^{151}Pm β^- decay (28.40 h) 1973Co29,1977Ho21,1964Be10

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 110, 1 (2009)	20-Nov-2008

Parent: ^{151}Pm: E=0.0; $J^\pi=5/2^+$; $T_{1/2}$=28.40 h *4*; Q(β^-)=1187 *5*; %β^- decay=100.0

Main level scheme is from γ and $\gamma\gamma$ data of 1973Co29. $\gamma\gamma$ results from 1977Ho21 are in general agreement with those from 1973Co29. Both report γ, $\gamma\gamma$ data using germanium detectors. 1964Be10 report detailed β, $\beta\gamma$ and ce results.

Other measurements:

β: 1964Be10, 1963Ho15, 1963Bu02, 1963Na03, 1963Re03, 1962Ch06, 1960Bu06, 1952Ru10.

$\beta\gamma$: 1964Be10, 1962Ch06, 1952Ru10.

$\beta\gamma$(t): 1971An07.

(β)(ce)(t): 1977Bu12, 1971Dr05, 1971An07.

γ,$\gamma\gamma$: 1971Ho09, 1971Be23, 1969GuZW, 1969Gr32, 1966Lo17, 1965Fu15, 1965Fo08, 1965Be13, 1964Ew04, 1964Be10, 1963Re03, 1963Na03, 1963Bu08, 1963Bu02, 1962Ch06, 1960Bu06, 1955Ha33, 1952Ru10.

$\gamma\gamma(\theta)$: 1981Ya07, 1977Ho21, 1977Bu12, 1976Ba44 and 1975Wa02 use germanium detectors. 1974Si12 and 1971Be23 use semi-scin combination. 1962Ch06 use pair of scin detectors.

$\gamma(\theta)$: 1975Wa02 (low temperature nuclear orientation technique).

$\gamma\gamma(\theta$,H,T): 1974Dr03, 1971Be23.

$\gamma\gamma$(t): 1971Ho09, 1965Fo08.

(γ)(ce): 1964Be10, 1963Bu02.

(γ)(ce)(t): 1971Dr05, 1971An07, 1965Fo08.

ce: 1985GrZT, 1965Be13, 1964Be10, 1963Ma51, 1963Ma16, 1963Ge10, 1963Bu02, 1962Ha24, 1952Ru10.

(ce)(ce): 1963Bu02.

For levels and radiation data, consult ENSDF database (http://www.nndc.bnl.gov/ensdf/) and/or Nuclear Data Sheets 80, 263 (1997).

^{151}Sm Levels

The 405 and 650 levels proposed by 1964Be10 have been discarded due to lack of confirmatory evidence in later studies.

E(level)‡	J^π†	$T_{1/2}$	Comments
0.0	$5/2^-$		
4.821 *3*	$3/2^-$	35 ns *1*	$T_{1/2}$: from γ(ce)(t) (1971Dr05). Other: 19 ns *10* (γ(ce)(t) 1963Bu02).
65.823 *7*	$7/2^-$	<0.5 ns	$T_{1/2}$: $\gamma\gamma$(t) (1971Ho09). Other: 1962Ch06.
69.703 *7*	$5/2^-$	<0.5 ns	$T_{1/2}$: $\gamma\gamma$(t) (1971Ho09). J^π: 275$\gamma(\theta)$ allows 5/2, not 3/2.
91.52 *2*	$(9/2)^+$	78 ns *1*	g-factor=−0.21 *1* (1974Dr03, time dependent PAC method). $T_{1/2}$: $\gamma\gamma$(t) (1971Ho09). Other: 1974Dr03.
104.833 *6*	$3/2^-$	0.48 ns *3*	$T_{1/2}$: from $\beta\gamma$(t) (1965Fo08). Others: 0.48 ns *6* (ceγ(t), 1971An07), 1971Ho09, 1962Ch06. J^π: $\gamma\gamma(\theta)$ with either 105γ or 100γ consistent with 3/2, not with 5/2.
167.751 *7*	$5/2^+$	0.38 ns *4*	$T_{1/2}$: $\beta\gamma$(t) (1971An07). Other: $\gamma\gamma$(t) (1971Ho09).
168.40 *2*	$(5/2)^-$	<0.4 ns	$T_{1/2}$: $\gamma\gamma$(t) (1971Ho09).
175.38 *2*	$(9/2)^-$		
208.995 *8*	$(7/2)^-$		J^π: $\gamma\gamma(\theta)$ with 209γ and 209$\gamma(\theta)$ support 7/2, not 5/2.
284.94 *3*	$1/2^-$,$3/2^-$		
294.8 *1*	$9/2^-$		
302.62 *3*	$7/2^-$		
306.79 *2*	$3/2^+$		J^π: 202$\gamma(\theta)$ and $\gamma\gamma(\theta)$ with 202γ give 3/2, not 5/2.
313.78 *4*	$(1/2^-,3/2^-)$		
315.26 *2*	$(3/2^-)$		
323.941 *8*	$7/2^+$		J^π: 324$\gamma(\theta)$ and (258γ)(65γ)(θ) give 7/2, not 5/2.
344.909 *6*	$3/2^+$	9.3 ps *2*	$T_{1/2}$: βce(t) (1977Bu12). Others: 1971An07, 1965Fo08. J^π: $\gamma(\theta)$ and $\gamma\gamma(\theta)$ data for 345γ, 340γ, 275γ and 240γ give 3/2, not 5/2.
355.5? *10*	$1/2^+$		

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^{151}Pm β^- decay (28.40 h) 1973Co29,1977Ho21,1964Be10 (continued)

^{151}Sm Levels (continued)

E(level)‡	Jπ†	$T_{1/2}$	Comments
395.581 *9*	5/2+		Jπ: 291γ(θ) and (330γ)(66γ)(θ) give 5/2, not 3/2.
415.61 *3*	(5/2−,7/2−)		
445.68 *2*	5/2+	20 ps *3*	Jπ: 446γ(θ) and (380γ)(66γ)(θ) give 5/2, not 3/2. $T_{1/2}$: βce(t) (1977Bu12). Other: 1971An07.
448.5 *1*	(3/2−)		
470.35 *3*	(5/2,7/2+)		
490.32 *3*	(7/2)−		
521.10 *2*	3/2+		Jπ: 451γ(θ) and (451γ)(65γ)(θ) give 3/2, not 5/2.
620.43 *14*	(3/2−,5/2,7/2+)		
663.1 *2*	3/2(+)		
663.54 *7*	(5/2−,7/2,9/2−)		
741.03 *2*	3/2(+)	<0.1 ns	Jπ: 736γ(θ) and (636γ)(100γ)(θ) give 3/2, not 5/2. $T_{1/2}$: βγ(t) (1971An07).
773.98 *4*	5/2(+)		
777.4? *10*	(≤7/2)		
822.63 *3*	(3/2+,5/2+)	<0.1 ns	E(level): this level may be a doublet (see 'Adopted Levels'). Jπ: 718γ(θ) and γγ(θ) with 753γ, 718γ, 654γ give 3/2, not 5/2. But this conclusion may be questionable since the (n,γ) results show that 718γ and 752γ may be doublets, the other components deexciting an 822 level. $T_{1/2}$: βγ(t) (1971An07).
851.6? *3*			
877.63 *3*	5/2(+)		
887.32 *7*	(5/2−,7/2)		
889.3 *6*	(1/2,3/2,5/2+)		
926.0 *2*	(5/2,7/2)		
953.49 *4*	3/2(+)		Jπ: from 949γ(θ), 849γ(θ).
964.24 *7*	5/2(+)		Jπ: from 796γ(θ).
1016.5 *4*	(3/2−,5/2,7/2−)		

† From 'Adopted Levels', unless stated otherwise.
‡ From least squares fitting to Eγ's.

β− radiations

E(decay)	E(level)	Iβ−†	Log *ft*	Comments
(171 *5*)	1016.5	0.013 *4*	8.0 *2*	av Eβ= 46 *3*
(223 *5*)	964.24	0.18 *3*	7.2 *1*	av Eβ= 62 *3*
(234 *5*)	953.49	1.00 *13*	6.56 *9*	av Eβ= 65 *3*
(261 *5*)	926.0	0.039 *7*	8.1 *1*	av Eβ= 73 *3*
(298 *5*)	889.3	0.011 *3*	8.9 *2*	av Eβ= 85 *4*
(300 *5*)	887.32	0.35 *6*	7.37 *9*	av Eβ= 85 *4*
(309 *5*)	877.63	2.4 *3*	6.57 *8*	av Eβ= 88 *4*
(335‡ *5*)	851.6?	<0.02	>8.8	av Eβ= 97 *4*
(364 *5*)	822.63	6.1 *8*	6.40 *7*	av Eβ= 106 *4*
(410‡ *5*)	777.4?	0.014 *6*	9.2 *2*	av Eβ= 121 *4*
(413 *5*)	773.98	1.14 *15*	7.31 *7*	av Eβ= 122 *4*
(446 *5*)	741.03	3.1 *4*	6.98 *7*	av Eβ= 133 *4*
(523 *5*)	663.54	0.22 *3*	8.4 *1*	av Eβ= 160 *4*
(524 *5*)	663.1	0.053 *10*	9.0 *1*	av Eβ= 160 *4*
(567 *5*)	620.43	0.12 *2*	8.75 *8*	av Eβ= 175 *4*
(666 *5*)	521.10	0.77 *10*	8.18 *6*	av Eβ= 212 *4*

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^{151}Pm β^- decay (28.40 h) 1973Co29,1977Ho21,1964Be10 (continued)

β^- radiations (continued)

E(decay)	E(level)	Iβ^-[†]	Log *ft*	Comments
(697 *5*)	490.32	0.47 *6*	8.46 *6*	av Eβ= 223 *4*
(717 *5*)	470.35	0.05 *2*	9.5 *2*	av Eβ= 231 *4*
(739[‡] *5*)	448.5	<0.10	>9.2	av Eβ= 239 *4*
(741 *5*)	445.68	7.1 *8*	7.38 *6*	av Eβ= 240 *4*
(771 *5*)	415.61	0.17 *4*	9.1 *1*	av Eβ= 251 *4*
(791 *5*)	395.581	1.9 *3*	8.05 *8*	av Eβ= 259 *4*
(832[‡] *5*)	355.5?	<0.02	>10.1	av Eβ= 274 *4*
(842 *5*)	344.909	42 *5*	6.80 *6*	av Eβ= 278 *4*
(863 *5*)	323.941	3.3 *4*	7.94 *6*	av Eβ= 287 *4*
(872[‡] *5*)	315.26	<0.05	>9.8	av Eβ= 290 *4*
(873[‡] *5*)	313.78	<0.02	>10.2	av Eβ= 291 *4*
(880 *5*)	306.79	1.7 *3*	8.26 *8*	av Eβ= 293 *4*
(884 *5*)	302.62	0.17 *7*	9.3 *2*	av Eβ= 295 *4*
(892[‡] *5*)	294.8	<0.002	>11.7[1*u*]	av Eβ= 298 *4*
(902 *5*)	284.94	<0.05	>9.8	av Eβ= 302 *4*
(978 *5*)	208.995	2.3 *3*	8.30 *8*	av Eβ= 332 *4*
(1012[‡] *5*)	175.38	<0.02	>11.0[1*u*]	av Eβ= 345 *4*
(1019 *5*)	168.40	1.4 *3*	8.6 *1*	av Eβ= 348 *4*
(1019 *5*)	167.751	7.9 *10*	7.83 *7*	av Eβ= 348 *4*
(1082 *5*)	104.833	3.0 *9*	8.3 *2*	av Eβ= 374 *4*
(1095[‡] *5*)	91.52	<0.5	>9.1	av Eβ= 379 *4*
(1117 *5*)	69.703	2.7 *13*	8.4 *2*	av Eβ= 388 *4*
(1121[‡] *5*)	65.823	<1.3	>8.8	av Eβ= 390 *4*
(1182 *5*)	4.821	<10	>8.0	av Eβ= 415 *5* Combined feeding to g.s. and 4.8 level=10% 3 (1964Be10). See also comment on β^- feeding to g.s.
1190 *10*	0.0	<10	>8.0	av Eβ= 417 *5* E(decay),Iβ^-: from 1964Be10. Iβ is total for g.s. and 4.8 level. Others: Eβ=1200, Iβ≤1 (1963Bu02); Eβ=1300, Iβ=38 (1962Ch06).

[†] Absolute intensity per 100 decays.
[‡] Existence of this branch is questionable.

^{151}Pm β^- decay (28.40 h) 1973Co29,1977Ho21,1964Be10 (continued)

$\gamma(^{151}Sm)$

Iγ normalization: From intensity balance. Combined feeding to g.s. and 4.8 level is taken as 10% 3 (1964Be10). Conversion coefficients have been included for transitions where α is expected to be>0.01.

The following γ′s reported in ce data of 1962Ha24 have been discarded because of lack of confirmation from γ, γγ data 58.7, 77.2 105.8, 112.0, 188.1, 219.5, 251.1, 394.5, 422.9, 433.6, 447.3, 459.0, 464.3, 467.8, 498.1, 547.0, 555.5, 833.4 and 838.2.

Unplaced γ′s are from 1973Co29.

The table below contains experimental conversion coefficients deduced (evaluator) using ce data mainly from 1964Be10. Uncertainty in conversion coefficients is ≈25% for strong transitions and ≈50% for weak transitions. Other ce data: 1963Ma16, 1963Bu02, 1962Ha24. α(N)exp values are available for 25.7γ, 64.9γ, 65.8γ, 100.0γ, 104.8γ, and 177.2γ (1964Be10,1963Bu02,1962Ha24) but not given here

Eγ	K	L	L1	L2	L3	M	M1	M2	M3		
25.7				0.25		0.33	0.25		0.25		
61.0			3.6	11	11						
62.9	≈0.7										
64.9	5.9	0.99	0.88	0.107		0.27	0.16	0.027			
65.8	5.0			0.22	0.22	0.22	0.18	0.044	0.022		
69.7	4.5	0.64	0.53	0.11			0.22				
76.2	2.2		0.57	2.1	1.9					0.50	0.50
88.8	3.3										
98.0	0.28										
98.7	1.7										
100.0	2.0	0.34	0.24	0.02		0.067	0.059				
101.9	0.23	0.043	0.040		0.022						
104.8	1.9	0.21	0.19	0.029	0.010	0.054	0.043				
109.6	0.59										
121.8	1.1		0.28								
139.3	0.41		0.10	0.020	0.020		0.051				
143.2	0.47		0.19								
156.2	0.58		0.068								
162.9	0.092	0.14	0.023								
163.6	0.36		0.065		0.016						
167.7	0.054	0.015	0.0061			0.0073	0.0030				
168.4	0.44		0.055				0.027				
176.5	0.059										
177.2	0.33	0.045	0.034	0.0053	0.0053	0.0106	0.013				
186.6	0.084										
204.2	0.12										
209.0	0.18	0.035	0.035			0.0079	0.0087				
227.2$^+$											
227.8	0.20										
232.4$^+$											
232.7	0.16	0.044	0.044								

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236.6+			
236.7+			
237.1	0.041		
240.1	0.024	0.0072	0.0026
258.1	0.018		
275.2	0.021	0.0023	0.0022
277.6	0.083		
280.1	0.087		
290.7	0.018		
308.9	0.062		
323.9	0.0095		
329.7	0.014		
340.0	0.102		
344.9	0.0060		
349.8	0.036		
440.8	0.0050		
445.7	0.0060		
654.2	≈0.006		
671.2	≈0.08		
717.7	0.0010		
752.8	0.0020		

$\gamma(\theta)$ data from oriented nuclei (1975Wa02)

Eγ	A_2	Eγ	A_2
64.88	+0.56 6	440.8	+0.34 2
65.83	+0.81 12	445.7	-0.44 2
69.70	-0.55 15	451.4	-0.10 12
100.00	-0.41 5	565.0	+0.20 8
101.93	+0.16 4	636.2	-0.41 2
104.84	-0.01 3	717.7	-0.385 9
163.6	+0.55 12		
168.39	-0.2 5	736.1	-0.43 3
177.2	-0.25 3	752.8	+0.09 2
201.96	-0.37 6	772.7	+0.37 3
209.0	+0.19 5	785.1	+0.12 6
240.0	-0.42 2	795.7	-0.24 8
258.1	-0.35 9	807.9	-0.47 3
275.2	+0.102 5	848.6	-0.44 6
290.7	+0.34 3	877.7	-0.40 7
323.9	+0.30 3	948.7	-0.37 4
344.9	+0.125 13	953.4	+0.06 14
379.8	+0.12 2		

$\gamma\gamma(\theta)$ data

γ - γ cascade	A_2	A_4	references from	others

98 - 65	+0.05 3	+0.01 4	1977Ho21	
102 - 66	+0.14 8	-0.05 9	1977Ho21	
139 - 65	+0.25 6	-0.06 11	1977Ho21	1981Ya02,1974Si12
143 - 66	+0.03 6	-0.20 13	1974Si12	
177.2 - 167.8				
+	+0.11 1	+0.01 2	1971Be23	1962Ch06
176.5 - 168.4				
177.2 - 102	+0.01 2	+0.02 4	1974Si12	
177.2 - 76	+0.09 3		1981Ya07	
187 - 209	+0.084 24		1981Ya07	
202 - 100	+0.14 1		1981Ya07	1975Wa02,1974Si12
202 - 105	+0.01 3		1975Wa02	
232 - 26	+0.038 4		1974Dr03	
237 - 65+70	+0.07 6	+0.02 12	1974Si12	
240 - 100	+0.169 15	+0.012 18	1977Bu12	1976Ba44,1975Wa02
240 - 100	+0.142 4		1981Ya07	1974Si12,1962Ch06
240 - 105	-0.005 10	+0.011 15	1977Bu12	1977Ho21,1976Ba44, 1975Wa02,1971Be23
258 - 66	-0.31 2		1981Ya07	1977Ho21,1975Wa02,1974Si12
275 - 65	+0.208 15	-0.008 18	1977Bu12	1977Ho21,1976Ba44,1975Wa02
275 - 65	+0.220 4		1981Ya07	1974Si12,1962Ch06
275 - 70	-0.24 3	-0.03 4	1977Bu12	1976Ba44,1975Wa02,1971Be23
277.6 - 168.4				
+	+0.14 3		1971Be23	
278.2 - 167.7				
330 - 66	+0.22 4		1981Ya07	1974Si12
350 - 66	+0.43 15		1981Ya07	
380 - 66	+0.203 14		1981Ya07	1975Wa02,1974Si12
451 - 65	+0.27 12		1974Si12	
565 - 139	+0.20 6		1981Ya07	
598 - 66	-0.32 21		1981Ya07	
636 - 100	+0.17 1		1981Ya07	1974Si12
654 - 163	+0.27 2		1981Ya07	
654 - 168	-0.10 4		1981Ya07	
668.7 - 209	+0.15 4	+0.06 4	1971Be23	
669.2 - 209	-0.14 3		1981Ya07	1974Si12
671 - 65	+0.19 2		1981Ya07	1974Si12
704 - 65	-0.25 3		1981Ya07	1974Si12
718 - 100	+0.152 5		1981Ya07	1974Si12
718 - 105	+0.02 3		1974Si12	1971Be23
753 - 65	+0.16 2		1981Ya07	1974Si12
773 - 100	+0.01 4		1974Si12	
773 - 105	+0.01 3		1974Si12	
785 - 168	-0.11 5		1981Ya07	
796 - 163	-0.30 6		1981Ya07	
808 - 65	-0.03 6		1974Si12	
808 - 70	+0.12 3	+0.07 5	1971Be23	
849 - 100+105	+0.18 5	-0.00 8	1974Si12	

E_γ [†]	I_γ [‡e]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	δ[#]	α[@]	$I_{(\gamma+ce)}$ [e]	Comments
4.821 *3*	0.27 *7*	4.821	$3/2^-$	0.0	$5/2^-$	M1+E2	0.024 *3*	8.8×10^2 *12*		α(M)=7.0×10^2 *10*; α(N+..)=177 *24* α(N)=155 *21*; α(O)=20.9 *25*; α(P)=0.711 *10* E_γ: from ce data (1963Ge10). I_γ: from decay scheme, deduced I(γ+ce)=58% 12 which gives Iγ=0.27 *7*. Feeding to g.s. and 4.8 level=10% 3. ce(M1:M2:M3:M4:M5)=1.0:0.50 *10*:0.76 *15*:0.021 *8*: 0.011 *4* (1963Ge10). ce(N1,N2,N3,N4,N5,O1,O2,O3) also observed but ratios not given (1963Ge10). δ: from M1/M2 and M2/M3 ratios (1963Ge10). Other M subshell (1963Ge10) give δ<0.07.
25.69 *2*	4.3 *3*	91.52	$(9/2)^+$	65.823	$7/2^-$	E1		1.99		α(L)=1.567 *23*; α(M)=0.339 *5*; α(N+..)=0.0828 *12* α(N)=0.0733 *11*; α(O)=0.00916 *13*; α(P)=0.000299 *5* δ: <0.05 from Ice(L2)/Ice(M1). ce(L1) and ce(L3) are unresolved.
35.2 *3*	0.15 *11*	104.833	$3/2^-$	69.703	$5/2^-$	M1+E2	0.6 *1*	49 *11*	1.8 *5*	ce(L)/(γ+ce)=0.76 *12*; ce(M)/(γ+ce)=0.18 *5*; ce(N+)/(γ+ce)=0.043 *13* ce(N)/(γ+ce)=0.038 *12*; ce(O)/(γ+ce)=0.0048 *15*; ce(P)/(γ+ce)=3.1×10^{-5} *7* $I_{(\gamma+ce)}$: deduced from $\gamma\gamma$ (1973Co29). From summing of Ice of 1964Be10, I(γ+ce)=2.6 9. I_γ: from I(γ+ce) and α for mult and δ as given. Ice(L1)=1, Ice(L2)=5.3 *10*, Ice(L3)=6.3 *10*, Ice(M)=2.5 *10*, Ice(M2)=Ice(M3)=1, Ice(N)=1 (1964Be10). δ: from L subshell ratios.
59.93 *4*	0.11 *1*	344.909	$3/2^+$	284.94	$1/2^-$,$3/2^-$	[E1]		1.086		α(K)=0.902 *13*; α(L)=0.1448 *21*; α(M)=0.0311 *5*; α(N+..)=0.00784 *11* α(N)=0.00686 *10*; α(O)=0.000940 *14*; α(P)=4.07×10^{-5} *6*
61.00 *8*	0.031 *10*	65.823	$7/2^-$	4.821	$3/2^-$	(E2)		15.17		α(K)=3.56 *5*; α(L)=9.00 *14*; α(M)=2.10 *4*; α(N+..)=0.515 *8* α(N)=0.458 *7*; α(O)=0.0565 *9*; α(P)=0.0001605 *23* Mult.: L-subshell ratios consistent with E2.
62.91 *2*	0.92 *7*	167.751	$5/2^+$	104.833	$3/2^-$	(E1)		0.956		α(K)=0.796 *12*; α(L)=0.1263 *18*; α(M)=0.0271 *4*; α(N+..)=0.00685 *10* α(N)=0.00599 *9*; α(O)=0.000823 *12*; α(P)=3.61×10^{-5} *5*
64.88 *1*	8.4 *7*	69.703	$5/2^-$	4.821	$3/2^-$	M1+E2	−0.076 *9*	5.92		δ: <0.05 from α(K)exp. α(K)=4.97 *7*; α(L)=0.746 *14*; α(M)=0.161 *3*; α(N+..)=0.0421 *8* α(N)=0.0364 *7*; α(O)=0.00540 *10*; α(P)=0.000318 *5* ce(L1/L2)=9.1 *5* (1985GrZT). δ: from Ice(L1)/Ice(L2) (1985GrZT). Sign from $\gamma\gamma(\theta)$. Others from $\gamma\gamma(\theta)$: −0.10 *4*

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$\gamma(^{151}Sm)$ (continued)

E_γ[†]	I_γ[‡e]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	δ[#]	α[@]	Comments
									(1975Wa02), −0.10 *5* (1981Ya07), −0.07 *7* (1977Ho21), −0.099 *23* (1977Bu12), −0.16 *10* (1974Si12).
65.83 *1*	5.1 *4*	65.823	7/2$^-$	0.0	5/2$^-$	M1+E2	−0.22 *2*	5.90 *10*	α(K)=4.70 *7*; α(L)=0.94 *5*; α(M)=0.207 *12*; α(N+..)=0.053 *3* α(N)=0.0464 *25*; α(O)=0.0066 *3*; α(P)=0.000298 *5* ce(L2/L3)=1.14 *5* (1985GrZT). δ: from Ice(L2)/Ice(L3) (1985GrZT). Sign from $\gamma\gamma(\theta)$. Others from $\gamma\gamma(\theta)$: −0.30 *10* (1975Wa02), −0.20 *2* (1981Ya07); −0.06 *14* (1977Ho21), −0.24 *16* (1974Si12).
69.70 *2*	2.1 *2*	69.703	5/2$^-$	0.0	5/2$^-$	M1+E2	0.16 *2*	4.89 *8*	α(K)=4.02 *6*; α(L)=0.68 *3*; α(M)=0.149 *7*; α(N+..)=0.0386 *17* α(N)=0.0335 *15*; α(O)=0.00485 *18*; α(P)=0.000256 *4* ce(L1/L2)=5.35 *51* (1985GrZT). δ: from Ice(L1)/Ice(L2) (1985GrZT). Others from $\gamma\gamma(\theta)$: +0.13 *+30−16* (1975Wa02), 0.14 (1971Be23),≥0.15 (1977Bu12), −0.45 *25* (1974Si12). Sign of δ uncertain.
76.22 *2*	0.90 *7*	167.751	5/2$^+$	91.52	(9/2)$^+$	(E2)		6.40	α(K)=2.36 *4*; α(L)=3.13 *5*; α(M)=0.729 *11*; α(N+..)=0.179 *3* α(N)=0.1595 *23*; α(O)=0.0198 *3*; α(P)=9.87×10^{-5} *14* Mult.,δ: L and M subshell ratios give E2(+M1) with δ>1.0.
88.80 *9*	0.055 *7*	395.581	5/2$^+$	306.79	3/2$^+$	M1,E2		3.0 *7*	α(K)=1.82 *20*; α(L)=0.9 *7*; α(M)=0.21 *15*; α(N+..)=0.05 *4* α(N)=0.05 *4*; α(O)=0.006 *4*; α(P)=0.00010 *3*
91.7[c] *3*	0.025 *15*	415.61	(5/2$^-$,7/2$^-$)	323.941	7/2$^+$	[E1]		0.349 *6*	α(K)=0.293 *5*; α(L)=0.0436 *8*; α(M)=0.00933 *16*; α(N+..)=0.00238 *4* α(N)=0.00207 *4*; α(O)=0.000292 *5*; α(P)=1.403×10^{-5} *23*
92.97 *4*	0.15 *1*	395.581	5/2$^+$	302.62	7/2$^-$	[E1]		0.336	α(K)=0.283 *4*; α(L)=0.0419 *6*; α(M)=0.00897 *13*; α(N+..)=0.00229 *4* α(N)=0.00200 *3*; α(O)=0.000281 *4*; α(P)=1.355×10^{-5} *19*
98.05 *2*	1.60 *13*	167.751	5/2$^+$	69.703	5/2$^-$	E1		0.291	α(K)=0.245 *4*; α(L)=0.0361 *5*; α(M)=0.00772 *11*; α(N+..)=0.00197 *3* α(N)=0.001719 *24*; α(O)=0.000243 *4*; α(P)=1.183×10^{-5} *17*
98.74 *8*	0.26 *4*	168.40	(5/2)$^-$	69.703	5/2$^-$	M1,E2		2.1 *4*	α(K)=1.36 *13*; α(L)=0.6 *4*; α(M)=0.13 *9*; α(N+..)=0.033 *22* α(N)=0.029 *19*; α(O)=0.0038 *23*; α(P)=7.4×10^{-5} *22*
100.02 *1*	11.3 *7*	104.833	3/2$^-$	4.821	3/2$^-$	M1(+E2)	<0.02	1.689	α(K)=1.431 *20*; α(L)=0.203 *3*; α(M)=0.0436 *7*; α(N+..)=0.01146 *16* α(N)=0.00989 *14*; α(O)=0.001481 *21*; α(P)=9.13×10^{-5} *13* ce(L1/L2)=14.5 *26* (1985GrZT). δ: from Ice(L1)/Ice(L2) (1985GrZT). Others from $\gamma\gamma(\theta)$: −0.02 *1* (1981Ya07), +0.15 *25* (1977Bu12), +0.06 *8* (1974Si12). From $\gamma(\theta)$ δ=+0.01 *3* (1975Wa02). ce data (1964Be10) give δ<0.12.
100.6[c] *3*	0.053 *15*	445.68	5/2$^+$	344.909	3/2$^+$	[M1,E2]		2.0 *4*	α(K)=1.29 *13*; α(L)=0.5 *4*; α(M)=0.12 *8*; α(N+..)=0.031 *20* α(N)=0.027 *18*; α(O)=0.0035 *21*; α(P)=7.0×10^{-5} *20*
101.93 *1*	5.7 *4*	167.751	5/2$^+$	65.823	7/2$^-$	E1		0.262	α(K)=0.221 *3*; α(L)=0.0323 *5*; α(M)=0.00692 *10*; α(N+..)=0.001771 *25*

$^{151}_{62}Sm_{89}$-8

^{151}Pm β^- decay (28.40 h) 1973Co29,1977Ho21,1964Be10 (continued)

$\gamma(^{151}Sm)$ (continued)

E_γ[†]	I_γ[‡e]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	δ[#]	α[@]	Comments
									α(N)=0.001542 *22*; α(O)=0.000218 *3*; α(P)=1.072×10^{-5} *15* δ: <0.08 from ce data, 0.02 *3* from $\gamma(\theta)$.
102.7[cg] *5*	0.14 *7*	168.40	(5/2)$^-$	65.823	7/2$^-$	[M1,E2]		1.8 *3*	α(K)=1.22 *12*; α(L)=0.5 *3*; α(M)=0.11 *8*; α(N+..)=0.028 *18* α(N)=0.025 *16*; α(O)=0.0032 *19*; α(P)=6.6×10^{-5} *19*
104.84 *1*	15.6 *10*	104.833	3/2$^-$	0.0	5/2$^-$	M1+E2	−0.12 *3*	1.483 *22*	α(K)=1.248 *18*; α(L)=0.185 *5*; α(M)=0.0399 *12*; α(N+..)=0.0104 *3* α(N)=0.0090 *3*; α(O)=0.00134 *4*; α(P)=7.93×10^{-5} *12* ce(L1/L2)=9.3 *10* (1985GrZT). δ: from Ice(L1)/Ice(L2) (1985GrZT). Sign from $\gamma\gamma(\theta)$ others from $\gamma\gamma(\theta)$: −0.13 *6* (1977Ho21), −0.076 *23* (1977Bu12), −0.14 *8* (1974Si12),<0.12 (1971Be23). From $\gamma(\theta)$, δ=−0.10 *3* (1975Wa02). ce data give 0.20 *5* (1964Be10), 0.12 *4* (1962Ha24).
109.56 *2*	0.38 *3*	175.38	(9/2)$^-$	65.823	7/2$^-$	M1,E2		1.49 *20*	α(K)=1.01 *10*; α(L)=0.37 *22*; α(M)=0.09 *6*; α(N+..)=0.021 *13* α(N)=0.019 *12*; α(O)=0.0025 *14*; α(P)=5.5×10^{-5} *16*
113.1 *2*	0.043 *7*	415.61	(5/2$^-$,7/2$^-$)	302.62	7/2$^-$	[M1,E2]		1.35 *16*	α(K)=0.92 *9*; α(L)=0.33 *19*; α(M)=0.07 *5*; α(N+..)=0.019 *11* α(N)=0.017 *10*; α(O)=0.0022 *12*; α(P)=5.0×10^{-5} *14*
121.77 *4*	0.40 *4*	445.68	5/2$^+$	323.941	7/2$^+$	(M1,E2)		1.06 *10*	α(K)=0.75 *7*; α(L)=0.24 *13*; α(M)=0.06 *3*; α(N+..)=0.014 *8* α(N)=0.012 *7*; α(O)=0.0016 *8*; α(P)=4.1×10^{-5} *11*
125.2[fg] *3*	<0.054[f]	448.5	(3/2$^-$)	323.941	7/2$^+$	[M2]		7.19 *12*	α(K)=5.58 *10*; α(L)=1.248 *22*; α(M)=0.282 *5*; α(N+..)=0.0741 *13* α(N)=0.0642 *11*; α(O)=0.00936 *16*; α(P)=0.000511 *9* Placement by 1977Ho21. Mainly deexcites 521 level.
125.2[f] *3*	0.054[f] *8*	521.10	3/2$^+$	395.581	5/2$^+$	[M1,E2]		0.97 *8*	α(K)=0.69 *7*; α(L)=0.22 *11*; α(M)=0.05 *3*; α(N+..)=0.012 *7* α(N)=0.011 *6*; α(O)=0.0014 *7*; α(P)=3.8×10^{-5} *11* $\gamma\gamma$ (1973Co29) suggests deexcitation from 521 level only.
[x]126.8[g] *5*	0.013 *6*								
130.43 *2*	0.30 *2*	445.68	5/2$^+$	315.26	(3/2$^-$)	[E1]		0.1339	α(K)=0.1133 *16*; α(L)=0.01620 *23*; α(M)=0.00346 *5*; α(N+..)=0.000890 *13* α(N)=0.000774 *11*; α(O)=0.0001107 *16*; α(P)=5.69×10^{-6} *8*
134.22 *20*	0.090 *9*	302.62	7/2$^-$	168.40	(5/2)$^-$	[M1,E2]		0.78 *5*	α(K)=0.56 *6*; α(L)=0.16 *8*; α(M)=0.037 *19*; α(N+..)=0.009 *5* α(N)=0.008 *4*; α(O)=0.0011 *5*; α(P)=3.1×10^{-5} *9*
134.9 *6*	0.018 *9*	302.62	7/2$^-$	167.751	5/2$^+$	[E1]		0.1221 *23*	α(K)=0.1034 *20*; α(L)=0.0147 *3*; α(M)=0.00315 *6*; α(N+..)=0.000811 *16* α(N)=0.000705 *14*; α(O)=0.0001010 *19*; α(P)=5.22×10^{-6} *10*
138.38 *12*	0.18 *2*	306.79	3/2$^+$	168.40	(5/2)$^-$	[E1]		0.1140	α(K)=0.0966 *14*; α(L)=0.01373 *20*; α(M)=0.00294 *5*; α(N+..)=0.000756 *11* α(N)=0.000657 *10*; α(O)=9.42×10^{-5} *14*; α(P)=4.89×10^{-6} *7*
138.9[c] *3*	0.12 *3*	306.79	3/2$^+$	167.751	5/2$^+$	[M1,E2]		0.70 *4*	α(K)=0.51 *6*; α(L)=0.14 *7*; α(M)=0.032 *16*; α(N+..)=0.008

$^{151}_{62}Sm_{89}$-9

^{151}Pm β^- decay (28.40 h) 1973Co29,1977Ho21,1964Be10 (continued)

$\gamma(^{151}Sm)$ (continued)

E_γ[†]	I_γ[‡e]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	δ[#]	α[@]	Comments
									4 α(N)=0.007 *4*; α(O)=0.0010 *4*; α(P)=2.8×10^{-5} *8*
139.28 *2*	2.2 *2*	208.995	(7/2)$^-$	69.703	5/2$^-$	M1+E2	−0.18 *7*	0.661	α(K)=0.556 *9*; α(L)=0.083 *4*; α(M)=0.0179 *9*; α(N+..)=0.00468 *22* α(N)=0.00405 *19*; α(O)=0.000600 *23*; α(P)=3.52×10^{-5} *7* δ: weighted av from $\gamma\gamma(\theta)$ (1981Ya07,1977Ho21,1974Si12). Subshell ratios give δ=0.34 *10*.
[x]141.7[g] *5*	0.045 *15*								
143.17 *3*	0.95 *6*	208.995	(7/2)$^-$	65.823	7/2$^-$	M1,E2		0.632 *24*	α(K)=0.47 *5*; α(L)=0.13 *6*; α(M)=0.029 *14*; α(N+..)=0.007 *4* α(N)=0.006 *3*; α(O)=0.0009 *4*; α(P)=2.6×10^{-5} *7*
143.2[c] *3*	0.045 *15*	445.68	5/2$^+$	302.62	7/2$^-$	[E1]		0.1039 *16*	α(K)=0.0880 *14*; α(L)=0.01248 *19*; α(M)=0.00267 *4*; α(N+..)=0.000687 *11* α(N)=0.000597 *9*; α(O)=8.57×10^{-5} *13*; α(P)=4.48×10^{-6} *7*
[x]146.2[g] *4*	0.074 *12*								
147.53 *3*	0.68 *4*	315.26	(3/2$^-$)	167.751	5/2$^+$	[E1]		0.0958	α(K)=0.0812 *12*; α(L)=0.01149 *17*; α(M)=0.00246 *4*; α(N+..)=0.000633 *9* α(N)=0.000550 *8*; α(O)=7.90×10^{-5} *11*; α(P)=4.15×10^{-6} *6*
148.50 *12*	0.24 *2*	323.941	7/2$^+$	175.38	(9/2)$^-$	[E1]		0.0941	α(K)=0.0798 *12*; α(L)=0.01129 *16*; α(M)=0.00241 *4*; α(N+..)=0.000622 *9* α(N)=0.000540 *8*; α(O)=7.76×10^{-5} *11*; α(P)=4.08×10^{-6} *6*
[x]150.1[g] *4*	0.040 *10*								
155.5 *2*	0.11 *2*	323.941	7/2$^+$	168.40	(5/2)$^-$	[E1]		0.0831	α(K)=0.0705 *11*; α(L)=0.00993 *15*; α(M)=0.00212 *3*; α(N+..)=0.000547 *8* α(N)=0.000475 *7*; α(O)=6.85×10^{-5} *10*; α(P)=3.62×10^{-6} *6*
156.18 *5*	0.66 *6*	323.941	7/2$^+$	167.751	5/2$^+$	M1,E2		0.481 *8*	α(K)=0.36 *5*; α(L)=0.09 *4*; α(M)=0.021 *9*; α(N+..)=0.0052 *20* α(N)=0.0046 *18*; α(O)=0.00062 *21*; α(P)=2.0×10^{-5} *6*
162.94 *2*	3.9 *3*	167.751	5/2$^+$	4.821	3/2$^-$	(E1)		0.0732	α(K)=0.0621 *9*; α(L)=0.00873 *13*; α(M)=0.00187 *3*; α(N+..)=0.000481 *7* α(N)=0.000418 *6*; α(O)=6.03×10^{-5} *9*; α(P)=3.21×10^{-6} *5* Mult.: α(L)exp and α(L1)exp disagree with E1 assignment. Ice′s are probably in error.
163.58 *2*	6.9 *5*	168.40	(5/2)$^-$	4.821	3/2$^-$	M1+E2	−0.15 *5*	0.420	α(K)=0.355 *6*; α(L)=0.0514 *12*; α(M)=0.0111 *3*; α(N+..)=0.00290 *7* α(N)=0.00250 *6*; α(O)=0.000373 *8*; α(P)=2.25×10^{-5} *4* δ: av of −0.10 *7* (from $\gamma(\theta)$) and −0.20 *3* (from $\gamma\gamma(\theta)$). L1/L3 data give 0.5 *1*.
167.75 *2*	37 *2*	167.751	5/2$^+$	0.0	5/2$^-$	E1		0.0677	α(K)=0.0575 *8*; α(L)=0.00806 *12*; α(M)=0.001722 *25*; α(N+..)=0.000444 *7* α(N)=0.000386 *6*; α(O)=5.57×10^{-5} *8*; α(P)=2.98×10^{-6} *5* δ: <0.1 from ce data.
168.39 *5*	4.1 *4*	168.40	(5/2)$^-$	0.0	5/2$^-$	M1+E2	+0.15 *10*	0.388	α(K)=0.327 *6*; α(L)=0.0473 *19*; α(M)=0.0102 *5*;

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$\gamma(^{151}Sm)$ (continued)

E_γ [†]	I_γ [‡e]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	δ[#]	α[@]	Comments
									α(N+..)=0.00267 *11* α(N)=0.00231 *10*; α(O)=0.000344 *11*; α(P)=2.08×10^{-5} *5*
176.52 *3*	3.8 *3*	344.909	3/2$^+$	168.40	(5/2)$^-$	(E1)		0.0590	δ: from $\gamma\gamma(\theta)$. $\gamma(\theta)$ gives δ=0.2 *6*. α(K)=0.0501 *7*; α(L)=0.00700 *10*; α(M)=0.001497 *21*; α(N+..)=0.000387 *6* α(N)=0.000335 *5*; α(O)=4.85×10^{-5} *7*; α(P)=2.62×10^{-6} *4*
177.16 *1*	17 *1*	344.909	3/2$^+$	167.751	5/2$^+$	M1+E2	−0.36 *5*	0.334	α(K)=0.278 *5*; α(L)=0.0441 *12*; α(M)=0.0096 *3*; α(N+..)=0.00249 *7* α(N)=0.00216 *6*; α(O)=0.000316 *8*; α(P)=1.73×10^{-5} *4* δ: from $\gamma(\theta)$. Others: −0.45 *10* from $\gamma\gamma(\theta)$, 0.34 *10* from subshell ratios in ce data.
186.59 *2*	0.8 *1*	395.581	5/2$^+$	208.995	(7/2)$^-$	(E1)		0.0509	α(K)=0.0432 *6*; α(L)=0.00602 *9*; α(M)=0.001286 *18*; α(N+..)=0.000332 *5* α(N)=0.000288 *4*; α(O)=4.18×10^{-5} *6*; α(P)=2.27×10^{-6} *4*
192.9[c] *4*	0.033 *10*	663.1	3/2$^{(+)}$	470.35	(5/2,7/2$^+$)	[D,E2]		0.16 *11*	
195.5 *2*	0.12 *3*	490.32	(7/2)$^-$	294.8	9/2$^-$	[M1,E2]		0.241 *17*	α(K)=0.19 *3*; α(L)=0.040 *10*; α(M)=0.0089 *24*; α(N+..)=0.0023 *6* α(N)=0.0020 *6*; α(O)=0.00028 *6*; α(P)=1.1×10^{-5} *3*
201.96 *2*	3.9 *2*	306.79	3/2$^+$	104.833	3/2$^-$	[E1]		0.0412	α(K)=0.0350 *5*; α(L)=0.00485 *7*; α(M)=0.001036 *15*; α(N+..)=0.000268 *4* α(N)=0.000233 *4*; α(O)=3.38×10^{-5} *5*; α(P)=1.85×10^{-6} *3* δ: <0.06 from $\gamma(\theta)$.
204.17 *3*	0.58 *5*	208.995	(7/2)$^-$	4.821	3/2$^-$	(E2)		0.195	α(K)=0.1408 *20*; α(L)=0.0420 *6*; α(M)=0.00950 *14*; α(N+..)=0.00239 *4* α(N)=0.00210 *3*; α(O)=0.000280 *4*; α(P)=7.01×10^{-6} *10* Mult.: α(K)exp gives M1,E2 but ΔJ^π consistent with E2.
205.7[c] *3*	0.04 *1*	521.10	3/2$^+$	315.26	(3/2$^-$)				
206.7[c] *2*	0.16 *3*	415.61	(5/2$^-$,7/2$^-$)	208.995	(7/2)$^-$	[M1,E2]		0.204 *17*	α(K)=0.16 *3*; α(L)=0.033 *7*; α(M)=0.0073 *18*; α(N+..)=0.0019 *4* α(N)=0.0016 *4*; α(O)=0.00023 *4*; α(P)=9.E−6 *3*
207.0[c] *3*	0.033 *8*	521.10	3/2$^+$	313.78	(1/2$^-$,3/2$^-$)				
209.00 *1*	7.7 *5*	208.995	(7/2)$^-$	0.0	5/2$^-$	M1(+E2)	<0.10	0.214	α(K)=0.181 *3*; α(L)=0.0255 *4*; α(M)=0.00547 *8*; α(N+..)=0.001437 *21* α(N)=0.001240 *18*; α(O)=0.000186 *3*; α(P)=1.151×10^{-5} *17* δ: +0.07 *3* or −0.63 *12* from $\gamma(\theta)$ (1975Wa02), +0.04 *4* from $\gamma\gamma(\theta)$ (1981Ya07).
215.3[b] *3*	0.040 *16*	284.94	1/2$^-$,3/2$^-$	69.703	5/2$^-$	[M1,E2]		0.180 *18*	α(K)=0.144 *24*; α(L)=0.029 *6*; α(M)=0.0064 *14*; α(N+..)=0.0016 *3* α(N)=0.0014 *3*; α(O)=0.00020 *3*; α(P)=8.3×10^{-6} *23*
227.18 *2*	1.5 *1*	395.581	5/2$^+$	168.40	(5/2)$^-$	(E1)		0.0302	α(K)=0.0257 *4*; α(L)=0.00353 *5*; α(M)=0.000755 *11*;

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^{151}Pm β^- decay (28.40 h) 1973Co29,1977Ho21,1964Be10 (continued)

$\gamma(^{151}Sm)$ (continued)

E_γ [†]	I_γ [‡ e]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [&]	δ [#]	α [@]	$I_{(\gamma+ce)}$ [e]	Comments
										α(N+..)=0.000196 *3* α(N)=0.0001696 *24*; α(O)=2.47×10^{-5} *4*; α(P)=1.377×10^{-6} *20*
227.81 *15*	0.22 *7*	395.581	5/2$^+$	167.751	5/2$^+$	(M1,E2)		0.152 *17*		Mult.: see comment for 227.8γ. α(K)=0.122 *22*; α(L)=0.024 *4*; α(M)=0.0052 *10*; α(N+..)=0.00134 *21* α(N)=0.00117 *20*; α(O)=0.000165 *19*; α(P)=7.1×10^{-6} *20*
229.01 *15*	0.10 *2*	294.8	9/2$^-$	65.823	7/2$^-$	[M1,E2]		0.150 *17*		Mult.: α(K)exp (227.8γ+227.2γ) consistent with E1 for 227.2γ and M1,E2 for 227.8γ. α(K)=0.120 *22*; α(L)=0.023 *4*; α(M)=0.0051 *9*; α(N+..)=0.00132 *21* α(N)=0.00115 *19*; α(O)=0.000162 *18*; α(P)=7.0×10^{-6} *20*
232.43 *2*	4.6 *4*	323.941	7/2$^+$	91.52	(9/2)$^+$	M1+E2	−0.09 *1*	0.1599		α(K)=0.1357 *19*; α(L)=0.0190 *3*; α(M)=0.00409 *6*; α(N+..)=0.001074 *15* α(N)=0.000926 *13*; α(O)=0.0001389 *20*; α(P)=8.60×10^{-6} *12*
232.7[c] *3*	0.39 *9*	302.62	7/2$^-$	69.703	5/2$^-$	[M1,E2]		0.143 *17*		δ: from (232γ)(26γ)(θ) (1974Dr03). α(K)=0.115 *21*; α(L)=0.022 *4*; α(M)=0.0049 *8*; α(N+..)=0.00125 *18* α(N)=0.00109 *17*; α(O)=0.000153 *16*; α(P)=6.7×10^{-6} *19*
236.2 *2*	0.42 *7*	521.10	3/2$^+$	284.94	1/2$^-$,3/2$^-$	[E1]		0.0272		α(K)=0.0232 *4*; α(L)=0.00319 *5*; α(M)=0.000680 *10*; α(N+..)=0.000176 *3* α(N)=0.0001529 *22*; α(O)=2.23×10^{-5} *4*; α(P)=1.248×10^{-6} *18*
236.6 *1*	0.71 *8*	445.68	5/2$^+$	208.995	(7/2)$^-$	[E1]		0.0271		α(K)=0.0231 *4*; α(L)=0.00317 *5*; α(M)=0.000677 *10*; α(N+..)=0.0001757 *25* α(N)=0.0001522 *22*; α(O)=2.22×10^{-5} *4*; α(P)=1.243×10^{-6} *18*
236.7 *2*	0.86 *21*	302.62	7/2$^-$	65.823	7/2$^-$	(M1,E2)		0.136 *17*		α(K)=0.109 *21*; α(L)=0.021 *3*; α(M)=0.0046 *8*; α(N+..)=0.00118 *16* α(N)=0.00103 *15*; α(O)=0.000145 *14*; α(P)=6.4×10^{-6} *19*
237.1 *2*	2.3 *4*	306.79	3/2$^+$	69.703	5/2$^-$	(E1)		0.0270		α(K)=0.0230 *4*; α(L)=0.00315 *5*; α(M)=0.000673 *10*; α(N+..)=0.0001747 *25* α(N)=0.0001513 *22*; α(O)=2.21×10^{-5} *4*; α(P)=1.236×10^{-6} *18*
240.09 *1*	17 *1*	344.909	3/2$^+$	104.833	3/2$^-$	E1		0.0261		Mult.: α(K)exp consistent with E1 for 237.1γ and M1,E2 for 236.7. α(K)=0.0222 *4*; α(L)=0.00305 *5*; α(M)=0.000651 *10*; α(N+..)=0.0001690 *24* α(N)=0.0001464 *21*; α(O)=2.14×10^{-5} *3*;

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$\gamma(^{151}Sm)$ (continued)

E_γ [†]	I_γ [‡e]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	α[@]	Comments
								α(P)=1.198×10^{-6} *17* δ: <0.03 from $\gamma(\theta)$.
247.1 *2*	0.08 *2*	415.61	(5/2$^-$,7/2$^-$)	168.40	(5/2)$^-$	[M1,E2]	0.120 *16*	α(K)=0.097 *19*; α(L)=0.0180 *20*; α(M)=0.0040 *6*; α(N+..)=0.00102 *12* α(N)=0.00089 *11*; α(O)=0.000126 *9*; α(P)=5.7×10^{-6} *17*
247.8 *2*	0.13 *2*	415.61	(5/2$^-$,7/2$^-$)	167.751	5/2$^+$			
250.5[cg] *8*	0.04 *2*	355.5?	1/2$^+$	104.833	3/2$^-$			
254.28 *3*	0.75 *7*	323.941	7/2$^+$	69.703	5/2$^-$	[E1]	0.0225	α(K)=0.0191 *3*; α(L)=0.00262 *4*; α(M)=0.000559 *8*; α(N+..)=0.0001452 *21* α(N)=0.0001258 *18*; α(O)=1.84×10^{-5} *3*; α(P)=1.038×10^{-6} *15*
258.11 *2*	2.5 *2*	323.941	7/2$^+$	65.823	7/2$^-$	E1	0.0216	α(K)=0.0184 *3*; α(L)=0.00252 *4*; α(M)=0.000538 *8*; α(N+..)=0.0001396 *20* α(N)=0.0001210 *17*; α(O)=1.770×10^{-5} *25*; α(P)=1.000×10^{-6} *14* δ: <0.2 from $\gamma(\theta)$.
261.4 *3*	0.050 *15*	470.35	(5/2,7/2$^+$)	208.995	(7/2)$^-$	[D,E2]	0.07 *5*	
270.72 *3*	0.30 *3*	741.03	3/2$^{(+)}$	470.35	(5/2,7/2$^+$)	[D,E2]	0.06 *4*	
275.21 *2*	30 *2*	344.909	3/2$^+$	69.703	5/2$^-$	E1	0.0183	α(K)=0.01562 *22*; α(L)=0.00213 *3*; α(M)=0.000455 *7*; α(N+..)=0.0001181 *17* α(N)=0.0001023 *15*; α(O)=1.499×10^{-5} *21*; α(P)=8.53×10^{-7} *12* δ: <0.006 from $\gamma(\theta)$.
277.62 *10*	0.27 *6*	445.68	5/2$^+$	168.40	(5/2)$^-$			Mult.: α(K)exp disagrees with expected mult=E1.
278.2 *3*	0.035 *15*	445.68	5/2$^+$	167.751	5/2$^+$	[M1,E2]	0.085 *14*	α(K)=0.069 *15*; α(L)=0.0122 *6*; α(M)=0.00268 *19*; α(N+..)=0.00069 *4* α(N)=0.00060 *4*; α(O)=8.60×10^{-5} *16*; α(P)=4.1×10^{-6} *12*
280.09 *3*	1.03 *8*	284.94	1/2$^-$,3/2$^-$	4.821	3/2$^-$	M1,E2	0.083 *14*	α(K)=0.068 *15*; α(L)=0.0120 *6*; α(M)=0.00262 *17*; α(N+..)=0.00068 *4* α(N)=0.00059 *4*; α(O)=8.42×10^{-5} *14*; α(P)=4.0×10^{-6} *12*
285.0[g]	<0.01	284.94	1/2$^-$,3/2$^-$	0.0	5/2$^-$			
290.75 *1*	3.7 *3*	395.581	5/2$^+$	104.833	3/2$^-$	E1	0.01593	α(K)=0.01358 *19*; α(L)=0.00185 *3*; α(M)=0.000394 *6*; α(N+..)=0.0001025 *15* α(N)=8.87×10^{-5} *13*; α(O)=1.302×10^{-5} *19*; α(P)=7.45×10^{-7} *11* δ: <0.035 from $\gamma(\theta)$.
292.4[c] *3*	0.05 *3*	741.03	3/2$^{(+)}$	448.5	(3/2$^-$)			
294.8[b] *3*	0.06 *2*	294.8	9/2$^-$	0.0	5/2$^-$	[E2]	0.0594	α(K)=0.0461 *7*; α(L)=0.01035 *15*; α(M)=0.00231 *4*; α(N+..)=0.000587 *9* α(N)=0.000514 *8*; α(O)=7.06×10^{-5} *11*; α(P)=2.47×10^{-6} *4*
295.2 *3*	0.07 *2*	741.03	3/2$^{(+)}$	445.68	5/2$^+$	[M1,E2]	0.072 *13*	α(K)=0.059 *13*; α(L)=0.01012 *24*; α(M)=0.00221 *9*; α(N+..)=0.000572 *15* α(N)=0.000497 *16*; α(O)=7.14×10^{-5} *16*; α(P)=3.5×10^{-6} *11*
297.80 *5*	0.17 *2*	302.62	7/2$^-$	4.821	3/2$^-$	[E2]	0.0575	α(K)=0.0447 *7*; α(L)=0.00998 *14*; α(M)=0.00222 *4*; α(N+..)=0.000566 *8* α(N)=0.000495 *7*; α(O)=6.81×10^{-5} *10*; α(P)=2.40×10^{-6} *4*

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$\gamma(^{151}Sm)$ (continued)

E_γ[†]	I_γ[‡e]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	α[@]	Comments
[x]298.6[g] 5	0.027 15							
301.8 2	0.06 2	470.35	(5/2,7/2$^+$)	168.40	(5/2)$^-$	[D,E2]	0.05 3	
302.5 3	0.12 3	470.35	(5/2,7/2$^+$)	167.751	5/2$^+$	[D,E2]	0.05 3	
302.8 3	0.11 2	302.62	7/2$^-$	0.0	5/2$^-$	[M1,E2]	0.067 13	α(K)=0.055 13; α(L)=0.00934 15; α(M)=0.00204 6; α(N+..)=0.000528 9 α(N)=0.000459 10; α(O)=6.60×10^{-5} 21; α(P)=3.3×10^{-6} 10
306.74 6	1.06 6	306.79	3/2$^+$	0.0	5/2$^-$	[E1]	0.01391	α(K)=0.01187 17; α(L)=0.001610 23; α(M)=0.000343 5; α(N+..)=8.93×10^{-5} 13 α(N)=7.73×10^{-5} 11; α(O)=1.136×10^{-5} 16; α(P)=6.54×10^{-7} 10
308.97 8	0.36 4	313.78	(1/2$^-$,3/2$^-$)	4.821	3/2$^-$	(M1,E2)	0.063 12	α(K)=0.052 12; α(L)=0.00877 13; α(M)=0.00192 4; α(N+..)=0.000496 7 α(N)=0.000431 7; α(O)=6.20×10^{-5} 24; α(P)=3.1×10^{-6} 10
310.8 2	0.075 20	315.26	(3/2$^-$)	4.821	3/2$^-$	[M1,E2]	0.062 12	α(K)=0.051 12; α(L)=0.00861 14; α(M)=0.00188 4; α(N+..)=0.000487 7 α(N)=0.000423 7; α(O)=6.09×10^{-5} 25; α(P)=3.0×10^{-6} 10
310.8 2	0.16 3	415.61	(5/2$^-$,7/2$^-$)	104.833	3/2$^-$	[M1,E2]	0.062 12	α(K)=0.051 12; α(L)=0.00861 14; α(M)=0.00188 4; α(N+..)=0.000487 7 α(N)=0.000423 7; α(O)=6.09×10^{-5} 25; α(P)=3.0×10^{-6} 10
314.92 10	0.28[d] 3	490.32	(7/2)$^-$	175.38	(9/2)$^-$	[M1,E2]	0.060 12	α(K)=0.049 12; α(L)=0.00827 15; α(M)=0.00180 3; α(N+..)=0.000467 8 α(N)=0.000406 6; α(O)=5.8×10^{-5} 3; α(P)=2.9×10^{-6} 9
315.1 5	0.035 10	315.26	(3/2$^-$)	0.0	5/2$^-$	[M1,E2]	0.060 12	α(K)=0.049 12; α(L)=0.00825 16; α(M)=0.00180 3; α(N+..)=0.000466 9 α(N)=0.000405 6; α(O)=5.8×10^{-5} 3; α(P)=2.9×10^{-6} 9
321.87 10	0.43 5	490.32	(7/2)$^-$	168.40	(5/2)$^-$	[M1,E2]	0.056 11	α(K)=0.046 11; α(L)=0.00773 20; α(M)=0.001686 25; α(N+..)=0.000437 11 α(N)=0.000379 7; α(O)=5.5×10^{-5} 3; α(P)=2.8×10^{-6} 9
323.94 1	5.4 4	323.941	7/2$^+$	0.0	5/2$^-$	E1	0.01213	α(K)=0.01036 15; α(L)=0.001401 20; α(M)=0.000299 5; α(N+..)=7.78×10^{-5} 11 α(N)=6.73×10^{-5} 10; α(O)=9.90×10^{-6} 14; α(P)=5.73×10^{-7} 8 δ: <0.03 from $\gamma(\theta)$.
325.2[c] 3	0.065 14	741.03	3/2$^{(+)}$	415.61	(5/2$^-$,7/2$^-$)			
325.80 10	0.47 6	395.581	5/2$^+$	69.703	5/2$^-$			
329.0[cg] 8	0.06 3	777.4?	(≤7/2)	448.5	(3/2$^-$)			
329.75 2	0.98 6	395.581	5/2$^+$	65.823	7/2$^-$	(E1)	0.01161	α(K)=0.00991 14; α(L)=0.001339 19; α(M)=0.000286 4; α(N+..)=7.44×10^{-5} 11 α(N)=6.43×10^{-5} 9; α(O)=9.47×10^{-6} 14; α(P)=5.49×10^{-7} 8
340.08 1	100	344.909	3/2$^+$	4.821	3/2$^-$	E1	0.01075	α(K)=0.00918 13; α(L)=0.001239 18; α(M)=0.000264 4; α(N+..)=6.88×10^{-5} 10 α(N)=5.95×10^{-5} 9; α(O)=8.77×10^{-6} 13; α(P)=5.10×10^{-7} 8

$^{151}_{62}Sm_{89}$-14

^{151}Pm β^- decay (28.40 h) 1973Co29,1977Ho21,1964Be10 (continued)

$\gamma(^{151}Sm)$ (continued)

E_γ[†]	I_γ[‡e]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	α[@]	Comments
								Additional information 1. α(K)exp=0.0090 *14* (1963Bu02), 0.102 *14* (1965Be13). Direct measurement of α(K)exp from internal and external conversion of 340γ. This transition used for normalization of ce data for other transitions.
341.0[c] *3*	0.33 *8*	445.68	$5/2^+$	104.833	$3/2^-$			
344.90 *1*	9.4 *5*	344.909	$3/2^+$	0.0	$5/2^-$	E1	0.01039	α(K)=0.00887 *13*; α(L)=0.001196 *17*; α(M)=0.000255 *4*; α(N+..)=6.64×10^{-5} *10* α(N)=5.75×10^{-5} *8*; α(O)=8.47×10^{-6} *12*; α(P)=4.93×10^{-7} *7* <0.03 from $\gamma(\theta)$.
346.1[c] *2*	0.17 *4*	415.61	$(5/2^-,7/2^-)$	69.703	$5/2^-$	[M1,E2]	0.046 *10*	α(K)=0.038 *10*; α(L)=0.0062 *4*; α(M)=0.00135 *5*; α(N+..)=0.000350 *18* α(N)=0.000303 *14*; α(O)=4.4×10^{-5} *4*; α(P)=2.3×10^{-6} *7*
348.8[c] *3*	0.041 *10*	663.1	$3/2^{(+)}$	313.78	$(1/2^-,3/2^-)$			
349.81 *3*	0.63 *6*	415.61	$(5/2^-,7/2^-)$	65.823	$7/2^-$	(M1,E2)	0.045 *10*	α(K)=0.037 *9*; α(L)=0.0060 *4*; α(M)=0.00131 *6*; α(N+..)=0.000339 *19* α(N)=0.000294 *15*; α(O)=4.3×10^{-5} *4*; α(P)=2.2×10^{-6} *7*
352.3 *3*	0.07 *2*	822.63	$(3/2^+,5/2^+)$	470.35	$(5/2,7/2^+)$			
353.32 *10*	0.47 *5*	521.10	$3/2^+$	167.751	$5/2^+$	[M1,E2]	0.043 *10*	α(K)=0.036 *9*; α(L)=0.0058 *4*; α(M)=0.00127 *6*; α(N+..)=0.000329 *20* α(N)=0.000285 *15*; α(O)=4.1×10^{-5} *4*; α(P)=2.2×10^{-6} *7*
[x]356.9 *5*	0.035 *13*							
358.4 *2*	0.068 *13*	773.98	$5/2^{(+)}$	415.61	$(5/2^-,7/2^-)$			
360.9 *3*	0.047 *12*	663.54	$(5/2^-,7/2,9/2^-)$	302.62	$7/2^-$			
369.0 *2*	0.073 *11*	663.54	$(5/2^-,7/2,9/2^-)$	294.8	$9/2^-$			
374.2 *2*	0.098 *20*	822.63	$(3/2^+,5/2^+)$	448.5	$(3/2^-)$			
376.9 *3*	0.07 *2*	822.63	$(3/2^+,5/2^+)$	445.68	$5/2^+$			
378.5[c] *3*	0.045 *20*	448.5	$(3/2^-)$	69.703	$5/2^-$	[M1,E2]	0.036 *8*	α(K)=0.030 *8*; α(L)=0.0047 *4*; α(M)=0.00103 *8*; α(N+..)=0.000268 *23* α(N)=0.000232 *18*; α(O)=3.4×10^{-5} *4*; α(P)=1.8×10^{-6} *6*
379.86 *3*	4.2 *3*	445.68	$5/2^+$	65.823	$7/2^-$	(E1)[a]	0.00821	α(K)=0.00701 *10*; α(L)=0.000941 *14*; α(M)=0.000201 *3*; α(N+..)=5.23×10^{-5} *8* α(N)=4.52×10^{-5} *7*; α(O)=6.68×10^{-6} *10*; α(P)=3.92×10^{-7} *6* δ: <0.03 from $\gamma(\theta)$.
381.2[g] *3*	0.09 *3*	851.6?		470.35	$(5/2,7/2^+)$			
390.67 *6*	0.24 *2*	395.581	$5/2^+$	4.821	$3/2^-$			
395.63 *10*	0.19 *2*	395.581	$5/2^+$	0.0	$5/2^-$			
398.9 *2*	0.14 *2*	490.32	$(7/2)^-$	91.52	$(9/2)^+$			
400.5 *5*	0.031 *14*	470.35	$(5/2,7/2^+)$	69.703	$5/2^-$			
404.74 *6*	0.29 *3*	470.35	$(5/2,7/2^+)$	65.823	$7/2^-$	[D,E2]	0.022 *15*	
407.03 *3*	0.83 *6*	822.63	$(3/2^+,5/2^+)$	415.61	$(5/2^-,7/2^-)$			
410.75 *7*	0.28 *3*	415.61	$(5/2^-,7/2^-)$	4.821	$3/2^-$			
415.7 *3*	0.099 *20*	415.61	$(5/2^-,7/2^-)$	0.0	$5/2^-$			

^{151}Pm β^- decay (28.40 h) 1973Co29,1977Ho21,1964Be10 (continued)

$\gamma(^{151}Sm)$ (continued)

E_γ[†]	I_γ[‡e]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	α[@]	Comments
[x]416.8 *4*	0.069 *20*							
420.65 *6*	0.25 *3*	490.32	$(7/2)^-$	69.703	$5/2^-$	[M1,E2]	0.027 *7*	α(K)=0.023 *6*; α(L)=0.0035 *5*; α(M)=0.00076 *8*; α(N+..)=0.000197 *24* α(N)=0.000170 *20*; α(O)=2.5×10^{-5} *4*; α(P)=1.4×10^{-6} *5*
424.55 *6*	0.22 *3*	490.32	$(7/2)^-$	65.823	$7/2^-$	[M1,E2]	0.026 *7*	α(K)=0.022 *6*; α(L)=0.0034 *5*; α(M)=0.00074 *8*; α(N+..)=0.000192 *23* α(N)=0.000166 *20*; α(O)=2.4×10^{-5} *4*; α(P)=1.3×10^{-6} *5*
425.6 *4*	0.044 *13*	741.03	$3/2^{(+)}$	315.26	$(3/2^-)$			
427.25 *4*	0.28 *3*	741.03	$3/2^{(+)}$	313.78	$(1/2^-,3/2^-)$			
429.1 *3*	0.07 *3*	877.63	$5/2^{(+)}$	448.5	$(3/2^-)$			
440.85 *2*	6.7 *4*	445.68	$5/2^+$	4.821	$3/2^-$	E1	0.00576	α(K)=0.00493 *7*; α(L)=0.000657 *10*; α(M)=0.0001400 *20*; α(N+..)=3.65×10^{-5} *6* α(N)=3.16×10^{-5} *5*; α(O)=4.67×10^{-6} *7*; α(P)=2.78×10^{-7} *4* δ: <0.05 from $\gamma(\theta)$.
443.8[c] *3*	0.10 *4*	448.5	$(3/2^-)$	4.821	$3/2^-$			
445.68 *2*	17.8 *10*	445.68	$5/2^+$	0.0	$5/2^-$	E1	0.00562	α(K)=0.00480 *7*; α(L)=0.000640 *9*; α(M)=0.0001364 *19*; α(N+..)=3.56×10^{-5} *5* α(N)=3.08×10^{-5} *5*; α(O)=4.56×10^{-6} *7*; α(P)=2.71×10^{-7} *4* δ: <0.03 from $\gamma(\theta)$.
448.7 *3*	0.09 *4*	448.5	$(3/2^-)$	0.0	$5/2^-$			
451.40 *2*	1.28 *10*	521.10	$3/2^+$	69.703	$5/2^-$	(E1)[a]	0.00545	α(K)=0.00466 *7*; α(L)=0.000621 *9*; α(M)=0.0001324 *19*; α(N+..)=3.45×10^{-5} *5* α(N)=2.99×10^{-5} *5*; α(O)=4.42×10^{-6} *7*; α(P)=2.63×10^{-7} *4* δ: −0.18 *13* from $\gamma(\theta)$.
452.2 *5*	0.06 *2*	620.43	$(3/2^-,5/2,7/2^+)$	168.40	$(5/2)^-$			
454.4 *4*	0.06 *2*	663.54	$(5/2^-,7/2,9/2^-)$	208.995	$(7/2)^-$			
456.05 *13*	0.17 *3*	741.03	$3/2^{(+)}$	284.94	$1/2^-,3/2^-$			
457.5[c] *10*	0.02 *1*	773.98	$5/2^{(+)}$	315.26	$(3/2^-)$			
462.24 *13*	0.16 *2*	877.63	$5/2^{(+)}$	415.61	$(5/2^-,7/2^-)$			
[x]463.8[g] *4*	0.040 *20*							
467.2 *6*	0.05 *2*	773.98	$5/2^{(+)}$	306.79	$3/2^+$			
470.5 *3*	0.08 *3*	470.35	$(5/2,7/2^+)$	0.0	$5/2^-$			
471.3 *2*	0.08 *3*	887.32	$(5/2^-,7/2)$	415.61	$(5/2^-,7/2^-)$			
471.4 *5*	0.06 *2*	773.98	$5/2^{(+)}$	302.62	$7/2^-$			
[x]473.8[g] *8*	0.030 *15*							
477.75 *4*	0.42 *4*	822.63	$(3/2^+,5/2^+)$	344.909	$3/2^+$	[M1,E2]	0.019 *5*	α(K)=0.016 *5*; α(L)=0.0024 *4*; α(M)=0.00053 *8*; α(N+..)=0.000137 *21* α(N)=0.000119 *18*; α(O)=1.7×10^{-5} *3*; α(P)=1.0×10^{-6} *3*
[x]487.1[g] *2*	0.075 *20*							
490.26 *5*	0.56 *4*	490.32	$(7/2)^-$	0.0	$5/2^-$	[M1,E2]	0.018 *5*	α(K)=0.015 *5*; α(L)=0.0023 *4*; α(M)=0.00049 *8*; α(N+..)=0.000128 *21* α(N)=0.000111 *17*; α(O)=1.6×10^{-5} *3*; α(P)=9.E−7 *3*

$^{151}_{62}Sm_{89}$-16

^{151}Pm β^- decay (28.40 h) 1973Co29,1977Ho21,1964Be10 (continued)

$\gamma(^{151}Sm)$ (continued)

E_γ[†]	I_γ[‡e]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	α[@]	Comments
494.9 *4*	0.05 *2*	663.1	$3/2^{(+)}$	168.40	$(5/2)^-$			
495.5 *4*	0.06 *2*	663.1	$3/2^{(+)}$	167.751	$5/2^+$			
x503.7[g] *7*	0.020 *10*							
507.27 *14*	0.21 *3*	822.63	$(3/2^+,5/2^+)$	315.26	$(3/2^-)$			
x510.1[bg] *7*	0.038 *16*							
516.25 *6*	0.86 *6*	521.10	$3/2^+$	4.821	$3/2^-$			
521.1 *2*	0.14 *2*	521.10	$3/2^+$	0.0	$5/2^-$			
532.5 *2*	0.15 *2*	877.63	$5/2^{(+)}$	344.909	$3/2^+$			
537.65 *11*	0.20 *3*	822.63	$(3/2^+,5/2^+)$	284.94	$1/2^-,3/2^-$			
550.7 *3*	0.069 *12*	620.43	$(3/2^-,5/2,7/2^+)$	69.703	$5/2^-$			
554.2 *3*	0.072 *12*	620.43	$(3/2^-,5/2,7/2^+)$	65.823	$7/2^-$			
562.1 *3*	0.085 *15*	877.63	$5/2^{(+)}$	315.26	$(3/2^-)$			
565.00 *4*	1.57 *9*	773.98	$5/2^{(+)}$	208.995	$(7/2)^-$	(E1)	0.00329	α(K)=0.00281 *4*; α(L)=0.000371 *6*; α(M)=7.90×10^{-5} *11*; α(N+..)=2.06×10^{-5} *3* α(N)=1.783×10^{-5} *25*; α(O)=2.65×10^{-6} *4*; α(P)=1.606×10^{-7} *23* δ: <0.11 from $\gamma(\theta)$.
572.5 *2*	0.23 *5*	741.03	$3/2^{(+)}$	168.40	$(5/2)^-$			
573.2 *2*	0.13 *3*	741.03	$3/2^{(+)}$	167.751	$5/2^+$			
574.97 *7*	0.52 *4*	877.63	$5/2^{(+)}$	302.62	$7/2^-$			
575.1[c] *10*	0.013 *5*	889.3	$(1/2,3/2,5/2^+)$	313.78	$(1/2^-,3/2^-)$			
x581.1[g] *6*	0.020 *6*							
x583.1[bg] *2*	0.114 *14*							
584.9 *4*	0.038 *7*	887.32	$(5/2^-,7/2)$	302.62	$7/2^-$			
593.6 *4*	0.045 *9*	663.1	$3/2^{(+)}$	69.703	$5/2^-$			
597.7 *1*	0.35 *4*	663.54	$(5/2^-,7/2,9/2^-)$	65.823	$7/2^-$			
598.0[c] *10*	0.04 *2*	953.49	$3/2^{(+)}$	355.5?	$1/2^+$			
x599.1[g] *7*	0.034 *15*							
603.0 *6*	0.050 *15*	926.0	(5/2,7/2)	323.941	$7/2^+$			
604.0 *6*	0.036 *10*	889.3	$(1/2,3/2,5/2^+)$	284.94	$1/2^-,3/2^-$			
605.9 *5*	0.043 *11*	773.98	$5/2^{(+)}$	167.751	$5/2^+$			
x609.25[bg] *10*	0.21 *2*							
620.6 *2*	0.32 *3*	620.43	$(3/2^-,5/2,7/2^+)$	0.0	$5/2^-$			
636.20 *3*	6.3 *4*	741.03	$3/2^{(+)}$	104.833	$3/2^-$	(E1)[a]	0.00254	α(K)=0.00218 *3*; α(L)=0.000286 *4*; α(M)=6.08×10^{-5} *9*; α(N+..)=1.591×10^{-5} *23* α(N)=1.374×10^{-5} *20*; α(O)=2.05×10^{-6} *3*; α(P)=1.249×10^{-7} *18* δ: <0.02 from $\gamma(\theta)$.
654.25 *6*	1.07 *7*	822.63	$(3/2^+,5/2^+)$	168.40	$(5/2)^-$	(E1)	0.00240	α(K)=0.00206 *3*; α(L)=0.000269 *4*; α(M)=5.72×10^{-5} *8*; α(N+..)=1.498×10^{-5} *21* α(N)=1.294×10^{-5} *19*; α(O)=1.93×10^{-6} *3*; α(P)=1.179×10^{-7} *17*
x655.6[g] *5*	0.05 *2*							
661.55 *15*	0.10 *4*	964.24	$5/2^{(+)}$	302.62	$7/2^-$			

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$\gamma(^{151}Sm)$ (continued)

E_γ[†]	I_γ[‡e]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	α[@]	Comments
663.5 *1*	0.42 *4*	663.54	(5/2$^-$,7/2,9/2$^-$)	0.0	5/2$^-$			
668.5[c] *8*	0.015 *7*	953.49	3/2$^{(+)}$	284.94	1/2$^-$,3/2$^-$			
668.7 *2*	1.6 *2*	877.63	5/2$^{(+)}$	208.995	(7/2)$^-$			
669.2 *2*	1.3 *2*	773.98	5/2$^{(+)}$	104.833	3/2$^-$			
671.28 *3*	4.0 *3*	741.03	3/2$^{(+)}$	69.703	5/2$^-$	(E1)	0.00227	α(K)=0.00195 *3*; α(L)=0.000255 *4*; α(M)=5.42×10^{-5} *8*; α(N+..)=1.418×10^{-5} *20* α(N)=1.224×10^{-5} *18*; α(O)=1.82×10^{-6} *3*; α(P)=1.118×10^{-7} *16*
678.30 *15*	0.20 *2*	887.32	(5/2$^-$,7/2)	208.995	(7/2)$^-$			
x699.0[g] *8*	0.085 *25*							
704.24 *8*	1.5 *1*	773.98	5/2$^{(+)}$	69.703	5/2$^-$			
709.25 *6*	0.61 *5*	877.63	5/2$^{(+)}$	168.40	(5/2)$^-$			
712.0 *1*	0.42 *4*	887.32	(5/2$^-$,7/2)	175.38	(9/2)$^-$			
713.4 *5*	0.040 *15*	1016.5	(3/2$^-$,5/2,7/2$^-$)	302.62	7/2$^-$			
717.72 *8*	18 *1*	822.63	(3/2$^+$,5/2$^+$)	104.833	3/2$^-$	E1	0.00198	α(K)=0.001697 *24*; α(L)=0.000221 *3*; α(M)=4.70×10^{-5} *7*; α(N+..)=1.231×10^{-5} *18* α(N)=1.063×10^{-5} *15*; α(O)=1.586×10^{-6} *23*; α(P)=9.76×10^{-8} *14* δ: −0.010 *6* from $\gamma(\theta)$.
719.0 *5*	0.050 *15*	887.32	(5/2$^-$,7/2)	168.40	(5/2)$^-$			
x727.0[bg] *3*	0.030 *6*							
736.12 *10*	2.1 *2*	741.03	3/2$^{(+)}$	4.821	3/2$^-$	(E1)[a]	0.00188	α(K)=0.001612 *23*; α(L)=0.000210 *3*; α(M)=4.46×10^{-5} *7*; α(N+..)=1.168×10^{-5} *17* α(N)=1.008×10^{-5} *15*; α(O)=1.505×10^{-6} *21*; α(P)=9.27×10^{-8} *13* δ: <0.04 from $\gamma(\theta)$.
740.8 *2*	0.10 *2*	741.03	3/2$^{(+)}$	0.0	5/2$^-$			
752.82 *8*	5.7 *4*	822.63	(3/2$^+$,5/2$^+$)	69.703	5/2$^-$	E1	0.00179	α(K)=0.001540 *22*; α(L)=0.000200 *3*; α(M)=4.26×10^{-5} *6*; α(N+..)=1.115×10^{-5} *16* α(N)=9.63×10^{-6} *14*; α(O)=1.437×10^{-6} *21*; α(P)=8.86×10^{-8} *13* δ: <0.03 from $\gamma(\theta)$.
755 *1*	0.03 *1*	964.24	5/2$^{(+)}$	208.995	(7/2)$^-$			
758.5 *4*	0.040 *9*	926.0	(5/2,7/2)	167.751	5/2$^+$			
769.10 *8*	0.47 *4*	773.98	5/2$^{(+)}$	4.821	3/2$^-$			
772.76 *8*	4.0 *3*	877.63	5/2$^{(+)}$	104.833	3/2$^-$	(E1)[a]	1.70×10^{-3}	α(K)=0.001461 *21*; α(L)=0.000190 *3*; α(M)=4.04×10^{-5} *6*; α(N+..)=1.057×10^{-5} *15* α(N)=9.12×10^{-6} *13*; α(O)=1.362×10^{-6} *19*; α(P)=8.42×10^{-8} *12* δ: <0.01 from $\gamma(\theta)$.
785.10 *7*	0.98 *7*	953.49	3/2$^{(+)}$	168.40	(5/2)$^-$	(E1)[a]	1.65×10^{-3}	α(K)=0.001415 *20*; α(L)=0.000184 *3*; α(M)=3.91×10^{-5} *6*;

$^{151}_{62}Sm_{89}$-18

$\gamma(^{151}Sm)$ (continued)

E_γ [†]	I_γ [‡e]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	δ[#]	α[@]	Comments
									α(N+..)=1.023×10^{-5} *15* α(N)=8.83×10^{-6} *13*; α(O)=1.319×10^{-6} *19*; α(P)=8.16×10^{-8} *12* δ: <0.07 from $\gamma(\theta)$.
[x]792.8 *7*	0.010 *7*								
795.74 *9*	0.26 *2*	964.24	5/2$^{(+)}$	168.40	(5/2)$^-$	(E1+M2)[a]	−0.17 *7*	0.0021 *5*	α(K)=0.0018 *4*; α(L)=0.00024 *6*; α(M)=5.1×10^{-5} *12*; α(N+..)=1.3×10^{-5} *3* α(N)=1.1×10^{-5} *3*; α(O)=1.7×10^{-6} *4*; α(P)=1.06×10^{-7} *25* δ: from $\gamma(\theta)$.
807.90 *6*	2.5 *2*	877.63	5/2$^{(+)}$	69.703	5/2$^-$	(E1)[a]		1.56×10^{-3}	α(K)=0.001337 *19*; α(L)=0.0001734 *25*; α(M)=3.69×10^{-5} *6*; α(N+..)=9.65×10^{-6} *14* α(N)=8.33×10^{-6} *12*; α(O)=1.245×10^{-6} *18*; α(P)=7.71×10^{-8} *11* δ: <0.07 from $\gamma(\theta)$.
811.8 *1*	0.30 *3*	877.63	5/2$^{(+)}$	65.823	7/2$^-$				
817.7 *2*	0.40 *15*	822.63	(3/2$^+$,5/2$^+$)	4.821	3/2$^-$				
817.7 *2*	0.75 *15*	887.32	(5/2$^-$,7/2)	69.703	5/2$^-$				
822.45 *11*	0.15 *4*	822.63	(3/2$^+$,5/2$^+$)	0.0	5/2$^-$				
848.65 *7*	1.25 *9*	953.49	3/2$^{(+)}$	104.833	3/2$^-$	(E1)[a]		1.41×10^{-3}	α(K)=0.001214 *17*; α(L)=0.0001570 *22*; α(M)=3.34×10^{-5} *5*; α(N+..)=8.75×10^{-6} *13* α(N)=7.55×10^{-6} *11*; α(O)=1.128×10^{-6} *16*; α(P)=7.01×10^{-8} *10* δ: <0.07 from $\gamma(\theta)$.
856.2 *3*	0.029 *5*	926.0	(5/2,7/2)	69.703	5/2$^-$				
859.8 *3*	0.037 *5*	926.0	(5/2,7/2)	65.823	7/2$^-$				
[x]867.1[g] *7*	0.013 *5*								
877.7 *1*	0.45 *4*	877.63	5/2$^{(+)}$	0.0	5/2$^-$	(E1)[a]		1.32×10^{-3}	α(K)=0.001137 *16*; α(L)=0.0001469 *21*; α(M)=3.12×10^{-5} *5*; α(N+..)=8.18×10^{-6} *12* α(N)=7.06×10^{-6} *10*; α(O)=1.055×10^{-6} *15*; α(P)=6.57×10^{-8} *10* δ: <0.1 from $\gamma(\theta)$.
883.68 *13*	0.20 *2*	953.49	3/2$^{(+)}$	69.703	5/2$^-$				
887.6 *6*	0.012 *4*	887.32	(5/2$^-$,7/2)	0.0	5/2$^-$				
894.1 *7*	0.012 *4*	964.24	5/2$^{(+)}$	69.703	5/2$^-$				
898.58 *12*	0.11 *1*	964.24	5/2$^{(+)}$	65.823	7/2$^-$				
[x]903.5 *5*	0.014 *4*								
[x]911.25[bg] *15*	0.114 *11*								
[x]919.3[g] *7*	0.008 *4*								
[x]922.1[g] *7*	0.006 *3*								
926.1 *5*	0.018 *3*	926.0	(5/2,7/2)	0.0	5/2$^-$				

$^{151}_{62}Sm_{89}$-19

^{151}Pm β^- decay (28.40 h) 1973Co29,1977Ho21,1964Be10 (continued)

$\gamma(^{151}Sm)$ (continued)

E_γ[†]	I_γ[‡e]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	α[@]	Comments
[x]933.9[bg] 5	0.017 3							
[x]939.8 5	0.017 4							
948.72 7	1.56 12	953.49	$3/2^{(+)}$	4.821	$3/2^-$	(E1)[a]	1.14×10^{-3}	α(K)=0.000979 14; α(L)=0.0001261 18; α(M)=2.68×10^{-5} 4; α(N+..)=7.02×10^{-6} 10 α(N)=6.06×10^{-6} 9; α(O)=9.07×10^{-7} 13; α(P)=5.67×10^{-8} 8 δ: <0.04 from $\gamma(\theta)$.
953.41 11	0.43 4	953.49	$3/2^{(+)}$	0.0	$5/2^-$	(E1)[a]	1.13×10^{-3}	α(K)=0.000970 14; α(L)=0.0001249 18; α(M)=2.65×10^{-5} 4; α(N+..)=6.96×10^{-6} 10 α(N)=6.00×10^{-6} 9; α(O)=8.98×10^{-7} 13; α(P)=5.61×10^{-8} 8 δ: <0.16 from $\gamma(\theta)$.
959.7 3	0.28 3	964.24	$5/2^{(+)}$	4.821	$3/2^-$			
964.4 4	0.021 4	964.24	$5/2^{(+)}$	0.0	$5/2^-$			
[x]968.9[bg] 2	0.065 7							
1012.2 5	0.016 4	1016.5	$(3/2^-,5/2,7/2^-)$	4.821	$3/2^-$			

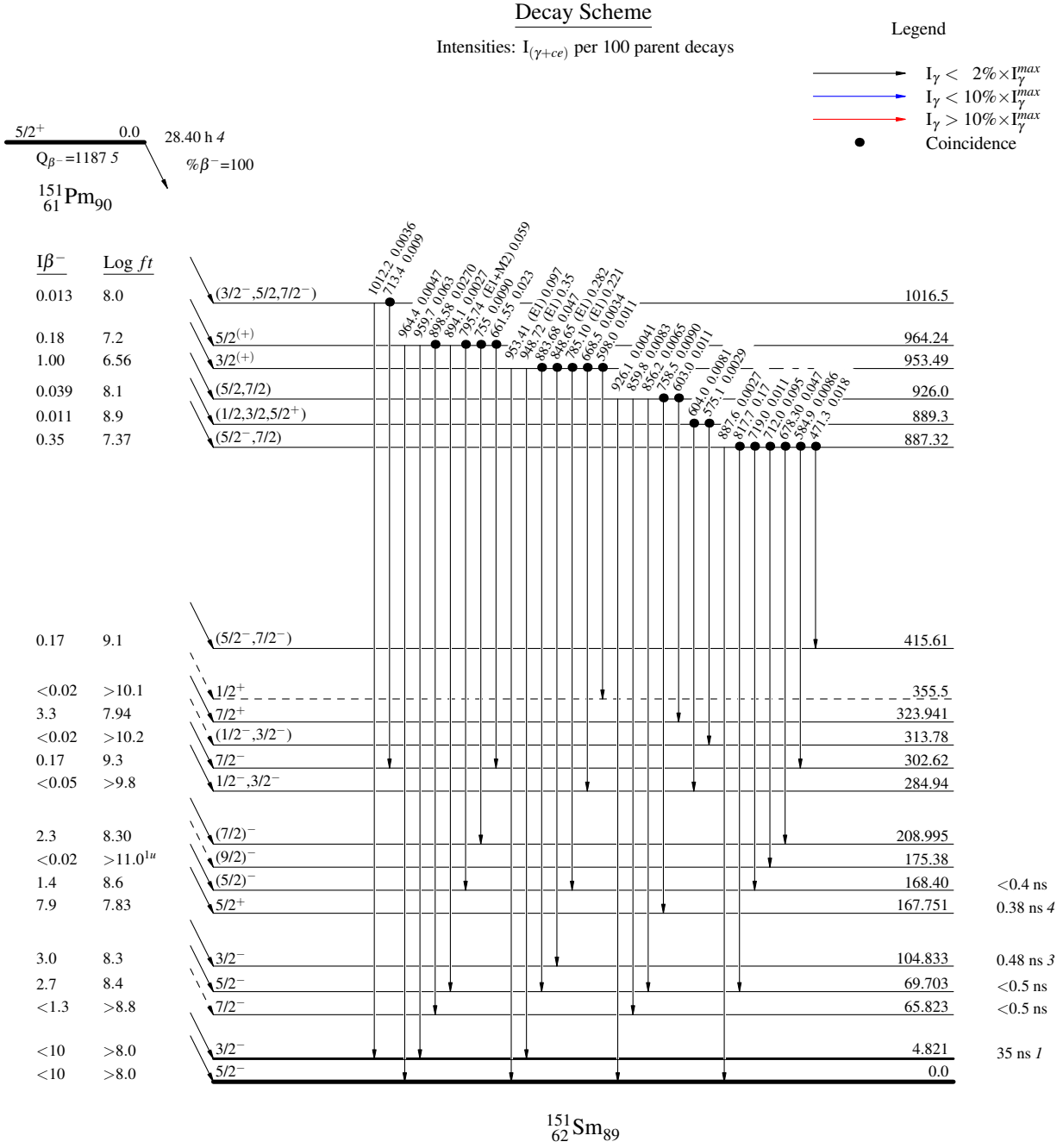
[†] Weighted average of 1973Co29 and 1977Ho21.
[‡] Unweighted average of 1973Co29 and 1977Ho21, except for closely spaced lines where values are from 1973Co29.
[#] From ce data and/or $\gamma\gamma(\theta)$ data.
[@] Theoretical values for assigned mult and δ (from BrIcc code). The experimental values deduced from Ice′s taken mainly from 1964Be10 and Iγ′s given here are given under comments. The uncertainties on these values are≈25% for strong lines and≈50% for weak lines. α′s are given for all transitions where expected to be>0.01.
[&] From ce data unless otherwise indicated. For purposes of normalization of the decay scheme, mult of several transitions have been assumed as E1, M1,E2 etc., based on adopted J^π′s.
[a] From $\gamma(\theta)$ data (1975Wa02).
[b] Probably from room background. Treated uncertain (evaluator).
[c] Observed in $\gamma\gamma$ only.
[d] From 1973Co29. 1977Ho21 give Iγ=0.54 4.
[e] For absolute intensity per 100 decays, multiply by 0.225 9.
[f] Multiply placed with intensity suitably divided.
[g] Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.

$^{151}_{62}Sm_{89}$-20

^{151}Pm β^- decay (28.40 h) 1973Co29,1977Ho21,1964Be10

Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays



^{151}Pm β^- decay (28.40 h) 1973Co29,1977Ho21,1964Be10

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays

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)
- Coincidence

$5/2^+$ 0.0 28.40 h *4*
Q_{β^-}=1187 *5* $\%\beta^-$=100
$^{151}_{61}Pm_{90}$

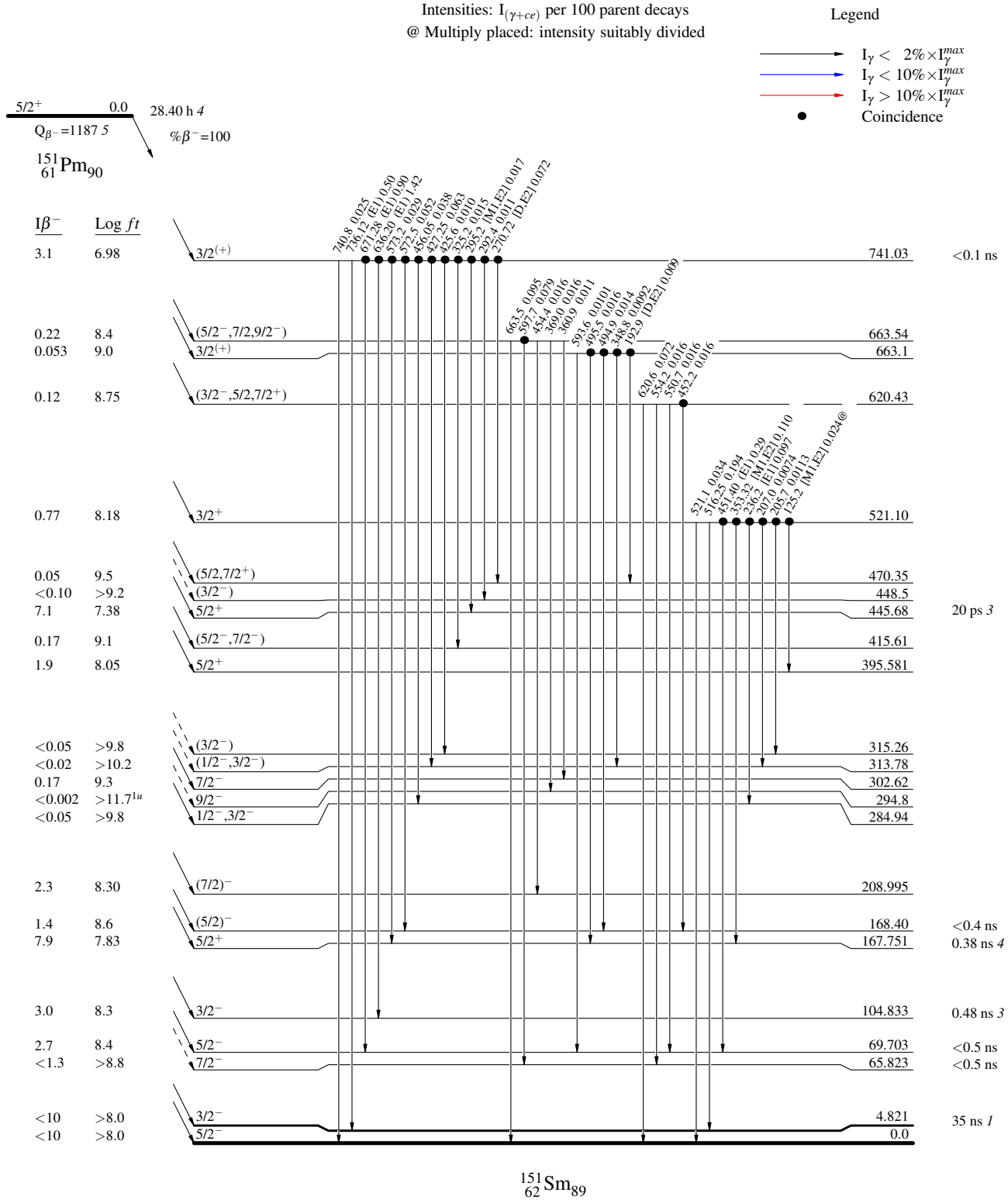
Iβ⁻	Log *ft*			
2.4	6.57	$5/2^{(+)}$	877.63	
<0.02	>8.8		851.6	
6.1	6.40	$(3/2^+,5/2^+)$	822.63	<0.1 ns
0.014	9.2	$(\leq 7/2)$	777.4	
1.14	7.31	$5/2^{(+)}$	773.98	
0.05	9.5	$(5/2,7/2^+)$	470.35	
<0.10	>9.2	$(3/2^-)$	448.5	
7.1	7.38	$5/2^+$	445.68	20 ps *3*
0.17	9.1	$(5/2^-,7/2^-)$	415.61	
42	6.80	$3/2^+$	344.909	9.3 ps *2*
<0.05	>9.8	$(3/2^-)$	315.26	
1.7	8.26	$3/2^+$	306.79	
0.17	9.3	$7/2^-$	302.62	
<0.05	>9.8	$1/2^-,3/2^-$	284.94	
2.3	8.30	$(7/2)^-$	208.995	
1.4	8.6	$(5/2)^-$	168.40	<0.4 ns
7.9	7.83	$5/2^+$	167.751	0.38 ns *4*
3.0	8.3	$3/2^-$	104.833	0.48 ns *3*
2.7	8.4	$5/2^-$	69.703	<0.5 ns
<1.3	>8.8	$7/2^-$	65.823	<0.5 ns
<10	>8.0	$3/2^-$	4.821	35 ns *1*
<10	>8.0	$5/2^-$	0.0	

$^{151}_{62}Sm_{89}$

^{151}Pm β^- decay (28.40 h) 1973Co29,1977Ho21,1964Be10

Decay Scheme (continued)

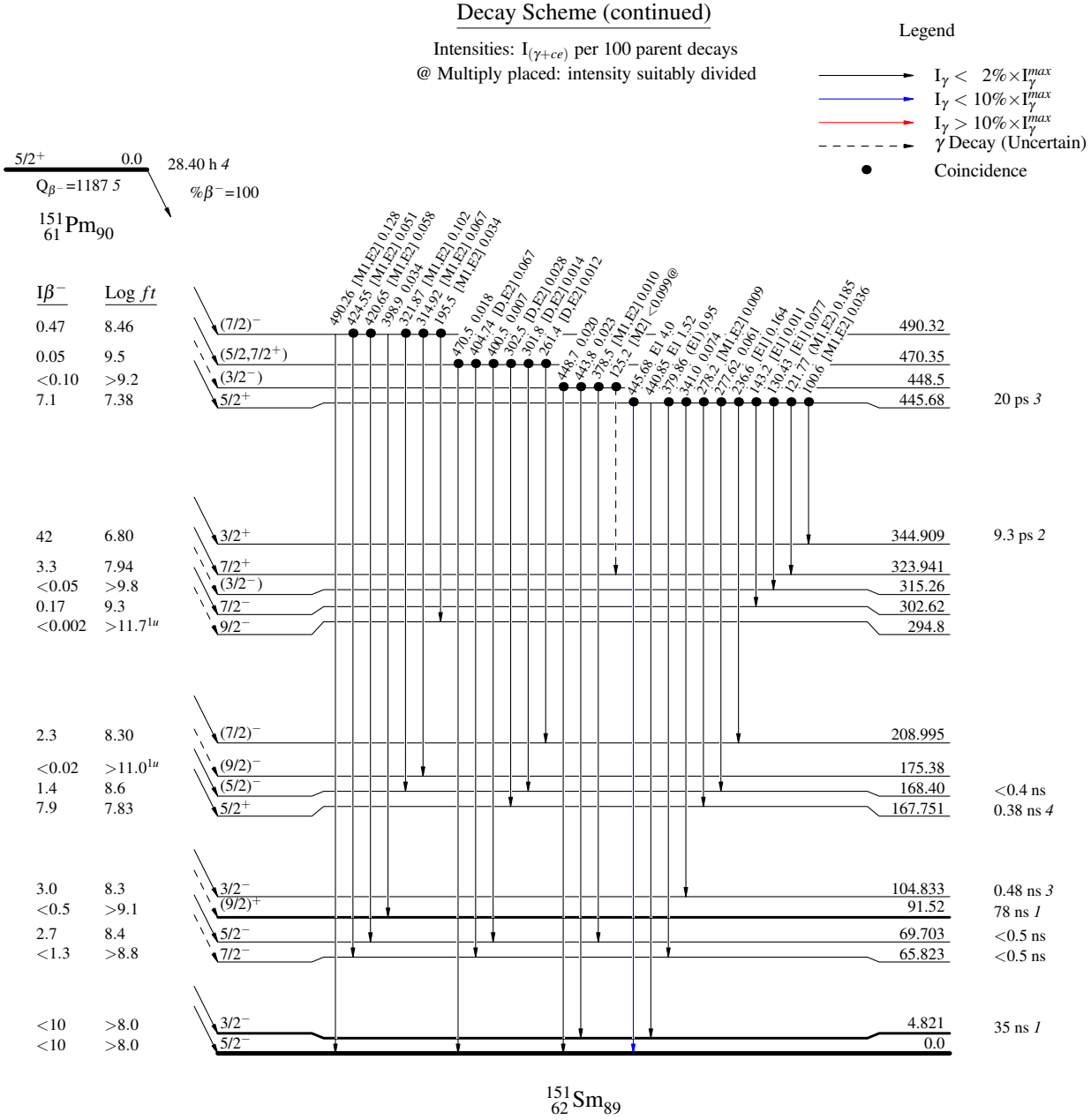
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
@ Multiply placed: intensity suitably divided



^{151}Pm β^- decay (28.40 h) 1973Co29,1977Ho21,1964Be10

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
@ Multiply placed: intensity suitably divided

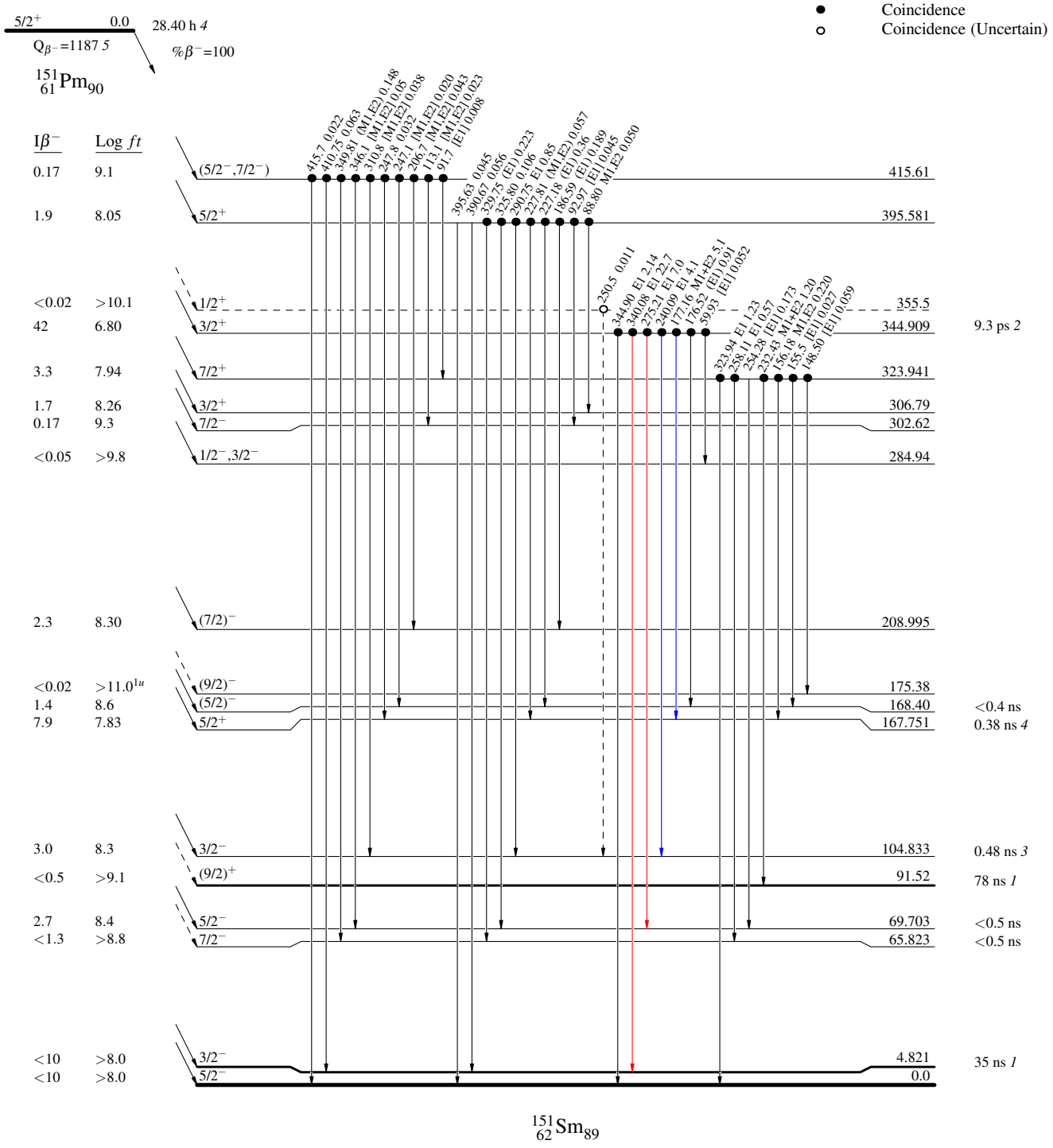


^{151}Pm β^- decay (28.40 h) 1973Co29,1977Ho21,1964Be10

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
@ 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)
- Coincidence
- Coincidence (Uncertain)

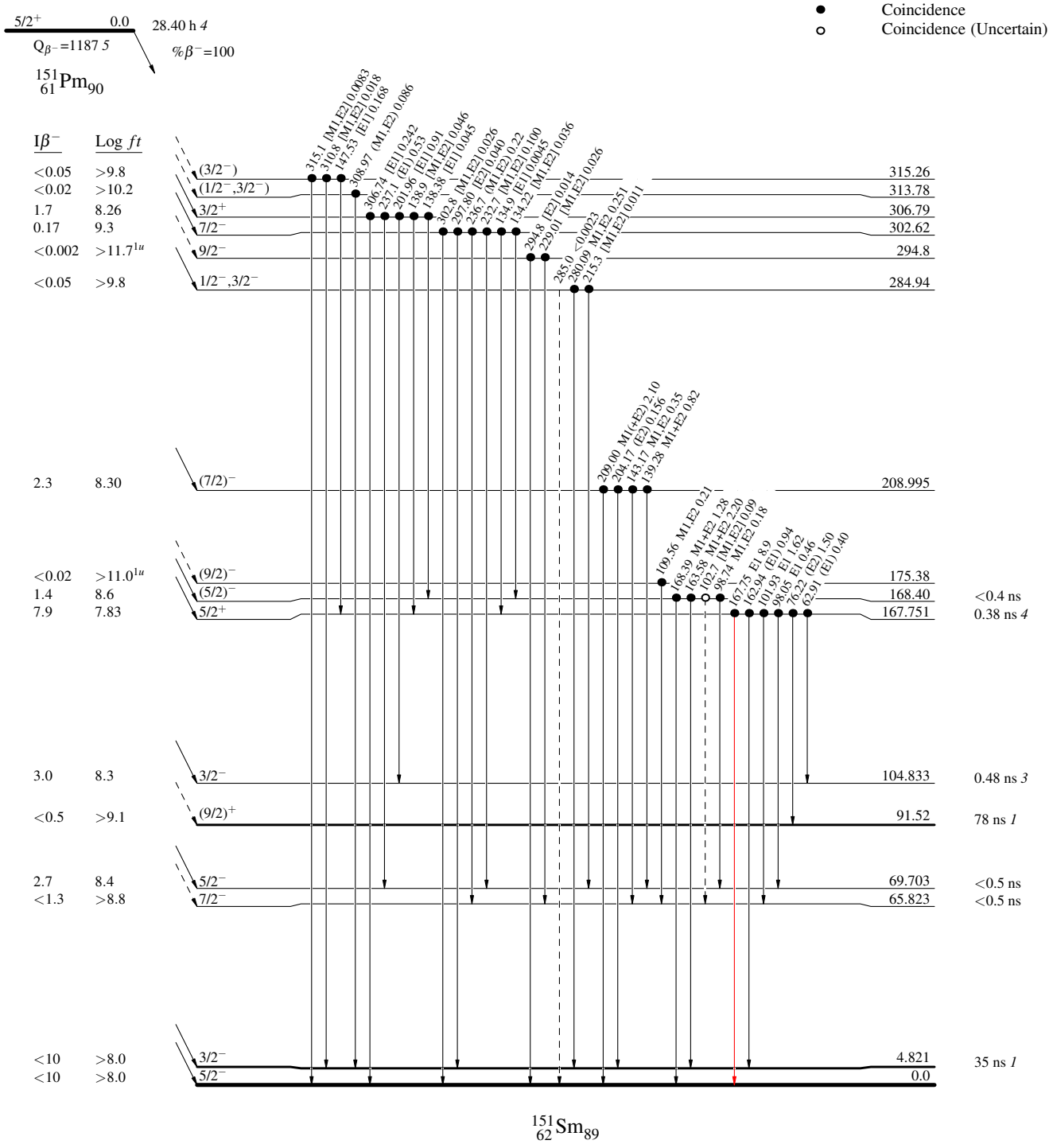


^{151}Pm β^- decay (28.40 h) 1973Co29,1977Ho21,1964Be10

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
@ 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)
- Coincidence
- Coincidence (Uncertain)



^{151}Pm β^- decay (28.40 h) 1973Co29,1977Ho21,1964Be10

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
@ Multiply placed: intensity suitably divided