.79[#] *3*	100 *4*	1380.301	3−	M1		1.13×10^{-3}	
3368.76	(4+)	1987.44[#] *15*	70 *40*	1381.287	4+				
		1988.45[#] *15*	100 *40*	1380.301	3−				
		2621.56[#] *11*	57 *4*	747.174	2+				
3376.78	4+	937.68[#] *8*	15 *6*	2439.071	4+				
		1293.48[#] *13*	40 *4*	2083.432	5−				
		1330.33[‡#i] *20*	10.3 *14*	2045.715	4−				E_γ: poor fit; the level energy difference equals 1331.02 *4*.

$^{146}_{62}$Sm$_{84}$-15

Adopted Levels, Gammas (continued)

γ(^{146}Sm) (continued)

E_i(level)	J^π_i	E_γ [†]	I_γ [b]	E_f	J^π_f	Mult. [c]	δ [df]	α [e]	Comments
3376.78	4+	1728.76[#] 7	4.1 11	1647.980	2+				
		1995.75[#i] 9	100 4	1381.287	4+	M1+E2		0.00103 10	E_γ: poor fit; the level energy difference equals 1995.44 4.
		2629.50[#] 5	22.9 6	747.174	2+	E2		9.80×10^{-4}	
3377.14		210.6[@] 10	100[@] 23	3166.91	8−				
		776.75[@] 15	91[@] 17	2600.38	7−				
3378.45	(3−,4,5−)	1294.3[@] 10	[@]	2083.432	5−				
		1332.74[#] 4	100 4	2045.715	4−	D+Q			
		1998.00[#] 15	46 6	1380.301	3−				
3391.1		1579.45[@] 45	100[@]	1811.674	6+				
3391.678	3−	459.4[#] 2	38 3	2932.33	(4+)				
		1110.79[#] 5	9.3 21	2280.902	4+				
		1743.69[#] 3	27.0 13	1647.980	2+				
		2010.37[#] 4	43 7	1381.287	4+				
		2011.38[#] 4	100 7	1380.301	3−	M1+E2		0.00103 10	
		2644.43[#] 5	77.1 21	747.174	2+	E1		1.20×10^{-3}	
3397.62	(4+)	1175.0[#] 2	100 18	2222.438	6+				
		2017.40[#] 13	21.2 16	1380.301	3−				
		2650.35[g#] 17	7.1[g] 6	747.174	2+				
3412.7	(4+,5,6−)	1190.2[@] 10	[@]	2222.438	6+				
		1367.1[@] 10	[@]	2045.715	4−				
3418.98	3+	1137.8[#] 3	32 2	2280.902	4+				
		1335.52[#] 9	100 5	2083.432	5−				
		1373.5[a] 1		2045.715	4−				
		2037.86[#] 7	54.3 18	1381.287	4+				
		2671.65[#] 5	29.6 8	747.174	2+	M1+E2		0.00105 7	δ: from 1992Ad04; −0.21 +8−9 or −2.1 +4−5.
3427.77		2680.57[#] 7	100	747.174	2+				
3431.28	3−,4−	1347.79[#] 6	36.1 17	2083.432	5−				
		1385.60[#] 6	1.0×10^{2} 6	2045.715	4−				
		2049.96[#] 8	23 3	1381.287	4+				
		2050.97[#] 8	97 13	1380.301	3−				
3461.572	5−	948.14[#] 15	0.54 9	2513.448	3−				
		1378.135[#] 19	35.9 8	2083.432	5−	M1+E2		0.00189	δ: from 1992Ad04; −0.12 8 or +0.97 15.
		1415.859[#] 21	14.5 3	2045.715	4−	M1+E2	+0.45 +7−5	0.00171 4	
		1649.76[#] 10	8.9 11	1811.674	6+				

γ(^{146}Sm) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[b]	E_f	J_f^π	Mult.[c]	α[e]	Comments
3461.572	5⁻	2080.05[#] *15*	44 *17*	1381.287	4⁺	E1	9.29×10^{-4}	
		2081.11[#] *15*	100 *17*	1380.301	3⁻	E2	9.25×10^{-4}	
3465.84		1184.93[#] *3*	100	2280.902	4⁺			
3471.90	(2⁺),3⁺	1191.01[#] *10*	42 *13*	2280.902	4⁺			
		1823.90[#] *10*	28 *6*	1647.980	2⁺			
		2724.70[#] *6*	100 *3*	747.174	2⁺	M1	1.12×10^{-3}	
3475.09	5⁺,(6⁺)	624.75[#] *14*	100 *12*	2850.317	4⁺			
		1663.42[#] *6*	80 *2*	1811.674	6⁺	M1(+E2)	0.00120 *16*	
		2092.7[@] *7*		1381.287	4⁺			
3476.95	(2⁺,3,4,5⁻)	2095.64[#] *20*	100 *13*	1381.287	4⁺			
		2096.64[#] *20*	100 *13*	1380.301	3⁻			
3484.3	(4⁺,5,6⁻)	818.3[@] *10*		2667.19	4⁻			
		1672.5[@] *3*		1811.674	6⁺			
3509.34	(3⁺)	441.43[#] *12*	50 *6*	3067.703	3⁺			
		721.24[#] *8*	100 *7*	2788.224	5⁻			
		1239.86[#] *20*	15 *4*	2269.885	3⁺			
		2762.04[#] *8*	27.0 *11*	747.174	2⁺	(M1+E2)	0.00107 *7*	
3517.37	3⁺	380.91[#] *7*	83 *3*	3136.38	3⁻			
		1004.3[#] *4*	8.3 *25*	2513.448	3⁻			
		1078.29[#] *7*	31.7 *11*	2439.071	4⁺			
		1471.63[#] *14*	58.0 *25*	2045.715	4⁻			
		1869.86[#] *25*	6.1 *13*	1647.980	2⁺			
		2137.08[#] *4*	100.0 *25*	1380.301	3⁻	E1(+M2)	9.64×10^{-4} *16*	δ: from 1992Ad04; $-0.18\le\delta\le+2.0$.
		2770.12[#] *8*	16.0 *6*	747.174	2⁺	M1+E2	0.00107 *7*	
3530.59	4⁺	845.81[#] *10*	40 *9*	2684.714	(2⁺)			
		852.28[#] *12*	42 *10*	2678.287	4⁺			
		881.5[#] *2*	38.7 *22*	2649.59	(2⁺)			
		998.7[#] *3*	4.9 *14*	2531.934	4⁺			
		1017.08[#] *16*	18.8 *23*	2513.448	3⁻			
		1260.89[#] *9*	25.7 *19*	2269.885	3⁺			
		1447.12[#] *9*	100 *19*	2083.432	5⁻			
		1484.72[#] *8*	88 *4*	2045.715	4⁻	E1	7.07×10^{-4}	
		2149.2[#] *3*	32 *11*	1381.287	4⁺			
3546.17	2⁺,3⁺	1898.17[#] *8*	27 *7*	1647.980	2⁺			
		2164.86[#] *5*	100 *3*	1381.287	4⁺			

$^{146}_{62}$Sm$_{84}$-17

γ(^{146}Sm) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[b]	E_f	J^π_f	Mult.[c]	α[e]	Comments
3546.17	2+,3+	2798.97[#] *6*	64.7 *20*	747.174	2+	M1+E2	0.00107 *7*	
3560.28		393.2[@] *10*	100[@] *22*	3166.91	8−			
		460.8[@] *2*	98[@] *28*	3099.49	7−			
3565.4		1753.75[@] *35*	100[@]	1811.674	6+			
3567.47	9+	401.0 *5*	2.4[@] *6*	3166.91	8−			
		524.33[@] *3*	100[@] *7*	3043.13	8+	M1	0.0191	
		830.6[@] *3*	≤22[@]	2737.16	8+			
3568.4		2187.1[@] *10*	100[@]	1381.287	4+			
3580.2	(4+)	1496.8[@] *3*	100[@]	2083.432	5−			
3583.85	4−	399.81[#] *10*	8.1 *23*	3183.928	3+			
		569.11[#] *10*	11 *3*	3014.624	3+			
		783.96[#] *3*	27.6 *12*	2799.89	3+			
		1500.44[#] *3*	73.6 *23*	2083.432	5−	M1+E2	0.00139 *22*	
		2203.73[‡#i] *3*	100.0 *23*	1380.301	3−	M1+E2	0.00100 *8*	E_γ: poor fit; the level energy difference equals 2203.55 *3*. δ: from 1992Ad04; +4.6 *+19−12* or +0.43 *+8−9*.
3591.74	(4+)	534.1[#] *2*	100 *6*	3058.09				
		1190.1[#] *3*	76.3 *24*	2400.92	2+			
		1944.3[#] *3*	9.6 *23*	1647.980	2+			
		2210.35[#] *6*	71.3 *26*	1381.287	4+			
		2845.0[#] *3*	1.2 *4*	747.174	2+			
3593.2		2212.9[@] *10*	100[@]	1380.301	3−			
3594.89		1783.2[@] *2*	100[@]	1811.674	6+			
3605.83	3−	422.3[#] *3*	30 *9*	3183.928	3+			
		1166.67[#] *10*	39 *7*	2439.071	4+			
		1336.01[#] *9*	100 *7*	2269.885	3+			
		2858.2[#] *3*	4.6 *11*	747.174	2+			
3620.0		1808.35[@] *25*	100[@]	1811.674	6+			
3626.046	4+	532.87[#] *7*	41.4 *25*	3093.122	3+	E2	0.01085	
		611.46[#] *25*	4.7 *13*	3014.624	3+			
		826.32[#] *12*	4.3 *6*	2799.89	3+	E2,M1	0.0050 *13*	
		941.30[#] *3*	50.2 *16*	2684.714	(2+)			
		1094.11[#] *6*	18 *7*	2531.934	4+			
		1186.98[#] *10*	9.8 *6*	2439.071	4+			
		1225.39[#] *11*	4.2 *4*	2400.92	2+			
		1345.176[#] *22*	48.9 *13*	2280.902	4+	M1+E2	0.0017 *3*	δ: from 1992Ad04; −0.16≤δ≤1.3.

γ(^{146}Sm) (continued)

E_i(level)	J^π_i	E_γ [†]	I_γ [b]	E_f	J^π_f	Mult. [c]	δ [d f]	α [e]	Comments
3626.046	4+	1356.145[#] *17*	100 *2*	2269.885	3+	M1+E2	+0.05 *+7−8*	0.00196	δ: from 1992Ad04; the 2nd value −6.9 *+24−79*.
		1470.21[#] *4*	6.2 *19*	2155.824	2+				
		1542.56[#] *3*	33.0 *9*	2083.432	5−				
		1580.16[#] *18*	4.0 *5*	2045.715	4−				
		1978.20[#] *6*	16.0 *6*	1647.980	2+				
		2244.71[#] *4*	50.2 *13*	1381.287	4+	M1+E2		0.00100 *8*	δ: from 1992Ad04; $-1.1\leq\delta\leq28$.
		2878.76[#] *10*	2.02 *16*	747.174	2+				
3633.5		1033.1[@] *10*	100[@]	2600.38	7−				
3646.99	(2+,3,4+)	553.8[#] *10*	1.0×10^2 *3*	3093.122	3+				
		1491.16[#] *3*	100 *12*	2155.824	2+				
3652.22	(3−),4+	1371.33[#] *10*	20 *8*	2280.902	4+				
		1496.39[#] *10*	25 *8*	2155.824	2+				
		1568.93[#] *10*	97 *13*	2083.432	5−				
		2004.25[#] *11*	76 *6*	1647.980	2+				
		2904.87[#] *9*	100 *6*	747.174	2+	E2		1.04×10^{-3}	
3654.19	(2+,3,4+)	415.52[#] *16*	27 *9*	3238.646	4+				
		1110.03[#] *16*	100 *14*	2544.18	2+				
		1373.29[#] *15*	64 *23*	2280.902	4+				
		1498.35[#] *14*	36 *10*	2155.824	2+				
		2906.99[#] *13*	70 *10*	747.174	2+				
3669.78		1069.4[@] *2*	100[@]	2600.38	7−				
3685.3		1084.9[@] *10*	100[@]	2600.38	7−				
3693.44	(2+,3,4+)	1161.75[#] *14*	100 *12*	2531.934	4+				
		2946.10[#] *10*	65 *7*	747.174	2+				
3701.09	(7−,8,9)	346.5[@] *10*	100[@] *25*	3354.64	9−				
		534.20[@] *12*	34[@] *8*	3166.91	8−				
		657.85[@] *25*	58[@] *11*	3043.13	8+				
3715.62		2968.41[#] *18*	100[@]	747.174	2+				
3720.53	3−	653.0[#] *3*	100 *30*	3067.703	3+				
		2072.50[#] *15*	32 *4*	1647.980	2+				
		2973.3[g#] *4*	3.3[g] *8*	747.174	2+				
3740.78	(3,4+)	1208.82[#] *8*	99 *6*	2531.934	4+				
		2360.49[#] *14*	100 *6*	1380.301	3−				
		2993.61[#] *24*	6.7 *7*	747.174	2+				
3749.43	(3−,4+)	1667.0[#] *7*	100 *43*	2083.432	5−				

$^{146}_{62}Sm_{84}$-19

$\gamma(^{146}Sm)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[b]	E_f	J^π_f	Mult.[c]	α[e]	Comments
3749.43	(3−,4+)	2368.93[#] 22	56 6	1380.301	3−			
		3002.24[#] 12	44.3 21	747.174	2+			
3753.57	10−	955.90 3	100[@]	2797.67	9−	M1	0.00438	
3766.9		1166.5[@] 10	100[@]	2600.38	7−			
3770.32	2+	372.67[#] 23	1.0×10^2 3	3397.62	(4+)			
		749.8[#] 15	70 7	3020.6	0+			
		838.02[#] 15	6.9 14	2932.33	(4+)			
		2389.00[#] 17	80.3 14	1381.287	4+			
3774.66	10+	207.16 7	100[@] 4	3567.47	9+	E2+M1	0.202 17	
		731.56 15	36[@] 3	3043.13	8+			
3783.47	11−	985.85[@] 7	100[@]	2797.67	9−	E2	0.00256	B(E2)(W.u.)=1.3 +4−6
3786.03	(2+,3,4+)	1385.6[#] 3	100 3	2400.92	2+			
		2404.74[#] 22	21.4 19	1381.287	4+			
		3038.50[#] 23	1.53 17	747.174	2+			
3790.06	3−,4−	606.22[#] 22	100 24	3183.928	3+			
		1565.02[#] 20	≤71	2225.00	(2+)			
		3042.85[#] 8	15 3	747.174	2+			
3800.7		1989.0[@] 10	100[@]	1811.674	6+			
3804.25	(3−,4,5+)	544.32[#] 13	1.0×10^2 4	3259.934	5−			
		736.55[#] 11	57 6	3067.703	3+			
		1063.6[#] 7	6.4 21	2740.7				
		1198.3[#] 10	6 5	2605.11				
3809.6		766.5[@] 10	100	3043.13	8+			
3815.2		1078.0[@] 10	100	2737.16	8+			
3825.5		1027.8[@] 10	100	2797.67	9−			
3869.7		2058.0[@] 10	100	1811.674	6+			
3924.49	(9−)	171.10 45	22 5	3753.57	10−			
		569.83 7	98 15	3354.64	9−	D		
		757.62 10	100 11	3166.91	8−	D+Q		
3963.4		2151.7[@] 10	100	1811.674	6+			
3970.25		1172.57[@] 14	100	2797.67	9−			
3990.3	(3−),4−	650.0[@] 10	100	3340.26	(5−,6−)			
4005.7		1208.0[@] 10		2797.67	9−			
		1268.5[@] 10		2737.16	8+			
4032.4		833.55[@] 15	100	3198.84				

$^{146}_{62}Sm_{84}$-20

γ(^{146}Sm) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[b]	E_f	J^π_f	Mult.[c]	α[e]	Comments
4033.5	(11$^+$)	259.0[&] *5*		3774.66	10$^+$			
		466.0[&] *5*		3567.47	9$^+$			
4080.14		725.5[@] *2*	100	3354.64	9$^-$			
4091.25	11$^-$	167.0[&] *5*		3924.49	(9$^-$)			
		308.0 *5*		3783.47	11$^-$			
		736.8 *3*	100 *10*	3354.64	9$^-$	E2	0.00489	B(E2)(W.u.)=6.8 *+20−23*
		1293.57[@] *3*	71 *7*	2797.67	9$^-$	E2	1.49×10^{-3}	B(E2)(W.u.)=0.29 *+9−10*
4125.99		771.35[@] *10*	100	3354.64	9$^-$			
4127.8		1390.6[@] *10*	100	2737.16	8$^+$			
4135.7		1398.5[@] *10*	100	2737.16	8$^+$			
4143.89	(10$^-$,11$^-$)	1346.17 *19*	100	2797.67	9$^-$			
4145.3	(10$^+$)	1408.1 *5*	100	2737.16	8$^+$			
4164.5		1121.4[@] *10*	100	3043.13	8$^+$			
4194.90	12$^+$	411.40 *15*	100[&] *17*	3783.47	11$^-$	(E1)	0.00678	B(E1)(W.u.)=0.00033 *10*
		1397.0[&] *5*	0.68[&] *12*	2797.67	9$^-$	E3	0.00247	B(E3)(W.u.)=60 *17*
4202.21	(11$^+$)	427.53[@] *5*	100	3774.66	10$^+$	(M1+E2)	0.026 *7*	
4239.3		948.6[@] *2*	100	3290.7	8$^+$			
4282.32		1545.15[@] *15*	100	2737.16	8$^+$			
4341.15	(11$^-$)	250.00 *18*	80 *8*	4091.25	11$^-$	D		
		558.1[@] *2*	100 *70*	3783.47	11$^-$			
		566.0[&] *5*		3774.66	10$^+$			
		1543.0[&] *5*		2797.67	9$^-$			
4461.34	(12$^-$)	120.43 *18*	18 *2*	4341.15	(11$^-$)	(M1+E2)	1.10 *11*	
		259.13[@] *3*	9 *5*	4202.21	(11$^+$)	E1	0.0214	B(E1)(W.u.)>0.00013
		317.0[&] *5*		4143.89	(10$^-$,11$^-$)			
		370.08 *7*	100 *8*	4091.25	11$^-$	M1	0.0466	B(M1)(W.u.)>0.045
		428.0[&] *5*		4033.5	(11$^+$)			
		678.0[@] *3*	15 *5*	3783.47	11$^-$			
4579.75	(12$^-$)	238.62 *10*	100	4341.15	(11$^-$)	D		
		436.0[&] *5*		4143.89	(10$^-$,11$^-$)			
4628.77	13$^-$	167.43 *3*	100 *17*	4461.34	(12$^-$)	(M1+E2)	0.388 *9*	
		433.0[&] *5*		4194.90	12$^+$	(E1)	0.00601	
		537.5 *1*	58 *6*	4091.25	11$^-$	E2	0.01060	B(E2)(W.u.)=15 *7*
4752.24	(13$^-$)	172.52 *10*	36 *5*	4579.75	(12$^-$)	(M1+E2)	0.353 *11*	
		290.89 *10*	100 *10*	4461.34	(12$^-$)	D		
		969.0[&] *5*		3783.47	11$^-$			
4969.51	(14$^-$)	217.29 *10*	17 *2*	4752.24	(13$^-$)	D		

From ENSDF

$^{146}_{62}Sm_{84}$-21

Adopted Levels, Gammas (continued)

$\gamma(^{146}Sm)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[b]	E_f	J_f^π	Mult.[c]	α[e]
4969.51	(14^-)	340.7 *1*	100 *10*	4628.77	13^-	D	
5129.47	13^-	1346.0[@] *1*	100	3783.47	11^-	E2	1.39×10^{-3}
5144.2		392.0[&] *5*	100	4752.24	(13^-)		
5206.29	14^+	1011.39 *1*	100	4194.90	12^+	E2	0.00243
5218.03	(15^-)	248.5 *1*	100 *10*	4969.51	(14^-)	M1	0.1338
		589.26 *18*	44 *8*	4628.77	13^-		
5517.42	(16^-)	299.39 *10*	100 *10*	5218.03	(15^-)	(M1+E2)	0.069 *13*
		547.91 *18*	35 *5*	4969.51	(14^-)	E2	0.01009
5613.93	(15^-)	644.42 *12*	100	4969.51	(14^-)	(M1+E2)	0.0091 *24*
5697.18	(16^+)	479.07 *26*	100 *30*	5218.03	(15^-)		
		490.9 *1*	76 *8*	5206.29	14^+	E2	0.01347
5800.2		656.0[&] *5*	100[&]	5144.2			
5873.0		259.1 *12*	100	5613.93	(15^-)		
5972.3		454.9[@] *3*	100	5517.42	(16^-)		
6176.9	(18^+)	479.71 *26*	100	5697.18	(16^+)		

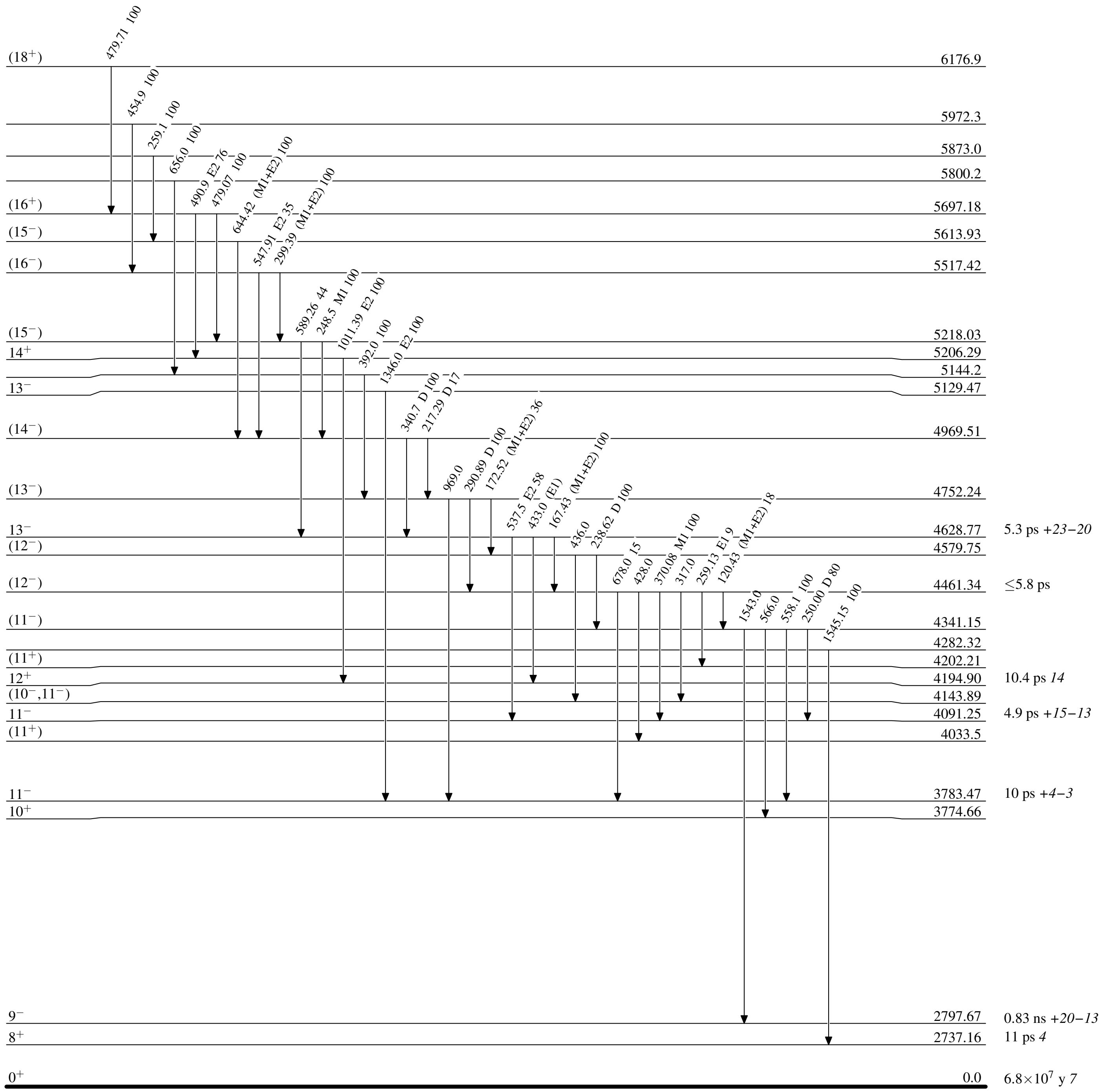
[†] Weighted average, except as noted.
[‡] Not taken in to account in a least-squares fitting.
[#] From ^{146}Eu $\varepsilon+\beta^+$ decay.
[@] From ^{144}Nd(α,xnγ).
[&] From ^{139}La(^{11}B,4nγ).
[a] Unweighted average.
[b] From ^{146}Eu $\varepsilon+\beta^+$ decay to the energy levels <3809 keV and from (α,xn) reaction above this energy, unless otherwise stated.
[c] From α(exp), $\gamma(\theta)$ at oriented nuclei, $\gamma\gamma(\theta)$ and RUL.
[d] From $\gamma(\theta)$ in ^{146}Eu $\varepsilon+\beta^+$ decay and $\gamma(\theta)$ in Nd(α,xnγ).
[e] Additional information 1.
[f] If No value given it was assumed δ=1.00 for E2/M1 and δ=0.10 for the other multipolarities.
[g] Multiply placed with undivided intensity.
[h] Multiply placed with intensity suitably divided.
[i] Placement of transition in the level scheme is uncertain.

$^{146}_{62}Sm_{84}$-22

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level

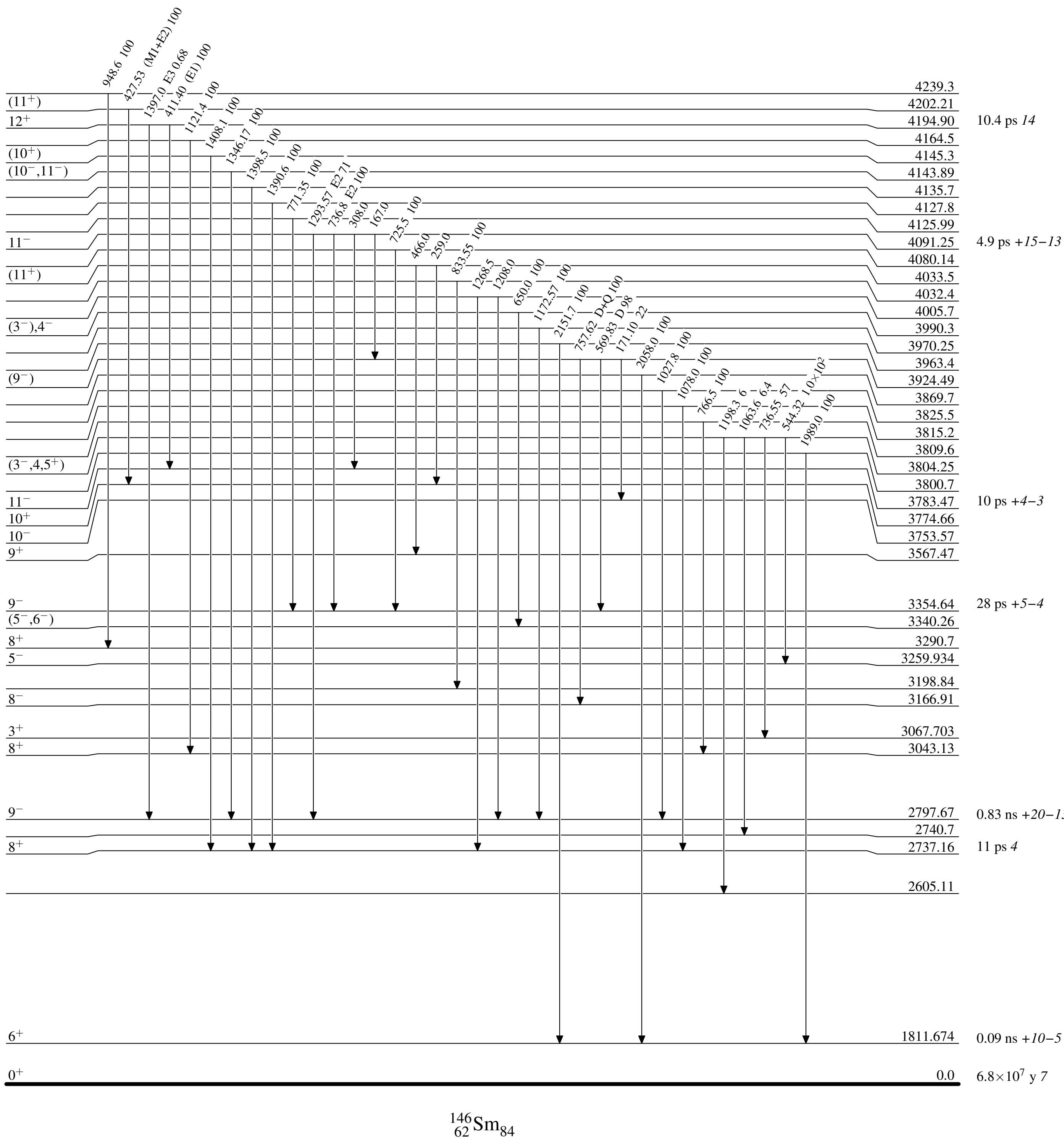


$^{146}_{62}Sm_{84}$

Adopted Levels, Gammas

Level Scheme (continued)

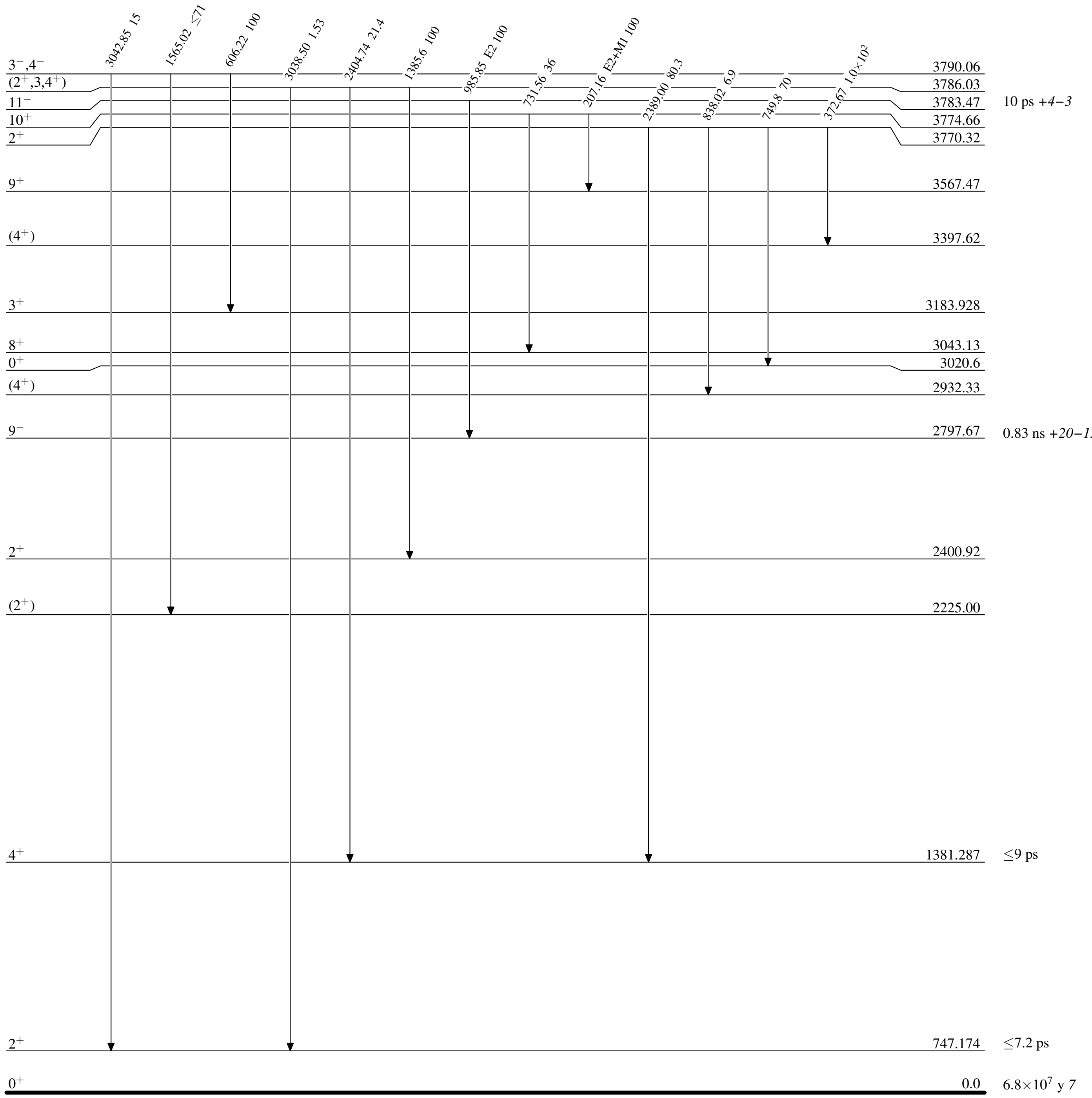
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

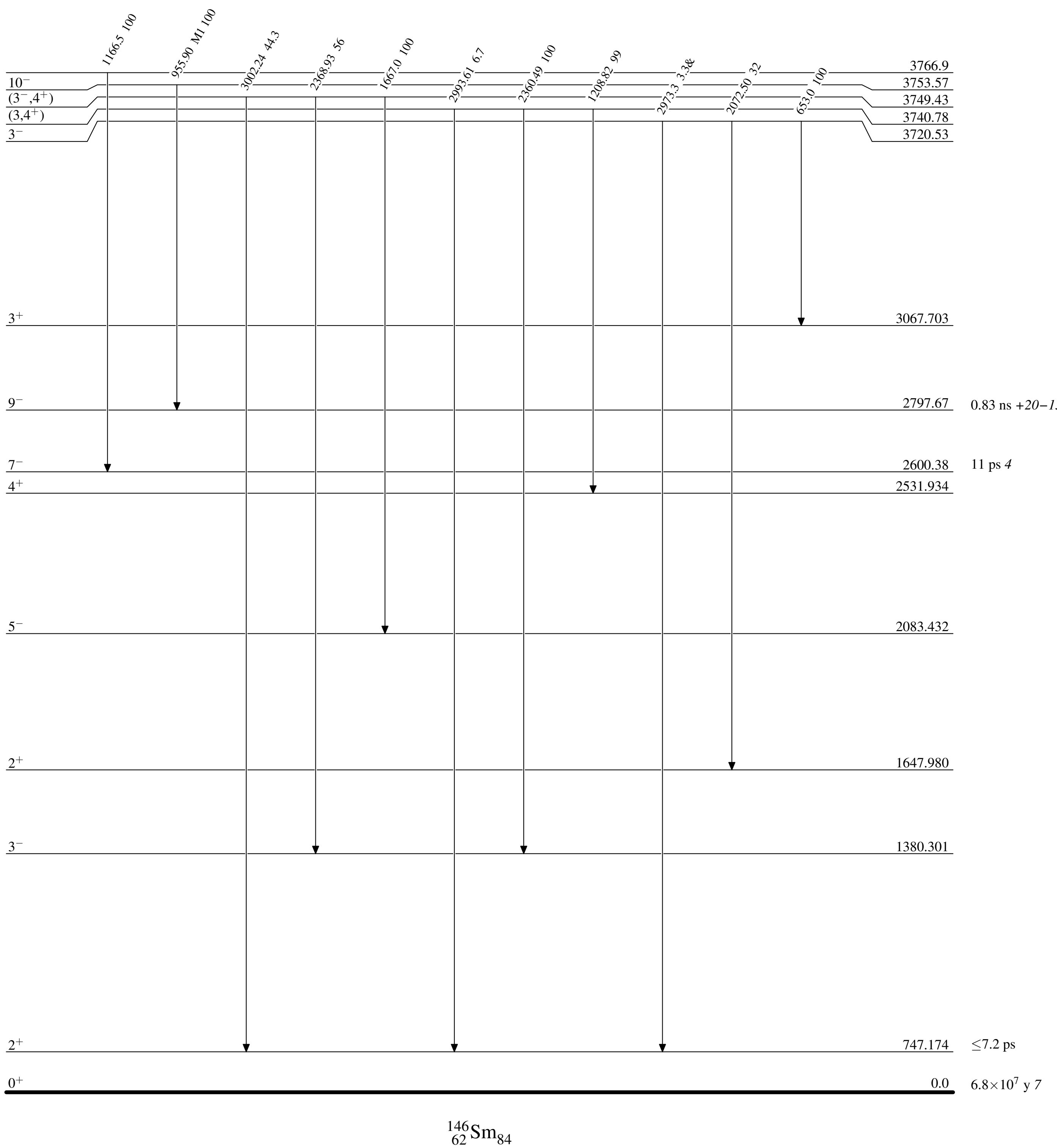


$^{146}_{62}Sm_{84}$

Adopted Levels, Gammas

Level Scheme (continued)

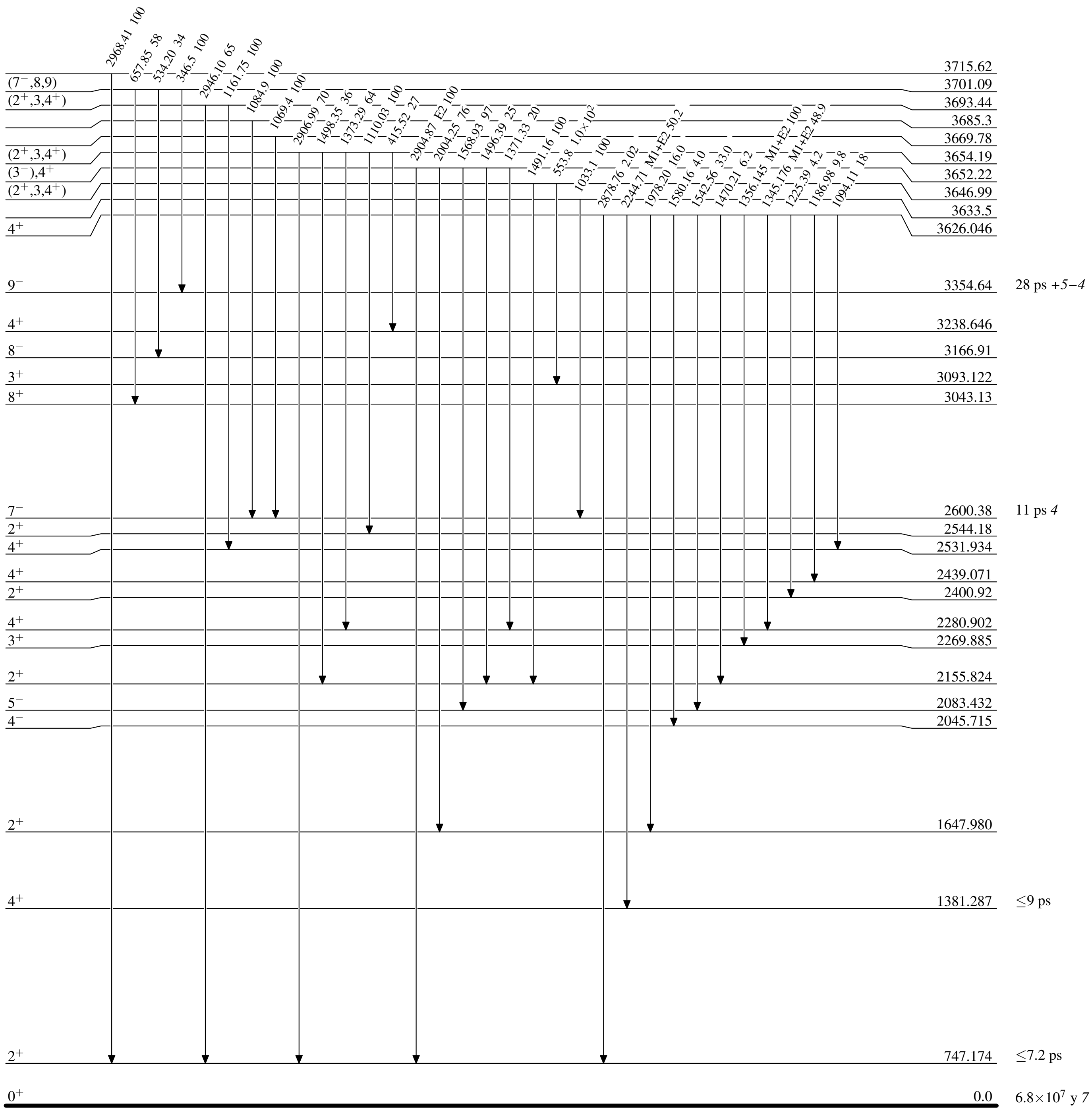
Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

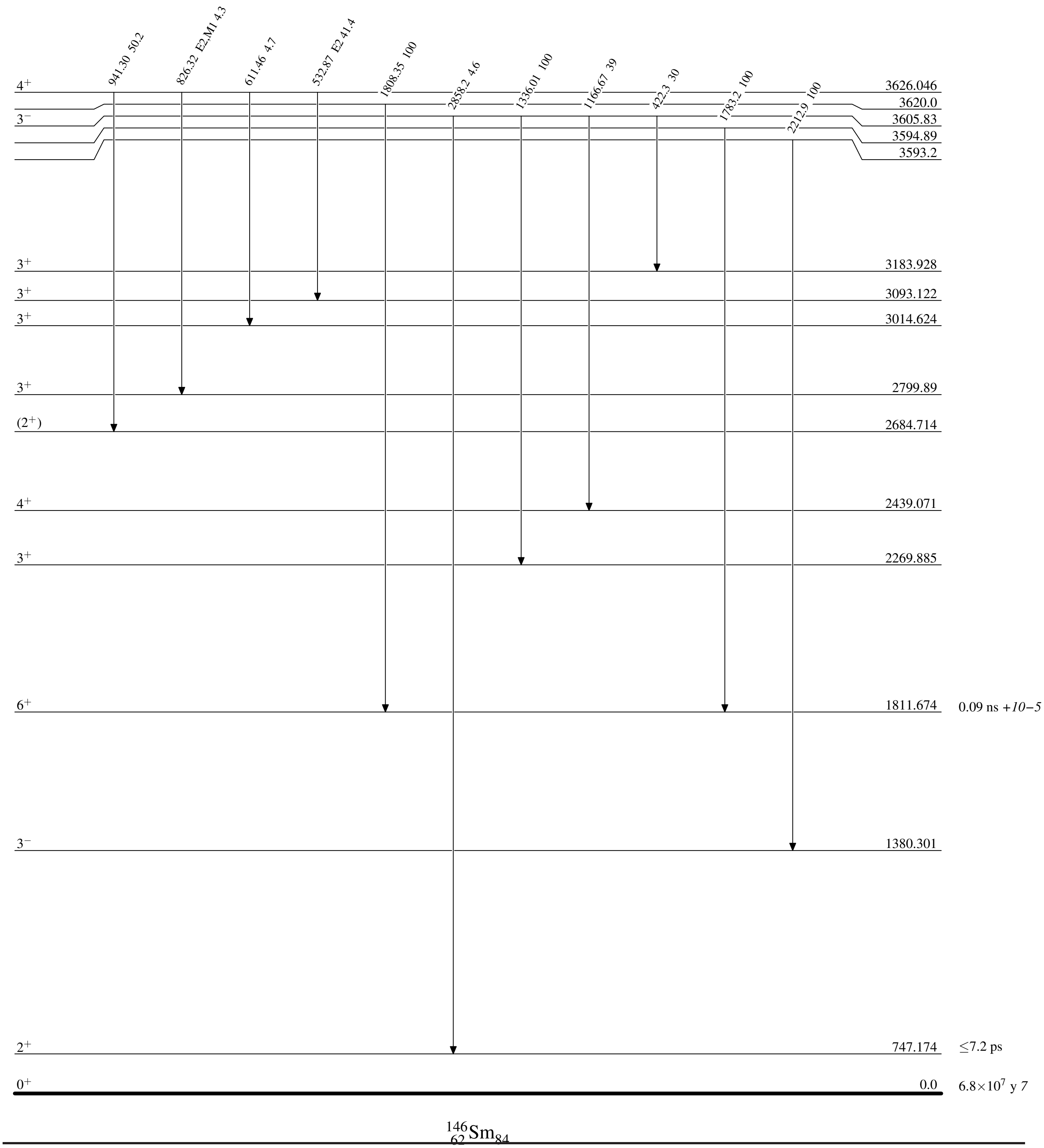


$^{146}_{62}Sm_{84}$

Adopted Levels, Gammas

Level Scheme (continued)

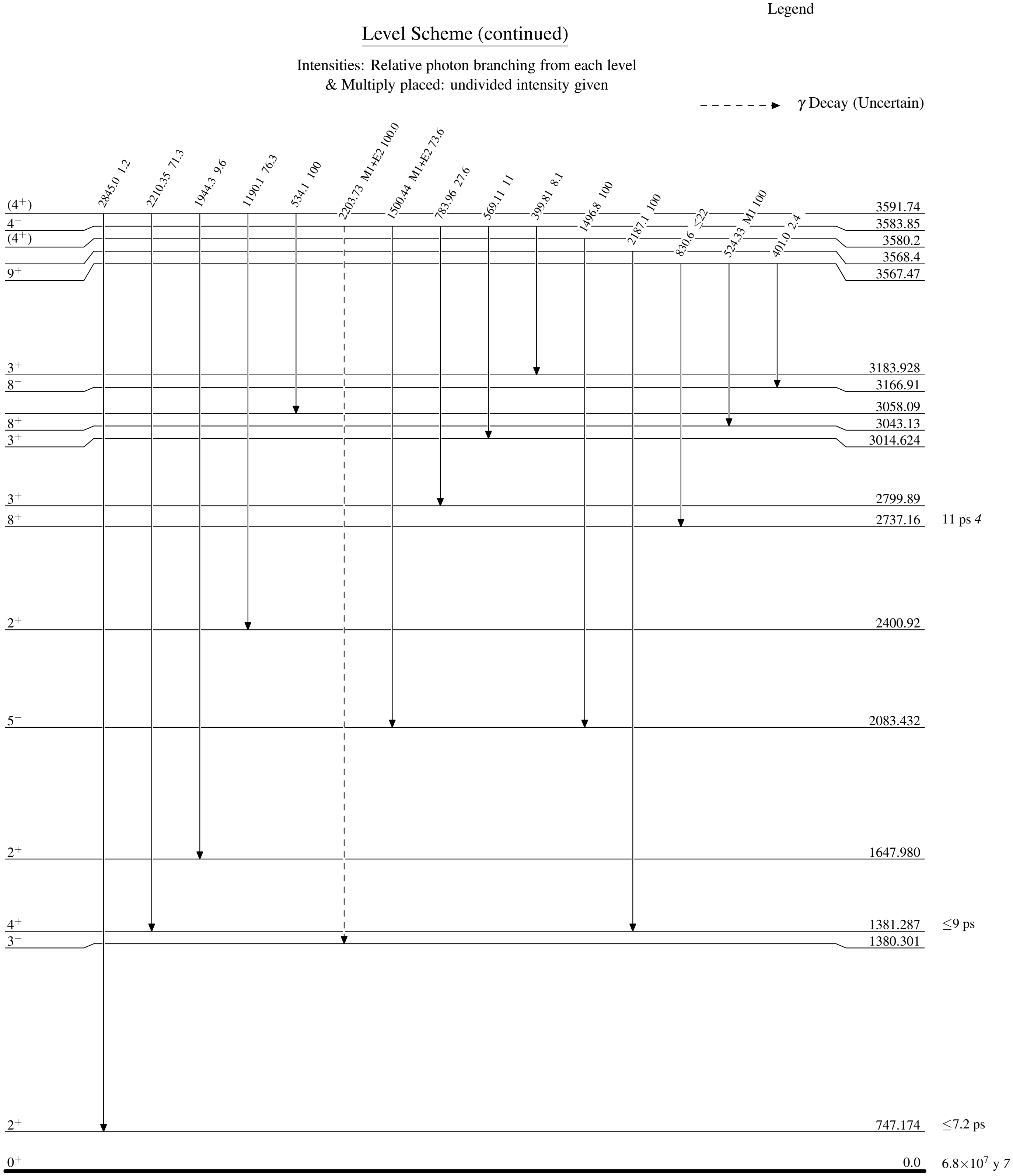
Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

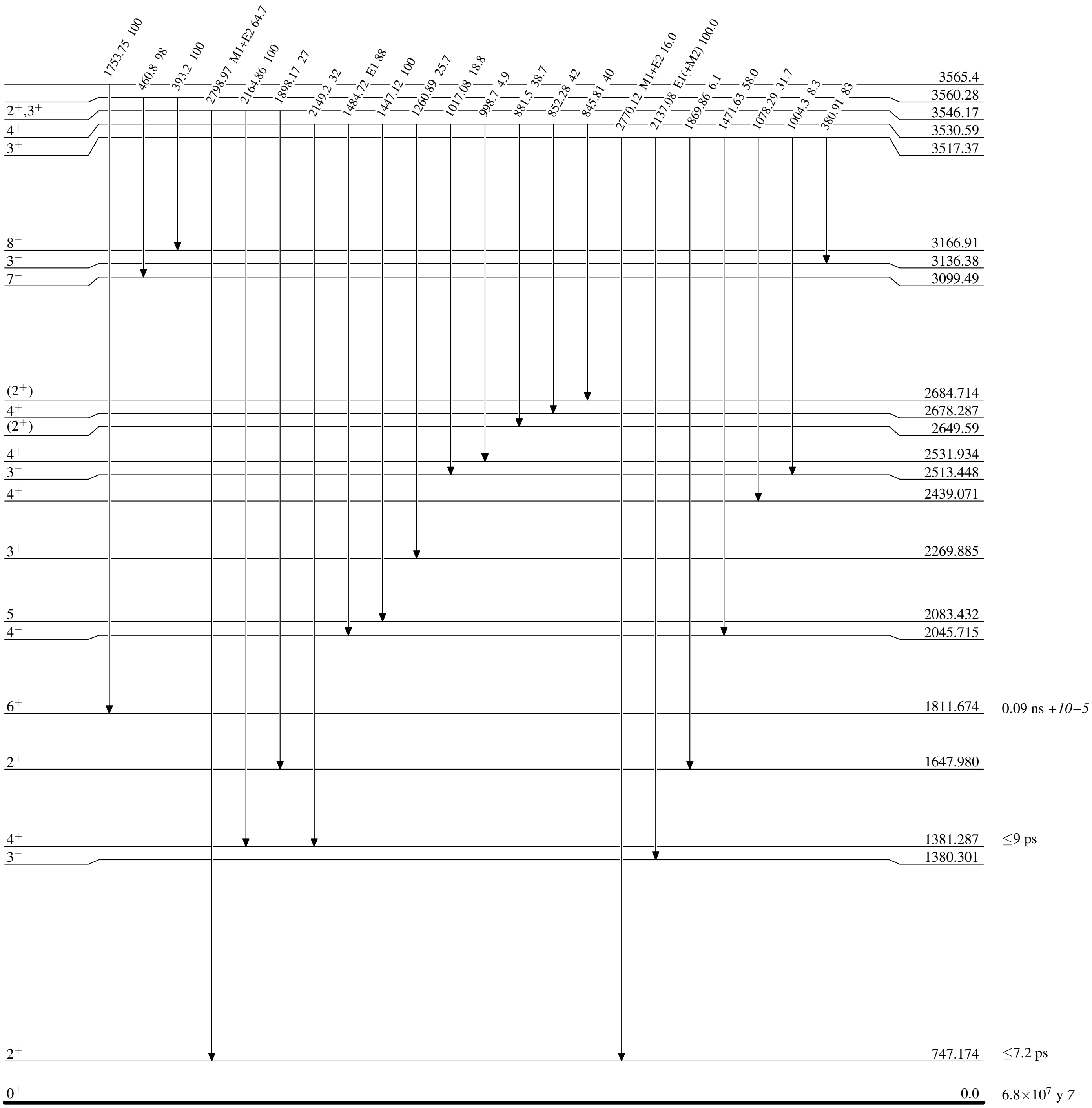


$^{146}_{62}Sm_{84}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

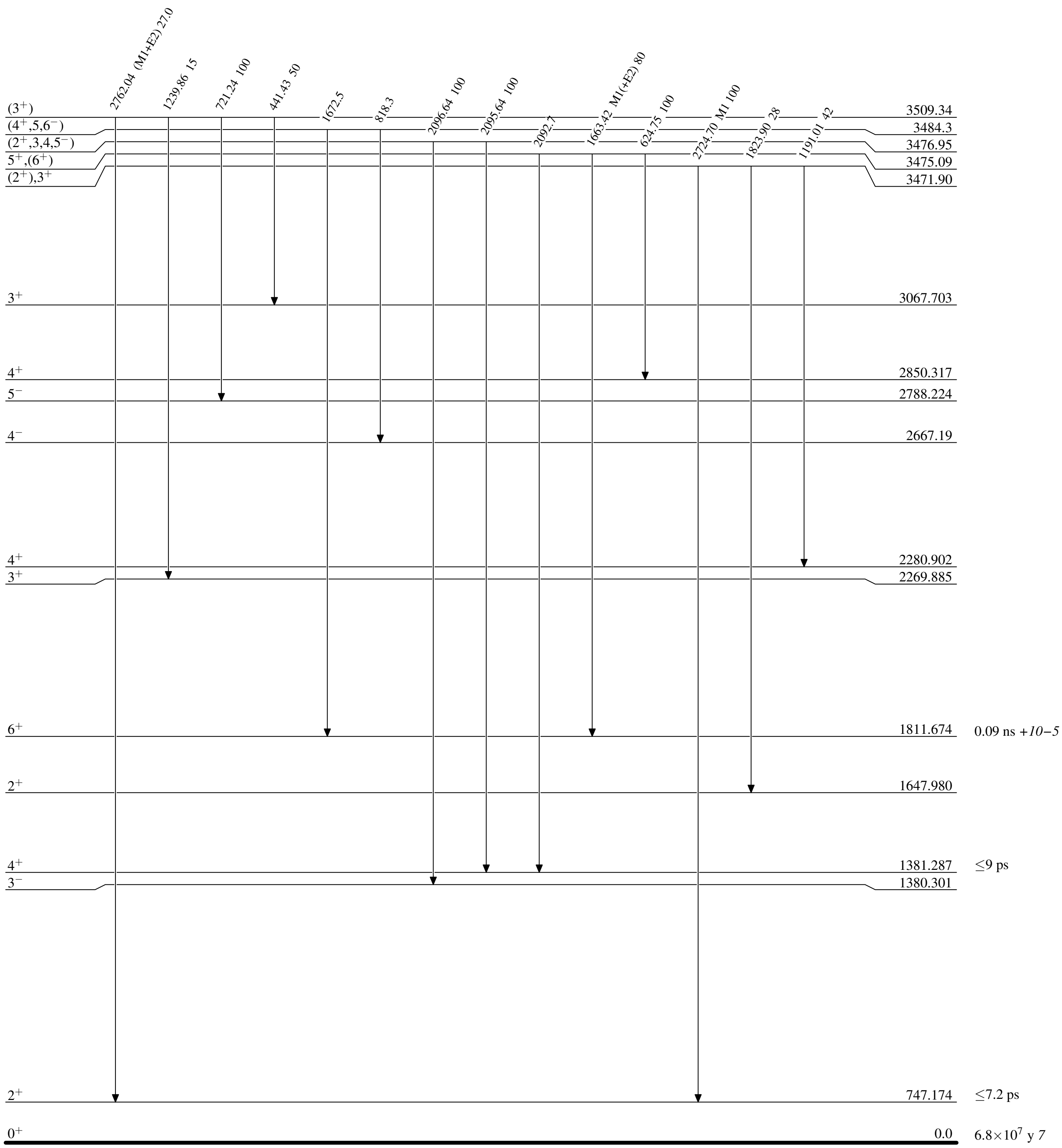


$^{146}_{62}Sm_{84}$

Adopted Levels, Gammas

Level Scheme (continued)

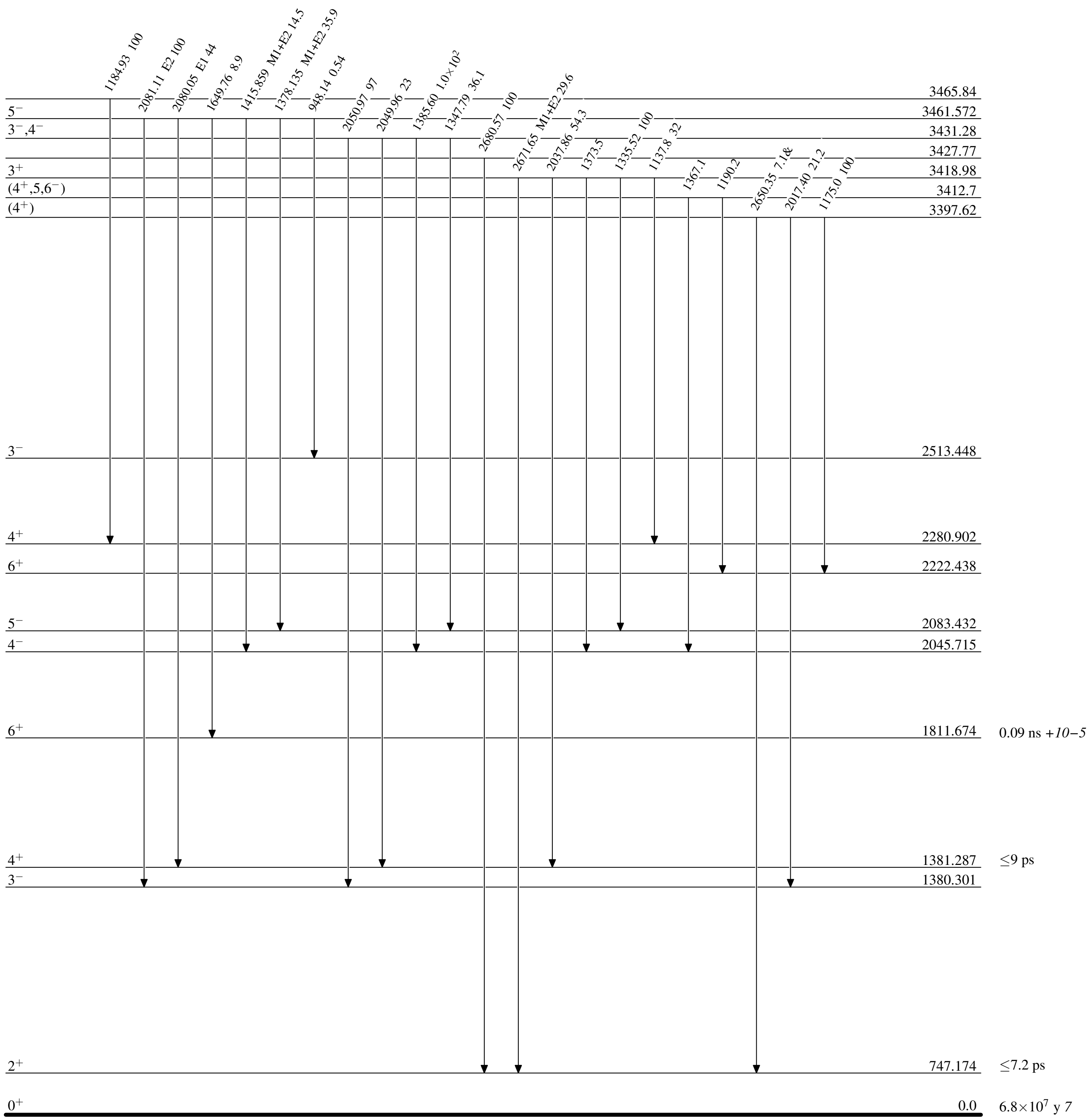
Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

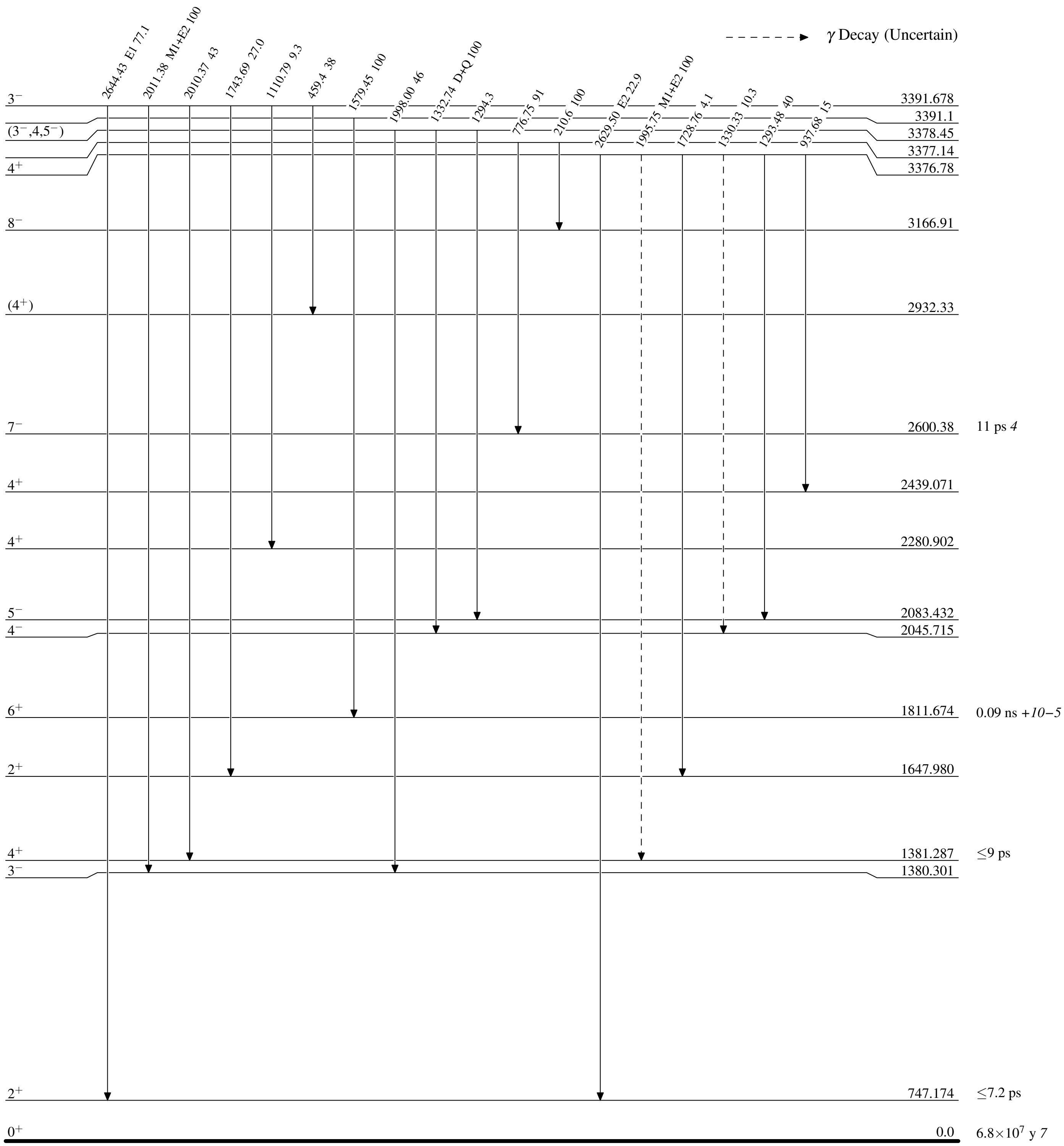


$^{146}_{62}Sm_{84}$

Adopted Levels, Gammas

Level Scheme (continued)

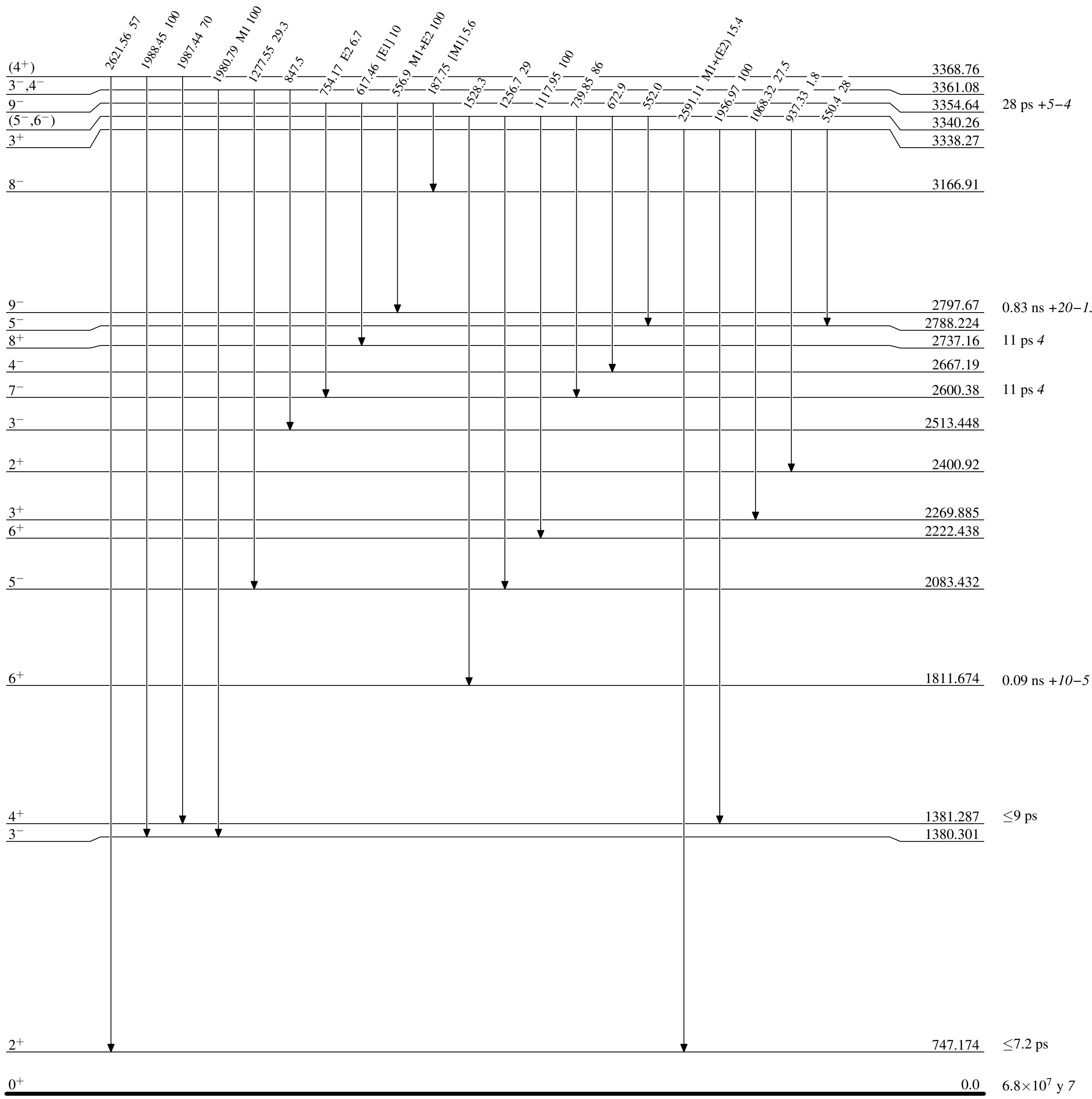
Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

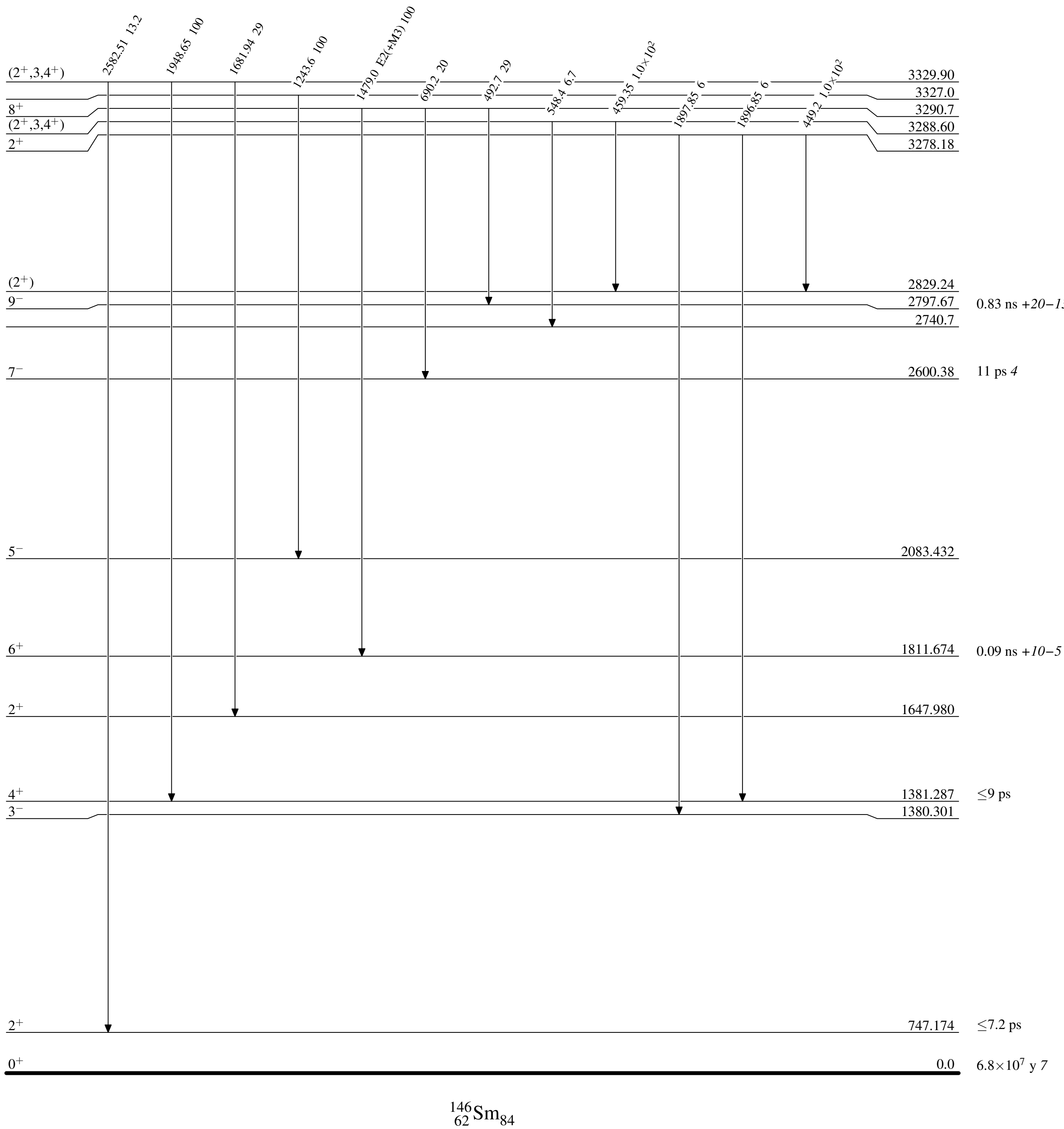


$^{146}_{62}Sm_{84}$

Adopted Levels, Gammas

Level Scheme (continued)

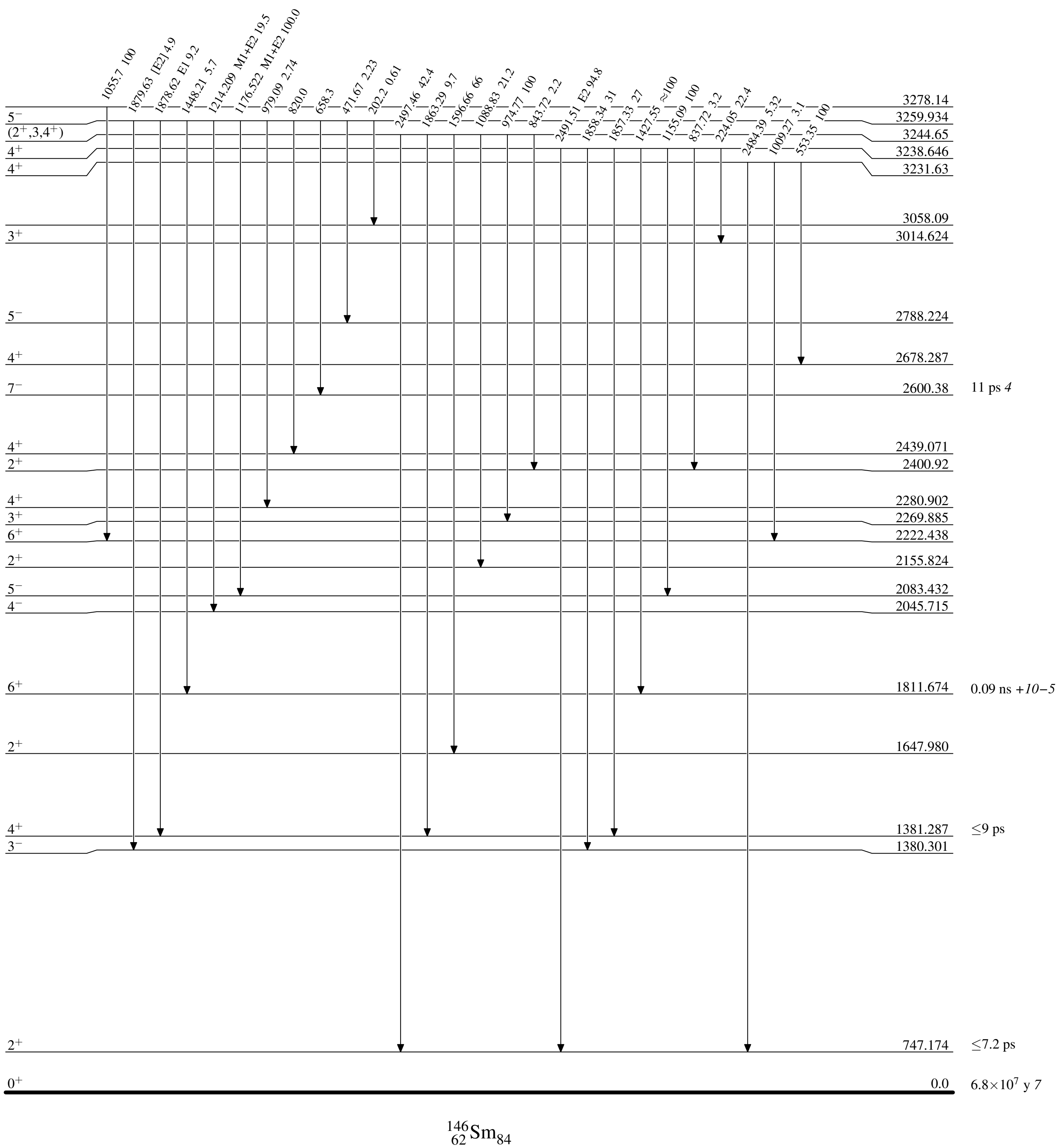
Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given



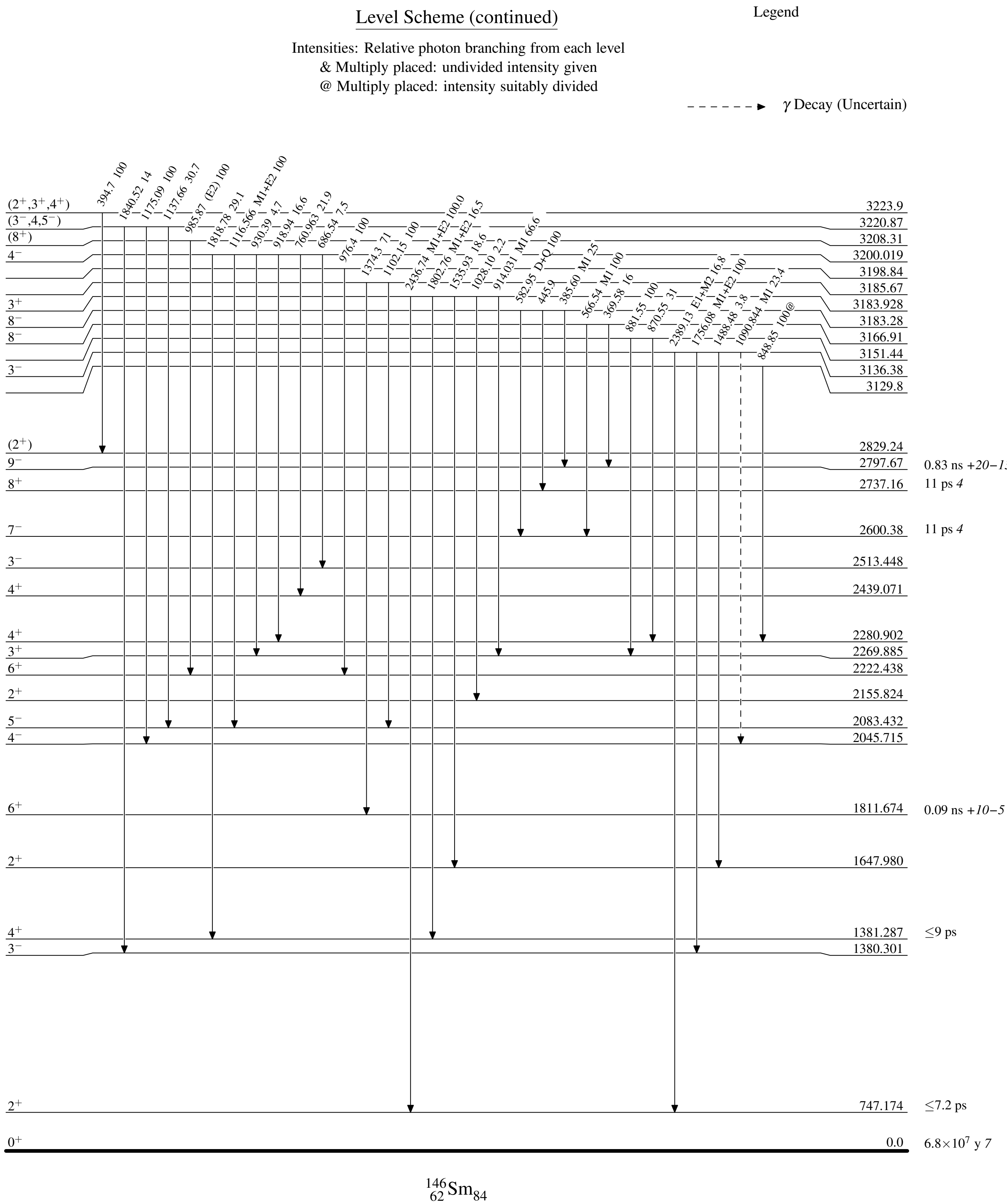
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given



Adopted Levels, Gammas



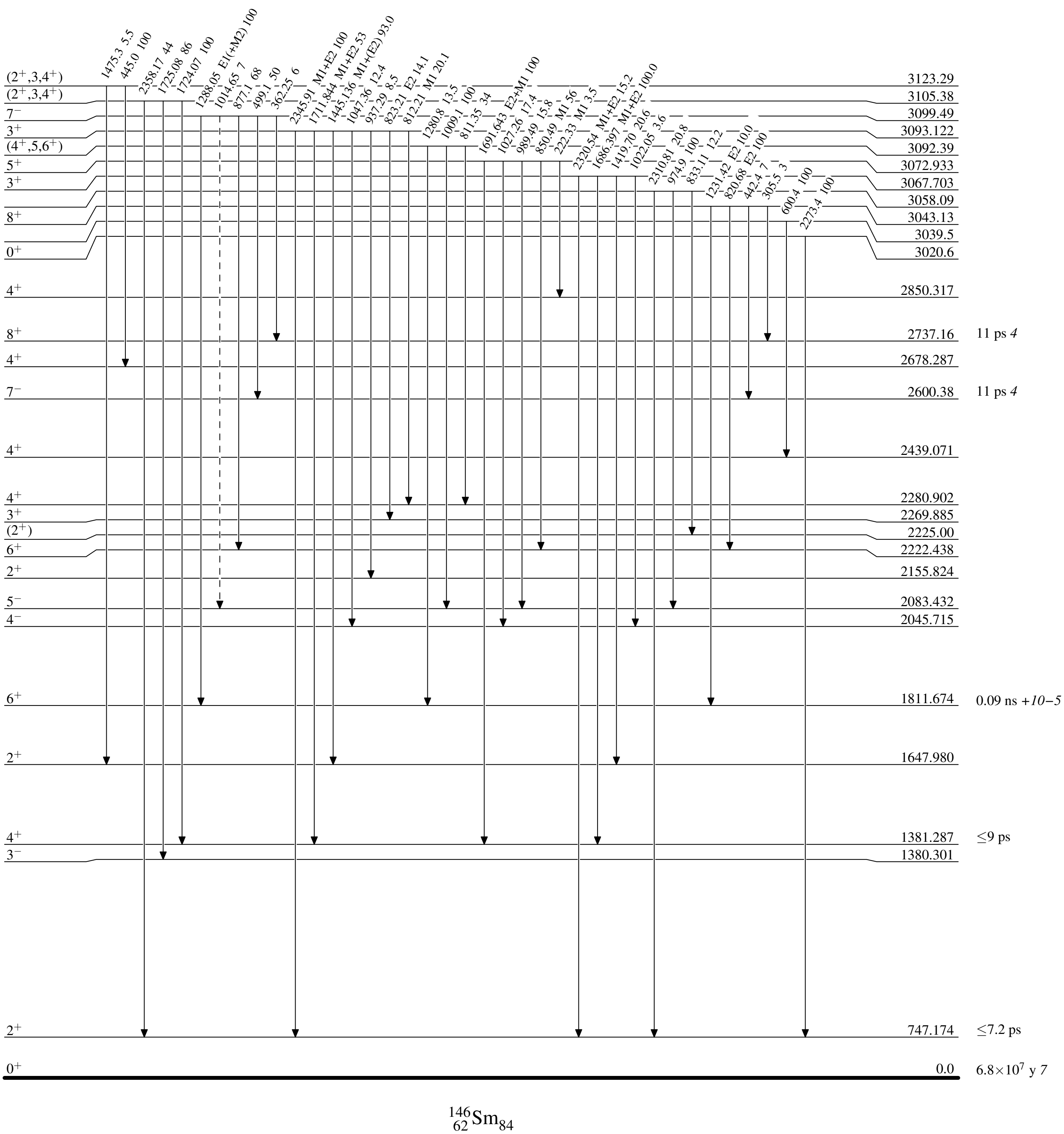
Adopted Levels, Gammas

Level Scheme (continued)

Legend

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

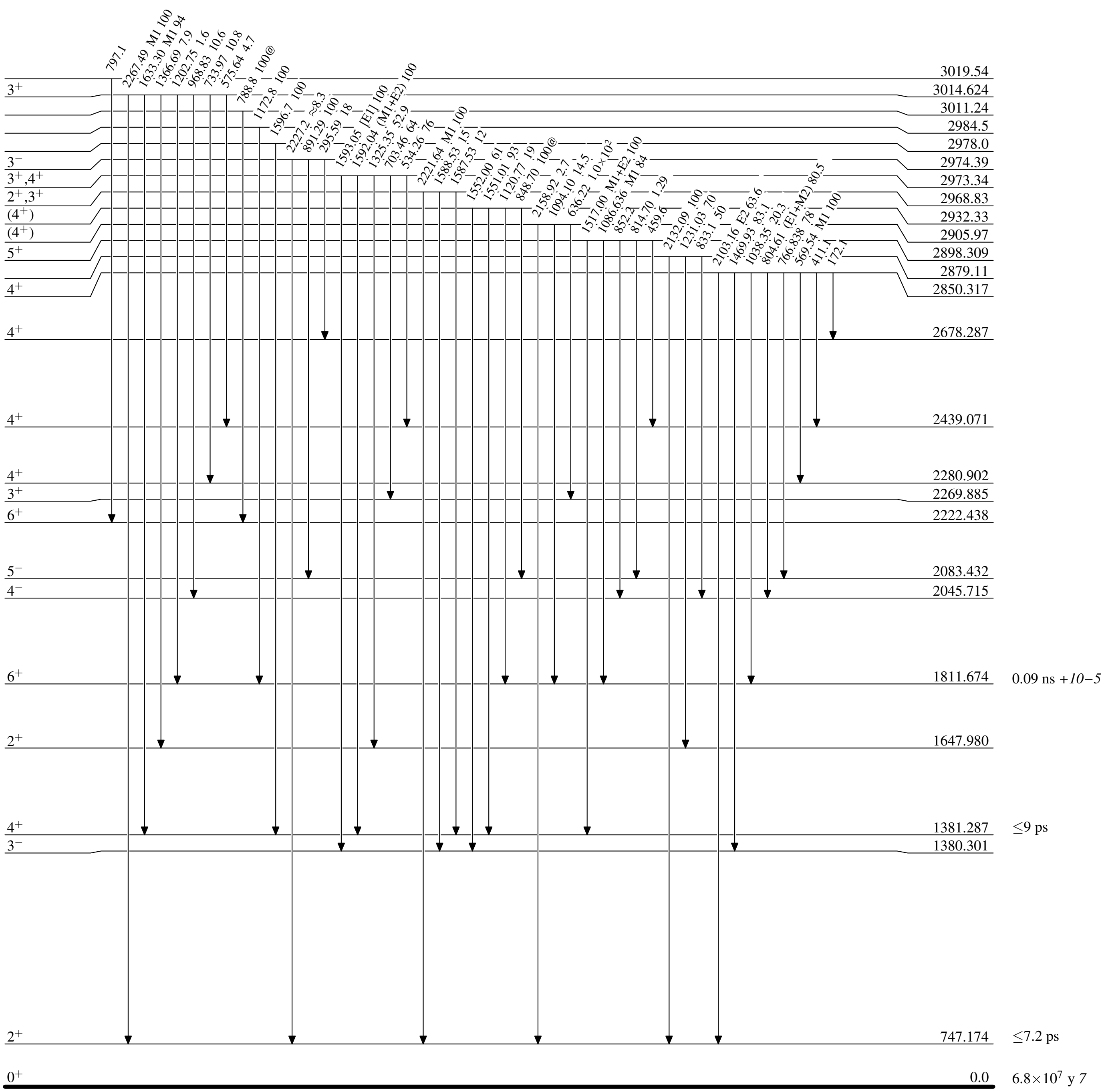
- - - - - -► γ Decay (Uncertain)



Adopted Levels, Gammas

Level Scheme (continued)

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



$^{146}_{62}Sm_{84}$

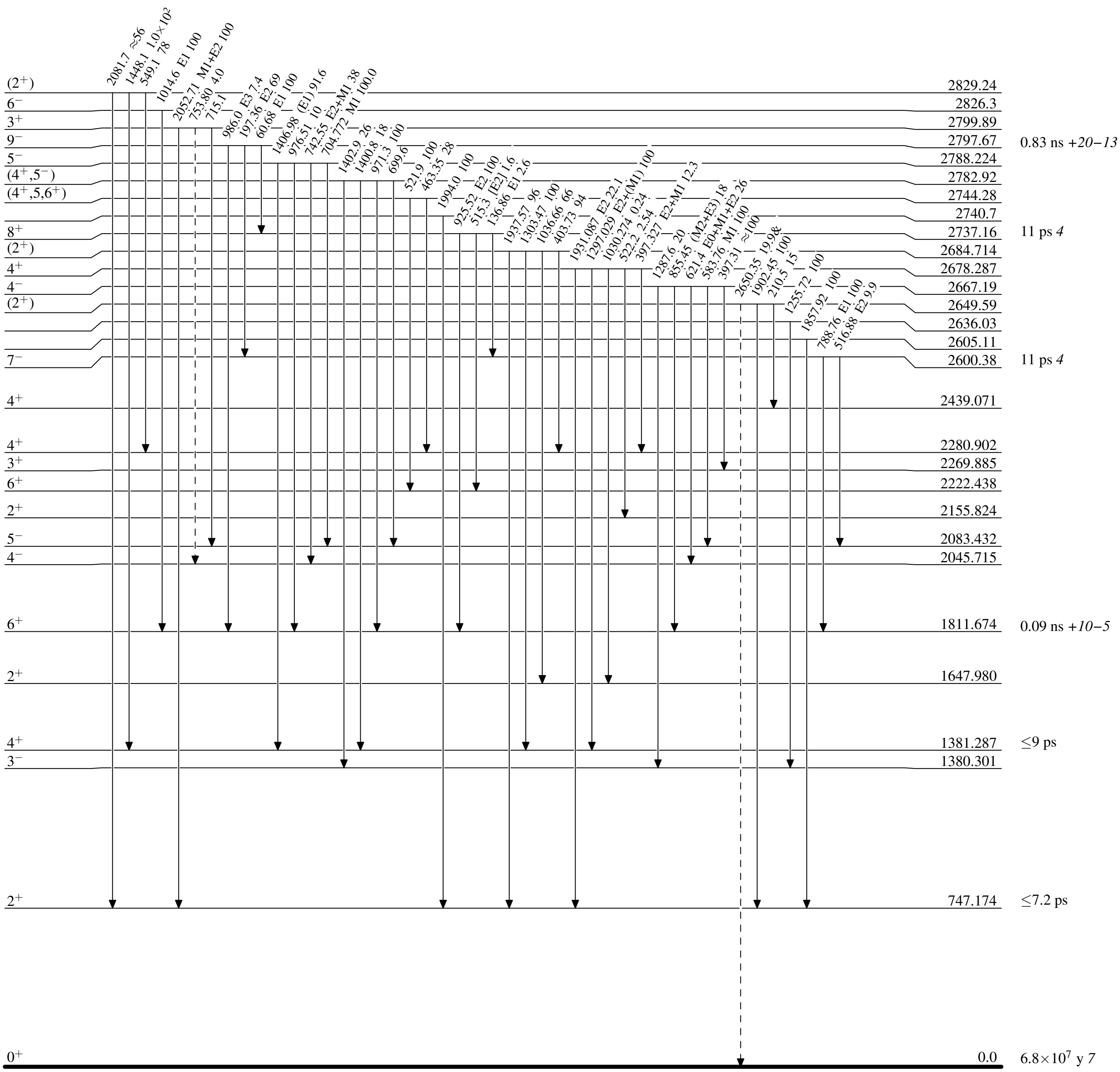
Adopted Levels, Gammas

Level Scheme (continued)

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

Legend

γ Decay (Uncertain)



$^{146}_{62}Sm_{84}$

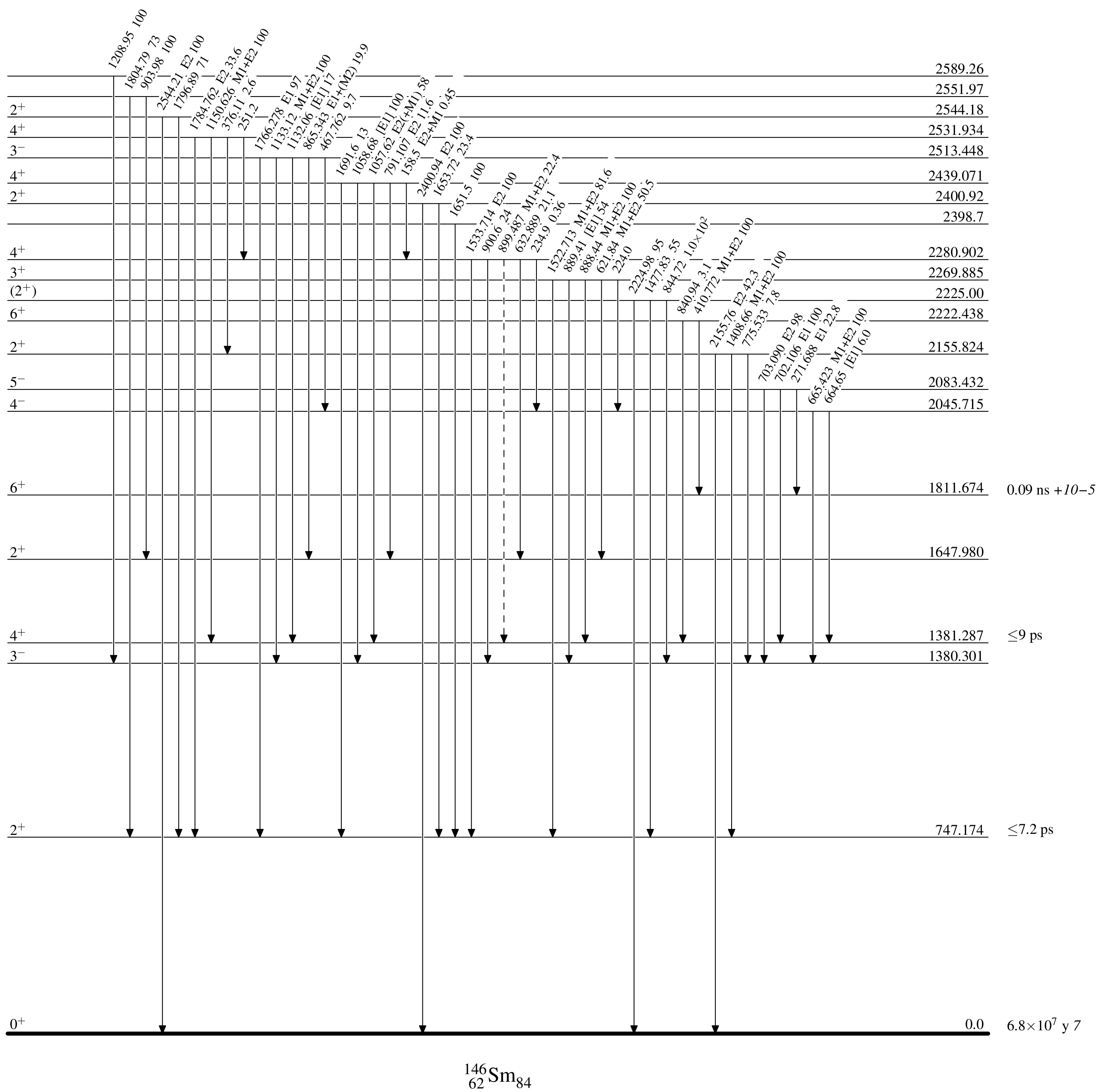
Adopted Levels, Gammas

Level Scheme (continued)

Legend

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

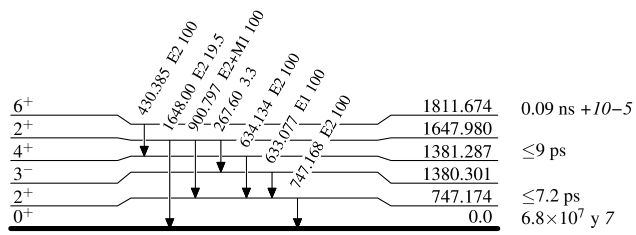
γ Decay (Uncertain)



Adopted Levels, Gammas

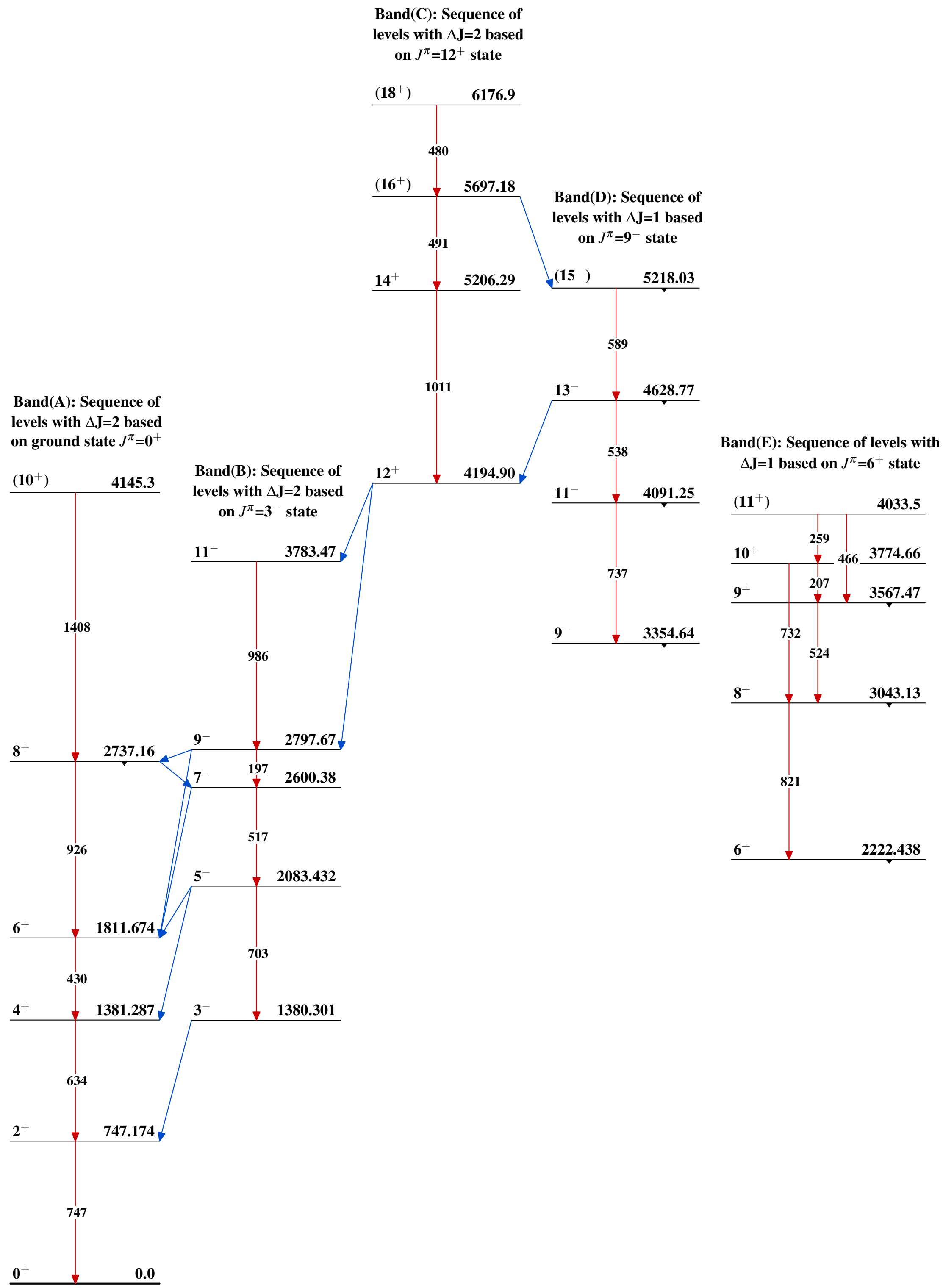
Level Scheme (continued)

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



$^{146}_{62}Sm_{84}$

Adopted Levels, Gammas



$^{146}_{62}Sm_{84}$

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 117, 1 (2014)	1-Oct-2013

Q(β^-)=−3037 *10*; S(n)=8141.37 *28*; S(p)=7583.1 *4*; Q(α)=1986.9 *10* 2012Wa38

^{148}Sm Levels

The band designations and suggested configurations are from (HI,xnγ).

Cross Reference (XREF) Flags

A	^{148}Nd 2β^- decay	I	^{147}Sm(n,γ) E=3.4 eV	Q	^{148}Sm(d,d′)
B	^{148}Pm β^- decay (5.368 d)	J	^{147}Sm(n,γ) E=24.5 keV	R	^{149}Sm(d,t)
C	^{148}Pm β^- decay (41.29 d)	K	^{147}Sm(n,X):resonances	S	^{150}Sm(p,t)
D	^{148}Eu ε decay	L	^{147}Sm(d,p)	T	^{151}Eu(μ^-,3nγ)
E	^{152}Gd α decay	M	^{148}Sm(γ,γ')	U	Coulomb excitation
F	^{147}Sm(n,γ) E=thermal	N	^{148}Sm(e,e′)	V	(HI,xnγ)
G	^{147}Sm(n,γ) E=0.020-1.0 keV	O	^{148}Sm(n,n′γ)		
H	^{147}Sm(n,γ) E=0.1-10 keV	P	^{148}Sm(p,p′), (pol p,p′)		

E(level)[†]	J$^\pi$	T$_{1/2}$	XREF	Comments
0.0[@]	0$^+$	7×10^{15} y *3*	ABCDEFGHIJ LMNOPQRSTUV	%α=100 T$_{1/2}$: from 1970Gu14. Others: 8×10^{15} y *2* (1968Ko06),>3×10^{15} y (1987AlZX), see also 1960Ka23, 1961Ma05, 1946Cu01. rms charge radius <r^2>$^{1/2}$=5.0009 fm *16* (2004An14).
550.255[@] *8*	2$^+$	7.72 ps *32*	ABCD FGHIJ LMNOPQRSTUV	μ=+0.508 *42* (2005St24,1987Ba65) Q=−0.98 *27* (2005St24,1973ClZF) J$^\pi$: E2 to 0$^+$. T$_{1/2}$: from 2001Ra27, based on their adopted B(E2)↑=0.720 *30* derived from Coul. ex., (e,e′), and T$_{1/2}$ from RDM. μ, other: +0.61 *7* (1987Be08).
1161.529[&] *12*	3$^-$	0.6 ps *+4−2*	BCD FGH J LM OPQRS UV	J$^\pi$: E1 to 2$^+$ and L(d,t)=0. T$_{1/2}$: from thermal-neutron capture data using γ-ray induced Doppler (GRID) broadening technique. B(E3)↑=0.37 *3* (Coul. ex., 1968Ke04).
1180.261[@] *12*	4$^+$	2.39 ps *24*	CD FGH J L OPQRS UV	T$_{1/2}$: from B(E2)(2$^+$ to 4$^+$)=0.43 *4* (Coul. ex., 1968Ke04). J$^\pi$: J=4 from $\gamma\gamma(\theta)$ in β^- decay; π=+ from E2 to 2$^+$.
1424.46 *4*	0$^+$		AB G L Op S U	J$^\pi$: J=0 from $\gamma\gamma(\theta)$ in β^- decay; π=+ from L(p,t)=0.
1434.0 *8*			F H p	
1454.115 *13*	2$^+$	285 fs *28*	AB D FGHIJ M O QRS U	T$_{1/2}$: from ^{148}Sm(γ,γ'); other: 0.36 ps *11* (Coul. ex., from B(E2)↑=0.36 ps *11* and and branching 1454g=0.499 *5*). J$^\pi$: E2 to 0$^+$.
1461.1	(1,2$^+$)		l p U	J$^\pi$: γ to 0$^+$.
1465.137 *11*	1$^-$	92 fs *8*	B D FGH lM OpQ U	T$_{1/2}$: from ^{148}Sm(γ,γ'). B(E1)↑=0.013 *5* (Coul. ex., 1968Ve01). J$^\pi$: J=1 from $\gamma\gamma(\theta)$ in β^- decay; π=− from E1 to 0$^+$.
1594.247[&] *12*	5$^-$		CD FGH L OPQ S V	J$^\pi$: J=5 from $\gamma\gamma(\theta)$ in β^- decay; π=− from E1 to 4$^+$. This disagrees with J=3$^-$ or 4$^-$ from

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Adopted Levels, Gammas (continued)

^{148}Sm Levels (continued)

E(level)[†]	J^π	$T_{1/2}$	XREF	Comments
				average-resonance capture in (n,γ).
1659.4 *8*	(2,3,4$^+$)		F	J^π: thermal-neutron capture γ assumed to be D from 3^-,4^- capturing state and γ to 2^+.
1664.278 *22*	2^+	0.25 ps *8*	B D GHIJ L OPQRS U	$T_{1/2}$: from B(E2)=0.03 *1* and 1664γ branching=0.34 *1*. J^π: J=2 from $\gamma(\theta)$ in β^- decay; π=+ from L(d,p)=3.
1717.8 *10*			F	
1733.465 *12*	4^+		CD FGH J L OPQRS V	J^π: J=4 from $\gamma\gamma(\theta)$ in ε decay; π=+ from L(d,p)=1+3.
1894.824 *14*	4^+		CD FGHI O R	J^π: J=4 from $\gamma\gamma(\theta)$ in ε decay; π=+ from L(d,t)=3.
1903.773 *18*	3^+		D GH O	J^π: 3^+,4^+ from average neutron capture, and M1 to 2^+.
1905.908[@] *13*	6^+		CD G L OP R UV	J^π: J=6 from $\gamma\gamma(\theta)$ in β^- decay; π=+ from E1 to 5^-.
1920.97 *6*	0^+		B G M O S	J^π: L(p,t)=0.
1972.480 *21*	2^+		G I L OP R	J^π: L(d,t)=1 and γ to 0^+.
2031.403 *13*	4^-		D FGH O R V	J^π: L(d,t)=0, and log *ft*=8.9 via 5^- parent in ε decay.
2041 *8*			L	
2057.960 *22*	2^-		B G O	J^π: J=2 from $\gamma\gamma(\theta)$ in β^- decay; π=− from M1 to 1^-.
2095.595[b] *13*	6^+		CD GH L OpQRS V	J^π: J=6 from $\gamma\gamma(\theta)$ in β^- decay; π=+ from E1 to 5^-.
2111.053 *13*	4^+		D FGHI L OpQR	J^π: E2 to 2^+ and E1+M2 to 5^-. Disagrees with J=3^+ (1984Kr09) in ε decay.
2128.64[&] *7*	7^-[‡]		D G O V	
2142.5 *20*	(2,3,4)		I	J^π: from 3^- (n,γ) resonance and average-resonance neutron capture.
2146.35 *3*	2^+[#]	<64.1 fs	FGH M O q	$T_{1/2}$: from ^{148}Sm(γ,γ').
2147.499 *13*	5^+		D G L OPqRS	J^π: J=5 from $\gamma(\theta)$ in ε decay; π=+ from L(d,p)=1+3.
2194.061 *14*	6^+[‡]		CD GH L O R V	
2204.99 *15*	0^+		G O S	J^π: L(p,t)=0.
2208.85 *7*	(1,2$^+$)		GH O	J^π: γ to 0^+.
2214.215 *15*	5^+		D FGH L Op R	J^π: J=5 from $\gamma(\theta)$ in ε decay; π=+ from L(d,t)=1.
2228.042 *17*	4^+		D FGHI L OpQRS	J^π: J=4 from $\gamma(\theta)$ in ε decay; π=+ from L(d,p)=1+3.
2277 *3*	+		l R	J^π: L(d,t)=3.
2284.406 *21*	(1,2$^+$)	46 fs *5*	B G lM O	J^π: γ to 0^+. $T_{1/2}$: from ^{148}Sm(γ,γ').
2313.57 *8*	2^+		B GH O Q	J^π: J=2 from $\gamma\gamma(\theta)$ in β^- decay; π=+ from E1 to 3^-.
2318.5 *5*	+		D L R	J^π: L(d,t)=1.
2327.09 *5*	4^+[#]		D FGHI O	
2327.62 *9*	3^+[#]		G O	
2339.21 *8*	3^-[#]		D GH L O QR	
2344 *3*	3^-,4^-		R	J^π: L(d,t)=0.
2358 *4*	0^+		S	J^π: L(p,t)=0.
2374.447 *16*	5^+,6^+		D G O Q	J^π: J=5,6 from $\gamma(\theta)$ in ε decay; π=+ from M1 to 6^+.
2381.67 *10*	2^+[#]	87 fs *17*	G LM O QR	J^π: from ^{148}Sm(γ,γ') based on angular correlations (π=+ from linear polarization In ^{148}Sm(n,n$'\gamma$)). $T_{1/2}$: from ^{148}Sm(γ,γ').
2390.43 *7*	3^+[#]		D GHI O	
2392.32 *7*	7^+[‡]		D G O V	
2397.8 *10*			F L R	
2440.8 *10*			F H	
2442.29 *10*	(2^+)		G O	J^π: γ to 0^+ and γ to 4^+.
2467.38 *8*	$3^{(-)}$[#]		G O Q	
2472.48 *16*	1[#]	37 fs *3*	G M O R	$T_{1/2}$: from ^{148}Sm(γ,γ').
2490.004 *14*	4^+		D GH O	J^π: J=4 from $\gamma(\theta)$ in ε decay; π=+ from M1,E2 to 4^+.
2496 *3*	+		L R	J^π: L(d,p)=1.
2513.50 *18*	1[#]	99 fs *5*	GH M O	$T_{1/2}$: from ^{148}Sm(γ,γ').

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Adopted Levels, Gammas (continued)

^{148}Sm Levels (continued)

E(level)[†]	J^π	$T_{1/2}$	XREF	Comments
2524.101 *16*	4^+		D FGHI O Q	J^π: J=4 from $\gamma(\theta)$ in ε decay; π=+ from M1 to 4^+.
2532.39 *4*	$4^-,5^-$		D G L O R	J^π: J=4,5 from $\gamma\gamma(\theta)$ in ε decay; π=− from M1,E2 from $5^-,6^-$. This contradicts J^π=+ from L(d,p)=L(d,t)=1 for levels at 2532 *3*, and 2531 *3*, respectively, both observed by 1975Oe01. In (d,t), the level is an unresolved doublet; hence, the L assignments could be suspect.
2539.82 *17*	3^-[#]		GH O S	
2541.8 *10*			F	
2544.67[b] *15*	8^+[‡]		V	
2567.89 *19*	2^+[#]		G l O	
2570.832 *19*	$4^{(-)}$[#]		D GH l O	
2583.862 *16*	$4^{(-)}$[#]		D G l O	
2631.8 *10*			F	
2633.15 *8*	3^-[#]		G O Q	
2641.222 *17*	5^+[#]		D FGH O	
2645.50 *15*	$4^+,5^+$		G L R	J^π: L(d,p)=L(d,t)=1; γ to 5^-.
2673.07 *4*	4^+		D G O	J^π: J=4 from $\gamma(\theta)$ in ε decay; π=+ from polarization data in (n,γ) E=0.020-1.0 keV.
2675.20 *14*	$(3^+,4,5^-)$		D	J^π: gammas to 3^- and 5^+.
2681.8 *10*			F	
2683.467 *12*	$4^-,5^-$		D G L O R	J^π: J=4,5 from $\gamma(\theta)$ in ε decay; π from M1 to 5^-.
2692.8 *10*			F	
2697.77 *12*	$3^+,4^+$[#]		G O	
2698.539 *16*	$5^-,6^-$		D	J^π: J=5,6 from $\gamma(\theta)$ in ε decay; π=− from M1 to 5^-.
2701.92 *4*	$4^{(-)},(3^-)$[#]		D G O	
2704.6 *5*	$(1,2^+)$	20.1 fs *12*	G LM O R	J^π: γ to 0^+. $T_{1/2}$: from ^{148}Sm(γ,γ').
2711.8 *10*			F q	
2713.334 *20*	$3^+,4^+$[#]		D G O q	
2714.98[@] *16*	8^+[‡]		V	
2716.05 *4*	$(4^+,5,6^+)$		D G	J^π: γ's to 4^+, 6^+.
2719.8 *5*	$(3^-,4^-)$		G R	J^π: L(d,t)=(0).
2723.506 *23*	4^+		D FG O Q S	J^π: J=3,4 from $\gamma\gamma(\theta)$ in ε decay and γ to 6^+; π=+ from M1 to 4^+.
2727.31 *6*	5^+		D G L O R	J^π: J=5,6 from $\gamma(\theta)$ in (n,γ), γ to 3^- makes J=6 unlikely; π=+ from L(d,p)=1+3.
2734.44 *19*	(3)		D O	J^π: gammas to 1^- and 3^- and log *ft*=10.0 from 5^-.
2738.79 *20*	(8^+)[‡]		V	
2753.15 *6*	3^+[#]		FG O	E(level): from (n,γ).
2762.1 *5*	1^+	7.5 fs *4*	LM R	J^π: from ^{148}Sm(γ,γ') based on angular correlations and L(d,p)=1+3.
2801.752 *13*	5^+		D G O	J^π: J=5 from $\gamma\gamma(\theta)$ in ε decay; π=+ from M1 to 5^+.
2806.73 *10*	$3^+,4^+$[#]		G O	
2807.35[&] *16*	9^-[‡]		V	
2809 *3*			L	
2812.8 *10*			F	
2815.584 *18*	4^-		D G O	J^π: J=4 from $\gamma(\theta)$ in ε decay; π=− from M1 to 5^-.
2822 *2*	+		L R	J^π: L(d,t)=1.
2828.13 *15*			G O	
2830.660 *14*	5^+		D G O	J^π: J=5 from $\gamma(\theta)$ in ε decay; π=+ from M1 to 5^+.
2846.9 *3*	$(3^-,4^-)$		G O QR	J^π: L(d,t)=(0).
2861.07 *8*	$4^-,5^-$		D FG O	J^π: J=4,5 from $\gamma(\theta)$ in ε decay; π=− from M1 to 5^-.

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Adopted Levels, Gammas (continued)

^{148}Sm Levels (continued)

E(level)[†]	J^π	$T_{1/2}$	XREF	Comments
				J=3,4 from $\gamma(\theta)$ in (n,γ) E=0.020-1.0 keV; however, M1 to 5^- rules out J=3.
2862.06 *11*	$3^+,4^+$[#]		G L O QRS	
2891.8 *5*			FG L	
2908.13 *22*	$3^-,4^-$		D G R	J^π: L(d,t)=0.
2917.8 *10*			F	
2928.84 *5*	$(4,5,6)^+$		D G L O R	J^π: γ's to 4^+, 6^+ and L(d,p)=1+3.
2931.98 *20*			G O R	
2941.1 *7*	$2^+,3^-$[#]		G	
2942.82 *18*	8^-[‡]		V	
2952.7 *9*			G L RS	
2967.6 *7*	$3^+,4^+$[#]		FG O	
2976.32 *20*	8^-[‡]		V	
2980.50 *19*	$3^+,4^+$[#]		G O	
2991.78 *16*	$3^+,4^+$[#]		FG L O R	
2993 *3*			R	
3004 *3*			L R	
3014.1 *6*	$3^-,4^-$		G O R	J^π: L(d,t)=0.
3022 *3*			L	
3038.8 *6*	1	41.4 fs *22*	M	J^π: from ^{148}Sm(γ,γ') based on angular correlations. $T_{1/2}$: from ^{148}Sm(γ,γ').
3045 *2*	+		L R	J^π: L(d,p)=1+3.
3050.5 *4*			FG O R	
3063.25 *22*	3^-[#]		FG l O	
3073 *3*			l R	
3082.1 *4*	1	10.2 fs *7*	M	J^π: from ^{148}Sm(γ,γ') based on angular correlations. $T_{1/2}$: from ^{148}Sm(γ,γ').
3089.84 *23*	$2^+,3^-$[#]		FG	
3095.25 *19*	$9^{(+)}$[‡]		V	
3098 *3*	$(3^-,4^-)$		R	J^π: L(d,t)=(0).
3107.8 *4*	$3^+,4^+$[#]		FG O	
3112 *2*	+		L R	J^π: L(d,p)=1+3.
3138.46 *11*	$3^{(-)},4^{(-)}$[#]		FG O R	
3153.5 *3*	+		G L R	J^π: L(d,p)=1+3.
3164.8 *4*	$3^+,4^+$[#]		FG	
3178.0 *15*	+		G L R	J^π: L(d,p)=1+3.
3188.31[e] *17*	9^-[‡]		V	
3189.8 *8*	$2^+,3^-$[#]		G	
3197.4 *10*	$3^-,4^-$		G R	J^π: L(d,t)=0.
3216.15 *18*	9^-[‡]		V	
3221.2 *4*			G l O	
3224.83 *19*			G l R	
3235.23[b] *17*	10^+[‡]		V	
3235.8 *10*			F	
3245 *3*	+		L R	J^π: L(d,p)=1+3.
3253.45 *17*	10^-[‡]		V	
3255.3 *5*	$(1,2^+)$		M	J^π: γ to 0^+. B(E1)↑=4.4×10^{-5} *3* (γ,γ', 1993Zi05).
3261.8 *10*			F	
3276.2 *5*			G L O R	
3286.8 *10*			F	

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Adopted Levels, Gammas (continued)

^{148}Sm Levels (continued)

E(level)[†]	J^π	XREF	Comments
3291.5 *5*	$(1,2^+)$	M	J^π: γ to 0^+. B(E1)↑=1.7×10^{-5} *2* (γ,γ', 1993Zi05).
3308.8 *10*		F L R	
3322.6 *3*	(10^+)[‡]	V	
3337.8 *10*		F	
3347 *3*	$+$	L R	J^π: L(d,p)=1.
3375.8 *10*		F	
3387.8 *10*	$3^-,4^-$	F l R	J^π: L(d,t)=0.
3397 *3*		l R	
3398.13[@] *16*	10^+[‡]	V	
3403.8 *10*		F L R	
3413.8 *10*		F R	
3421.90[c] *16*	11^-[‡]	V	
3428 *3*		R	
3437.8 *10*		F	
3451.9 *5*	$(1,2^+)$	LM R	J^π: γ to 0^+.
3465.8 *10*		F R	
3479.8 *10*		F L	
3483.6 *5*	$(1,2^+)$	M	J^π: γ to 0^+. B(E1)↑=6.0×10^{-5} *15* (γ,γ', 1993Zi05).
3488 *4*	$(3^-,4^-)$	R	J^π: L(d,t)=(0).
3507.8 *10*		F R	
3519.8 *10*		F l	
3526.57 *18*	10^-[‡]	V	
3530 *4*	$(3^-,4^-)$	l R	J^π: L(d,t)=(0).
3534.9 *5*	$(1,2^+)$	lM	J^π: γ to 0^+. B(E1)↑=5.8×10^{-5} *4* (γ,γ', 1993Zi05).
3545.63 *17*	10^-[‡]	V	
3546 *4*	$(3^-,4^-)$	l R	J^π: L(d,t)=(0).
3562.8 *10*		F l	
3572 *4*		R	
3586.0 *5*	$(1,2^+)$	LM	J^π: γ to 0^+.
3598.8 *10*	$(3^-,4^-)$	F R	J^π: L(d,t)=(0).
3613.8 *10*		F l	
3614.76[&] *17*	11^-[‡]	V	
3628 *4*	$(3^-,4^-)$	l R	J^π: L(d,t)=(0).
3635.8 *10*		F	
3640.4 *4*	(11)[‡]	V	
3652 *4*	$(3^-,4^-)$	L R	J^π: L(d,t)=(0).
3668 *10*		L	
3674 *4*		R	
3701.8 *10*	$(3^-,4^-)$	F l R	J^π: L(d,t)=(0).
3714 *4*		l R	
3734 *4*	$(3^-,4^-)$	L R	J^π: L(d,t)=(0).
3752 *4*		l R	
3766.8 *10*		F l	
3774 *4*	$(3^-,4^-)$	L R	J^π: L(d,t)=(0).
3797 *4*		L R	
3806.98[e] *18*	11^-[‡]	V	
3812.0 *5*	$(1,2^+)$	M	J^π: γ to 0^+.
3817 *4*	$3^-,4^-$	R	J^π: L(d,t)=0.
3831.8 *10*		F	
3843.6 *5*	$(1,2^+)$	M	J^π: γ to 0^+. B(E1)↑=0.6×10^{-5} *2* (γ,γ', 1993Zi05).

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Adopted Levels, Gammas (continued)

^{148}Sm Levels (continued)

E(level)[†]	J^π	XREF	Comments
3844.8 *10*		F L	
3865.8 *10*	$3^-,4^-$	F R	J^π: L(d,t)=0.
3884.3 *5*	$(1,2^+)$	lM R	J^π: γ to 0^+.
3895.4 *5*	$(1,2^+)$	M	J^π: γ to 0^+.
3902 *4*	$3^-,4^-$	l R	J^π: L(d,t)=0.
3920.8 *10*	$3^-,4^-$	F L R	J^π: L(d,t)=0.
3951 *4*		L R	
3971.8 *10*	$(3^-,4^-)$	F R	J^π: L(d,t)=(0).
3990 *4*	$(3^-,4^-)$	L R	J^π: L(d,t)=(0).
3992.62[b] *17*	12^+[‡]	V	
4005 *4*		R	
4011 *4*		R	
4026 *4*	$3^-,4^-$	L R	J^π: L(d,t)=0.
4041 *4*		L R	
4085 *10*		L	
4104.39[@] *17*	12^+[‡]	V	
4107 *10*		L	
4108.70 *18*	12^-[‡]	V	
4110.68[c] *17*	13^-[‡]	V	
4122.8 *10*		F L	
4166 *10*		L	
4189.28 *19*	12^+[‡]	V	
4192 *10*		L	
4196.25 *18*	12^-[‡]	V	
4214 *10*		L	
4228 *10*		L	
4241.52 *21*	13^-[‡]	V	
4255 *10*		L	
4290 *10*		L	
4334 *10*		L	
4357 *10*		L	
4383 *10*		L	
4397.78[&] *18*	13^-[‡]	V	
4402 *10*		L	
4444 *10*		L	
4466 *10*		L	
4510 *10*		L	
4512.91[e] *19*	13^-[‡]	V	
4516.75 *19*	13^+[‡]	V	
4535 *10*		L	
4573 *10*		L	
4592 *10*		L	
4630 *10*		L	
4649 *10*		L	
4675 *10*		L	
4735 *10*		L	
4784 *10*		L	
4805.18[@] *18*	14^+[‡]	V	
4824 *10*		L	
4842.69[c] *18*	15^-[‡]	V	
4864.69[b] *17*	14^+[‡]	V	
4876 *10*		L	
4889.71 *19*	14^-[‡]	V	

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Adopted Levels, Gammas (continued)

^{148}Sm Levels (continued)

E(level)[†]	J^π	$T_{1/2}$	XREF	Comments
4909.65 *19*	14+[‡]		V	
4917.55 *18*	14−[‡]		V	
4951.75 *23*	14(−)[‡]		V	
5087.55 *19*	15−[‡]		V	
5136.13[&] *19*	15−[‡]		V	
5217.20 *20*	15(−)[‡]		V	
5274.93 *20*	15+[‡]		V	
5287.77[e] *25*	15−[‡]		V	
5320.28 *19*	16−[‡]		V	
5496.39[@] *19*	16+[‡]		V	
5524.48[b] *19*	16+[‡]		V	
5556.54 *21*	16−[‡]		V	
5561.19[c] *20*	17−[‡]		V	
5578.31 *21*	16(+)[‡]		V	
5649.57 *20*	17−[‡]		V	
5777.74 *21*	17+[‡]		V	
5837.32[a] *22*	17−[‡]		V	
5946.08[@] *19*	18+[‡]		V	
6011.15 *21*	18[‡]		V	
6029.22 *21*	18−[‡]		V	
6195.29[a] *21*	19−[‡]		V	
6392.23 *23*	19−[‡]		V	
6477.07 *20*	19−[‡]		V	
6557.5? *4*	(19)[‡]		V	
6592.79[@] *21*	20(+)[‡]		V	
6694.32[d] *21*	21(−)[‡]	32 ns *3*	V	$T_{1/2}$: from DSAM in (HI,xnγ) (1998UrZZ).
6913.3[a] *3*	21(−)[‡]		V	
7329.3[@] *3*	22(+)[‡]		V	
7332.92[d] *23*	23(−)[‡]		V	
7620.4[a] *3*	23(−)[‡]		V	
7942.5 *3*	(22)[‡]		V	
7977.6[@] *3*	24(+)[‡]		V	
8010.61[d] *25*	25(−)[‡]		V	
8214.5[a] *3*	25(−)[‡]		V	
8358.8 *3*	(24)[‡]		V	
8602.2[d] *3*	27(−)[‡]		V	
8659.5[@] *5*	26(+)[‡]		V	
8931.5? *7*	(27)[‡]		V	
9045.9 *3*	(26)[‡]		V	
9601.2[d] *4*	29[‡]		V	
9898.2 *11*	(28)[‡]		V	
10439.0[d] *4*	31[‡]		V	
10609.1 *4*	(30)[‡]		V	
11524.7 *5*	(32)[‡]		V	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{148}Sm Levels (continued)

† From the data sets which provided Eγ, and other particle-transfer reactions.

‡ From (HI,xnγ) based on γ-ray excitation functions, $\gamma(\theta)$, DCO ratios, γ-ray linear polarization, Ice spectra, $T_{1/2}$, prompt and delayed Ice spectra. π of levels upto J=19 were deduced from linear-polarization data. J^{π} assignments of high-spin levels should be considered as tentative pending publication of detailed data.

From $\gamma(\theta)$, primary-capture γ $I\gamma/E_{\gamma}^{5}$, and linear-polarization data in (n,γ) E=0.020-1.0 keV and (n,n$'\gamma$).

@ Band(A): band 1; g.s. band.

& Band(B): band 2; octupole band.

[a] Band(C): band 3.

[b] Band(D): band 4.

[c] Band(E): band 5.

[d] Band(F): band 6.

[e] Band(G): band 7.

$\gamma(^{148}Sm)$

E_i(level)	J^π_i	E_γ[‡]	I_γ[#]	E_f	J^π_f	Mult.[@]	δ	α[†]	Comments
550.255	2^+	550.273 *9*	100	0.0	0^+	E2		0.00998 *14*	α=0.00998 *14*; α(K)=0.00825 *12*; α(L)=0.001360 *19*; α(M)=0.000296 *5*; α(N+..)=7.67×10^{-5} *11* α(N)=6.66×10^{-5} *10*; α(O)=9.59×10^{-6} *14*; α(P)=4.78×10^{-7} *7* B(E2)(W.u.)=31.2 *13*
1161.529	3^-	611.293 *8*	100	550.255	2^+	E1		0.00277 *4*	α=0.00277 *4*; α(K)=0.00237 *4*; α(L)=0.000312 *5*; α(M)=6.63×10^{-5} *10*; α(N+..)=1.735×10^{-5} *25* α(N)=1.498×10^{-5} *21*; α(O)=2.23×10^{-6} *4*; α(P)=1.358×10^{-7} *19* B(E1)(W.u.)=0.0018 *+6−12* Mult.: E1+M2 with δ=+0.026 *13* from ^{148}Sm β^- decay, +0.08 *4* from (HI,xnγ), and<0.4 from (n,n′γ). However, RUL estimate of δ is≤0.007 and the evaluator has set the mult=E1.
1180.261	4^+	629.987 *8*	100	550.255	2^+	E2		0.00710 *10*	B(E2)(W.u.)=51 *6* α=0.00710 *10*; α(K)=0.00591 *9*; α(L)=0.000932 *13*; α(M)=0.000202 *3*; α(N+..)=5.25×10^{-5} *8* α(N)=4.55×10^{-5} *7*; α(O)=6.61×10^{-6} *10*; α(P)=3.46×10^{-7} *5*
1424.46	0^+	874.18 *3*	100	550.255	2^+	E2		0.00332 *5*	α=0.00332 *5*; α(K)=0.00280 *4*; α(L)=0.000406 *6*; α(M)=8.74×10^{-5} *13*; α(N+..)=2.28×10^{-5} *4* α(N)=1.97×10^{-5} *3*; α(O)=2.91×10^{-6} *4*; α(P)=1.663×10^{-7} *24*
1434.0		884.2 *10*	100	550.255	2^+				
1454.115	2^+	903.831 *15*	100 *2*	550.255	2^+	M1+E2	+2.32[c] *10*	0.00339 *6*	α=0.00339 *6*; α(K)=0.00287 *5*; α(L)=0.000406 *7*; α(M)=8.72×10^{-5} *14*; α(N+..)=2.28×10^{-5} *4* α(N)=1.97×10^{-5} *3*; α(O)=2.92×10^{-6} *5*; α(P)=1.72×10^{-7} *3* B(M1)(W.u.)=0.0082 *11*; B(E2)(W.u.)=30 *3*
		1454.110 *20*	99.6 *2*	0.0	0^+	E2		0.001230 *18*	α=0.001230 *18*; α(K)=0.001000 *14*; α(L)=0.0001338 *19*; α(M)=2.86×10^{-5} *4*; α(N+..)=6.78×10^{-5} α(N)=6.46×10^{-6} *9*; α(O)=9.66×10^{-7} *14*; α(P)=5.96×10^{-8} *9*; α(IPF)=6.03×10^{-5} *9* B(E2)(W.u.)=3.3 *4*
1461.1	$(1,2^+)$	910.7	56	550.255	2^+				
		1461.1	100	0.0	0^+				
1465.137	1^-	303.59 *3*	0.17 *2*	1161.529	3^-				If E2 B(E2)(W.u.)=67.
		914.916 *15*	51.6 *4*	550.255	2^+	E1		0.001221 *17*	α=0.001221 *17*; α(K)=0.001050 *15*; α(L)=0.0001354 *19*; α(M)=2.88×10^{-5} *4*; α(N+..)=7.54×10^{-6} α(N)=6.51×10^{-6} *10*; α(O)=9.73×10^{-7} *14*; α(P)=6.07×10^{-8} *9* B(E1)(W.u.)=0.00117 *11*
		1465.101 *13*	100 *3*	0.0	0^+	E1		0.000704 *10*	α=0.000704 *10*; α(K)=0.000449 *7*; α(L)=5.70×10^{-5} *8*;

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γ(^{148}Sm) (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ[#]	E_f	J^π_f	Mult.[@]	δ	α[†]	Comments
									α(M)=1.208×10^{-5} *17*; α(N+..)=0.000186 *3* α(N)=2.74×10^{-6} *4*; α(O)=4.11×10^{-7} *6*; α(P)=2.61×10^{-8} *4*; α(IPF)=0.000183 *3* B(E1)(W.u.)=0.00055 *6*
1594.247	5$^-$	414.028 *12*	100 *3*	1180.261	4$^+$	E1+M2	−0.013[a] *10*	0.00670 *11*	α=0.00670 *11*; α(K)=0.00573 *9*; α(L)=0.000766 *13*; α(M)=0.000163 *3*; α(N+..)=4.26×10^{-5} *7* α(N)=3.68×10^{-5} *6*; α(O)=5.45×10^{-6} *9*; α(P)=3.22×10^{-7} *6*
		432.745 *8*	27.6 *15*	1161.529	3$^-$	E2		0.0190	α(K)=0.01544 *22*; α(L)=0.00281 *4*; α(M)=0.000617 *9*; α(N+..)=0.0001587 *23* α(N)=0.0001382 *20*; α(O)=1.96×10^{-5} *3*; α(P)=8.75×10^{-7} *13*
1659.4	(2,3,4$^+$)	1109 *1*	100	550.255	2$^+$				
1664.278	2$^+$	1113.92 *3*	100 *3*	550.255	2$^+$	M1+E2	−0.565[c] *21*	0.00279 *5*	B(M1)(W.u.)=0.032 *11*; B(E2)(W.u.)=4.5 *15* α=0.00279 *5*; α(K)=0.00239 *4*; α(L)=0.000319 *5*; α(M)=6.81×10^{-5} *10*; α(N+..)=1.85×10^{-5} *3* α(N)=1.544×10^{-5} *23*; α(O)=2.32×10^{-6} *4*; α(P)=1.466×10^{-7} *23*; α(IPF)=5.65×10^{-7} *8*
		1664.20 *4*	51.6 *16*	0.0	0$^+$	E2		0.001042 *15*	B(E2)(W.u.)=1.3 *5* α=0.001042 *15*; α(K)=0.000775 *11*; α(L)=0.0001023 *15*; α(M)=2.18×10^{-5} *3*; α(N+..)=0.000143 α(N)=4.94×10^{-6} *7*; α(O)=7.40×10^{-7} *11*; α(P)=4.62×10^{-8} *7*; α(IPF)=0.0001375 *20*
1733.465	4$^+$	279.30 *5*	0.65 *3*	1454.115	2$^+$	E2		0.0703	α(K)=0.0542 *8*; α(L)=0.01261 *18*; α(M)=0.00282 *4*; α(N+..)=0.000715 *10* α(N)=0.000627 *9*; α(O)=8.56×10^{-5} *12*; α(P)=2.87×10^{-6} *4*
		553.231 *14*	100 *17*	1180.261	4$^+$	M1+E2	+1.66[b] *20*	0.0117 *4*	α(K)=0.0098 *4*; α(L)=0.00150 *4*; α(M)=0.000324 *8*; α(N+..)=8.43×10^{-5} *22* α(N)=7.31×10^{-5} *18*; α(O)=1.07×10^{-5} *3*; α(P)=5.83×10^{-7} *24*
		571.962 *7*	74 *2*	1161.529	3$^-$	E1		0.00320 *5*	α=0.00320 *5*; α(K)=0.00274 *4*; α(L)=0.000361 *5*; α(M)=7.68×10^{-5} *11*; α(N+..)=2.01×10^{-5} *3* α(N)=1.735×10^{-5} *25*; α(O)=2.58×10^{-6} *4*; α(P)=1.564×10^{-7} *22*
		1183.208 *16*	12.8 *3*	550.255	2$^+$	E2		0.001761 *25*	α=0.001761 *25*; α(K)=0.001496 *21*; α(L)=0.000205 *3*; α(M)=4.40×10^{-5} *7*; α(N+..)=1.555×10^{-5} *2* α(N)=9.94×10^{-6} *14*; α(O)=1.480×10^{-6} *21*; α(P)=8.91×10^{-8} *13*; α(IPF)=4.04×10^{-6} *6*
1894.824	4$^+$	300.65 *7*	2.9 *2*	1594.247	5$^-$	[E1]		0.01463	α(K)=0.01248 *18*; α(L)=0.001694 *24*; α(M)=0.000362 *5*; α(N+..)=9.40×10^{-5} *14*

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$\gamma(^{148}Sm)$ (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ[#]	E_f	J^π_f	Mult.[@]	δ	α[†]	Comments
									α(N)=8.14×10^{-5} *12*; α(O)=1.195×10^{-5} *17*; α(P)=6.86×10^{-7} *10*
1894.824	4$^+$	714.769 *13*	91 *2*	1180.261	4$^+$	M1+E2		0.0070 *18*	α=0.0070 *18*; α(K)=0.0060 *16*; α(L)=0.00084 *18*; α(M)=0.00018 *4*; α(N+..)=4.7×10^{-5} *10* α(N)=4.1×10^{-5} *9*; α(O)=6.1×10^{-6} *14*; α(P)=3.6×10^{-7} *11* δ: +0.25 *10* or −1.5 *5* from $\gamma\gamma(\theta)$; −0.03≤δ≤+1.02 from $\gamma(\theta$,T); all from ^{148}Eu ε decay.
		1344.740 *23*	100 *8*	550.255	2$^+$	E2		0.001391 *20*	α=0.001391 *20*; α(K)=0.001162 *17*; α(L)=0.0001569 *22*; α(M)=3.35×10^{-5} *5*; α(N+..)=3.86×10^{-5} α(N)=7.59×10^{-6} *11*; α(O)=1.133×10^{-6} *16*; α(P)=6.92×10^{-8} *10*; α(IPF)=2.98×10^{-5} *5* δ(M3/E2)=−0.01 *8*.
1903.773	3$^+$	449.66 *9*	7 *3*	1454.115	2$^+$				
		723.58 *5*	15.4 *7*	1180.261	4$^+$				
		742.16 *11*	4.5 *4*	1161.529	3$^-$				
		1353.509 *17*	100 *2*	550.255	2$^+$	M1+E2	+8.2[c] *12*	0.001385 *20*	α=0.001385 *20*; α(K)=0.001155 *17*; α(L)=0.0001558 *22*; α(M)=3.33×10^{-5} *5*; α(N+..)=4.07×10^{-5} α(N)=7.53×10^{-6} *11*; α(O)=1.125×10^{-6} *16*; α(P)=6.89×10^{-8} *10*; α(IPF)=3.20×10^{-5} *5*
1905.908	6$^+$	311.570 *20*	14.2 *3*	1594.247	5$^-$	E1		0.01337	α(K)=0.01141 *16*; α(L)=0.001547 *22*; α(M)=0.000330 *5*; α(N+..)=8.58×10^{-5} *12* α(N)=7.43×10^{-5} *11*; α(O)=1.092×10^{-5} *16*; α(P)=6.29×10^{-7} *9*
		725.673 *9*	100 *2*	1180.261	4$^+$	E2		0.00506 *7*	α=0.00506 *7*; α(K)=0.00424 *6*; α(L)=0.000642 *9*; α(M)=0.0001389 *20*; α(N+..)=3.61×10^{-5} *5* α(N)=3.13×10^{-5} *5*; α(O)=4.58×10^{-6} *7*; α(P)=2.50×10^{-7} *4*
1920.97	0$^+$	1370.71 *6*	100	550.255	2$^+$				
1972.480	2$^+$	308.29 *11*	9.5 *10*	1664.278	2$^+$				
		810.65 *14*	12 *2*	1161.529	3$^-$				
		1422.216 *20*	100 *3*	550.255	2$^+$	M1+E2	−0.556[c] *24*	0.001663 *25*	α=0.001663 *25*; α(K)=0.001379 *21*; α(L)=0.000182 *3*; α(M)=3.88×10^{-5} *6*; α(N+..)=6.40×10^{-5} *9* α(N)=8.80×10^{-6} *13*; α(O)=1.325×10^{-6} *20*; α(P)=8.43×10^{-8} *13*; α(IPF)=5.38×10^{-5} *8*
		1972.8 *3*	9.9 *8*	0.0	0$^+$				
2031.403	4$^-$	437.18 *4*	3.5 *1*	1594.247	5$^-$	M1		0.0303	α(K)=0.0258 *4*; α(L)=0.00353 *5*; α(M)=0.000756 *11*; α(N+..)=0.000199 *3* α(N)=0.0001715 *24*; α(O)=2.58×10^{-5} *4*; α(P)=1.621×10^{-6} *23*
		851.4 *5*	0.28 *13*	1180.261	4$^+$				
		869.891 *8*	100 *2*	1161.529	3$^-$	M1+E2	−1.7[b] *3*	0.00391 *18*	α=0.00391 *18*; α(K)=0.00331 *16*; α(L)=0.000466 *19*; α(M)=0.000100 *4*; α(N+..)=2.62×10^{-5} *11* α(N)=2.26×10^{-5} *9*; α(O)=3.36×10^{-6} *14*; α(P)=2.00×10^{-7} *11*

$^{148}_{62}Sm_{86}$-11

γ(^{148}Sm) (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[#]	E_f	J_f^π	Mult.[@]	δ	α[†]	Comments
2057.960	2⁻	393.80 *3*	1.6 *2*	1664.278	2⁺				
		592.83 *3*	36.0 *7*	1465.137	1⁻	M1+E2		0.011 *3*	α(K)=0.009 *3*; α(L)=0.0014 *3*; α(M)=0.00029 *6*; α(N+..)=7.7×10^{-5} *15* α(N)=6.6×10^{-5} *13*; α(O)=9.8×10^{-6} *21*; α(P)=5.7×10^{-7} *18* δ: +11 +*11*−*4* or −0.20 *5* from ^{148}Pm β^- decay.
		896.42 *3*	100 *1*	1161.529	3⁻	M1+E2	+1.32[&] *9*	0.00386 *9*	α=0.00386 *9*; α(K)=0.00328 *8*; α(L)=0.000456 *10*; α(M)=9.77×10^{-5} *20*; α(N+..)=2.56×10^{-5} *6* α(N)=2.21×10^{-5} *5*; α(O)=3.29×10^{-6} *7*; α(P)=1.99×10^{-7} *5*
		1507.68 *3*	0.6 *1*	550.255	2⁺				
2095.595	6⁺	189.721 *16*	6.9 *2*	1905.908	6⁺	M1,E2		0.264 *16*	α(K)=0.21 *3*; α(L)=0.045 *12*; α(M)=0.010 *3*; α(N+..)=0.0025 *7* α(N)=0.0022 *6*; α(O)=0.00031 *7*; α(P)=1.2×10^{-5} *4*
		362.09 *3*	1.0 *2*	1733.465	4⁺				
		501.312 *11*	37.4 *8*	1594.247	5⁻	E1+M2	−0.017[a] *14*	0.00431 *8*	α=0.00431 *8*; α(K)=0.00369 *7*; α(L)=0.000489 *9*; α(M)=0.0001041 *20*; α(N+..)=2.72×10^{-5} *5* α(N)=2.35×10^{-5} *5*; α(O)=3.49×10^{-6} *7*; α(P)=2.09×10^{-7} *4*
		915.331 *8*	100 *2*	1180.261	4⁺	E2		0.00300 *5*	α=0.00300 *5*; α(K)=0.00254 *4*; α(L)=0.000364 *5*; α(M)=7.83×10^{-5} *11*; α(N+..)=2.04×10^{-5} *3* α(N)=1.769×10^{-5} *25*; α(O)=2.61×10^{-6} *4*; α(P)=1.508×10^{-7} *22*
2111.053	4⁺	216.16 *6*	2.2 *2*	1894.824	4⁺	M1		0.195	α(K)=0.1657 *24*; α(L)=0.0232 *4*; α(M)=0.00497 *7*; α(N+..)=0.001307 *19* α(N)=0.001127 *16*; α(O)=0.0001691 *24*; α(P)=1.052×10^{-5} *15*
		377.560 *20*	11.6 *26*	1733.465	4⁺	M1		0.0442	α(K)=0.0376 *6*; α(L)=0.00518 *8*; α(M)=0.001109 *16*; α(N+..)=0.000292 *4* α(N)=0.000251 *4*; α(O)=3.78×10^{-5} *6*; α(P)=2.37×10^{-6} *4*
		446.52 *6*	3.0 *2*	1664.278	2⁺	(E2)		0.01744	α(K)=0.01419 *20*; α(L)=0.00255 *4*; α(M)=0.000559 *8*; α(N+..)=0.0001437 *21* α(N)=0.0001252 *18*; α(O)=1.778×10^{-5} *25*; α(P)=8.07×10^{-7} *12*
		516.793 *14*	31 *1*	1594.247	5⁻	E1+M2	0.48 *8*	0.015 *3*	α(K)=0.013 *3*; α(L)=0.0019 *4*; α(M)=0.00041 *9*; α(N+..)=0.000108 *23* α(N)=9.3×10^{-5} *20*; α(O)=1.4×10^{-5} *3*; α(P)=8.4×10^{-7} *18* δ: calculated from %E1=81 *5* estimated from Ice data in ^{148}Eu ε decay.
		656.93 *3*	10.3 *6*	1454.115	2⁺				
		930.807 *19*	100 *21*	1180.261	4⁺	E2		0.00290 *4*	α=0.00290 *4*; α(K)=0.00245 *4*; α(L)=0.000350 *5*; α(M)=7.53×10^{-5} *11*; α(N+..)=1.97×10^{-5} *3* α(N)=1.701×10^{-5} *24*; α(O)=2.51×10^{-6} *4*; α(P)=1.455×10^{-7} *21* Mult.: from Ice data in ^{148}Eu ε decay. M1+E2 from (n,n′γ); however, since this γ is doubly placed in this reaction, the result is suspect.
		949.590 *20*	17.6 *4*	1161.529	3⁻				

From ENSDF

$^{148}_{62}$Sm$_{86}$-12

$\gamma(^{148}Sm)$ (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ[#]	E_f	J^π_f	Mult.[@]	δ	α[†]	Comments
2111.053	4^+	1560.786 *17*	61.6 *16*	550.255	2^+	E2		0.001118 *16*	α=0.001118 *16*; α(K)=0.000874 *13*; α(L)=0.0001161 *17*; α(M)=2.48×10^{-5} *4*; α(N+..)=0.000103 α(N)=5.61×10^{-6} *8*; α(O)=8.40×10^{-7} *12*; α(P)=5.21×10^{-8} *8*; α(IPF)=9.68×10^{-5} *14*
2128.64	7^-	222.71 *12*	22.9 *21*	1905.908	6^+	E1		0.0318	α(K)=0.0270 *4*; α(L)=0.00373 *6*; α(M)=0.000796 *12*; α(N+..)=0.000206 *3* α(N)=0.000179 *3*; α(O)=2.61×10^{-5} *4*; α(P)=1.448×10^{-6} *21*
		534.38 *7*	100 *21*	1594.247	5^-	E2		0.01077	α(K)=0.00888 *13*; α(L)=0.001480 *21*; α(M)=0.000323 *5*; α(N+..)=8.35×10^{-5} *12* α(N)=7.25×10^{-5} *11*; α(O)=1.043×10^{-5} *15*; α(P)=5.14×10^{-7} *8*
2146.35	2^+	985.16 *20*	10.4 *12*	1161.529	3^-				
		1596.08 *3*	100 *3*	550.255	2^+	M1+E2	−0.11[c] *5*	0.001447 *21*	α=0.001447 *21*; α(K)=0.001137 *17*; α(L)=0.0001491 *22*; α(M)=3.18×10^{-5} *5*; α(N+..)=0.000128 α(N)=7.21×10^{-6} *11*; α(O)=1.087×10^{-6} *16*; α(P)=6.98×10^{-8} *11*; α(IPF)=0.0001206 *17* B(M1)(W.u.)>0.069; B(E2)(W.u.)>0.019
		2146.3	<17	0.0	0^+				
2147.499	5^+	116.01 *4*	1.49 *4*	2031.403	4^-	E1		0.184	α(K)=0.1556 *22*; α(L)=0.0225 *4*; α(M)=0.00481 *7*; α(N+..)=0.001234 *18* α(N)=0.001073 *15*; α(O)=0.0001528 *22*; α(P)=7.69×10^{-6} *11*
		241.653 *15*	14.3 *3*	1905.908	6^+	M1+E2	−0.34[b] *11*	0.141 *3*	α(K)=0.119 *3*; α(L)=0.0176 *4*; α(M)=0.00379 *10*; α(N+..)=0.000991 *23* α(N)=0.000857 *21*; α(O)=0.0001269 *23*; α(P)=7.41×10^{-6} *25*
		243.83 *4*	3.2 *1*	1903.773	3^+	E2		0.1086	α(K)=0.0817 *12*; α(L)=0.0210 *3*; α(M)=0.00472 *7*; α(N+..)=0.001192 *17* α(N)=0.001046 *15*; α(O)=0.0001413 *20*; α(P)=4.22×10^{-6} *6*
		252.60 *3*	1.33 *4*	1894.824	4^+	M1,E2		0.112 *16*	α(K)=0.091 *18*; α(L)=0.0167 *17*; α(M)=0.0037 *5*; α(N+..)=0.00095 *10* α(N)=0.00083 *9*; α(O)=0.000117 *7*; α(P)=5.4×10^{-6} *16*
		414.057 *16*	100 *5*	1733.465	4^+	M1+E2	−1.8[b] *8*	0.025 *4*	α(K)=0.020 *4*; α(L)=0.00343 *23*; α(M)=0.00075 *5*; α(N+..)=0.000194 *13* α(N)=0.000168 *11*; α(O)=2.42×10^{-5} *20*; α(P)=1.19×10^{-6} *24*
		553.260 *15*	50 *21*	1594.247	5^-	E1		0.00344 *5*	α=0.00344 *5*; α(K)=0.00295 *5*; α(L)=0.000389 *6*; α(M)=8.28×10^{-5} *12*; α(N+..)=2.16×10^{-5} *3* α(N)=1.87×10^{-5} *3*; α(O)=2.78×10^{-6} *4*; α(P)=1.680×10^{-7} *24*
		967.306 *17*	26.9 *6*	1180.261	4^+	M1+E2		0.0035 *8*	α=0.0035 *8*; α(K)=0.0030 *7*; α(L)=0.00040 *9*; α(M)=8.6×10^{-5} *18*; α(N+..)=2.3×10^{-5} *5* α(N)=2.0×10^{-5} *4*; α(O)=2.9×10^{-6} *7*; α(P)=1.8×10^{-7} *5* δ: +0.42 *10* or +2.0 *5* from $\gamma\gamma(\theta)$; +0.55 *+17−11* or −2.8 *+11−9* from $\gamma(\theta$,T) all from ^{148}Eu ε decay.
2194.061	6^+	98.530 *20*	12.2 *2*	2095.595	6^+	M1+E2	0.18	1.79 *3*	α(K)=1.486 *21*; α(L)=0.235 *4*; α(M)=0.0511 *8*; α(N+..)=0.01330 *19*

$^{148}_{62}Sm_{86}$-13

$\gamma(^{148}Sm)$ (continued)

E_i(level)	J_i^π	E_γ [‡]	I_γ [#]	E_f	J_f^π	Mult. [@]	δ	α [†]	Comments
									α(N)=0.01152 *17*; α(O)=0.001689 *24*; α(P)=9.40×10^{-5} *14* δ: from M1/E2=30 from ^{148}Eu ε decay.
2194.061	6$^+$	288.141 *13*	61.9 *4*	1905.908	6$^+$	M1+E2	+0.088[a] *21*	0.0898	α(K)=0.0763 *11*; α(L)=0.01061 *15*; α(M)=0.00228 *4*; α(N+..)=0.000599 *9* α(N)=0.000516 *8*; α(O)=7.75×10^{-5} *11*; α(P)=4.82×10^{-6} *7*
		299.1 *2*	0.44 *9*	1894.824	4$^+$				
		460.80 *20*	2.06 *9*	1733.465	4$^+$				
		599.81 *3*	61.8 *6*	1594.247	5$^-$	E1+M2	−0.021[a] *11*	0.00290 *5*	α=0.00290 *5*; α(K)=0.00249 *4*; α(L)=0.000327 *6*; α(M)=6.96×10^{-5} *12*; α(N+..)=1.82×10^{-5} *3* α(N)=1.57×10^{-5} *3*; α(O)=2.34×10^{-6} *4*; α(P)=1.423×10^{-7} *24*
		1013.808 *11*	100 *1*	1180.261	4$^+$	E2+M3	−0.025[a] *14*	0.00243 *4*	α=0.00243 *4*; α(K)=0.00206 *4*; α(L)=0.000290 *5*; α(M)=6.22×10^{-5} *10*; α(N+..)=1.62×10^{-5} *3* α(N)=1.404×10^{-5} *22*; α(O)=2.08×10^{-6} *4*; α(P)=1.224×10^{-7} *20* Additional information 1.
2204.99	0$^+$	1654.72 *15*	100	550.255	2$^+$				
2208.85	(1,2$^+$)	1658.58 *7*	100 *4*	550.255	2$^+$				
		2208.9 *3*	24 *4*	0.0	0$^+$				
2214.215	5$^+$	66.72 *9*	0.33 *4*	2147.499	5$^+$	M1		5.43	α(K)=4.60 *7*; α(L)=0.656 *10*; α(M)=0.1410 *21*; α(N+..)=0.0370 *6* α(N)=0.0319 *5*; α(O)=0.00478 *7*; α(P)=0.000294 *5* I_γ: from ce(K) and α(K).
		182.83 *3*	1.9 *4*	2031.403	4$^-$	E1		0.0537	α(K)=0.0456 *7*; α(L)=0.00636 *9*; α(M)=0.001359 *19*; α(N+..)=0.000351 *5* α(N)=0.000305 *5*; α(O)=4.42×10^{-5} *7*; α(P)=2.39×10^{-6} *4*
		308.45 *10*	0.96 *9*	1905.908	6$^+$	E2,M1		0.063 *12*	α(K)=0.052 *12*; α(L)=0.00882 *13*; α(M)=0.00193 *5*; α(N+..)=0.000498 *7* α(N)=0.000433 *7*; α(O)=6.23×10^{-5} *24*; α(P)=3.1×10^{-6} *10*
		310.14 *10*	1.9 *4*	1903.773	3$^+$	E2		0.0507	α(K)=0.0397 *6*; α(L)=0.00863 *13*; α(M)=0.00192 *3*; α(N+..)=0.000489 *7* α(N)=0.000428 *6*; α(O)=5.90×10^{-5} *9*; α(P)=2.15×10^{-6} *3*
		319.270 *20*	2.0 *1*	1894.824	4$^+$	M1,E2		0.057 *12*	α(K)=0.047 *11*; α(L)=0.00792 *18*; α(M)=0.001730 *25*; α(N+..)=0.000448 *10* α(N)=0.000389 *7*; α(O)=5.6×10^{-5} *3*; α(P)=2.8×10^{-6} *9*
		480.89 *8*	1.21 *6*	1733.465	4$^+$	M1		0.0238	α(K)=0.0203 *3*; α(L)=0.00276 *4*; α(M)=0.000591 *9*; α(N+..)=0.0001555 *22* α(N)=0.0001340 *19*; α(O)=2.02×10^{-5} *3*; α(P)=1.269×10^{-6} *18*
		620.04 *3*	11.6 *7*	1594.247	5$^-$	E1+M2	+0.13[b] *5*	0.0033 *5*	α=0.0033 *5*; α(K)=0.0028 *5*; α(L)=0.00037 *7*; α(M)=8.0×10^{-5} *14*; α(N+..)=2.1×10^{-5} *4* α(N)=1.8×10^{-5} *4*; α(O)=2.7×10^{-6} *5*; α(P)=1.6×10^{-7} *3*

$^{148}_{62}Sm_{86}$-14

$\gamma(^{148}Sm)$ (continued)

E_i(level)	J_i^π	E_γ[‡]	I_γ[#]	E_f	J_f^π	Mult.[@]	δ	α[†]	Comments
2214.215	5^+	1033.986 *14*	100 *2*	1180.261	4^+	M1+E2	−1.9[b] *6*	0.00260 *21*	α=0.00260 *21*; α(K)=0.00222 *18*; α(L)=0.000306 *22*; α(M)=6.5×10^{-5} *5*; α(N+..)=1.71×10^{-5} *13* α(N)=1.48×10^{-5} *11*; α(O)=2.21×10^{-6} *17*; α(P)=1.33×10^{-7} *12*
2228.042	4^+	322 *1*	4.6 *24*	1905.908	6^+				
		495.25 *6*	11 *5*	1733.465	4^+	M1		0.0221	α(K)=0.0188 *3*; α(L)=0.00256 *4*; α(M)=0.000548 *8*; α(N+..)=0.0001442 *21* α(N)=0.0001243 *18*; α(O)=1.87×10^{-5} *3*; α(P)=1.177×10^{-6} *17*
		774.2 *5*	2.4 *12*	1454.115	2^+				
		1047.570 *20*	46 *7*	1180.261	4^+	M1		0.00353 *5*	α=0.00353 *5*; α(K)=0.00302 *5*; α(L)=0.000401 *6*; α(M)=8.55×10^{-5} *12*; α(N+..)=2.25×10^{-5} *4* α(N)=1.94×10^{-5} *3*; α(O)=2.92×10^{-6} *4*; α(P)=1.87×10^{-7} *3*
		1066.75 *3*	91.7 *22*	1161.529	3^-				
		1677.85 *3*	100 *3*	550.255	2^+	E2		0.001034 *15*	α=0.001034 *15*; α(K)=0.000763 *11*; α(L)=0.0001007 *15*; α(M)=2.15×10^{-5} *3*; α(N+..)=0.000148 α(N)=4.86×10^{-6} *7*; α(O)=7.28×10^{-7} *11*; α(P)=4.55×10^{-8} *7*; α(IPF)=0.0001432 *20*
2284.406	$(1,2^+)$	362.8[f] *2*	<5	1920.97	0^+				
		819.27 *3*	30 *5*	1465.137	1^-				
		1734.12 *3*	87 *2*	550.255	2^+				
		2284.39 *3*	100 *5*	0.0	0^+	D			
2313.57	2^+	1152.20 *15*	42 *3*	1161.529	3^-	E1+M2	−0.10[c] *9*	0.00086 *15*	α=0.00086 *15*; α(K)=0.00073 *13*; α(L)=9.5×10^{-5} *18*; α(M)=2.0×10^{-5} *4*; α(N+..)=1.50×10^{-5} *8* α(N)=4.5×10^{-6} *9*; α(O)=6.8×10^{-7} *14*; α(P)=4.3×10^{-8} *9*; α(IPF)=9.7×10^{-6} *3*
		1763.26 *8*	100 *4*	550.255	2^+	M1+E2	+2.2[c] *5*	0.00104 *3*	α=0.00104 *3*; α(K)=0.000732 *22*; α(L)=9.6×10^{-5} *3*; α(M)=2.05×10^{-5} *6*; α(N+..)=0.000189 *4* α(N)=4.64×10^{-6} *14*; α(O)=6.97×10^{-7} *21*; α(P)=4.39×10^{-8} *14*; α(IPF)=0.000183 *3*
		2314.0[f] *2*	<4	0.0	0^+				
2318.5	+	1138.4[f] *5*	100	1180.261	4^+				
2327.09	4^+	216.16 *6*	0.99 *7*	2111.053	4^+				
		423.5 *4*	1.9 *5*	1903.773	3^+				
		432.745 *8*	5 *3*	1894.824	4^+	M1		0.0311	α(K)=0.0265 *4*; α(L)=0.00363 *5*; α(M)=0.000776 *11*; α(N+..)=0.000204 *3* α(N)=0.0001761 *25*; α(O)=2.65×10^{-5} *4*; α(P)=1.664×10^{-6} *24*
		662.79 *5*	5.1 *2*	1664.278	2^+				
		732.99 *7*	2.9 *3*	1594.247	5^-				
		1146.805 *14*	100 *2*	1180.261	4^+	M1+E2	−2.0[b] *5*	0.00207 *11*	α=0.00207 *11*; α(K)=0.00176 *10*; α(L)=0.000240 *12*;

From ENSDF

$\gamma(^{148}$Sm) (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ[#]	E_f	J^π_f	Mult.[@]	δ	α[†]	Comments
									α(M)=5.14×10^{-5} *25*; α(N+..)=1.51×10^{-5} *7* α(N)=1.16×10^{-5} *6*; α(O)=1.74×10^{-6} *9*; α(P)=1.06×10^{-7} *7*; α(IPF)=1.61×10^{-6} *3*
2327.09	4^+	1165.54 *5*	4.1 *2*	1161.529	3^-				
		1776.87 *4*	3.3 *1*	550.255	2^+				
2327.62	3^+	1166.08 *17*	11.3 *16*	1161.529	3^-				
		1777.35 *10*	100 *4*	550.255	2^+				
2339.21	3^-	885.6 *8*	19 *3*	1454.115	2^+				
		1159.15 *20*	30 *4*	1180.261	4^+				
		1177.6 *4*	8 *5*	1161.529	3^-				
		1788.90 *9*	100 *4*	550.255	2^+	E1+M2	+0.06[c] *4*	0.000804 *15*	α=0.000804 *15*; α(K)=0.000328 *12*; α(L)=4.15×10^{-5} *16*; α(M)=8.8×10^{-6} *4*; α(N+..)=0.000425 *7* α(N)=1.99×10^{-6} *8*; α(O)=2.99×10^{-7} *11*; α(P)=1.91×10^{-8} *7*; α(IPF)=0.000423 *7*
2374.447	$5^+,6^+$	468.500 *12*	100 *2*	1905.908	6^+	M1+E2	≥0.41[b]	0.020 *5*	α(K)=0.016 *4*; α(L)=0.0025 *4*; α(M)=0.00055 *7*; α(N+..)=0.000142 *19* α(N)=0.000123 *16*; α(O)=1.8×10^{-5} *3*; α(P)=1.0×10^{-6} *3*
		780.11 *6*	27.4 *9*	1594.247	5^-				
		1194.185 *17*	30.4 *7*	1180.261	4^+				
2381.67	2^+	1831.40 *10*	100	550.255	2^+	M1+E2	+0.46[c] *8*	0.001167 *21*	α=0.001167 *21*; α(K)=0.000804 *15*; α(L)=0.0001051 *20*; α(M)=2.24×10^{-5} *5*; α(N+..)=0.000235 α(N)=5.07×10^{-6} *10*; α(O)=7.65×10^{-7} *15*; α(P)=4.91×10^{-8} *10*; α(IPF)=0.000229 *4* B(M1)(W.u.)<0.042; B(E2)(W.u.)>0.79
2390.43	3^+	1229.6 *5*	59 *30*	1161.529	3^-				
		1840.06 *8*	100 *6*	550.255	2^+	M1+E2	−1.37[c] *12*	0.001047 *18*	α=0.001047 *18*; α(K)=0.000707 *13*; α(L)=9.25×10^{-5} *17*; α(M)=1.97×10^{-5} *4*; α(N+..)=0.000228 *4* α(N)=4.47×10^{-6} *8*; α(O)=6.72×10^{-7} *13*; α(P)=4.26×10^{-8} *8*; α(IPF)=0.000223 *4*
2392.32	7^+	263.96 *20*	20 *4*	2128.64	7^-	Q+D			
		486.45 *6*	100 *5*	1905.908	6^+	M1+E2	−0.15[d] *8*	0.0229 *5*	α(K)=0.0195 *4*; α(L)=0.00267 *5*; α(M)=0.000571 *9*; α(N+..)=0.0001500 *24* α(N)=0.0001294 *21*; α(O)=1.94×10^{-5} *4*; α(P)=1.220×10^{-6} *24*
2442.29	(2^+)	778.19 *11*	25 *2*	1664.278	2^+				
		1262.0 *3*	15 *3*	1180.261	4^+				
		2441.88 *20*	100 *6*	0.0	0^+				
2467.38	$3^{(-)}$	1305.75 *10*	42 *4*	1161.529	3^-				
		1917.25 *12*	100 *5*	550.255	2^+				
2472.48	1	1922.28 *25*	100 *12*	550.255	2^+				
		2472.41 *20*	71 *14*	0.0	0^+	D			
2490.004	4^+	583.4 *5*	1.5 *8*	1905.908	6^+				

$^{148}_{62}$Sm$_{86}$-16

$\gamma(^{148}Sm)$ (continued)

E_i(level)	J^π_i	E_γ‡	I_γ#	E_f	J^π_f	Mult.@	δ	α†	Comments
2490.004	4^+	594.89 *4*	14.7 *5*	1894.824	4^+				
		756.581 *12*	23.1 *5*	1733.465	4^+	M1,E2		0.0061 *16*	α=0.0061 *16*; α(K)=0.0052 *14*; α(L)=0.00073 *16*; α(M)=0.00016 *4*; α(N+..)=4.1×10^{-5} *9* α(N)=3.5×10^{-5} *8*; α(O)=5.3×10^{-6} *12*; α(P)=3.2×10^{-7} *9*
		826.30 *16*	2.0 *2*	1664.278	2^+				
		1036 *1*	8.2 *16*	1454.115	2^+				
		1309.778 *16*	36.1 *8*	1180.261	4^+	M1+E2		0.0018 *4*	α=0.0018 *4*; α(K)=0.0015 *3*; α(L)=0.00020 *4*; α(M)=4.3×10^{-5} *8*; α(N+..)=3.4×10^{-5} *3* α(N)=9.7×10^{-6} *18*; α(O)=1.5×10^{-6} *3*; α(P)=9.2×10^{-8} *19*; α(IPF)=2.31×10^{-5} *9* δ: $-0.21\le\delta\le+1.47$ from ^{148}Eu ε decay.
		1328.504 *15*	100 *2*	1161.529	3^-	E1		0.000708 *10*	α=0.000708 *10*; α(K)=0.000531 *8*; α(L)=6.76×10^{-5} *10*; α(M)=1.434×10^{-5} *20*; α(N+..)=9.44×10^{-5} *1* α(N)=3.25×10^{-6} *5*; α(O)=4.87×10^{-7} *7*; α(P)=3.09×10^{-8} *5*; α(IPF)=9.06×10^{-5} *13*
		1939.17 *4*	5.2 *2*	550.255	2^+				
2513.50	1	2513.48 *18*	100	0.0	0^+	D			
2524.101	4^+	296.21 *7*	3.2 *2*	2228.042	4^+	M1		0.0836	α(K)=0.0711 *10*; α(L)=0.00985 *14*; α(M)=0.00211 *3*; α(N+..)=0.000555 *8* α(N)=0.000479 *7*; α(O)=7.19×10^{-5} *10*; α(P)=4.49×10^{-6} *7*
		310.14 *10*	6.0 *17*	2214.215	5^+	M1		0.0740	α(K)=0.0630 *9*; α(L)=0.00871 *13*; α(M)=0.00187 *3*; α(N+..)=0.000491 *7* α(N)=0.000424 *6*; α(O)=6.36×10^{-5} *9*; α(P)=3.98×10^{-6} *6*
		620.04 *3*	11.9 *26*	1905.908	6^+				
		790.20 *20*	2.4 *3*	1733.465	4^+				
		859.90 *20*	2.1 *3*	1664.278	2^+				
		929.85 *3*	72 *13*	1594.247	5^-	[E1]		0.001184 *17*	α=0.001184 *17*; α(K)=0.001018 *15*; α(L)=0.0001312 *19*; α(M)=2.79×10^{-5} *4*; α(N+..)=7.30×10^{-6} α(N)=6.30×10^{-6} *9*; α(O)=9.43×10^{-7} *14*; α(P)=5.88×10^{-8} *9*
		1069.82 *4*	13.0 *4*	1454.115	2^+				
		1343.87 *3*	100 *8*	1180.261	4^+	M1+E2	+0.20[b]	0.00198 *3*	α=0.00198 *3*; α(K)=0.001668 *24*; α(L)=0.000220 *3*; α(M)=4.69×10^{-5} *7*; α(N+..)=4.41×10^{-5} *7* α(N)=1.064×10^{-5} *15*; α(O)=1.604×10^{-6} *23*; α(P)=1.026×10^{-7} *15*; α(IPF)=3.18×10^{-5} *5*
		1362.640 *19*	35.3 *8*	1161.529	3^-	E1		0.000702 *10*	α=0.000702 *10*; α(K)=0.000509 *8*; α(L)=6.46×10^{-5} *9*; α(M)=1.371×10^{-5} *20*; α(N+..)=0.0001155 α(N)=3.10×10^{-6} *5*; α(O)=4.66×10^{-7} *7*; α(P)=2.95×10^{-8} *5*; α(IPF)=0.0001119 *16*
		1973.81 *4*	3.2 *1*	550.255	2^+				
2532.39	$4^-,5^-$	157.8 *5*	9 *4*	2374.447	$5^+,6^+$				
		938.10 *9*	100 *4*	1594.247	5^-				
		1370.97 *17*	16.7 *12*	1161.529	3^-				

Adopted Levels, Gammas (continued)

γ(^{148}Sm) (continued)

E_i(level)	J^π_i	E_γ‡	I_γ#	E_f	J^π_f	Mult.@	δ	α†	Comments
2539.82	3⁻	1378.31 23	100 10	1161.529	3⁻				
		1989.52 25	73 7	550.255	2⁺				
2544.67	8⁺	152.1 2	1.23	2392.32	7⁺				
		350.5 2		2194.061	6⁺				
		415.9 1	100 5	2128.64	7⁻	E1		0.00661 10	α=0.00661 10; α(K)=0.00565 8; α(L)=0.000755 11; α(M)=0.0001610 23; α(N+..)=4.20×10^{-5} 6 α(N)=3.63×10^{-5} 5; α(O)=5.37×10^{-6} 8; α(P)=3.18×10^{-7} 5
		449.0 11	35 4	2095.595	6⁺	E2		0.0172 3	α(K)=0.01398 22; α(L)=0.00250 4; α(M)=0.000549 9; α(N+..)=0.0001413 23 α(N)=0.0001230 20; α(O)=1.75×10^{-5} 3; α(P)=7.96×10^{-7} 13
		638.5 1	32	1905.908	6⁺	E2		0.00687 10	α=0.00687 10; α(K)=0.00573 8; α(L)=0.000899 13; α(M)=0.000195 3; α(N+..)=5.06×10^{-5} 7 α(N)=4.39×10^{-5} 7; α(O)=6.38×10^{-6} 9; α(P)=3.35×10^{-7} 5
2567.89	2⁺	2017.65 19	100 7	550.255	2⁺	M1+E2		0.00102 10	α=0.00102 10; α(K)=0.00061 7; α(L)=7.9×10^{-5} 9; α(M)=1.69×10^{-5} 19; α(N+..)=0.000319 18 α(N)=3.8×10^{-6} 5; α(O)=5.8×10^{-7} 7; α(P)=3.7×10^{-8} 5; α(IPF)=0.000314 18 δ: −0.46 19 or 1/δ=+0.01 13 from (n,n′γ).
		2567.0 10	30 6	0.0	0⁺				
2570.832	4$^{(-)}$	356.47 15	8.7 20	2214.215	5⁺				
		423.5 4	27 7	2147.499	5⁺				
		539.1 5	7 4	2031.403	4⁻				
		667.170 20	76 15	1903.773	3⁺				
		976.50 4	57.6 15	1594.247	5⁻				
		1390.44 14	6.9 8	1180.261	4⁺				
		1409.160 20	100 3	1161.529	3⁻	D+Q			δ: +0.04 12 if J=4⁻;>+0.47 or<−0.47 if J=3⁻, from ^{148}Eu ε decay.
2583.862	4$^{(-)}$	989.606 10	100 2	1594.247	5⁻	M1,E2		0.0033 8	α=0.0033 8; α(K)=0.0028 7; α(L)=0.00038 8; α(M)=8.2×10^{-5} 17; α(N+..)=2.1×10^{-5} 5 α(N)=1.9×10^{-5} 4; α(O)=2.8×10^{-6} 6; α(P)=1.7×10^{-7} 5
		1422.21 18	2.9 2	1161.529	3⁻				
2633.15	3⁻	1471.61 16	21.8 20	1161.529	3⁻				
		2082.88 9	100 4	550.255	2⁺	E1		0.000931 13	α=0.000931 13; α(K)=0.000253 4; α(L)=3.17×10^{-5} 5; α(M)=6.73×10^{-6} 10; α(N+..)=0.000640 9 α(N)=1.523×10^{-6} 22; α(O)=2.29×10^{-7} 4; α(P)=1.471×10^{-8} 21; α(IPF)=0.000638 9
2641.222	5⁺	493.51 20	4.9 18	2147.499	5⁺				
		735.00 5	10.5 18	1905.908	6⁺	M1+E2	−1.1[b] 6	0.0064 12	α=0.0064 12; α(K)=0.0055 11; α(L)=0.00077 12; α(M)=0.000165 24; α(N+..)=4.3×10^{-5} 7 α(N)=3.7×10^{-5} 6; α(O)=5.6×10^{-6} 9; α(P)=3.3×10^{-7} 7
		736.90 20	1.8 4	1903.773	3⁺				
		745.87 5	4.6 3	1894.824	4⁺				
		1047.570 20	4.3 25	1594.247	5⁻				

Adopted Levels, Gammas (continued)

$\gamma(^{148}$Sm) (continued)

E_i(level)	J^{π}_i	E_γ‡	I_γ#	E_f	J^{π}_f	Mult.@	δ	α†	Comments
2641.222	5^+	1460.630 *19*	100 *2*	1180.261	4^+	M1+E2	+2.1[b] *16*	0.0013 *3*	α=0.0013 *3*; α(K)=0.00107 *25*; α(L)=0.00014 *4*; α(M)=3.0×10^{-5} *7*; α(N+..)=7.1×10^{-5} *6* α(N)=6.9×10^{-6} *16*; α(O)=1.03×10^{-6} *24*; α(P)=6.4×10^{-8} *17*; α(IPF)=6.3×10^{-5} *4*
2645.50	$4^+,5^+$	1051.25 *14*	100	1594.247	5^-				
2673.07	4^+	478.4 *4*	22 *3*	2194.061	6^+				
		1219.01 *9*	51 *4*	1454.115	2^+				
		1492.81 *4*	100 *3*	1180.261	4^+				
		1511.49 *7*	42 *3*	1161.529	3^-				
		2122.75 *8*	13.9 *6*	550.255	2^+				
2675.20	$(3^+,4,5^-)$	460.80 *20*	100 *12*	2214.215	5^+				
		643.90 *20*	84 *7*	2031.403	4^-				
		1513.9 *4*	46 *12*	1161.529	3^-				
2683.467	$4^-,5^-$	455.30 *15*	13.3 *14*	2228.042	4^+				
		489.2 *5*	9 *5*	2194.061	6^+				
		587.52 *6*	57.2 *21*	2095.595	6^+				
		651.5 *5*	9 *5*	2031.403	4^-				
		787.98 *18*	13.0 *18*	1894.824	4^+				
		1089.154 *18*	100 *2*	1594.247	5^-	M1		0.00322 *5*	α=0.00322 *5*; α(K)=0.00275 *4*; α(L)=0.000365 *6*; α(M)=7.79×10^{-5} *11*; α(N+..)=2.05×10^{-5} *3* α(N)=1.767×10^{-5} *25*; α(O)=2.66×10^{-6} *4*; α(P)=1.701×10^{-7} *24*
		1503.200 *2*	91 *2*	1180.261	4^+				
		1521.85 *3*	75 *2*	1161.529	3^-				
2697.77	$3^+,4^+$	1517.81 *22*	24 *3*	1180.261	4^+				
		1536.03 *22*	55 *8*	1161.529	3^-				
		2147.47 *16*	100 *8*	550.255	2^+				
2698.539	$5^-,6^-$	166.15 *3*	18.4 *6*	2532.39	$4^-,5^-$	M1,E2		0.397 *8*	α(K)=0.30 *4*; α(L)=0.073 *25*; α(M)=0.016 *6*; α(N+..)=0.0041 *15* α(N)=0.0036 *13*; α(O)=0.00050 *15*; α(P)=1.7×10^{-5} *5*
		504.57 *7*	37.6 *14*	2194.061	6^+				
		587.52 *6*	31.9 *12*	2111.053	4^+				
		602.62 *3*	9 *4*	2095.595	6^+				
		667.170 *20*	18 *6*	2031.403	4^-				
		792.59 *6*	32.1 *14*	1905.908	6^+				
		1104.321 *16*	100 *2*	1594.247	5^-	M1		0.00311 *5*	α=0.00311 *5*; α(K)=0.00267 *4*; α(L)=0.000353 *5*; α(M)=7.54×10^{-5} *11*; α(N+..)=2.02×10^{-5} *3* α(N)=1.710×10^{-5} *24*; α(O)=2.58×10^{-6} *4*; α(P)=1.646×10^{-7} *23*; α(IPF)=4.01×10^{-7} *6*
2701.92	$4^{(-)},(3^-)$	1107.67 *3*	100 *3*	1594.247	5^-				
		1540.27 *15*	61 *6*	1161.529	3^-				
2704.6	$(1,2^+)$	2154.6 *3*	33.5 *22*	550.255	2^+				

$^{148}_{62}$Sm$_{86}$-19

$\gamma(^{148}Sm)$ (continued)

E_i(level)	J^{π}_i	E_{γ}‡	I_{γ}#	E_f	J^{π}_f	Mult.@	α†	Comments
2704.6	(1,2$^+$)	2704.6 *5*	100	0.0	0$^+$			
2713.334	3$^+$,4$^+$	385.9 *6*	7 *3*	2327.09	4$^+$			
		485.90 *14*	7.4 *13*	2228.042	4$^+$			
		979.843 *15*	100 *2*	1733.465	4$^+$			
		1533.10 *20*	15.1 *13*	1180.261	4$^+$			
		2163.9 *3*	2.6 *3*	550.255	2$^+$			
2714.98	8$^+$	586.2 *1*		2128.64	7$^-$	E1	0.00303 *5*	α=0.00303 *5*; α(K)=0.00260 *4*; α(L)=0.000342 *5*; α(M)=7.27×10^{-5} *11*; α(N+..)=1.90×10^{-5} *3* α(N)=1.643×10^{-5} *23*; α(O)=2.44×10^{-6} *4*; α(P)=1.484×10^{-7} *21*
		808.7 *1*		1905.908	6$^+$	E2	0.00395 *6*	α=0.00395 *6*; α(K)=0.00333 *5*; α(L)=0.000490 *7*; α(M)=0.0001056 *15*; α(N+..)=2.75×10^{-5} *4* α(N)=2.38×10^{-5} *4*; α(O)=3.50×10^{-6} *5*; α(P)=1.97×10^{-7} *3*
2716.05	(4$^+$,5,6$^+$)	810.12 *4*	74.8 *24*	1905.908	6$^+$			
		1121.70 *20*	22.8 *24*	1594.247	5$^-$			
		1535.84 *10*	100 *4*	1180.261	4$^+$			
2719.8	(3$^-$,4$^-$)	2169.5 *5*	100	550.255	2$^+$			
2723.506	4$^+$	332.91 *13*	1.4 *3*	2390.43	3$^+$			E_{γ}: 1985Si16 relate this γ to ^{150}Eu ε decay.
		495.25 *6*	35 *1*	2228.042	4$^+$	M1	0.0221	α(K)=0.0188 *3*; α(L)=0.00256 *4*; α(M)=0.000548 *8*; α(N+..)=0.0001442 *21* α(N)=0.0001243 *18*; α(O)=1.87×10^{-5} *3*; α(P)=1.177×10^{-6} *17*
		575.97 *10*	6.2 *8*	2147.499	5$^+$			
		817.5 *5*	1.4 *7*	1905.908	6$^+$			
		828.61 *12*	4.7 *4*	1894.824	4$^+$			
		1058.7 *5*	1.4 *7*	1664.278	2$^+$			
		1269.3 *4*	1.8 *4*	1454.115	2$^+$			
		1543.289 *27*	100 *3*	1180.261	4$^+$	M1+E2	0.00133 *21*	α=0.00133 *21*; α(K)=0.00106 *17*; α(L)=0.000140 *22*; α(M)=3.0×10^{-5} *5*; α(N+..)=0.000102 *6* α(N)=6.8×10^{-6} *11*; α(O)=1.02×10^{-6} *16*; α(P)=6.4×10^{-8} *12*; α(IPF)=9.5×10^{-5} *5* δ: −0.17 *11* or +1.35 *30* from ^{148}Eu ε decay.
		2173.28 *4*	31.2 *8*	550.255	2$^+$			
2727.31	5$^+$	832.82 *14*	27.6 *16*	1894.824	4$^+$			
		1133.12 *8*	52.8 *24*	1594.247	5$^-$			
		1547.14 *10*	100 *16*	1180.261	4$^+$			
		1565.29 *11*	35.8 *16*	1161.529	3$^-$			
2734.44	(3)	1269.3 *4*	100 *21*	1465.137	1$^-$			
		1572.90 *20*	84 *7*	1161.529	3$^-$			
2738.79	(8$^+$)	544.6 *2*		2194.061	6$^+$			
		643.0 *2*		2095.595	6$^+$			
2753.15	3$^+$	2202.88 *6*	100	550.255	2$^+$	M1+E2	0.00100 *8*	α=0.00100 *8*; α(K)=0.00051 *5*; α(L)=6.6×10^{-5} *7*; α(M)=1.41×10^{-5} *14*; α(N+..)=0.000412 *24* α(N)=3.2×10^{-6} *3*; α(O)=4.8×10^{-7} *5*; α(P)=3.1×10^{-8} *4*;

$^{148}_{62}Sm_{86}$-20

$\gamma(^{148}Sm)$ (continued)

E_i(level)	J^{π}_i	E_{γ}‡	I_{γ}#	E_f	J^{π}_f	Mult.@	δ	α†	Comments
									α(IPF)=0.000409 *24* δ: +0.05 *6* or −5.6 +*30*−*14* from (n,n′γ).
2762.1	1^+	2213.0 *10*	68 *4*	550.255	2^+				
		2762.1 *5*	100	0.0	0^+				
2801.752	5^+	161.00 *6*	0.62 *3*	2641.222	5^+				
		474.2 *4*	0.11 *6*	2327.62	3^+				
		574 *1*	0.42 *22*	2228.042	4^+				
		654.220 *8*	34.8 *8*	2147.499	5^+	M1+E2	+0.9[b] *3*	0.0090 *9*	α=0.0090 *9*; α(K)=0.0076 *8*; α(L)=0.00108 *8*; α(M)=0.000231 *17*; α(N+..)=6.1×10^{-5} *5* α(N)=5.2×10^{-5} *4*; α(O)=7.8×10^{-6} *6*; α(P)=4.7×10^{-7} *5*
		690.74 *3*	2.62 *6*	2111.053	4^+				
		705.91 *18*	0.37 *9*	2095.595	6^+				
		770.307 *10*	9.1 *2*	2031.403	4^-				
		895.847 *10*	13.9 *3*	1905.908	6^+	M1+E2	−0.20[b] *11*	0.00504 *12*	α=0.00504 *12*; α(K)=0.00431 *11*; α(L)=0.000576 *13*; α(M)=0.000123 *3*; α(N+..)=3.24×10^{-5} *8* α(N)=2.79×10^{-5} *7*; α(O)=4.20×10^{-6} *10*; α(P)=2.67×10^{-7} *7*
		906.87 *3*	4.5 *1*	1894.824	4^+				
		1068.25 *10*	2.0 *2*	1733.465	4^+				
		1207.473 *14*	13.6 *3*	1594.247	5^-	E1+M2		0.003 *3*	α=0.003 *3*; α(K)=0.0029 *23*; α(L)=0.0004 *4*; α(M)=8.E−5 *7*; α(N+..)=3.8×10^{-5} *4* α(N)=1.9×10^{-5} *16*; α(O)=2.9×10^{-6} *24*; α(P)=1.8×10^{-7} *15*; α(IPF)=1.5×10^{-5} *14* δ: $-0.36\le\delta\le+1.52$ from ^{148}Eu ε decay.
		1621.510 *20*	100 *2*	1180.261	4^+	M1+E2		0.00124 *18*	α=0.00124 *18*; α(K)=0.00096 *15*; α(L)=0.000126 *19*; α(M)=2.7×10^{-5} *4*; α(N+..)=0.000133 *8* α(N)=6.1×10^{-6} *9*; α(O)=9.2×10^{-7} *14*; α(P)=5.8×10^{-8} *10*; α(IPF)=0.000126 *7* δ: +4.1 *6*, or +1.75 *50*, or +0.45 *10* from ^{148}Eu ε decay.
2806.73	$3^+,4^+$	1073.32 *16*	74 *5*	1733.465	4^+				
		1626.38 *18*	54 *5*	1180.261	4^+				
		1645.7 *3*	43 *5*	1161.529	3^-				
		2256.36 *16*	100 *7*	550.255	2^+				
2807.35	9^-	92.2 *2*		2714.98	8^+	E1		0.343 *6*	α(K)=0.289 *5*; α(L)=0.0429 *7*; α(M)=0.00918 *14*; α(N+..)=0.00234 *4* α(N)=0.00204 *4*; α(O)=0.000288 *5*; α(P)=1.384×10^{-5} *21*
		262.5	18	2544.67	8^+	E1		0.0207	α(K)=0.01764 *25*; α(L)=0.00241 *4*; α(M)=0.000514 *8*; α(N+..)=0.0001336 *19* α(N)=0.0001157 *17*; α(O)=1.694×10^{-5} *24*; α(P)=9.59×10^{-7} *14*
		678.6 *1*	100 *6*	2128.64	7^-	E2		0.00593 *9*	α=0.00593 *9*; α(K)=0.00496 *7*; α(L)=0.000764 *11*; α(M)=0.0001656 *24*; α(N+..)=4.30×10^{-5} *6* α(N)=3.73×10^{-5} *6*; α(O)=5.43×10^{-6} *8*; α(P)=2.91×10^{-7} *4*

$^{148}_{62}Sm_{86}$-21

γ(^{148}Sm) (continued)

E$_i$(level)	J$^\pi_i$	E$_\gamma$‡	I$_\gamma$#	E$_f$	J$^\pi_f$	Mult.@	δ	α†	Comments
2815.584	4$^-$	92.6 *5*	10 *5*	2723.506	4$^+$				
		291.3 *3*	5.7 *8*	2524.101	4$^+$				
		441.23 *14*	6.1 *11*	2374.447	5$^+$,6$^+$				
		587.52 *6*	62 *2*	2228.042	4$^+$				
		704.4 *3*	10 *3*	2111.053	4$^+$				
		1082.096 *17*	100 *2*	1733.465	4$^+$				
		1151.3 *4*	10 *5*	1664.278	2$^+$				
		1221.37 *4*	73 *3*	1594.247	5$^-$	M1		0.00247 *4*	α=0.00247 *4*; α(K)=0.00211 *3*; α(L)=0.000278 *4*; α(M)=5.94×10^{-5} *9*; α(N+..)=2.44×10^{-5} *4* α(N)=1.347×10^{-5} *19*; α(O)=2.03×10^{-6} *3*; α(P)=1.299×10^{-7} *19*; α(IPF)=8.80×10^{-6} *13*
		1635.31 *3*	84 *2*	1180.261	4$^+$	E1+M2		0.0018 *11*	α=0.0018 *11*; α(K)=0.0014 *11*; α(L)=0.00019 *14*; α(M)=4.E−5 *3*; α(N+..)=0.00019 *12* α(N)=9.E−6 *7*; α(O)=1.4×10^{-6} *11*; α(P)=9.E−8 *7*; α(IPF)=0.00018 *13* δ: −0.05≤δ≤+1.06 from ^{148}Eu ε decay.
		1654.02 *15*	62 *7*	1161.529	3$^-$				
2828.13		1233.88 *14*	100	1594.247	5$^-$				
2830.660	5$^+$	157.8 *5*	0.27 *14*	2673.07	4$^+$				
		602.62 *3*	8.0 *2*	2228.042	4$^+$				
		636.86 *7*	0.78 *14*	2194.061	6$^+$				
		683.153 *7*	34.5 *8*	2147.499	5$^+$	M1+E2		0.0079 *21*	α=0.0079 *21*; α(K)=0.0067 *18*; α(L)=0.00094 *20*; α(M)=0.00020 *4*; α(N+..)=5.3×10^{-5} *11* α(N)=4.6×10^{-5} *10*; α(O)=6.8×10^{-6} *15*; α(P)=4.1×10^{-7} *12* δ: +0.85 *+35−50* or −0.06 *+38−18* from ^{148}Eu ε decay.
		701.9 *5*	0.52 *27*	2128.64	7$^-$				
		719.64 *7*	7.4 *4*	2111.053	4$^+$				
		735.00 *5*	0.8 *4*	2095.595	6$^+$	M1+E2	−1.1[b] *6*	0.0064 *12*	α=0.0064 *12*; α(K)=0.0055 *11*; α(L)=0.00077 *12*; α(M)=0.000165 *24*; α(N+..)=4.3×10^{-5} *7* α(N)=3.7×10^{-5} *6*; α(O)=5.6×10^{-6} *9*; α(P)=3.3×10^{-7} *7*
		799.23 *3*	11.3 *3*	2031.403	4$^-$				
		924.75 *3*	8.5 *2*	1905.908	6$^+$	M1		0.00474 *7*	α=0.00474 *7*; α(K)=0.00406 *6*; α(L)=0.000541 *8*; α(M)=0.0001155 *17*; α(N+..)=3.04×10^{-5} *5* α(N)=2.62×10^{-5} *4*; α(O)=3.95×10^{-6} *6*; α(P)=2.51×10^{-7} *4*
		935.20 *20*	1.43 *14*	1894.824	4$^+$				
		1097.18 *3*	3.35 *12*	1733.465	4$^+$	M1		0.00316 *5*	α=0.00316 *5*; α(K)=0.00271 *4*; α(L)=0.000359 *5*; α(M)=7.66×10^{-5} *11*; α(N+..)=2.02×10^{-5} *3* α(N)=1.737×10^{-5} *25*; α(O)=2.62×10^{-6} *4*; α(P)=1.672×10^{-7} *24*
		1236.374 *16*	11.0 *2*	1594.247	5$^-$	E1		0.000743 *11*	α=0.000743 *11*; α(K)=0.000603 *9*; α(L)=7.69×10^{-5} *11*; α(M)=1.632×10^{-5} *23*; α(N+..)=4.69×10^{-5} *7*

$\gamma(^{148}Sm)$ (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ[#]	E_f	J^π_f	Mult.[@]	α[†]	Comments
								α(N)=3.69×10^{-6} *6*; α(O)=5.54×10^{-7} *8*; α(P)=3.50×10^{-8} *5*; α(IPF)=4.26×10^{-5} *6*
2830.660	5$^+$	1650.436 *24*	100 *3*	1180.261	4$^+$	M1+E2	0.00121 *17*	α=0.00121 *17*; α(K)=0.00092 *14*; α(L)=0.000121 *18*; α(M)=2.6×10^{-5} *4*; α(N+..)=0.000145 *8* α(N)=5.9×10^{-6} *9*; α(O)=8.8×10^{-7} *13*; α(P)=5.6×10^{-8} *9*; α(IPF)=0.000138 *7* δ: +0.53 *+6−5* or +2.92 *42*; +0.50 *15* or +1.75 *50* from ^{148}Eu ε decay.
2846.9	(3$^-$,4$^-$)	1685.2 *3*	100 *18*	1161.529	3$^-$			
		2297.0 *5*	50 *14*	550.255	2$^+$			
2861.07	4$^-$,5$^-$	485.90 *14*	11 *2*	2374.447	5$^+$,6$^+$			
		646.9 *5*	7 *3*	2214.215	5$^+$			
		1127.69 *4*	58 *2*	1733.465	4$^+$			
		1266.76 *5*	100 *2*	1594.247	5$^-$	M1	0.00228 *4*	α=0.00228 *4*; α(K)=0.00194 *3*; α(L)=0.000255 *4*; α(M)=5.45×10^{-5} *8*; α(N+..)=3.02×10^{-5} *5* α(N)=1.236×10^{-5} *18*; α(O)=1.86×10^{-6} *3*; α(P)=1.193×10^{-7} *17*; α(IPF)=1.581×10^{-5} *23*
		1680.90 *15*	20.3 *25*	1180.261	4$^+$			
		1699.54 *6*	10.5 *4*	1161.529	3$^-$			
2862.06	3$^+$,4$^+$	1128.04 *15*	85 *6*	1733.465	4$^+$			
		1682.91 *25*	55 *10*	1180.261	4$^+$			
		2312.13 *21*	100 *7*	550.255	2$^+$			
2891.8		2341.5 *5*	100	550.255	2$^+$			
2908.13	3$^-$,4$^-$	1746.59 *22*	100	1161.529	3$^-$			
2928.84	(4,5,6)$^+$	817.5 *5*	29 *15*	2111.053	4$^+$			
		832.9 *5*	29 *15*	2095.595	6$^+$			
		1748.58 *5*	100 *3*	1180.261	4$^+$			
2931.98		1477.3 *4*	26 *5*	1454.115	2$^+$			
		2381.89 *22*	100 *8*	550.255	2$^+$			
2941.1	2$^+$,3$^-$	2390.8 *7*	100	550.255	2$^+$			
2942.82	8$^-$	814.1 *2*	100	2128.64	7$^-$			
2952.7		2402.4 *9*	100	550.255	2$^+$			
2967.6	3$^+$,4$^+$	936.38[f] *10*	100 *10*	2031.403	4$^-$			
		2417.3 *7*	49 *10*	550.255	2$^+$			
2976.32	8$^-$	847.4 *2*	100	2128.64	7$^-$	E2(+M1)	0.0047 *12*	α=0.0047 *12*; α(K)=0.0040 *10*; α(L)=0.00055 *12*; α(M)=0.000119 *25*; α(N+..)=3.1×10^{-5} *7* α(N)=2.7×10^{-5} *6*; α(O)=4.0×10^{-6} *9*; α(P)=2.4×10^{-7} *7* δ: large δ (from $\gamma(\theta)$ in (HI,xnγ)).
2980.50	3$^+$,4$^+$	1800.26 *19*	100	1180.261	4$^+$			
2991.78	3$^+$,4$^+$	1258.41[f] *10*	45 *3*	1733.465	4$^+$			
		1810.94 *25*	28 *3*	1180.261	4$^+$			
		2441.88 *20*	100 *6*	550.255	2$^+$			

$^{148}_{62}Sm_{86}$-23

Adopted Levels, Gammas (continued)

$\gamma(^{148}Sm)$ (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ[#]	E_f	J^π_f	Mult.[@]	δ	α[†]	Comments
3014.1	$3^-,4^-$	2463.8 *6*	100	550.255	2^+				
3038.8	1	2489	<10	550.255	2^+				
		3038.5 *7*	100 *4*	0.0	0^+				
3050.5		1888.7 *4*	100 *15*	1161.529	3^-				
		2500.6 *5*	76 *17*	550.255	2^+				
3063.25	3^-	1399.02 *22*	100	1664.278	2^+				
3082.1	1	2531.9 *9*	8.8 *15*	550.255	2^+				
		3082.0 *4*	100 *3*	0.0	0^+				
3089.84	$2^+,3^-$	1909.4 *4*	78 *15*	1180.261	4^+				
		1928.4 *3*	100 *16*	1161.529	3^-				
		2539.6 *6*	82 *18*	550.255	2^+				
3095.25	$9^{(+)}$	702.6 *2*	100	2392.32	7^+				
3107.8	$3^+,4^+$	2557.5 *4*	100	550.255	2^+				
3138.46	$3^{(-)},4^{(-)}$	1976.91 *10*	100	1161.529	3^-				
3153.5	$^+$	1973.3 *3*	100	1180.261	4^+				
3164.8	$3^+,4^+$	2003.3 *4*	100	1161.529	3^-				
3178.0	$^+$	2627.7 *15*	100	550.255	2^+				
3188.31	9^-	212.1 *2*		2976.32	8^-				
		245.2 *2*		2942.82	8^-				
		381.4 *2*		2807.35	9^-				
		473.3 *2*		2714.98	8^+				
		643.6 *2*		2544.67	8^+				
		1059.5 *2*		2128.64	7^-				
3189.8	$2^+,3^-$	2639.5 *8*	100	550.255	2^+				
3197.4	$3^-,4^-$	1743.3	100	1454.115	2^+				E_γ: multiplet.
3216.15	9^-	671.4 *2*		2544.67	8^+				
		1087.5 *2*		2128.64	7^-				
3221.2		2041.0 *4*	100	1180.261	4^+				
3224.83		2044.58 *19*	100	1180.261	4^+				
3235.23	10^+	690.6 *1*	100	2544.67	8^+	E2		0.00569 *8*	α=0.00569 *8*; α(K)=0.00476 *7*; α(L)=0.000730 *11*; α(M)=0.0001581 *23*; α(N+..)=4.11×10^{-5} *6* α(N)=3.56×10^{-5} *5*; α(O)=5.19×10^{-6} *8*; α(P)=2.80×10^{-7} *4*
3253.45	10^-	158.2 *1*		3095.25	$9^{(+)}$				
		446.1 *1*		2807.35	9^-	M1+E2	−0.10[d] *5*	0.0287 *5*	α(K)=0.0244 *4*; α(L)=0.00334 *5*; α(M)=0.000716 *11*; α(N+..)=0.000188 *3* α(N)=0.0001624 *24*; α(O)=2.44×10^{-5} *4*; α(P)=1.531×10^{-6} *24*
3255.3	$(1,2^+)$	3255.3 *5*	100	0.0	0^+				
3276.2		2725.9 *5*	100	550.255	2^+				
3291.5	$(1,2^+)$	3291.5 *5*	100	0.0	0^+				
3322.6	(10^+)	583.8 *2*	100	2738.79	(8^+)				
3398.13	10^+	590.8 *1*		2807.35	9^-	E1		0.00298 *5*	α=0.00298 *5*; α(K)=0.00255 *4*; α(L)=0.000336 *5*;

$^{148}_{62}Sm_{86}$-24

γ(^{148}Sm) (continued)

E_i(level)	J^π_i	E_γ‡	I_γ#	E_f	J^π_f	Mult.@	α†	Comments
								α(M)=7.15×10^{-5} *10*; α(N+..)=1.87×10^{-5} *3* α(N)=1.615×10^{-5} *23*; α(O)=2.40×10^{-6} *4*; α(P)=1.460×10^{-7} *21*
3398.13	10$^+$	683.1 *1*		2714.98	8$^+$	E2	0.00584 *9*	α=0.00584 *9*; α(K)=0.00488 *7*; α(L)=0.000751 *11*; α(M)=0.0001627 *23*; α(N+..)=4.23×10^{-5} *6* α(N)=3.66×10^{-5} *6*; α(O)=5.34×10^{-6} *8*; α(P)=2.87×10^{-7} *4*
		853.4^f *3*		2544.67	8$^+$			
3421.90	11$^-$	168.5 *1*		3253.45	10$^-$			
		186.7 *1*		3235.23	10$^+$	E1	0.0508	α(K)=0.0432 *6*; α(L)=0.00601 *9*; α(M)=0.001284 *18*; α(N+..)=0.000332 *5* α(N)=0.000288 *4*; α(O)=4.17×10^{-5} *6*; α(P)=2.27×10^{-6} *4*
		205.8 *2*		3216.15	9$^-$			
		614.5 *1*		2807.35	9$^-$	E2	0.00755 *11*	α=0.00755 *11*; α(K)=0.00628 *9*; α(L)=0.000998 *14*; α(M)=0.000217 *3*; α(N+..)=5.62×10^{-5} *8* α(N)=4.87×10^{-5} *7*; α(O)=7.07×10^{-6} *10*; α(P)=3.67×10^{-7} *6*
3451.9	(1,2$^+$)	3451.9 *5*	100	0.0	0$^+$			
3483.6	(1,2$^+$)	3483.6 *5*	100	0.0	0$^+$			
3526.57	10$^-$	310.6 *3*		3216.15	9$^-$			
		338.4 *2*		3188.31	9$^-$			
		719.1 *1*		2807.35	9$^-$			
3534.9	(1,2$^+$)	3534.9 *5*	100	0.0	0$^+$			
3545.63	10$^-$	329.4 *2*		3216.15	9$^-$			
		357.4 *1*		3188.31	9$^-$			
		568.8 *3*		2976.32	8$^-$			
		602.9 *1*		2942.82	8$^-$			
		738.5 *2*		2807.35	9$^-$			
3586.0	(1,2$^+$)	3586.0 *5*	100	0.0	0$^+$			
3614.76	11$^-$	216.6 *1*		3398.13	10$^+$	E1	0.0342	α(K)=0.0291 *4*; α(L)=0.00402 *6*; α(M)=0.000858 *12*; α(N+..)=0.000222 *4* α(N)=0.000193 *3*; α(O)=2.81×10^{-5} *4*; α(P)=1.553×10^{-6} *22*
		807.4 *1*		2807.35	9$^-$	E2	0.00396 *6*	α=0.00396 *6*; α(K)=0.00334 *5*; α(L)=0.000492 *7*; α(M)=0.0001060 *15*; α(N+..)=2.76×10^{-5} *4* α(N)=2.39×10^{-5} *4*; α(O)=3.52×10^{-6} *5*; α(P)=1.97×10^{-7} *3*
3640.4	(11)	317.8 *2*	100	3322.6	(10$^+$)			
3806.98	11$^-$	261.2 *2*		3545.63	10$^-$			
		385.4 *2*		3421.90	11$^-$			
		618.6 *1*		3188.31	9$^-$			
3812.0	(1,2$^+$)	3811.9 *5*	100	0.0	0$^+$			
3843.6	(1,2$^+$)	3843.5 *5*	100	0.0	0$^+$			
3884.3	(1,2$^+$)	3884.2 *5*	100	0.0	0$^+$			
3895.4	(1,2$^+$)	3895.3 *5*	100	0.0	0$^+$			
3992.62	12$^+$	570.6 *2*		3421.90	11$^-$	E1	0.00322 *5*	α=0.00322 *5*; α(K)=0.00275 *4*; α(L)=0.000363 *5*; α(M)=7.72×10^{-5} *11*; α(N+..)=2.02×10^{-5} *3* α(N)=1.744×10^{-5} *25*; α(O)=2.59×10^{-6} *4*; α(P)=1.572×10^{-7} *22*
		594.7 *2*		3398.13	10$^+$			
		757.3 *1*		3235.23	10$^+$	E2	0.00459 *7*	α=0.00459 *7*; α(K)=0.00385 *6*; α(L)=0.000576 *8*; α(M)=0.0001245 *18*;

$^{148}_{62}Sm_{86}$-25

Adopted Levels, Gammas (continued)

$\gamma(^{148}\mathrm{Sm})$ (continued)

E_i(level)	J_i^π	E_γ‡	I_γ#	E_f	J_f^π	Mult.@	α†	Comments
								α(N+..)=3.24×10^{-5} 5 α(N)=2.81×10^{-5} 4; α(O)=4.11×10^{-6} 6; α(P)=2.27×10^{-7} 4
4104.39	12$^+$	489.6 1		3614.76	11$^-$	E1	0.00452 7	α=0.00452 7; α(K)=0.00387 6; α(L)=0.000514 8; α(M)=0.0001094 16; α(N+..)=2.86×10^{-5} 4 α(N)=2.47×10^{-5} 4; α(O)=3.66×10^{-6} 6; α(P)=2.20×10^{-7} 3
		682.2 2		3421.90	11$^-$	E1	0.00220 3	α=0.00220 3; α(K)=0.00188 3; α(L)=0.000246 4; α(M)=5.24×10^{-5} 8; α(N+..)=1.370×10^{-5} 20 α(N)=1.183×10^{-5} 17; α(O)=1.763×10^{-6} 25; α(P)=1.082×10^{-7} 16
		706.2 1		3398.13	10$^+$	E2	0.00540 8	α=0.00540 8; α(K)=0.00452 7; α(L)=0.000689 10; α(M)=0.0001491 21; α(N+..)=3.87×10^{-5} 6 α(N)=3.36×10^{-5} 5; α(O)=4.90×10^{-6} 7; α(P)=2.66×10^{-7} 4
		869.6 2		3235.23	10$^+$			
4108.70	12$^-$	855.2 1	100	3253.45	10$^-$			
4110.68	13$^-$	688.8 1	100	3421.90	11$^-$			
4189.28	12$^+$	196.5 2		3992.62	12$^+$			
		767.5 2		3421.90	11$^-$			
4196.25	12$^-$	389.2 2		3806.98	11$^-$			
		650.8 1		3545.63	10$^-$			
		669.4 2		3526.57	10$^-$			
4241.52	13$^-$	248.9 2		3992.62	12$^+$			
		819.9 3		3421.90	11$^-$			
4397.78	13$^-$	293.3 2		4104.39	12$^+$	E1	0.01558	α(K)=0.01329 19; α(L)=0.00181 3; α(M)=0.000385 6; α(N+..)=0.0001002 15 α(N)=8.67×10^{-5} 13; α(O)=1.273×10^{-5} 18; α(P)=7.29×10^{-7} 11
		783.0 1		3614.76	11$^-$	E2	0.00425 6	α=0.00425 6; α(K)=0.00357 5; α(L)=0.000530 8; α(M)=0.0001145 16; α(N+..)=2.98×10^{-5} 5 α(N)=2.58×10^{-5} 4; α(O)=3.79×10^{-6} 6; α(P)=2.11×10^{-7} 3
4512.91	13$^-$	316.7 2		4196.25	12$^-$			
		402.2 2		4110.68	13$^-$			
		705.9 2		3806.98	11$^-$			
4516.75	13$^+$	408.0 1	100	4108.70	12$^-$			
4805.18	14$^+$	407.4 2		4397.78	13$^-$	E1	0.00694 10	α=0.00694 10; α(K)=0.00593 9; α(L)=0.000794 12; α(M)=0.0001692 24; α(N+..)=4.41×10^{-5} 7 α(N)=3.82×10^{-5} 6; α(O)=5.64×10^{-6} 8; α(P)=3.33×10^{-7} 5
		616.0 2		4189.28	12$^+$			
		694.7 2		4110.68	13$^-$	E1	0.00211 3	α=0.00211 3; α(K)=0.00181 3; α(L)=0.000237 4; α(M)=5.04×10^{-5} 7; α(N+..)=1.319×10^{-5} 19 α(N)=1.138×10^{-5} 16; α(O)=1.697×10^{-6} 24; α(P)=1.042×10^{-7} 15
		700.8 2		4104.39	12$^+$	E2	0.00549 8	α=0.00549 8; α(K)=0.00460 7; α(L)=0.000703 10; α(M)=0.0001521 22; α(N+..)=3.95×10^{-5} 6 α(N)=3.43×10^{-5} 5; α(O)=5.00×10^{-6} 7; α(P)=2.71×10^{-7} 4
		812.6 2		3992.62	12$^+$			
4842.69	15$^-$	732.0 1	100	4110.68	13$^-$			

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$\gamma(^{148}Sm)$ (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ[#]	E_f	J^π_f	Mult.[@]	α[†]	Comments
4864.69	14^+	466.9 *2*		4397.78	13^-			
		623.3 *2*		4241.52	13^-			
		675.3 *2*		4189.28	12^+			
		754.0 *2*		4110.68	13^-			
		760.3 *2*		4104.39	12^+			
		872.0 *1*		3992.62	12^+			
4889.71	14^-	373.0 *2*		4516.75	13^+	E1	0.00858 *12*	α=0.00858 *12*; α(K)=0.00733 *11*; α(L)=0.000984 *14*; α(M)=0.000210 *3*; α(N+..)=5.47×10^{-5} *8* α(N)=4.73×10^{-5} *7*; α(O)=6.98×10^{-6} *10*; α(P)=4.09×10^{-7} *6*
		781.0 *1*		4108.70	12^-	E2	0.00427 *6*	α=0.00427 *6*; α(K)=0.00359 *5*; α(L)=0.000534 *8*; α(M)=0.0001152 *17*; α(N+..)=3.00×10^{-5} *5* α(N)=2.60×10^{-5} *4*; α(O)=3.81×10^{-6} *6*; α(P)=2.12×10^{-7} *3*
4909.65	14^+	799.0 *2*		4110.68	13^-			
		805.2 *2*		4104.39	12^+			
		917.1 *2*		3992.62	12^+			
4917.55	14^-	400.5 *2*		4516.75	13^+			
		404.6 *2*		4512.91	13^-			
		721.4 *1*		4196.25	12^-			
		808.9 *2*		4108.70	12^-			
4951.75	$14^{(-)}$	843.0 *2*	100	4108.70	12^-			
5087.55	15^-	170.0 *2*		4917.55	14^-			
		198.0 *2*		4889.71	14^-			
		244.9 *2*		4842.69	15^-			
		976.8 *2*		4110.68	13^-			
5136.13	15^-	331.0 *2*		4805.18	14^+	E1	0.01150	α(K)=0.00982 *14*; α(L)=0.001326 *19*; α(M)=0.000283 *4*; α(N+..)=7.37×10^{-5} *11* α(N)=6.37×10^{-5} *9*; α(O)=9.38×10^{-6} *14*; α(P)=5.44×10^{-7} *8*
		738.3 *2*		4397.78	13^-	E2	0.00486 *7*	α=0.00486 *7*; α(K)=0.00408 *6*; α(L)=0.000615 *9*; α(M)=0.0001328 *19*; α(N+..)=3.46×10^{-5} *5* α(N)=2.99×10^{-5} *5*; α(O)=4.38×10^{-6} *7*; α(P)=2.41×10^{-7} *4*
5217.20	$15^{(-)}$	265.4 *2*		4951.75	$14^{(-)}$			
		327.6 *2*		4889.71	14^-			
		819.3 *2*		4397.78	13^-			
5274.93	15^+	385.1 *2*		4889.71	14^-	E1	0.00794 *12*	α=0.00794 *12*; α(K)=0.00678 *10*; α(L)=0.000910 *13*; α(M)=0.000194 *3*; α(N+..)=5.06×10^{-5} *8* α(N)=4.38×10^{-5} *7*; α(O)=6.46×10^{-6} *9*; α(P)=3.80×10^{-7} *6*
		758.2 *1*		4516.75	13^+	E2	0.00457 *7*	α=0.00457 *7*; α(K)=0.00384 *6*; α(L)=0.000575 *8*; α(M)=0.0001241 *18*; α(N+..)=3.23×10^{-5} *5* α(N)=2.80×10^{-5} *4*; α(O)=4.10×10^{-6} *6*; α(P)=2.27×10^{-7} *4*
5287.77	15^-	445.0[e] *3*		4842.69	15^-			
		774.9 *2*		4512.91	13^-			
5320.28	16^-	103.1 *3*		5217.20	$15^{(-)}$			
		184.1 *2*		5136.13	15^-			

$^{148}_{62}Sm_{86}$-27

$\gamma(^{148}Sm)$ (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ[#]	E_f	J^π_f	Mult.[@]	α[†]	Comments
5320.28	16^-	233.0 2		5087.55	15^-			
		402.8 2		4917.55	14^-			
		430.6 2		4889.71	14^-			
5496.39	16^+	360.3 2		5136.13	15^-	E1	0.00933 14	α=0.00933 14; α(K)=0.00797 12; α(L)=0.001073 15; α(M)=0.000229 4; α(N+..)=5.96×10^{-5} 9 α(N)=5.15×10^{-5} 8; α(O)=7.60×10^{-6} 11; α(P)=4.44×10^{-7} 7
		586.6 2		4909.65	14^+			
		631.8 2		4864.69	14^+			
		653.7 2		4842.69	15^-	E1	0.00240 4	α=0.00240 4; α(K)=0.00206 3; α(L)=0.000270 4; α(M)=5.74×10^{-5} 8; α(N+..)=1.501×10^{-5} 21 α(N)=1.296×10^{-5} 19; α(O)=1.93×10^{-6} 3; α(P)=1.181×10^{-7} 17
		691.2 2		4805.18	14^+	E2	0.00568 8	α=0.00568 8; α(K)=0.00475 7; α(L)=0.000728 11; α(M)=0.0001577 23; α(N+..)=4.10×10^{-5} 6 α(N)=3.55×10^{-5} 5; α(O)=5.18×10^{-6} 8; α(P)=2.79×10^{-7} 4
5524.48	16^+	615.0 2		4909.65	14^+			
		659.6 2		4864.69	14^+			
		681.7 2		4842.69	15^-			
		719.4 2		4805.18	14^+			
5556.54	16^-	281.7[f] 5		5274.93	15^+			
		666.8 1		4889.71	14^-			
5561.19	17^-	718.5 1	100	4842.69	15^-			
5578.31	$16^{(+)}$	442.2 2		5136.13	15^-			
		713.4 2		4864.69	14^+			
		773.3 2		4805.18	14^+			
5649.57	17^-	92.7 3		5556.54	16^-			
		329.8 2		5320.28	16^-			
		432.0 5		5217.20	$15^{(-)}$			
		561.9 2		5087.55	15^-			
		806.7[f] 5		4842.69	15^-			
5777.74	17^+	281.4 3		5496.39	16^+			
		502.8 1		5274.93	15^+			
5837.32	17^-	517.0 2	100	5320.28	16^-			
5946.08	18^+	108.7 2		5837.32	17^-	E1	0.220	α(K)=0.185 3; α(L)=0.0270 4; α(M)=0.00577 9; α(N+..)=0.001479 22 α(N)=0.001288 20; α(O)=0.000183 3; α(P)=9.09×10^{-6} 14
		296.5 2		5649.57	17^-			
		384.9 2		5561.19	17^-	E1	0.00795 12	α=0.00795 12; α(K)=0.00679 10; α(L)=0.000911 13; α(M)=0.000194 3; α(N+..)=5.07×10^{-5} 8 α(N)=4.38×10^{-5} 7; α(O)=6.47×10^{-6} 9; α(P)=3.80×10^{-7} 6
		421.6 2		5524.48	16^+			
		449.7 2		5496.39	16^+	E2	0.01710	α(K)=0.01392 20; α(L)=0.00249 4; α(M)=0.000546 8; α(N+..)=0.0001406 20 α(N)=0.0001224 18; α(O)=1.739×10^{-5} 25; α(P)=7.93×10^{-7} 12
6011.15	18	233.4 2		5777.74	17^+			

$^{148}_{62}Sm_{86}$-28

Adopted Levels, Gammas (continued)

$\gamma(^{148}Sm)$ (continued)

E_i(level)	J^{π}_i	E_{γ}‡	I_{γ}#	E_f	J^{π}_f	Mult.@	α†	Comments
6011.15	18	361.5 *2*		5649.57	17^-			
6029.22	18^-	379.9 *2*		5649.57	17^-			
		708.8 *2*		5320.28	16^-			
6195.29	19^-	166.1 *1*		6029.22	18^-			
		184.0 *2*		6011.15	18			
		249*f*		5946.08	18^+	E1	0.0237	α(K)=0.0202 *3*; α(L)=0.00277 *4*; α(M)=0.000591 *9*; α(N+..)=0.0001535 *22* α(N)=0.0001329 *19*; α(O)=1.94×10^{-5} *3*; α(P)=1.094×10^{-6} *16*
		358.0 *2*		5837.32	17^-	E2	0.0329	α(K)=0.0262 *4*; α(L)=0.00524 *8*; α(M)=0.001159 *17*; α(N+..)=0.000296 *5* α(N)=0.000259 *4*; α(O)=3.61×10^{-5} *6*; α(P)=1.448×10^{-6} *21*
6392.23	19^-	381.0 *3*		6011.15	18			
		742.6 *2*		5649.57	17^-			
6477.07	19^-	466.0 *2*		6011.15	18			
		531.0 *1*		5946.08	18^+			
		827.6 *2*		5649.57	17^-			
		915.9*f* *5*		5561.19	17^-			
6557.5?	(19)	779.8 *3*	100	5777.74	17^+			
6592.79	$20^{(+)}$	397.5 *2*		6195.29	19^-	E1	0.00736 *11*	α=0.00736 *11*; α(K)=0.00629 *9*; α(L)=0.000842 *12*; α(M)=0.000180 *3*; α(N+..)=4.68×10^{-5} *7* α(N)=4.05×10^{-5} *6*; α(O)=5.98×10^{-6} *9*; α(P)=3.53×10^{-7} *5*
		646.6 *2*		5946.08	18^+	E2	0.00666 *10*	α=0.00666 *10*; α(K)=0.00556 *8*; α(L)=0.000869 *13*; α(M)=0.000188 *3*; α(N+..)=4.89×10^{-5} *7* α(N)=4.24×10^{-5} *6*; α(O)=6.17×10^{-6} *9*; α(P)=3.26×10^{-7} *5*
6694.32	$21^{(-)}$	101.5 *1*		6592.79	$20^{(+)}$			
		217.3 *1*		6477.07	19^-			
		302.0 *2*		6392.23	19^-			
6913.3	$21^{(-)}$	718.0 *2*	100	6195.29	19^-			
7329.3	$22^{(+)}$	416.0 *3*		6913.3	$21^{(-)}$	E1	0.00660 *10*	α=0.00660 *10*; α(K)=0.00565 *8*; α(L)=0.000755 *11*; α(M)=0.0001609 *23*; α(N+..)=4.20×10^{-5} *6* α(N)=3.63×10^{-5} *6*; α(O)=5.36×10^{-6} *8*; α(P)=3.17×10^{-7} *5*
		736.5 *2*		6592.79	$20^{(+)}$	E2	0.00489 *7*	α=0.00489 *7*; α(K)=0.00410 *6*; α(L)=0.000618 *9*; α(M)=0.0001337 *19*; α(N+..)=3.48×10^{-5} *5* α(N)=3.01×10^{-5} *5*; α(O)=4.41×10^{-6} *7*; α(P)=2.42×10^{-7} *4*
7332.92	$23^{(-)}$	638.6 *1*	100	6694.32	$21^{(-)}$			
7620.4	$23^{(-)}$	291.2 *2*		7329.3	$22^{(+)}$	E1	0.01587	α(K)=0.01353 *19*; α(L)=0.00184 *3*; α(M)=0.000393 *6*; α(N+..)=0.0001021 *15* α(N)=8.84×10^{-5} *13*; α(O)=1.297×10^{-5} *19*; α(P)=7.42×10^{-7} *11*
		707.1 *2*		6913.3	$21^{(-)}$	E2	0.00538 *8*	α=0.00538 *8*; α(K)=0.00451 *7*; α(L)=0.000687 *10*; α(M)=0.0001486 *21*; α(N+..)=3.86×10^{-5} *6* α(N)=3.35×10^{-5} *5*; α(O)=4.89×10^{-6} *7*; α(P)=2.65×10^{-7} *4*
7942.5	(22)	1248.2 *2*	100	6694.32	$21^{(-)}$			
7977.6	$24^{(+)}$	357.2 *3*		7620.4	$23^{(-)}$	E1	0.00953 *14*	α=0.00953 *14*; α(K)=0.00814 *12*; α(L)=0.001096 *16*; α(M)=0.000234 *4*;

From ENSDF

Adopted Levels, Gammas (continued)

$\gamma(^{148}Sm)$ (continued)

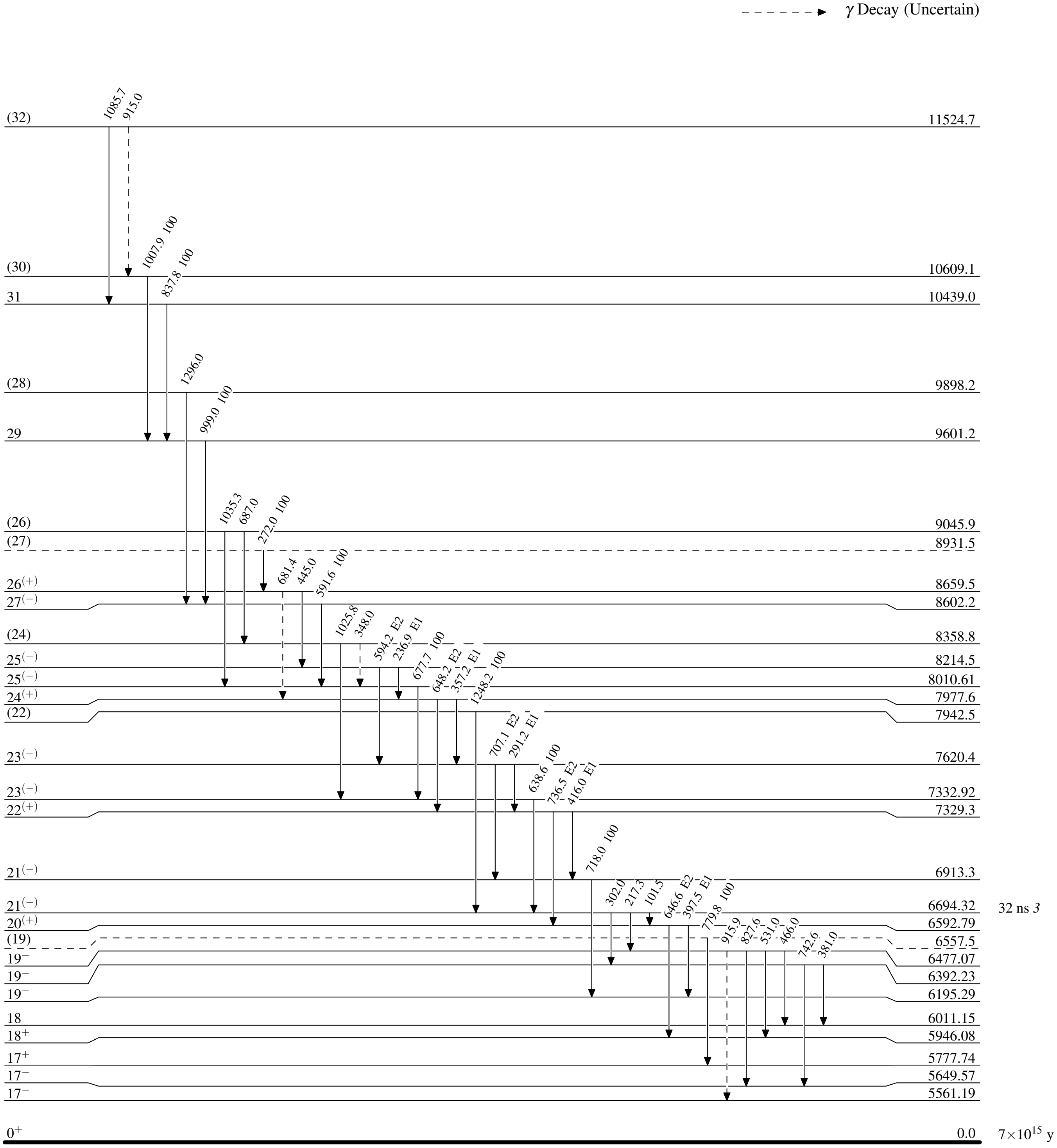
E_i(level)	J^π_i	E_γ[‡]	I_γ[#]	E_f	J^π_f	Mult.[@]	α[†]	Comments
								α(N+..)=6.09×10^{-5} *9* α(N)=5.27×10^{-5} *8*; α(O)=7.76×10^{-6} *11*; α(P)=4.53×10^{-7} *7*
7977.6	24$^{(+)}$	648.2 *2*		7329.3	22$^{(+)}$	E2	0.00662 *10*	α=0.00662 *10*; α(K)=0.00553 *8*; α(L)=0.000863 *13*; α(M)=0.000187 *3*; α(N+..)=4.86×10^{-5} *7* α(N)=4.21×10^{-5} *6*; α(O)=6.13×10^{-6} *9*; α(P)=3.24×10^{-7} *5*
8010.61	25$^{(-)}$	677.7 *1*	100	7332.92	23$^{(-)}$			
8214.5	25$^{(-)}$	236.9 *2*		7977.6	24$^{(+)}$	E1	0.0270	α(K)=0.0230 *4*; α(L)=0.00316 *5*; α(M)=0.000675 *10*; α(N+..)=0.0001751 *25* α(N)=0.0001517 *22*; α(O)=2.21×10^{-5} *4*; α(P)=1.239×10^{-6} *18*
		594.2 *2*		7620.4	23$^{(-)}$	E2	0.00821 *12*	α=0.00821 *12*; α(K)=0.00682 *10*; α(L)=0.001095 *16*; α(M)=0.000238 *4*; α(N+..)=6.17×10^{-5} *9* α(N)=5.35×10^{-5} *8*; α(O)=7.75×10^{-6} *11*; α(P)=3.97×10^{-7} *6*
8358.8	(24)	348.0[f] *5*		8010.61	25$^{(-)}$			
		1025.8 *2*		7332.92	23$^{(-)}$			
8602.2	27$^{(-)}$	591.6 *1*	100	8010.61	25$^{(-)}$			
8659.5	26$^{(+)}$	445.0[e] *3*		8214.5	25$^{(-)}$			
		681.4[f] *5*		7977.6	24$^{(+)}$			
8931.5?	(27)	272.0 *5*	100	8659.5	26$^{(+)}$			
9045.9	(26)	687.0 *3*		8358.8	(24)			
		1035.3 *2*		8010.61	25$^{(-)}$			
9601.2	29	999.0 *2*	100	8602.2	27$^{(-)}$			
9898.2	(28)	1296.0		8602.2	27$^{(-)}$			E_γ: doublet.
10439.0	31	837.8 *2*	100	9601.2	29			
10609.1	(30)	1007.9 *2*	100	9601.2	29			
11524.7	(32)	915.0[f] *5*		10609.1	(30)			
		1085.7 *2*		10439.0	31			

† Additional information 2.
‡ From β^- decay, ε decay, (n,γ), (γ,γ'), (n,n$'\gamma$), Coulomb ex., and (HI,xnγ) data.
# Relative photon branching from each level.
@ From α(K)exp, $\gamma\gamma(\theta)$ in ^{148}Pm β^- decay (5.370 d, and 41.29 d); Ice, $\gamma(\theta)$ of polarized nuclei, and $\gamma\gamma(\theta)$ in ^{148}Eu ε decay; $\gamma(\theta)$ and linear polarization of gammas in (n,n$'\gamma$); $\gamma(\theta)$, DCO, α(K)exp, linear polarization of gammas and $T_{1/2}$ in (HI,xnγ). See individual data sets for details.
& From ^{148}Pm β^- decay (5.370 d).
a From ^{148}Pm β^- decay (41.29 d).
b From ^{148}Eu ε decay.
c From (n,n$'\gamma$).
d From (HI,xnγ).
e Multiply placed.
f Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level



$^{148}_{62}Sm_{86}$

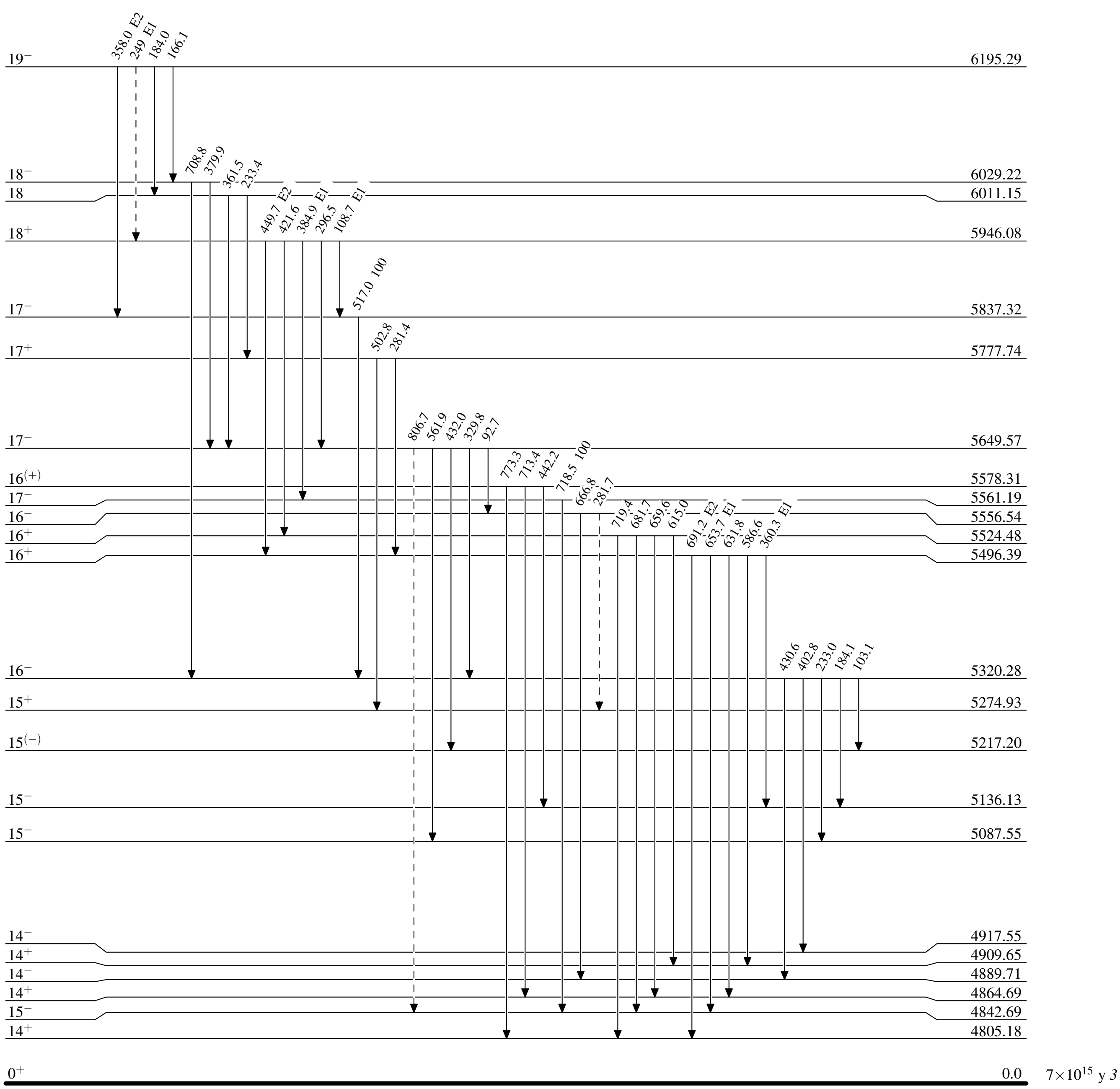
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

Legend

γ Decay (Uncertain)

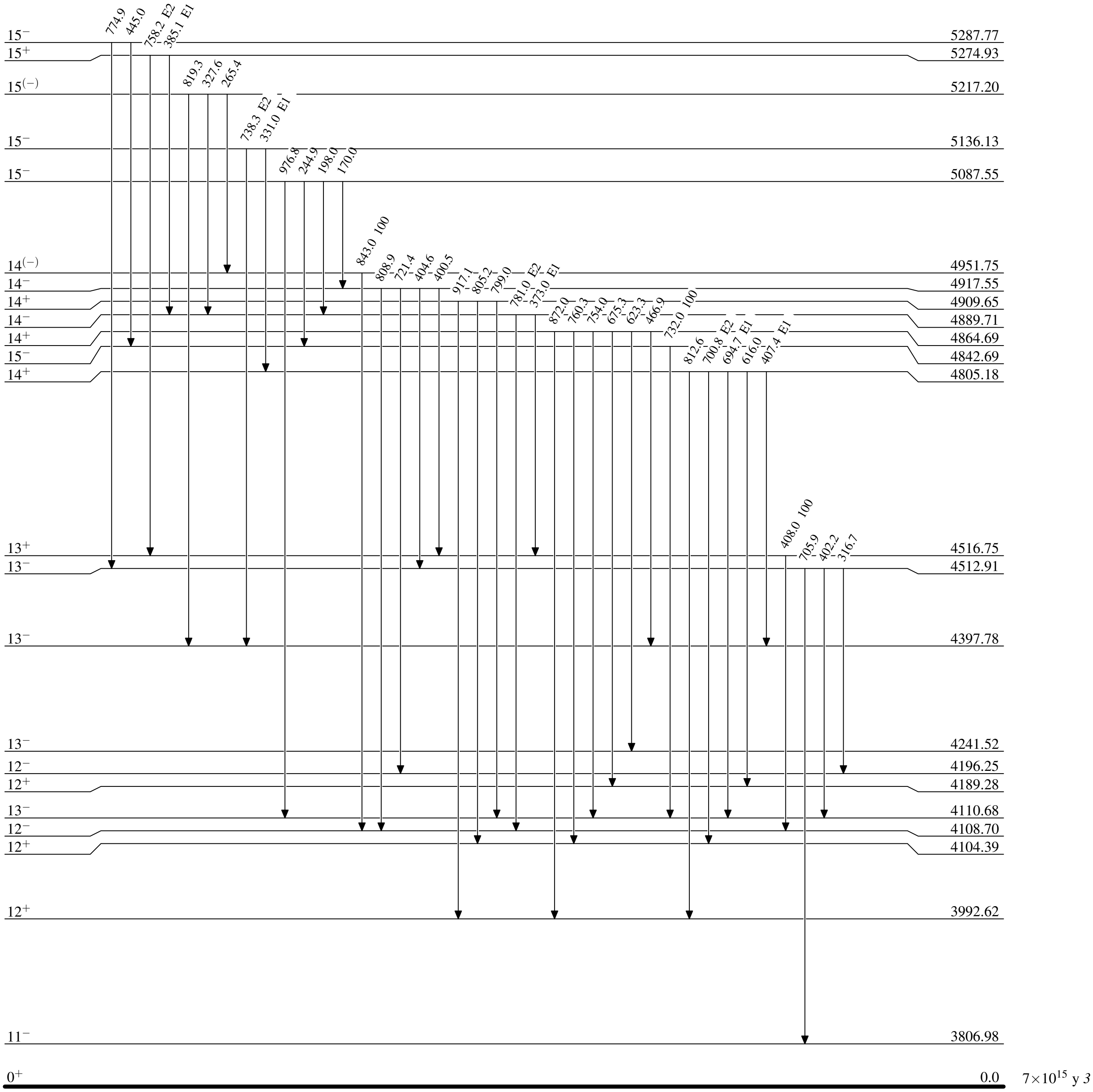


$^{148}_{62}Sm_{86}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

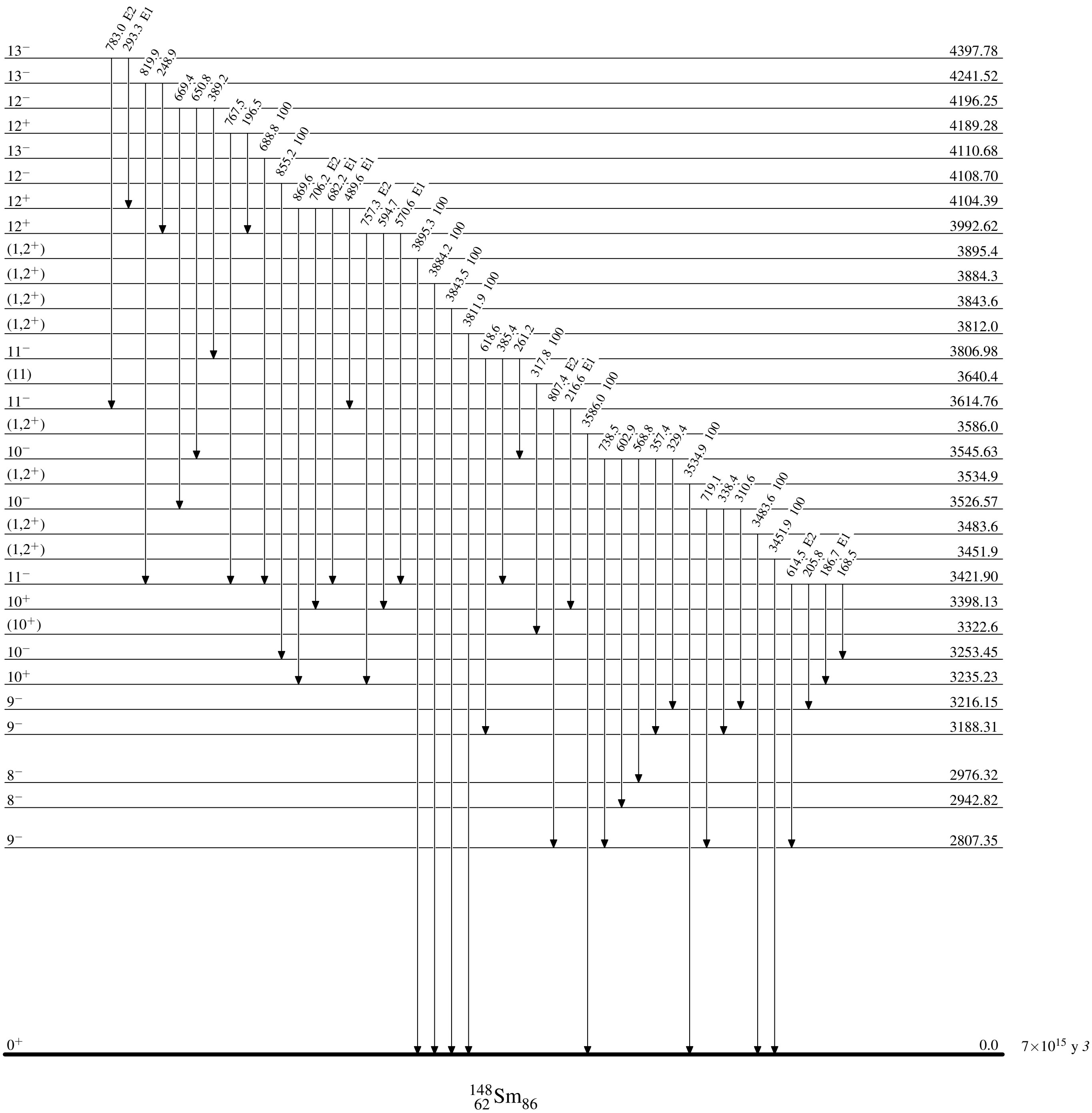


$^{148}_{62}Sm_{86}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

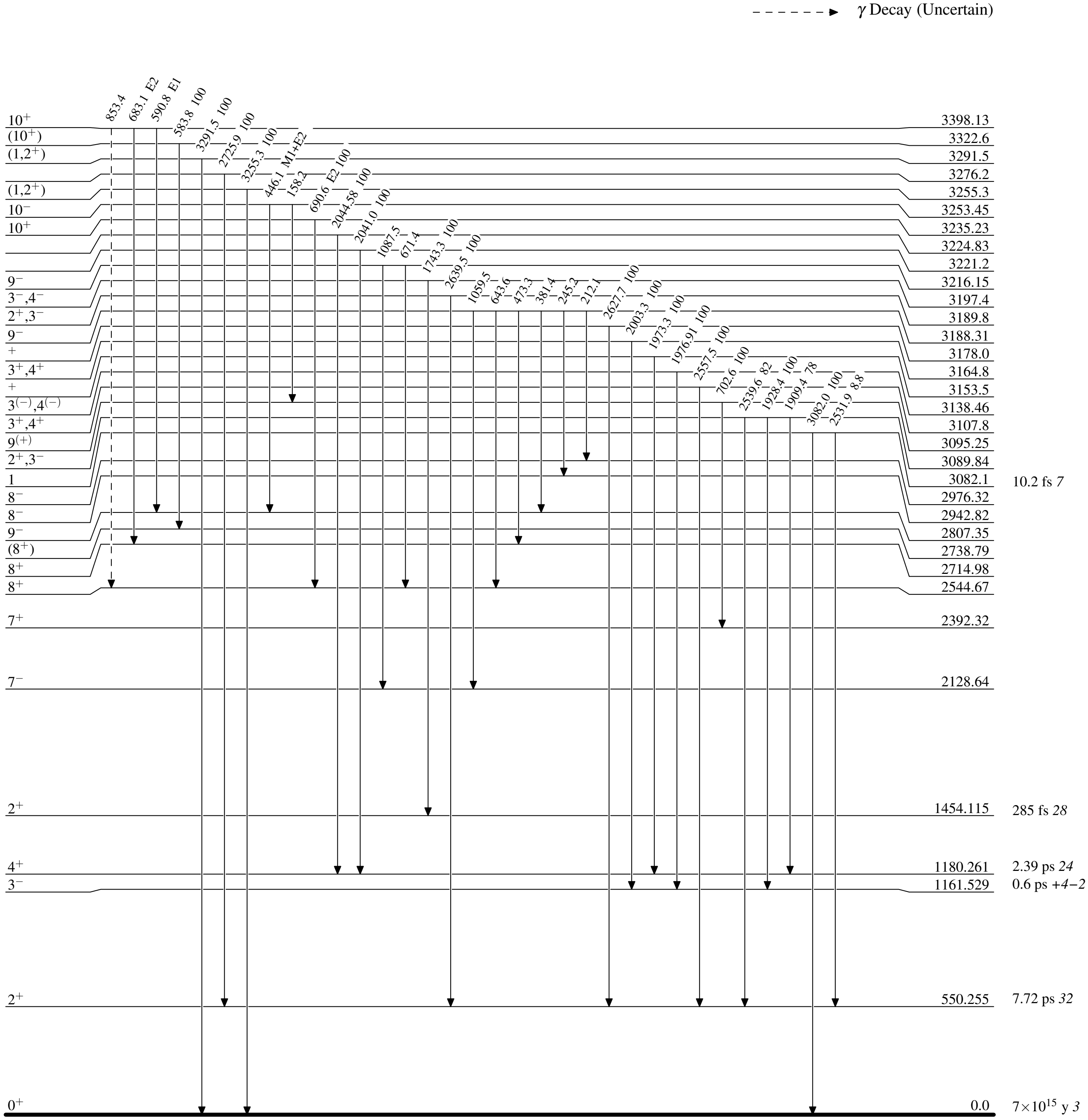


Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

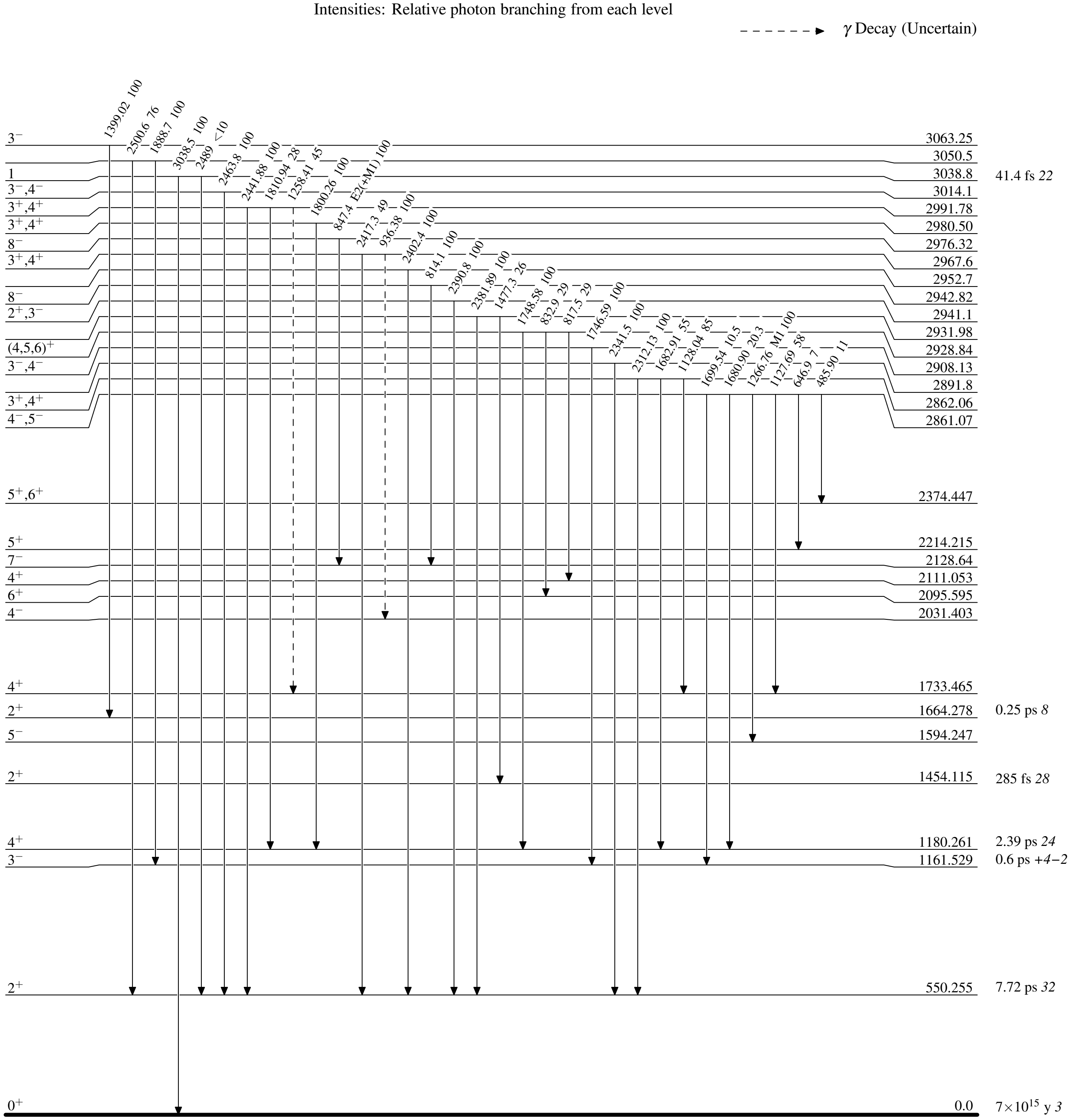


$^{148}_{62}Sm_{86}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

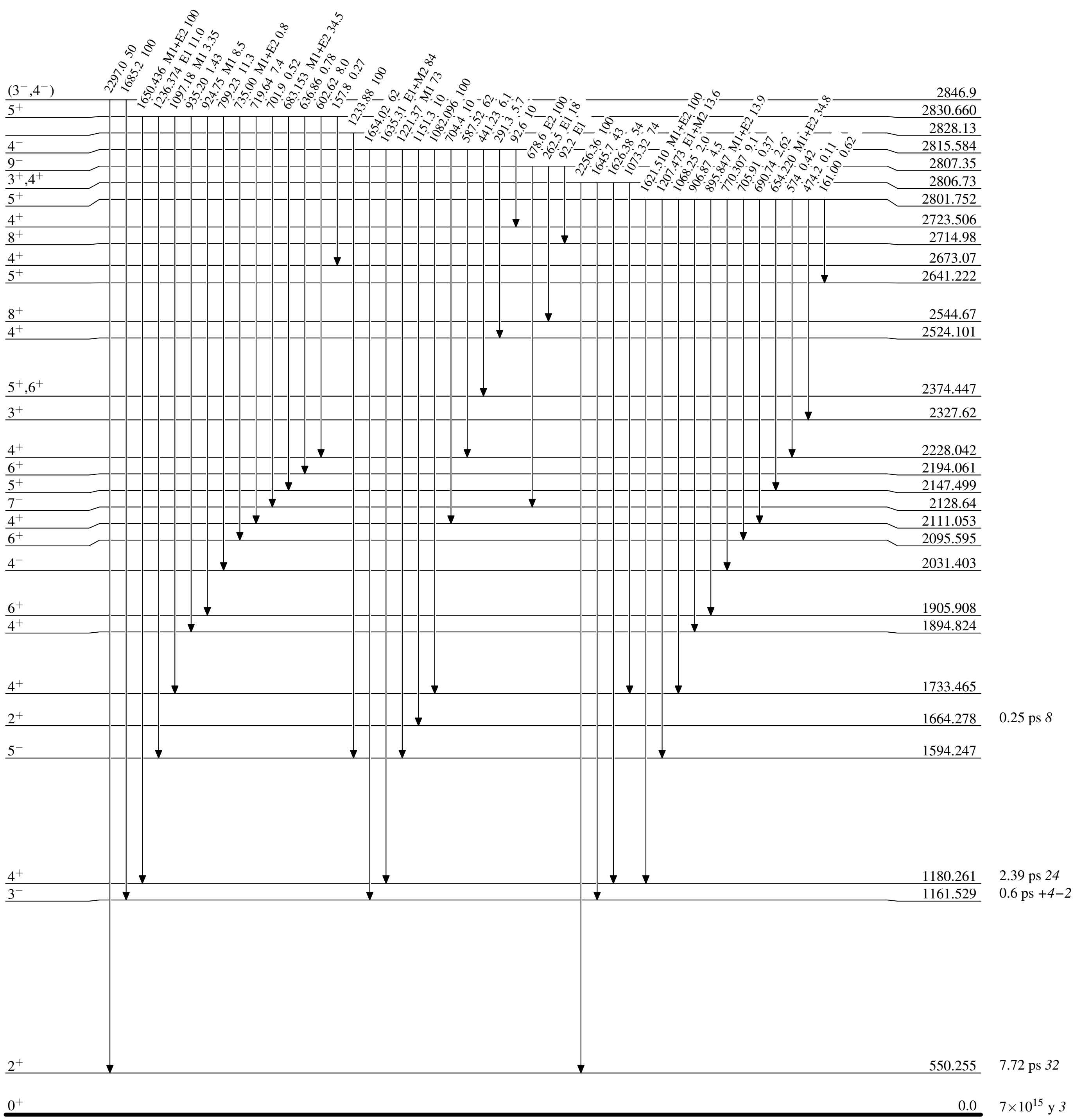


$^{148}_{62}Sm_{86}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

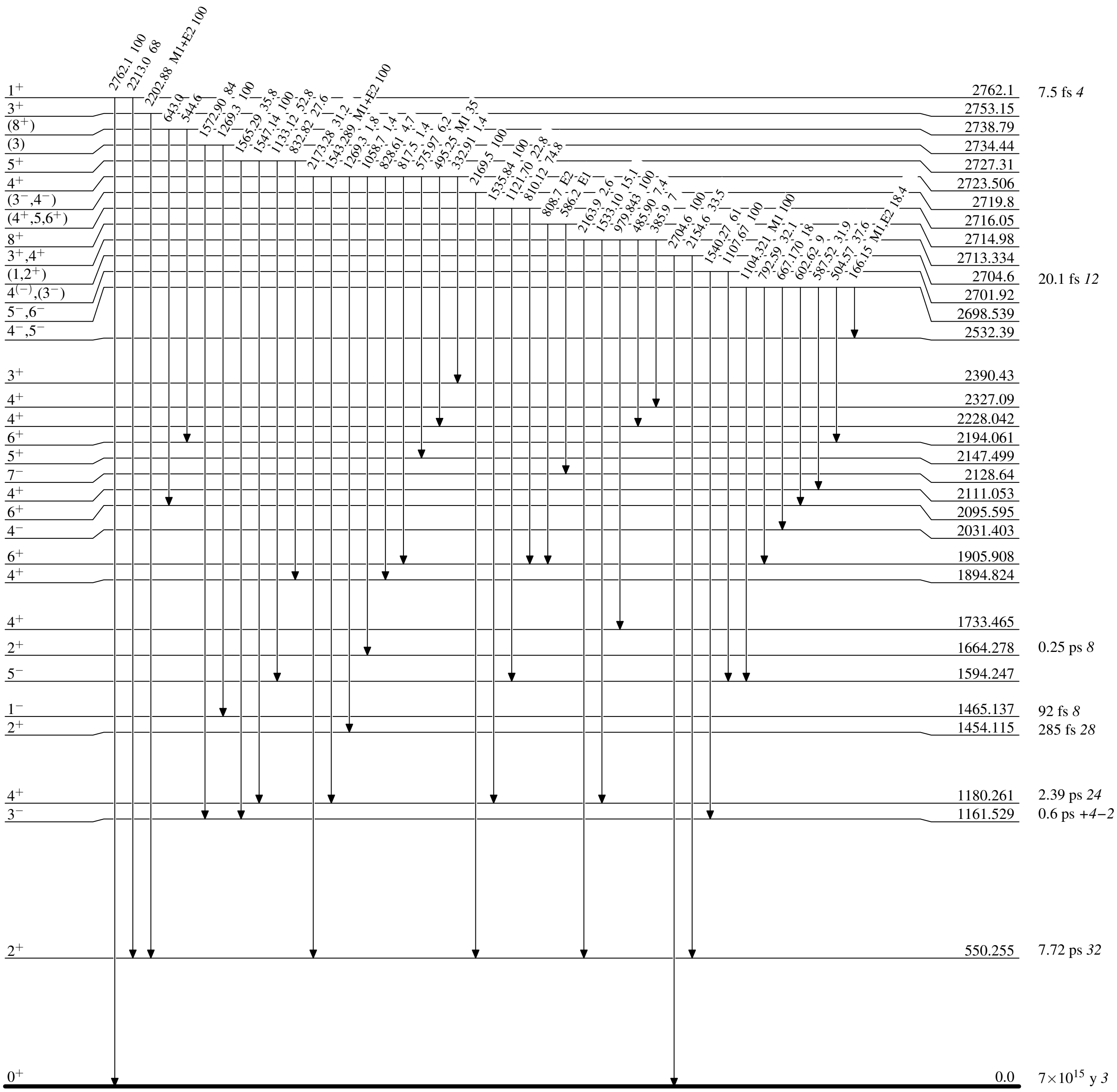


$^{148}_{62}Sm_{86}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

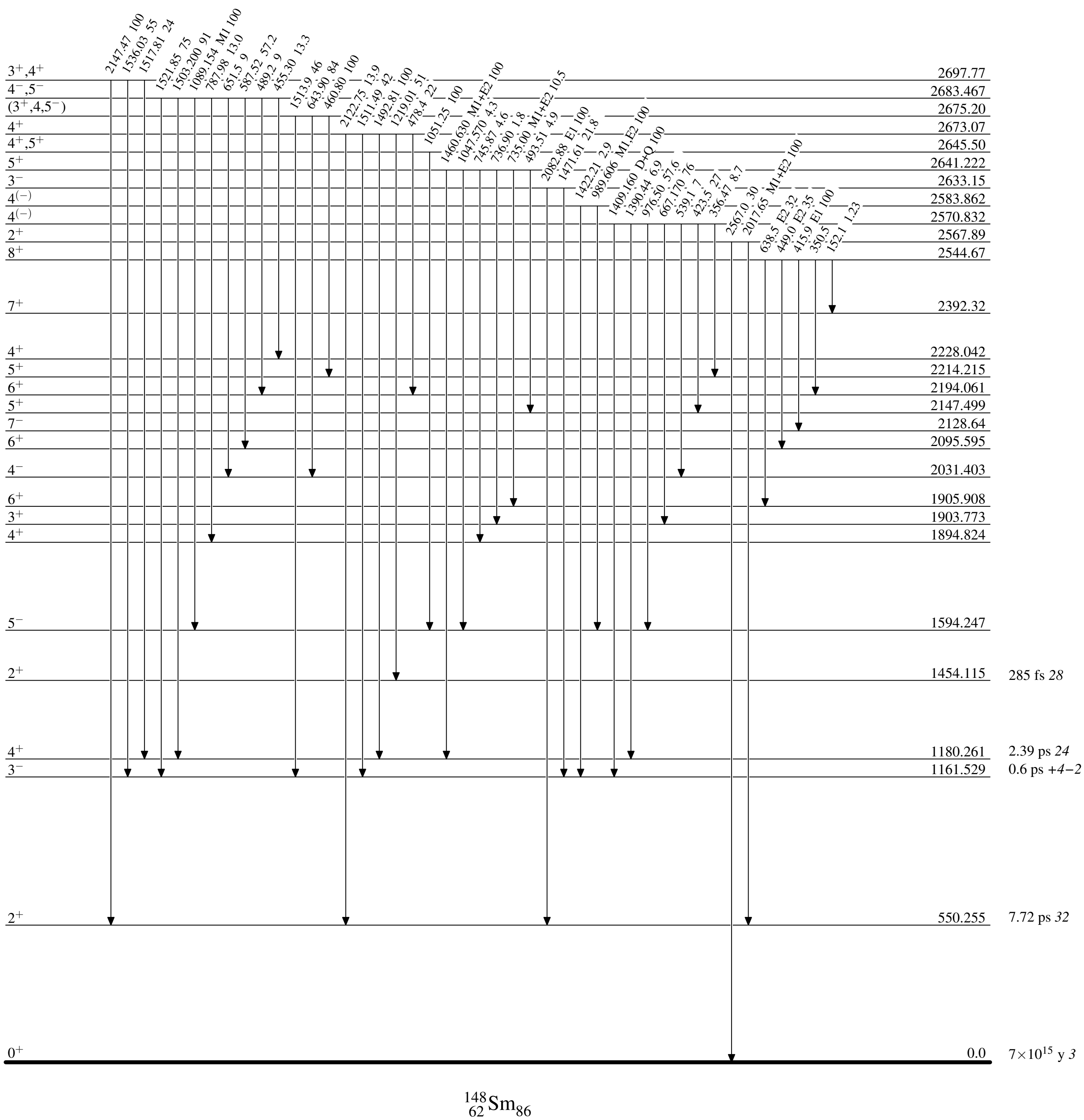


$^{148}_{62}Sm_{86}$

Adopted Levels, Gammas

Level Scheme (continued)

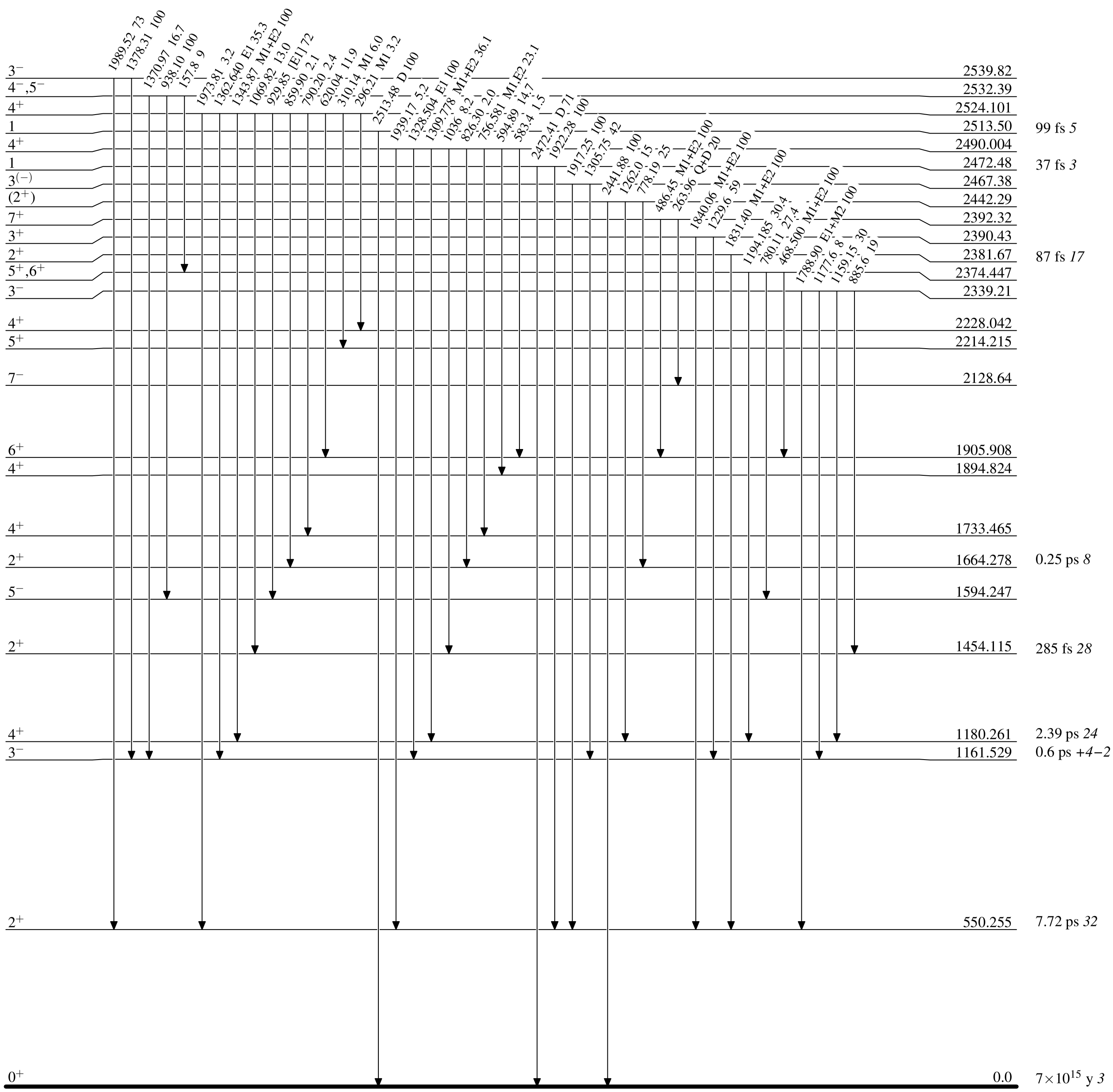
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

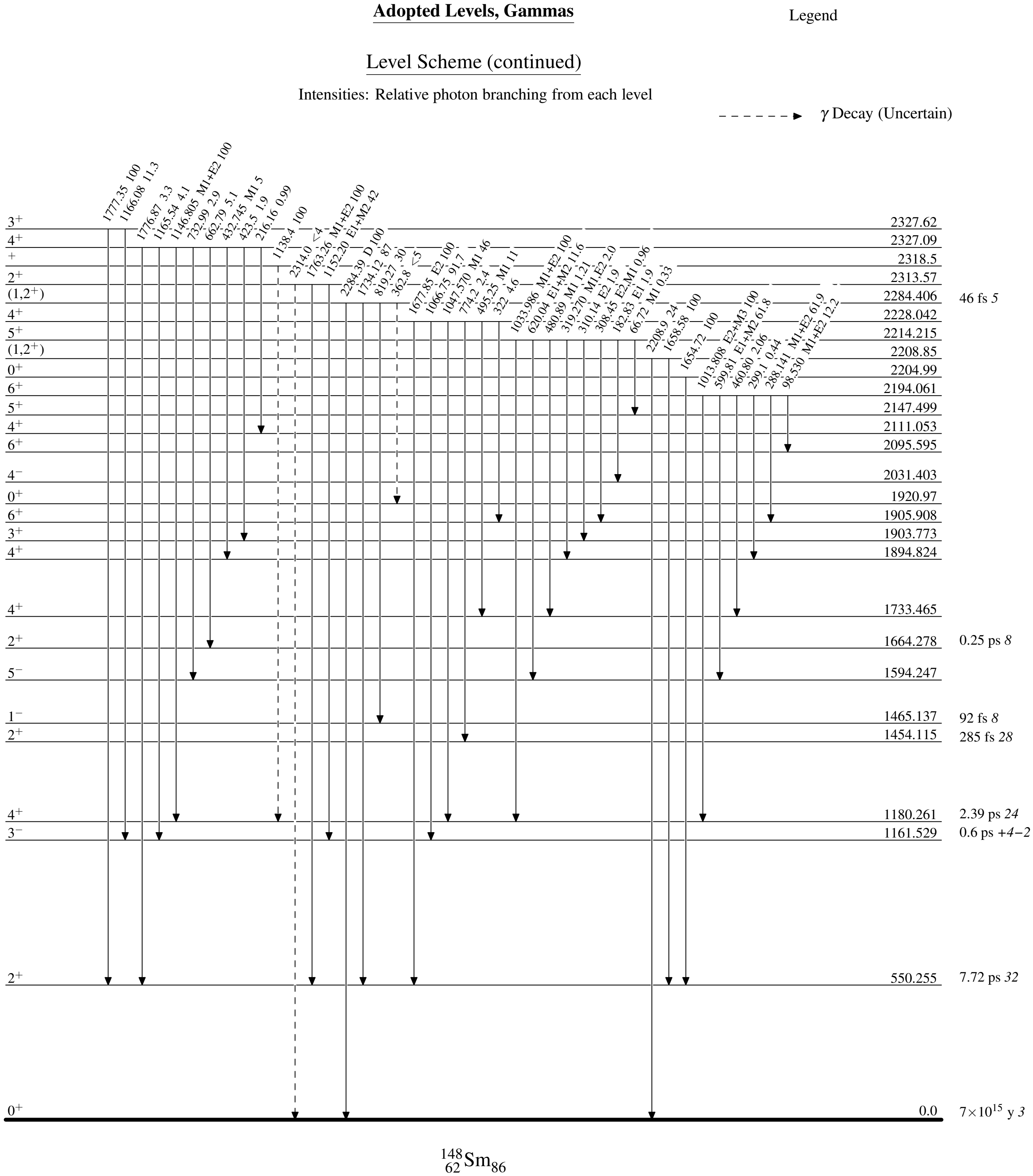


$^{148}_{62}Sm_{86}$

Adopted Levels, Gammas

Level Scheme (continued)

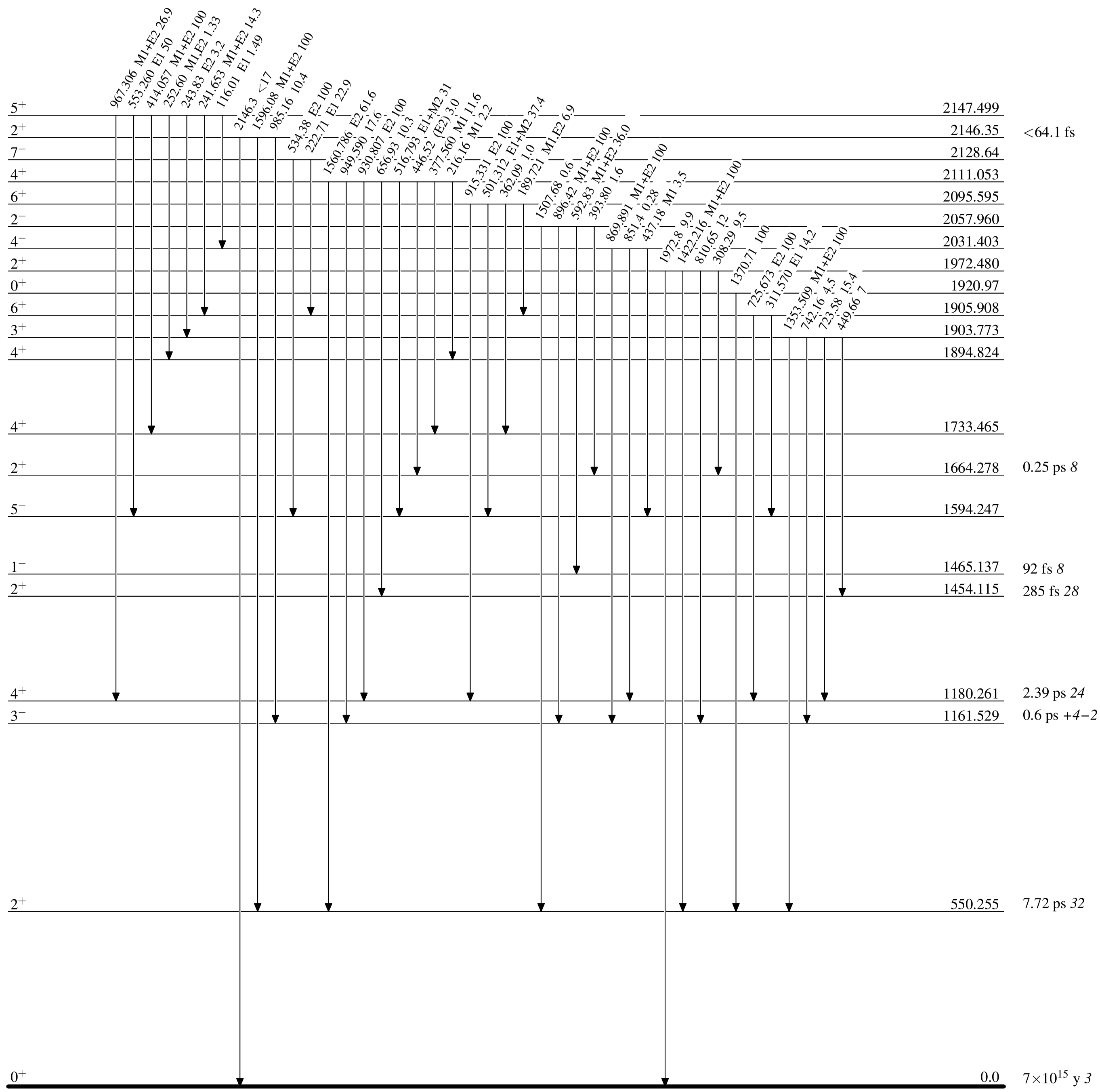
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

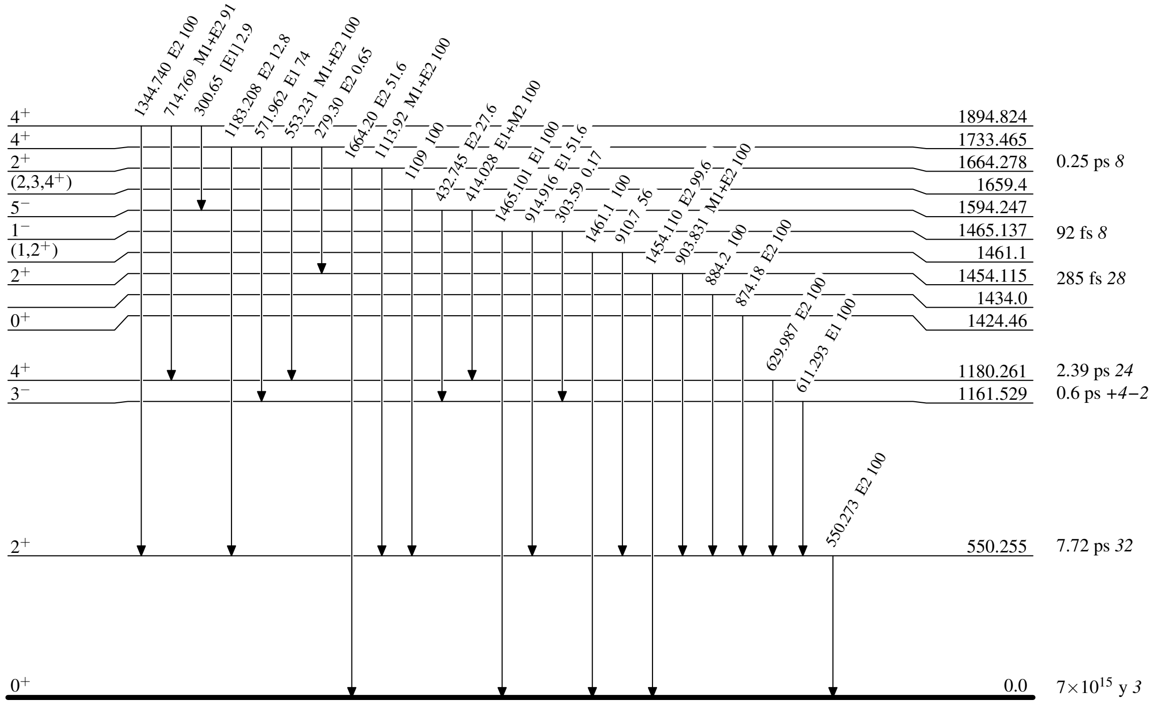


$^{148}_{62}Sm_{86}$

Adopted Levels, Gammas

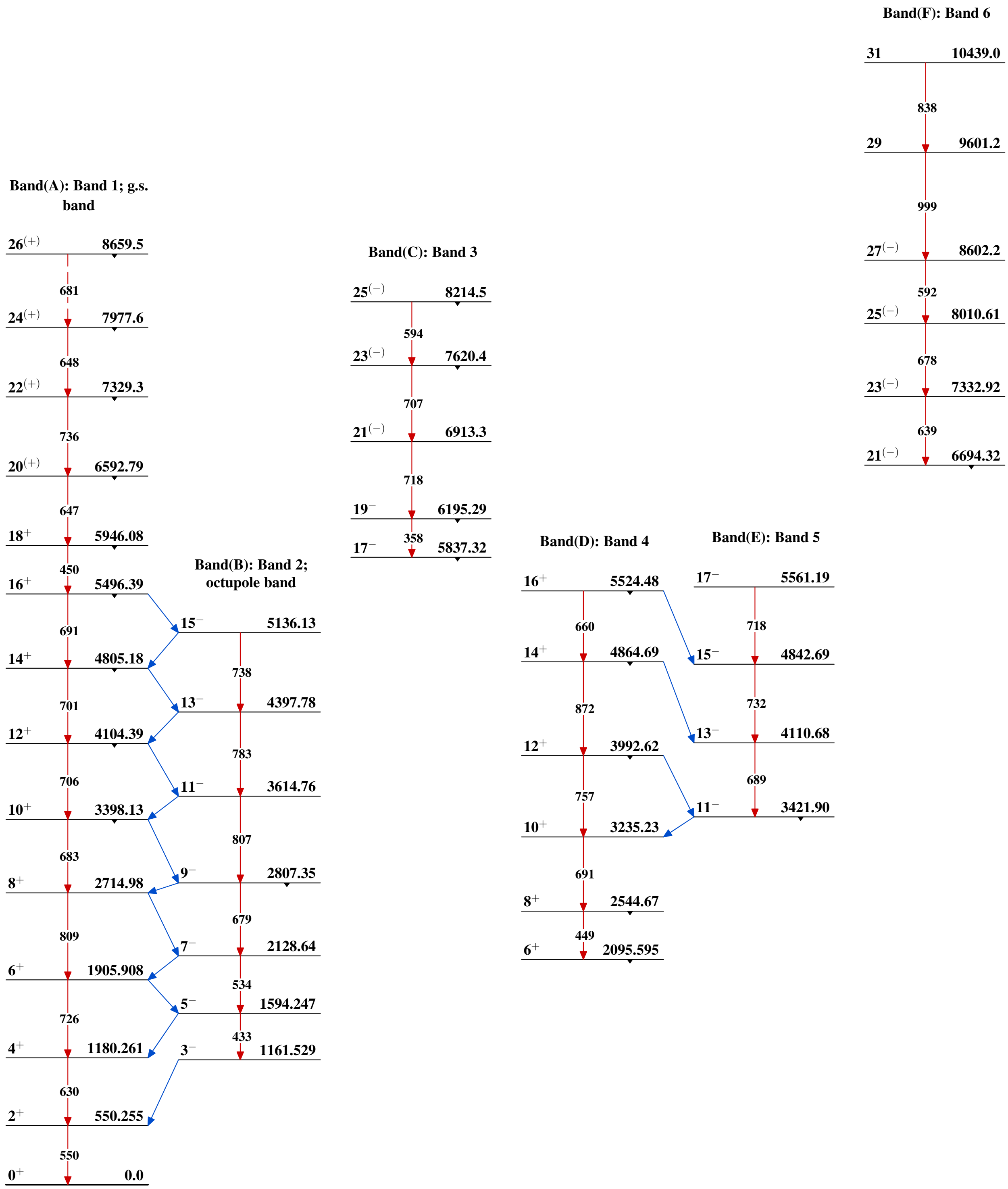
Level Scheme (continued)

Intensities: Relative photon branching from each level



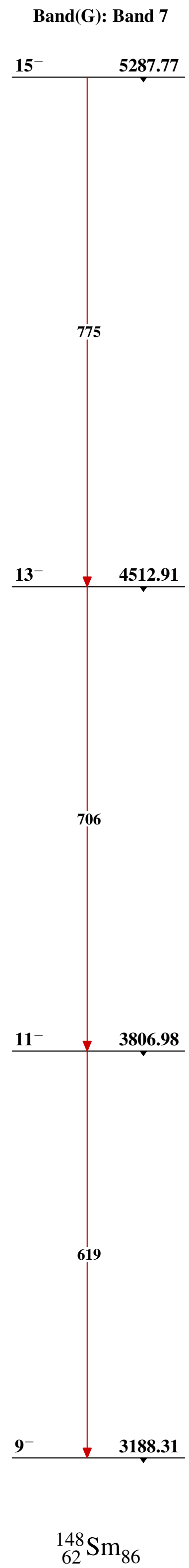
$^{148}_{62}Sm_{86}$

Adopted Levels, Gammas



$^{148}_{62}Sm_{86}$

Adopted Levels, Gammas (continued)



Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	S. K. Basu, A. A. Sonzogni	NDS 114, 435 (2013)	1-Apr-2013

Q(β^-)=−2259 *6*; S(n)=7986.7 *4*; S(p)=8275.8 *19*; Q(α)=1449.8 *10* 2017Wa10
S(2n)=13857.5 *4*; S(2p)=14221.1 *19* 2017Wa10
Additional information 1.
Levels reported in scattering, pickup, and stripping reactions with uncertainties such that they overlap levels observed in Coul. ex., β decay, (n,γ), or heavy ion (compound nucleus formation) reactions have been assumed to be the same as the latter levels, unless other evidence to the contrary exists.
α: Additional information 2.

^{150}Sm Levels

Cross Reference (XREF) Flags

A	^{150}Pm β^- decay (2.68 h)	H	^{149}Sm(n,γ) E=resonance	O	^{151}Sm(^{3}He,α) E=24 MeV
B	^{150}Eu ε decay (12.8 h)	I	^{149}Sm(d,p)	P	^{152}Sm(p,t) E=19 MeV
C	^{150}Eu ε decay (36.9 y)	J	^{150}Nd(α,4nγ) E=45 MeV	Q	^{150}Sm(p,p′), (d,d′)
D	^{148}Nd(α,2nγ) E=26 MeV	K	^{150}Sm(p,p′),(p,p′γ)	R	^{150}Sm(γ,γ′)
E	^{148}Sm(t,p) E=12 MeV	L	^{150}Sm(d,d′)	S	^{149}Sm(n,γ):high resolution
F	^{149}Sm(n,γ): av res	M	Coulomb excitation	T	^{136}Xe(^{18}O,4nγ)
G	^{149}Sm(n,γ) E=thermal	N	^{151}Sm(d,t) E=12 MeV		

E(level)[‡#]	J$^\pi$[†]	T$_{1/2}$	XREF	Comments
0.0[a]	0$^+$	stable	ABCDE G IJKLMN P ST	
333.955[a] *10*	2$^+$	48.4 ps *11*	ABCDEFGHIJKLMNOP ST	Q=−1.32 *19*; μ=+0.77 *5* (1989Ra17) J$^\pi$: from $\gamma\gamma(\theta)$, Coul. ex. and measured conversion coefficients. μ: Others: from g-factor: 0.76 *5* (1987Be08), 0.81 *6* (1987By02). Q: Other: −1.25 *20* (1978LeZA).
740.464 *19*	0$^+$	19.7[l] ps *19*	ABCDEFG I KLMN P S	J$^\pi$: from E0 transition to g.s.
773.374[a] *12*	4$^+$	6.5 ps *10*	A CDEFGHIJKLMNOP ST	μ=+1.43 *20* (1989Ra17) XREF: E(780). J$^\pi$: from E2 γ to 2$^+$, member of g.s. band. B(E2)↑: B(E2) (from 334 keV (2$^+$) level)=0.96 *10*. μ: g-factor/g-factor(2$^+$)=1.60 *12* (1993Va10) from $\gamma(\theta$,H,t). The authors state the value to be consistent between their number of different measurements but is too large as compared with earlier measured as well as theoretical values.
1046.148 *13*	2$^+$	0.86[l] ps +*31*−*21*	ABCDEFGHI KLMN P S	μ=+0.72 *17* (1989Ra17) J$^\pi$: from E2 γ to 0$^+$. 272.8 γ not adopted following ^{149}Sm(n,γ):high resolution.
1071.406[b] *12*	3$^-$	0.11 ps +*13*−*5*	A CDEFG IJKLM PQ ST	B(E3)↑=0.31 *3* T$_{1/2}$: from DSA in ^{150}Sm(n,n′γ) E=1.3 MeV (1993Ju04). See 1993Ju01 for various values from Doppler broadening techniques. J$^\pi$: from E1 γ′s to 2$^+$, 4$^+$. B(E3)↑: From Coul. ex.
1165.791 *17*	1$^-$	0.06 ps +*3*−*2*	ABCD FG KL PQ S	XREF: K(1172). J$^\pi$: from E1 γ to 0$^+$. T$_{1/2}$: from DSA in ^{150}Sm(n,n′γ) E=1.3 MeV (1993Ju04). See 1993Ju01 for various values from Doppler

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{150}Sm Levels (continued)

E(level)[‡#]	J^{π}[†]	$T_{1/2}$	XREF	Comments
				broadening techniques.
1193.843 *12*	2^+	1.3[l] ps *3*	ABC FGH KLMN P S	μ=+0.83 *14* (1989Ra17) J^{π}: from E2 γ to 0^+. $T_{1/2}$: from B(E2)=0.048 *10* and branching(1193)=0.52 *3* from (n,γ).
1255.512 *20*	0^+		AB FG OP S	XREF: O(1268). J^{π}: E0 transitions to 0^+ state at 740 keV and g.s.
1278.922[a] *14*	6^+	2.4 ps *7*	CD FG J P ST	μ=+2.3 *5* (1989Ra17) J^{π}: from E2 γ to 4^+, member of g.s. band; not 2^+ to 5^+ from (n,γ): av res. μ: g-factor/g-factor(2^+)=1.14 *34* (1993Va10) from $\gamma(\theta$,H,t). See comment on 4^+ level.
1357.710[b] *13*	5^-		CD FG IJ L OPQ ST	XREF: I(1369)O(1354). J^{π}: from E1 γ's to 4^+ and 6^+.
1417.346 *13*	2^+		A C FGHI P S	XREF: I(1425). E(level): this level was observed in β-decay studies of ^{150}Sm and was adopted by 1976Ba18. All transitions assigned to this level were observed by 1966Sm03. J^{π}: from E1 γ's to 1^- and 3^-. 370.8 and 676.8 gammas not adopted following ^{149}Sm(n,γ):high resolution.
1449.182 *13*	4^+	1.8 ps *8*	CD FGHIJ L P S	XREF: I(1460). J^{π}: from L(d,d′)=4.
1504.572 *13*	3^+		A C FGHI S	XREF: I(1515). J^{π}: from γ's to 2^+ and $\gamma(\theta)$ aligned.
1603 *4*			P	
1642.611 *12*	4^+	0.54 ps *25*	C EFGHI L P S	XREF: E(1649)I(1652). J^{π}: from E2 γ to 2^+ and E1 γ to 3^-. Confirmed by 1969Re11 through $\gamma(\theta)$ studies. 475.9 γ not adopted following ^{149}Sm(n,γ):high resolution.
1658.39 *3*	$2^{(-)}$		A G	J^{π}: from γ's to 1^-,3^-, but not 0^+,4^+.
1672.717? *22*	(4^+)		FG I S	XREF: I(1686). J^{π}: from (E2+E0) γ to 4^+ and γ's to 2^+,3^+,4^+,6^+; not consistent with (2^-,5^-) from ^{149}Sm(n,γ) av res. (1970Bu19). 168.2, 223.5 and 393.9 γ's not adopted following ^{149}Sm(n,γ):high resolution.
1684.162 *17*	3^-		A C EFG I KL O Q	XREF: I(1697)K(1697). J^{π}: from E1 γ's to 2^+ and 4^+.
1713.51 *5*	1		A C G	J^{π}: from γ's to 0^+ and 2^+, and $\gamma\gamma(\theta)$ in ^{150}Pm β^- inconsistent with J=2.
1760.060 *19*	(3^-)		FG I OP	XREF: I(1760). J^{π}: 3^-,4^-,(2^-),(5^-) from (n,γ) av res. Excited in (p,t) so probably not 2^-,4^-. Possible 565γ to 2^+ so J≠5.
1764.89[b] *4*	7^-[i]		CD G J T	J^{π}: (E1) γ to 6^+ in (α,xnγ), γ to 5^- in (α,2nγ) establish J=(5^- 6^-,7^-). Assumed member of K=0 octupole band.
1773.3?	2^-,5^-,(3^-,4^-)		F	
1786.30 *13*	(≤3)		AB I O	XREF: I(1790). J^{π}: from γ's to 1^-,2^+ and absence in (n,γ) res (1976Ba18).
1794.30 *3*	2^+		FGH P	J^{π}: J^{π}=2^+,5^+ in (n,γ) av res. γ's to 0^+,2^+, so J≠5. The 515 γ is not adopted.
1819.510 *13*	4^+		C eFGHI L OP S	XREF: I(1826). J^{π}: E1 γ's to 3^- and 5^-.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{150}Sm Levels (continued)

E(level)[‡#]	Jπ[†]	$T_{1/2}$	XREF	Comments
				1045.9, 135.16 gammas not adopted following ^{149}Sm(n,γ):high resolution.
1821.894 *19*	$(4)^+$		C e G i S	Jπ: from E1 γ to 5^- and (E2) γ to 6^+.
1822.472 *19*	$(3)^-$		C e G i O	Jπ: from E1 γ to 4^+ and M1(+E2) γ to 3^-. The population in (t,p) suggests natural parity.
1833.01 *3*	$(2)^+$		C H P	Jπ: from M1(+E0+E2) γ to 2^+ and (E2) γ to 0^+.
1837.03[a] *10*	8^+	1.3 ps *7*	D J ST	Jπ: from E2 γ to 6^+.
1883.3	$2^+,5^+$		F	
1927.33? *9*	(2^+)		GH P	Primary γ to level of this energy seen in (n,γ) E=res, but not in (n,γ) E=th. However, 510- and 761-keV γ's observed by 1966Sm03 in (n,γ) can be placed here. Jπ: from (n,γ) E=resonance (1974Be37).
1952.46 *3*	3^-[j]		FG L PQ	
1963.72[&] *4*	$1^{(-)}$		AB	Jπ: β^- from (1^-) (log *ft*=7.4) allows J=0,1,2. Two γ's to 0^+ disallow J=0. log *ft*>8.6 for several β^- decays to 2^+ levels indicate 2^+ not likely thus requiring γ decays to 0^+ states to be M2. β^- decays to other 1^- states have log *ft*=7.3 or 7.5 making an assignment of $1^{(-)}$ reasonable.
1970.465 *16*	4^+		C EFGHi L P	This level established in (d,d′), (p,t) and (n,γ) E=res. In (n,γ) E=th, 1966Sm03 see several of the γ rays deexciting it. Jπ: L(d,d′)=4 and E1 γ to 3^-.
1979.3	$3^-,4^-$		F i	
2005.5 *8*	2^+		F H P	E(level),Jπ: from ^{149}Sm(n,γ) E=res and av res.
2020.377 *14*	5^+		C FGH L P	Jπ: from ^{149}Sm(n,γ) E=res and av res.
2024.663 *13*	4^+		C FGHI L	Jπ: E0 component in γ to 4^+.
2035.42 *3*	5^-		C E G L	XREF: E(2038)L(2033). Jπ: E1 γ's to 4^+ and 6^+.
2044.0 *10*	$(3^+,4^+)$		C eF H	Jπ: from ^{149}Sm(n,γ) E=res.
2054.5?	$(2^+,5^+)$		F	
2062.80? *4*	$(3)^+$		FGHi	Jπ,E(level): from ^{149}Sm(n,γ) E=res, $J^\pi=3^+,4^+$, but from γ(θ) aligned $J^\pi=3^+,5^+$.
2070.270[&] *23*	$2^{(-)}$		A C i	Jπ: from γ's to $1^-,2^+,3^-,4^-$ but not $0^+,4^+$.
2095.33 *3*	$(5)^+$		C FGH	Jπ: 5^+ from γ(θ) aligned and E2(+M1) γ's to $4^+,6^+$. 1974Be37 suggest $J^\pi=3^+,4^+$ in (n,γ) res. $J^\pi=2^+,5^+$ from (n,γ) av res.
2107.449 *19*	$(6)^+$		C F L	Jπ: E1 γ to 5^-, E2 γ to 4^+.
2108.9?	2^- to5^-		F	
2113 *4*			L	
2117.030 *15*	4^+		C GHI L	E(level): from ^{149}Sm(n,γ) E=res and ^{150}Eu ε decay (36.9 y). Jπ: E2 γ to 2^+, γ to 6^+.
2119.36 *3*	(3^-)		C E	E(level): from ^{150}Eu ε decay (36.9 y) and ^{148}Sm(t,p). Jπ: (E2) γ to 5^-.
2152.56 *3*	4^+		C EFGHI L	XREF: E(2166). Jπ: from γ(θ) aligned.
2160 *2*	1^-[j]		Q	
2174? *10*			P	E(level): from ^{152}Sm(p,t) and ^{148}Sm(t,p).
2190.9 *3*	4^+		FG	Fed directly in (n,γ) E=th (1969Re11). Jπ: E2 to 2^+, γ(θ) aligned.
2193.51 *3*	(4^+)		C EFGHI L P	XREF: I(2205).
2199.7 *11*	2,3,4		H	
2227? *5*	$-$		FG L P	XREF: L(2220)P(2220). Jπ: from (n,γ) E=av res.
2232.37[b] *18*	9^-		D J T	E(level): from (α,4nγ). Jπ: from E2 γ to 7^-, E1 γ to 8^+.
2233.5	2^- to 5^-		F	

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Adopted Levels, Gammas (continued)

^{150}Sm Levels (continued)

E(level)[‡#]	J^π[†]	$T_{1/2}$	XREF	Comments
2250.4? *6*	$(3^+,4^+)$		FGHI	1963Gr18 see primary γ ray to this level. E is from (n,γ) E=res. J^π: from (n,γ) av res and res.
2259.94 *4*	(1^-)		A	J^π: γ's to 0^+,2^+ and β^- from (1^-), similar to 1963.7 level.
2262.4? *10*	$4^{(+)}$		FGHI l	XREF: I(2290). J^π: J from $\gamma(\theta)$ aligned, π from 3^+,4^+ in (n,γ) av res and res. E(level): 1963Gr18 see primary γ ray to this level in (n,γ) E=th.
2264? *8*	$4^{(+)}$		G	J^π: from $\gamma(\theta)$ aligned (1969Re11).
2271 *4*			i L	
2280.800 *19*	(3^-)		C F Hi L P	E(level): from ^{150}Eu ε decay (36.9 y), (d,d′), and (d,p). J^π: from γ's to 1^- and 5^-.
2289.5 *6*	3^+,4^+		H	
2292.2 *8*	3^+,4^+		FGH	J^π: from (n,γ) av res and res.
2294 *5*	3^-[j]		Q	
2328.1	3^-,4^-		F	
2342.0 *6*	2^+,3^+,4^+		GHI	XREF: I(2334). J^π: from (n,γ) res.
2360.3 *4*	3^+,4^+		FGH P	J^π: from ^{149}Sm(n,γ) res.
2367.43[&] *8*	(3^+)		A FGHI	XREF: H(2371.2)I(2372). Level fed by primary γ ray in (n,γ) E=th. J^π: J^π=$(3^+,4^+)$ in (n,γ) av res, $(3^+,5^+)$ in $\gamma(\theta)$ aligned, and ≤3 from γ's to 1^-,2^+.
2395.9 *4*	3^+,4^+		HI	XREF: I(2400). E(level),J^π: from ^{149}Sm(n,γ) E=resonance.
2433.19[a] *20*	10^+		D F J P T	E(level): from (α,4nγ). J^π: member of g.s. band.
2444 *10*			E	
2455.5? *5*	3^+		FGHI P	XREF: I(2468). 1963Gr18 see primary γ ray to this level. J^π: from $\gamma(\theta)$ aligned in (n,γ) E=th.
2465.3 *4*	3^+,4^+		H	J^π: from (n,γ) resonance.
2472.4 *5*	3^+,4^+		FGH	1963Gr18 see primary γ ray to this level. J^π: from (n,γ) av res.
2480.5 *4*	3^+,4^+		H	J^π: from (n,γ) res.
2482 *5*	3^-[j]		E Q	XREF: E(2485).
2495.6? *7*	$(3)^+$		FGH	From (n,γ) res and av res. J^π: from J^π (n,γ) res=3^+,4^+ and J^π (n,γ) aligned=3^+,5^+.
2507.27[&] *18*	$(1^-,2^+)$		A H	Level placed by energy fitting. J^π: from decay of level to known low-lying levels.
2507.5 *6*	3^+,4^+		H	E(level),J^π: from (n,γ) res.
2522.3 *6*	3^+,4^+		HI	E(level),J^π: from ^{149}Sm(n,γ) E=res.
2529.4[&] *3*	1,2^+		A	J^π: from γ's to 0^+, 2^+.
2550.57[&] *23*	$1^{(-)}$[k]	11×10^{-3}[m] eV *4*	A R	J^π: from γ's to 0^+, 2^+.
2556.0 *6*	3^+,4^+		H	E(level),J^π: from ^{149}Sm(n,γ) res.
2565.3 *7*	3^+,4^+		H	E(level),J^π: from ^{149}Sm(n,γ) res.
2575.3? *7*	3^+,4^+		E GHI	1963Gr18 see primary γ ray to this level from 4^-. J^π: from ^{149}Sm(n,γ) res.
2587.3? *5*	3^+,4^+		GH	1963Gr18 see primary γ ray to this level from 4^-. J^π: from ^{149}Sm(n,γ) res.
2589.12[c] *20*	(8^-)[g]		J	
2602.5[&] *4*	$(1^+,2,3)$		A	J^π: γ's to 1 and 3^+.
2612? *8*			G I	XREF: I(2624).

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Adopted Levels, Gammas (continued)

^{150}Sm Levels (continued)

E(level)[‡#]	J^π[†]	$T_{1/2}$	XREF	Comments
2627 *5*	5^-[j]		E Q	
2655? *7*	(3,5)		E G I	J^π: from $\gamma(\theta)$ aligned in (n,γ) E=th.
2665 *5*	5^-[j]		Q	
2668.8 *5*	$1^{(-)}$[k]	26×10^{-3}[m] eV *5*	R	
2679.6[&] *3*	3		A G	J^π: γ's to 2^+ and 4^+, primary γ from 4^- in (n,γ), gamma from $1^{(-)}$.
2701.3 *5*			R	
2715 *4*	3^-[j]		G I Q	
2731? *9*			G R	XREF: R(2725.4).
2744.35[b] *22*	11^-[i]		D IJ T	
2754? *7*			G R	XREF: R(2761.8).
2812.88[&] *10*	$(1^-,2)$		A G I P	XREF: I(2821)P(2798). J^π: log *ft*=6.6 from (1^-). γ's to 1^- and 3^-. Primary γ from 4^- in (n,γ).
2861? *7*			G I	XREF: I(2865).
2880.9 *5*	$1^{(-)}$[k]	9×10^{-3}[m] eV *5*	R	
2885.7 *5*	$1^{(+)}$[k]	17×10^{-3}[m] eV *4*	R	
2893.1[&] *3*	$(1^-,2)$		A R	J^π: log *ft*=6.7 from (1^-). γ's to 1^- and 3^-.
2910.5 *21*	3^-[j]		G I PQ	XREF: Q(2903).
2929.24[@c] *22*	$(10)^-$[g]		J	J^π: from closed loops of interband and intraband transitions in ^{150}Nd(α,4nγ) E=45 MeV.
2937? *20*			G I P	XREF: I(2934)P(2925).
2976.3 *5*	$1^{(+)}$[k]	12×10^{-3}[m] eV *3*	R	
2995.9 *3*	$11^{(-)}$		G IJ	
3012.30[&] *24*			A	
3023.7[&] *5*	2^+		A G I P	XREF: G(3030)I(3005)P(3015). J^π: from γ's to 0^+ and 2^+ and $4^{(+)}$.
3038.2[&] *4*	$1,2^+$		A I	XREF: I(3046). J^π: from β^- decay from (1^-) state and γ's to 0^+ and 2^+.
3048.4[a] *3*	12^+		D J T	J^π: member of g.s. band.
3050.0[&] *3*	$1^{(-)}$[k]		A G QR	XREF: G(3050.1).
3080.9[&] *4*	$1^{(+)}$[k]		A G I R	XREF: G(3080.5)I(3088).
3089.4[&] *3*	$1,2^+$		A I	XREF: I(3104). J^π: from β^- decay from (1^-) state and γ's to 0^+ and 2^+.
3113.2 *5*	$1^{(+)}$[k]		R	
3137.6[&] *3*	(1,2)		A G I	XREF: I(3135). J^π: from β^- decay from (1^-) state and γ's to 0^+,2^+.
3182? *6*			G I	
3212.5[&] *4*	$1^{(-)}$[k]		A I R	
3226? *7*			G	
3238.8 *5*			R	
3244.7? *5*			G I R	
3258.3 *5*	$1^{(-)}$[k]	28×10^{-3}[m] eV *10*	R	
3276? *7*			G I	
3293.3[b] *3*	13^-[i]		D J T	
3322.9 *5*	$1^{(+)}$[k]	21×10^{-3}[m] eV *4*	G I R	
3347 *11*			I	
3366 *11*			I	
3384.2?[@c] *3*	(12^-)[g]		J	
3389? *8*			G I	XREF: I(3404).
3416.9	1	21×10^{-3} eV *8*	R	

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Adopted Levels, Gammas (continued)

^{150}Sm Levels (continued)

E(level)[‡#]	J$^{\pi}$[†]	T$_{1/2}$	XREF	Comments
3431 *5*	$1^{(-)}$[k]	[m]	I R	
3448? *8*			G I	XREF: I(3465).
3492.2 *5*	$1^{(-)}$[k]	97×10^{-3}[m] eV *9*	G I R	XREF: I(3488).
3522.7?[e] *4*	(12)[h]		G J	
3528 *11*			I	
3566? *7*			G I	XREF: I(3556).
3592.1 *5*	$1^{(+)}$[k]	25×10^{-3}[m] eV *6*	G I R	XREF: I(3586).
3600.9 *5*	$1^{(-)}$[k]	22×10^{-3}[m] eV *12*	I R	XREF: I(3586).
3611.7 *5*			R	
3646.5 *21*			G I	
3675.9[a] *3*	14^{+}		IJ T	J$^{\pi}$: E2 to 12^{+}, member of g.s. band.
3702.0 *5*	$1^{(-)}$[k]	78×10^{-3}[m] eV *16*	G I R	XREF: I(3688).
3730? *6*			G I	XREF: I(3740).
3753? *7*			G	
3777 *7*			G I R	XREF: I(3780)R(3768.7).
3790.2 *5*	$1^{(-)}$[k]	65×10^{-3}[m] eV *12*	R	
3835.0[d] *3*	14^{+}		G IJ T	
3876? *7*			G I	XREF: I(3867).
3907? *7*			G I	XREF: I(3896).
3914.1[b] *3*	15^{-}[i]		J T	
3925 *11*			I	
3941.2[c] *4*	(14^{-})[g]		G J	
3943 *7*			G I	XREF: I(3948).
3970? *7*			G I	XREF: I(3976).
4000? *7*			G I	
4025.2[e] *4*	(14)[h]		J	
4035.4 *5*	(1)	19×10^{-3}[m] eV *10*	R	
4305.8[d] *4*	16^{+}		J T	
4386.3[a] *3*	16^{+}		J T	
4576.2[c] *5*	(16^{-})[g]		J	
4605.7[@b] *4*	17^{-}[i]		J T	
4612.0[e] *5*	(16)[h]		J	
4929.1[d] *4*	18^{+}		J T	
5046.0[a] *6*	(18^{+})		J T	
5251.0?[e] *6*	[h]		J	
5276.7[c] *6*	(18^{-})[g]		J	
5346.1[b] *5*	19^{-}[i]		J T	
5580.9[f] *7*	(19^{-})		J T	
5592.7[d] *11*	20^{+}		J T	
5739.3[a] *7*	(20^{+})		J T	
5937.0[f] *8*	(21^{-})		T	
6021.7?[c] *7*	(20^{-})[g]		J	
6064.9 *8*			J	
6106.4?[b] *8*	(21^{-})[i]		J T	
6308.3[d] *15*	(22^{+})		T	
6420.4[f] *13*	(23^{-})		T	
6421.0 *13*			J	
6448.9[a] *10*	(22^{+})		T	
7057.9[f] *16*	(25^{-})		T	

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Adopted Levels, Gammas (continued)

^{150}Sm Levels (continued)

E(level)[‡#]	J^{π}[†]	XREF	E(level)[‡#]	J^{π}[†]	XREF
7068.3[d] *18*	(24^+)	T	8586.9[d] *23*	(28^+)	T
7837.5[d] *20*	(26^+)	T	8760.9[f] *21*	(29^-)	T
7854.1[f] *19*	(27^-)	T	9736.9[f] *24*	(31^-)	T
7986.4 *18*	$3^-,4^-$	F			

[†] In (n,γ) E=th, 1969Re11 studied the directional anisotropy of capture γ rays from aligned ^{149}Sm nuclei. J^{π} were assigned by combining these data with α(exp) data. This work is referred to as γ(θ) aligned. 1970Bu19 inferred multipolarities of primary capture γ rays to low-lying states from the relative average intensity of γ transitions in (n,γ) in a large number of neutron resonances. π of final state is inferred and limits set on J (referred to as (n,γ) av res.). 1974Be37 analyzed γ spectra from (n,γ) in 16 resonances and set limits on J,π from analyses of γ transition intensities in individual resonances. (referred to as (n,γ) res.).

[‡] From least-squares fit to Eγ. Some discrepancy exists between Eγ and energy-level differences. This could be due to rather high precision quoted by the authors.

[#] Levels at 2937 and higher are from (d,p) reaction and presence of possible primary γ ray in (n,γ) E=th, unless otherwise noted.

[@] From ^{150}Nd(α,4nγ).

[&] From ^{150}Pm β^- decay (2.68 h).

[a] Band(A): g.s. rotational band.

[b] Band(B): K=0 octupole band.

[c] Band(C): Even-spin negative-parity side band.

[d] Band(D): Even-spin even-parity side band.

[e] Band(E): Even-spin side band.

[f] Band(c): Negative-parity side band.

[g] Even-spin negative-parity side band. The moment of inertia versus angular frequency plot resembles that of a rotational band based on a state with intrinsic spin 6.

[h] Member of even-spin side band with branching to even-spin even-parity side band and the odd-spin odd-parity octupole band.

[i] Odd-spin odd-parity band with a cascade of E2 transitions from J=(21) down to possibly 3^- and E1 transitions to the g.s. band members.

[j] From L in (p,p′), (d,d′).

[k] From γ(θ) in (γ,γ′).

[l] From B(E2) in Coul. ex.

[m] From(γ,γ′) with the assumption that the levels decay only to g.s. and the first 2^+ state.

$\gamma(^{150}Sm)$

E_i(level)	J^π_i	E_γ[†]	I_γ[d]	E_f	J^π_f	Mult.[‡]	α	$I_{(\gamma+ce)}$	Comments
333.955	2+	333.961 *11*	100 *3*	0.0	0+	E2	0.0405		α(K)=0.0320 *5*; α(L)=0.00665 *10*; α(M)=0.001475 *21*; α(N)=0.000329 *5*; α(O)=4.57×10^{-5} *7* α(P)=1.749×10^{-6} *25*; α(N+..)=0.000376 *6* B(E2)(W.u.)=57.1 *13* E_γ: weighted average of 333.92 *3* (^{150}Pm β^- decay (2.68 h)), 333.9 *1* (^{150}Eu ε decay (12.8 h)), 333.971 *12* (^{150}Eu ε decay (36.9 y)), 333.9 *2* (^{148}Nd(α,2nγ) E=26 MeV), 333.94 *4* (^{149}Sm(n,γ) E=thermal), 333.9 *3* (^{150}Nd(α,4nγ) E=45 MeV). Mult.: from K/L of 1967Pr08.. B(E2)(W.u.): From B(E2)(↑)=1.32 *6* (Coul. ex.).
740.464	0+	406.508 *22*	100	333.955	2+	E2	0.0227		α(K)=0.0183 *3*; α(L)=0.00343 *5*; α(M)=0.000756 *11*; α(N)=0.0001691 *24*; α(O)=2.39×10^{-5} *4* α(P)=1.031×10^{-6} *15*; α(N+..)=0.000194 *3* B(E2)(W.u.)=53 *5* E_γ: weighted average of 406.51 *3* (^{150}Pm β^- decay (2.68 h)), 406.5 *1* (^{150}Eu ε decay (12.8 h)), 406.52 *5* (^{150}Eu ε decay (36.9 y)), 406.49 5 (^{149}Sm(n,γ) E=thermal). B(E2)(W.u.): From B(E2)(2+ to 0+)=0.051 *5* (Coul. ex.).
		740.59 *10*		0.0	0+	E0		1.37 *14*	E_γ: weighted average of 740.4 *5* (^{150}Eu ε decay (12.8 h)), 740.6 *1* (^{149}Sm(n,γ) E=thermal). $I_{(\gamma+ce)}$,Mult.: from ^{150}Eu ε decay (36.9 y).
773.374	4+	439.400 *14*	100	333.955	2+	E2	0.0182		α(K)=0.01482 *21*; α(L)=0.00268 *4*; α(M)=0.000588 *9*; α(N)=0.0001317 *19*; α(O)=1.87×10^{-5} *3* α(P)=8.41×10^{-7} *12*; α(N+..)=0.0001512 *22* B(E2)(W.u.)=110 *17* E_γ: weighted average of 439.38 *7* (^{150}Pm β^- decay (2.68 h)), 439.401 *15* (^{150}Eu ε decay (36.9 y)), 439.3 *2* (^{148}Nd(α,2nγ) E=26 MeV), 439.39 *7* (^{149}Sm(n,γ) E=thermal), 439.6 *3* (^{150}Nd(α,4nγ) E=45 MeV). Mult.: from ^{149}Sm(n,γ) E=th. B(E2)(W.u.): From B(E2)(2+ to 4+)=0.96 *10*.
1046.148	2+	305.68 *3*	2.5[a] *5*	740.464	0+	E2	0.0530		α(K)=0.0414 *6*; α(L)=0.00909 *13*; α(M)=0.00202 *3*; α(N)=0.000451 *7*; α(O)=6.21×10^{-5} *9* α(P)=2.23×10^{-6} *4*; α(N+..)=0.000515 *8* B(E2)(W.u.)=1.1×10^2 *+4−3* E_γ: weighted average of 305.7 *2* (^{150}Pm β^- decay (2.68 h)), 305.4 *4* (^{150}Eu ε decay (12.8 h)), 305.70 *8* (^{150}Eu ε decay (36.9 y)), 305.68 3 (^{149}Sm(n,γ) E=thermal),
		712.207 *14*	100[a] *6*	333.955	2+	E2+E0+M1	0.0071 *19*		α(K)=0.0060 *16*; α(L)=0.00085 *18*; α(M)=0.00018 *4*;

From ENSDF

$^{150}_{62}Sm_{88}$-8

Adopted Levels, Gammas (continued)

$\gamma(^{150}Sm)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[d]	E_f	J_f^π	Mult.[‡]	α	Comments
								α(N)=4.1×10^{-5} *9*; α(O)=6.1×10^{-6} *14* α(P)=3.7×10^{-7} *11*; α(N+..)=4.8×10^{-5} *10* E_γ: weighted average of 712.22 *4* (^{150}Pm β^- decay (2.68 h)), 712.2 *1* (^{150}Eu ε decay (12.8 h)), 712.205 *15* (^{150}Eu ε decay (36.9 y)), 712.2 *3* (^{148}Nd(α,2nγ) E=26 MeV), 712.23 *15* (^{149}Sm(n,γ) E=thermal).
1046.148	2^+	1046.16[e] *14*	8.1[a] *9*	0.0	0^+	(E2)	0.00226 *4*	α(K)=0.00192 *3*; α(L)=0.000269 *4*; α(M)=5.76×10^{-5} *8*; α(N)=1.302×10^{-5} *19*; α(O)=1.93×10^{-6} *3* α(P)=1.142×10^{-7} *16*; α(N+..)=1.507×10^{-5} *21* B(E2)(W.u.)=0.81 *+26−21* E_γ: weighted average of 1046.12 *8* (^{150}Pm β^- decay (2.68 h)), 1046.2 *3* (^{150}Eu ε decay (12.8 h)), 1046.12 *8* (^{150}Eu ε decay (36.9 y)), 1047.9 *4* (^{149}Sm(n,γ) E=thermal). Mult.: from 1973PrZI.
1071.406	3^-	298.060 *13*	6.70 *23*	773.374	4^+	E1	0.01496	α(K)=0.01276 *18*; α(L)=0.001733 *25*; α(M)=0.000370 *6*; α(N)=8.32×10^{-5} *12* α(O)=1.222×10^{-5} *18*; α(P)=7.01×10^{-7} *10*; α(N+..)=9.61×10^{-5} *14* B(E1)(W.u.)=0.005 *+4−3* E_γ: weighted average of 297.9 *2* (^{150}Pm β^- decay (2.68 h)), 298.061 *14* (^{150}Eu ε decay (36.9 y)), 298.06 *3* (^{149}Sm(n,γ) E=thermal). I_γ: weighted average of 5.1 *9* (^{150}Pm β^- decay (2.68 h)), 6.71 *16* (^{150}Eu ε decay (36.9 y)), 7.6 *8* (^{149}Sm(n,γ) E=thermal).
		737.457 *15*	100.0 *19*	333.955	2^+	E1	0.00187 *3*	α(K)=0.001606 *23*; α(L)=0.000209 *3*; α(M)=4.44×10^{-5} *7*; α(N)=1.005×10^{-5} *14* α(O)=1.499×10^{-6} *21*; α(P)=9.24×10^{-8} *13*; α(N+..)=1.164×10^{-5} *17* B(E1)(W.u.)=0.005 *+4−3* E_γ: weighted average of 737.50 *8* (^{150}Pm β^- decay (2.68 h)), 737.455 *15* (^{150}Eu ε decay (36.9 y)), 737.5 *3* (^{148}Nd(α,2nγ) E=26 MeV), 737.47 *17* (^{149}Sm(n,γ) E=thermal), 737.6 *3* (^{150}Nd(α,4nγ) E=45 MeV). I_γ: weighted average of 100 *7* (^{150}Pm β^- decay (2.68 h)), 100.0 *20* (^{150}Eu ε decay (36.9 y)), 100 *8* (^{149}Sm(n,γ) E=thermal).
1165.791	1^-	425.22 *8*	2.7 *3*	740.464	0^+			E_γ: weighted average of 425.33 *7* (^{150}Pm β^- decay (2.68 h)), 425.3 *3* (^{150}Eu ε decay (12.8 h)), 425.10 *7* (^{149}Sm(n,γ) E=thermal). I_γ: weighted average of 3.0 *3* (^{150}Pm β^- decay (2.68 h)), 3.1 *6* (^{150}Eu ε decay (12.8 h)), 2.2 *3* (^{149}Sm(n,γ) E=thermal).
		831.83[e] *5*	75[a] *3*	333.955	2^+	(E1)	0.001470 *21*	α=0.001470 *21*; α(K)=0.001262 *18*; α(L)=0.0001635 *23*; α(M)=3.47×10^{-5} *5* α(O)=1.174×10^{-6} *17*; α(P)=7.28×10^{-8} *11*; α(N+..)=9.10×10^{-6} B(E1)(W.u.)=0.0029 *+14−10* E_γ: weighted average of 831.85 *4* (^{150}Pm β^- decay (2.68 h)), 831.8 *1* (^{150}Eu ε decay (12.8 h)), 831.92 *25* (^{150}Eu ε decay (36.9 y)), 831.28 *24* (^{149}Sm(n,γ) E=thermal). Mult.: from 1966Sm03 in (n,γ) mult=E2 on basis of α(K)exp. From 1973PrZI, mult=E1 on basis of α(K)exp. Mult=E1 on basis of $\gamma(\theta)$ and α(K)exp from 1969Re11.

Adopted Levels, Gammas (continued)

γ(^{150}Sm) (continued)

E$_i$(level)	J$^\pi_i$	E$_\gamma$[†]	I$_\gamma$[d]	E$_f$	J$^\pi_f$	Mult.[‡]	α	Comments
1165.791	1$^-$	1165.74 *3*	100[a] *4*	0.0	0$^+$	E1	0.000792 *11*	α=0.000792 *11*; α(K)=0.000670 *10*; α(L)=8.56×10^{-5} *12*; α(M)=1.82×10^{-5} *3*; α(N)=4.11×10^{-6} *6* α(O)=6.16×10^{-7} *9*; α(P)=3.88×10^{-8} *6*; α(N+..)=1.82×10^{-5} *3* B(E1)(W.u.)=0.0014 *+7−5* Mult.: on basis of α(K)exp, 1966Sm03 give mult=E2, but other authors assign E1. On basis of $\gamma(\theta)$ and α(K)exp, 1969Re11 assign E1. E$_\gamma$: weighted average of 1165.77 *6* (^{150}Pm β^- decay (2.68 h)), 1165.7 *2* (^{150}Eu ε decay (12.8 h)), 1165.74 *3* (^{150}Eu ε decay (36.9 y)), 1165.1 *13* (^{149}Sm(n,γ) E=thermal).
1193.843	2$^+$	147.73 *4*	0.15 *8*	1046.148	2$^+$	M1(+E0)		E$_\gamma$,I$_\gamma$: from ^{149}Sm(n,γ) E=thermal.
		420.47 *9*	1.8 *5*	773.374	4$^+$	(E2)	0.0206	α(K)=0.01670 *24*; α(L)=0.00308 *5*; α(M)=0.000677 *10*; α(N)=0.0001516 *22* α(O)=2.14×10^{-5} *3*; α(P)=9.44×10^{-7} *14*; α(N+..)=0.0001739 *25* B(E2)(W.u.)=7 *3* E$_\gamma$,I$_\gamma$: weighted average of 420.1 *5* (^{150}Pm β^- decay (2.68 h)), 420.48 *9* (^{149}Sm(n,γ) E=thermal). I$_\gamma$: weighted average of 2.3 *4* (^{150}Pm β^- decay (2.68 h)), 1.3 *4* (^{149}Sm(n,γ) E=thermal).
		453.40 *5*	3.4 *4*	740.464	0$^+$	(E2)	0.01672	α(K)=0.01362 *19*; α(L)=0.00243 *4*; α(M)=0.000532 *8*; α(N)=0.0001193 *17* α(O)=1.696×10^{-5} *24*; α(P)=7.76×10^{-7} *11*; α(N+..)=0.0001370 *20* B(E2)(W.u.)=9.1 *24* E$_\gamma$: weighted average of 453.48 *16* (^{150}Pm β^- decay (2.68 h)), 453.38 *10* (^{150}Eu ε decay (36.9 y)), 453.40 *6* (^{149}Sm(n,γ) E=thermal). Mult.: α(K)exp allows E1 or E2 but E1 ruled out by decay scheme. I$_\gamma$: weighted average of 3.0 *6* (^{150}Pm β^- decay (2.68 h)), 3.3 *6* (^{150}Eu ε decay (36.9 y)), 4.1 *8* (^{149}Sm(n,γ) E=thermal).
		859.88 *3*	73.3 *16*	333.955	2$^+$	E2+M1(+E0)	0.0045 *11*	α(K)=0.0039 *10*; α(L)=0.00053 *12*; α(M)=0.000114 *24*; α(N)=2.6×10^{-5} *6*; α(O)=3.9×10^{-6} *9* α(P)=2.4×10^{-7} *7*; α(N+..)=3.0×10^{-5} *7* E$_\gamma$: weighted average of 859.95 *4* (^{150}Pm β^- decay (2.68 h)), 860.1 *5* (^{150}Eu ε decay (12.8 h)), 859.867 *18* (^{150}Eu ε decay (36.9 y)), 859.28 *20* (^{149}Sm(n,γ) E=thermal). I$_\gamma$: weighted average of 70 *4* (^{150}Pm β^- decay (2.68 h)), 50 *13* (^{150}Eu ε decay (12.8 h)), 73.5 *12* (^{150}Eu ε decay (36.9 y)), 85 *8* (^{149}Sm(n,γ) E=thermal).
		1193.830 *22*	100 *3*	0.0	0$^+$	E2	0.001731 *25*	α=0.001731 *25*; α(K)=0.001470 *21*; α(L)=0.000201 *3*; α(M)=4.31×10^{-5} *6* α(O)=1.452×10^{-6} *21*; α(P)=8.75×10^{-8} *13*; α(N+..)=1.635×10^{-5} *2* B(E2)(W.u.)=2.1 *5*

$\gamma(^{150}Sm)$ (continued)

E_i(level)	J^{π}_i	E_{γ}†	I_{γ} d	E_f	J^{π}_f	Mult.‡	α	$I_{(\gamma+ce)}$	Comments
									E_{γ}: weighted average of 1193.87 *6* (^{150}Pm β^- decay (2.68 h)), 1193.7 *2* (^{150}Eu ε decay (12.8 h)), 1193.826 *24* (^{150}Eu ε decay (36.9 y)), 1193.1 *7* ($^{149}Sm(n,\gamma)$ E=thermal). Mult.: $\gamma(\theta)$ studies support E2 (1969Re11). I_{γ}: weighted average of 100 *6* (^{150}Pm β^- decay (2.68 h)), 100 *22* (^{150}Eu ε decay (12.8 h)), 100 *4* (^{150}Eu ε decay (36.9 y)), 100 *10* ($^{149}Sm(n,\gamma)$ E=thermal).
1255.512	0^+	209.364 *19*	8.9 *16*	1046.148	2^+	[E2]	0.179		α(K)=0.1303 *19*; α(L)=0.0380 *6*; α(M)=0.00859 *12*; α(N)=0.00190 *3*; α(O)=0.000253 *4* α(P)=6.52×10^{-6} *10*; α(N+..)=0.00216 *3* E_{γ}: weighted average of 209.45 *12* (^{150}Pm β^- decay (2.68 h)), 209.4 *1* (^{150}Eu ε decay (12.8 h)), 209.36 *2* ($^{149}Sm(n,\gamma)$ E=thermal). I_{γ}: weighted average of 7.2 *16* (^{150}Pm β^- decay (2.68 h)), 10.4 *15* (^{150}Eu ε decay (12.8 h)).
		515.3 *8*	≤25.0	740.464	0^+	E0		13 *4*	E_{γ},I_{γ}: from (^{150}Eu ε decay (12.8 h).
		921.55 *13*	100 *7*	333.955	2^+	E2	0.00296 *5*		α(K)=0.00250 *4*; α(L)=0.000359 *5*; α(M)=7.71×10^{-5} *11*; α(N)=1.741×10^{-5} *25*; α(O)=2.57×10^{-6} *4* α(P)=1.486×10^{-7} *21*; α(N+..)=2.01×10^{-5} *3* E_{γ}: weighted average of 921.61 *16* (^{150}Pm β^- decay (2.68 h)), 921.7 *3* (^{150}Eu ε decay (12.8 h)), 921.2 *3* ($^{149}Sm(n,\gamma)$ E=thermal). I_{γ}: weighted average of 100 *8* (^{150}Eu ε decay (12.8 h)), 100 *13* ($^{149}Sm(n,\gamma)$ E=thermal).
		1256.3 *3*		0.0	0^+	E0		0.9 *3*	E_{γ},I_{γ}: observed only in ($^{149}Sm(n,\gamma)$ E=thermal). E_{γ}: E0 transition to ground state reported by 1963Gr18. Energy and intensity as given are from 1976Ba18.
1278.922	6^+	505.508 *23*	100	773.374	4^+	E2	0.01246		α(K)=0.01024 *15*; α(L)=0.001743 *25*; α(M)=0.000381 *6*; α(N)=8.55×10^{-5} *12* α(O)=1.225×10^{-5} *18*; α(P)=5.89×10^{-7} *9*; α(N+..)=9.83×10^{-5} *14* B(E2)(W.u.)=1.5×10^{2} *5* E_{γ}: weighted average of 505.521 *25* (^{150}Eu ε decay (36.9 y)), 505.4 *1* ($^{148}Nd(\alpha,2n\gamma)$ E=26 MeV), 505.44 *8* ($^{149}Sm(n,\gamma)$ E=thermal), 505.5 *3* ($^{150}Nd(\alpha,4n\gamma)$ E=45 MeV). Mult.: from K/L in ^{150}Eu ε decay (36.9 y).
1357.710	5^-	78.76 *1*	0.158 *18*	1278.922	6^+	E1	0.525		α(K)=0.440 *7*; α(L)=0.0669 *10*; α(M)=0.01434 *20*; α(N)=0.00318 *5*; α(O)=0.000444 *7* α(P)=2.06×10^{-5} *3*; α(N+..)=0.00365 *6* E_{γ}: weighted average of 78.7 *3* (^{150}Eu ε decay (36.9 y)), 78.76 *1* ($^{149}Sm(n,\gamma)$ E=thermal). I_{γ}: weighted average of 0.157 *15* (^{150}Eu ε decay (36.9 y)), 0.37 *18* ($^{149}Sm(n,\gamma)$ E=thermal).

$^{150}_{62}Sm_{88}$-11

$\gamma(^{150}Sm)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[d]	E_f	J^π_f	Mult.[‡]	α	Comments
1357.710	5^-	286.290[e] *13*	0.20 *3*	1071.406	3^-			E_γ: weighted average of 286.293 *15* (^{150}Eu ε decay (36.9 y)), 286.28 *3* (^{149}Sm(n,γ) E=thermal). I_γ: weighted average of 0.19 *3* (^{150}Eu ε decay (36.9 y)), 0.28 *10* (^{149}Sm(n,γ) E=thermal).
		584.274 *12*	100 *3*	773.374	4^+	E1	0.00305 *5*	α(K)=0.00262 *4*; α(L)=0.000344 *5*; α(M)=7.33×10^{-5} *11*; α(N)=1.655×10^{-5} *24*; α(O)=2.46×10^{-6} *4* α(P)=1.495×10^{-7} *21*; α(N+..)=1.92×10^{-5} *3* E_γ: weighted average of 584.274 *12* (^{150}Eu ε decay (36.9 y)), 584.3 *2* (^{148}Nd(α,2nγ) E=26 MeV), 584.24 *10* (^{149}Sm(n,γ) E=thermal), 584.5 *3* (^{150}Nd(α,4nγ) E=45 MeV). I_γ: weighted average of 100 *3* (^{150}Eu ε decay (36.9 y)), 100 *8* (^{149}Sm(n,γ) E=thermal). Mult.: from $\gamma(\theta)$ and α(K)exp mult=E1 (1969Re11).
1417.346	2^+	161.84[h] *3*	3 *1*	1255.512	0^+	(E2)	0.428	α(K)=0.288 *4*; α(L)=0.1088 *16*; α(M)=0.0248 *4*; α(N)=0.00548 *8*; α(O)=0.000714 *10* α(P)=1.360×10^{-5} *19*; α(N+..)=0.00621 *9* E_γ,I_γ: From ^{149}Sm(n,γ) E=thermal.
		223.51[f] *2*	1.7[f] *3*	1193.843	2^+	(E2+E0)[c]		E_γ: from ^{149}Sm(n,γ) E=thermal. E_γ,I_γ: from ^{149}Sm(n,γ) E=th.
		251.582 *19*	43.7 *18*	1165.791	1^-	E1	0.0231	α(K)=0.0197 *3*; α(L)=0.00270 *4*; α(M)=0.000575 *8*; α(N)=0.0001294 *19*; α(O)=1.89×10^{-5} *3* α(P)=1.066×10^{-6} *15*; α(N+..)=0.0001494 *21* E_γ: weighted average of 251.60 *10* (^{150}Pm β^- decay (2.68 h)), 251.596 *25* (^{150}Eu ε decay (36.9 y)), 251.56 *3* (^{149}Sm(n,γ) E=thermal). I_γ: weighted average of 41 *6* (^{150}Pm β^- decay (2.68 h)), 43.4 *22* (^{150}Eu ε decay (36.9 y)), 46 *4* (^{149}Sm(n,γ) E=thermal).
		345.950 *17*	100 *10*	1071.406	3^-	E1	0.01031	α(K)=0.00880 *13*; α(L)=0.001187 *17*; α(M)=0.000253 *4*; α(N)=5.70×10^{-5} *8*; α(O)=8.40×10^{-6} *12* α(P)=4.89×10^{-7} *7*; α(N+..)=6.59×10^{-5} *10* E_γ: weighted average of 345.93 *8* (^{150}Pm β^- decay (2.68 h)), 345.955 *19* (^{150}Eu ε decay (36.9 y)), 345.93 *4* (^{149}Sm(n,γ) E=thermal). I_γ: weighted average of 100 *11* (^{150}Pm β^- decay (2.68 h)), 100 *4* (^{150}Eu ε decay (36.9 y)), 100 *10* (^{149}Sm(n,γ) E=thermal).
		1083.34 *4*	70 *8*	333.955	2^+	(E2+E0)		E_γ: weighted average of 1083.33 *8* (^{150}Pm β^- decay (2.68 h)), 1083.34 *3* (^{150}Eu ε decay (36.9 y)), 1082.6 *4* (^{149}Sm(n,γ) E=thermal). I_γ: weighted average of 41 *6* (^{150}Pm β^- decay (2.68 h)), 41.0 *24* (^{150}Eu ε decay (36.9 y)), 44 *6* (^{149}Sm(n,γ) E=thermal).
		1417.0[b]	0.06 *4*	0.0	0^+			E_γ,I_γ: from ^{150}Eu ε decay (36.9 y).
1449.182	4^+	170.23[h] *2*	0.26 *4*	1278.922	6^+	E2	0.360	α(K)=0.247 *4*; α(L)=0.0881 *13*; α(M)=0.0201 *3*; α(N)=0.00443 *7*; α(O)=0.000580 *9*

$^{150}_{62}Sm_{88}$-12

$\gamma(^{150}$Sm) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[d]	E_f	J^π_f	Mult.[‡]	α	Comments
								α(P)=1.178×10^{-5} *17*; α(N+..)=0.00502 *7* B(E2)(W.u.)=8.E+1 *4* E_γ,I_γ: from ^{149}Sm(n,γ) E=thermal.
1449.182	4$^+$	255.34[e] *3*	1.06 *15*	1193.843	2$^+$	(E2)	0.0936	α(K)=0.0710 *10*; α(L)=0.01761 *25*; α(M)=0.00395 *6*; α(N)=0.000877 *13* α(O)=0.0001190 *17*; α(P)=3.70×10^{-6} *6*; α(N+..)=0.001000 *14* B(E2)(W.u.)=42 *20* E_γ,I_γ: from ^{149}Sm(n,γ) E=thermal.
		377.73 *3*	3.0 *3*	1071.406	3$^-$			E_γ: weighted average of 377.73 *3* (^{150}Eu ε decay (36.9 y)), 377.74 *5* (^{149}Sm(n,γ) E=thermal). I_γ: from ^{149}Sm(n,γ) E=thermal.
		403.05 *16*	46.9 *18*	1046.148	2$^+$	E2	0.0233	α(K)=0.0188 *3*; α(L)=0.00353 *5*; α(M)=0.000778 *11*; α(N)=0.0001739 *25*; α(O)=2.45×10^{-5} *4* α(P)=1.054×10^{-6} *15*; α(N+..)=0.000200 *3* B(E2)(W.u.)=1.9×10^2 *9* E_γ: weighted average of 403.36 *10* (^{150}Eu ε decay (36.9 y)), 402.97 *5* (^{149}Sm(n,γ) E=thermal). Mult.: confirmed by 1969Re11 through $\gamma(\theta)$ studies. I_γ: weighted average of 47.2 *19* (^{150}Eu ε decay (36.9 y)), 45 *5* (^{149}Sm(n,γ) E=thermal).
		675.853 *24*	100 *2*	773.374	4$^+$	E2+E0+M1	0.0081 *21*	α(K)=0.0068 *19*; α(L)=0.00097 *20*; α(M)=0.00021 *5*; α(N)=4.7×10^{-5} *10*; α(O)=7.0×10^{-6} *16* α(P)=4.2×10^{-7} *13*; α(N+..)=5.5×10^{-5} *12* E_γ: weighted average of 675.856 *25* (^{150}Eu ε decay (36.9 y)), 676.1 *3* (^{148}Nd(α,2nγ) E=26 MeV), 675.77 *14* (^{149}Sm(n,γ) E=thermal), 675.6 *3* (^{150}Nd(α,4nγ) E=45 MeV). I_γ: weighted average of 100.0 *19* (^{150}Eu ε decay (36.9 y)), 100 *10* (^{149}Sm(n,γ) E=thermal).
1504.572	3$^+$	310.75[e] *4*	2.2 *4*	1193.843	2$^+$			E_γ: weighted average of 310.82 *8* (^{150}Eu ε decay (36.9 y)), 310.73 *4* (^{149}Sm(n,γ) E=thermal). I_γ: from ^{150}Eu ε decay (36.9 y).
		458.27 *7*	3.5 *8*	1046.148	2$^+$	E2	0.01623	α(K)=0.01324 *19*; α(L)=0.00235 *4*; α(M)=0.000515 *8*; α(N)=0.0001154 *17* α(O)=1.642×10^{-5} *23*; α(P)=7.55×10^{-7} *11*; α(N+..)=0.0001324 *19* E_γ: weighted average of 458.4 *2* (^{150}Pm β^- decay (2.68 h)), 458.36 *6* (^{150}Eu ε decay (36.9 y)), 458.17 *6* (^{149}Sm(n,γ) E=thermal). I_γ: weighted average of 3.2 *6* (^{150}Pm β^- decay (2.68 h)), 3.3 *4* (^{150}Eu ε decay (36.9 y)), 10.0 *19* (^{149}Sm(n,γ) E=thermal).
		731.218 *23*	25.6 *12*	773.374	4$^+$	E2	0.00497 *7*	α(K)=0.00417 *6*; α(L)=0.000630 *9*; α(M)=0.0001362 *19*; α(N)=3.07×10^{-5} *5*; α(O)=4.49×10^{-6} *7* α(P)=2.46×10^{-7} *4*; α(N+..)=3.54×10^{-5} *5* E_γ: weighted average of 731.06 *16* (^{150}Pm β^- decay (2.68 h)), 731.220 *24* (^{150}Eu ε decay (36.9 y)), 731.31 *16* (^{149}Sm(n,γ) E=thermal).

$^{150}_{62}$Sm$_{88}$-13

$\gamma(^{150}Sm)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ[d]	E_f	J^π_f	Mult.‡	α	Comments
								Mult.: confirmed by 1969Re11 through $\gamma(\theta)$ studies. I_γ: weighted average of 26 *4* (^{150}Pm β^- decay (2.68 h)), 25.2 *7* (^{150}Eu ε decay (36.9 y)), 33 *3* (^{149}Sm(n,γ) E=thermal).
1504.572	3^+	1170.589 *24*	100.0 *14*	333.955	2^+	E2(+M1)	0.0023 *5*	α(K)=0.0019 *4*; α(L)=0.00026 *5*; α(M)=5.5×10^{-5} *11*; α(N)=1.25×10^{-5} *24*; α(O)=1.9×10^{-6} *4* α(P)=1.2×10^{-7} *3*; α(N+..)=1.8×10^{-5} *3* E_γ: weighted average of 1170.9 *3* (^{150}Pm β^- decay (2.68 h)), 1170.587 *24* (^{150}Eu ε decay (36.9 y)), 1170.2 *10* (^{149}Sm(n,γ) E=thermal). Mult.: confirmed by 1969Re11 through $\gamma(\theta)$ studies. I_γ: weighted average of 100 *12* (^{150}Pm β^- decay (2.68 h)), 100.0 *14* (^{150}Eu ε decay (36.9 y)), 100 *19* (^{149}Sm(n,γ) E=thermal).
1642.611	4^+	138.05[h] *4*	0.11 *5*	1504.572	3^+			E_γ,I_γ: from ^{149}Sm(n,γ) E=thermal.
		193.46 *2*	0.70 *17*	1449.182	4^+	(E2+E0)		E_γ,I_γ: from ^{149}Sm(n,γ) E=thermal.
		225.34 *2*	0.39 *8*	1417.346	2^+	[E2]	0.1404	α(K)=0.1040 *15*; α(L)=0.0285 *4*; α(M)=0.00641 *9*; α(N)=0.001421 *20*; α(O)=0.000191 *3* α(P)=5.29×10^{-6} *8*; α(N+..)=0.001617 *23* B(E2)(W.u.)=7.E+1 *4* E_γ,I_γ: from ^{149}Sm(n,γ) E=thermal.
		284.001 *20*	9.3 *9*	1357.710	5^-	E1	0.01691	α(K)=0.01442 *21*; α(L)=0.00196 *3*; α(M)=0.000419 *6*; α(N)=9.43×10^{-5} *14*; α(O)=1.382×10^{-5} *20* α(P)=7.89×10^{-7} *11*; α(N+..)=0.0001079 *16* B(E1)(W.u.)=0.0009 *5* Mult.: from ^{150}Eu ε decay (36.9 y). E_γ: weighted average of 284.995 *26* (^{150}Eu ε decay (36.9 y)), 285.01 *3* (^{149}Sm(n,γ) E=thermal). I_γ: weighted average of 9.0 *4* (^{150}Eu ε decay (36.9 y)), 11.5 *10* (^{149}Sm(n,γ) E=thermal).
		448.785 *21*	14.0 *5*	1193.843	2^+			E_γ: weighted average of 448.789 *12* (^{150}Eu ε decay (36.9 y)), 448.68 *6* (^{149}Sm(n,γ) E=thermal). I_γ: from ^{150}Eu ε decay (36.9 y).
		571.258 *15*	22.4 *6*	1071.406	3^-	(E1)	0.00321 *5*	α(K)=0.00275 *4*; α(L)=0.000362 *5*; α(M)=7.70×10^{-5} *11*; α(N)=1.740×10^{-5} *25*; α(O)=2.59×10^{-6} *4* α(P)=1.568×10^{-7} *22*; α(N+..)=2.01×10^{-5} *3* B(E1)(W.u.)=0.00027 *13* E_γ: weighted average of 571.259 *15* (^{150}Eu ε decay (36.9 y)), 571.21 *10* (^{149}Sm(n,γ) E=thermal). Mult.: confirmed in $\gamma(\theta)$ aligned. I_γ: weighted average of 22.3 *5* (^{150}Eu ε decay (36.9 y)), 26 *3* (^{149}Sm(n,γ) E=thermal).
		596.52 *4*	2.8 *5*	1046.148	2^+	[E2]	0.00813 *12*	α(K)=0.00675 *10*; α(L)=0.001083 *16*; α(M)=0.000235 *4*; α(N)=5.29×10^{-5}

$\gamma(^{150}Sm)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[d]	E_f	J_f^π	Mult.[‡]	α	Comments
								8; α(O)=7.66×10^{-6} *11* α(P)=3.94×10^{-7} *6*; α(N+..)=6.10×10^{-5} *9* B(E2)(W.u.)=4.1 *21* E_γ: weighted average of 596.53 *4* (^{150}Eu ε decay (36.9 y)), 596.34 *18* (^{149}Sm(n,γ) E=thermal). I_γ: from ^{149}Sm(n,γ) E=thermal.
1642.611	4$^+$	869.256 *14*	100 *1*	773.374	4$^+$	E2+E0(+M1)	0.0044 *11*	α(K)=0.0038 *10*; α(L)=0.00052 *11*; α(M)=0.000111 *23*; α(N)=2.5×10^{-5} *6*; α(O)=3.8×10^{-6} *9* α(P)=2.3×10^{-7} *7*; α(N+..)=2.9×10^{-5} *7* E_γ: weighted average of 869.256 *14* (^{150}Eu ε decay (36.9 y)), 869.21 *20* (^{149}Sm(n,γ) E=thermal). Mult.: confirmed in $\gamma(\theta)$ aligned. I_γ: from ^{150}Eu ε decay (36.9 y)).
		1308.675 *23*	48.2 *10*	333.955	2$^+$	E2	0.001459 *21*	α=0.001459 *21*; α(K)=0.001226 *18*; α(L)=0.0001660 *24*; α(M)=3.55×10^{-5} *5* α(O)=1.198×10^{-6} *17*; α(P)=7.30×10^{-8} *11*; α(N+..)=3.14×10^{-5} B(E2)(W.u.)=1.4 *7* E_γ: weighted average of 1308.675 *23* (^{150}Eu ε decay (36.9 y)), 1308.1 *9* (^{149}Sm(n,γ) E=thermal). Mult.: confirmed by 1969Re11 through $\gamma(\theta)$ aligned. I_γ: weighted average of 48.2 *10* (^{150}Eu ε decay (36.9 y)), 48 *5* (^{149}Sm(n,γ) E=thermal).
1658.39	2$^{(-)}$	153.78[h] *4*	0.14 *3*	1504.572	3$^+$			E_γ,I_γ: observed only in ^{149}Sm(n,γ) E=thermal. I_γ: from Iγ(153)/Iγ(492) in (n,γ).
		241.5[a] *4*	≈0.08	1417.346	2$^+$			
		465.1[a] *6*	0.27 *4*	1193.843	2$^+$			
		492.53[a] *8*	2.0 *2*	1165.791	1$^-$			E_γ: weighted average of 492.56 *8* (^{150}Pm β^- decay (2.68 h)), 492.33 *21* (^{149}Sm(n,γ) E=thermal).
		587.02[a] *8*	7.7 *5*	1071.406	3$^-$			
		612.25[a] *8*	5.3 *4*	1046.148	2$^+$			
		1324.51[a] *6*	100 *4*	333.955	2$^+$			
1672.717?	(4$^+$)	626.67[#] *22*	8×10^1 *6*	1046.148	2$^+$			
		899.6[e#h] *3*	10×10^1 *8*	773.374	4$^+$			E_γ: from ^{149}Sm(n,γ) E=thermal.
1684.162	3$^-$	612.69 *3*	54[b] *3*	1071.406	3$^-$			
		637.85 *12*	8[b] *4*	1046.148	2$^+$			
		910.88 *4*	50[b] *6*	773.374	4$^+$	E1	0.001232 *18*	α=0.001232 *18*; α(K)=0.001058 *15*; α(L)=0.0001365 *20*; α(M)=2.90×10^{-5} *4* α(O)=9.81×10^{-7} *14*; α(P)=6.12×10^{-8} *9*; α(N+..)=7.60×10^{-6} E_γ: weighted average of 911.0 *6* (^{150}Pm β^- decay (2.68 h)),

$^{150}_{62}Sm_{88}$-15

Adopted Levels, Gammas (continued)

$\gamma(^{150}Sm)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[d]	E_f	J^π_f	Mult.[‡]	α	Comments
								910.88 *4* (^{150}Eu ε decay (36.9 y)), 910.73 *25* (^{149}Sm(n,γ) E=thermal).
1684.162	3^-	944	4[b] *3*	740.464	0^+			
		1350.28[h] *10*	100[b] *6*	333.955	2^+	E1	0.000704 *10*	α=0.000704 *10*; α(K)=0.000517 *8*; α(L)=6.57×10^{-5} *10*; α(M)=1.394×10^{-5} *20* α(O)=4.74×10^{-7} *7*; α(P)=3.00×10^{-8} *5*; α(N+..)=0.0001076 E_γ: weighted average of 1350.7 *5* (^{150}Pm β^- decay (2.68 h)), 1350.29 *3* (^{150}Eu ε decay (36.9 y)), 1347.9 *5* (^{149}Sm(n,γ) E=thermal). Mult.: confirmed in $\gamma(\theta)$ aligned.
1713.51	1	548.59[#] *11*	1.3[a] *4*	1165.791	1^-			
		667.31 *13*	5.0[a] *9*	1046.148	2^+			
		972.2 *8*	3.0[a] *4*	740.464	0^+			
		1379.22 *8*	100[a] *7*	333.955	2^+	(E2+M1)	0.0016 *3*	α(K)=0.00135 *25*; α(L)=0.00018 *3*; α(M)=3.8×10^{-5} *7*; α(N)=8.7×10^{-6} *15*; α(O)=1.30×10^{-6} *23* α(P)=8.2×10^{-8} *16*; α(N+..)=5.0×10^{-5} *4* Mult.: from ^{150}Eu ε decay (36.9 y).
		1713.31 *12*	11.2[a] *13*	0.0	0^+			
1760.060	(3^-)	117.58[#h] *2*	3 *2*	1642.611	4^+			
		255.34[e#h] *3*	55 *8*	1504.572	3^+			
		310.74[e#h] *4*	5.×10^1 *4*	1449.182	4^+			
		565.91[h] *14*	42 *13*	1193.843	2^+			
		688.30[#] *14*	100 *16*	1071.406	3^-	(E2)	0.00573 *8*	α(K)=0.00480 *7*; α(L)=0.000736 *11*; α(M)=0.0001594 *23*; α(N)=3.59×10^{-5} *5*; α(O)=5.24×10^{-6} *8* α(P)=2.82×10^{-7} *4*; α(N+..)=4.14×10^{-5} *6* Mult.: from ce(K) data of 1966El05.
1764.89	7^-	407.4[&] *3*	3[&]	1357.710	5^-	E2	0.0226	α(K)=0.0182 *3*; α(L)=0.00341 *5*; α(M)=0.000751 *11*; α(N)=0.0001679 *24*; α(O)=2.37×10^{-5} *4* α(P)=1.025×10^{-6} *15*; α(N+..)=0.000193 *3* E_γ,I_γ: from (α,4nγ) (1986UrZY).
		485.8[&] *3*	100[&] *4*	1278.922	6^+	E1	0.00460 *7*	α(K)=0.00394 *6*; α(L)=0.000523 *8*; α(M)=0.0001114 *16*; α(N)=2.51×10^{-5} *4*; α(O)=3.73×10^{-6} *6* α(P)=2.23×10^{-7} *4*; α(N+..)=2.91×10^{-5} *4*
1786.30	(≤3)	620.40[a] *20*	95[a] *16*	1165.791	1^-			
		740.4 *5*		1046.148	2^+			
		1452.32[a] *20*	1.0×10^2[a] *3*	333.955	2^+			
1794.30	2^+	151.64[#h] *4*	0.39 *19*	1642.611	4^+			
		600.43[#] *25*	15 *3*	1193.843	2^+			
		722.65[#] *18*	24 *4*	1071.406	3^-			

$\gamma(^{150}Sm)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[d]	E_f	J_f^π	Mult.[‡]	α	Comments
1794.30	2^+	1798[#] *4*	100 *19*	0.0	0^+			
1819.510	4^+	315.0 *2*	0.33[b] *11*	1504.572	3^+			E_γ: from ^{150}Eu ε decay (36.9 y).
		370.721 *25*	2.07[b] *17*	1449.182	4^+			E_γ: from ^{150}Eu ε decay (36.9 y).
		402.152 *12*	15.1[b] *2*	1417.346	2^+	(E2)	0.0234	α(K)=0.0189 *3*; α(L)=0.00356 *5*; α(M)=0.000783 *11*; α(N)=0.0001752 *25*; α(O)=2.47×10^{-5} *4* α(P)=1.061×10^{-6} *15*; α(N+..)=0.000201 *3* E_γ: from ^{150}Eu ε decay (36.9 y).
		461.75 *4*	15.9[b] *4*	1357.710	5^-	E1	0.00517 *8*	α(K)=0.00443 *7*; α(L)=0.000589 *9*; α(M)=0.0001255 *18*; α(N)=2.83×10^{-5} *4*; α(O)=4.19×10^{-6} *6* α(P)=2.50×10^{-7} *4*; α(N+..)=3.27×10^{-5} *5* E_γ: weighted average of 461.761 *15* (^{150}Eu ε decay (36.9 y)), 461.59 *6* (^{149}Sm(n,γ) E=thermal). Mult.: determined by 1973MeZX from α(K)exp data.
		540.55 *6*	1.67[b] *13*	1278.922	6^+			E_γ: from ^{150}Eu ε decay (36.9 y).
		625.568 *20*	5.98[b] *13*	1193.843	2^+	(E2)	0.00723 *11*	α(K)=0.00602 *9*; α(L)=0.000950 *14*; α(M)=0.000206 *3*; α(N)=4.64×10^{-5} *7*; α(O)=6.74×10^{-6} *10* α(P)=3.52×10^{-7} *5*; α(N+..)=5.35×10^{-5} *8* E_γ: from ^{150}Eu ε decay (36.9 y). Mult.: from ^{150}Eu ε decay (36.9 y).
		748.06 *9*	100[b] *2*	1071.406	3^-	E1[b]	0.00182 *3*	α(K)=0.001560 *22*; α(L)=0.000203 *3*; α(M)=4.31×10^{-5} *6*; α(N)=9.75×10^{-6} *14* α(O)=1.456×10^{-6} *21*; α(P)=8.98×10^{-8} *13*; α(N+..)=1.130×10^{-5} *16* E_γ: weighted average of 748.057 *12* (^{150}Eu ε decay (36.9 y)), 749.31 *17* (^{149}Sm(n,γ) E=thermal).
		773.29[e] *4*	11.7[b] *2*	1046.148	2^+	E2	0.00437 *7*	α(K)=0.00368 *6*; α(L)=0.000547 *8*; α(M)=0.0001181 *17*; α(N)=2.66×10^{-5} *4*; α(O)=3.91×10^{-6} *6* α(P)=2.17×10^{-7} *3*; α(N+..)=3.07×10^{-5} *5* E_γ: weighted average of 773.283 *15* (^{150}Eu ε decay (36.9 y)), 773.97 *24* (^{149}Sm(n,γ) E=thermal). Mult.: from ^{150}Eu ε decay (36.9 y).
		1485.50 *14*	36.7[b] *15*	333.955	2^+	E2	0.001193 *17*	α=0.001193 *17*; α(K)=0.000960 *14*; α(L)=0.0001282 *18*; α(M)=2.74×10^{-5} *4* α(O)=9.26×10^{-7} *13*; α(P)=5.72×10^{-8} *8*; α(N+..)=7.76×10^{-5} E_γ: weighted average of 1485.49 *3* (^{150}Eu ε decay (36.9 y)), 1489.3 *8* (^{149}Sm(n,γ) E=thermal). This and some of the other γ rays which are shown as originating at the 1819-keV level could energetically be assigned to the 1821- or the 1822-keV level instead. 1966Sm03 assigned the 1489-keV transition to the 1821-keV level in (n,γ), but 1977Si12 assigned it to the 1819-keV level in ε decay.

From ENSDF

$^{150}_{62}Sm_{88}$-17

$\gamma(^{150}Sm)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[d]	E_f	J^π_f	Mult.[‡]	α	Comments
								Mult.: 1966Sm03 suggest (E2)(M1) mixture (doublet) on basis of α(K)exp while 1973MeZX give E2 on basis of α(K)exp and α(L)exp data.
1821.894	$(4)^+$	179.26 *5*	0.40[b] *21*	1642.611	4^+			E_γ: from ^{149}Sm(n,γ) E=thermal.
		372.732 *22*	62.2[b] *23*	1449.182	4^+			E_γ: weighted average of 372.728 *25* (^{150}Eu ε decay (36.9 y)), 372.75 *5* (^{149}Sm(n,γ) E=thermal).
		464.10 *5*	100[b] *20*	1357.710	5^-	E1	0.00511 *8*	α(K)=0.00438 *7*; α(L)=0.000582 *9*; α(M)=0.0001240 *18*; α(N)=2.80×10^{-5} *4*; α(O)=4.14×10^{-6} *6* α(P)=2.47×10^{-7} *4*; α(N+..)=3.23×10^{-5} *5* E_γ: weighted average of 464.11 *7* (^{150}Eu ε decay (36.9 y)), 464.09 *8* (^{149}Sm(n,γ) E=thermal).
		542.970 *24*	35.0[b] *18*	1278.922	6^+	(E2)	0.01033	α(K)=0.00853 *12*; α(L)=0.001414 *20*; α(M)=0.000308 *5*; α(N)=6.92×10^{-5} *10* α(O)=9.96×10^{-6} *14*; α(P)=4.94×10^{-7} *7*; α(N+..)=7.97×10^{-5} *12* E_γ: weighted average of 542.972 *25* (^{150}Eu ε decay (36.9 y)), 542.95 *9* (^{149}Sm(n,γ) E=thermal). Mult.: from (n,γ) and ^{150}Eu ε decay.
1822.472	$(3)^-$	751.07[ebh] *2*	39.8[b] *9*	1071.406	3^-	M1(+E2)	0.0063 *16*	α(K)=0.0053 *14*; α(L)=0.00074 *16*; α(M)=0.00016 *4*; α(N)=3.6×10^{-5} *8*; α(O)=5.4×10^{-6} *12* α(P)=3.2×10^{-7} *10*; α(N+..)=4.2×10^{-5} *9* Mult.: from ^{150}Eu ε decay (36.9 y).
		1049.04[b] *3*	100[b] *4*	773.374	4^+	E1	0.000944 *14*	α=0.000944 *14*; α(K)=0.000812 *12*; α(L)=0.0001041 *15*; α(M)=2.21×10^{-5} *3* α(O)=7.49×10^{-7} *11*; α(P)=4.70×10^{-8} *7*; α(N+..)=5.80×10^{-6} Mult.: from ^{150}Eu ε decay (36.9 y).
1833.01	$(2)^+$	667.05[b] *3*	100[b] *4*	1165.791	1^-			
		788[bh]	1.48[b] *15*	1046.148	2^+			E_γ: from ^{150}Eu ε decay (36.9 y). In 1973MeZX but not 1978MeZK.
		1499.35[b] *10*	15.2[b] *7*	333.955	2^+	M1(+E0+E2)[b]	0.00140 *22*	α(K)=0.00113 *19*; α(L)=0.000149 *24*; α(M)=3.2×10^{-5} *5*; α(N)=7.2×10^{-6} *12*; α(O)=1.08×10^{-6} *18* α(P)=6.8×10^{-8} *13*; α(N+..)=8.7×10^{-5} *5*
		1833.30[b] *15*	1.00[b] *19*	0.0	0^+	(E2)[b]	0.000966 *14*	α=0.000966 *14*; α(K)=0.000647 *9*; α(L)=8.48×10^{-5} *12*; α(M)=1.81×10^{-5} *3*; α(N)=4.09×10^{-6} *6* α(O)=6.14×10^{-7} *9*; α(P)=3.85×10^{-8} *6*; α(N+..)=0.000216 *3*
1837.03	8^+	558.1 *1*	100	1278.922	6^+	E2	0.00962 *14*	α(K)=0.00796 *12*; α(L)=0.001306 *19*; α(M)=0.000285 *4*; α(N)=6.39×10^{-5} *9*; α(O)=9.22×10^{-6} *13* α(P)=4.62×10^{-7} *7*; α(N+..)=7.36×10^{-5} *11* B(E2)(W.u.)=1.7×10^2 *9* E_γ: weighted average of 558.1 *1* (^{148}Nd(α,2nγ) E=26 MeV), 558.1 *3* (^{150}Nd(α,4nγ) E=45 MeV).

$^{150}_{62}Sm_{88}$-18

$\gamma(^{150}Sm)$ (continued)

E_i(level)	J^π_i	E_γ [†]	I_γ [d]	E_f	J^π_f	Mult. [‡]	α	Comments
1927.33?	(2+)	510.01[e#h] 9	≤83	1417.346	2+			Observed by 1966Sm03, placed in decay scheme by evaluator.
		761.2[#h] 3	1.0×10^2 3	1165.791	1−	(E1)	0.001754 25	α=0.001754 25; α(K)=0.001506 22; α(L)=0.000196 3; α(M)=4.16×10^{-5} 6 α(O)=1.405×10^{-6} 20; α(P)=8.67×10^{-8} 13; α(N+..)=1.090×10^{-5} 1 E_γ: Observed by 1966Sm03, placed in decay scheme by evaluators. Mult.: from (n,γ) E=th.
1952.46	3−	308.05[#] 4	2.2 3	1642.611	4+			
		1176.6[#h] 13	100 20	773.374	4+	E1	0.000782 11	α=0.000782 11; α(K)=0.000659 10; α(L)=8.41×10^{-5} 12; α(M)=1.79×10^{-5} 3; α(N)=4.04×10^{-6} 6 α(O)=6.06×10^{-7} 9; α(P)=3.82×10^{-8} 6; α(N+..)=2.17×10^{-5} 6 Mult.: from (n,γ) E=th.
1963.72	1(−)	917.46 15	17[a] 2	1046.148	2+			E_γ: weighted average of 917.44 16 (^{150}Pm β^- decay (2.68 h)), 917.7 6 (^{150}Eu ε decay).
		1223.26 8	100[a] 7	740.464	0+			E_γ: weighted average of 1223.28 6 (^{150}Pm β^- decay (2.68 h)), 1223.0 2 (^{150}Eu ε decay (12.8 h)).
		1629.78 5	28[a] 2	333.955	2+			E_γ: weighted average of 1629.79 4 (^{150}Pm β^- decay (2.68 h)), 1629.4 3 (^{150}Eu ε decay (12.8 h)).
		1963.66 18	52[a] 4	0.0	0+			E_γ: weighted average of 1963.71 8 (^{150}Pm β^- decay (2.68 h)), 1963.0 3 (^{150}Eu ε decay (12.8 h)).
1970.465	4+	151.06[#h] 4	0.33 17	1819.510	4+			
		286.290[eh] 13	6[b] 3	1684.162	3−			
		553.20 10	2.9[b] 6	1417.346	2+			
		612.69[f] 3	8.2[fb] 5	1357.710	5−			
		777	0.6[b] 3	1193.843	2+			
		899.07[e] 3	83.1[b] 8	1071.406	3−	E1	0.001263 18	α=0.001263 18; α(K)=0.001085 16; α(L)=0.0001401 20; α(M)=2.98×10^{-5} 5 α(O)=1.007×10^{-6} 14; α(P)=6.27×10^{-8} 9; α(N+..)=7.80×10^{-6}
		1197.11 3	100[b] 3	773.374	4+	(E2+E0+M1)	0.0022 5	α(K)=0.0018 4; α(L)=0.00025 5; α(M)=5.3×10^{-5} 10; α(N)=1.19×10^{-5} 23; α(O)=1.8×10^{-6} 4 α(P)=1.12×10^{-7} 25; α(N+..)=1.9×10^{-5} 3 Placed in decay scheme in ^{150}Eu ε decay (36.9 y).
		1636.53 3	64[b] 2	333.955	2+	E2	0.001060 15	α=0.001060 15; α(K)=0.000799 12; α(L)=0.0001058 15; α(M)=2.25×10^{-5} 4 α(O)=7.65×10^{-7} 11; α(P)=4.76×10^{-8} 7; α(N+..)=0.000132 Placed in decay scheme by 1977Si12, energy taken from 1978MeZK. Mult.: ^{150}Eu ε decay (36.9 y).

$^{150}_{62}Sm_{88}$-19

$\gamma(^{150}Sm)$ (continued)

E_i(level)	J^π_i	E_γ [†]	I_γ [d]	E_f	J^π_f	Mult. [‡]	α	Comments
2020.377	5^+	377.73 *3*	5.9[b] *4*	1642.611	4^+			
		515.79[h] *1*	51.8[b] *10*	1504.572	3^+	E2	0.01181	α(K)=0.00972 *14*; α(L)=0.001642 *23*; α(M)=0.000359 *5*; α(N)=8.05×10^{-5} *12* α(O)=1.155×10^{-5} *17*; α(P)=5.61×10^{-7} *8*; α(N+..)=9.26×10^{-5} *13* Mult.: based on ^{150}Eu ε decay (36.9 y) α(K)exp and α(L)exp data.
		571.26 *2*	21.6 *5*	1449.182	4^+			
		662.66[h] *15*	0.8[b] *2*	1357.710	5^-	(E1)[b]	0.00233 *4*	α(K)=0.00200 *3*; α(L)=0.000262 *4*; α(M)=5.57×10^{-5} *8*; α(N)=1.259×10^{-5} *18*; α(O)=1.88×10^{-6} *3* α(P)=1.148×10^{-7} *16*; α(N+..)=1.458×10^{-5} *21*
		741.47[h] *2*	44.7[b] *5*	1278.922	6^+	E2(+M1)[b]	0.0065 *17*	α(K)=0.0055 *15*; α(L)=0.00077 *16*; α(M)=0.00016 *4*; α(N)=3.7×10^{-5} *8*; α(O)=5.6×10^{-6} *13* α(P)=3.3×10^{-7} *10*; α(N+..)=4.3×10^{-5} *9*
		1246.97[h] *3*	100[b] *3*	773.374	4^+	E2	0.001593 *23*	α=0.001593 *23*; α(K)=0.001348 *19*; α(L)=0.000184 *3*; α(M)=3.93×10^{-5} *6* α(O)=1.324×10^{-6} *19*; α(P)=8.03×10^{-8} *12*; α(N+..)=2.21×10^{-5} *3*
2024.663	4^+	205.21[h] *2*	5.6 *7*	1819.510	4^+	M1[b]	0.225	α(K)=0.191 *3*; α(L)=0.0267 *4*; α(M)=0.00574 *8*; α(N)=0.001301 *19*; α(O)=0.000195 *3* α(P)=1.213×10^{-5} *17*; α(N+..)=0.001508 *22*
		340.38[h] *4*	29[b] *3*	1684.162	3^-			
		381.99[h] *3*	21.1[b] *14*	1642.611	4^+			
		520.09 *2*	86.6[b] *18*	1504.572	3^+	E2+M1	0.016 *4*	α(K)=0.013 *4*; α(L)=0.0019 *4*; α(M)=0.00042 *7*; α(N)=9.4×10^{-5} *16*; α(O)=1.4×10^{-5} *3* α(P)=7.9×10^{-7} *25*; α(N+..)=0.000109 *19*
		575.51[e] *8*	5.8[b] *14*	1449.182	4^+	(E2+E0)		
		607.32 *3*	31.4[b] *9*	1417.346	2^+	(E2)[b]	0.00777 *11*	α(K)=0.00646 *9*; α(L)=0.001030 *15*; α(M)=0.000224 *4*; α(N)=5.04×10^{-5} *7*; α(O)=7.30×10^{-6} *11* α(P)=3.77×10^{-7} *6*; α(N+..)=5.80×10^{-5} *9*
		667.05[e] *3*	48.7[b] *18*	1357.710	5^-			
		830.82[eh] *2*	100[b] *2*	1193.843	2^+	(E2)	0.00372 *6*	α(K)=0.00313 *5*; α(L)=0.000459 *7*; α(M)=9.88×10^{-5} *14*; α(N)=2.23×10^{-5} *4*; α(O)=3.28×10^{-6} *5* α(P)=1.85×10^{-7} *3*; α(N+..)=2.58×10^{-5} *4*
		953.20 *8*	8.5[b] *13*	1071.406	3^-			
		978.47 *5*	3.8[b] *9*	1046.148	2^+			
		1251.25 *3*	30.7[b] *18*	773.374	4^+	(M1)[b]	0.00234 *4*	α(K)=0.00199 *3*; α(L)=0.000263 *4*; α(M)=5.61×10^{-5} *8*; α(N)=1.272×10^{-5} *18*; α(O)=1.92×10^{-6} *3* α(P)=1.227×10^{-7} *18*; α(N+..)=2.80×10^{-5} *4*
		1690.67 *2*	29[b] *9*	333.955	2^+	(E2)	0.001027 *15*	α=0.001027 *15*; α(K)=0.000752 *11*; α(L)=9.92×10^{-5} *14*;

$^{150}_{62}Sm_{88}$-20

Adopted Levels, Gammas (continued)

$\gamma(^{150}Sm)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[d]	E_f	J^π_f	Mult.[‡]	α	Comments
								α(M)=2.11×10^{-5} *3*; α(N)=4.79×10^{-6} *7* α(O)=7.18×10^{-7} *10*; α(P)=4.48×10^{-8} *7*; α(N+..)=0.0001541
2035.42	5$^-$	756.51[eh] *3*	≤25[b]	1278.922	6$^+$	(E1)[b]	0.001776 *25*	α=0.001776 *25*; α(K)=0.001525 *22*; α(L)=0.000198 *3*; α(M)=4.22×10^{-5} *6* α(O)=1.422×10^{-6} *20*; α(P)=8.78×10^{-8} *13*; α(N+..)=1.104×10^{-5} *1* E_γ: weighted average of 756.51 *3* (^{150}Eu ε decay (36.9 y)), 756.2 *3* (^{149}Sm(n,γ) E=thermal).
		1261.98 *6*	100[b] *2*	773.374	4$^+$	E1	0.000730 *11*	α=0.000730 *11*; α(K)=0.000581 *9*; α(L)=7.41×10^{-5} *11*; α(M)=1.572×10^{-5} *22* α(O)=5.34×10^{-7} *8*; α(P)=3.38×10^{-8} *5*; α(N+..)=5.92×10^{-5} *9* E_γ: weighted average of 1261.98 *3* (^{150}Eu ε decay (36.9 y)), 1263.2 *6* (^{149}Sm(n,γ) E=thermal).
2044.0	(3$^+$,4$^+$)	1710[bh]	1.0×10^2[b] *3*	333.955	2$^+$			
2062.80?	(3)$^+$	268.51[#h] *3*	1.3 *2*	1794.30	2$^+$			
		558.13[#h] *9*	44 *8*	1504.572	3$^+$	(E2+M1)	0.013 *4*	α(K)=0.011 *3*; α(L)=0.0016 *3*; α(M)=0.00034 *6*; α(N)=7.8×10^{-5} *14*; α(O)=1.15×10^{-5} *23* α(P)=6.7×10^{-7} *21*; α(N+..)=9.0×10^{-5} *17* Mult.: E2+M1 suggested by 1966Sm03 on basis of α(K)exp.
		869.21[f#h] *20*	2.5×10^2[f] *4*	1193.843	2$^+$			Assigned to 2062 level by energy fit.
		1016.3[f#h] *5*	100[f] *13*	1046.148	2$^+$	E2	0.00240 *4*	α(K)=0.00204 *3*; α(L)=0.000287 *4*; α(M)=6.15×10^{-5} *9*; α(N)=1.390×10^{-5} *20*; α(O)=2.06×10^{-6} *3* α(P)=1.212×10^{-7} *17*; α(N+..)=1.608×10^{-5} *23*
2070.270	2$^{(-)}$	565.70[a] *3*	18.0[a] *14*	1504.572	3$^+$			
		652.84[a] *9*	4.6[a] *6*	1417.346	2$^+$			
		876.41[a] *4*	100[a] *5*	1193.843	2$^+$			
		904.46[a] *8*	12.5[a] *9*	1165.791	1$^-$			
		999.0[ah] *10*	0.8[a] *3*	1071.406	3$^-$			
		1024.13[a] *6*	10.0[a] *8*	1046.148	2$^+$			
		1736.40[a] *8*	95[a] *5*	333.955	2$^+$			
2095.33	(5)$^+$	125[b]	1.1[b] *6*	1970.465	4$^+$			
		272.82[eh] *3*	13[b] *4*	1822.472	(3)$^-$			E_γ: weighted average of 272.79 *9* (^{150}Eu ε decay (36.9 y)), 272.82 *3* (^{149}Sm(n,γ) E=thermal).
		335.7 *1*	21[b] *8*	1760.060	(3$^-$)			
		590.79[h] *7*	18[b] *3*	1504.572	3$^+$			E_γ: weighted average of 590.71 *11* (^{150}Eu ε decay (36.9 y)), 590.85 *10* (^{149}Sm(n,γ) E=thermal).
		816.41[h] *8*	28[b] *3*	1278.922	6$^+$	E2+M1	0.0051 *13*	α(K)=0.0044 *11*; α(L)=0.00061 *13*; α(M)=0.00013 *3*; α(N)=2.9×10^{-5} *7*; α(O)=4.4×10^{-6} *10*

$^{150}_{62}Sm_{88}$-21

Adopted Levels, Gammas (continued)

$\gamma(^{150}Sm)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[d]	E_f	J_f^π	Mult.[‡]	α	Comments
								α(P)=2.7×10^{-7} *8*; α(N+..)=3.4×10^{-5} *8* E_γ: weighted average of 816.44 *8* (^{150}Eu ε decay (36.9 y)), 816.19 *23* (^{149}Sm(n,γ) E=thermal).
2095.33	(5)$^+$	1321.91[h] *7*	100[b] *6*	773.374	4$^+$	(E2)	0.001433 *20*	α=0.001433 *20*; α(K)=0.001202 *17*; α(L)=0.0001626 *23*; α(M)=3.48×10^{-5} *5* α(O)=1.173×10^{-6} *17*; α(P)=7.16×10^{-8} *10*; α(N+..)=3.39×10^{-5} E_γ: weighted average of 1321.91 *3* (^{150}Eu ε decay (36.9 y)), 1323.6 *7* (^{149}Sm(n,γ) E=thermal).
2107.449	(6)$^+$	342.56[h] *4*	25[b] *2*	1764.89	7$^-$			
		464.11 *7*	68[b] *10*	1642.611	4$^+$			
		749.80[eh] *3*	100[b] *2*	1357.710	5$^-$	E1	0.00181 *3*	α(K)=0.001552 *22*; α(L)=0.000202 *3*; α(M)=4.29×10^{-5} *6*; α(N)=9.71×10^{-6} *14* α(O)=1.449×10^{-6} *21*; α(P)=8.94×10^{-8} *13*; α(N+..)=1.125×10^{-5} *16*
		828.56 *2*	87[b] *3*	1278.922	6$^+$			
		1334.06 *3*	61[b] *2*	773.374	4$^+$	E2[b]	0.001411 *20*	α=0.001411 *20*; α(K)=0.001181 *17*; α(L)=0.0001595 *23*; α(M)=3.41×10^{-5} *5* α(O)=1.151×10^{-6} *17*; α(P)=7.03×10^{-8} *10*; α(N+..)=3.64×10^{-5}
2117.030	4$^+$	474.49 *3*	5.6[b] *3*	1642.611	4$^+$	(E2+M1+E0)	0.020 *5*	α(K)=0.017 *5*; α(L)=0.0025 *4*; α(M)=0.00054 *8*; α(N)=0.000121 *18*; α(O)=1.8×10^{-5} *3* α(P)=1.0×10^{-6} *4*; α(N+..)=0.000140 *21* Mult.: from (n,γ).
		612.69[f] *3*	3.59[fb] *22*	1504.572	3$^+$			
		667.05 *3*	≤10.0[b]	1449.182	4$^+$			
		699.5[h] *3*	0.22[b] *15*	1417.346	2$^+$			
		759.57 *9*	3.0[b] *3*	1357.710	5$^-$			
		838.40 *8*	2.2[b] *4*	1278.922	6$^+$			
		923.27[eh] *2*	11.9[b] *4*	1193.843	2$^+$	(E2)[b]	0.00295 *5*	α(K)=0.00249 *4*; α(L)=0.000357 *5*; α(M)=7.68×10^{-5} *11*; α(N)=1.733×10^{-5} *25*; α(O)=2.56×10^{-6} *4* α(P)=1.480×10^{-7} *21*; α(N+..)=2.00×10^{-5} *3*
		1045.87[e] *6*	35[b] *3*	1071.406	3$^-$			
		1071.00[eh] *3*	5.6[b] *4*	1046.148	2$^+$	(E2)	0.00215 *3*	α(K)=0.00183 *3*; α(L)=0.000255 *4*; α(M)=5.47×10^{-5} *8*; α(N)=1.236×10^{-5} *18*; α(O)=1.83×10^{-6} *3* α(P)=1.088×10^{-7} *16*; α(N+..)=1.430×10^{-5} *20* Mult.: from α(K)exp in ^{150}Eu ε decay (36.9 y).
		1343.78 *22*	100[b] *3*	773.374	4$^+$	M1+E2[b]	0.0017 *3*	α(K)=0.0014 *3*; α(L)=0.00019 *4*; α(M)=4.1×10^{-5} *7*; α(N)=9.2×10^{-6} *16*; α(O)=1.38×10^{-6} *25* α(P)=8.7×10^{-8} *18*; α(N+..)=4.1×10^{-5} *3*

γ(^{150}Sm) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[d]	E_f	J_f^π	Mult.[‡]	α	Comments
2117.030	4+	1783.19 5	3.96[b] 11	333.955	2+	E2[b]	0.000983 14	α=0.000983 14; α(K)=0.000681 10; α(L)=8.95×10^{-5} 13; α(M)=1.91×10^{-5} 3; α(N)=4.32×10^{-6} 6 α(O)=6.47×10^{-7} 9; α(P)=4.06×10^{-8} 6; α(N+..)=0.000194 3
2119.36	(3−)	286.29[e] 2	20×10^1[b] 14	1833.01	(2)+			E_γ: given 2119-keV level origin only by 1973MeZX in ^{150}Eu ε decay (36.9 y).
		476.89[e] 13	≤63[b]	1642.611	4+			
		762.03 9	1.0×10^2[b] 3	1357.710	5−	(E2)[b]	0.00452 7	α(K)=0.00380 6; α(L)=0.000567 8; α(M)=0.0001226 18; α(N)=2.76×10^{-5} 4; α(O)=4.05×10^{-6} 6 α(P)=2.24×10^{-7} 4; α(N+..)=3.19×10^{-5} 5
		1346.40 7	100[b] 23	773.374	4+			
2152.56	4+	509.88[e#h] 7	31 6	1642.611	4+			E_γ: weighted average of 509.84 5 (^{150}Eu ε decay (36.9 y)), 510.01 9 (^{149}Sm(n,γ) E=thermal).
		647.81[#h] 13	16 5	1504.572	3+	(E2)	0.00663 10	α(K)=0.00553 8; α(L)=0.000865 13; α(M)=0.000188 3; α(N)=4.22×10^{-5} 6; α(O)=6.14×10^{-6} 9 α(P)=3.24×10^{-7} 5; α(N+..)=4.87×10^{-5} 7
		795.30[#h] 19	14.2 21	1357.710	5−			
		958.25[h] 20	41[b] 17	1193.843	2+			
		1081.46[h] 8	23[b] 8	1071.406	3−			
		1379.12[e#h] 6	100 12	773.374	4+	(E2)	0.001334 19	α=0.001334 19; α(K)=0.001107 16; α(L)=0.0001490 21; α(M)=3.18×10^{-5} 5 α(O)=1.076×10^{-6} 15; α(P)=6.59×10^{-8} 10; α(N+..)=4.68×10^{-5} I_γ: used to normalize branching in (n,γ) and ε decay(36.9 y). Mult.: from (n,γ) and ^{150}Eu ε decay (36.9 y).
		1818.52[h] 8	9.8[b] 17	333.955	2+			
2190.9	4+	997.1[#h] 3	100	1193.843	2+	E2	0.00250 4	α(K)=0.00212 3; α(L)=0.000299 5; α(M)=6.42×10^{-5} 9; α(N)=1.451×10^{-5} 21; α(O)=2.15×10^{-6} 3 α(P)=1.260×10^{-7} 18; α(N+..)=1.679×10^{-5} 24
2193.51	(4+)	240.03[#h] 3	0.8 3	1952.46	3−			
		509.86[e#] 5	38 8	1684.162	3−			
		836.58[#] 3	68 10	1357.710	5−		0.00366 6	I_γ: Iγ(836)/Iγ(1123)=0.68 9 in (n,γ) E=th as compared with 0.91 3 in ε decay.
		915.28 12	5[b] 2	1278.922	6+			
		1122.3[#] 4	100 10	1071.406	3−			
		1420[h]	2[b]	773.374	4+			
2227?	−	2227[#h] 5	0.12	0.0	0+			

From ENSDF

$^{150}_{62}Sm_{88}$-23

Adopted Levels, Gammas (continued)

γ(^{150}Sm) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[d]	E_f	J_f^π	Mult.[‡]	δ	α	Comments
2232.37	9⁻	395.1[@] *3*	100[@] *6*	1837.03	8⁺	E1(+M2)	+0.03 *5*	0.0076 *8*	α(K)exp=0.0078 *10* α(K)=0.0065 *7*; α(L)=0.00087 *10*; α(M)=0.000186 *22*; α(N)=4.2×10^{-5} *5*; α(O)=6.2×10^{-6} *8* α(P)=3.6×10^{-7} *5*; α(N+..)=4.8×10^{-5} *6* Mult.,δ: from ^{150}Nd(α,4nγ) E=45 MeV.
		467.5[@] *3*	17.6[@] *9*	1764.89	7⁻	E2		0.01537	α(K)exp=0.014 *4* α(K)=0.01256 *18*; α(L)=0.00221 *4*; α(M)=0.000484 *7*; α(N)=0.0001084 *16* α(O)=1.545×10^{-5} *22*; α(P)=7.18×10^{-7} *11*; α(N+..)=0.0001246 *18* Mult.: from ^{150}Nd(α,4nγ) E=45 MeV.
2259.94	(1⁻)	842.55[a] *12*	39[a] *5*	1417.346	2⁺				
		1004.44[a] *12*	78[a] *5*	1255.512	0⁺				
		1066.00[a] *16*	43[a] *5*	1193.843	2⁺				
		1093.5[a] *8*	7.2[a] *13*	1165.791	1⁻				
		1213.72[a] *8*	100[a] *7*	1046.148	2⁺				
		1519.53[a] *12*	26[a] *5*	740.464	0⁺				
		1926.04[a] *8*	33[a] *7*	333.955	2⁺				
		2259.8[a] *8*	7[a] *2*	0.0	0⁺				
2280.800	(3⁻)	596.53[gb] *4*	7[gb] *4*	1684.162	3⁻				
		637.83[ebh] *3*	4.7[b] *22*	1642.611	4⁺				
		923.27[fb] *2*	100[fb] *3*	1357.710	5⁻	(E2)[b]		0.00295 *5*	α(K)=0.00249 *4*; α(L)=0.000357 *5*; α(M)=7.68×10^{-5} *11*; α(N)=1.733×10^{-5} *25*; α(O)=2.56×10^{-6} *4* α(P)=1.480×10^{-7} *21*; α(N+..)=2.00×10^{-5} *3*
		1115.4[b] *3*	5.0[b] *19*	1165.791	1⁻				
		1209.5[b] *2*	1.1[b] *5*	1071.406	3⁻				
2367.43	(3⁺)	1201.8[ah] *5*	7.7[a] *14*	1165.791	1⁻				
		2033.46[a] *8*	100[a] *7*	333.955	2⁺				
2433.19	10⁺	200.6[&] *3*	7.7[&]	2232.37	9⁻	M1+E2	+0.05 *20*	0.239	α(K)=0.203 *5*; α(L)=0.0285 *11*; α(M)=0.00612 *25*; α(N)=0.00139 *6*; α(O)=0.000208 *6* α(P)=1.29×10^{-5} *4*; α(N+..)=0.00161 *6* Mult.,δ: from internal conversion and γ(θ).
		596.3[&] *3*	100[&] *4*	1837.03	8⁺	E2		0.00814 *12*	α(K)=0.00676 *10*; α(L)=0.001084 *16*; α(M)=0.000236 *4*; α(N)=5.30×10^{-5} *8*; α(O)=7.67×10^{-6} *11* α(P)=3.94×10^{-7} *6*; α(N+..)=6.11×10^{-5} *9* Mult.: from internal conversion and γ(θ).
2507.27	(1⁻,2⁺)	848.1[ah] *5*	≈5[a]	1658.39	2$^{(-)}$				
		1340.9[a] *5*	21[a] *5*	1165.791	1⁻				
		1436.6[a] *4*	100[a] *18*	1071.406	3⁻				

Adopted Levels, Gammas (continued)

γ(^{150}Sm) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[d]	E_f	J^π_f	Mult.[‡]	δ	α	Comments
2507.27	(1$^-$,2$^+$)	1766.7[ea] *3*	≤72[a]	740.464	0$^+$				
		2173.7[a] *8*	21[a] *8*	333.955	2$^+$				
		2507.3[a] *6*	21[a] *8*	0.0	0$^+$				
2529.4	1,2$^+$	1789.8[a] *8*	4[a] *2*	740.464	0$^+$				
		2195.6[a] *6*	27[a] *6*	333.955	2$^+$				
		2529.2[a] *3*	100[a] *12*	0.0	0$^+$				
2550.57	1$^{(-)}$	1810.5[a] *6*	17[a] *6*	740.464	0$^+$				
		2216.5[a] *3*	100[a] *17*	333.955	2$^+$				
		2550.5[a] *5*	51[a] *11*	0.0	0$^+$				
2589.12	(8$^-$)	752.1[&] *3*	100[&]	1837.03	8$^+$	M2		0.0213	α(K)=0.0179 *3*; α(L)=0.00263 *4*; α(M)=0.000569 *8*; α(N)=0.0001291 *19*; α(O)=1.93×10^{-5} *3* α(P)=1.193×10^{-6} *17*; α(N+..)=0.0001497 *21*
		824.3[&] *3*	21[&]	1764.89	7$^-$				
2602.5	(1$^+$,2,3)	532.3[eah] *8*	19[a] *10*	2070.270	2$^{(-)}$				
		889.2[a] *5*	100[a] *19*	1713.51	1				
		1097.1[a] *10*	24[a] *10*	1504.572	3$^+$				
2679.6	3	1485.6[a] *8*	64[a] *18*	1193.843	2$^+$				
		1906.3[a] *6*	100[a] *18*	773.374	4$^+$				
		2679.5[eah] *6*	≤64[a]	0.0	0$^+$				
2744.35	11$^-$	311.23[&] *17*	77[&]	2433.19	10$^+$	E1(+M2)	≥−0.1	0.16 *15*	α(K)=0.13 *12*; α(L)=0.022 *21*; α(M)=0.005 *5*; α(N)=0.0011 *11*; α(O)=0.00017 *16* α(P)=1.0×10^{-5} *9*; α(N+..)=0.0013 *12* E_γ: weighted average of 311.2 *2* (^{148}Nd(α,2nγ) E=26 MeV), 311.3 *3* (^{150}Nd(α,4nγ) E=45 MeV). Mult.: from α(K)exp in (α,2nγ).
		512.0[&] *3*	100[&]	2232.37	9$^-$	E2		0.01204	α(K)exp=0.0075 *20* α(K)=0.00990 *14*; α(L)=0.001678 *24*; α(M)=0.000367 *6*; α(N)=8.23×10^{-5} *12* α(O)=1.180×10^{-5} *17*; α(P)=5.71×10^{-7} *8*; α(N+..)=9.47×10^{-5} *14* E_γ: weighted average of 511.9 *5* (^{148}Nd(α,2nγ) E=26 MeV), 512.1 *3* (^{150}Nd(α,4nγ) E=45 MeV). I_γ: due to the overlap of the 512.1-keV peak with the annihilation peak, the authors obtained this relative intensity from coincidence data.
2812.88	(1$^-$,2)	1128.6[ea] *8*	≤10[a]	1684.162	3$^-$				
		1154.64[a] *16*	100[a] *7*	1658.39	2$^{(-)}$				
		1647.20[a] *25*	37[a] *6*	1165.791	1$^-$				
		1766.7[ea] *3*	28[a] *5*	1046.148	2$^+$				
		2478.6[a] *2*	55[a] *6*	333.955	2$^+$				
2893.1	(1$^-$,2)	633.5[a] *6*	32[a] *6*	2259.94	(1$^-$)				

$\gamma(^{150}Sm)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[d]	E_f	J^π_f	Mult.[‡]	α	Comments
2893.1	(1⁻,2)	1179.6[a] *6*	48[a] *10*	1713.51	1			
		1726.9[a] *6*	90[a] *16*	1165.791	1⁻			
		1821.9[a] *8*	16[a] *10*	1071.406	3⁻			
		2893.1[a] *5*	100[a] *16*	0.0	0⁺			
2929.24	(10)⁻	340.2[&] *3*	77[&]	2589.12	(8⁻)			
		495.8[&] *3*	100[&] *20*	2433.19	10⁺	E1	0.00440 *7*	α(K)=0.00376 *6*; α(L)=0.000499 *7*; α(M)=0.0001063 *15*; α(N)=2.40×10^{-5} *4*; α(O)=3.56×10^{-6} *5* α(P)=2.14×10^{-7} *3*; α(N+..)=2.78×10^{-5} *4* Mult.: from (α,4nγ).
		696.9[&] *3*	48[&]	2232.37	9⁻			
2995.9	$11^{(-)}$	251.6[&] *3*	18[&]	2744.35	11⁻			
		562.8[&] *3*	100[&]	2433.19	10⁺			
		763.5[&] *3*	18[&]	2232.37	9⁻			
3012.30		1507.1[h] *6*	≈100	1504.572	3⁺			
		1848.0[h] *10*	≈5	1165.791	1⁻			
		1940.6 *3*	100 *20*	1071.406	3⁻			
		2679.5[e] *6*	≤70	333.955	2⁺			
3023.7	2⁺	761.3 *8*	100 *19*	2262.4?	$4^{(+)}$			
		1364.1[h] *8*	19 *6*	1658.39	$2^{(-)}$			
		2691.0[h] *8*	6 *5*	333.955	2⁺			
		3022.7 *20*	25 *6*	0.0	0⁺			
3038.2	1,2⁺	225.0[h] *8*	≈17	2812.88	(1⁻,2)			
		358.8 *8*	$8.\times10^1$ *3*	2679.6	3			
		2704.6 *7*	1.0×10^2 *5*	333.955	2⁺			
		3037.8 *10*	33 *17*	0.0	0⁺			
3048.4	12⁺	303.9[&] *3*	10[&] *3*	2744.35	11⁻	D		
		615.1[&] *3*	100[&] *6*	2433.19	10⁺	E2	0.00753 *11*	α(K)=0.00627 *9*; α(L)=0.000995 *14*; α(M)=0.000216 *3*; α(N)=4.86×10^{-5} *7*; α(O)=7.05×10^{-6} *10* α(P)=3.66×10^{-7} *6*; α(N+..)=5.60×10^{-5} *8* Mult.: from (α,4nγ).
3050.0	$1^{(-)}$	237.4 *6*	100 *17*	2812.88	(1⁻,2)			
		499.4 *10*	≈33	2550.57	$1^{(-)}$			
		542.9 *8*	1.0×10^2 *3*	2507.27	(1⁻,2⁺)			
		2003.4 *10*	$7.\times10^1$ *3*	1046.148	2⁺			
		2716.1 *8*	17 *8*	333.955	2⁺			
		3049.7 *10*	33 *17*	0.0	0⁺			
3080.9	$1^{(+)}$	572.8[h] *8*	≈18	2507.27	(1⁻,2⁺)			
		1915.9[h] *6*	100 *18*	1165.791	1⁻			

Adopted Levels, Gammas (continued)

$\gamma(^{150}Sm)$ (continued)

E_i(level)	J^{π}_i	E_{γ}[†]	I_{γ}[d]	E_f	J^{π}_f	Mult.[‡]	α	Comments
3080.9	$1^{(+)}$	3079.8 *10*	18 *9*	0.0	0^+			
3089.4	$1,2^+$	276.5 *5*	1.0×10^2 *4*	2812.88	$(1^-,2)$			
		1128.6[eh] *8*	71 *14*	1963.72	$1^{(-)}$			
		1670.7 *5*	93 *14*	1417.346	2^+			
		1833.3 *10*	29 *21*	1255.512	0^+			
		3090.5 *10*	7	0.0	0^+			
3137.6	(1,2)	1350.7 *5*	100 *15*	1786.30	(≤3)			
		2804.2 *5*	54 *23*	333.955	2^+			
		3137.3 *10*	≈2	0.0	0^+			
3212.5	$1^{(-)}$	532.3[e] *8*	≤36	2679.6	3			
		1499.6 *6*	100 *18*	1713.51	1			
		2017.8 *8*	55 *18*	1193.843	2^+			
		2878.7 *8*	36 *18*	333.955	2^+			
3293.3	13^-	244.7[&] *3*	23[&]	3048.4	12^+	D		I_{γ}: intensity obtained from coincidence data.
		549.4[&] *3*	100[&]	2744.35	11^-	E2	0.01002	α(K)=0.00828 *12*; α(L)=0.001366 *20*; α(M)=0.000298 *5*; α(N)=6.69×10^{-5} *10* α(O)=9.64×10^{-6} *14*; α(P)=4.80×10^{-7} *7*; α(N+..)=7.70×10^{-5} *11* E_{γ}: weighted average of 549.0 *5* (^{148}Nd(α,2nγ) E=26 MeV), 549.5 *3* (^{150}Nd(α,4nγ) E=45 MeV). Mult.: from (α,4nγ).
3384.2?	(12^-)	335.9 *3*	12	3048.4	12^+			
		454.8[&h] *3*	100[&]	2929.24	$(10)^-$			
3522.7?	(12)	778.4 *3*	100	2744.35	11^-			
3675.9	14^+	382.4[&]	16[&]	3293.3	13^-	E1	0.00808 *12*	α(K)=0.00690 *10*; α(L)=0.000926 *13*; α(M)=0.000197 *3*; α(N)=4.45×10^{-5} *7*; α(O)=6.57×10^{-6} *10* α(P)=3.86×10^{-7} *6*; α(N+..)=5.15×10^{-5} *8* Mult.: from (α,4nγ).
		627.5[&] *3*	100[&]	3048.4	12^+	E2	0.00717 *10*	α(K)=0.00597 *9*; α(L)=0.000942 *14*; α(M)=0.000205 *3*; α(N)=4.60×10^{-5} *7*; α(O)=6.68×10^{-6} *10* α(P)=3.49×10^{-7} *5*; α(N+..)=5.30×10^{-5} *8* Mult.: from (α,4nγ).
3835.0	14^+	541.8[&] *3*	100[&]	3293.3	13^-	E1	0.00360 *5*	α(K)=0.00309 *5*; α(L)=0.000407 *6*; α(M)=8.68×10^{-5} *13*; α(N)=1.96×10^{-5} *3*; α(O)=2.91×10^{-6} *4* α(P)=1.758×10^{-7} *25*; α(N+..)=2.27×10^{-5} *4*
		786.4[&] *3*	20[&]	3048.4	12^+			
3914.1	15^-	238.3[&] *3*	11[&]	3675.9	14^+	E1	0.0266	α(K)=0.0227 *4*; α(L)=0.00311 *5*; α(M)=0.000664 *10*; α(N)=0.0001493 *22*; α(O)=2.18×10^{-5} *4* α(P)=1.221×10^{-6} *18*; α(N+..)=0.0001724 *25* Mult.: from (α,4nγ).
		620.8[&] *3*	100[&]	3293.3	13^-	E2	0.00736 *11*	α(K)=0.00613 *9*; α(L)=0.000970 *14*; α(M)=0.000211 *3*; α(N)=4.74×10^{-5}

From ENSDF

$^{150}_{62}Sm_{88}$-27

$\gamma(^{150}Sm)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[d]	E_f	J^π_f	Mult.[‡]	α	Comments
								7; α(O)=6.88×10^{-6} 10 α(P)=3.58×10^{-7} 5; α(N+..)=5.46×10^{-5} 8 Mult.: from (α,4nγ).
3941.2	(14$^-$)	557.0[&] 3	100[&]	3384.2?	(12$^-$)			
4025.2	(14)	190.1 3	28	3835.0	14$^+$			
		502.5	100	3522.7?	(12)			
		732.1[h]	17	3293.3	13$^-$			
4305.8	16$^+$	470.5		3835.0	14$^+$			
		630.0[&] 3	100[&] 6	3675.9	14$^+$	E2	0.00710 10	α(K)=0.00591 9; α(L)=0.000932 14; α(M)=0.000202 3; α(N)=4.55×10^{-5} 7; α(O)=6.61×10^{-6} 10 α(P)=3.46×10^{-7} 5; α(N+..)=5.25×10^{-5} 8 Mult.: from (α,4nγ).
4386.3	16$^+$	472.2[&] 3	88[&]	3914.1	15$^-$	E1	0.00491 7	α(K)=0.00421 6; α(L)=0.000559 8; α(M)=0.0001190 17; α(N)=2.69×10^{-5} 4; α(O)=3.98×10^{-6} 6 α(P)=2.38×10^{-7} 4; α(N+..)=3.11×10^{-5} 5
		551.2[&] 3	59[&]	3835.0	14$^+$			
		710.4[&] 3	100[&]	3675.9	14$^+$	E2	0.00532 8	α(K)=0.00446 7; α(L)=0.000678 10; α(M)=0.0001468 21; α(N)=3.31×10^{-5} 5; α(O)=4.83×10^{-6} 7 α(P)=2.62×10^{-7} 4; α(N+..)=3.82×10^{-5} 6
4576.2	(16$^-$)	635.0 3	100	3941.2	(14$^-$)			
4605.7	17$^-$	219.7		4386.3	16$^+$			
		691.6[&] 3	100[&]	3914.1	15$^-$	E2	0.00567 8	α(K)=0.00474 7; α(L)=0.000727 11; α(M)=0.0001575 23; α(N)=3.55×10^{-5} 5; α(O)=5.17×10^{-6} 8 α(P)=2.79×10^{-7} 4; α(N+..)=4.09×10^{-5} 6 Mult.: from (α,4nγ).
4612.0	(16)	586.8[&] 3	100[&]	4025.2	(14)			
4929.1	18$^+$	323.4[&] 3	20[&]	4605.7	17$^-$	E1	0.01218	α(K)=0.01040 15; α(L)=0.001407 20; α(M)=0.000300 5; α(N)=6.76×10^{-5} 10 α(O)=9.94×10^{-6} 15; α(P)=5.75×10^{-7} 9; α(N+..)=7.81×10^{-5} 11
		542.7[&h] 3	9[&]	4386.3	16$^+$			
		623.3[&] 3	100[&]	4305.8	16$^+$	E2	0.00729 11	α(K)=0.00607 9; α(L)=0.000960 14; α(M)=0.000208 3; α(N)=4.69×10^{-5} 7; α(O)=6.80×10^{-6} 10 α(P)=3.55×10^{-7} 5; α(N+..)=5.40×10^{-5} 8
5046.0	(18$^+$)	439.8		4605.7	17$^-$			
		659.5	100	4386.3	16$^+$			
		739.8		4305.8	16$^+$			
5251.0?		639.0[&] 3	100[&]	4612.0	(16)			
5276.7	(18$^-$)	700.5[&] 3	100[&]	4576.2	(16$^-$)			
5346.1	19$^-$	299.0		5046.0	(18$^+$)			
		740.6[&] 3	100[&]	4605.7	17$^-$	E2	0.00483 7	α(K)=0.00405 6; α(L)=0.000610 9; α(M)=0.0001318 19; α(N)=2.97×10^{-5} 5;

$^{150}_{62}Sm_{88}$-28

Adopted Levels, Gammas (continued)

$\gamma(^{150}Sm)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[d]	E_f	J^π_f	Mult.[‡]	α	Comments
								α(O)=4.35×10^{-6} 7 α(P)=2.39×10^{-7} 4; α(N+..)=3.43×10^{-5} 5 Mult.: from (α,4nγ).
5580.9	(19$^-$)	651.8	100	4929.1	18$^+$			
		975.0		4605.7	17$^-$			
5592.7	20$^+$	663.6[&]	100[&]	4929.1	18$^+$	E2	0.00626 9	α(K)=0.00523 8; α(L)=0.000811 12; α(M)=0.0001757 25; α(N)=3.96×10^{-5} 6; α(O)=5.76×10^{-6} 8 α(P)=3.07×10^{-7} 5; α(N+..)=4.56×10^{-5} 7
5739.3	(20$^+$)	393.3		5346.1	19$^-$			
		693.2	100	5046.0	(18$^+$)			
5937.0	(21$^-$)	197.8		5739.3	(20$^+$)			
		355.9		5580.9	(19$^-$)			
		591.0		5346.1	19$^-$			
6021.7?	(20$^-$)	745.0[&] 3	100[&]	5276.7	(18$^-$)			
6064.9		484.0[&] 3	100[&]	5580.9	(19$^-$)			
6106.4?	(21$^-$)	367.0		5739.3	(20$^+$)			
		760.3[&]	100[&]	5346.1	19$^-$	E2	0.00454 7	α(K)=0.00382 6; α(L)=0.000571 8; α(M)=0.0001233 18; α(N)=2.78×10^{-5} 4; α(O)=4.07×10^{-6} 6 α(P)=2.25×10^{-7} 4; α(N+..)=3.21×10^{-5} 5
6308.3	(22$^+$)	715.6	100	5592.7	20$^+$			
6420.4	(23$^-$)	483.4	100	5937.0	(21$^-$)			
6421.0		356.1[&]	100[&]	6064.9				
6448.9	(22$^+$)	342.6		6106.4?	(21$^-$)			
		709.5		5739.3	(20$^+$)			
7057.9	(25$^-$)	637.5	100	6420.4	(23$^-$)			
7068.3	(24$^+$)	760.0	100	6308.3	(22$^+$)			
7837.5	(26$^+$)	769.2	100	7068.3	(24$^+$)			
7854.1	(27$^-$)	796.2		7057.9	(25$^-$)			
8586.9	(28$^+$)	749.4	100	7837.5	(26$^+$)			
8760.9	(29$^-$)	906.8	100	7854.1	(27$^-$)			
9736.9	(31$^-$)	976.0	100	8760.9	(29$^-$)			

† Eγ≤1833 keV are from ^{150}Eu ε decay (36.9 y), unless otherwise noted. γ rays with Eγ≥3980 keV are taken from (n,γ). From 2259-keV level and up, Eγ and Iγ are from ^{150}Pm β^- decay (2.68 h), unless otherwise specified.
‡ From ^{149}Sm(n,γ) E=th, unless otherwise noted.
# From ^{149}Sm(n,γ) E=thermal.
@ From (α,2nγ).
& From ^{150}Nd(α,4nγ).

From ENSDF

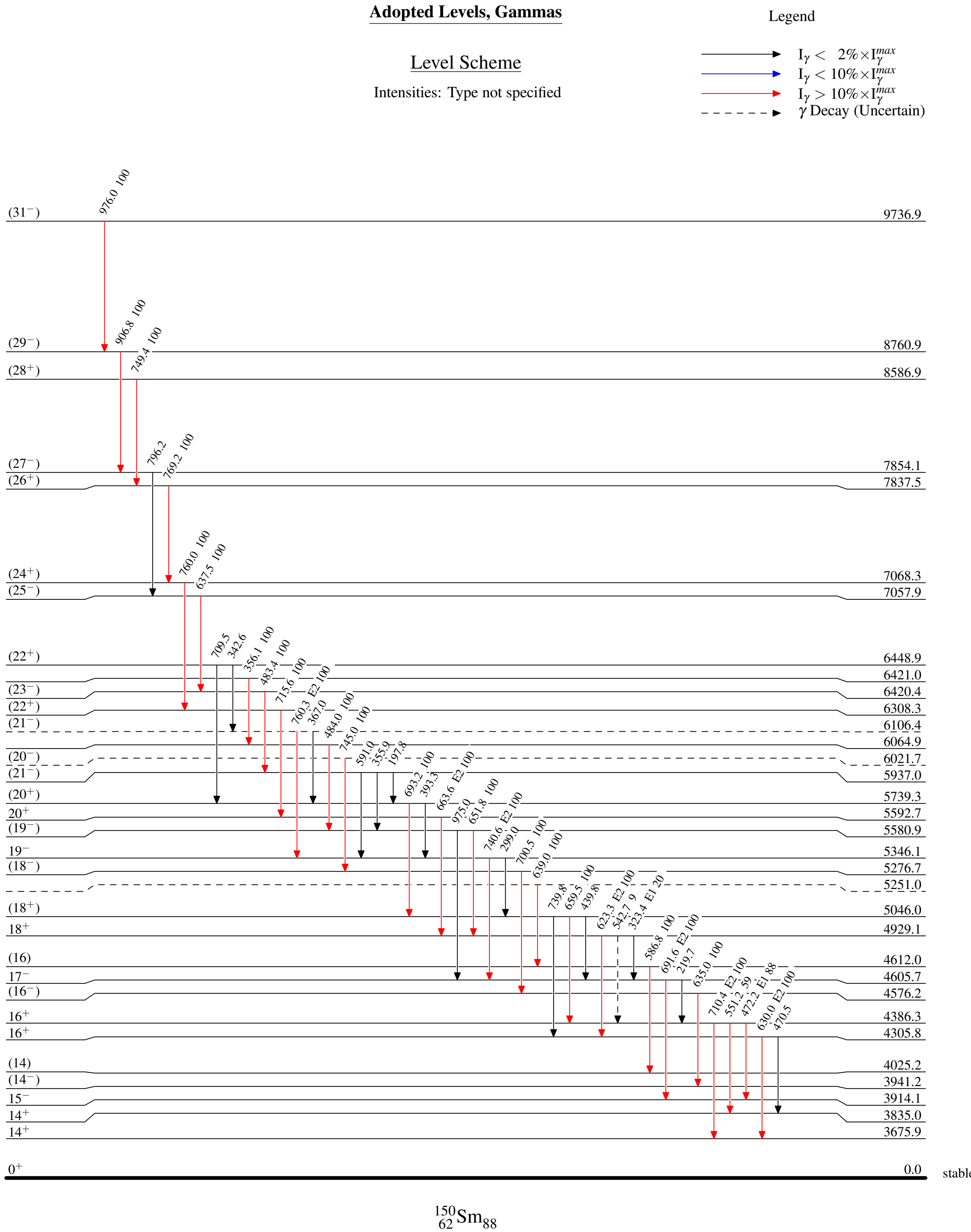
$^{150}_{62}Sm_{88}$-29

Adopted Levels, Gammas (continued)

$\gamma(^{150}Sm)$ (continued)

[a] From ^{150}Pm β^- decay (2.68 h).
[b] From ^{150}Eu ε decay (36.9 y).
[c] Multipolarity equals (E2+E0) for the doubly placed 223.51γ. Use of this multipolarity for J^π(1672 level) could be misleading.
[d] Relative branching from each level. Data are from ^{149}Sm(n,γ) E=th, unless otherwise noted.
[e] Multiply placed.
[f] Multiply placed with undivided intensity.
[g] Multiply placed with intensity suitably divided.
[h] Placement of transition in the level scheme is uncertain.

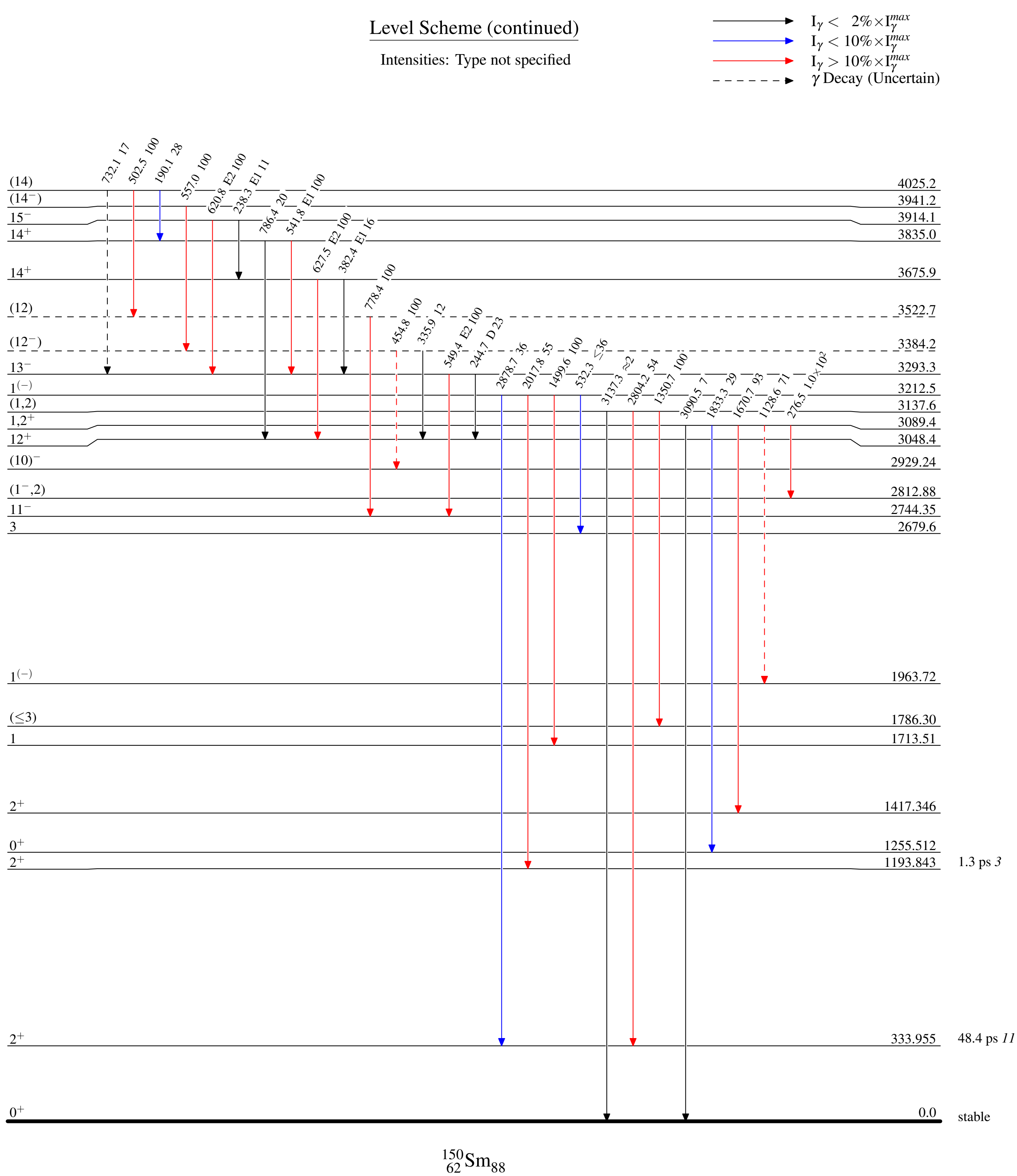
Adopted Levels, Gammas



Adopted Levels, Gammas

Level Scheme (continued)

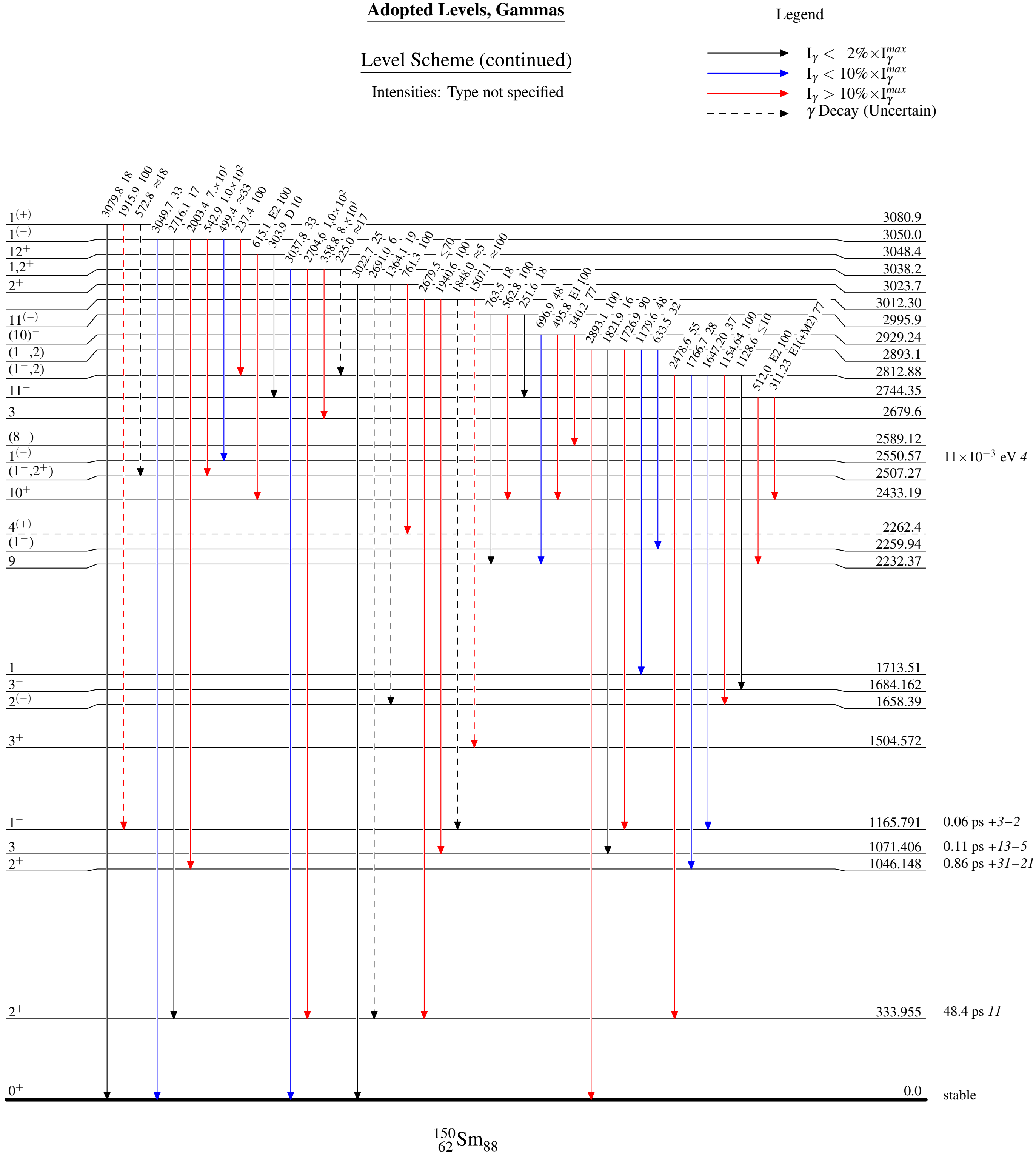
Intensities: Type not specified



Adopted Levels, Gammas

Level Scheme (continued)

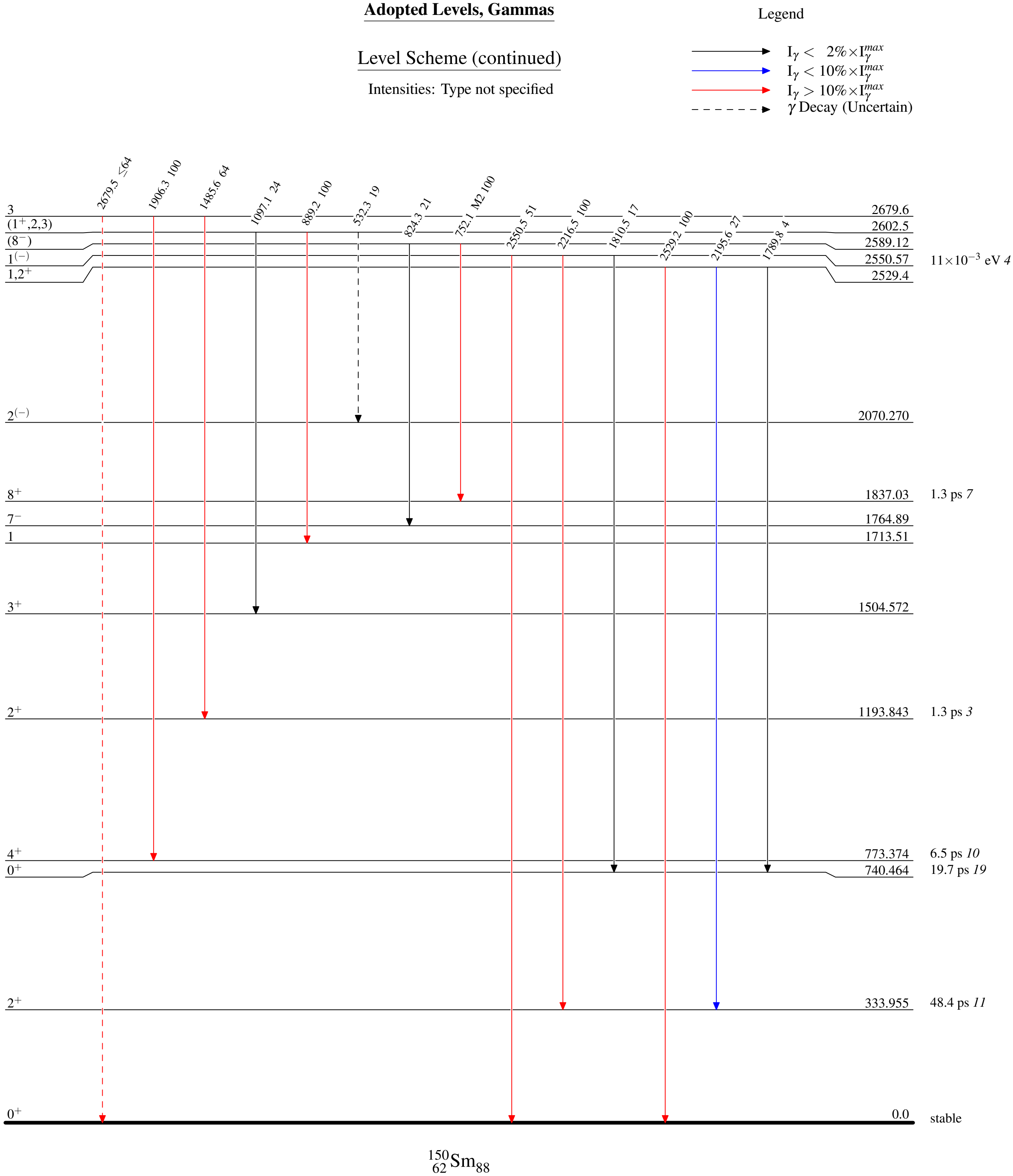
Intensities: Type not specified



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified



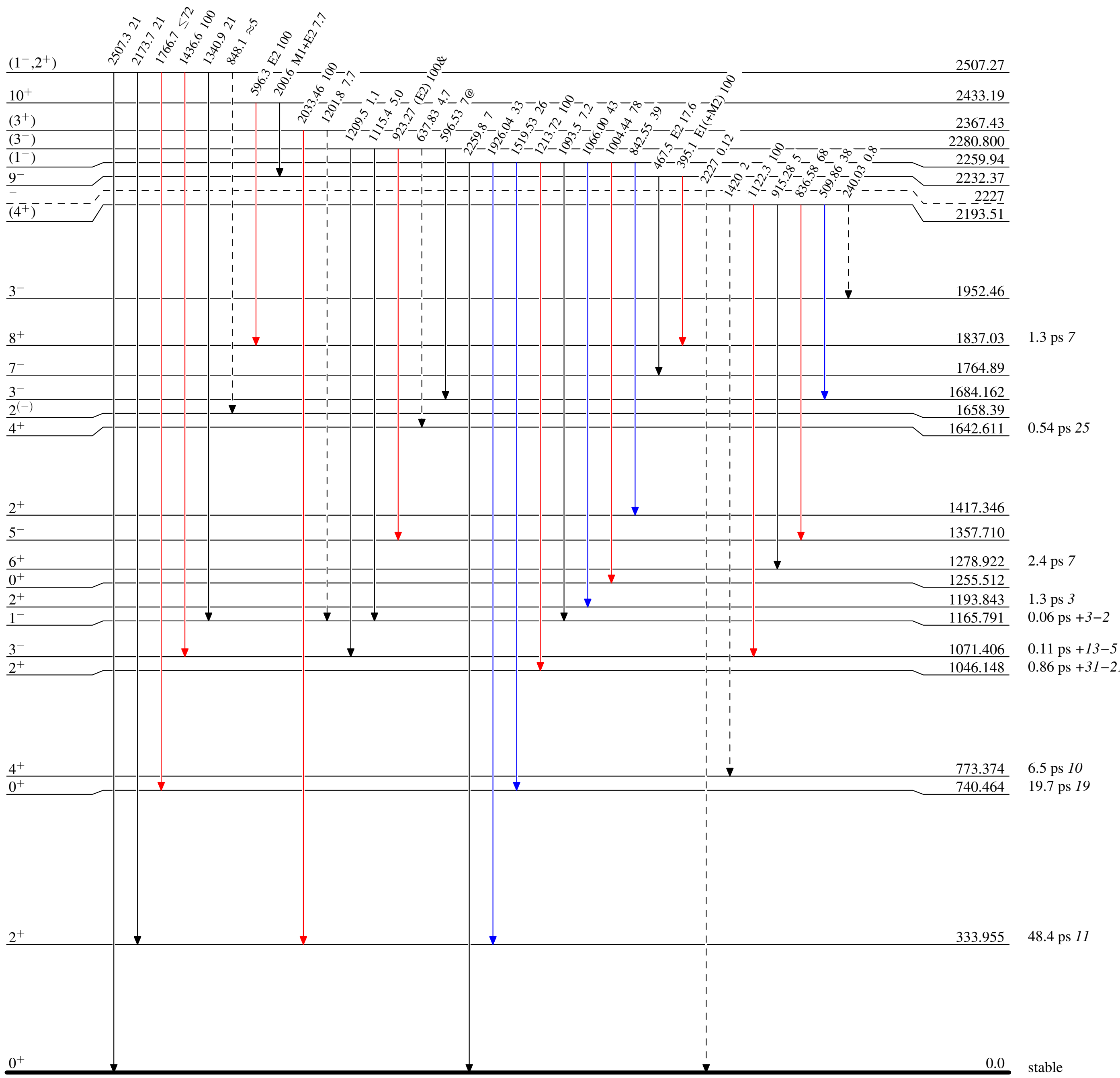
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$
γ Decay (Uncertain)

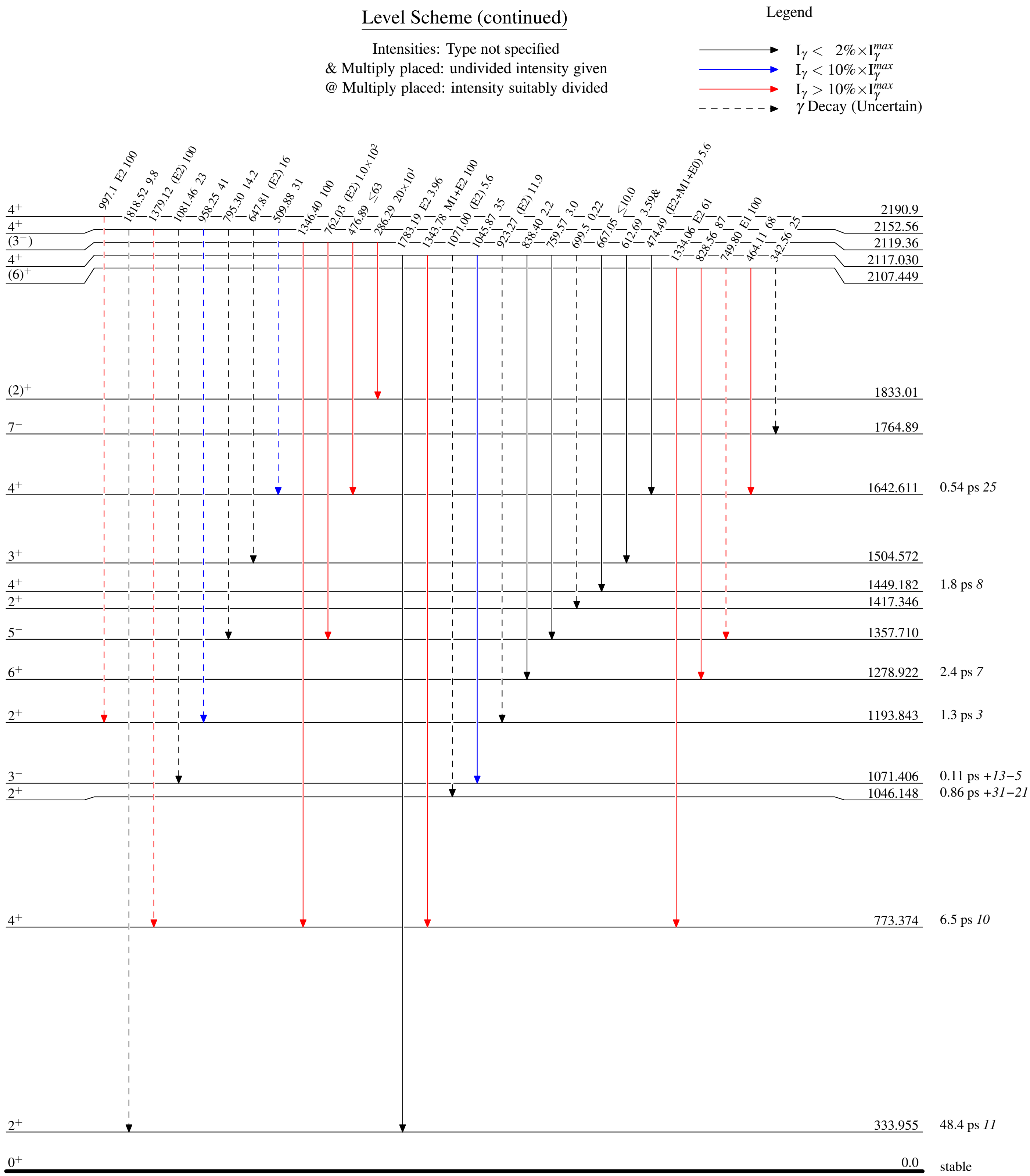


$^{150}_{62}Sm_{88}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided



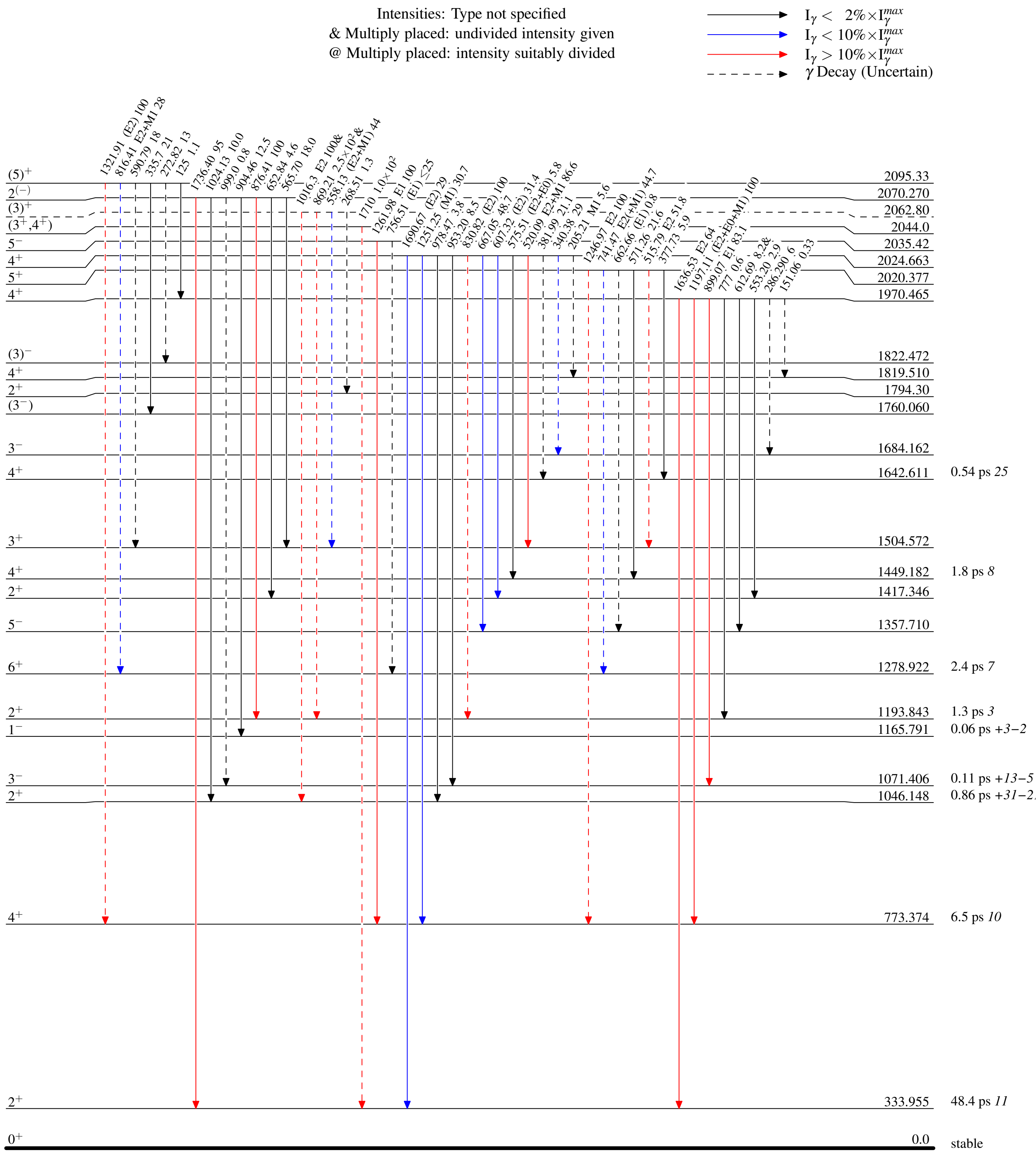
$^{150}_{62}Sm_{88}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

Legend



$^{150}_{62}Sm_{88}$

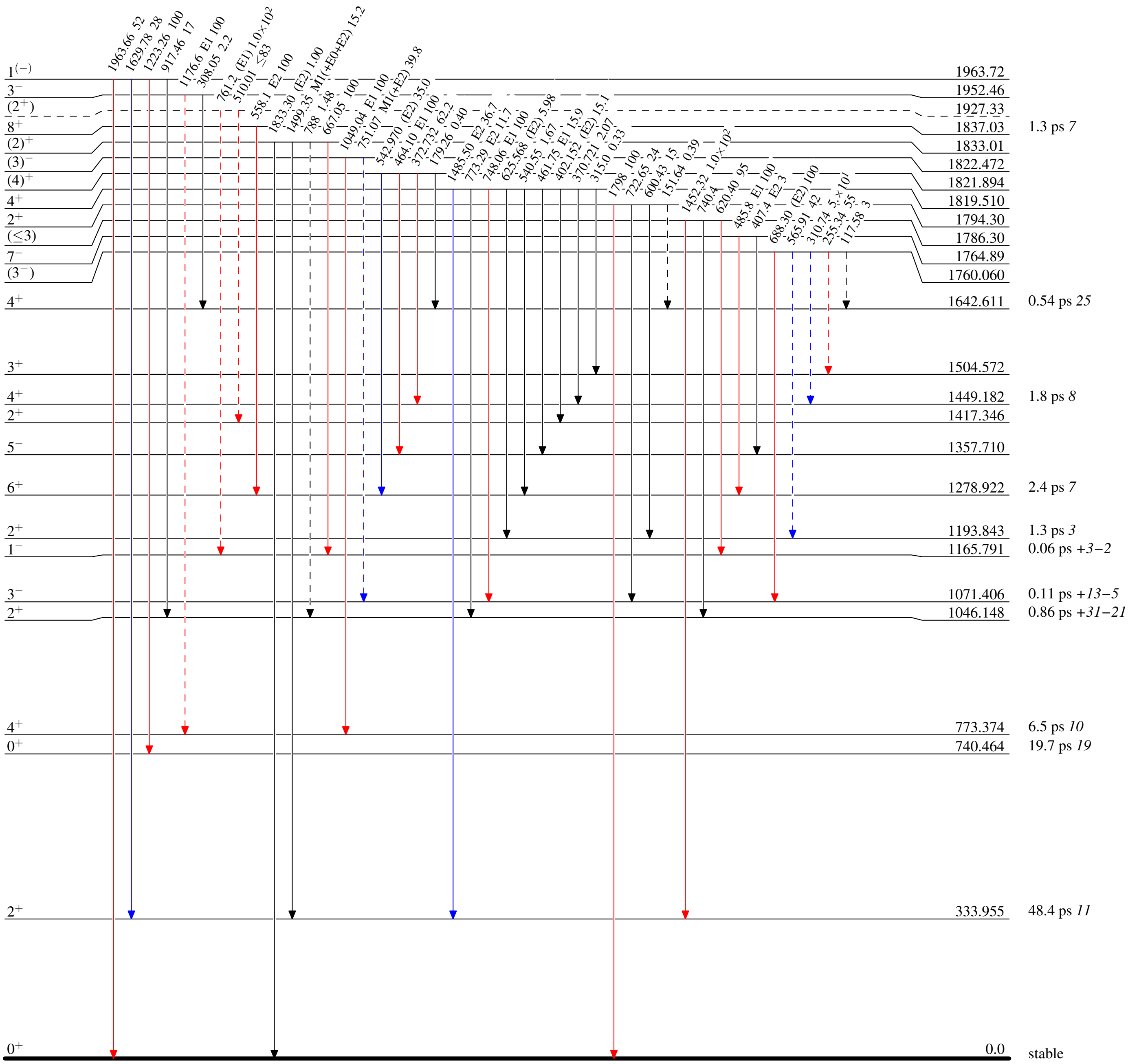
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

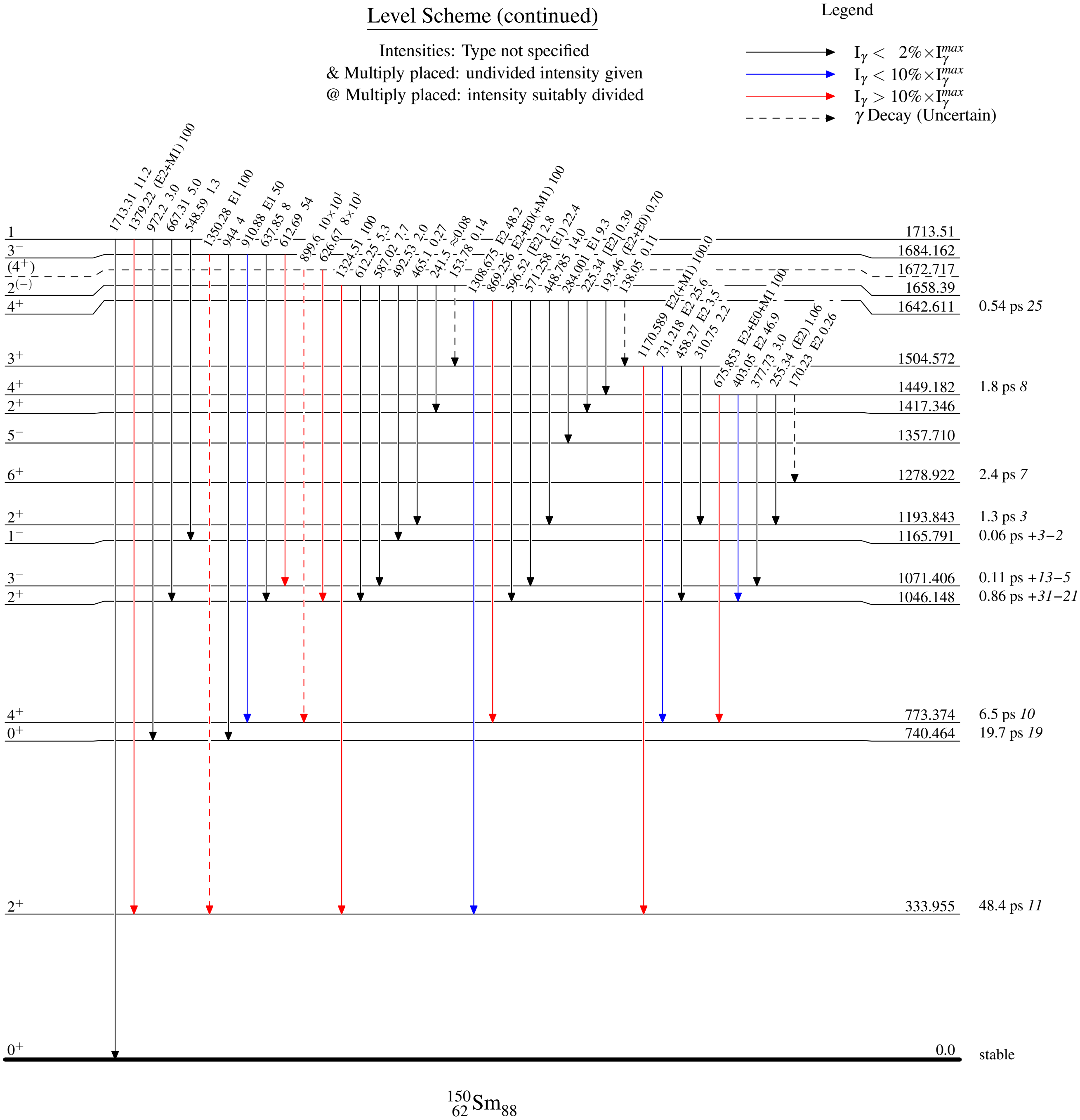
Legend

$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$
γ Decay (Uncertain)

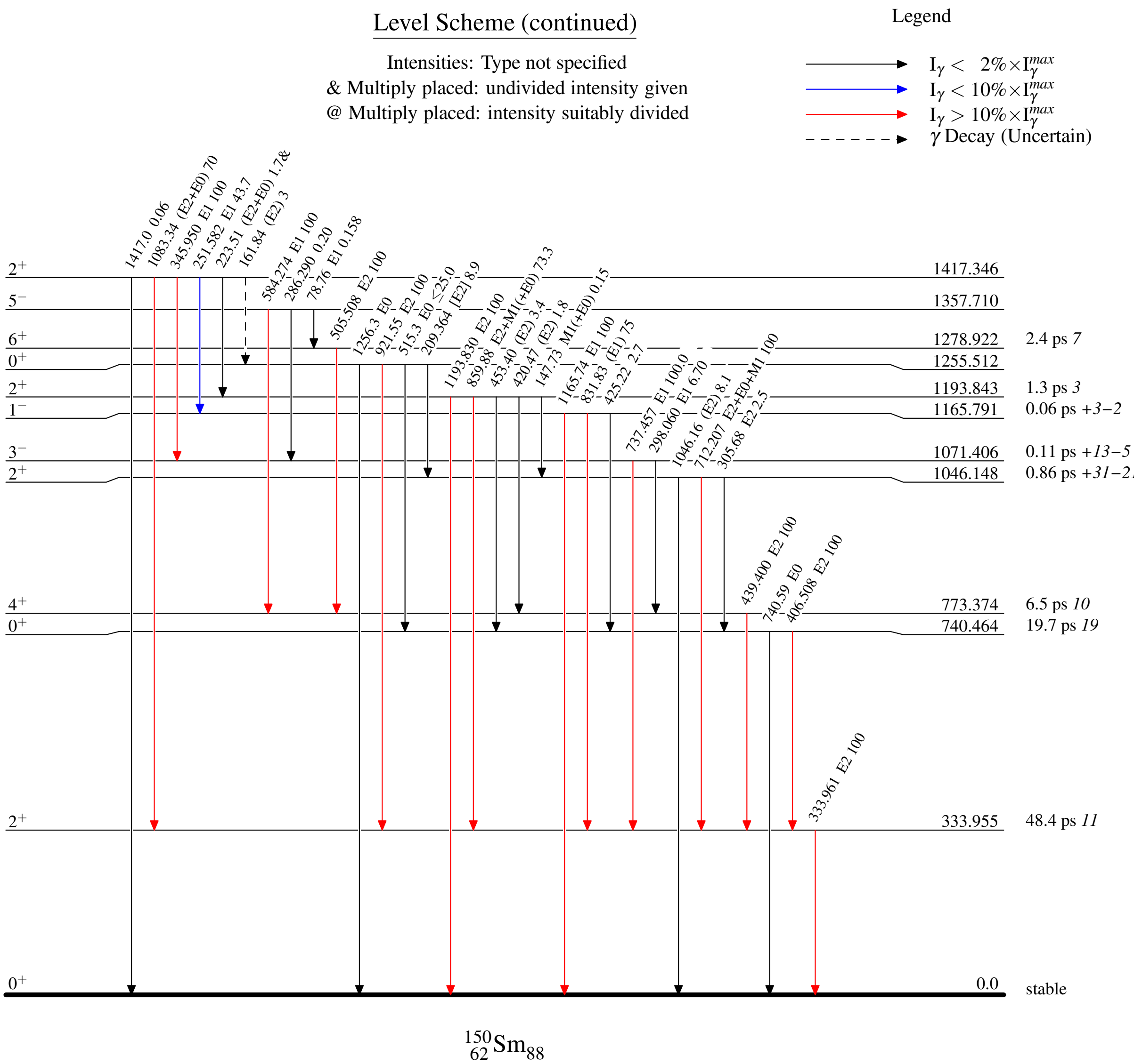


$^{150}_{62}Sm_{88}$

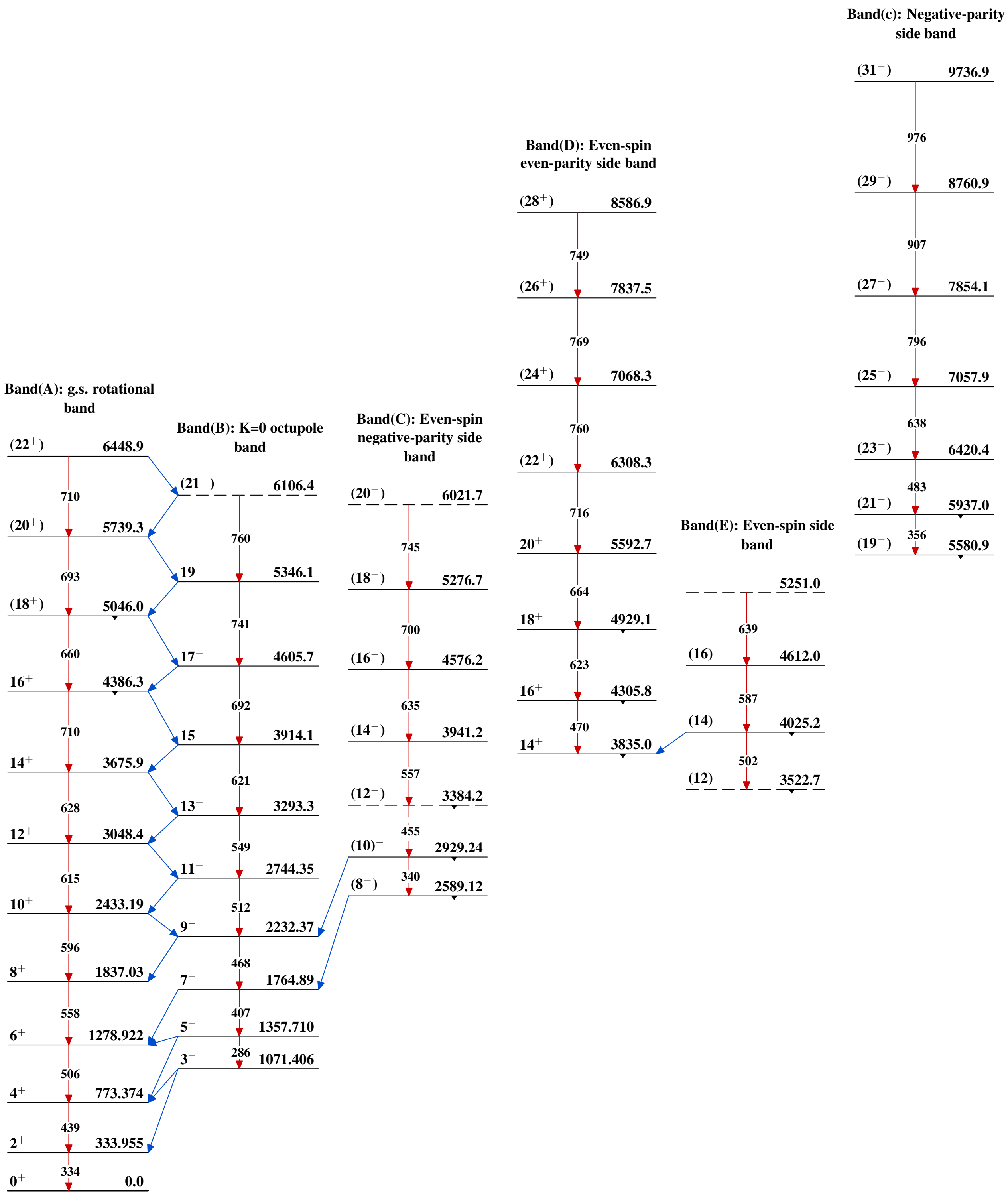
Adopted Levels, Gammas



Adopted Levels, Gammas



Adopted Levels, Gammas



Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	M. J. Martin	NDS 114, 1497 (2013)	31-Aug-2013

Q(β^-)=−1874.3 *7*; S(n)=8257.6 *6*; S(p)=8666 *5*; Q(α)=220.5 *19* 2017Wa10
S(2n)=13854.1 *6*; S(2p)=15660.8 *5* 2017Wa10
Additional information 1.

^{152}Sm Levels

Charge distribution: 2004An14 and references therein.
Isomer shift:1979Po04, 1978Ya11, 1974Ba77, 1968Ga26, 1968Be24, 1967St12, 1967Ye01.
Isotope shift: 1979Po04, 1978Ya11, 1970Hi03.
The band assignments are from Coulomb excitation except for the K$^\pi$=7$^-$ band which is from (α,2nγ).

Cross Reference (XREF) Flags

A	^{152}Pm β^- decay (4.12 min)	J	^{152}Sm(n,n′γ)	S	^{155}Gd(n,α)
B	^{152}Pm β^- decay (7.52 min)	K	Coulomb excitation	T	^{154}Sm(^{12}C,^{14}C)
C	^{152}Pm β^- decay (13.8 min)	L	^{152}Sm(x,x′)	U	^{152}Sm(γ,γ′):Mossbauer
D	^{152}Eu ε decay (13.517 y)	M	^{153}Eu(t,α)	V	^{154}Sm(α,^{6}He)
E	^{152}Eu ε decay (9.3116 h)	N	^{154}Sm(p,t)	W	^{154}Sm(^{208}Pb,Xγ),(^{176}Yb,Xγ)
F	^{150}Nd(α,2nγ)	O	Muonic atom	X	^{152}Sm(α,α′):giant resonances
G	^{151}Sm(n,γ) E=thermal	P	^{252}Cf SF decay	Y	^{151}Sm(n,γ) E=resonance
H	^{151}Sm(d,p)	Q	^{150}Sm(t,p)		
I	^{152}Sm(γ,γ′)	R	^{150}Sm(t,pγ)		

E(level)[†]	J$^\pi$	T$_{1/2}$[‡]	XREF	Comments
0.0[e]	0$^+$	stable	ABCDEFGHIJKL NOPQR T VW	<r^2>$^{1/2}$=5.084 fm 6 (2004Zn14).
121.7818[e] *3*	2$^+$	1.403 ns *11*	ABCDEFGHIJKLMNOPQRSTUVW	μ=+0.82 *4* (1967At04,1992De29,2005St24) Q=−1.683 *18* (1978Ya11,1979Po04,2005St24) Additional information 2. μ: From g=+0.411 *19*, a weighted average of 0.419 *25* (muonic atom, 1967At04) and 0.40 *3* (13-y Eu ε decay, 1992De29). Q: Weighted average of −1.702 *17* (1978Ya11) and −1.666 *16* (1979Po04). J$^\pi$: E2 γ to 0$^+$. T$_{1/2}$: Weighted average of T$_{1/2}$=1.396 ns *8* from 13-y ε decay and 1.420 ns *12* from B(E2)=3.451 *8* with α=1.155 *17*. The B(E2) value is a weighted average of values from Coulomb excitation and muonic atom. Other: 1.47 ns *4* from 4.12-min Pm β^- decay. Isotope shift: 1995Be19, 1994Ji08.
366.4793[e] *9*	4$^+$	57.7 ps *6*	ABCDEFGH JKLMN QRS W	μ=+1.68 *20* (1987By02,2005St24); Q=−2.6 *14* Additional information 3. μ: Other: +1.22 *15* (1972Ku10). J$^\pi$: E2 γ to 2$^+$ level; $\sigma(\theta)$, analyzing power (inelastic scattering). T$_{1/2}$: From Coulomb excitation. Other: 60 ps *5* from 13-y Eu ε decay. Q: From Coulomb excitation.
684.751[f] *21*	0$^+$	6.10 ps *14*	A DEF H JKL N QR	J$^\pi$: E0 transition to 0$^+$. T$_{1/2}$: From Coulomb excitation.

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Adopted Levels, Gammas (continued)

^{152}Sm Levels (continued)

E(level)[†]	J^π	$T_{1/2}$[‡]	XREF	Comments
706.928[e] *17*	6^+	10.29 ps *16*	BCD F H JKLMN W	μ=+2.3 *3* (1987By02,2005St24) J^π: $\sigma(\theta)$, analyzing power (inelastic scattering); E2 γ to 4^+ level. $T_{1/2}$: From Coulomb excitation.
810.453[f] *5*	2^+	7.4 ps *4*	AB DEFGH JKLMN Q	μ=+0.76 *19* (1987By02,2005St24) Additional information 4. J^π: E0 component in transition to 2^+. $T_{1/2}$: From Coulomb excitation. Other: 7 ps *5* from 13-y Eu ε decay.
963.358[g] *5*	1^-	20.5 fs *16*	A DEFG IJKL R	Additional information 5. J^π: E1 γ to 0^+. $T_{1/2}$: Weighted average of 28.2 fs *24* from (γ,γ'), 20 fs *3* from (n,n'γ), and 19.9 fs *7* from 13-y Eu ε decay. The (γ,γ') value comes from $\Gamma_{\gamma 0}$=0.0073 *6* eV with $\Gamma_{\gamma 0}/\Gamma$=0.451 *6*.
1022.970[f] *5*	4^+	8.3 ps *13*	B D F H JKLMN	Additional information 6. J^π: E0 component in transition to 4^+. $T_{1/2}$: From Coulomb excitation.
1041.122[g] *4*	3^-	27 fs *5*	AB DEFGH JKL N	Additional information 7. J^π: E1 γ's to 2^+ and 4^+. $T_{1/2}$: Others: 33 fs *+8−6* from (n,γ), <5 ps from 13-y Eu ε decay, <16 ps from 4.1-min Pm β^- decay.
1082.842[h] *18*	0^+	15 ps *6*	A DE JK QR	J^π: L(t,p)=0. $\gamma\gamma(\theta)$ in 9.3-hr ε decay is consistent only with J=0. $T_{1/2}$: From 4.1-min Pm β^- decay.
1085.841[i] *5*	2^+	1.09 ps *14*	AB DEFGH JKL N	μ=+0.82 *20* (1987By02,2005St24) Additional information 8. J^π: E2 γ to 0^+. $T_{1/2}$: From Coulomb excitation. Other: <4 ps from 13-y Eu ε decay.
1125.39[e] *3*	8^+	3.06 ps *4*	F JKL W	μ=+2.8 *5* (1987By02,2005St24) J^π: E2 ΔJ=2 γ to 6^+. Member of the g.s. $K^\pi=0^+$ band. $T_{1/2}$: From Coulomb excitation.
1221.64[g] *3*	5^-	73 fs *+16−12*	D F H JKLMn	XREF: n(1230). J^π: E1+M2 γ to 4^+ level; $\sigma(\theta)$, analyzing power (inelastic scattering).
1226?	(2^+)		L n	XREF: n(1230). E(level),J^π: Seen in (α,α') unresolved from the 1222 5- level. DWBA analysis suggests $J^\pi=2^+$.
1233.863[j] *3*	3^+	0.76 ps *14*	AB D FGH JKL	Additional information 9. J^π: M1+E2 γ's to 2^+ and 4^+. $T_{1/2}$: From ^{151}Sm(n,γ). Other: <6 ps from 13-y ^{152}Eu ε decay.
1292.773[h] *10*	2^+	<16 ps	A DEFGH JKL N Q	Additional information 10. J^π: E0 component in transition to 2^+. $T_{1/2}$: From 4.1-min Pm β^- decay.
1310.505[f] *22*	6^+		B F JK	J^π: E0 component in transition to 6^+.
1371.735[i] *12*	4^+	1.1 ps *+7−4*	B D FG JKL N	Additional information 11. J^π: E2 γ to 2^+. γ to 5^-. $T_{1/2}$: From Coulomb excitation.
1505.77[g] *3*	7^-		F JK	J^π: E1 γ to 6^+. Dipole γ to 8^+.
1510.790[k] *25*	1^-	91 fs *6*	A E JKLMN	J^π: E1+M2 γ to 2^+. γ to 0^+.
1529.802[l] *3*	2^-	0.27 ps *+6−4*	A D F JK	Additional information 12.

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Adopted Levels, Gammas (continued)

^{152}Sm Levels (continued)

E(level)†	J^π	$T_{1/2}$‡	XREF	Comments
				J^π: M1+E2 γ's to 1^- and 3^-.
1559.62[j] *3*	5^+		BC F JK	J^π: M1+E2 γ's to 4^+ and 6^+.
1579.429[k] *11*	3^-	72 fs *6*	B D FG JKL N	Additional information 13. J^π: E1 γ's to 2^+ and 4^+.
1609.26[e] *4*	10^+	1.38 ps *13*	F K W	μ=+3.7 *17* (1987By02,2005St24) J^π: E2 ΔJ=2 γ to 8^+. Member of $K^\pi=0^+$ g.s. band. $T_{1/2}$: From Coulomb excitation.
1612.90[h] *4*	4^+		D GH JKL N	J^π: γ's to 2^+ and 6^+.
1649.831[m] *7*	2^-	164 ps *+33−24*	A D G JK	Additional information 14. J^π: E1 γ's to 2^+. $\gamma\gamma(\theta)$ in 13-y Eu ε decay rules out J=1 and 3.
1658.80[o] *25*	0^+		A JK N	J^π: L(p,t)=0. $T_{1/2}$: The experimental values are discrepant. $T_{1/2}$=8 ps *5* is reported in 4.1-min Pm β^- decay, and 0.123 ps *+45−29* is reported in (n,n′γ).
1666.45[f] *4*	8^+		F K	J^π: E0 component in transition to 8^+.
1680.56[p] *3*	1^-	38.1 fs *28*	A E JKL	J^π: γ's to 0^+ and 3^-. log *ft*=6.8 from 0^-.
1682.07[l] *12*	4^-	>596 fs	D F JK	J^π: γ to 4^+. Member of a $K^\pi=1^-$ band.
1728.27[i] *3*	6^+		F JKl	J^π: M1+E2 γ to 6^+. Member of the $K^\pi=2^+$ γ-vibrational band.
1730.205[n] *19*	3^-	82 fs *+11−9*	B D JKl	J^π: E1 γ to 2^+. D(+Q) γ to 4^+.
1736	0^+		N	J^π: L(p,t)=0.
1754.98[q] *4*	0^+	>277 fs	JK m	J^π: From 792γ(E) and 792$\gamma(\theta)$ in (n,n′γ). Assigned as the bandhead of a $K^\pi=0^+$ band in Coulomb excitation.
1757.001[r] *14*	4^+		B D FG JKLm	Additional information 15. J^π: γ's to 2^+ and 6^+.
1764.32[k] *5*	5^-	0.08 ps *+9−4*	B F JKl	J^π: γ's to 4^+ and 6^+. Member of a $K^\pi=1^-$ band.
1769.132[t] *23*	2^+	130 fs *+42−28*	A D GH JKl N	J^π: E2 γ to 0^+.
1776.56[o] *5*	(2^+)	<15 ps	A D JKLM	J^π: γ's to 1^- and 3^-. log *ft*=7.0 from 1^+. Assigned in Coulomb excitation as the 2^+ member of a $K^\pi=0^+$ band built on the 1659 level but no other band members have been identified. $T_{1/2}$: From 4.1-min Pm β^- decay.
1779.119[p] *25*	3^-	56 fs *+11−9*	D JK	Additional information 16. J^π: γ's to 2^+ and 4^+. Member of a $K^\pi=1^-$ band.
1803.94[cv] *5*	5^-		BC F JK M	J^π: E1 γ's to 4^+ and 6^+.
1822.03[m] *21*	(4^-)		D F JK	J^π: γ's to 3^+, 3^-, and 4^+. Assigned in Coulomb excitation to α $K^\pi=2^-$ band with bandhead at 1649. From an angular distribution measurement in (α,2nγ) the 1455γ to 4^+ is assigned as M1+E2, in conflict with the suggested band assignment.
1879.14[g] *4*	9^-		F K	J^π: E1 ΔJ=1 γ to 8^+. γ to 10^+. Member of $K^\pi=0^-$ octupole vibrational band.
1891.06[ds] *6*	5^+		F JK m	J^π: γ's to 3^+ and 6^+. Member of a $K^\pi=4^+$ band.
1892.48 *5*	0^+,1,2		A JK m	J^π: γ's to 1^- and 2^+. log *ft*=7.5 from 1^+.
1901 *2*	(2^+)		G L n	J^π: L(p,t)=(2).
1906.13 *3*	2^+		JK n	J^π: γ's to 0^+, 3^+ and 3^-.
1907.73[u] *4*	(3^+)		JK	J^π: γ's to 2^+ and 4^+. Assigned in Coulomb excitation as α member of a $K^\pi=2^+$ band with bandhead at 1768, but no other band members have been identified.

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Adopted Levels, Gammas (continued)

^{152}Sm Levels (continued)

E(level)[†]	J$^{\pi}$	T$_{1/2}$[‡]	XREF	Comments
1920.46[w] *5*	6$^-$		C F JK M	J$^{\pi}$: M1+E2 γ to 5$^-$. γ to 6$^+$. Member of a K$^{\pi}$=5$^-$ band.
1929.93[l] *6*	6$^-$		F JK	J$^{\pi}$: E1 γ to 5$^+$. γ to 6$^+$. Member of a K$^{\pi}$=1$^-$ band.
1930.17 *13*			G	J$^{\pi}$: Primary γ from 2$^-$,3$^-$ suggests that this level is different from the 1929.9 level with J$^{\pi}$=6$^-$.
1933.30 *5*	(4$^+$,5,6$^+$)		J	J$^{\pi}$: γ's to 4$^+$ and 6$^+$.
1944.61 *4*	1$^-$,2		A JK	J$^{\pi}$: log *ft*=7.3 from 1$^+$. γ's to 1$^-$ and 3$^-$.
1945.10 *3*	1,2$^+$		A JK	J$^{\pi}$: γ's to 0$^+$ and 2$^+$.
1945.90[j] *5*	7$^+$		F K	J$^{\pi}$: M1+E2 γ's to 6$^+$ and 8$^+$.
1946.15 *6*	0,1,2,3$^-$		J	J$^{\pi}$: γ to 1$^-$.
1954.30 *5*	3$^-$,4,5$^-$		JK M	J$^{\pi}$: γ's to 3$^-$ and 5$^-$.
1958.27 *5*	(2$^+$,3,4$^+$)		J	J$^{\pi}$: γ's to 2$^+$ and 4$^+$.
1962 *1*			G L	
1963.95 *4*	(1,2$^+$)		A J M	J$^{\pi}$: γ's to 0$^+$ and 2$^+$.
1976.98[@] *6*	4$^+$,5,6$^+$		J	J$^{\pi}$: γ's to 4$^+$ and 6$^+$.
1977.19[@p] *19*	5$^-$		K	J$^{\pi}$: γ's to 4$^+$ and 6$^+$. Member of a K$^{\pi}$=1$^-$ band.
2003.66 *20*	2$^+$,3,4$^+$		B	J$^{\pi}$: γ to 2$^+$. γ from 2589.02 with J$^{\pi}$=4$^+$,5.
2004.24[h] *6*	6$^+$		K	J$^{\pi}$: γ's to 4$^+$ and 6$^+$. Member of K$^{\pi}$=0$^+$ second β band.
2004.29[k] *11*	7$^-$		F JK	J$^{\pi}$: E1 ΔJ=1 γ to 6$^+$. γ to 8$^+$. Member of K$^{\pi}$=1$^-$ band.
2006.61 *5*	0,1,2,3$^-$		J	J$^{\pi}$: γ to 1$^-$.
2011.55 *6*	3$^-$,4,5$^-$		g JK n	XREF: n(2023). J$^{\pi}$: γ's to 3$^-$ and 5$^-$. L(p,t)=3 for either or both of the 2012 levels.
2011.84 *5*	2$^+$,3,4$^+$		g JK n	XREF: n(2023). J$^{\pi}$: γ's to 2$^+$ and 4$^+$. L(p,t)=3 for either or both of the 2012 levels.
2038.37 *6*	1,2$^+$		JKl	J$^{\pi}$: γ's to 0$^+$ and 2$^+$.
2040.09[r] *8*	6$^+$		F JKl	J$^{\pi}$: γ's to 4$^+$ and 6$^+$. Member of K$^{\pi}$=4$^+$ band.
2042.79 *5*	0$^+$,1,2		A JKl	J$^{\pi}$: log *ft*=6.9 from 1$^+$. γ's to 2$^+$.
2044.45 *8*	3,4$^+$		B J	J$^{\pi}$: log *ft*=6.2 from 4$^-$. γ's to 2$^+$.
2046.16 *10*	4$^+$,5,6,7$^+$		F J	J$^{\pi}$: γ's to 5$^+$ and 6$^+$.
2048.04 *11*			J	J$^{\pi}$: γ to 2$^+$.
2051.45 *8*			J	J$^{\pi}$: γ to 2$^-$.
2051.83 *7*	4$^+$		G JK	J$^{\pi}$: γ's to 2$^+$ and 3$^+$. Member of K$^{\pi}$=2$^+$ band.
2053.52 *8*			J	J$^{\pi}$: γ's to 2$^+$.
2055.8 *10*			F	J$^{\pi}$: γ to 6$^+$.
2057.52[bv] *5*	7$^-$		C F K M	J$^{\pi}$: γ's to 5$^-$ and 8$^+$. Member of K$^{\pi}$−5$^-$ band. Note that J$^{\pi}$=(7$^-$) from (t,α) based on α comparison of experimental and calculated spectroscopic factors for members of a K$^{\pi}$=5$^-$ rotational band with configuration (π 5/2[413])(ν 5/2[532]).
2063.78 *4*	(1$^-$,2,3$^-$)		J	J$^{\pi}$: γ's to 1$^-$ and 3$^-$.
2069.31 *8*	0$^+$,1,2,3$^-$		J	J$^{\pi}$: γ's to 1$^-$ and 2$^+$.
2070.83 *8*	3$^-$,4,5$^-$		JK	J$^{\pi}$: γ's to 3$^-$ and 5$^-$.
2079.57[f] *4*	10$^+$		F K	J$^{\pi}$: E2 γ to 8$^+$. M1 γ to 10$^+$. Member of the K$^{\pi}$=0$^+$ β-vibrational band.
2091.21 *4*	1$^-$,2		A JK	J$^{\pi}$: γ's to 1$^-$ and 3$^-$. log *ft*=7.2 from 1$^+$ (log $f^{1u}t$<8).
2091.66 *7*			A J	J$^{\pi}$: γ to 2$^+$.
2096.82 *5*	3$^+$,4		G J	J$^{\pi}$: γ's to 4$^+$ and 5$^+$. Fed by primary in (n,γ) from 2$^-$,3$^-$.
2112.71 *5*	(2$^+$,3,4$^+$)		J MN	J$^{\pi}$: γ's to 2$^+$ and 4$^+$.
2120.98[z] *7*	7$^-$	2.4 ns *2*	C F	J$^{\pi}$: γ's to 6$^-$ and 7$^-$. Bandhead of a K$^{\pi}$=7$^-$ band. T$_{1/2}$: from (α,2nγ).

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Adopted Levels, Gammas (continued)

^{152}Sm Levels (continued)

E(level)[†]	J^π	XREF	Comments
2127.17 *7*	0^+,1,2	A J	E(level): (n,n′γ) reports a level at 2127.17 deexciting via a single transition with Eγ=2005.38 *7*. In 4.12-M Pm β^- decay, a level at 2127.4 is postulated with a 2007.0 *5* transition along with 616 and 1317γ′s. The evaluator assumes that the 2005 and 2007γ′s correspond to the same transition and that there is just one level at 2127; however, based on branching in the decay, the 1317γ should have been seen in (n,n′γ). J^π: log *ft*=7.0 from 1^+. γ′s to 2^+.
2129.84 *5*	$(1^+,2,3^-)$	J	J^π: γ′s to 1^- and 3^+.
2137.69 *6*		J	J^π: γ to 2^+.
2137.92 *6*	$(2^+,3,4^+)$	J	J^π: γ′s to 2^+ and 4^+.
2138.17 *12*	2^+	K	J^π: γ′s to 0^+ and 4^+.
2139.71[i] *4*	8^+	F K	J^π: γ′s to 6^+ and 9^-. Member of $K^\pi=2^+$ γ-vibrational band.
2146 *3*		M	
2148.81[e] *5*	12^+	F K W	J^π: E2 ΔJ=2 γ to 10^+. Member of $K^\pi=0^+$ g.s. band.
2167.0 *6*	0^+,1,2	A	J^π: log *ft*=7.4 from 1^+. γ to 2^+.
2172.60 *23*	$1,2^+$	A	J^π: γ to 0^+.
2175.7 *10*	$0^+,1,2,3^-$	A	J^π: log $f^{1u}t$=8.7 from 1^+. γ to 2^+.
2176.62[p] *16*	7^-	K	J^π: γ′s to 5^- and 8^+. Member of a $K^\pi=1^-$ band.
2194 *3*		LM	
2201.20 *12*	0^+,1,2	A	J^π: log *ft*=6.8 from 1^+. γ to 2^+.
2201.47[l] *7*	8^-	F K	J^π: E1 γ to 7^+. Member of a $K^\pi=1^-$ band.
2206[s]	7^+	F	J^π: γ′s to 6^+ and 8^+. Member of a $K^\pi=4^+$ band.
2214.98[w] *7*	8^-	F K	J^π: E2 ΔJ=2 γ to 6^-. Member of a $K^\pi=5^-$ band.
2224.8 *5*	$1,2^+$	A	J^π: γ to 0^+.
2227.71 *22*	$(5^-,6,7^-)$	K	J^π: γ′s to 5^- and 7^-.
2237.3 *5*	1,2	A G	J^π: log *ft*=7.4 from 1^+. Fed by primary γ in (n,γ) from $2^-,3^-$.
2239.8 *3*	2^+	A	J^π: γ′s to 0^+ and 4^+.
2263.9 *4*	$6^+,7,8^+$	K	J^π: γ′s to 6^+ and 8^+.
2268 *5*	2^+	N	J^π: L(p,t)=2.
2269.87[z] *8*	8^-	F	J^π: M1+E2 ΔJ=1 γ to 7^-. Member of a $K^\pi=7^-$ band.
2284.96 *20*	0,1,2	A K M	J^π: log *ft*=6.4 from 1^+.
2287.4 *10*	$0^+,1,2,3^-$	A	J^π: log $f^{1u}t$=8.6 from 1^+. γ to 2^+.
2290.37[k] *7*	9^-	F K	J^π: E1 ΔJ=1 γ to 8^+. D+Q γ to 10^+.
2295.3 *3*	1^-,2	A	J^π: log *ft*=7.2 from 1^+. γ to 3^-.
2308.6 *4*		F	J^π: γ to 8^+.
2308.9 *5*	$1,2^+$	A	J^π: γ to 0^+.
2320.35 *23*	4^+,5	B	J^π: log *ft*=6.7 from 4^-. γ to 6^+.
2326.94[g] *5*	11^-	F K	J^π: E1 γ to 10^+. Member of $K^\pi=0^-$ octupole vibrational band.
2340 *3*		MN	
2348.76 *7*		F K	J^π: γ′s to 7^- and 8^+.
2359.8 *3*		F	J^π: γ to 8^+.
2367.3 *3*	1^-,2	A	J^π: log *ft*=7.2 from 1^+. γ to 3^-.
2375.49[j] *7*	9^+	F K	J^π: M1+E2 γ to 10^+. γ to 8^-.
2376.8 *15*		A	J^π: γ to 2^+.
2388.79[v] *8*	9^-	F K	J^π: γ′s to 7^- and 8^+. Member of $K^\pi=5^-$ band.
2391.7[r] *3*	8^+	F K	J^π: γ′s to 7^- and 8^+. Member of $K^\pi=4^+$ band.
2402.23 *14*	$3,4^+$	B	J^π: log *ft*=6.8 from 4^-. γ′s to 2^+.
2415 *3*		M	
2423 *10*		N	
2424.36[z] *8*	9^-	F	J^π: M1+E2 γ to 8^-. γ to 7^-. Member of $K^\pi=7^-$ band.
2445.90[p] *8*	9^-	K	J^π: γ′s to 7^- and 9^-. Member of a $K^\pi=1^-$ band.
2458.6[x] *3*	8^+	K N	J^π: γ to 6^+. Bandhead of a $K^\pi=8^+$ band.
2482.00 *20*	3,4,5	B	J^π: log *ft*=6.7 from 4^-.

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Adopted Levels, Gammas (continued)

^{152}Sm Levels (continued)

E(level)[†]	J^π	$T_{1/2}$[‡]	XREF	Comments
2489 *3*			M N	
2506.29 *12*	$7^-,8,9^-$		K	J^π: γ's to 7^- and 9^-.
2510.4 *5*	$1^{(-)}$[#]	0.0097 eV *25*	A I	
2510.59[l] *8*	10^-		F K	J^π: E2 $\Delta J=2$ γ to 8^-. E1 γ to 9^+.
2517.41 *15*			F K M	J^π: γ's to 9^- and 10^+.
2525.69[f] *5*	12^+		F K	J^π: E2 $\Delta J=2$ γ to 10^+. γ to 12^+.
2541.6 *4*	$1^{(+)}$[#]	0.0058 eV *20*	I	
2544			N	
2567.06 *17*	$4^+,5$		B	J^π: log *ft*=6.5 from 4^-. γ to 6^+.
2576.29[w] *9*	10^-		F	J^π: M1+E2 γ to 9^-. Member of a $K^\pi=5^-$ band.
2588[s]	9^+		F	J^π: γ's to 8^+. Member of a $K^\pi=4^+$ band.
2589.02 *16*	$4^+,5$		B	J^π: log *ft*=6.8 from 4^-. γ to 6^+.
2590.68[z] *9*	10^-		F	J^π: M1+E2 γ to 9^-. Member of $K^\pi=7^-$ band.
2599.36 *14*	$7^-,8^+$		K N	J^π: γ's to 6^+ and 9^-.
2612 *3*			M	
2641.09[k] *10*	11^-		F K	J^π: E1 $\Delta J=1$ γ to 10^+. Member of $K^\pi=1^-$ band.
2643.4 *4*	$1^{(-)}$[#]	0.047 eV *5*	I	
2662.47[i] *5*	10^+		K	J^π: γ's to 8^+ and 10^+. Member of $K^\pi=2^+$ γ-vibrational band.
2663.4 *4*	$1^{(+)}$[#]	0.0088 eV *26*	I	
2687.8 *10*	$0^+,1,2$		A	J^π: log *ft*=7.0 from 1^+. γ to 2^+.
2697 *3*			M	
2712.5 *3*			F	J^π: γ to 10^+.
2736.19[e] *6*	14^+		F K W	J^π: γ to 12^+. Member of $K^\pi=0^+$ g.s. band.
2751.51[z] *10*	11^-		F	J^π: γ's to 9^-. Member of $K^\pi=7^-$ band.
2808.92[&p] *11*	11^-		K	J^π: Member of a $K^\pi=1^-$ band.
2810[r]	(10^+)		F	
2818.1 *4*	$1^{(+)}$[#]	0.0141 eV *26*	I	
2832.85[j] *16*	11^+		K	J^π: γ to 9^+. Member of $K^\pi=2^+$ γ-vibrational band.
2833.30[g] *6*	13^-		F K	J^π: E1 $\Delta J=1$ γ to 12^+. Member of $K^\pi=0^-$ octupole vibrational band.
2841.89 *10*			F K	J^π: γ's to 11^- and 12^+.
2887.3 *4*	$1^{(+)}$[#]	0.012 eV *3*	I	
2891.7 *4*	$1^{(+)}$[#]	0.028 eV *4*	I	
2895.49 *12*	4^+		B	J^π: γ's to 2^+ and 6^+.
2898.6? *3*			B	J^π: γ to $3,4^+$.
2901.39[l] *13*	12^-		F	J^π: E2 $\Delta J=2$ γ to 10^-. Member of a $K^\pi=1^-$ band.
2905.17[x] *10*	10^+		K	J^π: γ's to 8^+ and 10^+. Member of a band with unknown K.
2925.5 *10*	$0^+,1,2$		A	J^π: log *ft*=6.3 from 1^+. γ to 2^+.
2930.6 *4*	$1^{(+)}$[#]	0.078 eV *5*	I	
2939.3 *4*	$1^{(+)}$[#]	0.0036 eV *25*	I	
2946.8 *4*	$1^{(-)}$[#]	0.013 eV *6*	I	
2976.87[y] *6*	14^+		F K	J^π: E2 $\Delta J=2$ γ to 12^+. Member of a band with unknown K^π.
2991.6 *4*	$1^{(+)}$[#]	0.039 eV *5*	I	
3012.6 *4*	$1^{(+)}$[#]	0.015 eV *4*	I	
3025.3 *4*	$1^{(+)}$[#]	0.059 eV *4*	I	
3027[s]	11^+		F	J^π: γ to 9^+. Member of a $K^\pi=4^+$ band.
3080.1[k] *3*	13^-		F K	J^π: γ to 12^+. Member of a $K^\pi=1^-$ band.

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Adopted Levels, Gammas (continued)

^{152}Sm Levels (continued)

E(level)[†]	J$^\pi$	T$_{1/2}$[‡]	XREF	Comments
3090.2 *4*	1$^{(+)}$[#]	0.078 eV *5*	I	
3107.9 *4*	1$^{(-)}$[#]	0.032 eV *7*	I	
3122.6 *5*		0.0091 eV *11*	I	
3128.33[i] *21*	12$^+$		K	J$^\pi$: γ to 12$^+$. Member of the K$^\pi$=2$^+$ γ-vibrational band.
3262.9 *3*	10$^+$,11,12$^+$		K	J$^\pi$: γ's to 10$^+$ and 12$^+$.
3281.7 *4*	1$^{(+)}$[#]	0.022 eV *4*	I	
3292.82[f] *7*	14$^+$		K	J$^\pi$: γ's to 12$^+$ and 14$^+$. Member of the K$^\pi$=0$^+$ β vibrational band.
3352.26[x] *13*	12$^+$		K	J$^\pi$: γ's to 10$^+$ and 12$^+$. Member of band with unknown K.
3365.02[e] *6*	16$^+$		F K W	J$^\pi$: γ to 14$^+$. Member of K$^\pi$=0$^+$ g.s. band.
3378.39[l] *24*	14$^-$		F	J$^\pi$: γ to 12$^-$. Member of K$^\pi$=1$^-$ band.
3383.35[g] *8*	15$^-$		F K	J$^\pi$: γ's to 13$^-$ and 14$^+$. Member of the K$^\pi$=0$^-$ octupole vibrational band.
3390.90[p] *22*	13$^-$		K	J$^\pi$: γ to 11$^-$. Member of a K$^\pi$=1$^-$ band.
3422.1 *4*	1$^{(-)}$[#]	0.053 eV *17*	I	
3462.95[y] *13*	16$^+$		K	J$^\pi$: γ's to 14$^+$. Member of band with unknown K.
3708.8 *4*		0.0144 eV *25*	I	
3794.1 *4*		0.0123 eV *26*	I	
3857.16[f] *9*	16$^+$		K	J$^\pi$: γ's to 14$^+$ and 16$^+$. Member of K$^\pi$=0$^+$ β vibrational band.
3882.6 *4*		0.018 eV *3*	I	
3931.2[x] *4*	14$^+$		K	J$^\pi$: γ's to 12$^+$ and 14$^+$. Member of band with unknown K.
3973.2[g] *5*	17$^-$		K	J$^\pi$: γ's to 15$^-$ and 16$^+$. Member of K$^\pi$=0$^-$ octupole vibrational band.
4004.64[y] *17*	18$^+$		K	J$^\pi$: γ's to 16$^+$. Member of band with unknown K.
4047.7[ae] *12*	18$^+$		K	Additional information 17. J$^\pi$: γ's to 16$^+$. Member of K$^\pi$=0$^+$ g.s. band.
4524.8[x] *23*	16$^+$		K	J$^\pi$: γ to 14$^+$. Member of band with unknown K.
4749.56[e] *15*	20$^+$		K	J$^\pi$: γ to 18$^+$. Member of the K$^\pi$=0$^+$ g.s. band.
8257.7+x *7*			Y	E(level): E=neutron separation energy. For x=neutron resonances see ^{151}Sm(n,γ) E=resonance.
11.3×10^3	0$^+$		X	E(level): ΔE=+3-5. configuration: Low-energy component of the giant monopole resonance. %EWSR=17 *+2−4*.
11.53×10^3 *14*	2$^+$		X	configuration: Low-energy component of the giant quadrupole resonance. %EWSR=71 *5*.
12.8×10^3 *4*	1$^-$		X	configuration: Low-energy component of the isoscalar giant dipole resonance. %EWSR=29 *1*.
13.2×10^3 *38*	3$^-$		X	configuration: Low-energy component of the high-energy octupole resonance. %EWSR=3 *1*.

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Adopted Levels, Gammas (continued)

^{152}Sm Levels (continued)

E(level)[†]	J^π	XREF	Comments
14.9×10^3 *4*	2$^+$	X	configuration: High-energy component of the giant quadrupole resonance. %EWSR=40 *+5−17*.
15.44×10^3	0$^+$	X	E(level): ΔE=+12-23. configuration: High-energy component of the giant monopole resonance. %EWSR=73 *+4−25*.
23×10^3 *4*	3$^-$	X	configuration: High-energy component of the high-energy octupole resonance. %EWSR=31 *4*.
25.1×10^3 *10*	1$^-$	X	configuration: High-energy component of the isoscalar giant dipole resonance. %EWSR=103 *3*.

[†] From a least-squares fit to the adopted Eγ data, where available. other energies are weighted averages of the reaction data.

[‡] From (n,n′γ), except where noted otherwise. Values given as widths are from (γ,γ′).

[#] J from Iγ(127°)/Iγ(90°) in (γ,γ′). π from Iγ(g.s.)/Iγ(2$^+$) (Alaga rule).

[@] There is some overlap in the energies reported in Coulomb excitation and (n,n′γ) for the two 1977 levels. IT is possible that these are the same level.

[&] There are two γ′s from the 2808 level in Coulomb excitation, 728.48 *15* and 930.64 *15*. These give inconsistent level energies of 2808.02 *16* and 2809.77 *16*, respectively. One or both of these Eγ values must be in error. The evaluator adopts E(level)=2808.9 *9*.

[a] There are two γ′s from the 4048 level in Coulomb excitation, 585.98 *8* and 681.54 *5*. These give inconsistent level energies of 4048.91 *15* and 4046.53 *8*, respectively. One or both of these Eγ values must be in error. The evaluator adopts E(level)=4047.7 *12*.

[b] The γ branchings from the 2057 level in Coulomb excitation and (α,2nγ) are not consistent. The evaluator has chosen not to adopt branchings for this level. From Coulomb excitation one has Iγ(137γ):Iγ(253γ):Iγ(1351γ)=60 *9*:7 *10*:100 *9* and from (α,2nγ), normalized to the 1351γ, one has Iγ(137γ):Iγ(253γ):Iγ(329γ):Iγ(747γ):Iγ(932γ):Iγ(1351γ)=230 *2*:40:32 *3*:40 *2*:150 *30*:100 *30*.

[c] The γ branchings from the 1804 level are not consistent. The values shown are from 7.52-min Pm β^- decay. Coulomb excitation reports only the two highest energy γ′s, with Iγ(1097γ):Iγ(1437)= 100 *9*:72 *7*, consistent with the decay value. (n,n′γ) reports Iγ(781γ):Iγ(1097γ):Iγ(1437γ)=41 *7*:100 *50*:42 *8*, and (α,2nγ) reports Iγ(432γ):Iγ(781γ):Iγ(1097γ):Iγ(1437γ)=18.9 *15*:20 *5*:100 *4*:16 *7*.

[d] The γ energies from the 1891 level as measured in (n,n′γ) and Coulomb excitation are not consistent. the 1183 and 1524γ′s are reported only in (n,n′γ), and along with Eγ=331.33 *3* give E(level)=1890.93 *3*. The other transitions are taken from Coulomb excitation and, with Eγ=331.5 *5*, give E(level)=1891.53 *12*. The 134γ is not reported in Coulomb excitation. all the transitions except the 1183γ are reported in (α,2nγ).

[e] Band(A): $K^\pi=0^+$ g.s. band.

[f] Band(B): $K^\pi=0^+$ β-vibrational band.

[g] Band(C): $K^\pi=0^-$ octupole vibrational band.

[h] Band(D): $K^\pi=0^+$ second β band.

[i] Band(E): $K^\pi=2^+$ γ-vibrational band (even).

[j] Band(F): $K^\pi=2^+$ γ-vibrational band (odd).

[k] Band(G): $K^\pi=1^-$ (odd).

[l] Band(H): $K^\pi=1^-$ (even).

[m] Band(I): $K^\pi=2^-$ (even).

[n] Band(J): $K^\pi=2^-$ (odd).

[o] Band(K): $K^\pi=0^+$.

[p] Band(L): $K^\pi=1^-$.

[q] Band(M): $K^\pi=0^+$.

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Adopted Levels, Gammas (continued)

^{152}Sm Levels (continued)

[r] Band(N): $K^{\pi}=4^{+}$ (even).
[s] Band(O): $K^{\pi}=4^{+}$ (odd).
[t] Band(P): $K^{\pi}=2^{+}$ (even).
[u] Band(Q): $K^{\pi}=2^{+}$ (odd).
[v] Band(R): $K^{\pi}=5^{-}$ (odd).
[w] Band(S): $K^{\pi}=5^{-}$ (even).
[x] Band(T): K=?
[y] Band(U): K=?
[z] Band(V): $K^{\pi}=7^{-}$.

$\gamma(^{152}Sm)$

E_i(level)	J_i^{π}	E_{γ} †	I_{γ} †	E_f	J_f^{π}	Mult. ef	α g	$I_{(\gamma+ce)}$	Comments
121.7818	2^+	121.7817 *3*	100	0.0	0^+	E2	1.155		B(E2)(W.u.)=145.0 *16*
366.4793	4^+	244.6974 *8*	100	121.7818	2^+	E2	0.1073		B(E2)(W.u.)=209.5 *22*
684.751	0^+	562.98 *3*	100.0 *19*	121.7818	2^+	E2	0.00941		B(E2)(W.u.)=33.3 *12*
		684.85 *20*		0.0	0^+	E0		1.30 *14*	ρ^2(E0)=0.051 *5*. $I_{(\gamma+ce)}$: From 9.3-h Eu ε decay relative to Iγ(563γ).
706.928	6^+	340.45 *3*	100	366.4793	4^+	E2	0.0382		B(E2)(W.u.)=240 *4*
810.453	2^+	125.64 *7*	0.599 *22*	684.751	0^+	[E2]	1.034		B(E2)(W.u.)=170 *12*
		444.00 *3*	34.8 *13*	366.4793	4^+	E2	0.01772		B(E2)(W.u.)=18.0 *12*
		688.670 *5*	100.0 *6*	121.7818	2^+	E0+M1+E2	0.0434 *13*		B(E2)(W.u.)=5.7 *4*; B(M1)(W.u.)=1.5×10^{-5} *7* δ: δ(E2/M1)=+19 *+5−4* (1982La26); I(ce(K))(E0)/I(ce(K))(E2)=6.5 *3* (^{152}Eu ε decay (13.517 y)). α: from ^{152}Eu ε decay (13.517 y).
		810.451 *5*	37.0 *3*	0.0	0^+	E2	0.00393		B(E2)(W.u.)=0.94 *6*
963.358	1^-	152.77 *16*	0.0126 *11*	810.453	2^+	[E1]	0.0872		B(E1)(W.u.)=0.000225 *27*
		278.7 *3*		684.751	0^+	[E1]	0.0177		I_{γ}: weak (^{152}Eu ε decay (9.3116 h)).
		841.570 *5*	100.0 *18*	121.7818	2^+	E1	0.00144		B(E1)(W.u.)=0.0106 *9*
		963.367 *5*	82.3 *13*	0.0	0^+	[E1]	0.00111		B(E1)(W.u.)=0.0058 *5*
1022.970	4^+	212.43 *11*	14.4 *4*	810.453	2^+	E2	0.1706		B(E2)(W.u.)=2.5×10^{2} *4*
		316.13 *13*	7.00 *4*	706.928	6^+	(E2)	0.0478		B(E2)(W.u.)=17 *3*
		656.489 *5*	100.0 *15*	366.4793	4^+	E2+M1+E0	0.0568 *20*		B(E2)(W.u.)=5.0 *+10−7*; B(M1)(W.u.)=9.0×10^{-4} *25* δ: δ(E2/M1)=2.1 *3* (1982La26, Coulomb excitation). I(ce(K))(E0)/I(ce(K))(E2)=10.0 *6* (^{152}Eu ε decay (13.517 y)). α: from ^{152}Eu decay (13.517 y).
		901.19 *5*	59.2 *17*	121.7818	2^+	E2	0.00311		B(E2)(W.u.)=0.74 *12*
1041.122	3^-	674.65 *3*	40.4 *8*	366.4793	4^+	E1	0.00225		B(E1)(W.u.)=0.0082 *16* δ: δ(M2/E1)=−0.03 *6*.
		919.337 *4*	100.0 *10*	121.7818	2^+	E1	0.00121		B(E1)(W.u.)=0.0081 *15* δ: δ(M2/E1)=−0.09 *12*.
1082.842	0^+	119.46 *12*	8.1 *7*	963.358	1^-	[E1]	0.1700		B(E1)(W.u.)=0.00063 *+43−19* I_{γ}: From 9.3-hr Eu ε decay.
		272.41 *4*	7.8 *5*	810.453	2^+	(E2)	0.0761		B(E2)(W.u.)=34 *+23−11* I_{γ}: From 9.3-hr Eu ε decay.
		398.00 *15*		684.751	0^+	E0		1.52 *22*	Mult.: ρ^2(E0)=0.023 *9*. $I_{(\gamma+ce)}$: From 9.3-h Eu ε decay relative to the 961γ.
		961.08 *3*	100 *6*	121.7818	2^+	[E2]	0.00270		B(E2)(W.u.)=0.80 *+53−23*
		1082.8 *5*		0.0	0^+	E0		0.13 *6*	Mult.: ρ^2(E0)=0.0007 *4*. $I_{(\gamma+ce)}$: From 9.3-h Eu ε decay relative to the 961γ.
1085.841	2^+	275.41 *4*	0.238 *6*	810.453	2^+	M1	0.1015		B(M1)(W.u.)=0.00134 *18*
		401.29 *9*	0.0044 *3*	684.751	0^+	[E2]	0.0236		B(E2)(W.u.)=0.026 *4*
		719.346 *7*	1.72 *6*	366.4793	4^+	E2	0.00517		B(E2)(W.u.)=0.56 *8*

Adopted Levels, Gammas (continued)

γ(^{152}Sm) (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.[ef]	δ[e]	α[g]	Comments
									E_γ: Not included in the least-squares adjustment. The adjustment gives 719.406 *7*.
1085.841	2^+	964.057 *5*	100.00 *24*	121.7818	2^+	E2+M1	−9.3 *6*	0.00270	B(M1)(W.u.)=0.00015 *3*; B(E2)(W.u.)=7.4 *10*
		1085.837 *10*	69.71 *19*	0.0	0^+	E2		0.00209	B(E2)(W.u.)=2.9 *4*
1125.39	8^+	418.45 *3*	100	706.928	6^+	E2		0.0209	B(E2)(W.u.)=293 *4*
1221.64	5^-	514.78 *6*	21.9 *5*	706.928	6^+	[E1]		0.0075	B(E1)(W.u.)=0.0043 *+9−8*
									I_γ: Weighted average from 13-y and 9.3-h Eu ε decays.
		855.21 *7*	100 *3*	366.4793	4^+	E1+M2	−0.11 *7*	0.0016	B(E1)(W.u.)=0.0042 *+9−8*; B(M2)(W.u.)=3.2×10^2 *+52−29*
									δ: B(M2)(W.u.)<1 is expected from RUL. This requirement gives δ<0.0023;
1233.863	3^+	147.99 *5*	0.150 *8*	1085.841	2^+	M1+E2	+1.0 *6*	0.570 *13*	B(M1)(W.u.)=0.0051 *+25−38*; B(E2)(W.u.)=12×10^1 *+6−9*
		210.95 *14*	0.0278 *12*	1022.970	4^+	[M1,E2]		0.192 *18*	
		423.45 *4*	0.0218 *16*	810.453	2^+	[M1,E2]		0.027 *7*	
		867.380 *3*	30.93 *18*	366.4793	4^+	M1+E2	−6.5 *3*	0.00343 *5*	B(M1)(W.u.)=0.00024 *+6−5*; B(E2)(W.u.)=7.2 *+16−11*
		1112.076 *3*	100.0 *5*	121.7818	2^+	M1+E2	−8.7 *6*	0.00201 *3*	B(M1)(W.u.)=0.00021 *+6−5*; B(E2)(W.u.)=6.8 *+15−11*
1292.773	2^+	207.03 *23*	0.42 *9*	1085.841	2^+	[M1,E2]		0.203 *17*	
		209.97 *3*	1.58 *26*	1082.842	0^+	[E2]		0.1774	B(E2)(W.u.)>12
		251.633 *9*	24.6 *7*	1041.122	3^-	E1		0.0231	B(E1)(W.u.)>9.7×10^{-5}
									Mult.: α(K)exp in 13-y Eu ε decay gives δ(M2/E1)=0.24 *+4−6*; however this value of δ, assuming that the measured $T_{1/2}$ is correct, gives B(M2)(W.u.)>260. The RUL limit is 1, and suggests δ<0.014.
		269.84 *6*	2.88 *19*	1022.970	4^+	[E2]		0.0784	B(E2)(W.u.)>6.2
		329.436 *17*	44.5 *9*	963.358	1^-	[E1]		0.01163	B(E1)(W.u.)>7.8×10^{-5}
		482.35 *14*	9.1 *3*	810.453	2^+	E0+M1+E2		0.062 *12*	
		608.06 *15*	0.10 *3*	684.751	0^+	[E2]		0.0078	B(E2)(W.u.)>0.0037
		926.29 *4*	100.0 *12*	366.4793	4^+	[E2]		0.00293	B(E2)(W.u.)>0.46
		1170.98 *4*	13.7 *6*	121.7818	2^+	[M1,E2]		0.0023 *5*	
		1292.77 *4*	36.9 *10*	0.0	0^+	[E2]		0.00149	B(E2)(W.u.)>0.032
1310.505	6^+	89.17 *8*	4.26 *18*	1221.64	5^-				
		185.1 *10*	0.85 *34*	1125.39	8^+				
		287.53 *4*	95 *3*	1022.970	4^+	E2		0.0642	
		603.56 *3*	100 *4*	706.928	6^+	E0+M1+E2		0.032 *4*	δ: δ(E2/M1)=+1.6 *3*.
		944.00 *5*	61.3 *19*	366.4793	4^+	E2		0.00281	
1371.735	4^+	137.56 *22*	0.113 *20*	1233.863	3^+	[M1,E2]		0.72 *4*	
		150.13 *8*	0.137 *12*	1221.64	5^-	[E1]		0.0914	B(E1)(W.u.)=6.6×10^{-5} *+38−26*
		285.84 *5*	1.49 *24*	1085.841	2^+	[E2]		0.0654	B(E2)(W.u.)=62 *+35−24*
		330.60 *6*	1.41 *16*	1041.122	3^-	[E1]		0.01153	B(E1)(W.u.)=6.4×10^{-5} *+37−25*
		348.751 *15*	0.258 *24*	1022.970	4^+	[M1,E2]			
		561.26 *17*	0.21 *4*	810.453	2^+	[E2]		0.00949	B(E2)(W.u.)=0.30 *+18−13*
		664.77 *5*	1.50 *8*	706.928	6^+	[E2]		0.00623	B(E2)(W.u.)=0.9 *+6−4*
		1005.27 *5*	100.0 *16*	366.4793	4^+	M1+E2	−3.1 *+3−2*	0.00259 *5*	B(M1)(W.u.)=0.0014 *+8−6*; B(E2)(W.u.)=7 *+4−3*

$^{152}_{62}$Sm$_{90}$-11

$\gamma(^{152}Sm)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[ef]	δ[e]	α[g]	Comments
1371.735	4^+	1249.94 *5*	28.3 *4*	121.7818	2^+	E2		0.00159	B(E2)(W.u.)=0.7 *+5−3* δ: δ(M3/E2)=+0.04 *9*.
1505.77	7^-	380.36 *12*	4.7 *3*	1125.39	8^+	(E1)		0.00818	I_γ: From Coulomb excitation. Others: <38 from (n,n′γ), 12 from (α,2nγ). Mult.: Dipole from angular distribution. $\Delta\pi$=yes from placement.
		798.82 *3*	100 *3*	706.928	6^+	E1		0.00159	
1510.790	1^-	218.10 *15*	0.073 *9*	1292.773	2^+	[E1]		0.0336	B(E1)(W.u.)=0.000172 *25*
		424.3 *4*	0.021 *9*	1085.841	2^+	[E1]		0.0063	B(E1)(W.u.)=7.E−6 *3*
		427.9	<0.010	1082.842	0^+	[E1]		0.0062	
		469.97 *20*	0.068 *11*	1041.122	3^-	[E2]		0.0152	B(E2)(W.u.)=3.6 *7*
		547.36 *8*	1.17 *7*	963.358	1^-	[M1,E2]		0.014 *4*	
		700.28 *14*	1.27 *9*	810.453	2^+	[E1]		0.0021	B(E1)(W.u.)=9.0×10^{-5} *9*
		826.01 *5*	3.55 *21*	684.751	0^+	[E1]		0.0015	B(E1)(W.u.)=0.000154 *14*
		1389.03 *4*	100.0 *21*	121.7818	2^+	E1+M2	−0.025 *12*	0.00070	B(E1)(W.u.)=0.00091 *7*; B(M2)(W.u.)=1.3 *+18−11*
		1510.77 *5*	0.79 *3*	0.0	0^+	[E1]		0.00071	B(E1)(W.u.)=5.6×10^{-6} *5*
1529.802	2^-	237.11 *3*	0.0303 *9*	1292.773	2^+	[E1]		0.0270	B(E1)(W.u.)=1.7×10^{-5} *3*
		295.9387 *17*	2.110 *19*	1233.863	3^+	E1		0.01523	B(E1)(W.u.)=0.00060 *12* δ: δ(M2/E1)=0.00 *3*.
		443.9606 *16*	13.54 *4*	1085.841	2^+	E1+M2	+0.058 *12*	0.00598 *17*	B(E1)(W.u.)=0.00114 *22*; B(M2)(W.u.)=90 *+43−39* δ: The measured δ gives a value of B(M2)(W.u.) much larger than the RUL limit of 1, suggesting that the δ value is too large. RUL<1 requires δ<0.007.
		488.6792 *20*	1.985 *13*	1041.122	3^-	M1+E2	+5.6 *5*	0.01392 *21*	B(M1)(W.u.)=0.00036 *+10−9*; B(E2)(W.u.)=25 *5*
		566.438 *6*	0.628 *15*	963.358	1^-	M1+E2	−0.74 *35*	0.0134 *15*	B(M1)(W.u.)=0.0015 *6*; B(E2)(W.u.)=1.4 *9*
		719.36 *14*	0.455 *15*	810.453	2^+	(E1)		0.00197	B(E1)(W.u.)=9.0×10^{-6} *17*
		1408.013 *3*	100.00 *17*	121.7818	2^+	E1+M2	+0.043 *3*	0.00071 *1*	B(E1)(W.u.)=0.00026 *5*; B(M2)(W.u.)=1.1 *3*
1559.62	5^+	325.69 *6*	4.71 *26*	1233.863	3^+	(E2)		0.0437	Mult.: Mult=(Q) from angular distribution. $\Delta\pi$=no from placement.
		852.67 *7*	35.1 *13*	706.928	6^+	M1+E2			α: α=0.0053 *3* for δ=−0.5 *2*, and 0.0041 *3* for δ=−1.6 *4*. δ: −0.5 *2* or −1.6 *4*. I_γ: From Coulomb excitation. Iγ/Iγ(1193γ)=0.564 *23* from (α,2nγ), <0.33 from (n,n′γ).
		1193.10 *5*	100 *3*	366.4793	4^+	M1+E2	−4.0 *8*	0.00178 *4*	
1579.429	3^-	207.64 *11*	0.519 *19*	1371.735	4^+	[E1]		0.0382	B(E1)(W.u.)=0.00130 *12*
		286.50 *11*	0.098 *21*	1292.773	2^+	[E1]		0.0165	B(E1)(W.u.)=9.4×10^{-5} *22*
		345.54 *3*	0.69 *4*	1233.863	3^+	[E1]		0.0103	B(E1)(W.u.)=0.00038 *4*
		493.54 *4*	2.14 *10*	1085.841	2^+	[E1]		0.0044	B(E1)(W.u.)=0.00040 *4*
		538.29 *6*	0.306 *21*	1041.122	3^-	[M1,E2]		0.014 *4*	
		556.48 *10*	1.25 *5*	1022.970	4^+	[E1]		0.0034	B(E1)(W.u.)=0.000163 *15*
		616.05 *5*	0.65 *4*	963.358	1^-	[E2]		0.0075	B(E2)(W.u.)=8.1 *9*
		768.96 *4*	5.8 *3*	810.453	2^+	[E1]		0.0017	B(E1)(W.u.)=0.00029 *3*
		1212.948 *11*	100.0 *4*	366.4793	4^+	E1		0.00076 *1*	B(E1)(W.u.)=0.00126 *11* δ: δ(M2/E1)=0.00 *2*.

$^{152}_{62}Sm_{90}$-12

γ(^{152}Sm) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[ef]	α[g]	Comments
1579.429	3^-	1457.643 *11*	35.13 *26*	121.7818	2^+	E1	0.00070 *1*	B(E1)(W.u.)=0.000255 *22* δ: δ(M2/E1)=0.00 *3*.
1609.26	10^+	483.86 *3*	100	1125.39	8^+	E2	0.01400	B(E2)(W.u.)=314 *+35−26*
1612.90	4^+	241[h]	<4.1	1371.735	4^+			
		320.10 *5*	21.4 *11*	1292.773	2^+			
		379.05 *17*	2.6 *6*	1233.863	3^+			
		391.19 *7*	15.4 *5*	1221.64	5^-			
		527.1[h]	<2.0	1085.841	2^+			
		571.83 *8*	48.4 *18*	1041.122	3^-			
		589.83 *17*	14.2 *9*	1022.970	4^+			
		802.0 *5*	4.5 *5*	810.453	2^+			
		906.06 *10*	100 *5*	706.928	6^+			
		1246.34 *16*	10.1 *15*	366.4793	4^+			
		1491.4 *8*	6 *3*	121.7818	2^+			
1649.831	2^-	357.26 *5*	1.23 *9*	1292.773	2^+	[E1]	0.0095	B(E1)(W.u.)=2.1×10^{-7} *+4−3*
		416.02 *3*	22.0 *4*	1233.863	3^+	[E1]	0.0066	B(E1)(W.u.)=2.4×10^{-6} *+5−4*
		563.986 *5*	100.0 *9*	1085.841	2^+	E1	0.00330	B(E1)(W.u.)=4.3×10^{-6} *+9−7* δ: δ(M2/E1)=+0.07 *+11−9*.
		609.23 *22*	0.25 *3*	1041.122	3^-	[M1,E2]	0.010 *3*	
		686.60 *5*	4.11 *14*	963.358	1^-	[M1,E2]	0.0078 *20*	
		839.36 *4*	3.59 *10*	810.453	2^+	[E1]	0.00144	B(E1)(W.u.)=4.7×10^{-8} *+9−7*
		1528.10 *4*	56.6 *7*	121.7818	2^+	E1	0.00072	B(E1)(W.u.)=1.22×10^{-7} *+24−18* δ: δ(M2/E1)=−0.01 *3*.
1658.80	0^+	695.9 *3*	100 *5*	963.358	1^-	[E1]	0.00211	
		847.5 *5*	2.4 *6*	810.453	2^+	[E2]	0.00356	
		1535.3 *10*	1.2 *6*	121.7818	2^+	[E2]	0.00114	
1666.45	8^+	160.8 *2*	10.8 *4*	1505.77	7^-			
		355.9 *1*	100 *3*	1310.505	6^+	E2	0.0334	
		540.9 *3*	39.7 *13*	1125.39	8^+	E0+M1+E2	0.066 *10*	δ: $-0.45<\delta(Q/D)<+1.0$.
		959.5 *1*	21.9 *7*	706.928	6^+	E2	0.00271	Mult.: Mult=Q from (α,2nγ).
1680.56	1^-	388.3 *5*	0.13 *5*	1292.773	2^+	[E1]	0.0078	B(E1)(W.u.)=7.2×10^{-5} *28*
		594.7 *4*	0.38 *11*	1085.841	2^+	[E1]	0.0029	B(E1)(W.u.)=5.9×10^{-5} *18*
		597.50 *14*	0.77 *11*	1082.842	0^+	[E1]	0.0029	B(E1)(W.u.)=0.000117 *19*
		639.14 *14*	0.57 *11*	1041.122	3^-	[E2]	0.0069	B(E2)(W.u.)=8.6 *18*
		716.84 *21*	1.33 *21*	963.358	1^-	[M1,E2]	0.0070 *18*	
		870.14 *5*	100.0 *24*	810.453	2^+	[E1]	0.0013	B(E1)(W.u.)=0.0049 *4*
		995.84 *5*	73 *3*	684.751	0^+	[E1]	0.0010	B(E1)(W.u.)=0.00240 *+22−19*
		1558.74 *6*	9.0 *3*	121.7818	2^+	[E1]	0.00072	B(E1)(W.u.)=7.7×10^{-5} *+7−6*
		1680.62 *10*	6.2 *3*	0.0	0^+	[E1]	0.00076	B(E1)(W.u.)=4.2×10^{-5} *4*
1682.07	4^-	1315.49 *5*	100	366.4793	4^+			B(E1)(W.u.)<0.00018
1728.27	6^+	222.89 *13*	1.15 *10*	1505.77	7^-			
		356.56 *5*	8.0 *3*	1371.735	4^+			
		506.60 *5*	6.91 *25*	1221.64	5^-			

$^{152}_{62}$Sm$_{90}$-13

$\gamma(^{152}Sm)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[ef]	δ[e]	α[g]	Comments
1728.27	6^+	1021.41 *4*	100 *3*	706.928	6^+	M1+E2	−1.4 *+4−7*	0.00284 *23*	
		1361.7 *6*	20.6 *7*	366.4793	4^+				E_γ: From (α,2nγ). Eγ=1361.31 *11* is reported in Coulomb excitation.
1730.205	3^-	358.48 *7*	6.4 *5*	1371.735	4^+	[E1]		0.0095	B(E1)(W.u.)=0.0019 *3*
		496.56 *24*	23 *8*	1233.863	3^+	[E1]		0.0044	B(E1)(W.u.)=0.0026 *10*
		644.39 *6*	26.5 *19*	1085.841	2^+	[E1]		0.0025	B(E1)(W.u.)=0.00136 *+20−19*
		707.15 *7*	5.50 *21*	1022.970	4^+	[E1]		0.0020	B(E1)(W.u.)=0.00021 *3*
		766.84 *3*	2.7 *3*	963.358	1^-	[E2]		0.0045	B(E2)(W.u.)=6.9 *+12−11* E_γ: Rounded-off value from the level energies. Eγ=766.38 *18* is reported in 13-y Eu ε decay.
		919.74 *4*	25.1 *15*	810.453	2^+	[E1]		0.0012	B(E1)(W.u.)=0.00044 *6*
		1363.78 *5*	100.0 *23*	366.4793	4^+	(E1)		0.00070 *1*	B(E1)(W.u.)=0.00054 *+7−6* Mult.: Mult=D(+Q) with δ=−0.05 *12*. Placement in the level scheme requires $\Delta\pi$=yes.
		1608.36 *8*	20.9 *8*	121.7818	2^+	E1		0.00074 *1*	B(E1)(W.u.)=6.9×10^{-5} *9*
1754.98	0^+	462.16 *6*		1292.773	2^+				E_γ: Reported only in (n,n′γ).
		791.67 *7*	100 *5*	963.358	1^-				E_γ: Weighted average from (n,n′γ) and Coulomb excitation.
		944.8 *10*	6.3 *20*	810.453	2^+				E_γ: Reported only in Coulomb excitation.
1757.001	4^+	385.61 *21*	22.7 *10*	1371.735	4^+				
		464.28 *14*	1.8 *7*	1292.773	2^+				
		523.13 *5*	62.5 *26*	1233.863	3^+				
		671.155 *14*	100 *18*	1085.841	2^+				Mult.: See comment in (α,2nγ).
		734.12 *12*	3.7 *6*	1022.970	4^+				
		946.5	4.5 *8*	810.453	2^+				E_γ: Rounded-off value from the level energies. Eγ=947.15 *14* is reported in 13-y Eu ε decay.
		1050.1 *6*	2.9 *12*	706.928	6^+				
		1390.50 *12*	17.4 *7*	366.4793	4^+				
		1635.38 *20*	0.66 *18*	121.7818	2^+				
1764.32	5^-	1057.36 *6*	100 *6*	706.928	6^+	[E1]		0.00093	B(E1)(W.u.)=0.0014 *+14−8*
		1397.88 *7*	82 *5*	366.4793	4^+	[E1]		0.00070	B(E1)(W.u.)=0.00049 *+49−26*
1769.132	2^+	239.33[h] *17*	<27	1529.802	2^-	[E1]		0.026	B(E1)(W.u.)<0.012
		397.75 *26*	1.9 *3*	1371.735	4^+	[E2]			B(E2)(W.u.)=40 *+13−12*
		476.43 *10*	8.6 *16*	1292.773	2^+	[M1,E2]			
		535.44 *12*	8.8 *7*	1233.863	3^+	[M1,E2]			
		683.25 *9*	24.1 *14*	1085.841	2^+	[M1,E2]			
		728.03 *4*	56.5 *19*	1041.122	3^-	[E1]			B(E1)(W.u.)=6.2×10^{-4} *+17−16*
		805.71 *9*	77 *3*	963.358	1^-	[E1]			B(E1)(W.u.)=6.3×10^{-4} *+18−16*
		958.63 *5*	100 *6*	810.453	2^+	[M1,E2]			
		1084.36 *14*	54 *4*	684.751	0^+	[E2]			B(E2)(W.u.)=7.6 *+22−20*
		1647.44 *12*	36.9 *18*	121.7818	2^+	E2(+M1)	>0.6	0.00117 *13*	B(M1)(W.u.)<0.0033; B(E2)(W.u.)>0.12<0.82
		1769.09 *5*	47.3 *11*	0.0	0^+	E2		0.00099 *2*	B(E2)(W.u.)=0.58 *+16−15*
1776.56	(2^+)	735.43 *8*	100	1041.122	3^-	D,E2			Mult.: from comparison with RUL.
		813.20 *6*	93 *7*	963.358	1^-	D,E2			I_γ: Weighted average from 4.12-min Pm β^- and 13-y Eu ε

$^{152}_{62}Sm_{90}$-14

$\gamma(^{152}Sm)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[ef]	α[g]	Comments
								decays. Mult.: from comparison with RUL.
1779.119	3^-	737.84 *7*	11.2 *21*	1041.122	3^-	[M1,E2]	0.0065 *17*	I_γ: Not seen in 13-y ε decay. From $I\gamma/I\gamma(756\gamma+969\gamma)$=0.072 *14* in Coulomb excitation.
		756.16 *5*	56 *6*	1022.970	4^+	[E1]	0.0018	B(E1)(W.u.)=0.0033 *+7−6*
		968.64 *4*	100 *3*	810.453	2^+	[E1]	0.0011	B(E1)(W.u.)=0.0028 *+6−5*
1803.94	5^-	432.1 *2*	5.7[c] *4*	1371.735	4^+			
		762.2 *3*	0.7[c] *3*	1041.122	3^-			
		780.8 *1*	14.7[c] *9*	1022.970	4^+			
		1097.1 *1*	100[c] *5*	706.928	6^+	E1	0.00087 *2*	δ: δ(M2/E1)=−0.03 *8*.
		1437.5 *1*	79[c] *4*	366.4793	4^+	E1	0.00070 *1*	δ: δ(M2/E1)=−0.07 *11*.
1822.03	(4^-)	588.6 *3*	16 *6*	1233.863	3^+			
		780.9	16.3 *24*	1041.122	3^-			E_γ: Rounded-off value from the level energies. $E\gamma$=779.8 *5* is reported in Coulomb excitation.
		1455.1 *3*	100 *6*	366.4793	4^+			
1879.14	9^-	269.8 *4*	15	1609.26	10^+			E_γ: Reported only in (α,2nγ).
		373.7 *4*	0.70 *15*	1505.77	7^-			E_γ: Reported only in Coulomb excitation.
		753.83 *3*	100 *3*	1125.39	8^+	E1		δ: δ(M2/E1)=−0.03 *3*. ΔJ=1 from (α,2nγ).
1891.06	5^+	134.73[d] *21*	56 *8*	1757.001	4^+			
		331.5[d] *5*	65 *19*	1559.62	5^+			
		519.90[d] *20*	100 *8*	1371.735	4^+			
		657.39[d] *23*	85 *7*	1233.863	3^+			
		1183.95[d] *9*		706.928	6^+			
		1524.47[d] *10*		366.4793	4^+			
1892.48	0^+,1,2	929.12 *5*	100 *10*	963.358	1^-			E_γ: From (n,n′γ). $E\gamma$=929.4 *5* in Coulomb excitation, and 929.1 *4* in 4.12-min Pm β^- decay.
		1080.7 *11*	40 *10*	810.453	2^+			E_γ: From Coulomb excitation. Not reported in (n,n′γ) or in 4.12-min Pm β^- decay.
1906.13	2^+	255.96 *15*		1649.831	2^-			E_γ: Reported only in (n,n′γ).
		376.24 *8*		1529.802	2^-			E_γ: Reported only in (n,n′γ).
		672.5 *6*	2.8 *6*	1233.863	3^+			E_γ: Reported only in Coulomb excitation.
		820.31 *7*		1085.841	2^+			E_γ: Reported only in (n,n′γ).
		865.04 *6*		1041.122	3^-			E_γ: Reported only in (n,n′γ).
		942.85 *6*	8.5 *12*	963.358	1^-			
		1784.27 *7*	100 *8*	121.7818	2^+			
		1906.14 *7*		0.0	0^+			E_γ: Reported only in (n,n′γ).
1907.73	(3^+)	821.0 *6*	22 *3*	1085.841	2^+			E_γ: Reported only in Coulomb excitation.
		884.76 *10*	21.6 *21*	1022.970	4^+			
		1096.95 *22*	98 *6*	810.453	2^+			
		1541.24 *7*	60 *5*	366.4793	4^+			
		1785.97 *6*	100 *16*	121.7818	2^+			

$^{152}_{62}Sm_{90}$-15

$\gamma(^{152}Sm)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.[e,f]	δ[e]	α[g]	Comments
1920.46	6⁻	116.51 *6*	66 *7*	1803.94	5⁻	M1+E2	+0.21 *7*	1.104 *18*	E_γ: Reported only in (α,2nγ).
		360.90 *7*	100 *9*	1559.62	5⁺				
		1213.4 *3*	38 *8*	706.928	6⁺				I_γ: From Coulomb excitation. Iγ=74 *18* in (α,2nγ).
1929.93	6⁻	370.24 *6*	23.1 *19*	1559.62	5⁺	E1		0.00873	I_γ: From Coulomb excitation. (α,2nγ) reports Iγ(370γ):Iγ(1223γ)= 123 *5*:100 *25*.
		1223.16 *9*	100 *6*	706.928	6⁺				
1933.30	(4⁺,5,6⁺)	910.38 *7*		1022.970	4⁺				
		1226.32 *7*		706.928	6⁺				
		1566.82 *8*		366.4793	4⁺				
1944.61	1⁻,2	861.7 *8*	7 *7*	1082.842	0⁺				
		903.50 *5*	50 *7*	1041.122	3⁻				
		981.24 *5*	100 *7*	963.358	1⁻				E_γ: From (n,n′γ). Eγ=982.19 *23* is reported in Coulomb excitation, and Eγ=981.0 *3* in 4.12-min Pm β^- decay.
1945.10	1,2⁺	652.31 *6*	67 *33*	1292.773	2⁺				
		862.26 *5*		1082.842	0⁺				
		1260.41 *7*	100 *33*	684.751	0⁺				E_γ: Assigned in Coulomb excitation to the 1944.6 level, and in (n,n′γ) to the 1945.1 level. The Eγ data in (n,n′γ) agree well with placement from the higher-energy member of the doublet, suggesting that Coulomb excitation is exciting both members of the doublet; however, none of the other transitions from this level is seen in Coulomb excitation.
		1823.22 *7*		121.7818	2⁺				
		1945.15 *10*		0.0	0⁺				
1945.90	7⁺	217.6 *3*	7.6	1728.27	6⁺				
		386.2# *1*	19.6 *9*	1559.62	5⁺				
		820.6# *1*	48.1 *19*	1125.39	8⁺	M1+E2	−1.6 *4*	0.0045 *4*	
		1238.9# *1*	100 *3*	706.928	6⁺	M1+E2	−1.7 *2*	0.00181 *5*	
1946.15	0,1,2,3⁻	982.79 *6*		963.358	1⁻				
1954.30	3⁻,4,5⁻	732.66 *8*	70 *4*	1221.64	5⁻				
		913.17 *6*	100 *5*	1041.122	3⁻				
1958.27	(2⁺,3,4⁺)	935.33 *7*		1022.970	4⁺				
		1147.75 *8*		810.453	2⁺				
		1591.81 *8*		366.4793	4⁺				
1963.95	(1,2⁺)	1153.41 *7*		810.453	2⁺				
		1842.19 *6*		121.7818	2⁺				
		1963.98 *7*		0.0	0⁺				
1976.98	4⁺,5,6⁺	954.00 *7*		1022.970	4⁺				
		1270.11 *10*		706.928	6⁺				
		1610.41 *11*		366.4793	4⁺				
1977.19	5⁻	667.5 *4*	50 *6*	1310.505	6⁺				
		755.5 *3*	48 *5*	1221.64	5⁻				
		953.8 *3*	100 *9*	1022.970	4⁺				
2003.66	2⁺,3,4⁺	1193.2 *2*	100	810.453	2⁺				

$\gamma(^{152}Sm)$ (continued)

E_i(level)	J^π_i	E_γ †	I_γ †	E_f	J^π_f	Mult.[ef]	α[g]	Comments
2004.24	6^+	391.27 *7*	58.8 *25*	1612.90	4^+			
		444.99 *19*	9.3 *9*	1559.62	5^+			
		693.98 *13*	35.0 *17*	1310.505	6^+			
		782.37 *23*	20.4 *14*	1221.64	5^-			
		879.0 *10*	47.2 *26*	1125.39	8^+			
		982.3 *3*	17.0 *14*	1022.970	4^+			
		1297.4 *10*	11×10^1 *12*	706.928	6^+			
		1637.43 *14*	100 *4*	366.4793	4^+			E_γ: From the level energies. $E\gamma$=1635.36 *14* in Coulomb excitation.
2004.29	7^-	879.02 *17*	71 *24*	1125.39	8^+			I_γ: From (α,2nγ). $I\gamma/I\gamma(1297\gamma)$=0.30 *+80−12* in Coulomb excitation.
		1297.29 *13*	100 *7*	706.928	6^+	E1	0.00072 *1*	Mult.: ΔJ=1 from (α,2nγ).
2006.61	$0,1,2,3^-$	1043.25 *5*		963.358	1^-			
2011.55	$3^-,4,5^-$	789.96 *8*	86 *5*	1221.64	5^-			
		970.38 *7*	100 *6*	1041.122	3^-			
2011.84	$2^+,3,4^+$	989.08 *8*	13.1 *17*	1022.970	4^+			
		1201.7 *6*	6.0 *6*	810.453	2^+			
		1645.30 *10*	100 *9*	366.4793	4^+			
		1889.95 *6*	50 *9*	121.7818	2^+			
2038.37	$1,2^+$	1227.96 *6*	100 *11*	810.453	2^+			
		1352.97 *21*	30 *4*	684.751	0^+			
		1916.56 *24*		121.7818	2^+			
2040.09	6^+	149.06 *16*	41 *4*	1891.06	5^+			E_γ: Not reported in (n,n′γ).
		283.94[h] *23*	27 *4*	1757.001	4^+			E_γ: From Coulomb excitation and not included in the least-squares adjustment which gives $E\gamma$= 283.08 *8*. This transition is not reported in (α,2nγ); however, in that reaction a 276γ is seen and placed feeding the 1764 5- level. No 276γ is reported in Coulomb excitation. The two works are from the same group.
		312‡		1728.27	6^+			
		427‡		1612.90	4^+			
		818.8 *3*	30 *3*	1221.64	5^-			E_γ: Not reported in Coulomb excitation.
		1333.11 *9*	100 *6*	706.928	6^+			E_γ: From (n,n′γ). $E\gamma$=1334.7 *3* is reported in Coulomb excitation.
		1672‡		366.4793	4^+			
2042.79	$0^+,1,2$	1079.43 *5*	100 *8*	963.358	1^-			
		1234 *4*	10 *8*	810.453	2^+			E_γ: Reported only in Coulomb excitation.
		1921.6 *10*	3 *3*	121.7818	2^+			E_γ: Reported only in 4.12-min Pm β^-.
2044.45	$3,4^+$	810.2 *2*	100 *7*	1233.863	3^+			
		1021.4 *2*	28 *3*	1022.970	4^+			
		1234.2 *1*	68 *5*	810.453	2^+			
		1677.6 *2*	9 *3*	366.4793	4^+			
2046.16	$4^+,5,6,7^+$	486.2 *2*	100 *6*	1559.62	5^+			E_γ: Not reported in (n,n′γ).
		1339.33 *11*	89 *11*	706.928	6^+			
2048.04		962.20 *11*		1085.841	2^+			
2051.45		401.62 *8*		1649.831	2^-			

$^{152}_{62}Sm_{90}$-17

$\gamma(^{152}Sm)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[ef]	δ[e]	α[g]	Comments
2051.83	4^+	817.8 *3*	100 *10*	1233.863	3^+				
		965.0 *7*	57 *7*	1085.841	2^+				E_γ: Reported only in Coulomb excitation.
		1930.05 *7*		121.7818	2^+				E_γ: Reported only in (n,n′γ).
2053.52		1243.06 *9*		810.453	2^+				
		1931.74 *16*		121.7818	2^+				
2055.8		1348.9 *10*		706.928	6^+				
2057.52	7^-	137.08 *5*	100[b] *9*	1920.46	6^-	M1+E2	+0.18 *+3−4*	0.692 *10*	
		253.2 *2*	17[b]	1803.94	5^-				
		329.4 *1*	13.9[b] *13*	1728.27	6^+				
		747.1 *2*	17[b] *9*	1310.505	6^+				
		931.9 *2*	65[b] *13*	1125.39	8^+				
		1350.9 *4*	43[b] *13*	706.928	6^+				
2063.78	$(1^-,2,3^-)$	383.21 *9*		1680.56	1^-				
		1022.68 *6*		1041.122	3^-				
		1100.41 *5*		963.358	1^-				
2069.31	$0^+,1,2,3^-$	388.75 *7*		1680.56	1^-				
		1947.6 *3*		121.7818	2^+				
2070.83	$3^-,4,5^-$	849.14 *7*	61 *5*	1221.64	5^-				
		1030.21 *24*	100 *7*	1041.122	3^-				
2079.57	10^+	200.52 *4*	11.9 *4*	1879.14	9^-				
		413.11 *3*	100 *3*	1666.45	8^+	E2		0.0217	
		470.36 *5*	10.0 *3*	1609.26	10^+	M1		0.0251	Mult.,δ: δ(E2/M1)=+0.3 *5*.
		953.84 *9*	8.5 *3*	1125.39	8^+				
2091.21	$1^-,2$	1050.10 *5*	100 *7*	1041.122	3^-				
		1127.84 *5*	82 *7*	963.358	1^-				
2091.66		1969.86 *7*		121.7818	2^+				
2096.82	$3^+,4$	537.12 *7*		1559.62	5^+				
		725.13 *5*		1371.735	4^+				
2112.71	$(2^+,3,4^+)$	1071.48 *7*		1041.122	3^-				
		1746.27 *6*		366.4793	4^+				
		1991.02 *11*		121.7818	2^+				
2120.98	7^-	63.51 *5*	67 *9*	2057.52	7^-	[M1,E2]		10 *4*	
		200.6 *1*	100	1920.46	6^-	[M1,E2]		0.223 *17*	
2127.17	$0^+,1,2$	616.0 *3*	8 *8*	1510.790	1^-				
		1317.4 *5*	100 *8*	810.453	2^+				
		2005.38 *7*	85 *8*	121.7818	2^+				
2129.84	$(1^+,2,3^-)$	896.12 *7*		1233.863	3^+				
		1166.34 *7*		963.358	1^-				
2137.69		1327.23 *6*		810.453	2^+				
2137.92	$(2^+,3,4^+)$	1771.33 *10*		366.4793	4^+				
		2016.17 *7*		121.7818	2^+				
2138.17	2^+	1096.96 *12*	100 *4*	1041.122	3^-				

$^{152}_{62}Sm_{90}$-18

γ(^{152}Sm) (continued)

E$_i$(level)	J$^\pi_i$	E$_\gamma$†	I$_\gamma$†	E$_f$	J$^\pi_f$	Mult.[ef]	δ[e]	α[g]	Comments
2138.17	2$^+$	1116.9 *6*	15.9 *19*	1022.970	4$^+$				
		1327.7 *5*	15.0 *14*	810.453	2$^+$				
		1454.0 *8*	7.0 *10*	684.751	0$^+$				
2139.71	8$^+$	260.60 *23*	1.12 *15*	1879.14	9$^-$				E$_\gamma$: Reported only in Coulomb erxcitation.
		411.65 *6*	16.0 *7*	1728.27	6$^+$				E$_\gamma$: Reported only in Coulomb excitation.
		633.85 *5*	19.4 *7*	1505.77	7$^-$				
		1014.28 *4*	100 *3*	1125.39	8$^+$				
		1432.93 *19*	8.9 *4*	706.928	6$^+$				E$_\gamma$: Reported only in Coulomb excitation.
2148.81	12$^+$	539.50 *3*		1609.26	10$^+$	E2		0.01050	
2167.0	0$^+$,1,2	2045.2 *6*		121.7818	2$^+$				
2172.60	1,2$^+$	642.8 *3*	67 *7*	1529.802	2$^-$				
		661.7 *4*	100 *7*	1510.790	1$^-$				
		1488.1 *6*	13 *7*	684.751	0$^+$				
2175.7	0$^+$,1,2,3$^-$	2053.9 *10*		121.7818	2$^+$				
2176.62	7$^-$	510.0	21 *4*	1666.45	8$^+$				E$_\gamma$: Rounded-off value from the level energies. Eγ=507.4 *5* is reported in Coulomb excitation.
		670.7 *3*	31 *4*	1505.77	7$^-$				
		866.2 *4*	38 *4*	1310.505	6$^+$				
		955.03 *20*	100 *6*	1221.64	5$^-$				
2201.20	0$^+$,1,2	2079.3 *4*		121.7818	2$^+$				
2201.47	8$^-$	255.6 *1*	100 *3*	1945.90	7$^+$	E1		0.0222	δ: δ(M2/E1)=−0.03 *3*.
		271.3 *1*	18	1929.93	6$^-$				E$_\gamma$: Reported only in (α,2nγ).
		322.2 *1*	6.1 *18*	1879.14	9$^-$				E$_\gamma$: Reported only in (α,2nγ).
		1075 *1*	7 *4*	1125.39	8$^+$				E$_\gamma$: Reported only in (α,2nγ).
2206	7$^+$	260‡		1945.90	7$^+$				
		276‡		1929.93	6$^-$				
		478‡		1728.27	6$^+$				
		1081‡		1125.39	8$^+$				
		1499‡		706.928	6$^+$				
2214.98	8$^-$	157.3 *1*	100 *10*	2057.52	7$^-$	M1+E2	+0.36 *6*	0.469	E$_\gamma$: Reported only in (α,2nγ).
		269.0 *1*	73	1945.90	7$^+$				
		294.4 *1*	89	1920.46	6$^-$	E2		0.0596	E$_\gamma$: Reported only in (α,2nγ).
2224.8	1,2$^+$	2224.8 *5*		0.0	0$^+$				
2227.71	(5$^-$,6,7$^-$)	722.3 *3*	55 *5*	1505.77	7$^-$				
		1005.7 *3*	100 *10*	1221.64	5$^-$				
2237.3	1,2	727.1 *7*	67 *33*	1510.790	1$^-$				
		1274.4 *7*	100 *33*	963.358	1$^-$				
		2114.2 *8*	67 *33*	121.7818	2$^+$				
2239.8	2$^+$	1873.1 *10*	8 *8*	366.4793	4$^+$				
		2118.0 *3*	100 *8*	121.7818	2$^+$				
		2239.7 *8*	31 *8*	0.0	0$^+$				
2263.9	6$^+$,7,8$^+$	1138.3 *5*	45 *5*	1125.39	8$^+$				

Adopted Levels, Gammas (continued)

$\gamma(^{152}Sm)$ (continued)

E_i(level)	J_i^π	E_γ †	I_γ †	E_f	J_f^π	Mult. ef	δ e	α g	Comments
2263.9	$6^+,7,8^+$	1557.1 4	100 7	706.928	6^+				
2269.87	8^-	148.95 5		2120.98	7^-	M1+E2	−0.18 8	0.547 8	
2284.96	0,1,2	1321.6 2		963.358	1^-				
2287.4	$0^+,1,2,3^-$	2165.6 10		121.7818	2^+				
2290.37	9^-	623.9	52.1 24	1666.45	8^+				
		681.6 3	49 4	1609.26	10^+	D+Q			
		783.9 4	7.5 9	1505.77	7^-				E_γ: Reported only in Coulomb excitation.
		1165.0 2	100 4	1125.39	8^+	E1		0.00079	δ: δ(M2/E1)=−0.05 11.
2295.3	$1^-,2$	1253.2 6	100 25	1041.122	3^-				
		1332.0 4	75 25	963.358	1^-				
		2175.0 8	100 25	121.7818	2^+				
2308.6		1183.2 4		1125.39	8^+				
2308.9	$1,2^+$	2187.0 6	100 20	121.7818	2^+				
		2309.1 9	80 20	0.0	0^+				
2320.35	$4^+,5$	516.3 4	100 10	1803.94	5^-				
		1297.8 5	7 7	1022.970	4^+				
		1613.4 6	13 3	706.928	6^+				
		1953.7 4	30 7	366.4793	4^+				
2326.94	11^-	448.18 23	5.4 5	1879.14	9^-				E_γ: Reported only in Coulomb excitation.
		717.78 4	100 3	1609.26	10^+	E1		0.00198	
2348.76		682.11 9	55.9 23	1666.45	8^+				
		843.36 17	31.2 17	1505.77	7^-				
		1223.47 9	100 4	1125.39	8^+				
2359.8		1234.4 3		1125.39	8^+				
2367.3	$1^-,2$	1326.4 3	60 20	1041.122	3^-				
		1403.0 6	100 20	963.358	1^-				
2375.49	9^+	174.28 12	23.5 20	2201.47	8^-				
		235.8 2	33	2139.71	8^+				E_γ: Reported only in (α,2nγ).
		429.35 9	61 3	1945.90	7^+				
		766.3 2	40 4	1609.26	10^+	M1+E2	−1.0 4	0.0060 8	E_γ: From (α,2nγ). Eγ=759.7 3 in Coulomb excitation.
		1250.25 16	100 4	1125.39	8^+				
2376.8		2255.0 15		121.7818	2^+				
2388.79	9^-	173.8 1	≤100	2214.98	8^-				E_γ: Reported only in (α,2nγ).
		187.6 2	≤100	2201.47	8^-				E_γ: Reported only in (α,2nγ).
		331.3 1	33 27	2057.52	7^-				
		721.9 6	100 17	1666.45	8^+				E_γ: Reported only in Coulomb excitation.
2391.7	8^+	727 ‡		1666.45	8^+				
		885.9 3		1505.77	7^-				
		1267 ‡		1125.39	8^+				
2402.23	$3,4^+$	645.7 3	100 9	1757.001	4^+				
		1591.6 3	12 3	810.453	2^+				
		2280.2 3	9 3	121.7818	2^+				
2424.36	9^-	154.6 1	100 10	2269.87	8^-	M1+E2	−0.25 +9−15	0.493 10	

$^{152}_{62}Sm_{90}$-20

$\gamma(^{152}Sm)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[ef]	δ[e]	α[g]	Comments
2424.36	9^-	303.5 *1*	38	2120.98	7^-				
2445.90	9^-	567.1 *3*	9.4 *11*	1879.14	9^-				
		779.97 *12*	43.0 *19*	1666.45	8^+				
		939.80 *9*	100 *4*	1505.77	7^-				
2458.6	8^+	1751.7 *3*		706.928	6^+				
2482.00	3,4,5	725.0 *2*		1757.001	4^+				
2506.29	7^-,8,9^-	628.4 *9*	20 *3*	1879.14	9^-				
		1000.50 *11*	100 *4*	1505.77	7^-				
2510.4	$1^{(-)}$	2388.8[@] *5*	106 *34*	121.7818	2^+	[E1]		0.00108 *2*	B(E1)(W.u.)=1.9×10^{-4} *6*
		2510.6 *5*	100	0.0	0^+	[E1]		0.00114 *2*	B(E1)(W.u.)=1.5×10^{-4} *5*
2510.59	10^-	135.13 *5*	77 *8*	2375.49	9^+	E1		0.1216	E_γ: Reported only in (α,2nγ). δ: δ(M2/E1)=−0.11 +*11*−*7* (α,2nγ).
		309.0 *1*	100 *4*	2201.47	8^-	E2		0.0513	Mult.: ΔJ=2 from (α,2nγ).
		631.5 *3*	42 *5*	1879.14	9^-				I_γ: From Iγ<47 in (α,2nγ) and 54 *17* in Coulomb excitation.
2517.41		638.00 *18*	38 *10*	1879.14	9^-				I_γ: Weighted average of Iγ/Iγ(909γ)=0.45 *5* (Coulomb excitation) and 0.24 *7* (α,2nγ).
		908.62 *24*	100	1609.26	10^+				
2525.69	12^+	198.83 *6*	8.9 *4*	2326.94	11^-				
		376.7 *10*	4.6 *5*	2148.81	12^+				
		446.13 *3*	100 *3*	2079.57	10^+	E2		0.01748	
		916.3 *5*	7.3 *4*	1609.26	10^+				E_γ: Unweighted average of 916.8 *2* from (α,2nγ) and 915.79 *16* from Coulomb excitation.
2541.6	$1^{(+)}$	2419.8[@] *5*	62 *30*	121.7818	2^+	[M1]			B(M1)(W.u.)=0.008 *4*
		2541.6 *5*	100	0.0	0^+	[M1]			B(M1)(W.u.)=0.011 *5*
2567.06	4^+,5	1859.8 *3*	33 *8*	706.928	6^+				
		2200.7 *2*	100 *17*	366.4793	4^+				
2576.29	10^-	152.1 *1*	93 *10*	2424.36	9^-	M1(+E2)	+0.07 +*7*−*10*	0.515 *8*	
		187.6 *2*	<250	2388.79	9^-				
		361.0 *1*	100	2214.98	8^-				
2588	9^+	195[‡]		2391.7	8^+				
		1463[‡]		1125.39	8^+				
2589.02	4^+,5	584.8 *2*	100 *30*	2003.66	2^+,3,4^+				
		1217.7 *4*	WEAK	1371.735	4^+				
		1881.8 *3*	23 *8*	706.928	6^+				
2590.68	10^-	166.2 *1*	44 *5*	2424.36	9^-	M1(+E2)	−0.11 *11*	0.402 *7*	
		202.0 *2*	80 *20*	2388.79	9^-				
		320.9 *1*	17 *5*	2269.87	8^-				
		375.5 *3*	100 *30*	2214.98	8^-				
2599.36	7^-,8^+	719.56 *20*	68 *5*	1879.14	9^-				
		1094.37 *23*	100 *7*	1505.77	7^-				
		1474.1 *3*	83 *5*	1125.39	8^+				

$\gamma(^{152}Sm)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[ef]	α[g]	Comments
2599.36	$7^-,8^+$	1892.4	76 *5*	706.928	6^+			E_γ: Rounded-off value from the level energies. $E\gamma$=1895.1 *5* is reported in Coulomb excitation.
2641.09	11^-	314.3 *1*	81 *4*	2326.94	11^-	(M1+E2)	0.060 *12*	Mult.: Mult=D+Q from angular distributions. $\Delta\pi$=no from placement.
		493.0 *2*	59 *24*	2148.81	12^+			
		560.9 *3*	24	2079.57	10^+			
		1031.5 *2*	100 *5*	1609.26	10^+	E1	0.00097 *2*	δ: δ(M2/E2)=+0.03 *8*.
2643.4	$1^{(-)}$	2521.6[@] *5*	147 *16*	121.7818	2^+	[E1]	0.00114 *2*	B(E1)(W.u.)=9.0×10^{-4} *11*
		2643.4 *5*	100	0.0	0^+	[E1]	0.00120 *2*	B(E1)(W.u.)=5.3×10^{-4} *7*
2662.47	10^+	372.11 *6*	53.3 *23*	2290.37	9^-			
		522.78 *6*	62.1 *24*	2139.71	8^+			
		583.04 *6*	100 *4*	2079.57	10^+			
		1052.98 *9*	74 *3*	1609.26	10^+			
		1536.73 *14*	52.9 *20*	1125.39	8^+			
2663.4	$1^{(+)}$	2541.6[@] *5*	31 *13*	121.7818	2^+	[M1]	0.00109	B(M1)(W.u.)=0.006 *3*
		2663.4 *5*	100	0.0	0^+	[M1]	0.00111	B(M1)(W.u.)=0.017 *6*
2687.8	0^+,1,2	2566.0 *10*		121.7818	2^+			
2712.5		1103.2 *3*		1609.26	10^+			
2736.19	14^+	587.37 *3*		2148.81	12^+			
2751.51	11^-	160.8 *2*	<103	2590.68	10^-			
		175.1 *1*	<102	2576.29	10^-			
		327.3 *1*	100 *7*	2424.36	9^-			
		362.4 *3*	67 *10*	2388.79	9^-			
2808.92	11^-	728.48[a] *15*	75 *4*	2079.57	10^+			
		930.64[a] *15*	100 *5*	1879.14	9^-			
2810	(10^+)	730[‡]		2079.57	10^+			
		931[‡]		1879.14	9^-			
2818.1	$1^{(+)}$	2696.3[@] *5*	62 *16*	121.7818	2^+	[M1]	0.00111	B(M1)(W.u.)=0.013 *3*
		2818.1 *5*	100	0.0	0^+	[M1]	0.00114	B(M1)(W.u.)=0.019 *4*
2832.85	11^+	457.1 *3*		2375.49	9^+			
2833.30	13^-	506.26 *9*	17.3 *8*	2326.94	11^-			
		684.44 *6*	100 *3*	2148.81	12^+	E1	0.00218	δ: δ(M2/E1)=−0.03 *3*. ΔJ=1 from (α,2nγ).
2841.89		515.20 *10*	94 *5*	2326.94	11^-			
		692.52 *15*	100 *5*	2148.81	12^+			
2887.3	$1^{(+)}$	2765.5[@] *5*	36 *17*	121.7818	2^+	[M1]		B(M1)(W.u.)=0.0073 *27*
		2887.3 *5*	100 *30*	0.0	0^+	[M1]	0.00115	B(M1)(W.u.)=0.018 *5*
2891.7	$1^{(+)}$	2769.9[@] *5*	35 *6*	121.7818	2^+	[M1]		B(M1)(W.u.)=0.017 *4*
		2891.7 *5*	100	0.0	0^+	[M1]	0.00116	B(M1)(W.u.)=0.042 *7*
2895.49	4^+	493.3 *2*	100 *23*	2402.23	$3,4^+$			
		1524.5 *4*	15 *7*	1371.735	4^+			
		1810.5 *4*	38 *23*	1085.841	2^+			
		2188.6 *2*	54 *15*	706.928	6^+			

From ENSDF

$^{152}_{62}Sm_{90}$-22

$\gamma(^{152}Sm)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[ef]	α[g]	Comments
2895.49	4^+	2528.5 *2*	77 *15*	366.4793	4^+			
2898.6?		854.1 *3*		2044.45	$3,4^+$			
2901.39	12^-	390.8 *1*		2510.59	10^-	E2	0.0254	
2905.17	10^+	756.4	8.4 *21*	2148.81	12^+			E_γ: Rounded-off value from the least squares adjustment, which gives Eγ=756.37 *10*. The value 759.9 *3* reported in Coulomb excitation may be a typo.
		1026.48 *14*	65 *3*	1879.14	9^-			
		1295.98 *17*	76 *4*	1609.26	10^+			
		1779.05 *17*	100 *4*	1125.39	8^+			
2925.5	0^+,1,2	2803.7 *10*		121.7818	2^+			
2930.6	$1^{(+)}$	2808.8[@] *5*	50 *4*	121.7818	2^+	[M1]	0.00114	B(M1)(W.u.)=0.057 *5*
		2930.6 *5*	100	0.0	0^+	[M1]	0.00116	B(M1)(W.u.)=0.100 *7*
2939.3	$1^{(+)}$	2817.5[@] *5*	48 *47*	121.7818	2^+	[M1]	0.00114	B(M1)(W.u.)=0.003 *3*
		2939.3 *5*	100	0.0	0^+	[M1]	0.00117	B(M1)(W.u.)=0.005 *4*
2946.8	$1^{(-)}$	2825.0[@] *5*	180 *90*	121.7818	2^+	[E1]	0.00128	B(E1)(W.u.)=1.9×10^{-4} *10*
		2946.8 *5*	100	0.0	0^+	[E1]	0.00133	B(E1)(W.u.)=9×10^{-5} *5*
2976.87	14^+	451.25 *4*	100 *4*	2525.69	12^+	E2	0.01694	
		827.6 *3*	6.9 *5*	2148.81	12^+			E_γ: Reported only in Coulomb excitation.
2991.6	$1^{(+)}$	2869.8[@] *5*	41 *8*	121.7818	2^+	[M1]	0.00115	B(M1)(W.u.)=0.023 *5*
		2991.6 *5*	100	0.0	0^+	[M1]	0.00118	B(M1)(W.u.)=0.050 *7*
3012.6	$1^{(+)}$	2890.8[@] *5*	47 *20*	121.7818	2^+			B(M1)(W.u.)=0.010 *4*
		3012.6 *5*	100	0.0	0^+	[M1]	0.00118	B(M1)(W.u.)=0.019 *5*
3025.3	$1^{(+)}$	2903.5[@] *5*	43 *4*	121.7818	2^+			B(M1)(W.u.)=0.035 *4*
		3025.3 *5*	100	0.0	0^+	[M1]	0.00119	B(M1)(W.u.)=0.072 *6*
3027	11^+	440[‡]		2588	9^+			
3080.1	13^-	931.3 *3*		2148.81	12^+			
3090.2	$1^{(+)}$	2968.4[@] *5*	67 *6*	121.7818	2^+	[M1]	0.00117	B(M1)(W.u.)=0.058 *5*
		3090.2 *5*	100	0.0	0^+	[M1]	0.00120	B(M1)(W.u.)=0.077 *6*
3107.9	$1^{(-)}$	2986.1[@] *5*	100 *35*	121.7818	2^+	[E1]	0.00135	B(E1)(W.u.)=3.2×10^{-4} *9*
		3107.9 *5*	92 *32*	0.0	0^+	[E1]	0.00141	B(E1)(W.u.)=2.6×10^{-4} *7*
3122.6		(3000.8[@])	<13	121.7818	2^+			
		3122.6 *5*	100	0.0	0^+			
3128.33	12^+	979.51 *20*		2148.81	12^+			
3262.9	10^+,11,12^+	1113.8 *3*	97 *7*	2148.81	12^+			
		1654.6 *6*	100 *9*	1609.26	10^+			
3281.7	$1^{(+)}$	3159.9[@] *5*	52 *12*	121.7818	2^+	[M1]	0.00122	B(M1)(W.u.)=0.012 *3*
		3281.7 *5*	100	0.0	0^+	[M1]	0.00126	B(M1)(W.u.)=0.020 *4*
3292.82	14^+	316.03 *5*	87 *3*	2976.87	14^+			
		459.34 *8*	64 *3*	2833.30	13^-			
		556.49 *18*	27.7 *19*	2736.19	14^+			

$^{152}_{62}Sm_{90}$-23

$\gamma(^{152}\mathrm{Sm})$ (continued)

E_i(level)	J^{π}_i	E_{γ}[†]	I_{γ}[†]	E_f	J^{π}_f	Mult.[ef]	α[g]	Comments
3292.82	14^+	766.6	100 *4*	2525.69	12^+			E_{γ}: Rounded-off value from the level energies. Eγ=765.82 *7* is reported in Coulomb excitation.
3352.26	12^+	1026.32 *25*	61 *4*	2326.94	11^-			
		1203.32 *16*	100 *4*	2148.81	12^+			
		1742.0 *3*	57 *3*	1609.26	10^+			
3365.02	16^+	628.82 *3*		2736.19	14^+			
3378.39	14^-	477.0 *2*		2901.39	12^-			
3383.35	15^-	550.42 *17*	28.1 *19*	2832.85	11^+			E_{γ}: Reported only in Coulomb excitation.
		647.14 *7*	100 *4*	2736.19	14^+			
3390.90	13^-	1063.95 *21*		2326.94	11^-			
3422.1	$1^{(-)}$	3300.3[@] *5*	230 *80*	121.7818	2^+	[E1]	0.00149	B(E1)(W.u.)=5.4×10^{-4} *18*
		3422.1 *5*	100	0.0	0^+	[E1]	0.00153	B(E1)(W.u.)=2.1×10^{-4} *9*
3462.95	16^+	486.1	100 *6*	2976.87	14^+			E_{γ}: Rounded-off value from the least squares adjustment, which gives Eγ=486.09 *13*. The value 487.03 *9* reported in Coulomb excitation may be a typo.
		726.88 *18*	25.4 *18*	2736.19	14^+			
3708.8		(3587.0[@] *5*)	<18	121.7818	2^+			
		3708.8 *5*	100	0.0	0^+			
3794.1		(3672.3[@] *5*)	25	121.7818	2^+			
		3794.0 *5*	100	0.0	0^+			
3857.16	16^+	394.19 *16*	56 *5*	3462.95	16^+			
		473.75 *10*	99 *5*	3383.35	15^-			
		564.36 *11*	100 *5*	3292.82	14^+			
		880.53 *20*	54 *4*	2976.87	14^+			
3882.6		3760.8[@] *5*	20	121.7818	2^+			
		3882.6 *5*	100	0.0	0^+			
3931.2	14^+	1194.8 *6*	25.0 *24*	2736.19	14^+			
		1783.2 *5*	100 *9*	2148.81	12^+			
3973.2	17^-	589.9 *10*	87 *26*	3383.35	15^-			
		608.2 *5*	100 *17*	3365.02	16^+			
4004.64	18^+	542.1 *3*	100 *13*	3462.95	16^+			
		639.47 *18*	82 *6*	3365.02	16^+			
4047.7	18^+	585.98[&h] *8*	60.8 *24*	3462.95	16^+			
		681.54[&h] *5*	100 *4*	3365.02	16^+			
4524.8	16^+	1788.6 *23*		2736.19	14^+			
4749.56	20^+	701.86 *15*		4047.7	18^+			

[†] From 13-y Eu ε decay except where stated otherwise. other data are from (n,n′γ), Coulomb excitation, (α,2nγ), and (γ,γ').
[‡] Reported only in (α,2nγ).

$\gamma(^{152}$Sm) (continued)

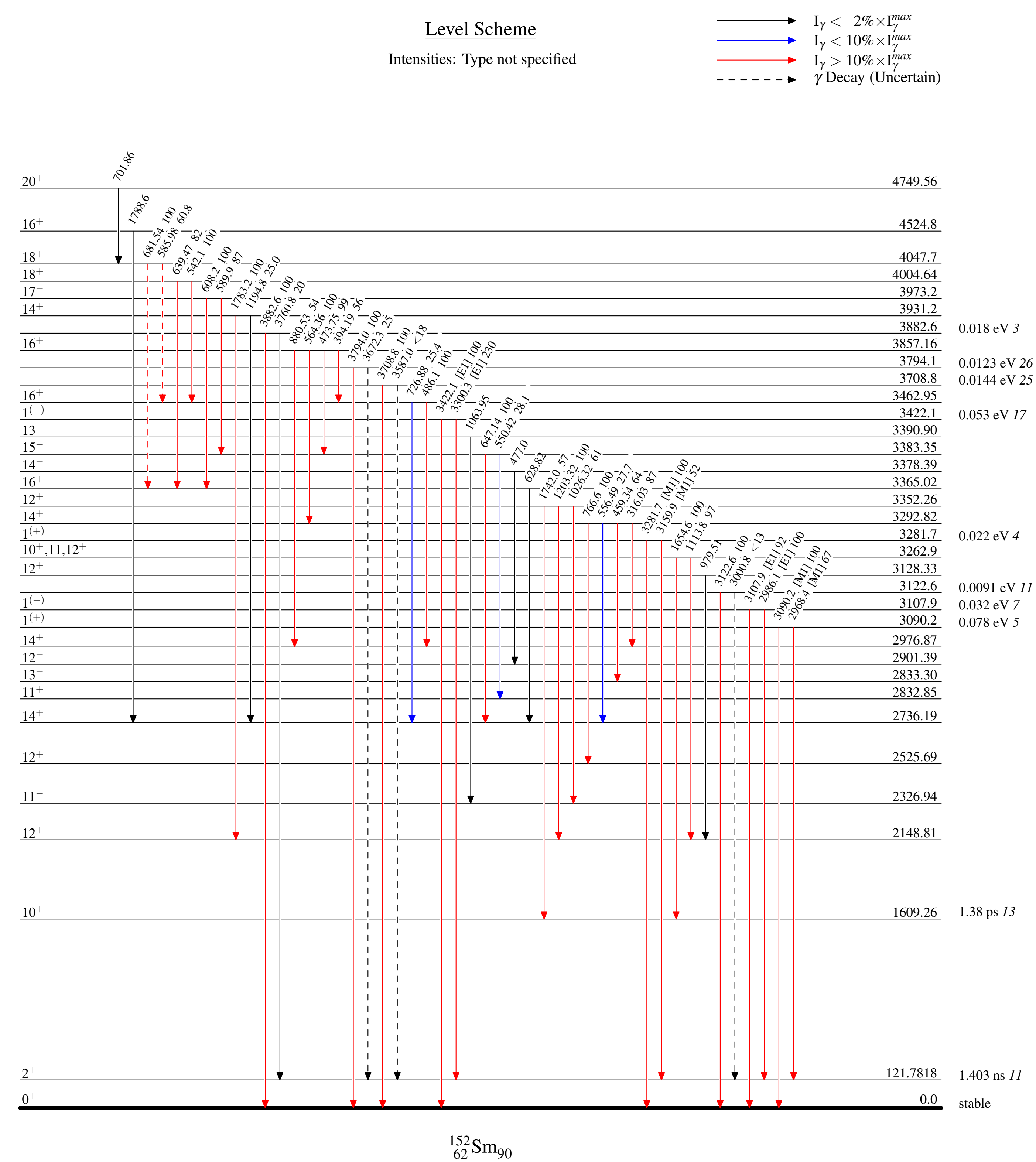
[#] E=386.41 *7*, 821.53 *7*, and 1238.70 *7* are reported in Coulomb excitation; however, these energies do not give consistent E(level) values.
[@] Energy for transition to the 2^+ level is not given explicitly by the authors in (γ,γ'). The value is that of the evaluator deduced from E(level)-E(2^+) with E(2^+) taken as 121.8.
[&] See comment on 4048 level.
[a] Not included in the least-squares adjustment. See comment on the 2808 level.
[b] See comment on the 2057 level.
[c] See comment on the 1804 level.
[d] See comment on the 1891 level.
[e] From α data in 9.3-h and 13-y Eu ε decay, and angular distributions and linear polarization measurements in (α,2nγ). For the levels seen in (γ,γ') with probable $J^\pi=1^+$ or 1^-, the transitions to 2^+ could have a quadrupole contribution. The M2/E1 component is probably negligible, but the E2/M1 component could be significant. The B(M1)(W.u.) values given for these transitions should thus be considered as upper limits.
[f] Values of ρ^2(E0), given in comments, are from 2005Ki02 and references therein.
[g] 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.
[h] Placement of transition in the level scheme is uncertain.

$^{152}_{62}$Sm$_{90}$-25

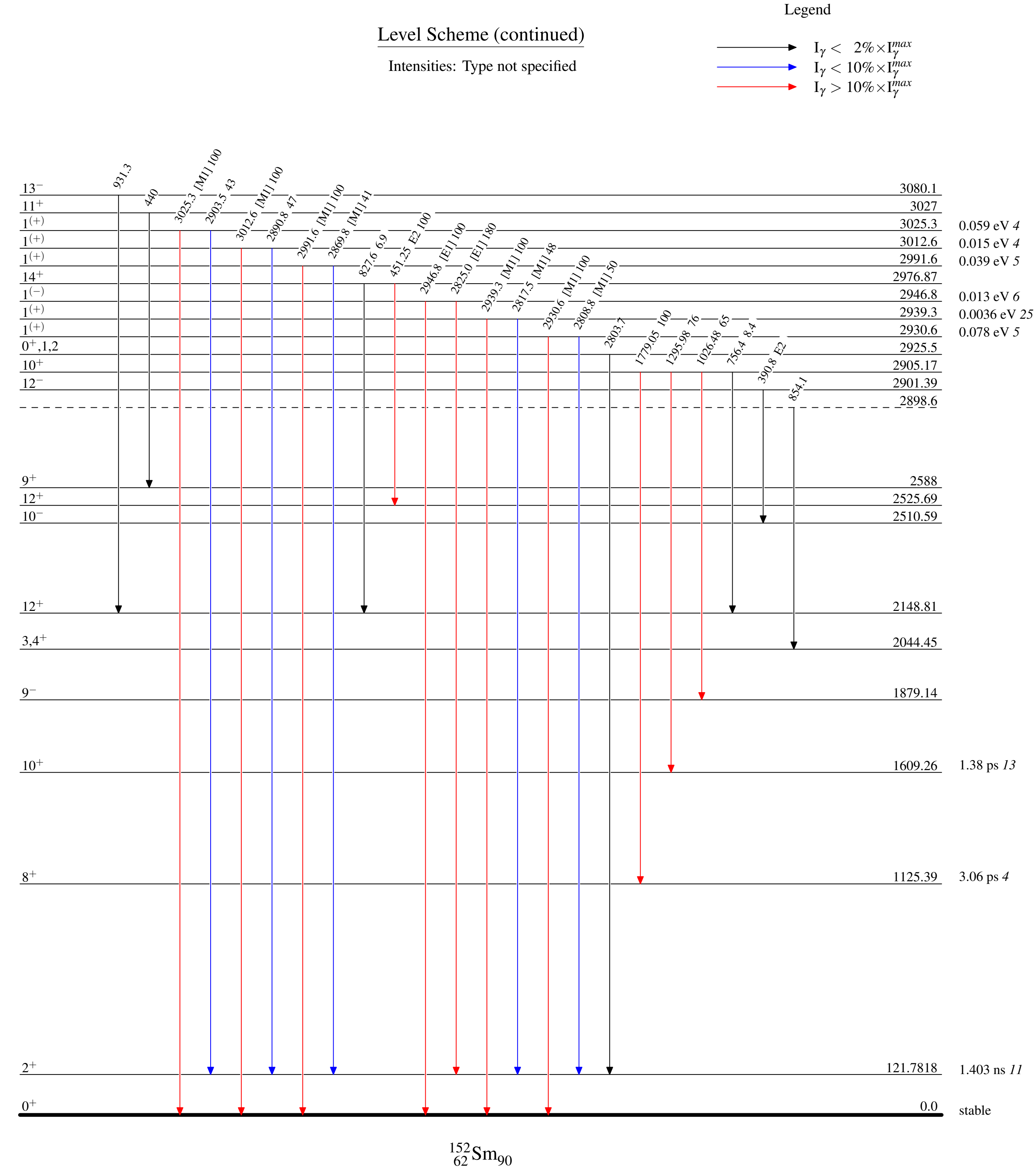
Adopted Levels, Gammas

Level Scheme

Intensities: Type not specified



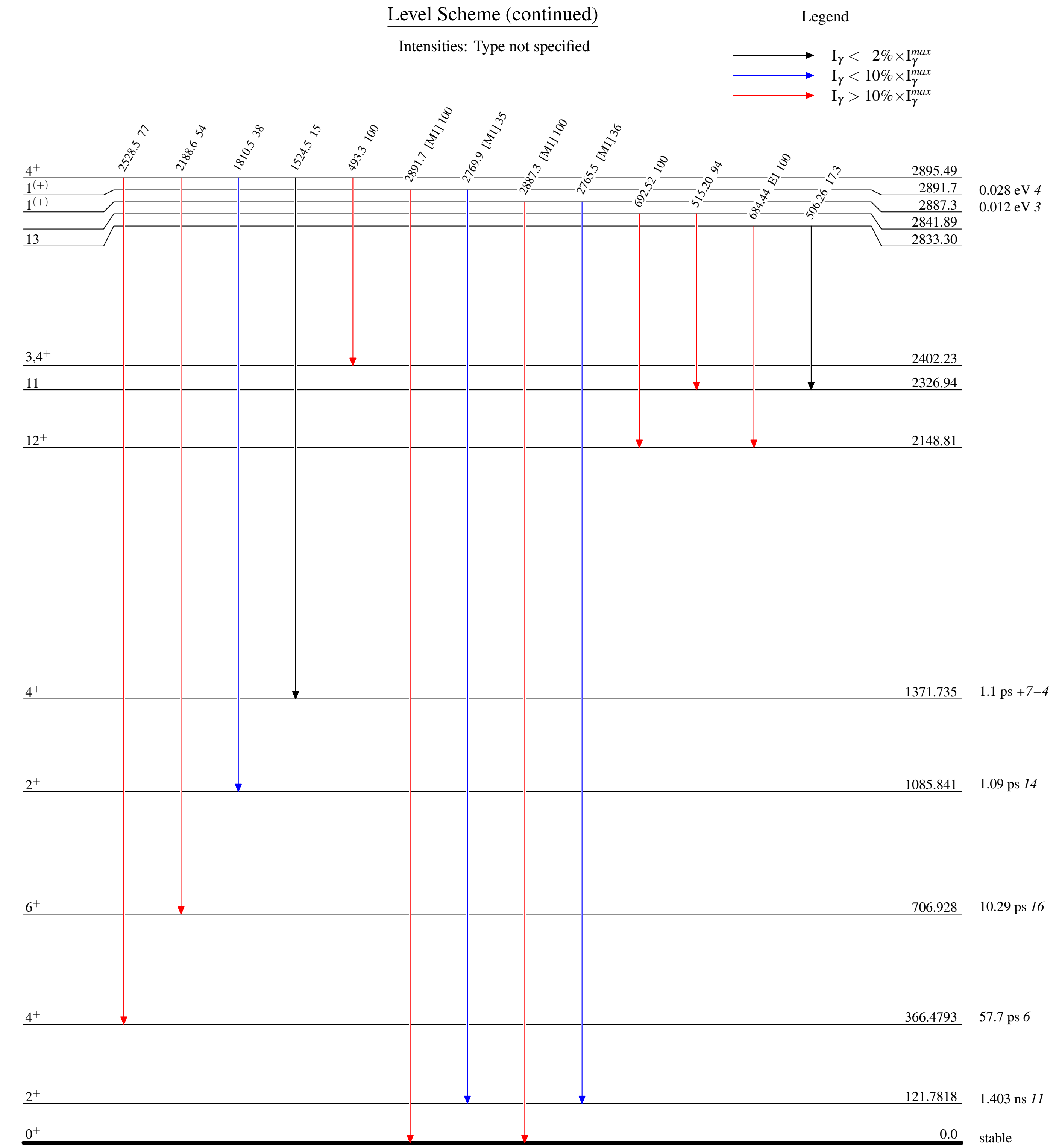
Adopted Levels, Gammas



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified



$^{152}_{62}Sm_{90}$

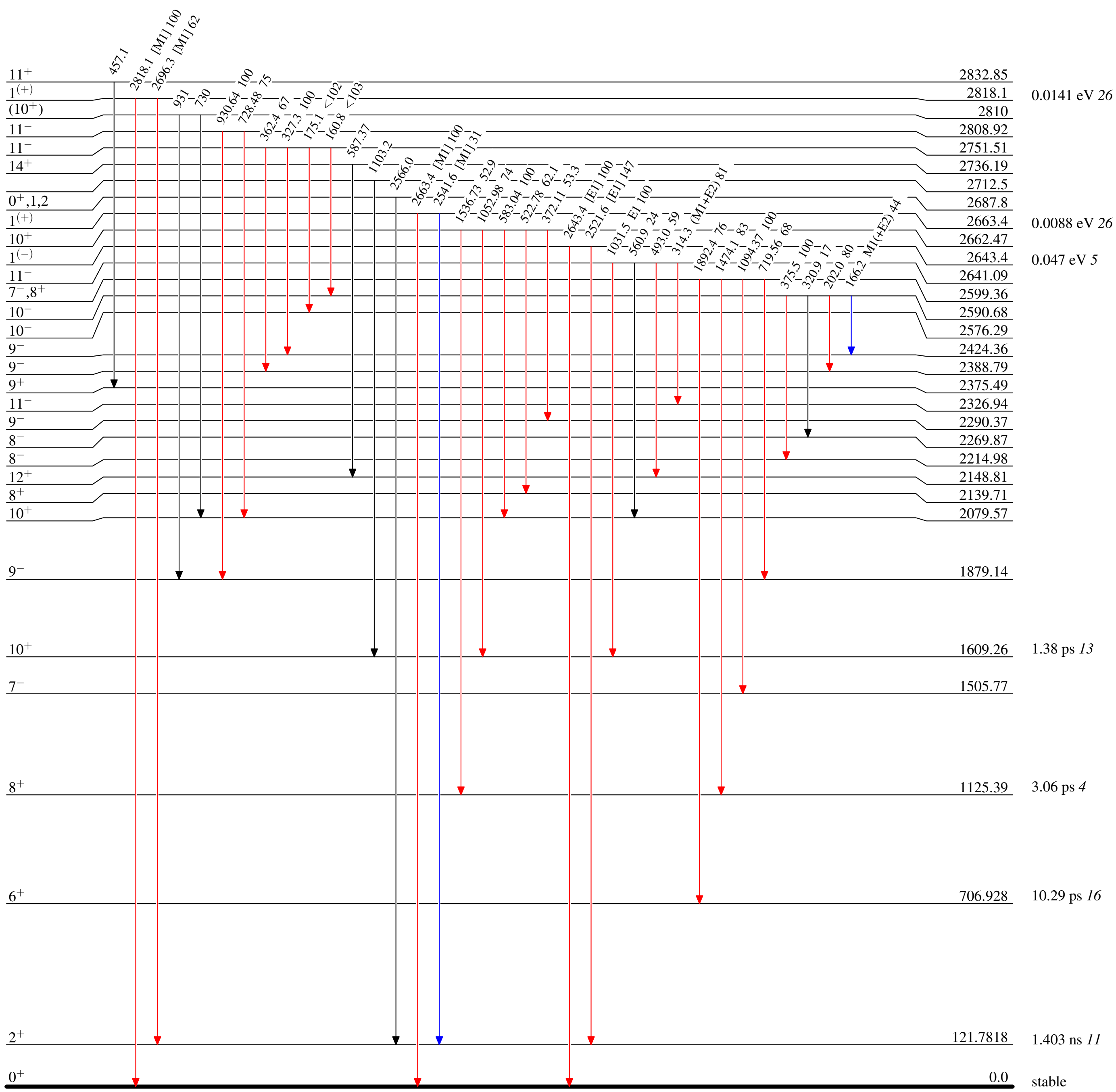
Adopted Levels, Gammas

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$

Level Scheme (continued)

Intensities: Type not specified

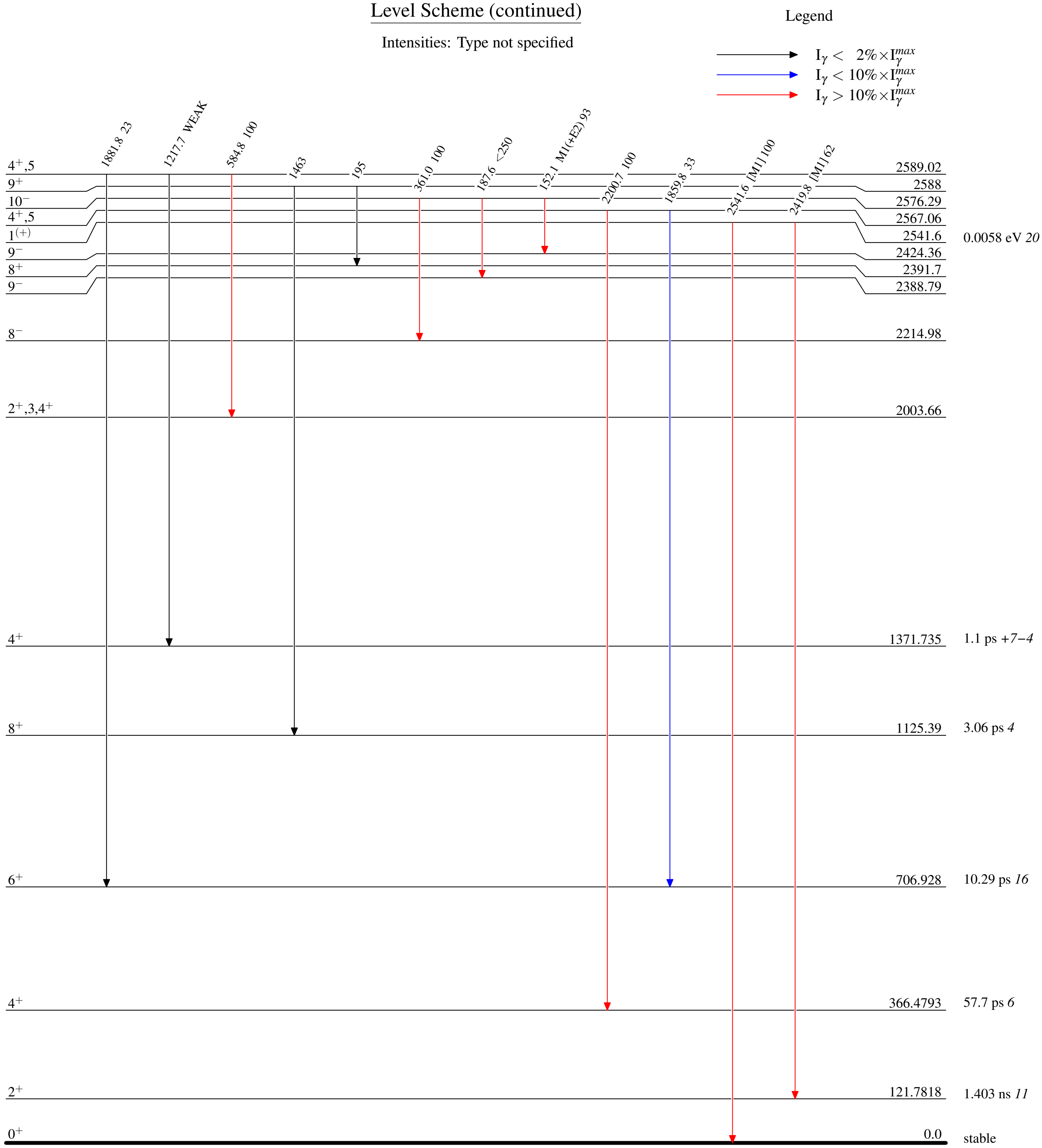


$^{152}_{62}Sm_{90}$

Adopted Levels, Gammas

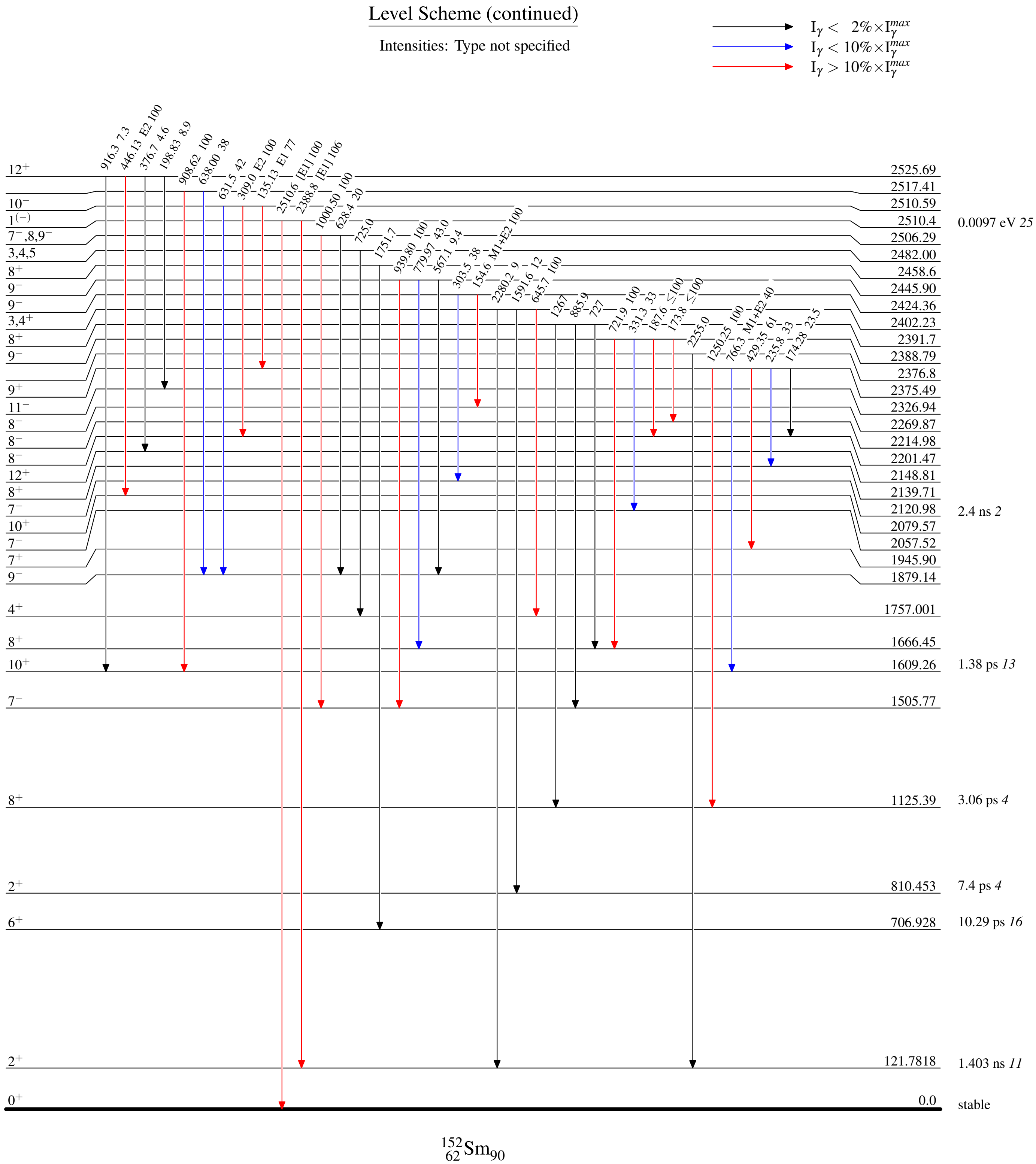
Level Scheme (continued)

Intensities: Type not specified



$^{152}_{62}Sm_{90}$

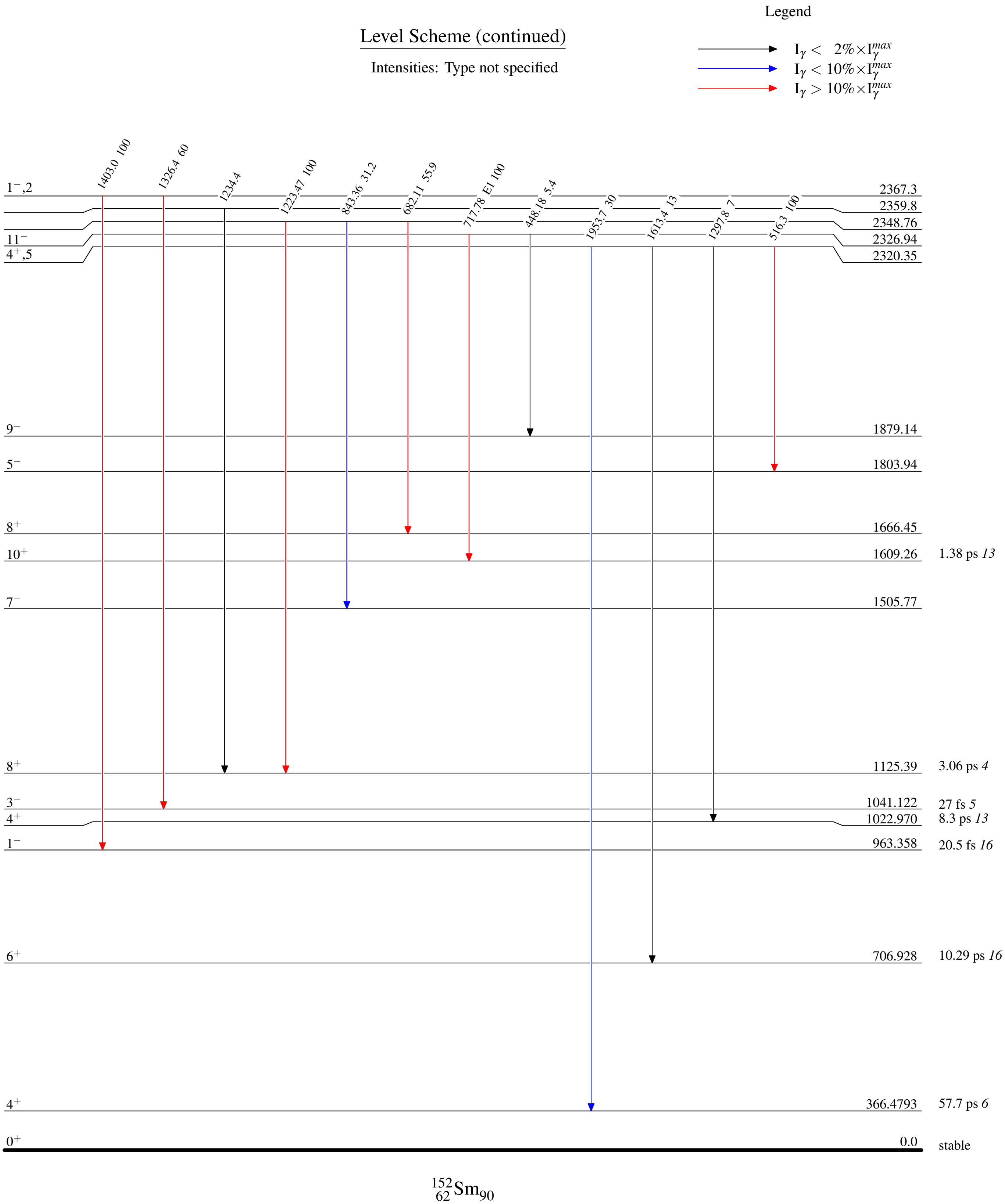
Adopted Levels, Gammas



Adopted Levels, Gammas

Level Scheme (continued)

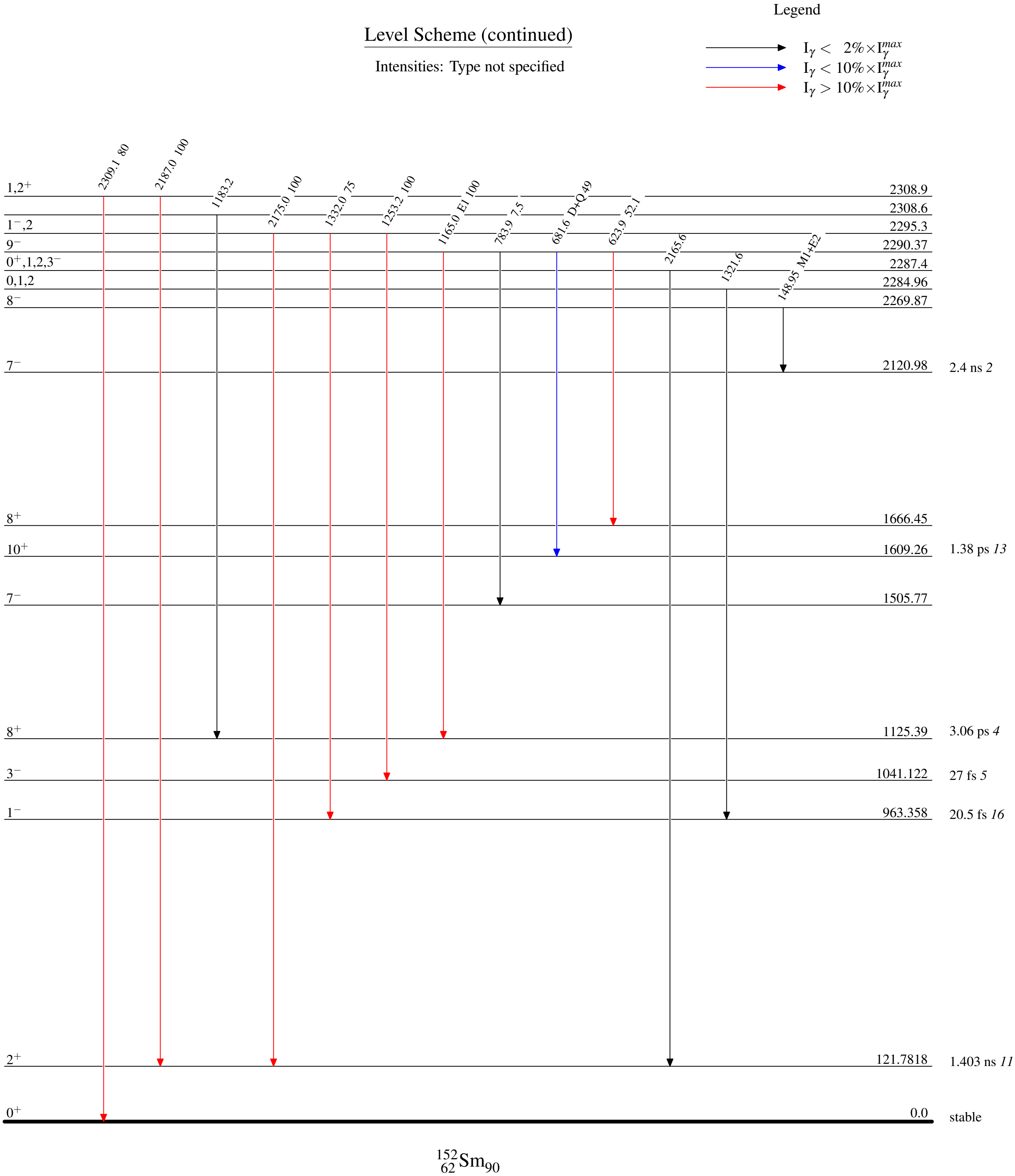
Intensities: Type not specified



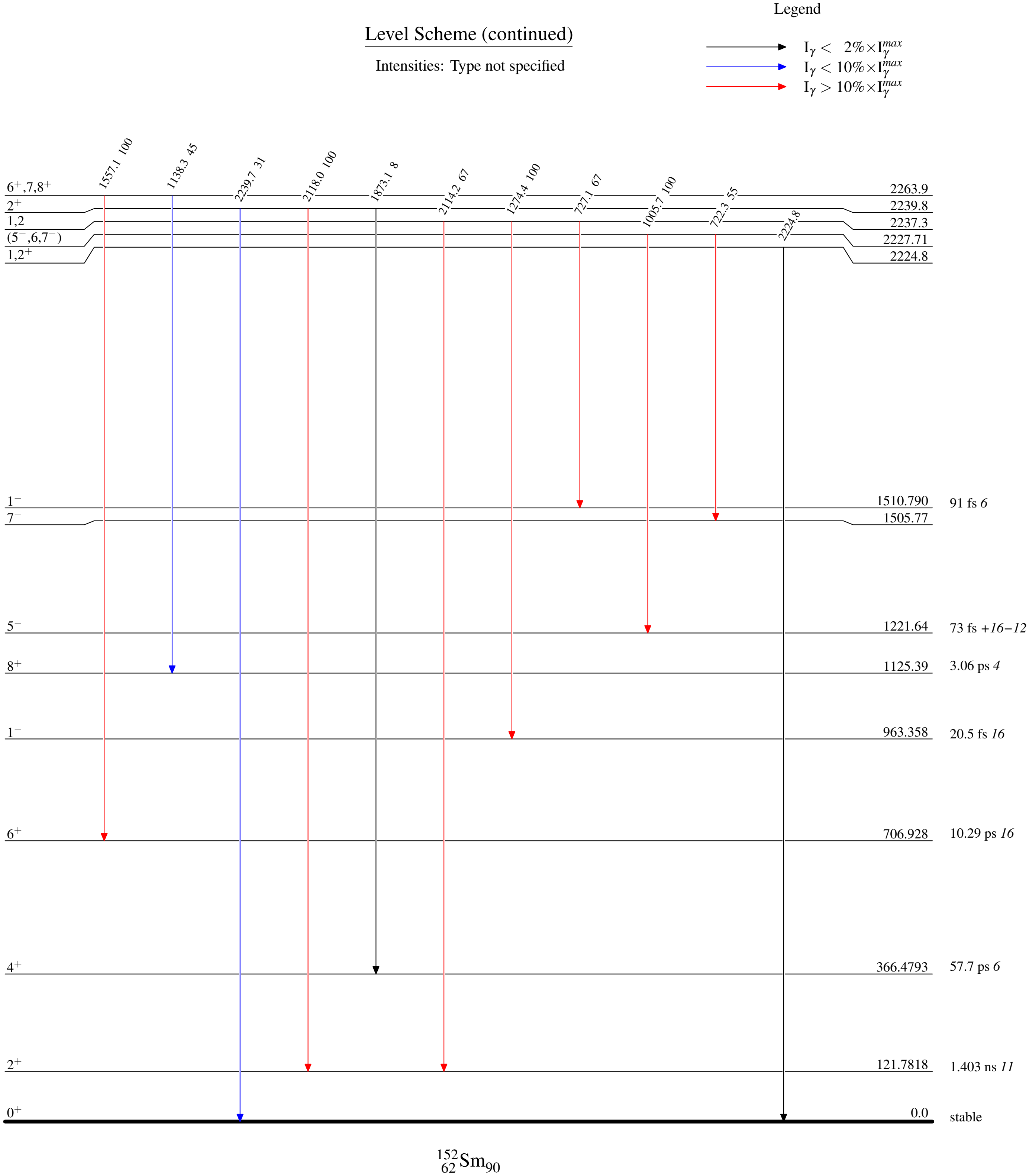
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified



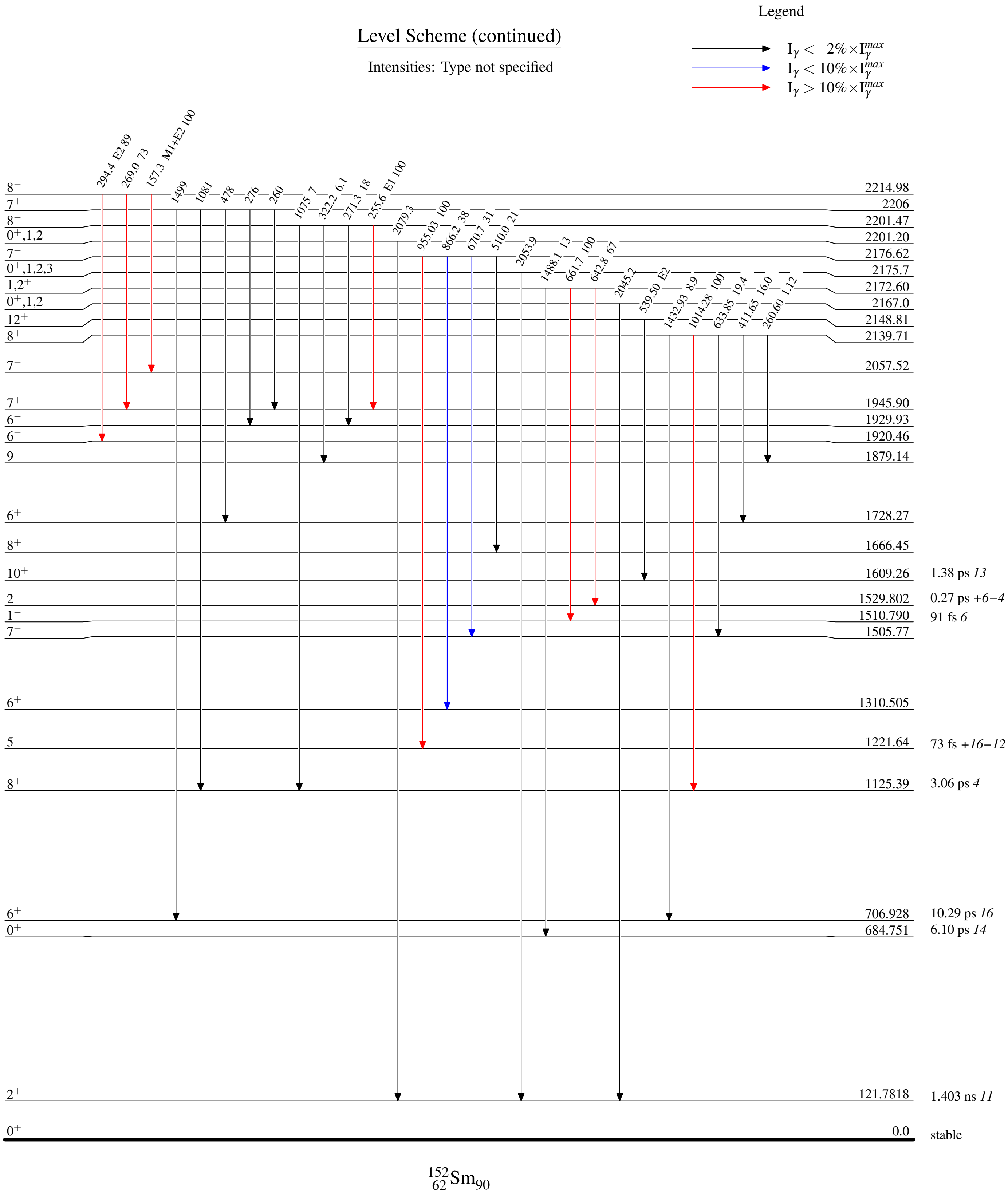
Adopted Levels, Gammas



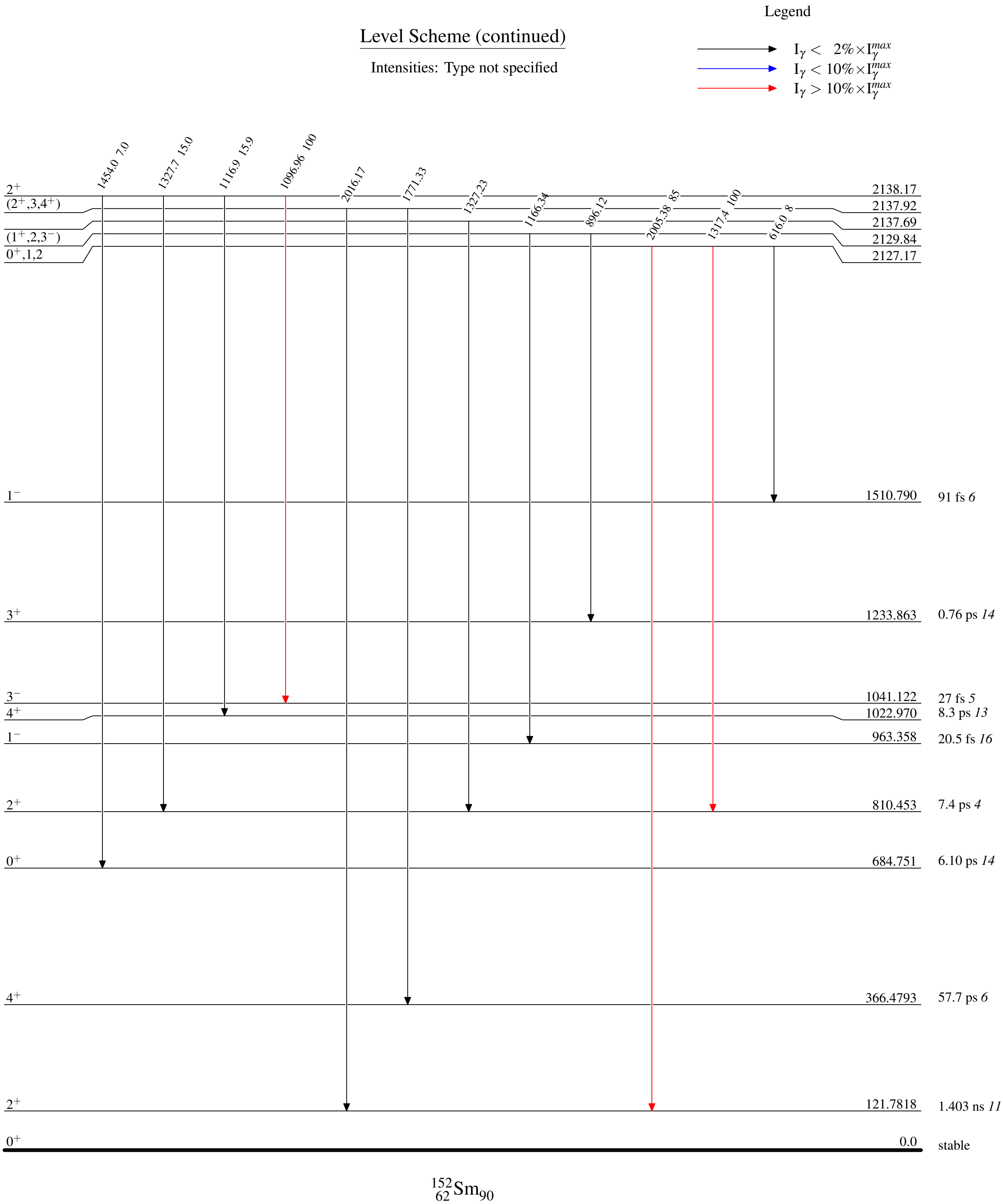
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified



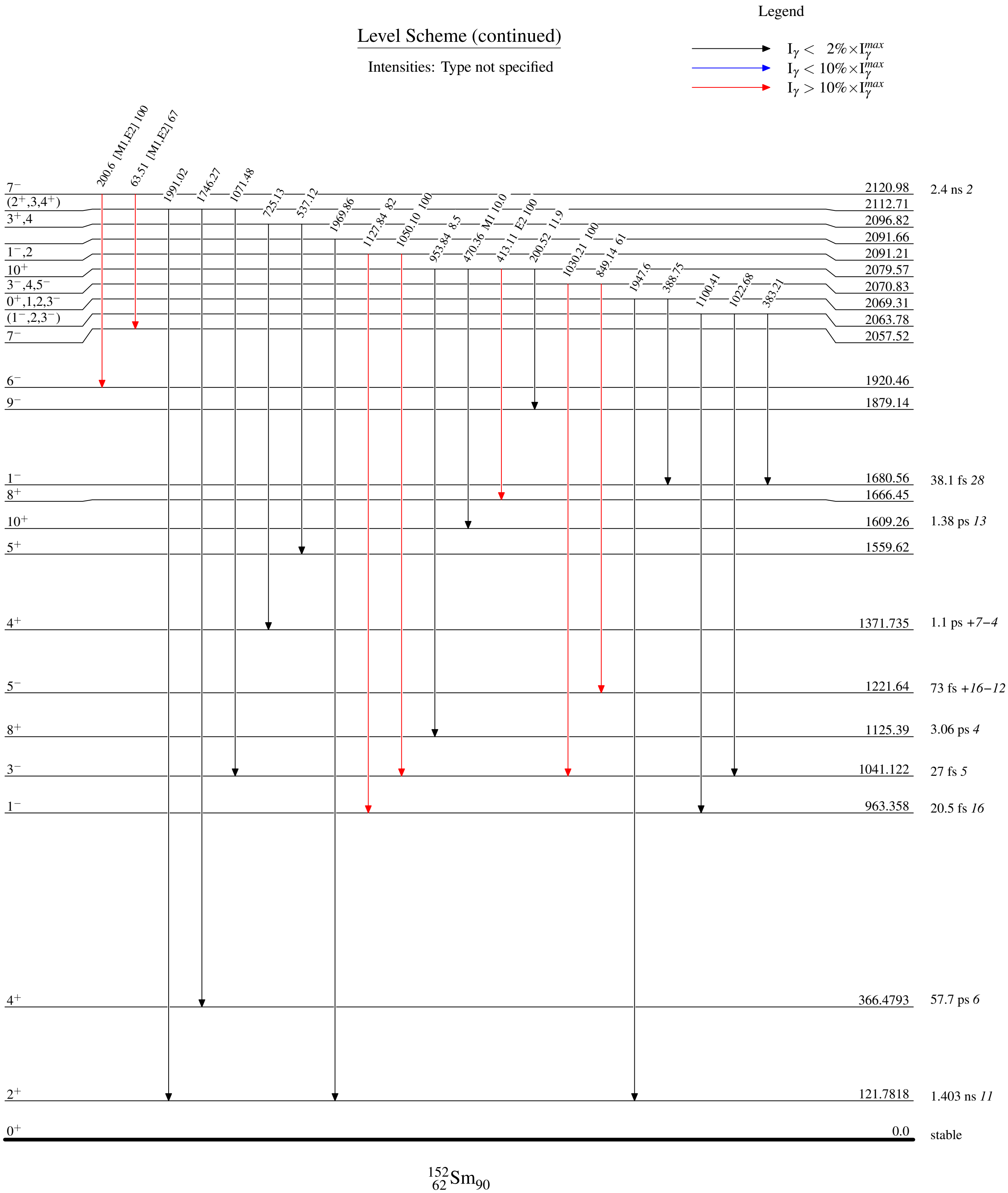
Adopted Levels, Gammas



Adopted Levels, Gammas

Level Scheme (continued)

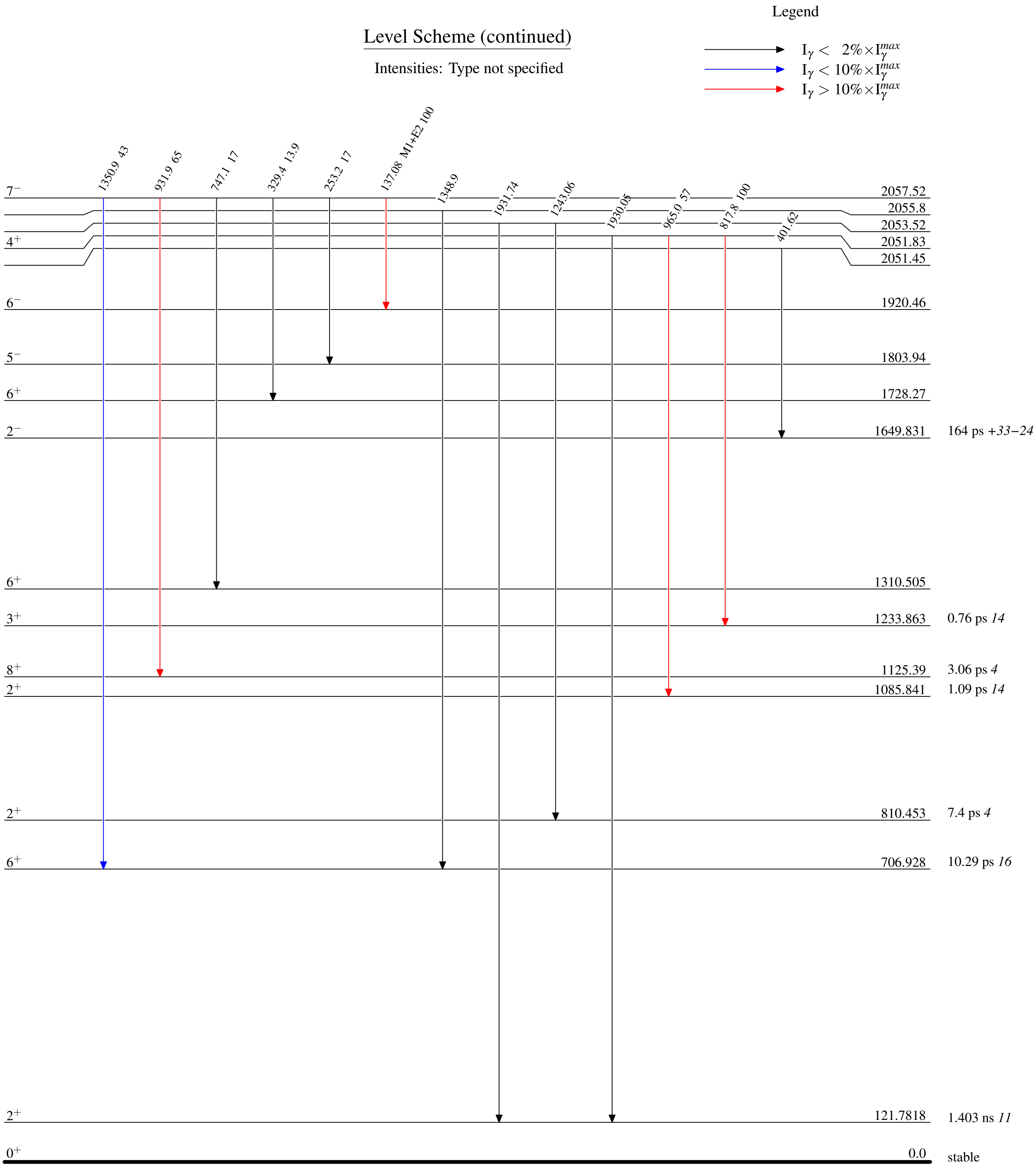
Intensities: Type not specified



Adopted Levels, Gammas

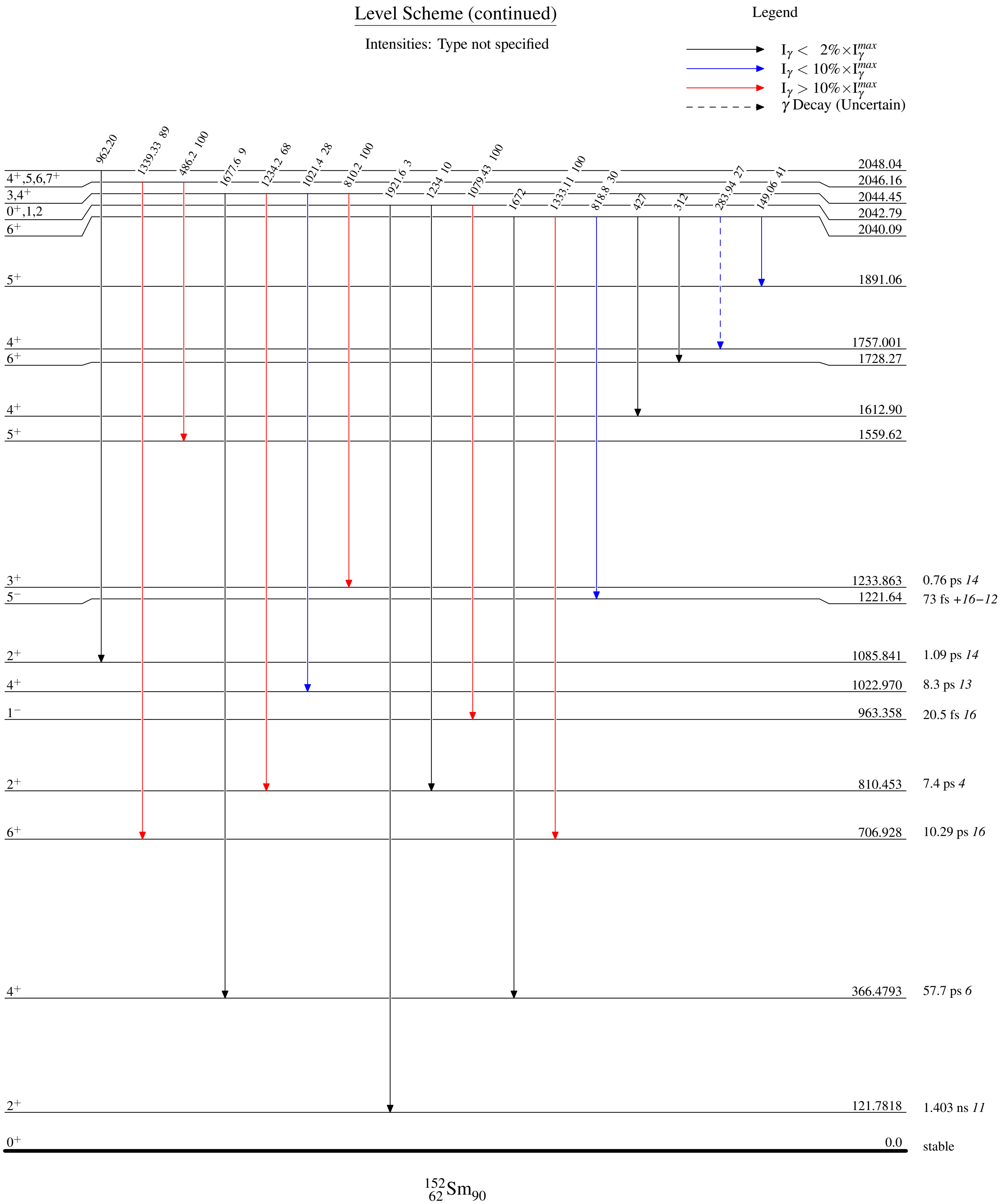
Level Scheme (continued)

Intensities: Type not specified



$^{152}_{62}Sm_{90}$

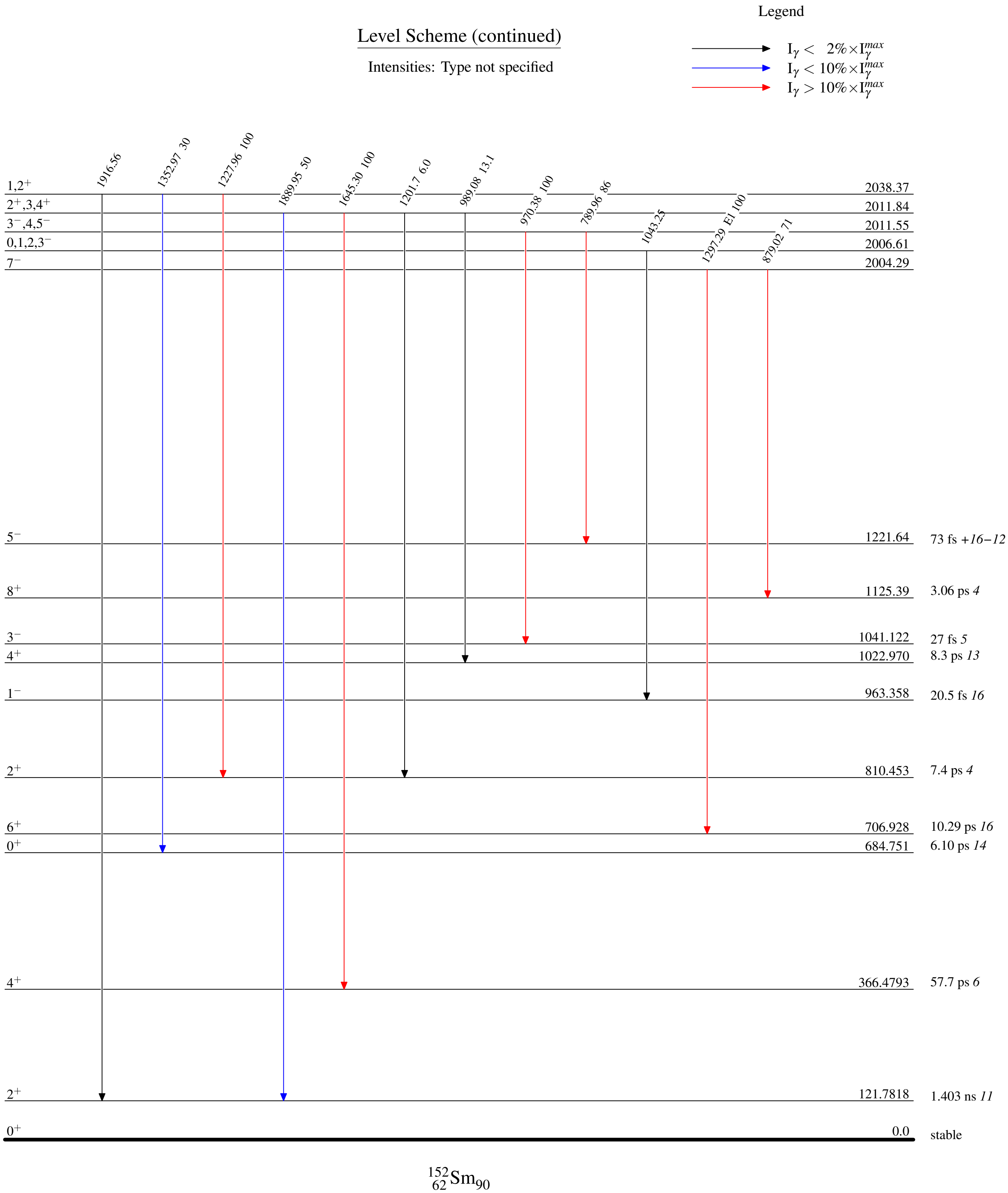
Adopted Levels, Gammas



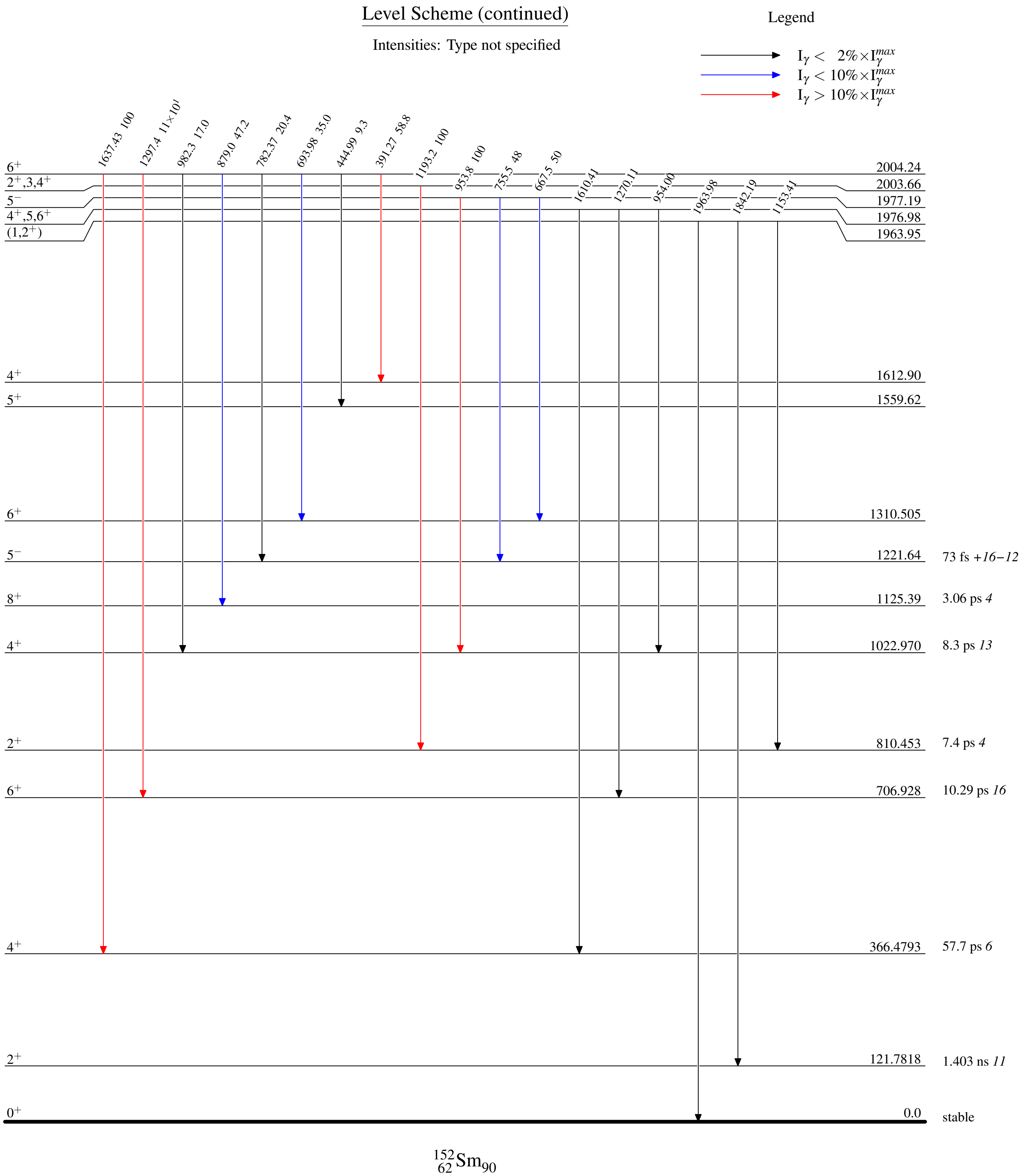
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified



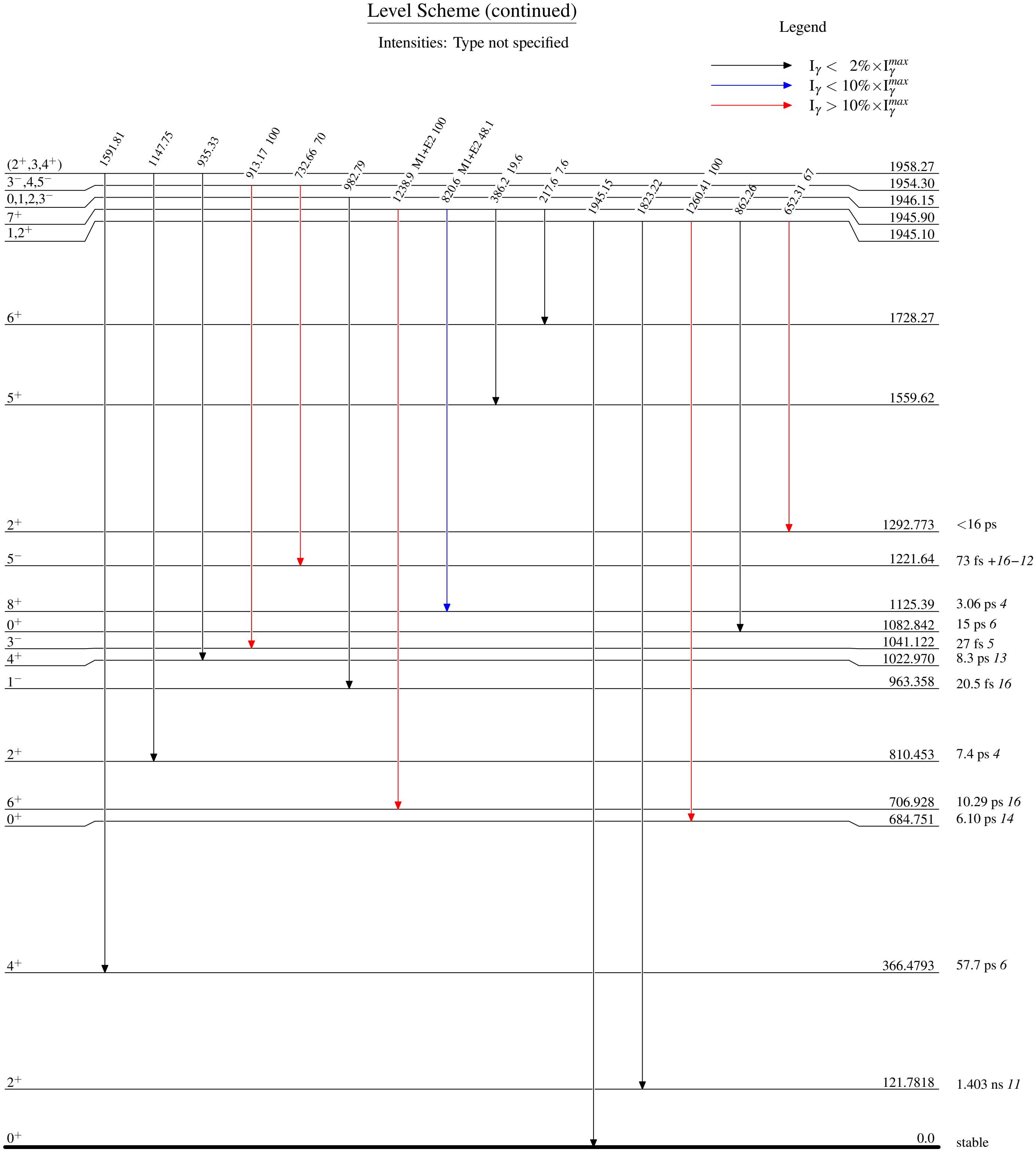
Adopted Levels, Gammas



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified

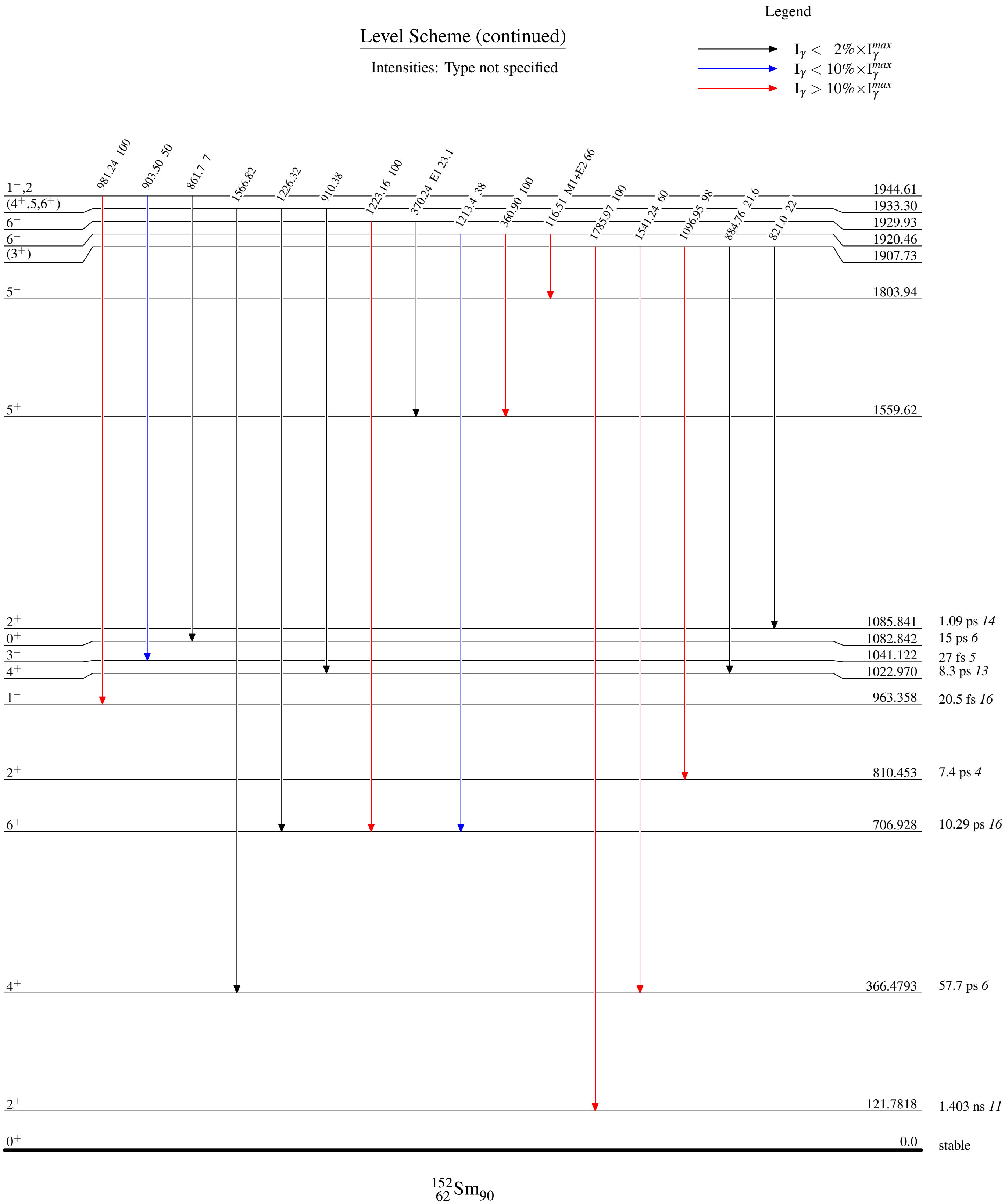


$^{152}_{62}Sm_{90}$

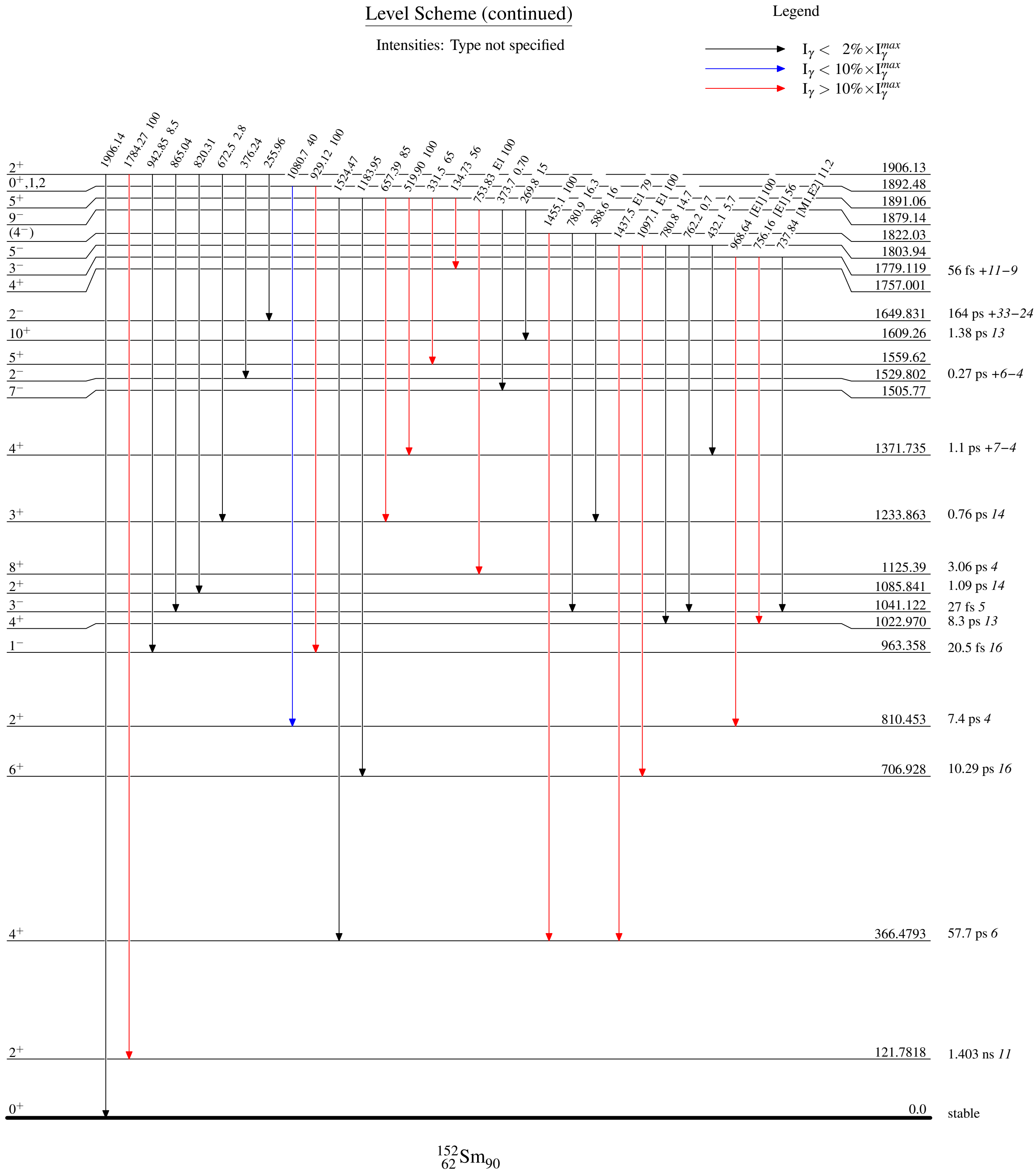
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified



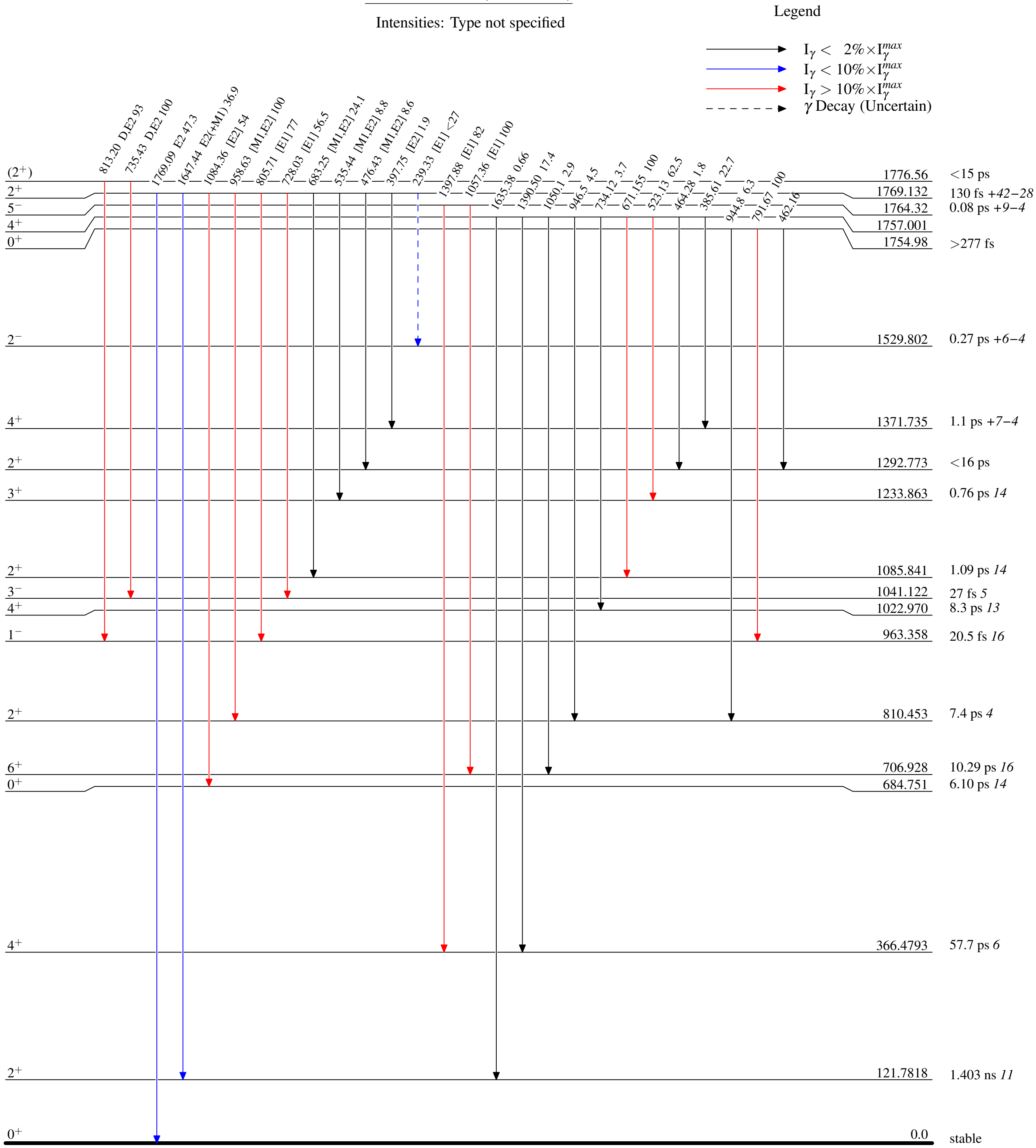
Adopted Levels, Gammas



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified

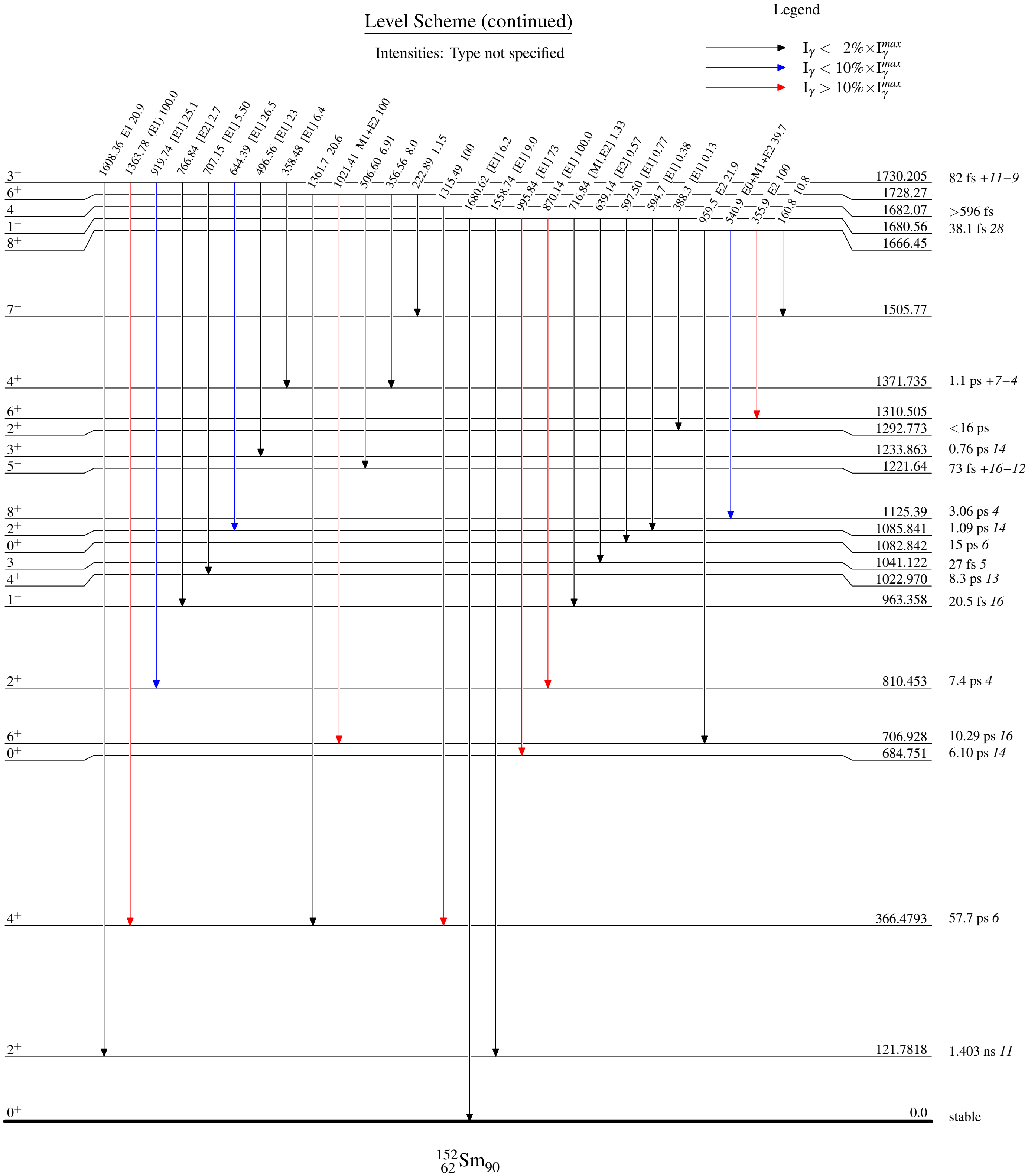


$^{152}_{62}Sm_{90}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified

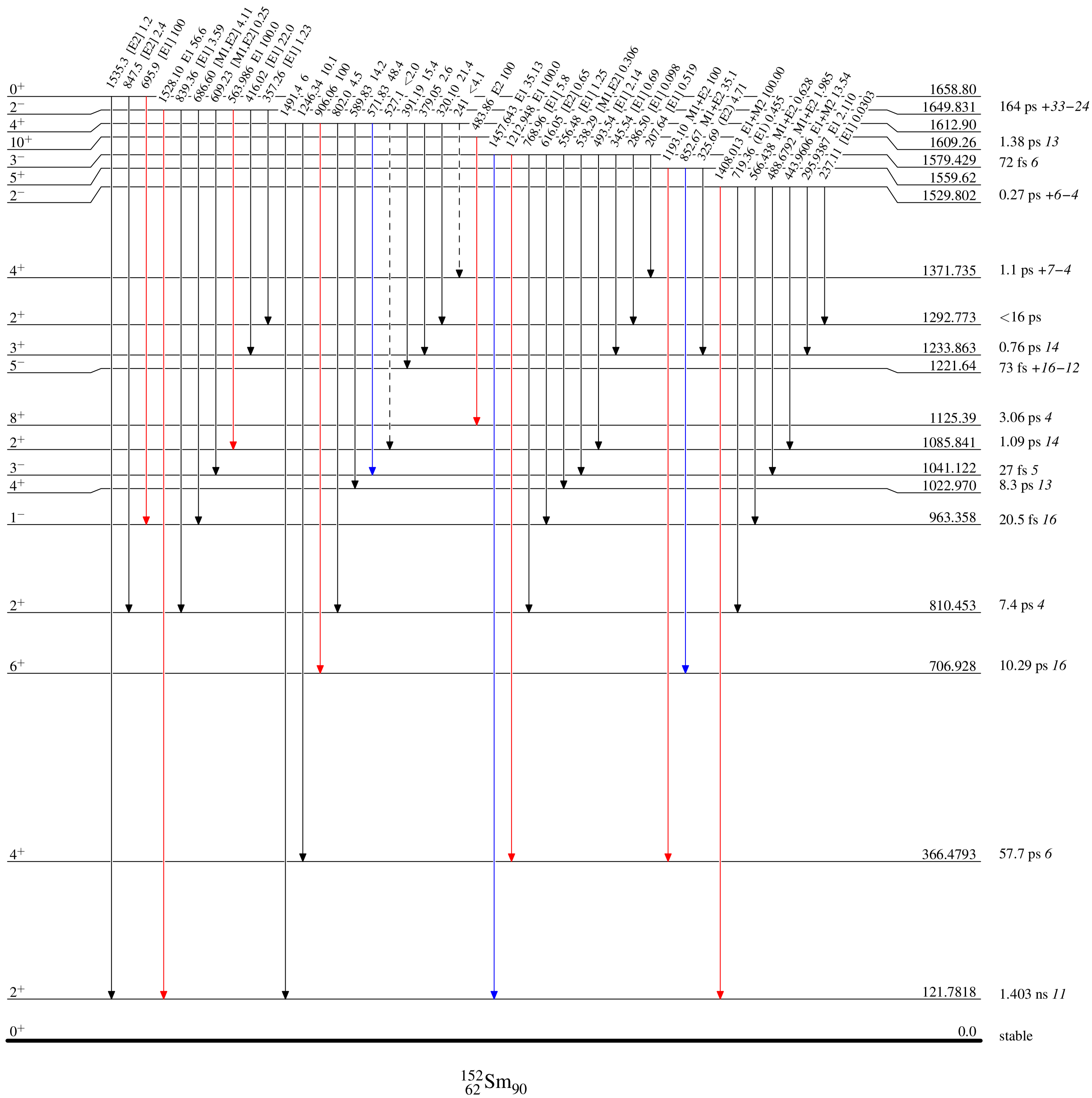
Legend

$I_\gamma < 2\% \times I_\gamma^{max}$

$I_\gamma < 10\% \times I_\gamma^{max}$

$I_\gamma > 10\% \times I_\gamma^{max}$

γ Decay (Uncertain)

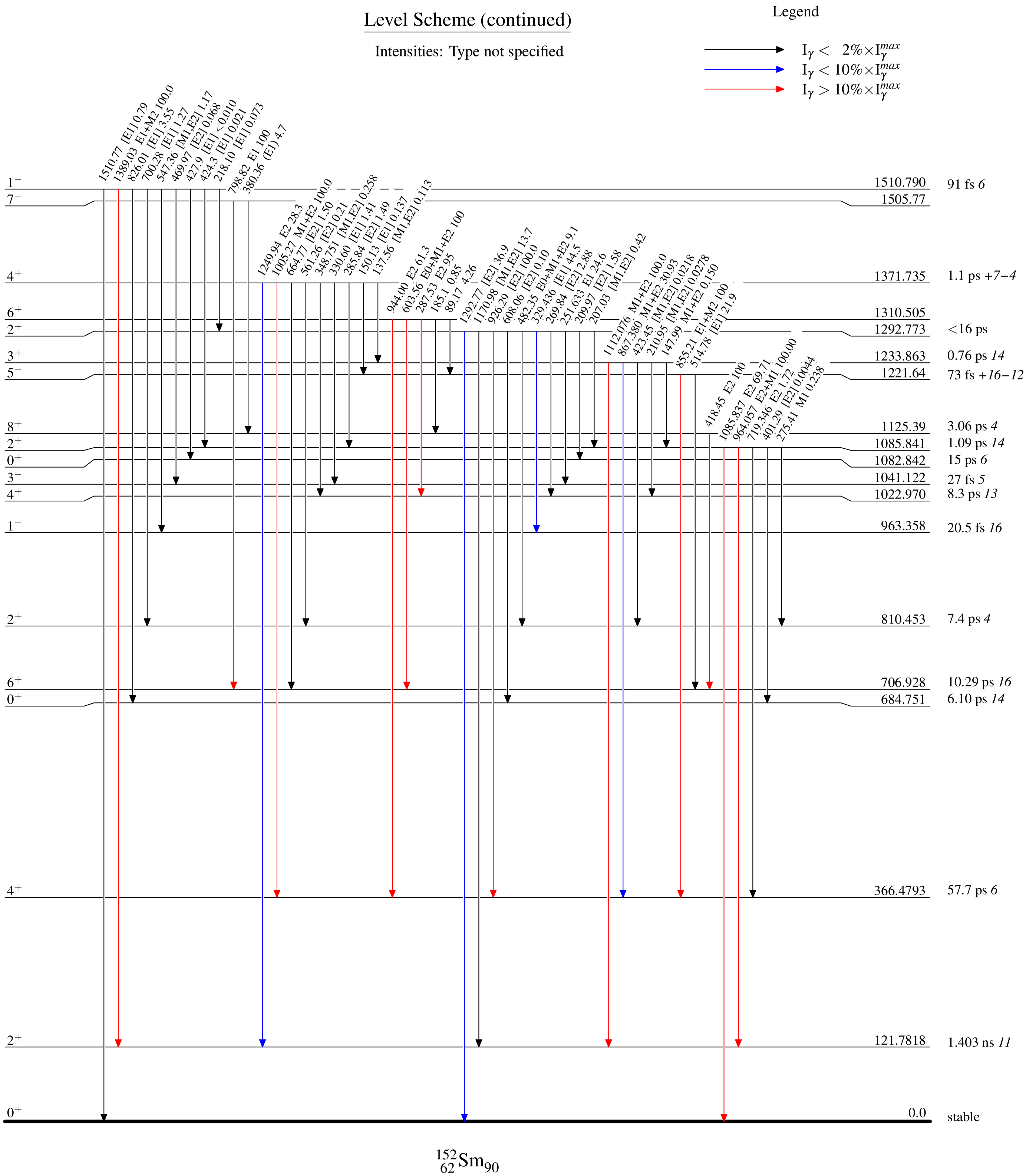


$^{152}_{62}Sm_{90}$

Adopted Levels, Gammas

Level Scheme (continued)

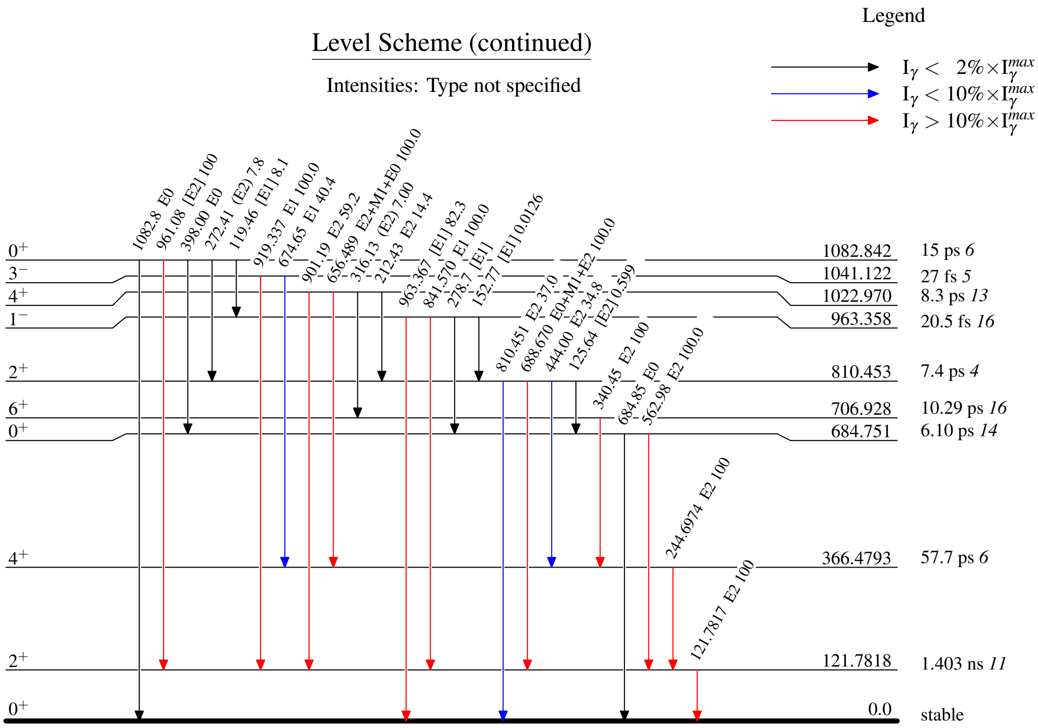
Intensities: Type not specified



Adopted Levels, Gammas

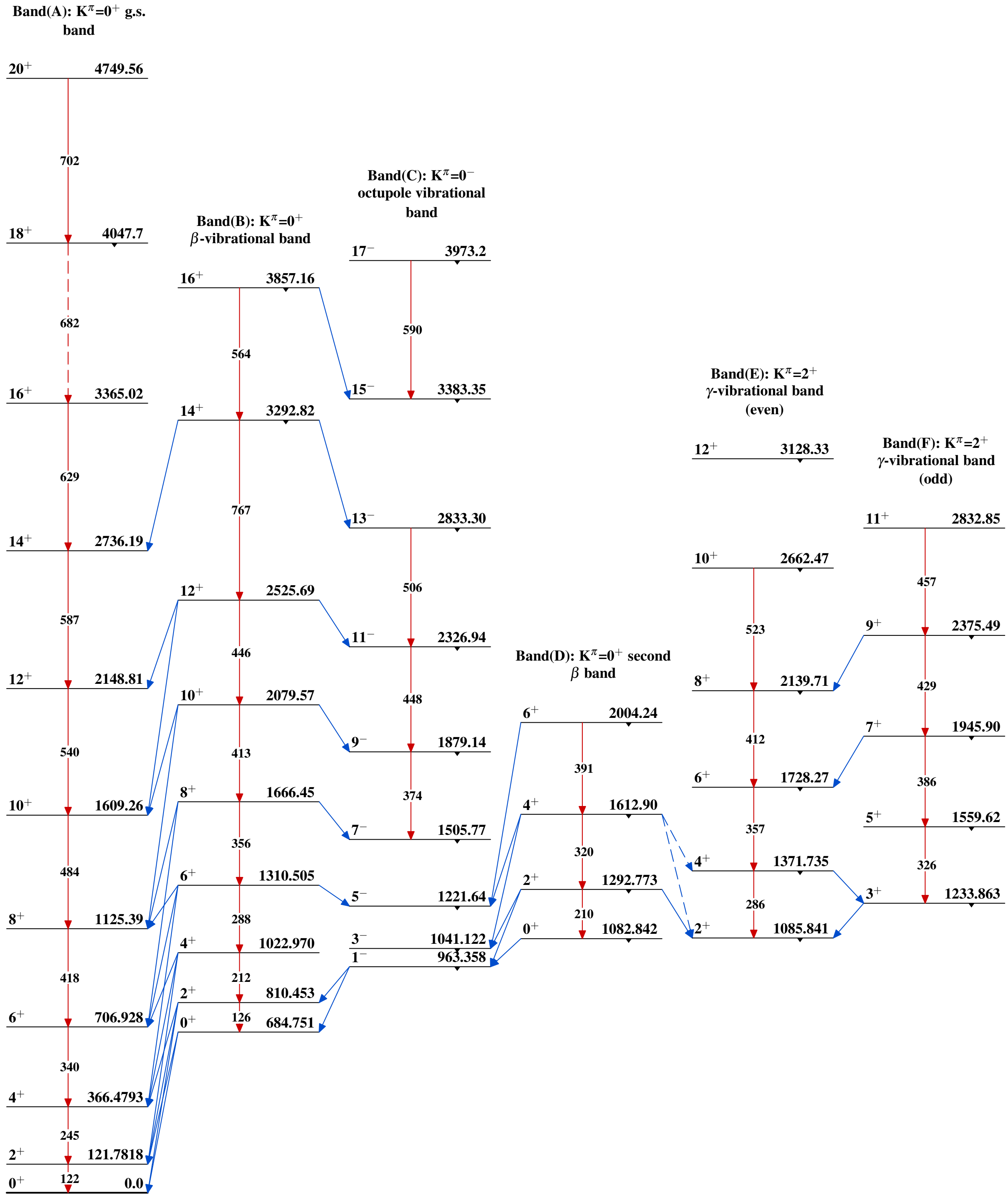
Level Scheme (continued)

Intensities: Type not specified



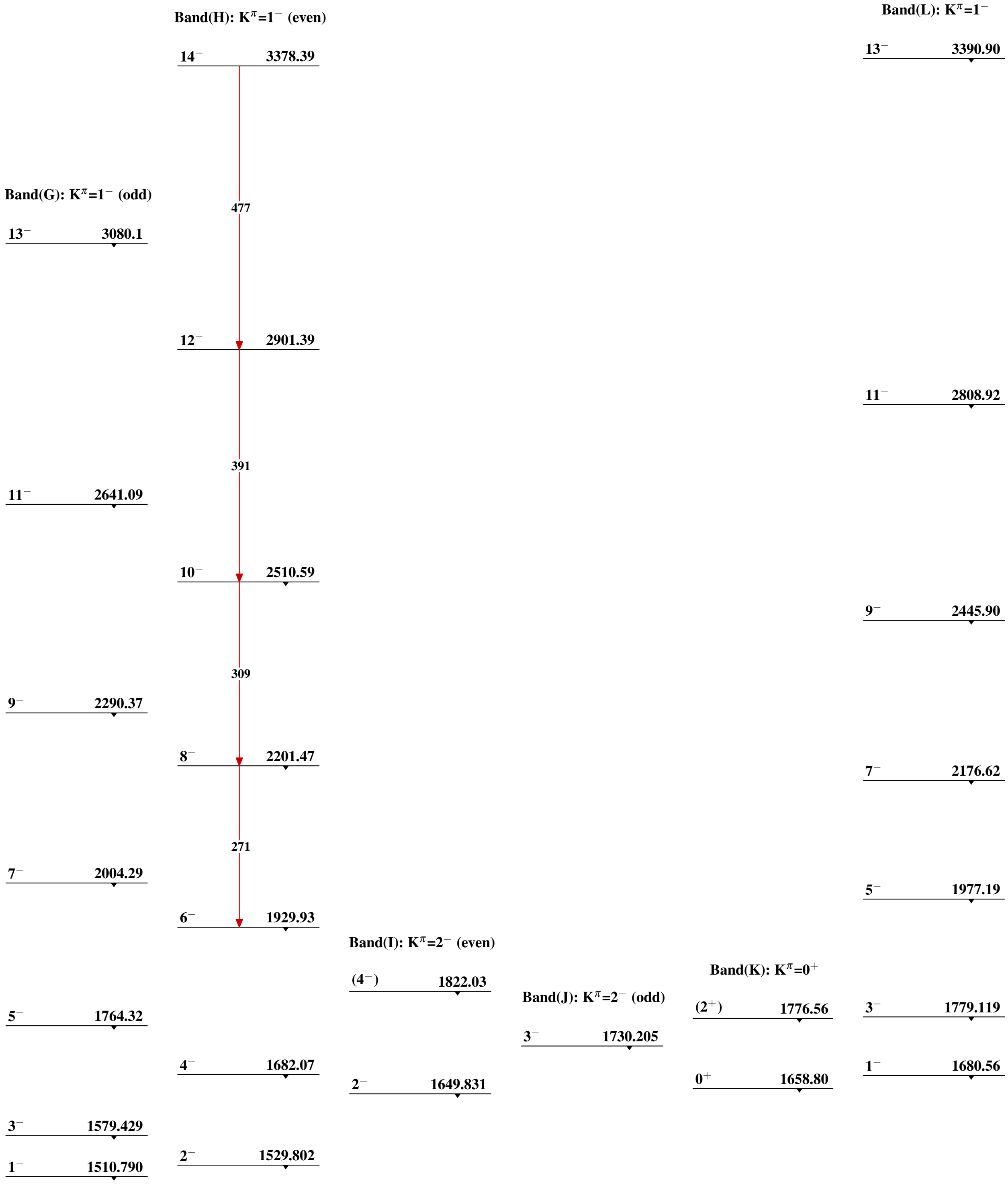
$^{152}_{62}Sm_{90}$

Adopted Levels, Gammas



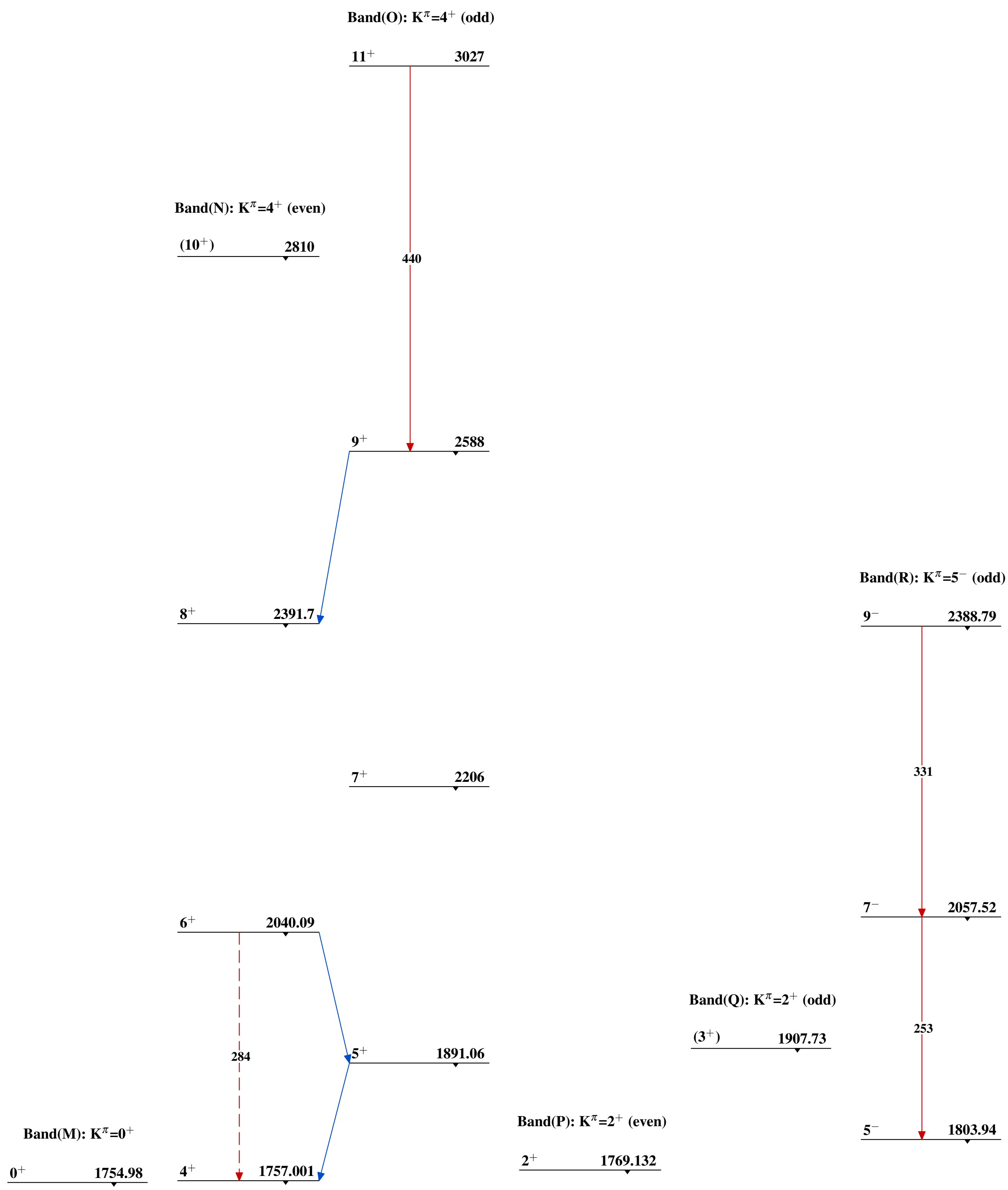
$^{152}_{62}Sm_{90}$

Adopted Levels, Gammas (continued)



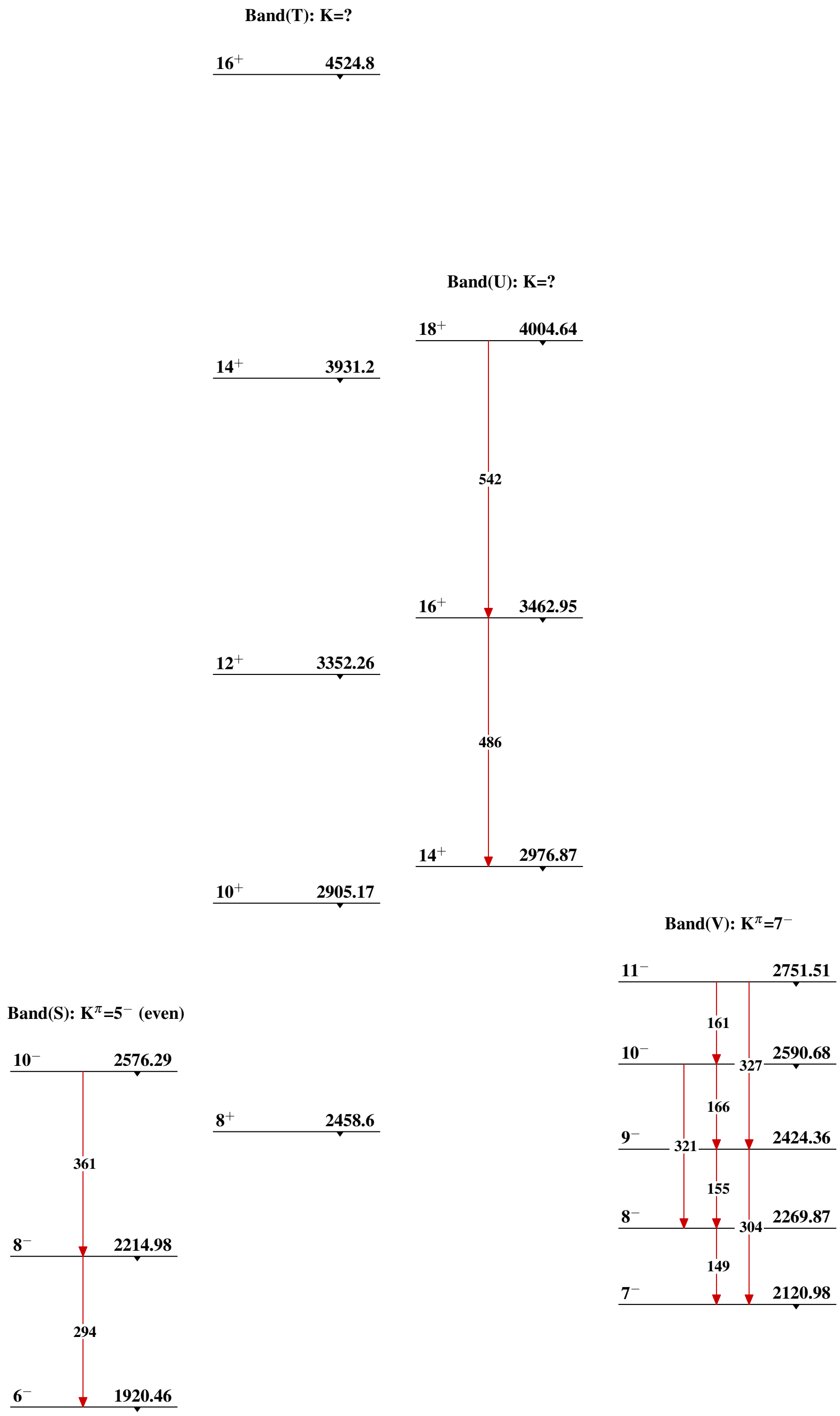
$^{152}_{62}Sm_{90}$

Adopted Levels, Gammas (continued)



$^{152}_{62}Sm_{90}$

Adopted Levels, Gammas (continued)



$^{152}_{62}Sm_{90}$

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	C. W. Reich	NDS 110, 2257 (2009)	1-May-2008

Q(β^-)=−717.1 *11*; S(n)=7966.8 *9*; S(p)=9096 *9*; Q(α)=−1200.3 *10* 2017Wa10
S(2n)=13835.2 *9*; S(2p)=16884 *9* 2017Wa10
Additional information 1.
The data on Eγ and Iγ values and J$^\pi$ assignments are primarily from the ^{154}Pm β^- decays (1.73 min and 2.68 min) (1971Da28,1974Ya07,1993GrZY) and the (n,n′γ) reaction (2006De19).

^{154}Sm Levels

In the Inelastic Scattering and (n,n′γ) data sets, a number of levels are shown which are not included in this Adopted Levels data set. For a listing of those levels, see those source data sets.
2006De19, in (n,n′γ), do not confirm the population of levels at 1104, 1120, 1295, 1365 and 1371 keV, if they have J≤5. see, also, the Inelastic Scattering Data Set.

Cross Reference (XREF) Flags

A	^{154}Sm(n,n′γ)	E	^{154}Pm β^- decay (1.73 min)
B	^{154}Sm(γ,γ′),(e,e′)	F	Coulomb excitation
C	Inelastic scattering	G	^{152}Sm(t,p)
D	^{154}Pm β^- decay (2.68 min)	H	^{154}Eu ε decay

E(level)†	J$^\pi$	T$_{1/2}$	XREF	Comments
0.0#	0+	stable	ABCDEFGH	T$_{1/2}$: The T$_{1/2}$ for two-neutrino double β- decay to the 2+ level in ^{154}Gd is measured to be ≥ 2.3x10^{18} y (1996De60). This is the same value listed in the tabulation of 2002Tr04. A model calculation of the T$_{1/2}$ for double β- decay gives 1.0x10^{23} y for two-neutrino mode and 9x10^{24}(m$_n^2$) y×(eV)^2. The change in the nuclear charge radius between ^{152}Sm and ^{154}Sm can given by either λ or Δ<r^2> where λ = Δ<r^2> + c$_1$ Δ<r^4> + c$_2$ Δ<r^6>. λ=0.219 fm^2 *10* with the corresponding values Δ<r^2>=0.231 fm^2 *11*, Δ<r^4>=0.00187 fm^4 *9*, and Δ<r^6>=0.0000126 fm^6 *7* from 1990Wa25. Other values: λ=0.221 *13* (1973Le16), 0.220 *11* (1981Ne01) and 0.222 *11* (1997Ji06) and Δ<r^2>=0.215 *16* (1974He28), 0.250 *14* (1979Po04 as quoted in 1983La06), 0.230 *12* (1980Br15), 0.230 (1985Al06), 0.226 *12* (1987Bo58), and 0.222 (1990En01). Other: 1989GaZO, 1995Ne12, and 1996La03. Δ<r^2> for the neutron distribution is 0.27 *4* 1983Ja06). From an analysis of proton-diffraction data using 800-MeV protons, 2004Ko34 deduce r$_{BS}$=5.24 fm *9* for the “Black-Sphere” radius, taken to be a measure of the matter distribution. The nuclear radius has been reported as <r^2>$^{1/2}$=5.113 fm *11* (1979Po04) and 5.1143 fm *9* (1995Fr22 evaluation). From an analysis of data on nuclear rms charge radii, 2004An14 report <r^2>$^{1/2}$=5.111 fm 6, while 2007Li14 recommend 5.120 fm 28. For other values, see 1976Co08 and 1977HoZF in the (γ,γ′),(e,e′) Data Set.
81.981# *15*	2+	3.02 ns *4*	ABCDEFGH	Q=−1.87 *4*; μ=+0.78 *4* XREF: G(86). The isomer shift is Δ<r^2>=0.0008 fm^2 *5* (1974Ka38) and 0.0012 fm^2 *9* [computed from Δ<r^2>/<r^2>(0) of 1970Wh02 and <r^2>(0) of 1979Po04]. J$^\pi$: From E2 γ to 0+ ground state. T$_{1/2}$: Weighted average of 3.03 ns *5* (1967Wo06) and 3.00 ns *6* (1968Ri09) from Coul. ex. Other: 2.74 ns *24* (1959Bi10) from Coul. ex. From the B(E2) value of 4.32 *2*, T$_{1/2}$=3.01 ns *4*, with the uncertainty primarily from the 1.5% uncertainty

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{154}Sm Levels (continued)

E(level)[†]	J^π	$T_{1/2}$	XREF	Comments
				assigned to the theoretical α. Q: From 1989Ra17 evaluation and 2005St24 compilation and based on muonic atom study (1979Po04). Others: −1.3 *5* (1969Wh04), −1.5 *3* (1982Cl03), and 1.42 (from ratio given by 1975Ro24 and converted to actual value by 1978LeZA). μ: From 1989Ra17 evaluation and 2005St24 compilation and based on data of 1969Wh04 in Coul. ex. For other values, see the Coul. ex. data set.
266.817[#] *22*	4^+	172 ps *4*	ABCDEF H	μ=+1.35 *15*; Q=−2.2 *8*; B(E4)↑=0.305 *18* J^π: From E2 γ to 2^+ level and band structure. $T_{1/2}$: Weighted average of 173 ps *5* (1972Di06) and 169 ps *10* (1980Jo08) from Coul. ex. μ: From 1989Ra17 evaluation and 2005St24 compilation and based on data of 1972Ku10. Q: From 1982Cl03 (inel. scatt.). B(E4)↑: From Coul. ex. Other: 0.221 *10*, from 1976Co08, (e,e′).
544.10[#] *4*	6^+	22.7 ps *6*	ABCD F	μ=+1.90 *28*; B(E6)↑=0.007 *5* J^π: From γ to 4^+ level and band structure. Coulomb-excited. $T_{1/2}$: Weighted average of 23.3 ps *7* (1972Di06) and 22.1 ps *7* (average of two values in 1980Jo08) from Coul. ex. μ: From 1989Ra17 evaluation and 2005St24 compilation and based on data of 1972Ku10. B(E6)↑: From 1977HoZF, (e,e′), reported as a preliminary result.
902.75[#] *19*	8^+	5.9 ps *3*	A F	μ=2.8 *4* J^π: From γ to 6^+ level and band structure. Coulomb-excited. $T_{1/2}$: Weighted average of 6.2 ps *6* (1972Di06), 6.0 ps *4* (1977Ke06), and 5.8 ps *4* (1980Jo08) from Coul. ex. μ: From graph in 1982An10. Other: see J-dependent expression given in 1989Ra17 evaluation which is based on data of 1982An10.
921.345[@] *19*	1^-	21 fs *1*	ABCDEF	J^π: E1 excitation in (γ,γ'). $T_{1/2}$: From weighted average of 20.1 fs *14*, by DSAM in (n,n′γ) (1993Ju04) and 24 fs *3*, (γ,γ').
1012.40[@] *3*	3^-	23 fs *3*	A CDEF	B(E3)↑=0.10 *2* J^π: E3 excitation in Coul. ex. $T_{1/2}$: From 1993Ju04 by DSAM in (n,n′γ). B(E3)↑: From Coul. ex.
1099.26[&] *5*	0^+	0.90 ps *21*	ABC EFG	XREF: G(1117). J^π: L=0 in (t,p). $T_{1/2}$: From Coul. ex. (1999Kr10).
1177.812[&] *21*	2^+	>2.4 ps	ABcDEF	J^π: From γ′s to 0^+ and 4^+ states. E2 excitation in Coul. ex. $T_{1/2}$: From Coul. ex. (1999Kr10). Other: 1.4 ps *3*, computed from B(E2)=0.023 *5*, but 1999Kr10 argue that this value is too small.
1181.26[@] *4*	5^-		A c F	J^π: From γ to 4^+ state and octupole-band structure.
1202.44[b] *6*	0^+		ABC E G	XREF: G(1218). J^π: L=0 transition in (t,p) (1966Bj01). Nuclear shape is discussed by 1999Kr10 and 2001MoZT.
1286.29[b] *4*	2^+		A DE G	XREF: G(1299). J^π: From γ′s to 0^+ and 4^+ states.
1333.0[#] *9*	10^+	2.45 ps *12*	A F	μ=3.2 *8* J^π: From multiple Coulomb excitation and band structure. $T_{1/2}$: Weighted average of 2.52 ps *16* (1977Ke06) and 2.37 ps *18* (1980Jo08), measured following Coulomb excitation. μ: From graph in 1982An10. Other: see J-dependent expression given in 1989Ra17 evaluation, which is based on data of 1982An10.
1337.60[&] *5*	4^+		A C F	J^π: From γ′s to 2^+ and 6^+ states. Populated in Coul. ex.

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Adopted Levels, Gammas (continued)

^{154}Sm Levels (continued)

E(level)[†]	J^π	$T_{1/2}$	XREF	Comments
1430.93[@] *14*	7^-		A F	J^π: From γ's to 6^+ and 8^+ levels and band structure.
1440.04[a] *3*	2^+	0.42 ps *3*	ABCDEF	J^π: γ's to 0^+ and 4^+ states. E2 excitation in Coul. ex. $T_{1/2}$: From Coul. ex., (1999Kr10); other: 0.28 ps *4*, computed from B(E2)=0.069 *10*.
1472.16[b] *12*	(4^+)		A D	J^π: From γ's to 3^- and 4^+ levels; expected band structure.
1475[‡]	(6^+)		F	J^π: From γ's to 4^+ and 6^+ levels. Suggested band member.
1475.81[c] *4*	1^-		A C E	J^π: γ's to 0^+ and 2^+ levels; angular distribution in inelastic scattering. Assigned as the bandhead of the $K^\pi=1^-$ octupole band.
1515.18[c] *5*	2^-		A C	XREF: C(1522). J^π: γ to 2^+ state only. Expected band structure.
1539.19[a] *4*	3^+		A CD F	XREF: C(1547). J^π: From γ's to 2^+ and 4^+ states. Expected band structure.
1577[&]	6^+		F	J^π: From γ's to 4^+ and 8^+ states. Band assignment is from 1992Mo20 (Coul. ex.).
1584.50[c] *5*	3^-		A CD	J^π: From γ to 2^+ and 4^+ states and angular distribution in inelastic scattering.
1614.77 *7*			E	
1660.65[c] *4*	4^-		A	J^π: From γ to 4^+ state and band structure.
1664.82[a] *7*	4^+		A CD F	J^π: From γ's to 2^+ and 4^+ states, angular distribution in inelastic scattering, and expected band structure.
1673.90 *7*	2		A DE	J^π: Dipole γ's to 1^- and 3^- levels.
1706.71 *5*	3^+		A CD	J^π: From $\gamma(\theta)$ in (n,n$'\gamma$), assuming that the transition to the 2^+ level involves no parity change.
1741[‡]	(8^+)		F	J^π: From γ to 6^+ level. Suggested band member.
1754.51 *5*			DE	
1755.67 *4*	$1^-,2,3^-$		AB DE	J^π: From γ's to 1^- and 3^- levels.
1760[@]	9^-		F	J^π: From γ to 8^+ level and band structure.
1764.4 *4*			E	
1774.31[c] *8*	5^-		A CD	J^π: From E1 γ to 4^+ level, γ to 6^+ level, and band structure.
1804.99[a] *10*	5^+		A D F	J^π: From γ's to 4^+ and 6^+ levels and band structure.
1815.04 *5*	$2^+,3$		A CD	J^π: Dipole γ to 2^+ level, γ to 4^+ level.
1818.37 *8*	$4^+,5,6^+$		A D	J^π: From γ's to 4^+ and 6^+ levels.
1825.9[#] *10*	12^+	1.39 ps *9*	F	J^π: From multiple Coulomb excitation and band structure. $T_{1/2}$: From Coulomb excitation (1980Jo08).
1878.70 *4*	2^+		A D	J^π: From γ's to 0^+ and 4^+ levels.
1890.45 *11*	1^-		AB E	J^π: E1 transitions to 0^+ and 2^+ levels in (n,n$'\gamma$). Excitation via a presumptive E1 transition in (γ,γ'). See the comment in that data set.
1900			B	
1922.05 *4*	2^+		AB D	J^π: Fed by primary γ from 1^- state populated via n-capture γ rays; γ's to 2^+ and 4^+ levels. E1 γ from 3^- indicates π=+.
1925.56 *16*			A	J^π: 2006De19, (n,n$'\gamma$), report $J^\pi=4^+$.
1945.61 *6*			A DE	
1973.76 *5*	$1^-,2^+$		ABC E	J^π: From γ's to 0^+ and 3^- levels. Proposed to be excited via M1 in (γ,γ'), indicating $J^\pi=1^+$, but this leads to a violation of RUL for the 961.3 γ (which would then be M2) deexciting this level.
1974[a]	(6^+)		F	J^π: From γ's to 4^+ and 6^+ levels. Assigned as the 6^+ member of the γ-vibrational band by 1992Mo20 (Coul. ex.).
1986.59 *4*	3^-		AB D	J^π: γ's to $2^+,2^-$ and 4^+ levels indicate $J^\pi=2^+,3$. E1 γ's to positive-parity states indicate π=−, and hence J=3. (See the comment on the decay modes of this level in the (n,n$'\gamma$) data set.
2013.4 *6*			A C	XREF: C(2012).
2015.40 *6*	$(1^-,2^+)$		A E	XREF: A(?). J^π: From γ's to 0^+ and 3^- levels.
2062 *4*			C	

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Adopted Levels, Gammas (continued)

^{154}Sm Levels (continued)

E(level)[†]	J$^{\pi}$	XREF	Comments
2065.90 *8*		D	
2069[‡]	(10^{+})	F	J$^{\pi}$: From γ to 8^{+} level and band structure.
2069.07 *4*	(2^{+})	A E	XREF: A(?). J$^{\pi}$: From γ's to 0^{+} and 4^{+} levels.
2130 *4*		C	
2131.82 *6*	(2^{+})	A E	J$^{\pi}$: From γ's to 0^{+} and 4^{+} levels.
2139.82 *4*	(1,2^{+})	A E	XREF: A(?). J$^{\pi}$: γ's to 0^{+} and 2^{+} levels.
2154.3?[a]	7^{+}	F	J$^{\pi}$: From γ to 6^{+} state and band structure.
2163[@]	11^{-}	F	J$^{\pi}$: From γ's to 9^{-} and 10^{+} and band structure.
2196.2? *5*	(1,2^{+})	E	J$^{\pi}$: From γ to 0^{+} level.
2232.8 *4*		A D	XREF: A(?).
2275 *4*		C	
2288 *4*		C	
2293.85 *12*	(2^{+},3,4^{+})	D	J$^{\pi}$: From γ's to 2^{+} and 4^{+} levels.
2368.81 *14*	(1,2^{+})	E	J$^{\pi}$: From γ's to 0^{+} and 2^{+} levels.
2373.0[#]	14^{+}	F	J$^{\pi}$: From γ to 12^{+} level and band structure.
2421.4?	(1,2^{+})	E	J$^{\pi}$: From γ's to 0^{+} and 2^{+} levels.
2428.48 *11*		E	
2439[‡]	(12^{+})	F	J$^{\pi}$: From γ to 10^{+} level and band structure.
2443.5 *4*	1^{+}	B	J$^{\pi}$: Excited via an M1 transition in (γ,γ').
2486? *3*		B	
2556.56 *22*	1^{-}	B E	J$^{\pi}$: γ's to 0^{+} and 2^{+} levels; E1 excitation in (γ,γ').
2591.32 *10*		E	
2618.03 *12*	1^{-}	B E	J$^{\pi}$: From E1 excitation in (γ,γ').
2636[@]	13^{-}	F	J$^{\pi}$: From γ's to 11^{-} and 12^{+} levels and band structure.
2721.28 *24*	(1,2^{+})	E	J$^{\pi}$: From γ's to 0^{+} and 2^{+} levels.
2743.7 *4*	1^{-}	B	J$^{\pi}$: From E1 excitation in (γ,γ').
2778.63 *17*	1	B E	J$^{\pi}$: From γ's to 0^{+} and 2^{+} levels, J^{π}=1,2^{+}. Dipole excitation in (γ,γ') rules out 2^{+}.
2793?[‡]	(14^{+})	F	J$^{\pi}$: From γ to 12^{+} level and band structure.
2825.3 *5*	1^{-}	B	J$^{\pi}$: From E1 excitation in (γ,γ').
2842.8 *4*	1^{-}	B E	J$^{\pi}$: From E1 excitation in (γ,γ').
2882.0 *5*	1^{-}	B	J$^{\pi}$: From E1 excitation in (γ,γ').
2907.3 *5*	1^{+}	B	J$^{\pi}$: From M1 excitation in (γ,γ').
2968.2[#]	16^{+}	F	J$^{\pi}$: From γ to 14^{+} level and band structure.
3051.23 *15*		E	
3091.5 *5*	1^{+}	B	J$^{\pi}$: From M1 excitation in (γ,γ').
3117.0 *5*	1^{+}	B	J$^{\pi}$: From M1 excitation in (γ,γ').
3193.42 *17*	1^{+}	B E	J$^{\pi}$: From M1 excitation in (γ,γ').
3339.5 *5*	1	B	J$^{\pi}$: From dipole excitation in (γ,γ').
3365.9 *5*	1	B	J$^{\pi}$: From dipole excitation in (γ,γ').
3371.1 *5*	1^{+}	B	J$^{\pi}$: From M1 excitation in (γ,γ').
3426.4 *5*	1	B	J$^{\pi}$: From dipole excitation in (γ,γ').
3492.4 *5*	1^{+}	B	J$^{\pi}$: From M1 excitation in (γ,γ').
3609.3[#]	18^{+}	F	J$^{\pi}$: γ to 16^{+}, and band structure.
3621.7 *5*	1^{+}	B	J$^{\pi}$: From M1 excitation in (γ,γ').
3745.8 *5*	1	B	J$^{\pi}$: From dipole excitation in (γ,γ').
3759.8 *5*	1	B	J$^{\pi}$: From dipole excitation in (γ,γ').
3801.3 *5*	1	B	J$^{\pi}$: From dipole excitation in (γ,γ').
3826.7 *5*	1^{-}	B	J$^{\pi}$: From E1 excitation in (γ,γ').
3836.7 *5*	1	B	J$^{\pi}$: From dipole excitation in (γ,γ').
3844.0 *5*	1	B	J$^{\pi}$: From dipole excitation in (γ,γ').
4020 *10*		B	
4240 *10*		B	

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Adopted Levels, Gammas (continued)

^{154}Sm Levels (continued)

E(level)[†]	J^π	$T_{1/2}$	XREF	Comments
4295.7[#]	20^+		F	J^π: γ to 18^+ and band structure.
4300 *10*			B	
5027.9[#]	22^+		F	J^π: γ to 20^+ and band structure.
6465.2 *10*	1^-	4.3 fs *21*	B	J^π: From E1 excitation in (γ,γ'). $T_{1/2}$: Calculated from level width of 0.105 eV *50* (1977Be05).

[†] From least-squares fit to γ energies, except omitted are those γ's with questionable placements and Eγ's that do not have uncertainties.

[‡] Proposed as a member of a band by 1992Mo20 in Coul. ex., but the existence of the suggested bandhead (at 1371 keV) is questionable, and the band characteristics are not otherwise clear.

[#] Band(A): K^π=0^+ ground-state band. A=13.80 keV, B=−23.0 eV, computed from the energies of the 0^+, 2^+ and 4^+ levels.

[@] Band(B): K^π=0^- octupole-vibrational band. A=8.97 keV, B=+9.8 eV, computed from the energies of the 1^-, 3^- and 5^- levels.

[&] Band(C): First excited K^π=0^+ band. A=13.60 keV, B=−84 eV, computed from the energies of the 0^+, 2^+ and 4^+ levels. 2001Ga02 suggest that this is probably not a pure β vibration.

[a] Band(D): K^π=2^+ γ-vibrational band. A=17.30 keV, B=−72 eV, A_4=+2.2 eV, computed from the energies of the 2^+ through 5^+ levels.

[b] Band(E): Second excited K^π=0^+ band. A=14.18 keV, B=−35 eV, computed from the energies of the 0^+, 2^+ and 4^+ levels.

[c] Band(F): K^π=1^- octupole-vibrational band. A=10.40 keV, B=+13 eV, A_2=+0.316 keV, computed from the energies of the 1^- through 4^- levels.

Adopted Levels, Gammas (continued)

$\gamma(^{154}Sm)$

The unplaced γ's are not given here, see ^{154}Pm γ- decay (1.73 m and 2.68 m) and ^{154}Sm(n,n$'\gamma$).

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Mult.[#]	δ	α[c]	Comments
81.981	2^+	81.990 *18*	100	0.0	0^+	E2		4.86	B(E2)(W.u.)=176 *1*
									B(E2)(W.u.) value computed directly from B(E2)↑.
266.817	4^+	184.810 *25*	100	81.981	2^+	E2		0.272	B(E2)(W.u.)=245 *6*
544.10	6^+	277.34 *4*	100	266.817	4^+	E2		0.0721	B(E2)(W.u.)=289 *8*
902.75	8^+	358.8 *2*	100	544.10	6^+	E2		0.0327	B(E2)(W.u.)=319 *17*
921.345	1^-	839.36 *2*	100 *3*	81.981	2^+	E1			B(E1)(W.u.)=0.0113 *7*
		921.33 *3*	68 *2*	0.0	0^+	E1			B(E1)(W.u.)=0.0058 *4*
									Mult.: From $\gamma(\theta)$ and linear polarization measurements in (γ,γ') (1976Me17).
1012.40	3^-	745.50 *4*	59.0 *18*	266.817	4^+	E1			B(E1)(W.u.)=0.0092 *13*
		930.37 *3*	100 *1*	81.981	2^+	E1			B(E1)(W.u.)=0.0080 *11*
1099.26	0^+	1017.23 *10*	100	81.981	2^+	[E2]			B(E2)(W.u.)=12 *3*
1177.812	2^+	910.96 *3*	75 *6*	266.817	4^+	E2			B(E2)(W.u.)<2.4
		1095.86 *3*	100 *2*	81.981	2^+	E2+M1	$+6\times10^1$ *+13−3*		B(M1)(W.u.)<4.3×10^{-6}; B(E2)(W.u.)<1.3
									δ: In (n,n$'\gamma$), 2006De19 report δ=+56 *+130−25*. See the comment there regarding another possible δ value.
		1177.79 *4*	65.8 *14*	0.0	0^+	E2			B(E2)(W.u.)<0.58
1181.26	5^-	637.14[e] *6*	35[e]	544.10	6^+	E1			
		914.44 *3*	100 *2*	266.817	4^+	E1			
1202.44	0^+	281.01 *9*	100 *21*	921.345	1^-				
		1120.51 *8*	79 *2*	81.981	2^+	E2			
1286.29	2^+	274.0 *10*	34 *1*	1012.40	3^-				
		364.91 *6*	52 *6*	921.345	1^-	E1			
		1019.40 *20*	54.1 *17*	266.817	4^+				
		1204.30 *4*	100 *10*	81.981	2^+	M1+E2	+0.8 *+15−6*		
		1286.8 *5*	6.9 *10*	0.0	0^+				
1333.0	10^+	430.2 *5*	100	902.75	8^+	[E2]		0.0193	B(E2)(W.u.)=314 *16*
1337.60	4^+	794.9 *2*	32 *2*	544.10	6^+				
		1070.68 *7*	84 *3*	266.817	4^+	E2+M1	>50		δ: In (n,n$'\gamma$), 2006De19 also report δ=−1.1 *3*.
		1255.55 *7*	100 *2*	81.981	2^+	E2			
1430.93	7^-	528.8[e] *4*	30[e] *4*	902.75	8^+				
		886.75 *14*	100 *6*	544.10	6^+				
1440.04	2^+	1173.1 *4*	8.0 *9*	266.817	4^+	[E2]			B(E2)(W.u.)=0.48 *7*
		1358.09 *3*	100 *2*	81.981	2^+	[M1+E2]			δ: 2006De19, (n,n$'\gamma$), report δ=−0.59 *3* or −8.5 *15*.
		1440.05[e] *10*	100[e]	0.0	0^+	[E2]			B(E2)(W.u.)=2.13 *16*
1472.16	(4^+)	460.0 *3*	34	1012.40	3^-				
		1205.4 *2*	100 *18*	266.817	4^+				
1475	(6^+)	931		544.10	6^+				
		1208		266.817	4^+				

$^{154}_{62}Sm_{92}$-6

$\gamma(^{154}Sm)$ (continued)

E_i(level)	J^π_i	E_γ †	I_γ ‡	E_f	J^π_f	Mult.#	δ	$I_{(\gamma+ce)}$	Comments
1475.81	1^-	554.3 *4*	5.6 *11*	921.345	1^-				
		1393.83[e] *3*	100[e]	81.981	2^+				
		1476.0 *6*	2.5 *7*	0.0	0^+				
1515.18	2^-	1433.19 *5*	100 *3*	81.981	2^+	E1			
1539.19	3^+	1272.34 *7*	38.0 *17*	266.817	4^+				
		1457.23 *4*	100 *3*	81.981	2^+	E2+M1	−7.5 *10*		
1577	6^+	674		902.75	8^+				
		1033		544.10	6^+				
		1310		266.817	4^+				
1584.50	3^-	45.5		1539.19	3^+			55	$E_\gamma,I_{(\gamma+ce)}$: From ^{154}Pm β^- decay (2.68 min).
		1317.68 *4*	100 *3*	266.817	4^+	E1			
		1502.6 *2*	20.0 *16*	81.981	2^+	E1			
1614.77		693.39 *6*	100	921.345	1^-				
1660.65	4^-	1393.83[e] *3*	100[e]	266.817	4^+				
1664.82	4^+	1398.00 *6*	100 *3*	266.817	4^+	M1(+E2)	−2.5 *+10−25*		
		1582.8 *3*	33.0 *18*	81.981	2^+	E2			
1673.90	2	661.47 *9*	100 *2*	1012.40	3^-	E1,M1			
		752.57 *10*	82 *3*	921.345	1^-	E1,M1			I_γ: From (n,n′γ); Iγ=121 from ^{154}Pm β- decay (1.73 m).
1706.71	3^+	1440.05[e] *10*	100[e]	266.817	4^+	M1+E2			
		1624.87 *12*	45 *18*	81.981	2^+	M1+E2	+0.75 *+25−10*		
1741	(8^+)	1197		544.10	6^+				
1754.51		742.2 *3*	85	1012.40	3^-				
		833.4 *3*	100	921.345	1^-				
1755.67	$1^-,2,3^-$	315.5 *3*	33 *7*	1440.04	2^+				
		742.90 *6*	100 *3*	1012.40	3^-				
		834.05 *20*	99 *3*	921.345	1^-				
		1674.1 *4*	11.7 *15*	81.981	2^+				
1760	9^-	857		902.75	8^+				
1764.4		1681.6 *5*	60	81.981	2^+				
		1764.9 *4*	100	0.0	0^+				
1774.31	5^-	1230.16 *7*	100 *4*	544.10	6^+				
		1509.0 *4*	20 *3*	266.817	4^+	E1			
1804.99	5^+	1261.0 *1*	47 *4*	544.10	6^+				
		1538.1 *2*	100 *5*	266.817	4^+	M1(+E2)			Mult.: From (n,n′γ), δ=0.00 *2* or −9 *2* (2006De19).
1815.04	$2^+,3$	276.00 *25*	46	1539.19	3^+				
		375.06 *8*	100	1440.04	2^+				
		528.8[e] *4*	12[e]	1286.29	2^+				E_γ: From 2006De19, (n,n′γ).

Adopted Levels, Gammas (continued)

γ(^{154}Sm) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Mult.[#]	δ	α[c]	Comments
1815.04	2^+,3	637.14[e] 6	24[e]	1177.812	2^+				E_γ: From 2006De19, (n,n′γ).
		802.7 3	27	1012.40	3^-				
		1548.6 2	77	266.817	4^+				
		1733.11 15	93	81.981	2^+	E1,M1			Mult.: From 2006De19 (n,n′γ).
1818.37	4^+,5,6^+	1274.33 19	40 4	544.10	6^+				
		1551.54 9	100 4	266.817	4^+				δ: 2006De19, (n,n′γ), give δ=−0.05 5 or −5 +1−2.
1825.9	12^+	492.9 5	100	1333.0	10^+	[E2]		0.0134	B(E2)(W.u.)=282 19
1878.70	2^+	339.68 20	25	1539.19	3^+				
		406.63 15	23	1472.16	(4^+)				
		438.76 20	79	1440.04	2^+				
		592.5 3	45	1286.29	2^+				
		701.1 3	21	1177.812	2^+				
		956.9 3	76 9	921.345	1^-				E_γ: From (n,n′γ). From ^{154}Pm β^- decay (2.68 min), a questionable γ with Eγ=958.1 4IS shown. I_γ: From Iγ(956.9γ)/Iγ(1796.8γ) in (n,n′γ) and Iγ(1796.8γ). from ^{154}Pm β^- decay (2.68 min), Iγ≤12, but γ is shown as questionable.
		1611.97 25	46	266.817	4^+				
		1796.85 15	100	81.981	2^+	M1+E2	−1.5 +8−70		Mult.,δ: From 2006De19 (n,n′γ).
		1878.3 5	6.2	0.0	0^+				
1890.45	1^-	603.54 25	12	1286.29	2^+				E_γ,I_γ: From ^{154}Pm β^- decay (1.73 min). γ not reported by 2006De19, in (n,n′γ).
		688.1 4	15 5	1202.44	0^+				
		1808.29 19	100 7	81.981	2^+	E1			
		1890.80 16	83 5	0.0	0^+	E1			
1900		1820		81.981	2^+				
		1900		0.0	0^+				
1922.05	2^+	584.4 6	19 4	1337.60	4^+				
		909.7 3	21	1012.40	3^-				E_γ: From ^{154}Pm β^- decay (2.68 min). γ not reported by 2006De19 in (n,n′γ). I_γ: From Iγ(909.7γ)/Iγ(1655γ) in ^{154}Pm β^- decay (2.68 min) and Iγ(1655γ).
		1655.24 15	100 6	266.817	4^+				
		1840.44 18	98 6	81.981	2^+				
1925.56		1658.73 15	100	266.817	4^+				
1945.61		933.5 4	100	1012.40	3^-				E_γ: γ not reported by 2006De19, (n,n′γ).
		1024.40 8	69	921.345	1^-	E1,M1			E_γ,Mult.: From 2006De19, (n,n′γ).
		1863.3 5	18	81.981	2^+				I_γ: From Iγ(1863γ)/Iγ(1024γ) in (n,n′γ) and Iγ(1024γ). In ^{154}Pm β^- decay (1.73 min), Iγ≤150.
1973.76	1^-,2^+	961.3 5	17	1012.40	3^-				
		1891.8 3	81	81.981	2^+				
		1973.59 20	100	0.0	0^+				
1974	(6^+)	1430		544.10	6^+				

Adopted Levels, Gammas (continued)

$\gamma(^{154}Sm)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Mult.[#]
1974	(6^+)	1707		266.817	4^+	
1986.59	3^-	64.548 25	33	1922.05	2^+	E1[@]
		107.896 25	47	1878.70	2^+	E1[@]
		171.6 3	49	1815.04	2^+,3	E1[@]
		230.82 3	43	1755.67	1^-,2,3^-	
		232.08 3	30	1754.51		
		279.93 4	82	1706.71	3^+	
		402.15 10	11	1584.50	3^-	
		447.5 3	3.0	1539.19	3^+	
		471.36 20	7.0	1515.18	2^-	
		546.66 6	100	1440.04	2^+	
		700.0[f] 3	4.5	1286.29	2^+	
		974.0[f] 4	2.0	1012.40	3^-	
		1719.74 25	4.8	266.817	4^+	
		1905.1 4	5.2	81.981	2^+	
2013.4		675.8 6	100 20	1337.60	4^+	
2015.40	$(1^-,2^+)$	837.4	100	1177.812	2^+	
		1002.8 10	53	1012.40	3^-	
		1933.5 3	93	81.981	2^+	
		2015.5[d] 4	67[d]	0.0	0^+	
2065.90		143.74 15	12	1922.05	2^+	
		247.75 15	17	1818.37	4^+,5,6^+	
		359.16 8	100	1706.71	3^+	
		526.7 4	7.1	1539.19	3^+	
		1799.4[f] 5	3.7	266.817	4^+	
2069	(10^+)	1166		902.75	8^+	
2069.07	(2^+)	95.2[f] 3	0.5	1973.76	1^-,2^+	
		782.9 3	2.5	1286.29	2^+	
		866.5 3	5.3	1202.44	0^+	
		891.28 4	71	1177.812	2^+	
		969.79 6	56 4	1099.26	0^+	
		1057.0 5	1.0	1012.40	3^-	
		1147.69 6	100 6	921.345	1^-	
		1801.6 5	1.4	266.817	4^+	
		1987.04 10	14 2	81.981	2^+	
		2069.04 8	20 2	0.0	0^+	
2131.82	(2^+)	62.62[f] 6	3.2	2069.07	(2^+)	
		953.97 8	100	1177.812	2^+	
		1032.55 8	69	1099.26	0^+	
		1210.2 3	15	921.345	1^-	
		1865.7 5	6.4	266.817	4^+	

$\gamma(^{154}Sm)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ‡	E_f	J^π_f	Mult.#	Comments
2131.82	(2^+)	2050.1 3	13	81.981	2^+		
2139.82	(1,2^+)	124.43 4	1.1	2015.40	(1^-,2^+)		
		166.06 3	3.6	1973.76	1^-,2^+	E1&	
		194.29 6	0.9	1945.61			
		384.5 3	0.4	1755.67	1^-,2,3^-		
		465.8 3	1.0	1673.90	2		
		524.2 3	0.5	1614.77			
		624.6 4	0.8	1515.18	2^-		
		664.20 14	3.0	1475.81	1^-		
		700.0 3	1.2	1440.04	2^+		
		853.1f 5	0.6	1286.29	2^+		
		937.30 12	2.2	1202.44	0^+		
		962.00 8	19.1 16	1177.812	2^+		
		1040.7 5	0.8	1099.26	0^+		
		1218.57 10	3.7	921.345	1^-		
		1873.6f 8	0.4	266.817	4^+		
		2057.76 6	100 10	81.981	2^+		
		2139.76 8	57	0.0	0^+		
2163	11^-	403f		1760	9^-		
		830		1333.0	10^+		
2196.2?	(1,2^+)	1096.9f 5	100	1099.26	0^+		E_γ: The existence and placement of this γ are doubtful.
2232.8		526.0 4	100	1706.71	3^+		
		2150.5f 5	14	81.981	2^+		
2293.85	(2^+,3,4^+)	307.3f 3	27	1986.59	3^-		
		371.7f 3	≤29	1922.05	2^+		
		415.23 15	100	1878.70	2^+		
		709.1 3	48	1584.50	3^-		
		853.1f 5	≤60	1440.04	2^+		
		2026.9 3	57	266.817	4^+		
		2211.9 3	48	81.981	2^+		
2368.81	(1,2^+)	853.3	≤26	1515.18	2^-		
		1082.0 5	22	1286.29	2^+		
		1191.1 3	44	1177.812	2^+		
		1447.4f 3	34	921.345	1^-		
		2287.0 3	26	81.981	2^+		
		2368.74 20	100	0.0	0^+		
2373.0	14^+	547.1		1825.9	12^+		
2421.4?	(1,2^+)	2340.8f 5	100	81.981	2^+		
		2421.4f 4	87	0.0	0^+		
2428.48		2346.48 10	100	81.981	2^+		

From ENSDF

$\gamma(^{154}Sm)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ‡	E_f	J^π_f	Mult.#	Comments
2439	(12+)	1106		1333.0	10+		
2443.5	1+	2361.5 *5*	38 *24*	81.981	2+	[M1]	B(M1)(W.u.)=0.014 *9*
		2443.5 *5*	100	0.0	0+	M1[b]	B(M1)(W.u.)=0.033 *8*
2556.56	1−	2474.5 *3*	100	81.981	2+	[E1]	B(E1)(W.u.)=0.0021 *3*
		2556.6 *3*	48 *6*	0.0	0+	E1[b]	B(E1)(W.u.)=9.4×10^{-4} *10* I_γ: From (γ,γ'); other: Iγ(2556)/Iγ(2474)=0.74 from ^{154}Pm β- decay (1.73 m).
2591.32		917.0 *5*	13	1673.90	2		
		1389.3 *3*	25	1202.44	0+		
		1670.16 *25*	19	921.345	1−		
		2509.27 *15*	100	81.981	2+		
		2591.14 *20*	39	0.0	0+		
2618.03	1−	2536.08 *15*	100	81.981	2+	[E1]	B(E1)(W.u.)=0.0017 *4*
		2617.92 *20*	67 *12*	0.0	0+	E1[b]	B(E1)(W.u.)=0.0010 *1* I_γ: From (γ,γ'); other: Iγ(2617)/Iγ(2536)=0.76 from ^{154}Pm β- decay (1.73 m).
2636	13−	473[f]		2163	11−		
		810		1825.9	12+		
2721.28	(1,2+)	2639.2 *4*	41	81.981	2+		
		2721.3 *3*	100	0.0	0+		
2743.7	1−	2661.7 *5*	100	81.981	2+	[E1]	B(E1)(W.u.)=0.0014 *2*
		2743.7 *5*	58 *8*	0.0	0+	E1[b]	B(E1)(W.u.)=7.4×10^{-4} *6*
2778.63	1	1022.4 *4*	33	1755.67	1−,2,3−		
		1576.7 *8*	36	1202.44	0+		
		1856.3 *4*	36	921.345	1−		
		2697.4 *3*	27	81.981	2+		I_γ: From ^{154}Pm β- decay (1.73 m); other: ≤ 17 from (γ,γ').
		2778.6 *3*	100	0.0	0+	D	
2793?	(14+)	967[f]		1825.9	12+		
2825.3	1−	2743.3 *5*	100	81.981	2+	[E1]	B(E1)(W.u.)=7.1×10^{-4} *16*
		2825.3 *5*	53 *14*	0.0	0+	E1[b]	B(E1)(W.u.)=3.5×10^{-4} *8*
2842.8	1−	2761.1 *5*	100	81.981	2+	[E1]	B(E1)(W.u.)=8.5×10^{-4} *16*
		2842.6 *4*	71 *10*	0.0	0+	E1[b]	B(E1)(W.u.)=5.6×10^{-4} *7* I_γ: From (γ,γ'); other: Iγ(2761)/Iγ(2842)=0.87 from ^{154}Pm β- decay (1.73 m).
2882.0	1−	2800.0 *5*	100	81.981	2+	[E1]	B(E1)(W.u.)=3.4×10^{-4} *16*
		2882.0 *5*	79 *26*	0.0	0+	E1[b]	B(E1)(W.u.)=2.5×10^{-4} *8*
2907.3	1+	2825.3 *5*	52 *13*	81.981	2+	[M1]	B(M1)(W.u.)=0.019 *6*
		2907.3 *5*	100	0.0	0+	M1[b]	B(M1)(W.u.)=0.033 *7*
2968.2	16+	595.2		2373.0	14+		
3051.23		919.23 *20*	100	2131.82	(2+)		
		1576.7 *8*	41	1475.81	1−		
		1764.9 *4*	55	1286.29	2+		
		1873.6 *8*	24	1177.812	2+		
		2130.4 *3*	72	921.345	1−		

$\gamma(^{154}$Sm) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Mult.[#]	Comments
3051.23		2968.9 *4*	45	81.981	2^+		
3091.5	1^+	3009.5 *5*	49 *5*	81.981	2^+	[M1]	B(M1)(W.u.)=0.045 *6*
		3091.5 *5*	100	0.0	0^+	M1[b]	B(M1)(W.u.)=0.084 *8*
3117.0	1^+	3035.0 *5*	53 *6*	81.981	2^+	[M1]	B(M1)(W.u.)=0.033 *5*
		3117.0 *5*	100	0.0	0^+	M1[b]	B(M1)(W.u.)=0.058 *7*
3193.42	1^+	1374.3 *3*	46	1818.37	4^+,5,6^+		
		1389.3 *3*	100	1804.99	5^+		
		1487.1[f] *3*	57	1706.71	3^+		
		2015.5[d] *4*	36[d]	1177.812	2^+		
		3111.2 *5*	29	81.981	2^+	[M1]	B(M1)(W.u.)=0.092 *9* E_γ: Simple average of 3111.4 *5* (γ,γ') and 3110.9 *5* (^{154}Pm β- decay (1.73 m)).
		3193.4 *5*	51 *4*	0.0	0^+	M1[b]	B(M1)(W.u.)=0.150 *11* E_γ: From (γ,γ'); γ not reported in ^{154}Pm β- decay (1.73 m). I_γ: Computed from Iγ(3111) and Iγ(3111)/Iγ(3193)=0.57 *4* (from (γ,γ')).
3339.5	1	(3257.5 *5*)	≤21	81.981	2^+		
		3339.5 *5*	100	0.0	0^+	D[b]	
3365.9	1	(3283.9 *5*)	≤21	81.981	2^+		
		3365.9 *5*	100	0.0	0^+	D[b]	
3371.1	1^+	3289.1 *5*	67 *20*	81.981	2^+	[M1]	B(M1)(W.u.)=0.019 *7*
		3371.1 *5*	100	0.0	0^+	M1[b]	B(M1)(W.u.)=0.027 *7*
3426.4	1	(3344.4 *5*)	≤21	81.981	2^+		
		3426.4 *5*	100	0.0	0^+	D[b]	
3492.4	1^+	3410.4 *5*	42 *20*	81.981	2^+	[M1]	B(M1)(W.u.)=0.008 *5*
		3492.4 *5*	100	0.0	0^+	M1[b]	B(M1)(W.u.)=0.018 *7*
3609.3	18^+	641.1		2968.2	16^+		
3621.7	1^+	3539.7 *5*	49 *14*	81.981	2^+	[M1]	B(M1)(W.u.)=0.019 *8*
		3621.7 *5*	100	0.0	0^+	M1[b]	B(M1)(W.u.)=0.036 *11*
3745.8	1	(3663.8 *5*)	≤17	81.981	2^+		
		3745.8 *5*	100	0.0	0^+	D[b]	
3759.8	1	(3677.8 *5*)	≤28	81.981	2^+		
		3759.8 *5*	100	0.0	0^+	D[b]	
3801.3	1	3719.3 *5*	93 *23*	81.981	2^+		
		3801.3 *4*	100	0.0	0^+	D[b]	
3826.7	1^-	3744.7 *5*	100	81.981	2^+	[E1]	B(E1)(W.u.)=0.0012 *3*
		3826.7 *5*	41 *6*	0.0	0^+	E1[b]	B(E1)(W.u.)=4.5×10^{-4} *9*
3836.7	1	3754.7 *5*	85 *30*	81.981	2^+		
		3836.7 *5*	100	0.0	0^+	D[b]	
3844.0	1	3762.0 *5*	112 *40*	81.981	2^+		
		3844.0 *5*	100	0.0	0^+	D[b]	

$^{154}_{62}$Sm$_{92}$-12

$\gamma(^{154}Sm)$ (continued)

E_i(level)	J^π_i	E_γ [†]	I_γ [‡]	E_f	J^π_f	Mult. [#]	δ	Comments
4020		3940		81.981	2^+			
		4020		0.0	0^+			
4240		4160		81.981	2^+			
		4240		0.0	0^+			
4295.7	20^+	686.4		3609.3	18^+			
4300		4220		81.981	2^+			
		4300		0.0	0^+			
5027.9	22^+	732.2		4295.7	20^+			
6465.2	1^-	3979 [f] *2*	10 *2*	2486?				
		4479 *3*	0.3	1986.59	3^-			
		4543 *3*	10 *2*	1922.05	2^+			
		4709 *3*	4 *3*	1755.67	$1^-,2,3^-$			
		5025 *3*	5 *3*	1440.04	2^+	[E1]		B(E1)(W.u.)=8.E−6 *7*
		5263 *3*	7 *1*	1202.44	0^+	E1 [a]		B(E1)(W.u.)=1.0×10^{-5} *5*
		5287 *3*	8 *2*	1177.812	2^+	E1 [a]		B(E1)(W.u.)= 1.1×10^{-5} *7*
		5366 *3*	45 *1*	1099.26	0^+	E1 [a]		B(E1)(W.u.)=6.E−5 *3*
		5544 *3*	8 *2*	921.345	1^-	E1 [a]		B(E1)(W.u.)=1.0×10^{-5} *6* Mult.: Multipolarity is not consistent with J^π's of 1^- to 1^-.
		6383 *3*	67 *1*	81.981	2^+	E1+M2 [a]	0.081 *18*	B(E1)(W.u.)=5.E−5 *3*; B(M2)(W.u.)=0.04 *3* δ: From $\gamma(\theta)$ in (γ,γ'), mult=D+Q. Since a parity change is involved in the transition, mult is not M1+E2.
		6465 *3*	100	0.0	0^+	E1		B(E1)(W.u.)=8.E−5 *4* Mult.: From $\gamma(\theta)$ and linear polarization in (γ,γ').

† Values are from the measurement giving the most precise value. This is often the ^{154}Sm(n,n′γ) reaction or one of the ^{154}Pm β- decays.

‡ From ^{154}Pm β- decays (1971Da28,1974Ya07,1993GrZY) and (n,n′γ) (1986Be52).

From ce data following Coulomb excitation (1970Da28) and (n,n′γ), unless noted otherwise.

@ From α_K(exp) in ^{154}Pm β- decay (2.68 m).

& From α_K(exp) in ^{154}Pm β- decay (1.73 m).

[a] From $\gamma(\theta)$ in (γ,γ') (1977Be05) together with the observation that the transition involves a change of parity.

[b] From $\gamma(\theta)$ and γ-branching considerations in (γ,γ') (1993Zi05).

[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.

[d] Multiply placed with undivided intensity.

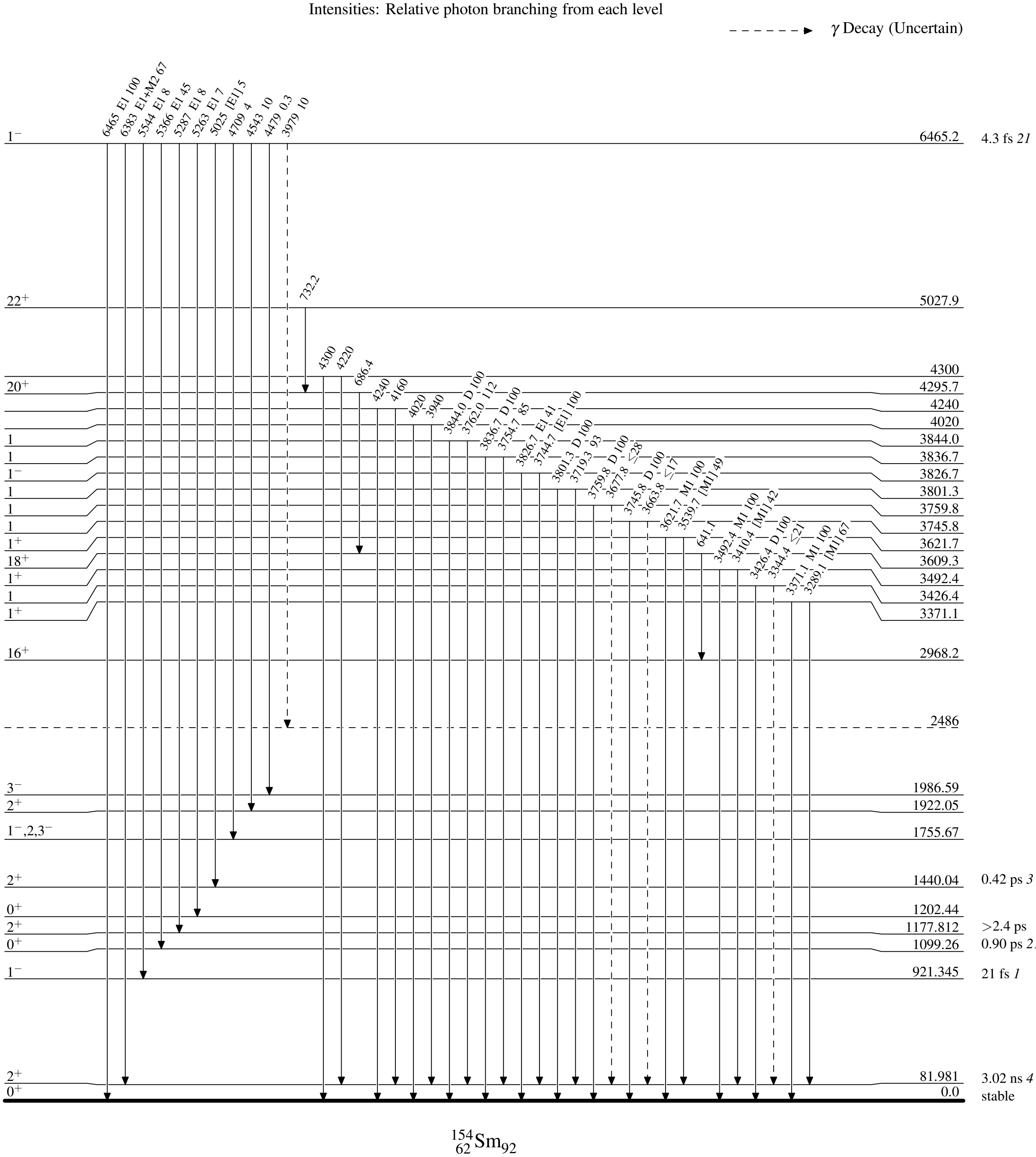
[e] Multiply placed with intensity suitably divided.

[f] Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Level Scheme

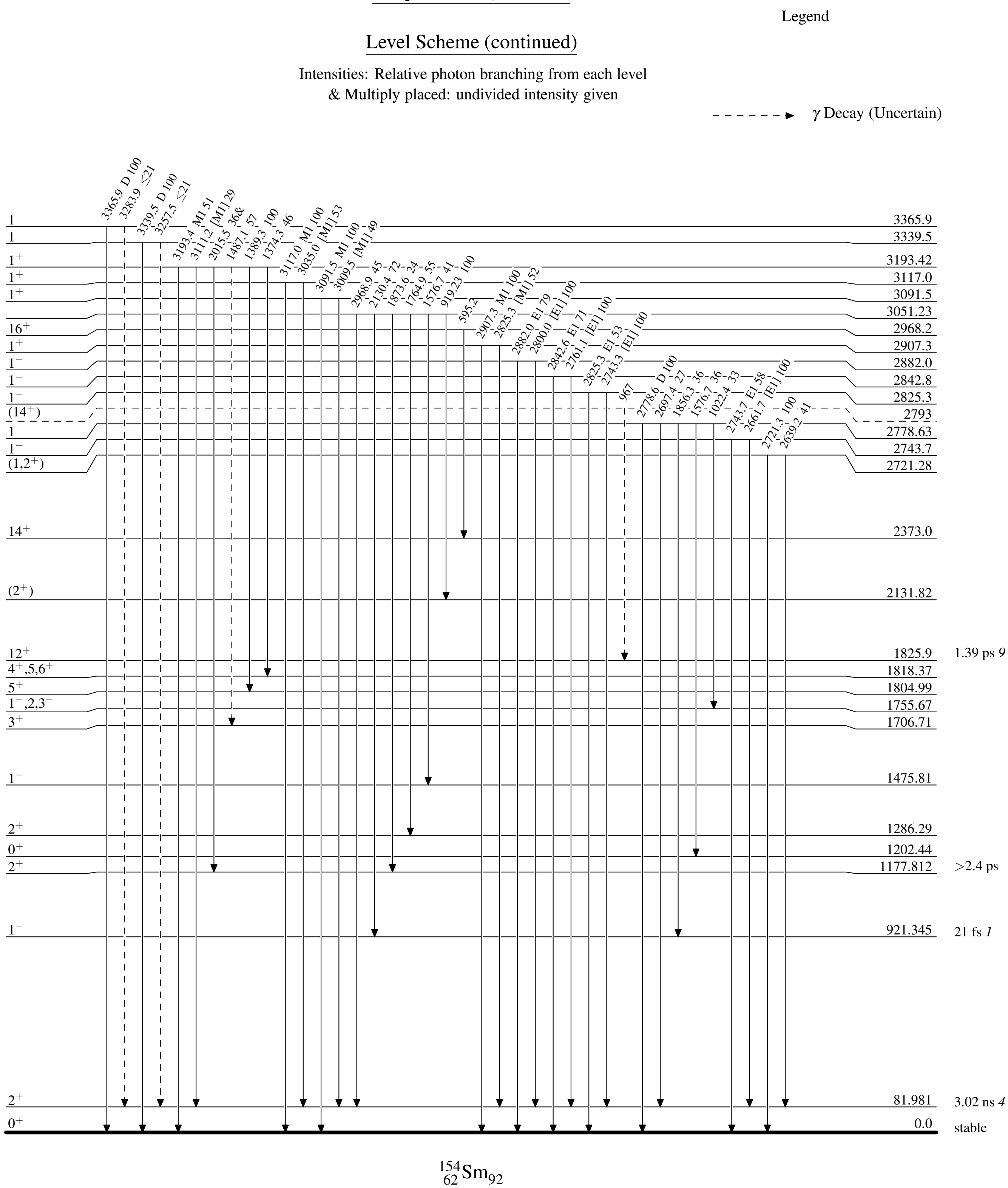
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

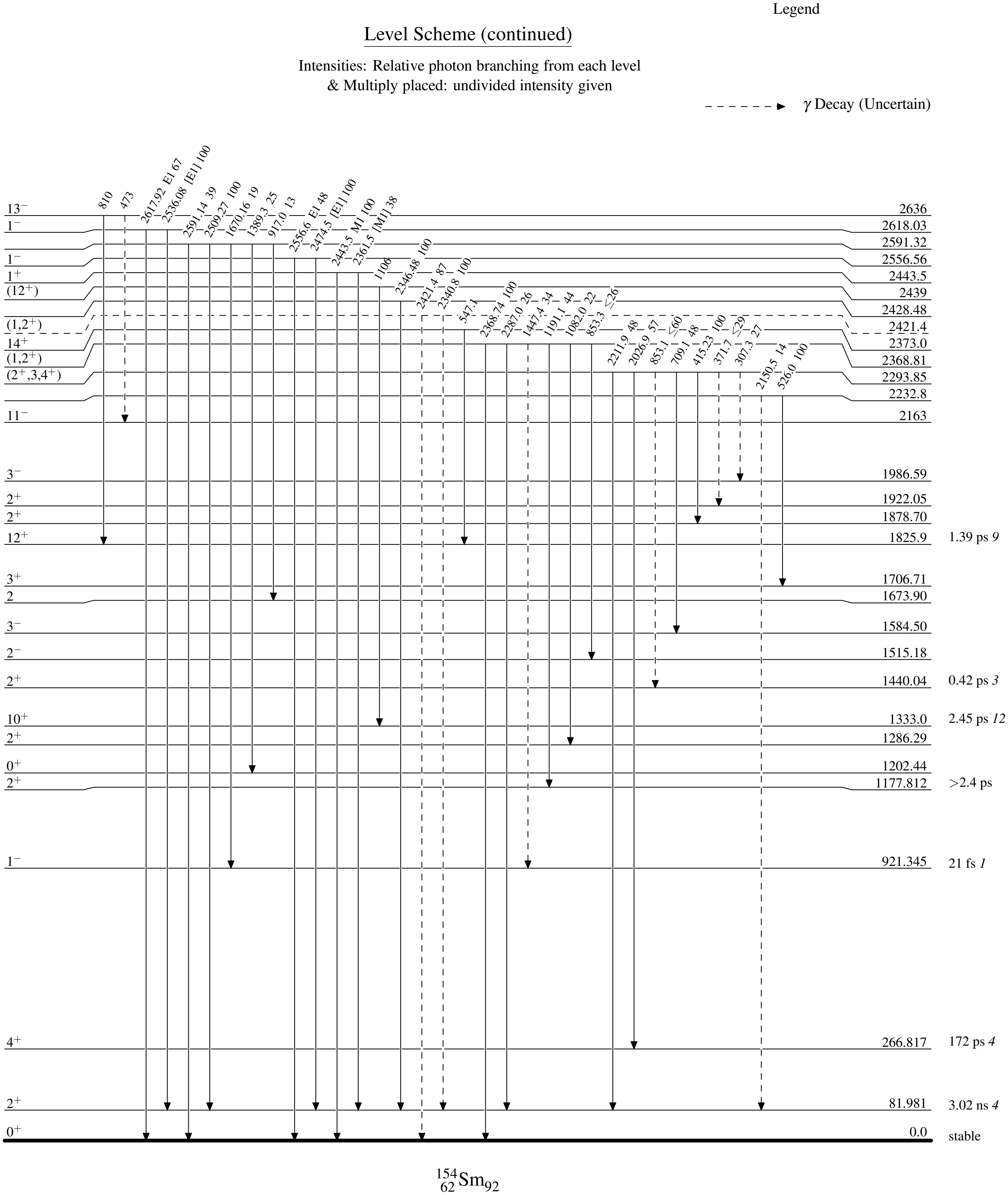
Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given



Adopted Levels, Gammas

Level Scheme (continued)

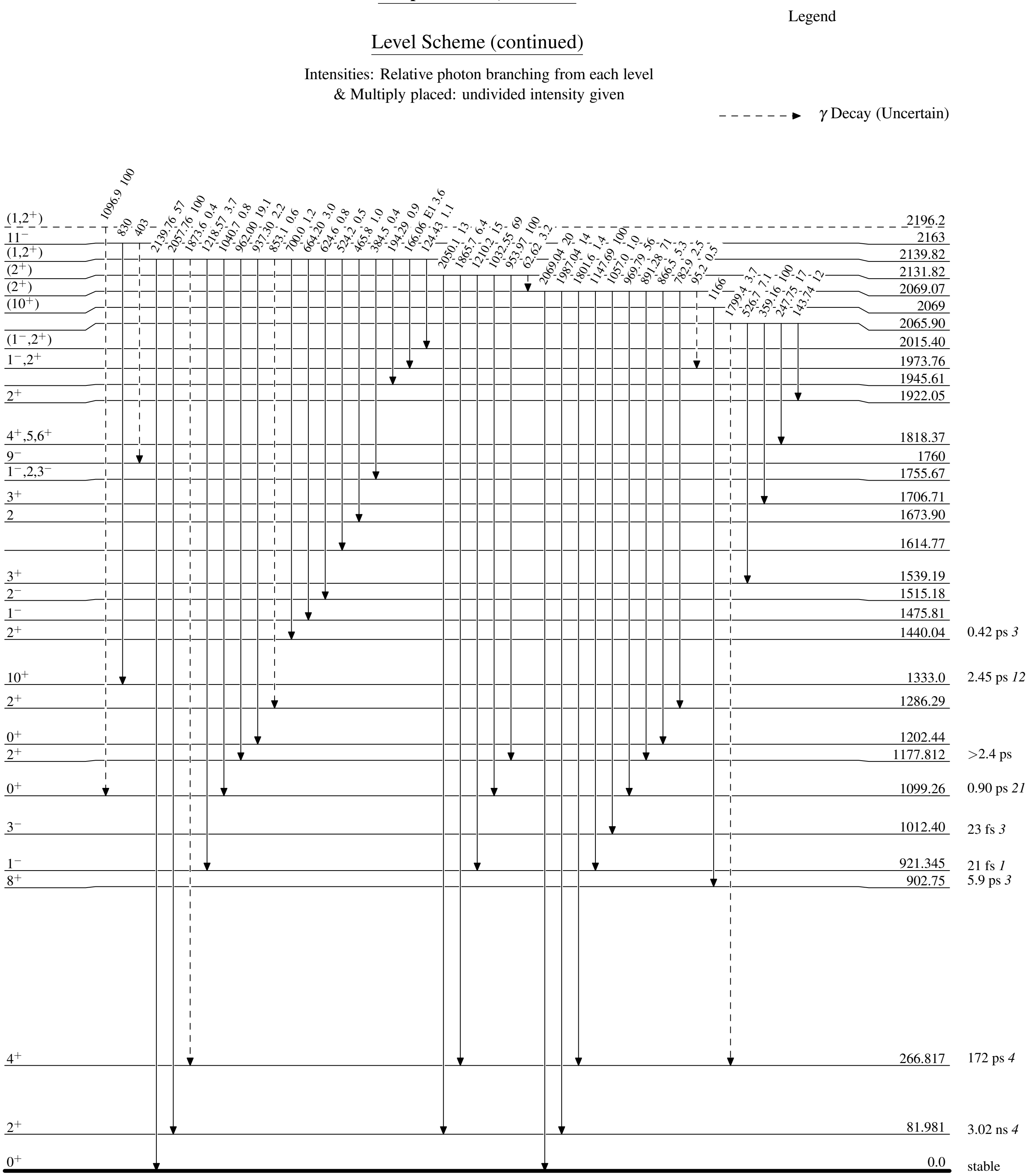
Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

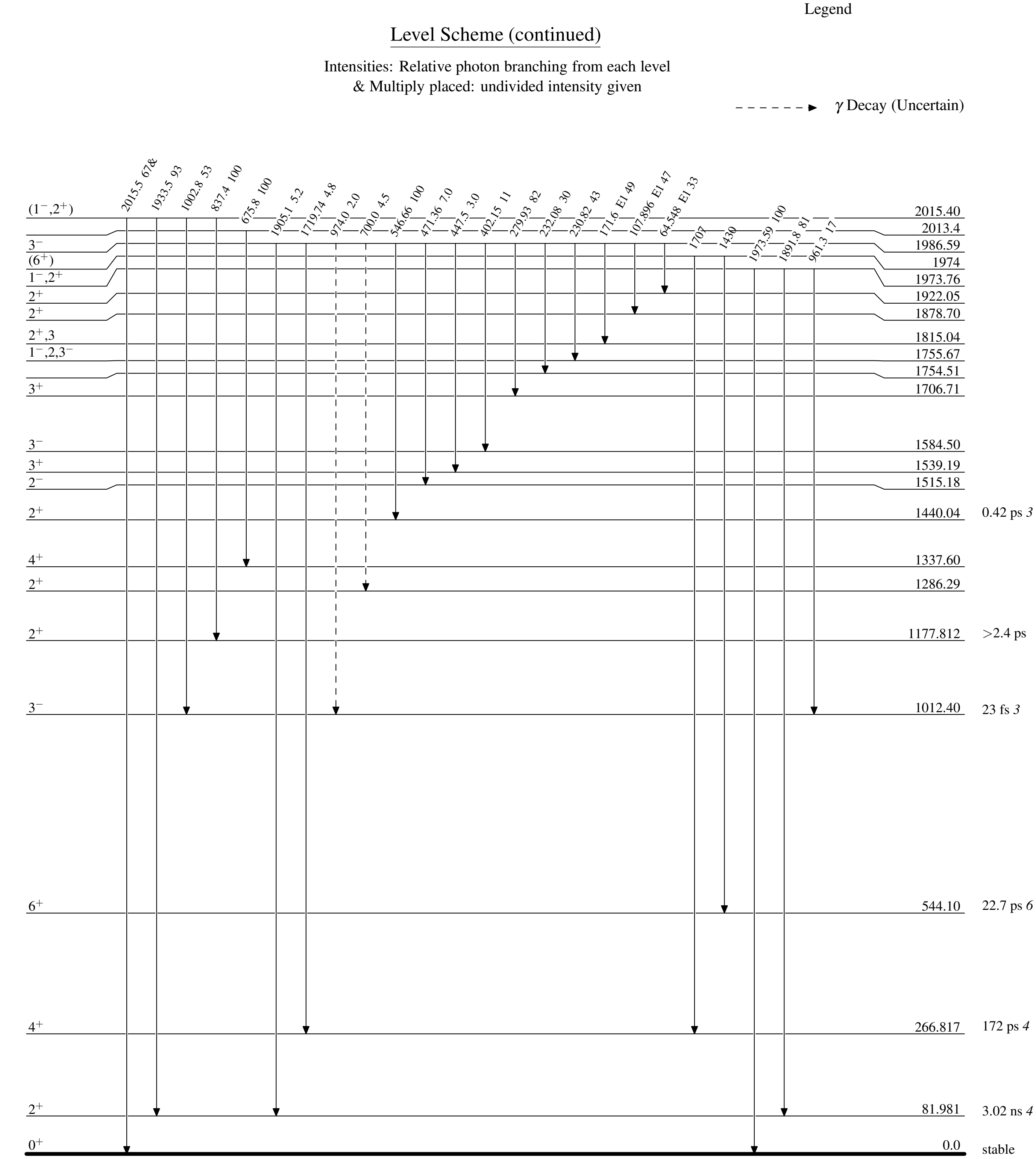


$^{154}_{62}Sm_{92}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

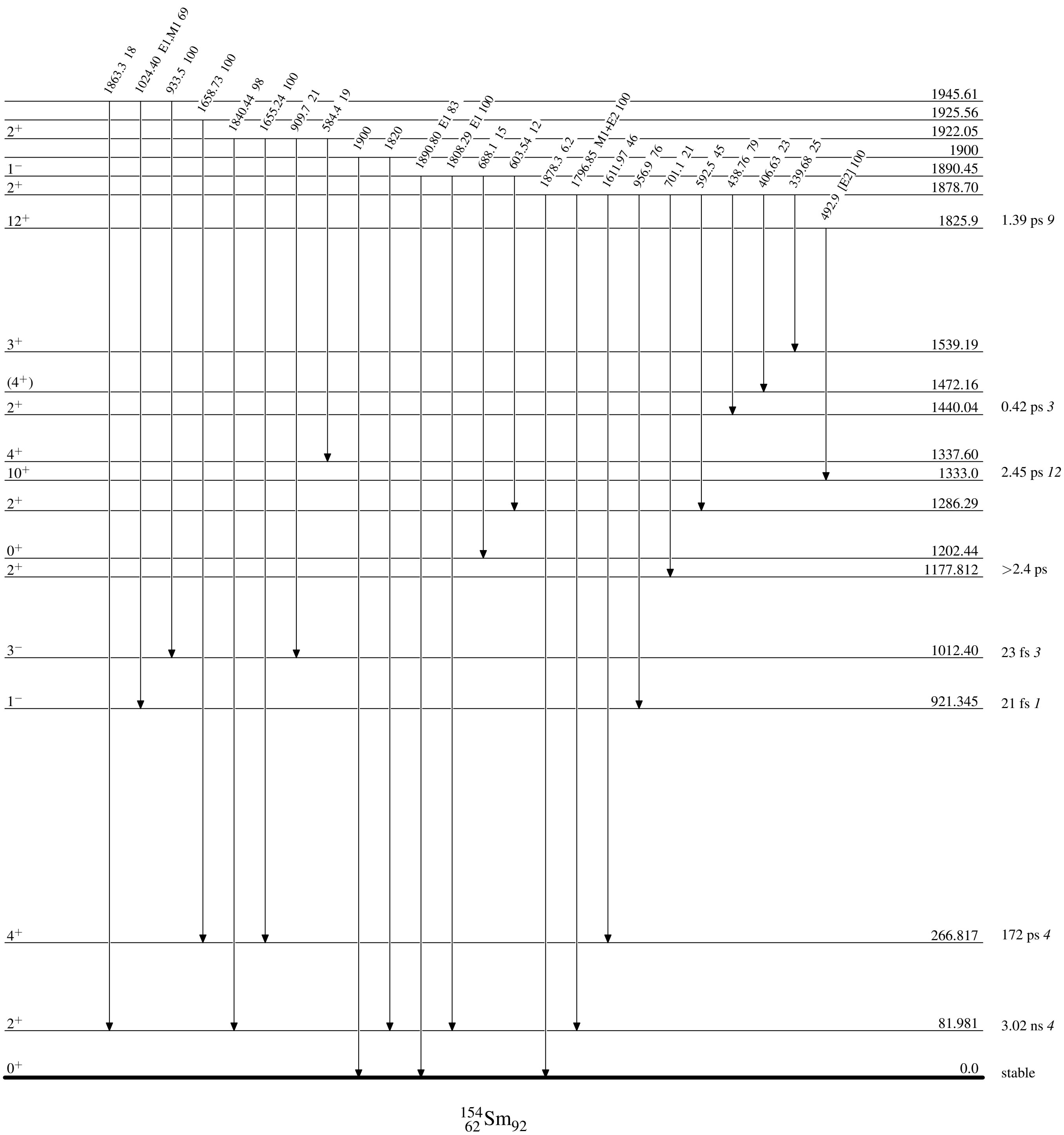


$^{154}_{62}Sm_{92}$

Adopted Levels, Gammas

Level Scheme (continued)

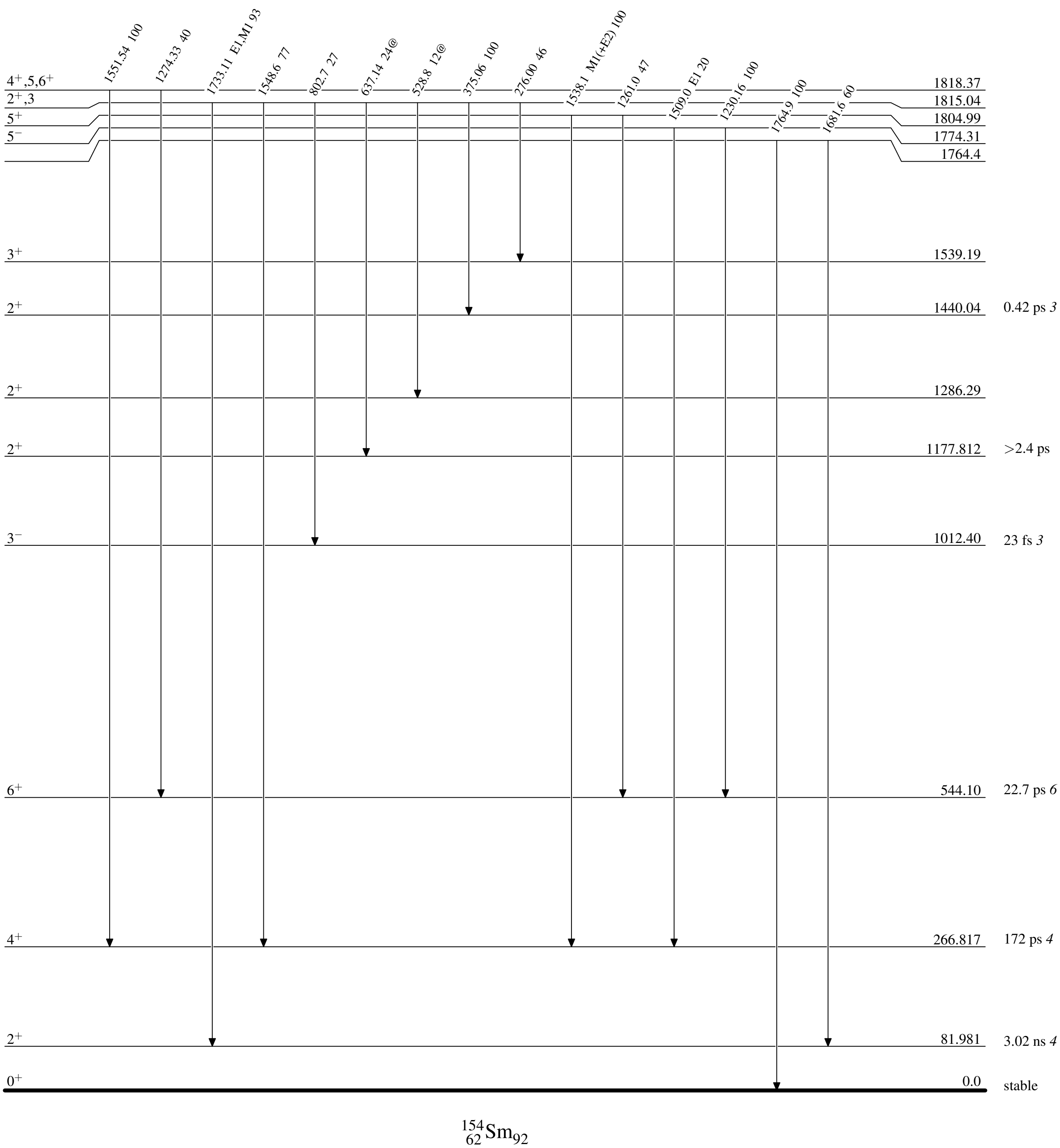
Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given



Adopted Levels, Gammas

Level Scheme (continued)

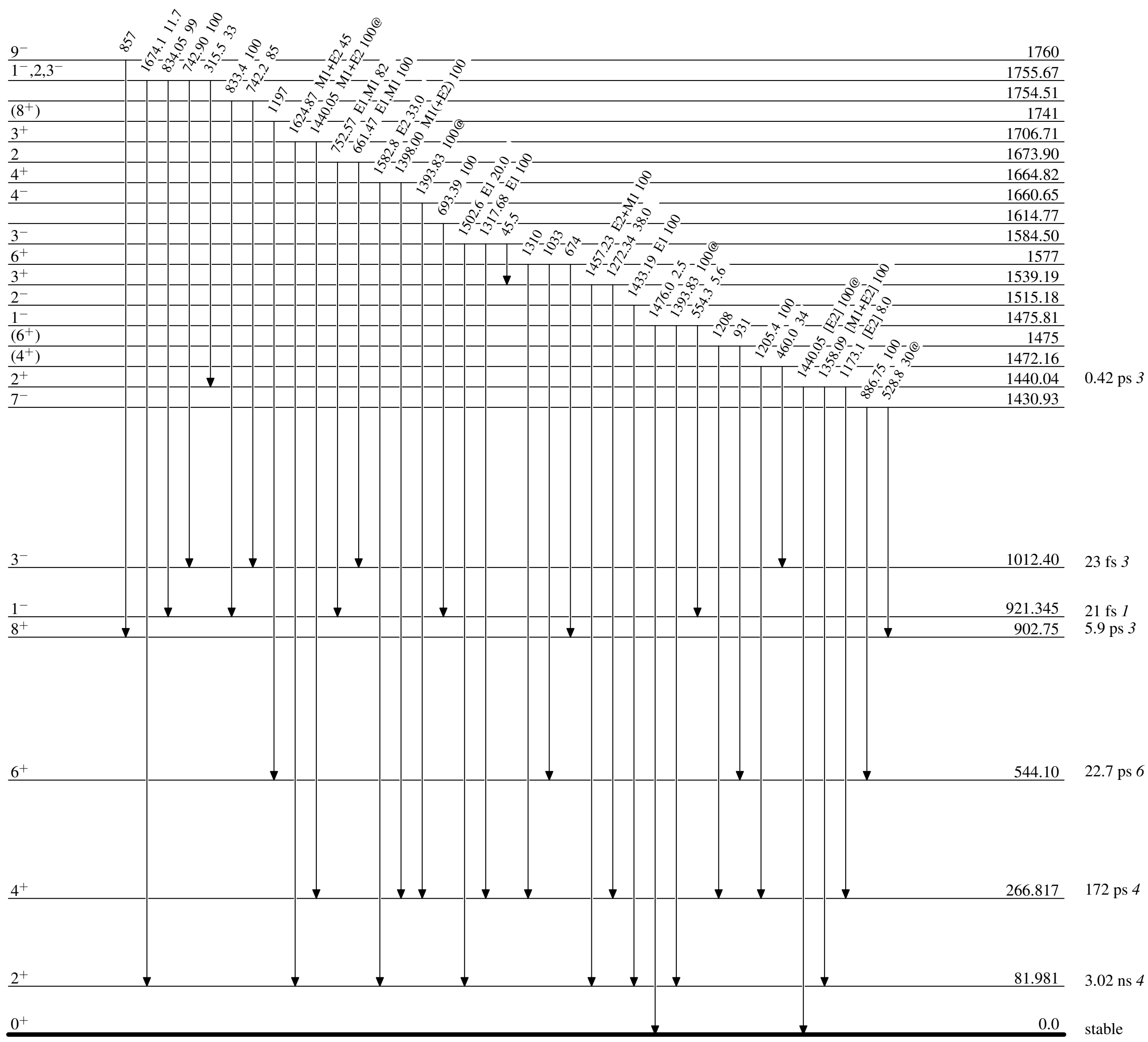
Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided



Adopted Levels, Gammas

Level Scheme (continued)

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

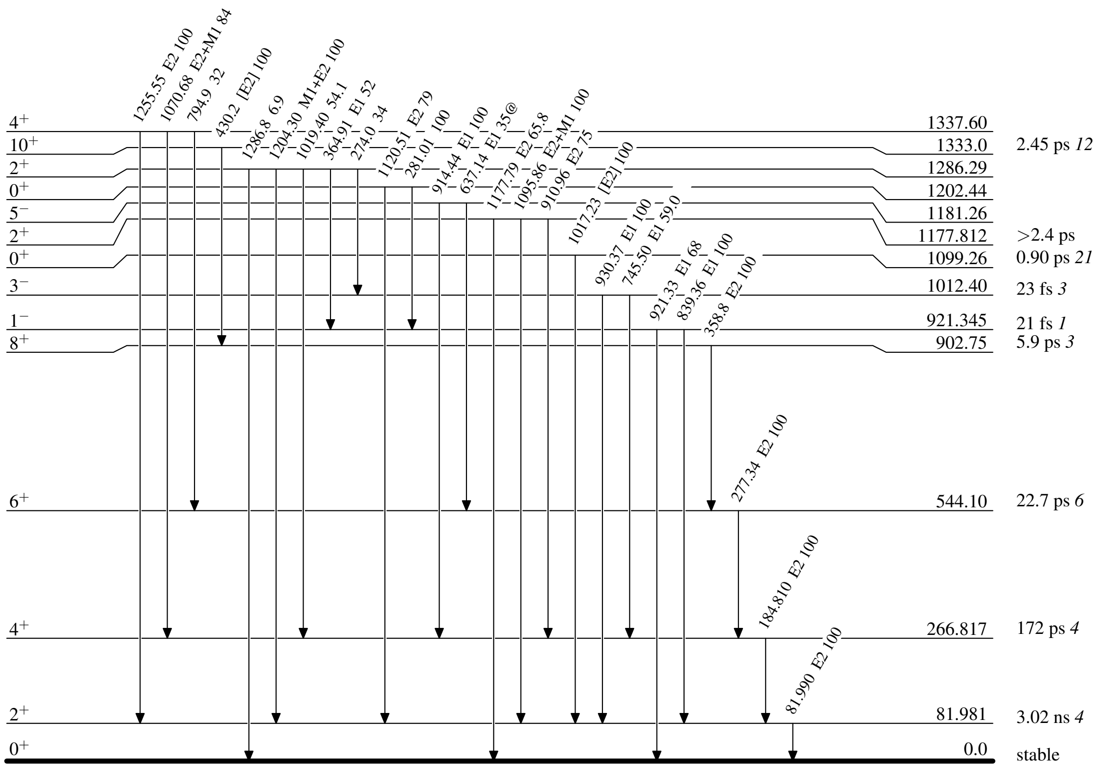


$^{154}_{62}Sm_{92}$

Adopted Levels, Gammas

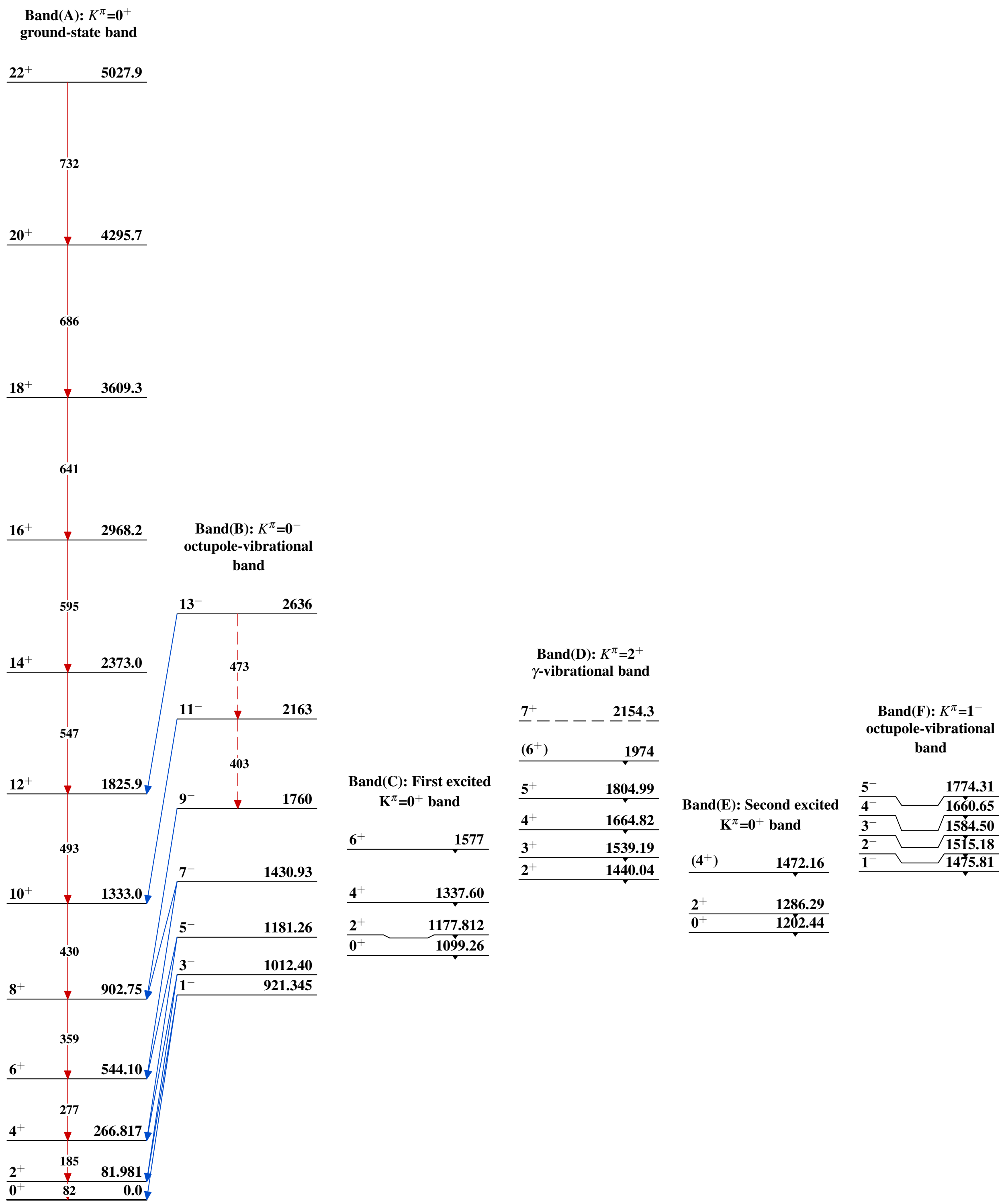
Level Scheme (continued)

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



$^{154}_{62}Sm_{92}$

Adopted Levels, Gammas



$^{154}_{62}Sm_{92}$

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	C. W. Reich	NDS 113, 2537 (2012)	1-Mar-2012

Q(β^-)=722 *8*; S(n)=7241 *9*; S(p)=9709 *10*; Q(α)=-1.64×10^3 *3* 2017Wa10
S(2n)=13048 *9*; S(2p)=1.811×10^4 *10* 2017Wa10
Additional information 1.
In this data set, the reference "^{156}Pm β^- Decay" generally refers to the decay of the ^{156}Pm g.s. (26.70 s) and not to the decay of the isomer (<5 s).
Some model and theory articles are:
1969Br18: deduced deformation parameter β_4.
1974So02: dependence of p(θ) from ^{154}Sm(t,p) on β_4 deformation.
1975Bi13: 0^+ level energies and B(E2).
1986Be10: Cranked shell-model calculations of the spectrum of two-quasiparticle states.
1987Ap04: nucleon correlations.
1990Ha22: level energies and B(E2).
1998Ga12: HFB-based calculations of expected two-quasiparticle states.
1998Lo07: IBA-based calculations of relative Iγ values of E1 transitions from the first 1^-,3^-,5^- levels to the g.s. band.

^{156}Sm Levels

The level energies are primarily from the ^{156}Pm β^- decay study and secondarily from the ^{252}Cf SF decay studies.

Cross Reference (XREF) Flags

A	^{156}Pm β^- decay (<5 s)	D	^{252}Cf SF decay
B	(HI,xnγ)	E	^{154}Sm(t,p)
C	^{156}Pm β^- decay (26.70 s)		

E(level)	J$^\pi$†	T$_{1/2}$	XREF	Comments
0‡	0^+	9.4 h *2*	ABCDE	%β^-=100 T$_{1/2}$: From 1963Gu04, γ(t). Others: 9.1 h *7*, β+γ(t) (1960Al33); 15 h *13*, γ(t) (1969WiZX). All values are from ^{156}Sm β^- decay.
75.89‡ *5*	2^+	>2 ns	ABCDE	J$^\pi$: L=2 in (t,p); E2 to 0^+ g.s. T$_{1/2}$: From 1970ChZH, ^{252}Cf SF decay.
249.71‡ *7*	4^+		BCDE	J$^\pi$: E2 γ to 2^+ and expected band structure.
517.07‡ *8*	6^+		BCDE	J$^\pi$: E2 γ to 4^+ and expected band structure.
803.69# *22*	(1^-)		A C E	XREF: E(810). J$^\pi$: γ's to 0^+ and 2^+. Probable bandhead of the K$^\pi$=1^- octupole vibrational band.
871.57‡ *22*	8^+		B D	J$^\pi$: γ to 6^+ and expected band structure.
875.69# *11*	(3^-)		C E	J$^\pi$: γ's to 2^+ and 4^+. Level energy suggests that this is the 3^- member of the K$^\pi$=1^- octupole band.
1009.79# *9*	(2^-)		C	J$^\pi$: Sole decay mode is γ to 2^+. From level energy, probable 2^- member of the K$^\pi$=1^- octupole band.
1020.62# *10*	(5^-)		C	J$^\pi$: γ's to 4^+ and 6^+. From level energy, probably the 5^- member of the K$^\pi$=1^- band.
1068@ *10*	0^+		E	J$^\pi$: L=0 in (t,p).
1110.11& *11*	(3^-)		C E	XREF: E(1120). J$^\pi$: From γ's to 2^+ and 4^+, J$^\pi$=2^+,3,4^+. Agreement of the γ branching to the 2^+ and 4^+ members of the g.s. band with the Alaga-rule predictions for ΔK=0 dipole transitions lends support to the assignment of this state as the 3^- member of the K$^\pi$=0^- octupole band. Hence, J$^\pi$=3^- is reasonable.

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Adopted Levels, Gammas (continued)

^{156}Sm Levels (continued)

E(level)	J^{π}[†]	$T_{1/2}$	XREF	Comments
1144.07[#] *9*	(4⁻)		C	J^{π}: Sole mode of decay is a γ to 4⁺. From level energy, probably the 4⁻ member of the K^{π}=1⁻ octupole band.
1256.1 *5*			C	
1307.4[‡] *3*	10⁺		B D	J^{π}: γ to 8⁺ and expected band structure.
1397.55[a] *9*	5⁻	185 ns *7*	CD	J^{π}: The γ transitions from this state to the g.s. band have large hindrance factors, indicating a large K value. Examination of the Nilsson orbitals expected to be present among the lowest-lying two-quasiparticle excitations in ^{156}Sm indicates two such pairs, each of which has K^{π}=5⁻. Since this state is the more weakly fed of the two in β^- decay, the listed two-neutron-quasiparticle conf is assigned as the dominant component in the make-up of this state. $T_{1/2}$: From 1990He11, ^{156}Pm β^- decay. 2009Si21, in SF decay, report $T_{1/2}$=186 ns *44*. Other: 1974ClZX report a 160 ns *40* activity among the products of ^{252}Cf spontaneous fission, but do not definitely associate it with a specific ^{156}Sm level. See the comment on this level in the ^{252}Cf SF Decay data set.
1441 *10*	2⁺		E	J^{π}: L=2 in (t,p).
1509.22[d] *9*	4⁺		C e	XREF: e(1516). J^{π}: γ's to 2⁺ and 6⁺.
1511.07[b] *18*	(6⁻)		D	E(level): Even though the levels immediately above and below this one may be associated with the 1516 proton group in (t,p), the evaluator has chosen not to include this level in that possible association because it is expected that only natural-parity states are excited to any appreciable extent in the (t,p) reaction. J^{π}: The sole decay mode of this state is a γ transition to the K^{π}=5⁻ bandhead at 1397 keV, suggesting that this state also has a large K value and is most probably the 6⁻ member of the band built on that state.
1515.04[c] *9*	5⁻	4.5 ns *2*	CDe	XREF: e(1516). J^{π}: In an argument similar to that for the 1397, 5⁻, state, this state has a large K value, for which K^{π}=5⁻ is the most likely assignment. See the discussion in the comment on the J^{π} value of the 1397, 5⁻, state above, as well as in the ^{156}Pm β^- Decay data set.
1610.30 *12*			C E	
1643.74[a] *18*	(7⁻)		D	
1711 *10*			E	
1738.35 *13*			C E	
1753.2[c] *5*	(7⁻)		D	
1792 *10*			E	
1794.32[b] *21*	(8⁻)		D	
1818.7[‡] *4*	12⁺		B D	J^{π}: γ to 10⁺ and expected band structure.
1851 *10*			E	
1911 *10*			E	
1963.41[a] *23*	(9⁻)		D	
1970 *20*			E	
2033.8 *3*			C	
2150.56[b] *24*	(10⁻)		D	
2199.91 *11*			C	
2265.52 *11*			C	
2341.92 *12*			C	
2355.0[a] *4*	(11⁻)		D	
2400.1[‡] *4*	14⁺		B D	J^{π}: γ to 12⁺ and expected band structure.
2482.6 *3*			C	
2519.04 *11*	3		C	J^{π}: γ's to 2⁺, (2⁻), 4⁺ and (4⁻) levels indicate J=3. The π assignment is problematic at present. See the discussion in the ^{156}Pm β^- Decay data set.
2526.22 *9*	3		C	J^{π}: γ's to 2⁺, (2⁻), 4⁺ and (4⁺) levels indicate J=3. The π assignment is problematic at present. See the discussion in the ^{156}Pm β^- Decay data set.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{156}Sm Levels (continued)

E(level)	J$^{\pi}$†	XREF	Comments
2576.9[b] *3*	(12$^-$)	C	
2609.7 *3*	(4$^-$)	C	J$^{\pi}$: Sole decay mode is a γ to 4$^+$.
2616.51 *21*	(4$^-$)	C	J$^{\pi}$: Sole decay mode is a γ to 4$^+$.
2677 *10*		E	
2699.7 *5*		C	
2814.9[a] *4*	(13$^-$)	D	
3044?‡	(16$^+$)	D	
3069.5[b] *4*	(14$^-$)	D	
3335?[a]	(15$^-$)	D	

† For those levels populated only in the SF-decay studies, the listed values are based on the observed decay properties and the usual considerations of rotational-band structure in strongly deformed nuclei.

‡ Band(A): K$^{\pi}$=0$^+$ g.s. band. α=12.72 keV, β=−11.6 eV.

Band(B): Probable K$^{\pi}$=1$^-$ octupole band. This band probably contains a sizeable component of the two-neutron quasiparticle state ν5/2[642]-ν3/2[521].

@ Band(C): Bandhead of the first excited K$^{\pi}$=0$^+$ band.

& Band(D): Possible 3$^-$ member of the K$^{\pi}$=0$^-$ octupole band.

[a] Band(E): K$^{\pi}$=5$^-$ band, α=1 branch. Dominant conf=ν5/2[642]+ν5/2[523]. α=9.49 keV, β=−0.64 eV, computed from the energies of the 5$^-$ through 8$^-$ levels. This state is most likely appreciably mixed with the K$^{\pi}$=5$^-$ state at 1515 keV. 1998Ga12 (in SF decay) propose that this (1397) state is the two-proton quasiparticle state with conf=π5/2[532]+π5/2[413].

[b] Band(e): K$^{\pi}$=5$^-$ band, α=0 branch. See the comments on the α=1 branch.

[c] Band(F): K$^{\pi}$=5$^-$ band. Dominant conf=π5/2[532]+π5/2[413]. α=8.49 keV, computed from the energies of the 5$^-$ and 7$^-$ levels. See the comment on the other 5$^-$ band regarding possible mixing of these two bands.

[d] Band(G): Probable K$^{\pi}$=4$^+$ bandhead. Probable conf is ν3//2[521]+ν5/2[523]. For another proposed configuration (which is not adopted here), see the discussion of this level in the ^{156}Pm β^- Decay data set.

γ(^{156}Sm)

E$_i$(level)	J$^{\pi}_i$	E$_{\gamma}$	I$_{\gamma}$	E$_f$	J$^{\pi}_f$	Mult.	α†	Comments
75.89	2$^+$	75.88 *5*	100	0	0$^+$	E2	6.51	B(E2)(W.u.)<300
249.71	4$^+$	173.75 *5*	100	75.89	2$^+$	E2	0.336	
517.07	6$^+$	267.32 *5*	100	249.71	4$^+$	E2	0.0808	
803.69	(1$^-$)	727.6 *3*	82 *18*	75.89	2$^+$			
		803.9 *3*	100 *18*	0	0$^+$			
871.57	8$^+$	354.5 *2*	100	517.07	6$^+$			
875.69	(3$^-$)	626.37 *20*	17 *3*	249.71	4$^+$			
		799.70 *10*	100 *11*	75.89	2$^+$			
1009.79	(2$^-$)	934.00 *10*	100	75.89	2$^+$			
1020.62	(5$^-$)	503.37 *20*	12 *4*	517.07	6$^+$			
		770.77 *10*	100 *12*	249.71	4$^+$			
1110.11	(3$^-$)	860.26 *20*	79 *7*	249.71	4$^+$			
		1034.25 *10*	100 *7*	75.89	2$^+$			
1144.07	(4$^-$)	894.35 *10*	100	249.71	4$^+$			
1256.1		380.4 *4*	100	875.69	(3$^-$)			
1307.4	10$^+$	435.8 *2*	100	871.57	8$^+$			
1397.55	5$^-$	376.75 *10*	4.4 *5*	1020.62	(5$^-$)	[M1,E2]	0.036 *9*	
		880.39 *10*	50.7 *25*	517.07	6$^+$	[E1]	0.00132	B(E1)(W.u.)=6.0×10^{-10} *4* I$_{\gamma}$: Value from 1990He11, ^{156}Pm β^- decay.

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Adopted Levels, Gammas (continued)

$\gamma(^{156}Sm)$ (continued)

E_i(level)	J^π_i	E_γ	I_γ	E_f	J^π_f	Mult.	α[†]	Comments
								From ^{252}Cf SF decay, 1995Zh15 report Iγ=152, while 1998Ga12 report Iγ=87.
1397.55	5⁻	1147.84 *10*	100.0 *5*	249.71	4⁺	[E1]	0.00081	B(E1)(W.u.)=5.4×10^{-10} *2* Additional information 2.
1509.22	4⁺	992.0 *10*	2.4 *8*	517.07	6⁺			
		1259.44 *10*	100 *5*	249.71	4⁺			
		1433.70 *10*	67 *3*	75.89	2⁺			
1511.07	(6⁻)	113.6 *2*	100	1397.55	5⁻			
1515.04	5⁻	117.42 *5*	100 *5*	1397.55	5⁻	M1	1.068	B(M1)(W.u.)=0.00142 *12*
		370.94 *10*	4.4 *7*	1144.07	(4⁻)	[M1,E2]	0.038 *9*	
		494.4 *4*	2.2 *7*	1020.62	(5⁻)	[M1,E2]	0.018 *5*	
1610.30		1360.58 *10*	100	249.71	4⁺			
1643.74	(7⁻)	132.6 *2*	230 *40*	1511.07	(6⁻)			
		246.1 *2*	100	1397.55	5⁻			
1738.35		223.31 *10*	100	1515.04	5⁻			
1753.2	(7⁻)	237.8[‡] *2*	100	1515.04	5⁻			
1794.32	(8⁻)	150.1 *2*	90 *14*	1643.74	(7⁻)			
		283.4 *2*	100	1511.07	(6⁻)			
1818.7	12⁺	511.3 *2*	100	1307.4	10⁺			
1963.41	(9⁻)	168.9 *2*	120 *18*	1794.32	(8⁻)			
		320.0 *2*	100	1643.74	(7⁻)			
2033.8		518.4 *4*	90 *10*	1515.04	5⁻			
		524.9 *4*	100 *10*	1509.22	4⁺			
2150.56	(10⁻)	187.2 *2*	50 *11*	1963.41	(9⁻)			
		356.1 *2*	100	1794.32	(8⁻)			
2199.91		684.65 *10*	37.5 *18*	1515.04	5⁻			
		690.90 *10*	100 *5*	1509.22	4⁺			
2265.52		750.26 *10*	100 *10*	1515.04	5⁻			
		756.51 *10*	100 *10*	1509.22	4⁺			
2341.92		827.03 *10*	50 *8*	1515.04	5⁻			
		832.08 *20*	100 *17*	1509.22	4⁺			
2355.0	(11⁻)	204.4 *2*	80 *16*	2150.56	(10⁻)			
		391.6 *2*	100	1963.41	(9⁻)			
2400.1	14⁺	581.4 *2*	100	1818.7	12⁺			
2482.6		2406.7 *3*	100	75.89	2⁺			
2519.04	3	1374.91 *10*	82 *7*	1144.07	(4⁻)			
		1509.12 *20*	100 *11*	1009.79	(2⁻)			
		2269.9 *4*	25 *4*	249.71	4⁺			
		2443.34 *20*	86 *7*	75.89	2⁺			
2526.22	3	1382.24 *10*	77 *4*	1144.07	(4⁻)			
		1516.56 *10*	100 *5*	1009.79	(2⁻)			
		2276.18 *20*	9.5 *14*	249.71	4⁺			
		2450.17 *10*	36 *4*	75.89	2⁺			
2576.9	(12⁻)	222.2 *2*	35 *12*	2355.0	(11⁻)			
		426.2 *2*	100	2150.56	(10⁻)			
2609.7	(4⁻)	2360.0 *3*	100	249.71	4⁺			
2616.51	(4⁻)	2366.78 *20*	100	249.71	4⁺			
2699.7		1555.6 *5*	100	1144.07	(4⁻)			
2814.9	(13⁻)	460.0 *2*	100	2355.0	(11⁻)			
3044?	(16⁺)	644[‡]	100	2400.1	14⁺			
3069.5	(14⁻)	492.6 *2*	100	2576.9	(12⁻)			
3335?	(15⁻)	520[‡]	100	2814.9	(13⁻)			

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Adopted Levels, Gammas (continued)

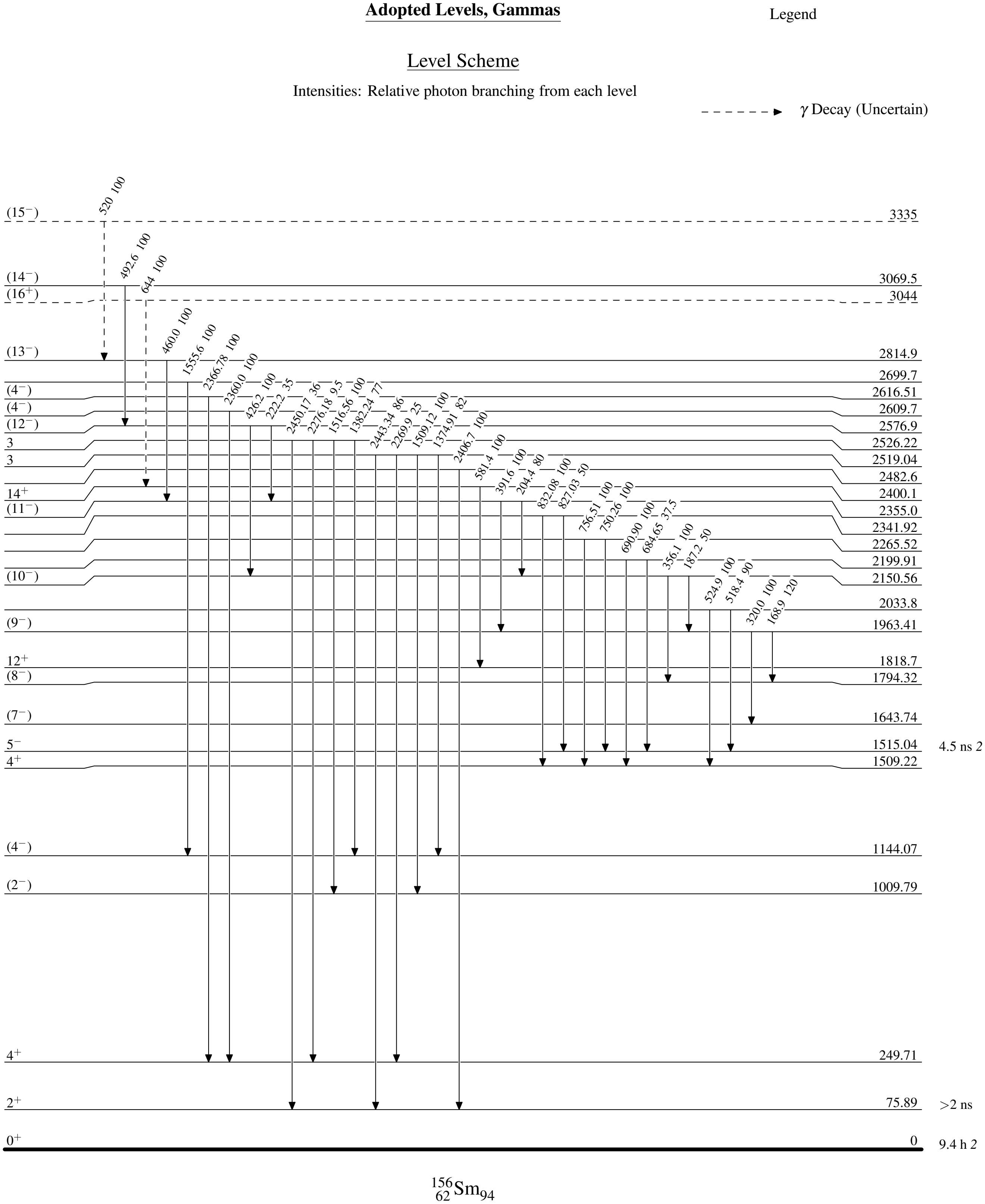
$\gamma(^{156}Sm)$ (continued)

† 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.
‡ Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level



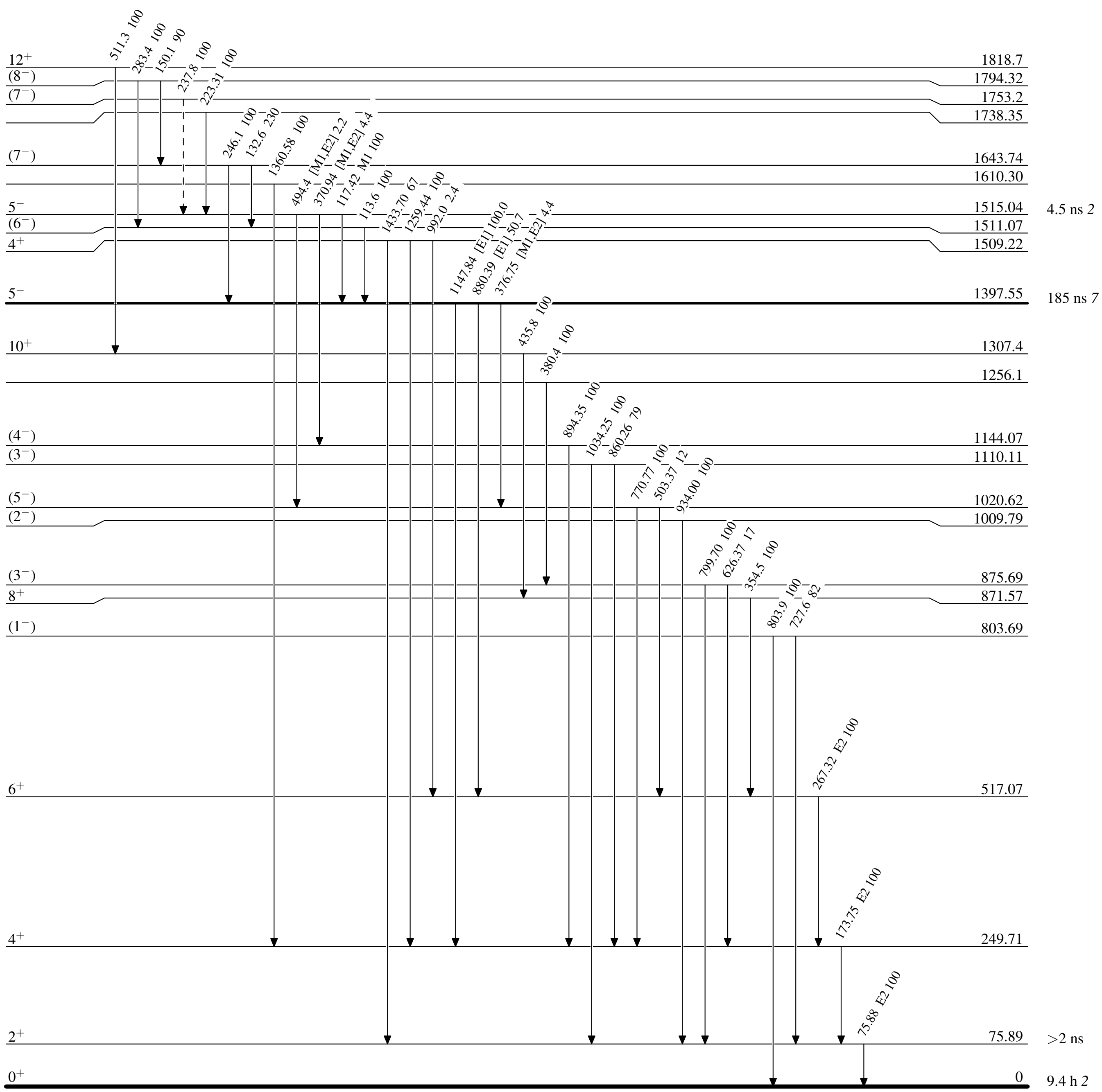
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

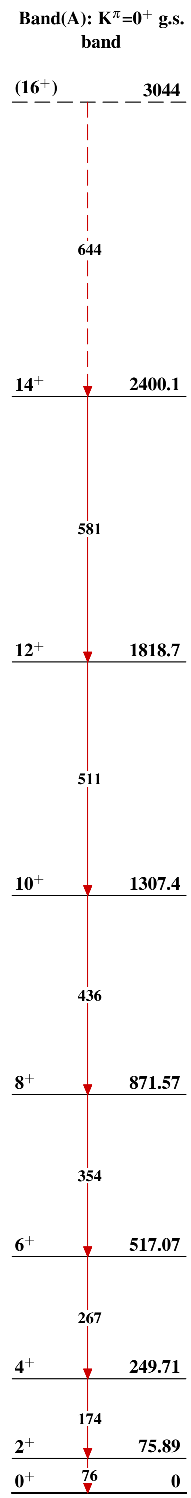
Legend

γ Decay (Uncertain)



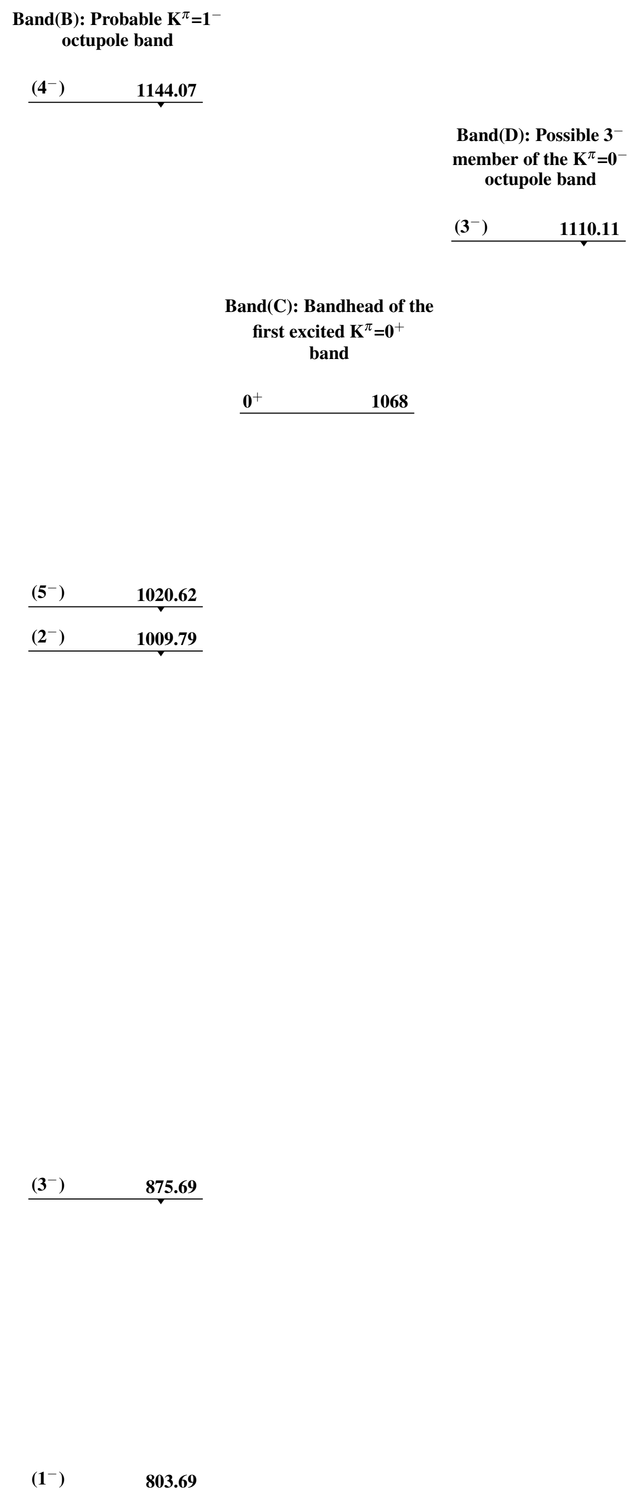
$^{156}_{62}Sm_{94}$

Adopted Levels, Gammas



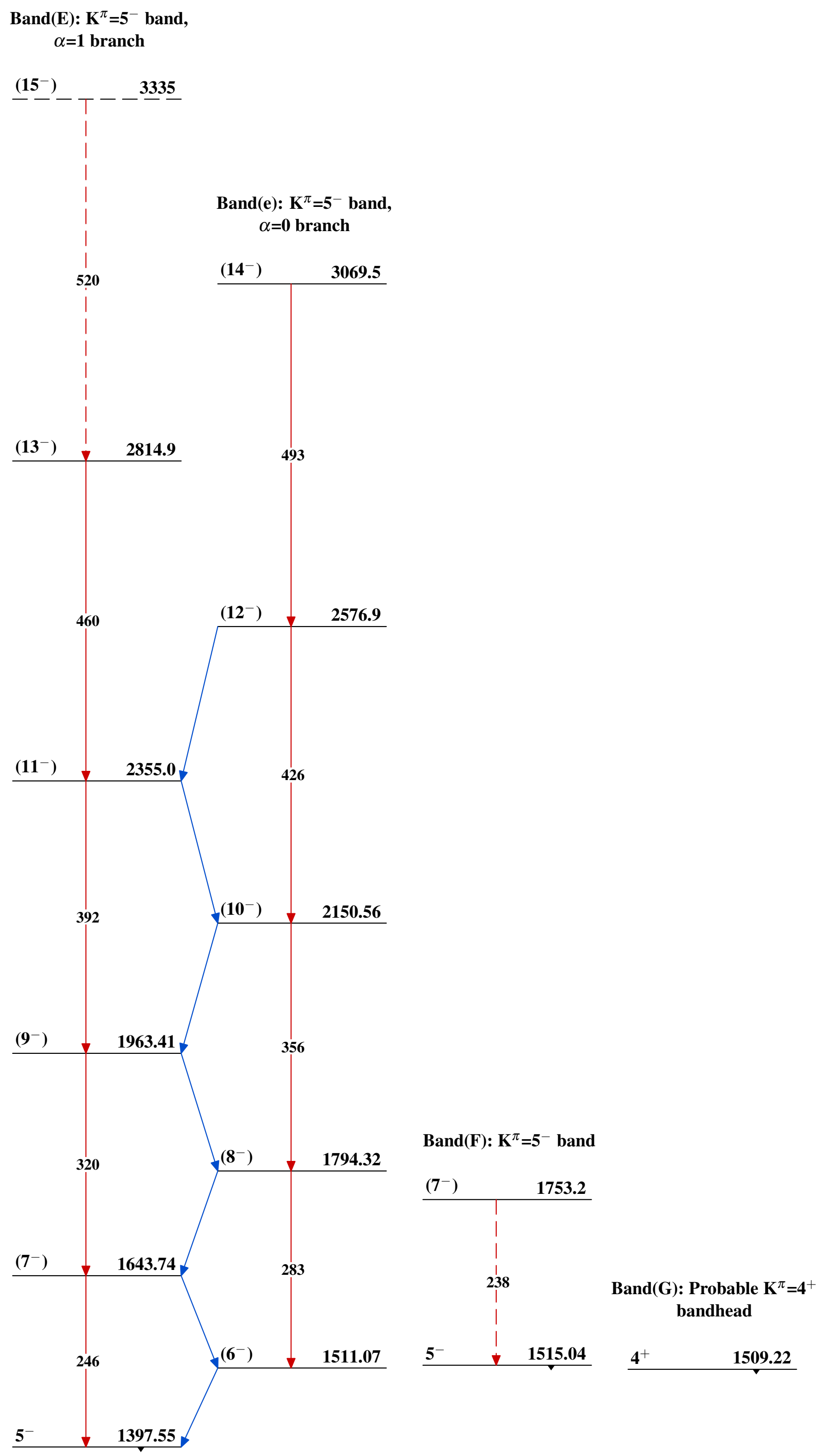
$^{156}_{62}Sm_{94}$

Adopted Levels, Gammas (continued)



$^{156}_{62}Sm_{94}$

Adopted Levels, Gammas (continued)



$^{156}_{62}Sm_{94}$