^{149}Nd β^- decay (1.726 h) 1979Sc12,1986Ii01,2003Me01

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen	NDS 185, 2 (2022)	23-Aug-2022

Parent: ^{149}Nd: E=0.0; $J^\pi=5/2^-$; $T_{1/2}$=1.726 h *5*; Q(β^-)=1688.9 *25*; %β^- decay=100.0

^{149}Nd-J^π,$T_{1/2}$: From ^{149}Nd Adopted Levels.

^{149}Nd-Q(β^-): From 2021Wa16.

1979Sc12 (also 1979ScZL thesis): measured Eγ, Iγ, $\gamma\gamma$ at Lawrence Livermore National Laboratory (LLNL).

1986Ii01: measured γ, $\gamma\gamma$, $\gamma\gamma(\theta)$ at Kyoto University. γ-ray energies and intensities generally agree with those in 1979Sc12 and 1968He19. Authors report 199 γ rays, but energy and intensity uncertainties were not given.

2003Me01: measured Eγ, Iγ, $\gamma\gamma$ at Instituto De Pesquisas Energeticas e Nucleares, Sao Paulo (IPEN).

1966He04, 1968He19: measured Eγ, Iγ, $\gamma\gamma$-coin, β^-, level half-life by $\beta\gamma$(t), half-life of ^{149}Nd decay.

Other main references:

1997Gr09, 1996Gr20: total absorption γ ray spectra (TAGS); deduced direct β^- feedings.

1987Si13 (also 1989SiZQ): γ, $\gamma(\theta$,H,temp) on oriented nuclei. Orientation was done at <16° mK in gadolinium host nuclei. The 654γ was used for normalization for determination of the orientation parameter B_2. The A_4 terms were all zero within the statistical uncertainties. The A_2 values are given under comments.

1970Se11: $\gamma\gamma(\theta)$, γce(t), $\gamma\gamma(\theta$,H,t) (magnetic moments by DPAC method).

1970Be67: $\gamma\gamma(\theta$,H,t) (magnetic moments by IPAC method).

Others:

γ: 1976CoZJ, 1973St22, 1972De67, 1972BaZU, 1970SeZY, 1969Gr32, 1967He20, 1966He04, 1966Go17, 1966Go05, 1965Ni03, 1965Cu01, 1965Ch09.

ce: 1972BaZU.

β^-, $\beta\gamma$: 1964Go08, 1952Ru10.

$\gamma\gamma$: 1965Cu01, 1965Ch09.

$\gamma\gamma$(t): 1970Se11, 1969Ta08, 1968Az04, 1966Go05.

$\beta\gamma$(t): 1965Fo08, 1968Az04.

β ce(t): 1967Ba27.

γ ce(t): 1967Ba27, 1970Se11.

$\gamma\gamma(\theta)$: 1969Be25, 1966Go05, 1966Sv01, 1965Ch09.

$\gamma\gamma(\theta$,H,t): 1969Ta08, 1966Sv01, 1965Bo16.

$T_{1/2}$ and production of ^{149}Nd: 1990Ab02, 1981Di01, 1980GuZN, 1973St22, 1967Me19, 1966Ri03, 1966He04, 1965Fo08, 1964Go08, 1964Ho03, 1960Wi10, 1952Ru10, 1950Ma05, 1946Bo25, 1938Po05.

The level scheme is basically that of 1979Sc12 with some modifications as suggested by 1986Ii01 and 2003Me01.

Total decay energy deposit of 1736 keV *56* calculated by RADLIST code is in general agreement with expected value of 1688.9 keV *25* (2021Wa16), indicating the completeness of the decay scheme.

^{149}Pm Levels

E(level)†	J^π‡	$T_{1/2}$‡	Comments
0.0	$7/2^+$	53.08 h *9*	
114.313 *5*	$5/2^+$	2.53 ns *3*	E(level): 114.3534 *15* (2003Me01). $T_{1/2}$: weighted average of 2.54 ns *7* ($\gamma\gamma$(t),1970Se11); 2.42 ns *9* ($\gamma\gamma$(t),1969Ta08); 2.55 ns *5* ($\gamma\gamma$(t),$\beta\gamma$(t),1968Az04); 2.58 ns *7* (γce(t),1967Ba27); 2.4 ns *2* ($\gamma\gamma$(t), 1966Go05); 2.52 ns *4* ($\gamma\gamma$(t),1965Cu01); 2.62 ns *10* ($\beta\gamma$(t),1965Fo08). Other: 3.2 ns *1* (βce(t),1967Ba27) is not included in the average. g factor=0.83 *6* (1970Be67). Others: 0.81 *3*, 0.77 *7* (1970Se11), 1.01 *12* (1969Ta08), 0.91 *10* (1966Sv01).
188.631 *6*	$3/2^+$	3.27 ns *5*	E(level): 188.6796 *17* (2003Me01). $T_{1/2}$: weighted average of 3.24 ns *7* (γce(t),1970Se11); 3.24 ns *10* (βce(t),1967Ba27); 3.46 ns *14* ($\gamma\gamma$(t),1965Cu01). g factor=0.72 *10* (1970Be67), 1.5 *4* (1970Se11).
211.308 *5*	$5/2^+$	80 ps *15*	E(level): 211.3624 *15* (2003Me01). $T_{1/2}$: βce(t) (1967Ba27). Others: ≤0.8 ns ($\gamma\gamma$(t),1965Cu01); ≤0.3 ns ($\beta\gamma$(t),1965Fo08).

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^{149}Nd β^- decay (1.726 h) 1979Sc12,1986Ii01,2003Me01 (continued)

^{149}Pm Levels (continued)

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$[‡]	Comments
			g factor=0.87 *14* (1970Be67).
240.215 *7*	11/2$^-$	35 μs *3*	E(level): 240.3946 *19* (2003Me01). T$_{1/2}$: ceγ(t) (1967Ba27). Other: 41 μs *10* ($\beta\gamma$(t),1966He04).
270.170 *5*	7/2$^-$	2.59 ns *2*	E(level): 270.2069 *15* (2003Me01). T$_{1/2}$: weighted average of 2.55 ns *7* ($\gamma\gamma$(t),1970Se11); 2.64 ns *7* (βce(t),1967Ba27); 2.6 ns *2* ($\gamma\gamma$(t),1966Go05); 2.58 ns *4* ($\gamma\gamma$(t),1965Cu01), 2.7 ns *2* ($\beta\gamma$(t),1965Fo08). g factor=0.62 *3* (1970Be67); 0.98 *14*, 1.07 *7* (1970Se11).
288.208 *8*	9/2$^+$		E(level): 288.2274 *21* (2003Me01). J$^\pi$: M1+E2 γ to 7/2$^+$ gives 5/2$^+$,7/2$^+$,9/2$^+$ but 5/2$^+$,7/2$^+$ are excluded by (366γ)(288γ)(θ) (1986Ii01).
360.046 *9*	7/2$^+$		E(level): 360.139 *5* (2003Me01).
387.559 *10*	1/2$^+$	0.6 ns *1*	E(level): 387.609 *4* (2003Me01). T$_{1/2}$: βce(t) (1967Ba27).
396.774 *7*	5/2$^+$		E(level): 396.8556 *23* (2003Me01).
415.449 *9*	3/2$^+$		E(level): 415.559 *5* (2003Me01).
425.276 *7*	7/2$^+$		E(level): 425.2798 *22* (2003Me01). J$^\pi$: M1+E2 γ to 5/2$^+$ and γ to 9/2$^+$ give 5/2$^+$,7/2$^+$ but (229γ)(214γ)(θ) excludes 5/2$^+$ (1986Ii01).
462.191 *10*	3/2$^-$		E(level): 462.349 *3* (2003Me01).
515.645 *9*	(9/2)$^-$		E(level): 515.796 *4* (2003Me01).
537.863 *6*	5/2$^-$	≤50 ps	E(level): 537.9789 *20* (2003Me01). T$_{1/2}$: βce(t) (1967Ba27). Other: ≤0.5 ns ($\beta\gamma$(t),1965Cu01).
547.126 *13*	(5/2,7/2$^+$)		E(level): 547.076 *6* (2003Me01).
558.15 *5*	(9/2)$^+$		E(level): 556.233 *4*; 9/2$^+$ (2003Me01).
637.43?[#] *20*			E(level): 635.983 *25*; (3/2$^+$,5/2$^+$) (2003Me01). E(level): 635.97γ proposed from this level by 2003Me01 is a very poor fit. See comment for 635.7γ from 923.9 level.
651.021 *18*	(5/2$^+$)		E(level): 651.132 *6* (2003Me01).
654.843 *5*	7/2$^-$	≤0.18 ns	E(level): 654.9478 *23* (2003Me01). T$_{1/2}$: $\beta\gamma$(t) (1965Cu01,1966He04).
721.23? *11*	7/2$^+$		E(level): 721.93 *3* (2003Me01). E(level): from 1979ScZL, not given in 1979Sc12 and 1986Ii01.
744.579 *13*	(3/2,5/2$^+$)		E(level): 744.575 *6* (2003Me01).
750.41 *5*	(7/2$^-$,9/2$^+$)		E(level): 750.491 *15*; 7/2$^-$ (2003Me01).
758.67[@] *7*	(5/2$^+$,7/2,9/2$^+$)		E(level): 758.075 *19* (2003Me01).
768.188 *17*	(5/2,7/2$^+$)		E(level): 767.482 *12*; (5/2,7/2$^+$) (2003Me01).
786.72 *3*	(3/2$^+$,5/2$^+$)		E(level): 785.86 *3* (2003Me01).
872.94?[&] *8*			
884.89[@] *7*	(5/2$^+$)		E(level): 885.82 *14* (2003Me01).
923.886 *18*	(5/2$^+$,7/2)		E(level): 924.05 *21* (2003Me01).
942.926 *22*	(3/2$^+$,5/2,7/2$^+$)		E(level): 942.505 *20* (2003Me01).
956.87?[#] *7*			E(level): 956.83 *7*; 7/2$^+$ (2003Me01).
1031.68 *3*	(7/2$^+$)		E(level): 1031.75 *4* (2003Me01).
1043.39 *5*	(3/2$^+$,5/2,7/2)		E(level): 1043.69 *20* (2003Me01).
1050.18 *3*			E(level): 1049.655 *24*; (1/2$^+$,3/2,5/2$^+$) (2003Me01).
1141.528 *18*	5/2$^+$		E(level): 1141.67 *4* (2003Me01).
1156.034 *24*	(3/2$^+$,5/2,7/2$^+$)		E(level): 1156.971 *8* (2003Me01).
1181.30?[#] *7*			J$^\pi$: (3/2$^+$,5/2$^+$) (2003Me01).
1190.274 *17*	(5/2)		E(level): 1190.728 *7* (2003Me01).
1234.099 *9*	(7/2)		E(level): 1234.242 *6* (2003Me01).
1239.616 *21*	(5/2$^+$,7/2)		E(level): 1239.75 *3* (2003Me01).
1264.01 *6*	(5/2,7/2)		E(level): 1264.28 *5* (2003Me01).
1290.078 *25*	(3/2$^+$,5/2,7/2)		E(level): 1290.85 *22* (2003Me01).

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^{149}Nd β^- decay (1.726 h) 1979Sc12,1986Ii01,2003Me01 (continued)

^{149}Pm Levels (continued)

E(level)[†]	Jπ[‡]	Comments
1293.4?[#] *4*		Jπ: (3/2+,5/2,7/2).
1312.106 *15*	(5/2)	E(level): 1312.506 *20* (2003Me01).
1328.81?[#] *7*		Jπ: 3/2+ (2003Me01).
1363.85?[#] *4*		Jπ: 5/2+ (2003Me01).
1367.97?[#] *13*		Jπ: (5/2+,7/2,9/2).
1394.25[@] *20*	3/2+	E(level): 1391.691 *6*; (5/2+,7/2+) (2003Me01).
1406.84?[#] *8*		Jπ: 9/2− (2003Me01).
1412.10 *4*	(5/2,7/2)	E(level): 1411.89 *3*; 7/2− (2003Me01).
1448.24 *7*	(3/2+,5/2,7/2+)	E(level): 1449.250 *23* (2003Me01).
1495.86 *5*	(5/2,7/2+)	E(level): 1495.19 *11* (2003Me01).
1568.60 *5*	(5/2+,7/2)	E(level): 1568.63 *6* (2003Me01).

[†] From least-squares fit to Eγ data, assuming ΔEγ=0.2 keV, when not stated. With the quoted uncertainties, 13 γ rays from levels above 745 keV fitted poorly, with a resultant reduced χ^2=4.5 as compared to critical χ^2 of 1.3. Uncertainties for such γ rays were doubled (generally from 0.05 keV to 0.10 keV) in the least-squares fitting procedure. Exception was 750.63γ from 750-keV level, where uncertainty was increased to 0.2 keV from the quoted 0.05 keV. With the adjustment of uncertainties, reduced χ^2 is 1.6, and only three γ rays out of a total of 227 γ rays fit somewhat poorly.
[‡] From the Adopted Levels.
[#] Level proposed by 2003Me01 only is treated as uncertain by the evaluators, and is not included in the Adopted Levels.
[@] Level not reported by 1986Ii01.
[&] Level from 1986Ii01 only.

β^- radiations

E(decay)	E(level)	Iβ−[†‡]	Log *ft*	Comments
(120 *3*)	1568.60	0.018 *3*	6.2 *1*	av Eβ=31.73 *70* Iβ−: 0.045 (TAGS,1997Gr09), 0.063 (2003Me01).
(193 *3*)	1495.86	0.010 *2*	7.1 *1*	av Eβ=52.54 *74* Iβ−: 0.059 (TAGS,1997Gr09), 0.014 (2003Me01).
(241 *3*)	1448.24	0.0047 *9*	7.7 *1*	av Eβ=66.79 *77* Iβ−: 0.020 (TAGS,1997Gr09), 0.067 (2003Me01).
(277 *3*)	1412.10	0.032 *8*	7.1 *1*	av Eβ=77.91 *78* Iβ−: 0.046 (TAGS,1997Gr09), 0.110 (2003Me01).
(282[#] *3*)	1406.84?	0.035 *3*	7.04 *4*	av Eβ=79.55 *80* Iβ−: 0.049 (2003Me01).
(295 *3*)	1394.25	0.016 *6*	7.4 *2*	av Eβ=83.49 *79* Iβ−: 0.023 (TAGS,1997Gr09), 0.101 (2003Me01).
(321[#] *3*)	1367.97?	0.016 *13*	7.6 *4*	av Eβ=91.83 *80* Iβ−: 0.022 (2003Me01).
(325[#] *3*)	1363.85?	0.024 *3*	7.40 *6*	av Eβ=93.15 *81* Iβ−: 0.068 (2003Me01).
(360[#] *3*)	1328.81?	0.034 *4*	7.40 *6*	av Eβ=104.48 *82* Iβ−: 0.039 (2003Me01).
(377 *3*)	1312.106	0.183 *13*	6.73 *4*	av Eβ=109.96 *83* Iβ−: 0.17 (TAGS,1997Gr09), 0.273 (2003Me01).
(396[#] *3*)	1293.4?	0.018 *8*	7.8 *2*	av Eβ=116.16 *85* Iβ−: 0.0025 (2003Me01).
(399 *3*)	1290.078	0.090 *8*	7.12 *4*	av Eβ=117.27 *84*

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^{149}Nd β^- decay (1.726 h) 1979Sc12,1986Ii01,2003Me01 (continued)

β^- radiations (continued)

E(decay)	E(level)	Iβ^{-}[†‡]	Log *ft*	Comments
				Iβ^-: 0.083 (TAGS,1997Gr09), 0.107 (2003Me01).
(425 *3*)	1264.01	0.035 *4*	7.62 *5*	av Eβ=126.00 *85*
				Iβ^-: 0.032 (TAGS,1997Gr09), 0.058 (2003Me01).
(449 *3*)	1239.616	0.10 *1*	7.25 *5*	av Eβ=134.28 *86*
				Iβ^-: 0.092 (TAGS,1997Gr09), 0.16 (2003Me01).
(455 *3*)	1234.099	0.94 *4*	6.29 *2*	av Eβ=136.16 *86*
				Iβ^-: 0.87 (TAGS,1997Gr09), 1.58 (2003Me01).
(499 *3*)	1190.274	0.16 *1*	7.19 *3*	av Eβ=151.30 *88*
				Iβ^-: 0.14 (TAGS,1997Gr09), 1.06 (2003Me01).
(508[#] *3*)	1181.30?	0.094 *5*	7.45 *3*	av Eβ=154.44 *88*
				Iβ^-: 0.11 (2003Me01).
(533 *3*)	1156.034	0.031 *2*	8.00 *3*	av Eβ=163.33 *89*
				Iβ^-: 0.055 (TAGS,1997Gr09), 0.44 (2003Me01).
(547 *3*)	1141.528	0.086 *6*	7.60 *4*	av Eβ=168.47 *89*
				Iβ^-: 0.15 (TAGS,1997Gr09), 0.052 (2003Me01).
(639 *3*)	1050.18	0.022 *2*	8.42 *4*	av Eβ=201.49 *92*
				Iβ^-: 0.036 (TAGS,1997Gr09), 0.16 (2003Me01).
(646 *3*)	1043.39	0.036 *5*	8.22 *6*	av Eβ=203.99 *92*
				Iβ^-: 0.068 (TAGS,1997Gr09), 0.019 (2003Me01).
(657 *3*)	1031.68	0.10 *1*	7.81 *5*	av Eβ=208.31 *93*
				Iβ^-: 0.19 (TAGS,1997Gr09), 0.090 (2003Me01).
(732[#] *3*)	956.87?	<0.01	>9.0	av Eβ=236.26 *95*
(746 *3*)	942.926	0.081 *10*	8.09 *6*	av Eβ=241.54 *95*
				Iβ^-: 0.088 (TAGS,1997Gr09), 0.57 (2003Me01).
(765 *3*)	923.886	0.30 *2*	7.56 *3*	av Eβ=248.78 *96*
				Iβ^-: 0.33 (TAGS,1997Gr09), 0.24 (2003Me01).
(804 *3*)	884.89	0.011 *3*	9.1 *1*	av Eβ=263.72 *97*
				Iβ^-: 0.012 (TAGS,1997Gr09).
				Additional information 1.
(816 *3*)	872.94?	0.028 *6*	8.7 *1*	av Eβ=268.33 *97*
				Iβ^-: 0.031 (TAGS,1997Gr09).
(902 *3*)	786.72	0.074 *8*	8.42 *5*	av Eβ=301.96 *99*
				Iβ^-: 0.077 (TAGS,1997Gr09), 0.049 (2003Me01).
(921 *3*)	768.188	0.66 *6*	7.51 *4*	av Eβ=309.28 *99*
				Iβ^-: 0.69 (TAGS,1997Gr09), 1.08 (2003Me01).
(930 *3*)	758.67	0.036 *8*	8.8 *1*	av Eβ=313.0 *10*
				Iβ^-: 0.038 (TAGS,1997Gr09), 0.24 (2003Me01).
(938 *3*)	750.41	0.08 *2*	8.5 *1*	av Eβ=316.3 *10*
				Iβ^-: 0.074 (TAGS,1997Gr09), 0.34 (2003Me01).
(944 *3*)	744.579	1.11 *5*	7.32 *2*	av Eβ=318.6 *10*
				E(decay): 920 ($\beta\gamma$,1966He04), 950 (1952Ru10).
				Iβ^-: 1.16 (TAGS,1997Gr09), 1.98 (2003Me01).
(968[#] *3*)	721.23?	<0.01	>9.4	av Eβ=327.9 *10*
				Iβ^-: 0 (TAGS,1997Gr09), 0.167 (2003Me01).
(1034 *3*)	654.843	19.3 *8*	6.22 *2*	av Eβ=354.6 *11*
				E(decay): 1025 *20* (1964Go08); 1000, 1020 ($\beta\gamma$,1966He04).
				Iβ^-: 17.2 (TAGS,1997Gr09), 30 (1964Go08), 23.9 (2003Me01).
(1038 *3*)	651.021	0.30 *5*	8.0 *1*	av Eβ=356.2 *11*
				Iβ^-: 0.27 (TAGS,1997Gr09), 0.12 (2003Me01).
(1051[#] *3*)	637.43?	<0.01	>9.5	av Eβ=361.7 *11*
(1131[#] *3*)	558.15	<0.02	>9.3	av Eβ=394.0 *11*
				Iβ^-: 0 (TAGS,1997Gr09), 0.70 (2003Me01).
(1142[#] *3*)	547.126	<0.14	>8.5	av Eβ=398.6 *11*
				Iβ^-: 0 (TAGS,1997Gr09), 0.25 (2003Me01).
(1151 *3*)	537.863	21.5 *9*	6.35 *2*	av Eβ=402.4 *11*

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^{149}Nd β^- decay (1.726 h) 1979Sc12,1986Ii01,2003Me01 (continued)

β^- radiations (continued)

E(decay)	E(level)	Iβ^-[†‡]	Log *ft*	Comments
				E(decay): 1130 *20* (1964Go08); 1100, 1120, 1130 ($\beta\gamma$,1966He04), 1100 (1952Ru10). Iβ^-: 20.6 (TAGS,1997Gr09), 26 (1964Go08), 23.8 (2003Me01).
(1173[#] *3*)	515.645	<0.15	>8.5	av Eβ=411.5 *11* Iβ^-: 0 (TAGS,1997Gr09), 0.45 (2003Me01).
(1227 *3*)	462.191	1.2 *3*	7.7 *1*	av Eβ=433.7 *11* Iβ^-: 1.6 (TAGS,1997Gr09), 1.13 (2003Me01).
(1264 *3*)	425.276	0.61 *9*	8.1 *1*	av Eβ=449.1 *11* Iβ^-: 0.78 (TAGS,1997Gr09), 1.20 (2003Me01).
(1273 *3*)	415.449	0.16 *3*	8.6 *1*	av Eβ=453.2 *11* Iβ^-: 0.21 (TAGS,1997Gr09); 0.26 (2003Me01).
(1292 *3*)	396.774	3.31 *12*	7.34 *2*	av Eβ=461.1 *11* E(decay): 1300 (β(185γ),1966He04). Iβ^-: 4.3 (TAGS,1997Gr09), 2.19 (2003Me01).
(1301[#] *3*)	387.559	<0.6	>8.8[1*u*]	av Eβ=469.8 *10* Iβ^-: 0 (TAGS,1997Gr09), 0.037 (2003Me01).
(1329[#] *3*)	360.046	<0.2	>8.6	av Eβ=476.5 *11* Iβ^-: 0 (TAGS,1997Gr09), 0.63 (2003Me01).
(1401[#] *3*)	288.208	<0.02	>10.5[1*u*]	av Eβ=510.1 *11* Iβ^-: 0 (TAGS,1997Gr09), 0.025 (2003Me01).
(1419 *3*)	270.170	17.5 *18*	6.78 *5*	av Eβ=514.6 *11* E(decay): 1425 *20* (1964Go08); 1360, 1400 from $\beta\gamma$ (1966He04). Iβ^-: 16.7 (TAGS,1997Gr09), 38 (1964Go08), 12.2 (2003Me01).
(1478 *3*)	211.308	24.7 *16*	6.70 *3*	av Eβ=539.7 *11* E(decay): 1450 *20* ($\beta\gamma$,1964Go08), 1470 ($\beta\gamma$,1966He04). Iβ^-: 23.5 (TAGS,1997Gr09), 20.4 (2003Me01).
(1500[#] *3*)	188.631	<2.7	>7.7	av Eβ=549.4 *11* Iβ^-: 0 (TAGS,1997Gr09).
(1575 *3*)	114.313	6 *3*	7.4 *2*	av Eβ=581.4 *11* E(decay): 1555 *10* (1964Go08), 1560 (1966He04), 1500 (1952Ru10,1950Ma05), 1600 (1946Bo25). Iβ^-: 7.6 (TAGS,1997Gr09), 6 (1964Go08), 2.71 (2003Me01).
(1688.9[#] *25*)	0.0	<5	>7.6	av Eβ=631.1 *11* Iβ^-: 2.8 *44* (tags data,1997Gr09,1996Gr20).

[†] From γ-ray intensity balance. The values agree well with those from TAGS data of 1997Gr09. 2003Me01 quote following β^- feedings for some of the levels where no feedings are found from γ-ray intensity balance based on level scheme and Iγ data adopted here: 0.52 for 240 level; 0.031 for 636 level; 0.014 for 957 level.

[‡] Absolute intensity per 100 decays.

[#] Existence of this branch is questionable.

^{149}Nd β^- decay (1.726 h) 1979Sc12,1986Ii01,2003Me01 (continued)

$\gamma(^{149}Pm)$

Iγ normalization: from Σ(I(γ+ce) of γ rays to g.s.)=100, with no β^- feeding to the g.s., consistent with results of TAGS data (1997Gr09,1996Gr20) giving Iβ(to g.s.)=2.8 *44*. If all the unplaced γ intensities were assumed to feed the g.s., Iγ normalization would only be reduced by 0.12%. 1966He04 report Iγ(654γ)=8.4% *5* from 4πβγ which leads to Σ(I(γ+ce) to g.s.)=106% *8* consistent with assumption of Iβ(g.s.)=0. This value of Iγ normalization gives absolute intensities which are in good agreement with those given by 1969Gr32 for selected γ rays.

The Eγ and Iγ data from 2003Me01 are not used in averaging Eγ and Iγ values, since the spectra presented in this paper seem to contain large contributions either from background peaks or from other contaminants. Several strong γ rays reported in this paper are not seen in earlier papers (1979Sc12,1986Ii01,1968He19). Moreover, within the quoted uncertainties for Eγ values, many γ-ray energies do not agree well with level-energy differences; deviations being many times the quoted uncertainties. Thus there is a problem of internal consistency of level scheme in this paper. Only some of the weak transitions from 2003Me01 are tentatively incorporated in the level scheme given here. Eγ and Iγ data from 2003Me01 are listed in comments.

E_γ[‡]	I_γ[#k]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	α[l]	Comments
22.7[h]	0.021[&] *6*	211.308	5/2$^+$	188.631	3/2$^+$	[M1]	18.20 *25*	%Iγ=0.0055 *16* α(L)=14.33 *20*; α(M)=3.06 *4* α(N)=0.690 *10*; α(O)=0.1037 *15*; α(P)=0.00649 *9* I_γ: 0.06 (1986Ii01). δ: <1.0 for a non-negative β feed to 188 level.
[x]26.394[j] *22*								
30.00[@h] *3*	0.067 *17*	270.170	7/2$^-$	240.215	11/2$^-$	(E2)	341	%Iγ=0.017 *4* α(L)=265 *4*; α(M)=61.0 *9* α(N)=13.17 *20*; α(O)=1.619 *24*; α(P)=0.000551 *8* Eγ=30.077 *26* (2003Me01). δ(E2/M1)>0.7 from L1/L3<0.076 and L2/L3=0.8 *+3−2*, but E2 required from level scheme.
[x]33.964[j] *16*								
36.7[he]	0.07[&] *3*	396.774	5/2$^+$	360.046	7/2$^+$	[M1]	4.38 *6*	%Iγ=0.018 *8* α(L)=3.45 *5*; α(M)=0.737 *10* α(N)=0.1661 *23*; α(O)=0.02499 *35*; α(P)=0.001567 *22* δ: <0.56 for a non-negative β feed to the 360 level.
[x]39.065[j] *9*								
[x]44.341[j] *14*								
[x]58.526[j] *11*	5.47 *9*							%Iγ=1.42 *5*
58.883 *20*	5.0 *8*	270.170	7/2$^-$	211.308	5/2$^+$	[E1]	1.110 *16*	%Iγ=1.30 *21* α(K)=0.925 *13*; α(L)=0.1465 *21*; α(M)=0.0312 *4* α(N)=0.00686 *10*; α(O)=0.000949 *13*; α(P)=4.22×10^{-5} *6* E_γ: from 1968He19. Eγ=59.652 *8*, Iγ=7.66 *13* (2003Me01). (59γ)(211γ)(θ): A_2=−0.02 *3*, A_4=−0.01 *4* (1986Ii01).
65.23[f]	0.06[a] *2*	425.276	7/2$^+$	360.046	7/2$^+$	[M1,E2]	8.2 *29*	%Iγ=0.016 *5*

^{149}Nd β^- decay (1.726 h) 1979Sc12,1986Ii01,2003Me01 (continued)

$\gamma(^{149}Pm)$ (continued)

E_γ[‡]	I_γ[#k]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	δ[†]	α[l]	Comments
									α(K)=3.9 *6*; α(L)=3.3 *27*; α(M)=0.8 *6* α(N)=0.17 *14*; α(O)=0.021 *17*; α(P)=2.2×10^{-4} *7* Eγ=65.792 *8*, Iγ=0.34 *4* (2003Me01).
65.42[h f]	0.12[a] *4*	462.191	3/2$^-$	396.774	5/2$^+$	[E1]		0.840 *12*	%Iγ=0.031 *10* α(K)=0.703 *10*; α(L)=0.1088 *15*; α(M)=0.02317 *32* α(N)=0.00510 *7*; α(O)=0.000710 *10*; α(P)=3.25×10^{-5} *5* Eγ: other: 65.356 *24* (1968He19) for doublet.
[x]67.20[j] *19*	0.17 *4*								%Iγ=0.044 *10*
[x]69.510[j] *21*	0.25 *3*								%Iγ=0.065 *8*
[x]72.753[j] *12*	2.30 *5*								%Iγ=0.597 *22*
74.32[@] *3*	4.3 *9*	188.631	3/2$^+$	114.313	5/2$^+$	M1+E2	+0.71 *6*	4.68 *14*	%Iγ=1.12 *24* α(K)=2.91 *5*; α(L)=1.38 *11*; α(M)=0.313 *25* α(N)=0.069 *6*; α(O)=0.0090 *7*; α(P)=0.000168 *4* Eγ=74.932 *4*, Iγ=12.45 *10* (2003Me01). δ: from L2/L1=1.6 *3* and L3/L1=1.5 *2*. Other: >+0.1 ($\gamma\gamma(\theta)$,1986Ii01).
74.66[@] *10*	3.8 *6*	462.191	3/2$^-$	387.559	1/2$^+$	E1		0.590 *9*	%Iγ=0.99 *16* α(K)=0.495 *7*; α(L)=0.0748 *11*; α(M)=0.01593 *23* α(N)=0.00351 *5*; α(O)=0.000494 *7*; α(P)=2.334×10^{-5} *34* Eγ=74.932 *4*, Iγ=12.45 *10* (2003Me01). δ(M2/E1)<0.09 from α(K)exp=0.5 *3*.
75.69[h] *6*	0.88 *8*	537.863	5/2$^-$	462.191	3/2$^-$	M1(+E2)	<0.8	4.0 *6*	%Iγ=0.229 *22* α(K)=2.84 *10*; α(L)=0.9 *5*; α(M)=0.21 *12* α(N)=0.045 *25*; α(O)=0.0061 *31*; α(P)=0.000172 *17* δ: from α(K)exp=4.0 *12*.
[x]77.097[j] *10*	2.35 *5*								%Iγ=0.610 *23*
[x]80.305[j] *10*	1.74 *3*								%Iγ=0.452 *16*
[x]90.12[j] *5*	0.199 *11*								%Iγ=0.0517 *33* Proposed placement (2003Me01): 515.8 − 425.3. Poor fit (evaluators).
[x]91.125[d] *22*									
[x]92.89[j] *3*	0.216 *13*								%Iγ=0.056 *4*
[x]94.88[e] *10*	0.16 *5*								%Iγ=0.042 *13*
96.9	0.13[a] *5*	654.843	7/2$^-$	558.15	(9/2)$^+$	[E1]		0.291 *4*	%Iγ=0.034 *13* α(K)=0.2460 *34*; α(L)=0.0358 *5*; α(M)=0.00761 *11* α(N)=0.001685 *24*; α(O)=0.0002403 *34*; α(P)=1.203×10^{-5} *17* Eγ=96.3 *3*, Iγ=0.18 *11* (2003Me01).
97.001 *12*	5.6[a] *4*	211.308	5/2$^+$	114.313	5/2$^+$	M1(+E2)	+0.09 *9*	1.696 *31*	%Iγ=1.45 *11* α(K)=1.432 *20*; α(L)=0.207 *18*; α(M)=0.044 *4* α(N)=0.0100 *9*; α(O)=0.00150 *11*; α(P)=9.19×10^{-5} *15*

^{149}Nd β^- decay (1.726 h) 1979Sc12,1986Ii01,2003Me01 (continued)

$\gamma(^{149}Pm)$ (continued)

E_γ[‡]	I_γ[#k]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	δ[†]	α[l]	Comments
									Eγ=97.354 *17*, Iγ=4.414 *4* (2003Me01). δ: from γγ(θ) (1986Ii01). γγ(θ) also gives −1.3 *3* but is inconsistent with <0.14 from α(K)exp=1.8 *4* and K/L=8.8 *22*.
107.79 *3*	0.33 *6*	654.843	7/2−	547.126	(5/2,7/2+)	[D,E2]		1.0 *8*	%Iγ=0.086 *16* Eγ=108.189 *14*, Iγ=0.54 *4* (2003Me01).
112.52[h] *4*	0.46 *6*	537.863	5/2−	425.276	7/2+	[E1]		0.1939 *27*	%Iγ=0.119 *16* α(K)=0.1641 *23*; α(L)=0.02349 *33*; α(M)=0.00499 *7* α(N)=0.001108 *16*; α(O)=0.0001590 *22*; α(P)=8.20×10^{-6} *11*
114.314 *11*	74 *5*	114.313	5/2+	0.0	7/2+	M1+E2	+0.16 *2*	1.065 *15*	%Iγ=19.2 *8* α(K)=0.895 *13*; α(L)=0.1340 *28*; α(M)=0.0288 *6* α(N)=0.00647 *14*; α(O)=0.000964 *19*; α(P)=5.71×10^{-5} *8* Eγ=114.066 *11*, Iγ=65.13 *7* (2003Me01). δ: average of 0.180 *24* from L1/L2=8.5 *20* and L1/L3=14.5 *30* and +0.14 *5* from A_2=0.30 *4* in γ(θ) (1987Si13).
116.930 *24*	0.42 *12*	654.843	7/2−	537.863	5/2−	M1+E2	0.5 *+11−3*	1.05 *16*	%Iγ=0.109 *31* α(K)=0.83 *4*; α(L)=0.18 *15*; α(M)=0.04 *4* α(N)=0.009 *8*; α(O)=0.0012 *9*; α(P)=5.0×10^{-5} *10* Eγ=117.088 *8*, Iγ=0.809 *7* (2003Me01). δ: from K/L=4.5 *2* and α(K)exp=0.8 *3*.
122.415 *13*	0.99 *6*	537.863	5/2−	415.449	3/2+	E1		0.1540 *22*	%Iγ=0.257 *17* α(K)=0.1305 *18*; α(L)=0.01854 *26*; α(M)=0.00394 *6* α(N)=0.000875 *12*; α(O)=0.0001260 *18*; α(P)=6.59×10^{-6} *9* Eγ=122.689 *8*, Iγ=0.826 *4* (2003Me01). δ(M2/E1)<0.1 from α(K)exp=0.15 *4*.
126.630 *18*	0.43 *3*	396.774	5/2+	270.170	7/2−	E1		0.1404 *20*	%Iγ=0.112 *8* α(N)=0.000796 *11*; α(O)=0.0001148 *16*; α(P)=6.04×10^{-6} *8* α(K)=0.1191 *17*; α(L)=0.01686 *24*; α(M)=0.00358 *5* Eγ=126.513 *17*, Iγ=0.303 *23* (2003Me01). δ(M2/E1)<0.095 from α(K)exp=0.10 *7*.
131.7[gh]	0.017[g]	547.126	(5/2,7/2+)	415.449	3/2+				%Iγ=0.00441 *13*
137.05 *3*	0.24 *2*	425.276	7/2+	288.208	9/2+	[M1,E2]		0.69 *5*	%Iγ=0.062 *6* α(K)=0.506 *32*; α(L)=0.14 *7*; α(M)=0.031 *15* α(N)=0.0069 *33*; α(O)=9.E−4 *4*; α(P)=2.8×10^{-5} *6* Eγ=137.288 *20*, Iγ=0.514 *4* (2003Me01).
139.210 *12*	1.96 *9*	654.843	7/2−	515.645	(9/2)−	(M1+E2)	+3 *3*	0.69 *9*	%Iγ=0.509 *28* α(N)=0.009 *5*; α(O)=0.0012 *7*; α(P)=2.2×10^{-5} *11* α(K)=0.46 *6*; α(L)=0.18 *11*; α(M)=0.041 *26* Eγ=139.357 *7*, Iγ=2.33 *8* (2003Me01).

$^{149}_{61}Pm_{88}$-8

^{149}Nd β^- decay (1.726 h) 1979Sc12,1986Ii01,2003Me01 (continued)

$\gamma(^{149}Pm)$ (continued)

E_γ [‡]	I_γ [#k]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [†]	α [l]	Comments
								ce(K) not reported by 1967Ba27 although peak should have been prominent in the electron spectrum. K conversion line reported by 1966He04 but no intensity given. δ: from A_2=0.34 *6*, A_4=−0.03 *11* for (139γ)(245γ)(θ) and A_2=0.21 *2*, A_4=−0.03 *3* for (139γ)(275γ)(θ) (1986Ii01).
141.06 *7*	0.15 *1*	537.863	5/2$^-$	396.774	5/2$^+$	[E1]	0.1046 *15*	%Iγ=0.0390 *29* α(K)=0.0888 *12*; α(L)=0.01247 *18*; α(M)=0.00265 *4* α(N)=0.000589 *8*; α(O)=8.53×10^{-5} *12*; α(P)=4.57×10^{-6} *6* Eγ=140.93 *5*, Iγ=0.50 *3* (2003Me01).
155.1[e]	0.13[a] *6*	425.276	7/2$^+$	270.170	7/2$^-$	[E1]	0.0808 *11*	%Iγ=0.034 *16* α(K)=0.0687 *10*; α(L)=0.00957 *13*; α(M)=0.002033 *28* α(N)=0.000453 *6*; α(O)=6.58×10^{-5} *9*; α(P)=3.58×10^{-6} *5* Eγ=154.74 *6*, Iγ=0.45 *3* (2003Me01).
155.873 *9*	22.9[a] *8*	270.170	7/2$^-$	114.313	5/2$^+$	E1	0.0798 *11*	%Iγ=5.95 *27* α(K)=0.0678 *9*; α(L)=0.00944 *13*; α(M)=0.002005 *28* α(N)=0.000447 *6*; α(O)=6.49×10^{-5} *9*; α(P)=3.53×10^{-6} *5* Eγ=156.048 *3*, Iγ=2.307 *5* (2003Me01). δ(M2/E1)=+0.03 *3* from A_2=0.26 *3* in $\gamma(\theta)$ (1987Si13). α(K)exp=0.059 *9* gives <0.012. (156γ)(114γ)(θ): A_2=0.04 *2*, A_4=0.01 *1* (1986Ii01). Others: 1970Se11, 1966Go05.
[x]171.17[j] *10*	0.124 *22*							%Iγ=0.032 *6*
176.27[f]	0.19[a] *4*	387.559	1/2$^+$	211.308	5/2$^+$	[E2]	0.310 *4*	%Iγ=0.049 *10* α(K)=0.2187 *31*; α(L)=0.0711 *10*; α(M)=0.01605 *22* α(N)=0.00352 *5*; α(O)=0.000468 *7*; α(P)=1.067×10^{-5} *15* Eγ=175.53 *8*, Iγ=0.144 *4* (2003Me01). Iγ: 0.05 (1986Ii01).
177.818 *18*	0.60[a] *6*	537.863	5/2$^-$	360.046	7/2$^+$	E1	0.0558 *8*	%Iγ=0.156 *16* α(K)=0.0475 *7*; α(L)=0.00656 *9*; α(M)=0.001393 *20* α(N)=0.000311 *4*; α(O)=4.54×10^{-5} *6*; α(P)=2.515×10^{-6} *35* Eγ=177.905 *13*, Iγ=0.59 *5* (2003Me01). Mult.: α(K)exp<0.07.
185.489 *25*	0.40 *2*	396.774	5/2$^+$	211.308	5/2$^+$	[M1,E2]	0.267 *7*	%Iγ=0.104 *6* α(N)=0.0022 *7*; α(O)=0.00031 *7*; α(P)=1.20×10^{-5} *28* α(K)=0.209 *23*; α(L)=0.045 *13*; α(M)=0.0099 *31* Eγ=185.617 *9*, Iγ=0.579 *12* (2003Me01).
188.640 *8*	6.9 *3*	188.631	3/2$^+$	0.0	7/2$^+$	E2	0.2462 *34*	%Iγ=1.79 *9* α(N)=0.00267 *4*; α(O)=0.000356 *5*; α(P)=8.77×10^{-6} *12* α(K)=0.1771 *25*; α(L)=0.0539 *8*; α(M)=0.01214 *17* Eγ=188.7832 *23*, Iγ=6.99 *3* (2003Me01). δ(M3/E2)<1 from α(K)exp=0.22 *2*, but A_2=−0.19 *8* in $\gamma(\theta)$ (1987Si13) is consistent with E2.
188.8[gh]	0.04[g]	651.021	(5/2$^+$)	462.191	3/2$^-$			%Iγ=0.010

$^{149}_{61}Pm_{88}$-9

^{149}Nd β^- decay (1.726 h) 1979Sc12,1986Ii01,2003Me01 (continued)

$\gamma(^{149}Pm)$ (continued)

E_γ[‡]	I_γ[#k]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	δ[†]	α[l]	Comments
192.026 *9*	2.20 *7*	462.191	$3/2^-$	270.170	$7/2^-$	E2		0.2318 *32*	%Iγ=0.571 *25* α(K)=0.1675 *23*; α(L)=0.0502 *7*; α(M)=0.01129 *16* α(N)=0.002480 *35*; α(O)=0.000332 *5*; α(P)=8.33×10^{-6} *12* Eγ=192.171 *3*, Iγ=2.207 *15* (2003Me01). Mult.: from α(K)exp=0.14 *2* and A_2=−0.42 *17* in γ(θ) (1987Si13). (192γ)(270γ)(θ): A_2G_2=0.145 *30*, A_4G_4=−0.01 *6* (1986Ii01). Assuming A_2=0.204, A_4=0.0 for 3/2−(E2)7/2−(E1)$7/2^+$ cascade, G_2=0.71 *15*.
197.4[gh]	0.05[g]	744.579	$(3/2,5/2^+)$	547.126	$(5/2,7/2^+)$				%Iγ=0.0130 *4*
198.00[f]	0.19[a] *2*	558.15	$(9/2)^+$	360.046	$7/2^+$				%Iγ=0.049 *5* Eγ=197.75 *8*, Iγ=0.31 *3* (2003Me01).
198.928 *8*	5.37[a] *16*	387.559	$1/2^+$	188.631	$3/2^+$	M1(+E2)	+0.2 *3*	0.224 *4*	%Iγ=1.39 *6* α(K)=0.190 *7*; α(L)=0.0272 *28*; α(M)=0.0058 *7* α(N)=0.00131 *14*; α(O)=0.000196 *16*; α(P)=1.21×10^{-5} *8* Eγ=199.066 *5*, Iγ=5.58 *5* (2003Me01). δ: from δ=−0.1 to +2.3 (γγ(θ),1986Ii01) and <0.5 from α(K)exp=0.20 *3* and K/L=8 *2*. γ(θ): $A_2U_2B_2$=0.00 *3* (1989SiZQ). (199γ)(74γ)(θ): A_2G_2=0.31 *6*, A_4G_4=−0.10 *15* (1986Ii01). Data are corrected by 1986Ii01 for unresolved components 74.6γ, 75.7γ. (199γ)(189γ)(θ): A_2G_2=−0.03 *2*, A_4G_4=−0.01 *3* (1986Ii01). (199γ)(74γ)(θ): A_2=0.095 *22*, A_4=0.0 (1970Se11).
208.147 *9*	9.83 *4*	396.774	$5/2^+$	188.631	$3/2^+$	M1+E2	+0.17 *3*	0.1980 *28*	%Iγ=2.55 *8* α(N)=0.001145 *17*; α(O)=0.0001721 *25*; α(P)=1.069×10^{-5} *16* α(K)=0.1678 *24*; α(L)=0.0238 *4*; α(M)=0.00508 *8* Eγ=208.3210 *21*, Iγ=10.526 *9* (2003Me01). δ: from A_2=0.047 *31* in γ(θ) (1987Si13). γγ(θ) (1986Ii01) gives +0.04 *4* or −3.9 *7* and α(K)exp=0.18 *3* gives <0.9. (208γ)(74γ)(θ): A_2G_2=0.00 *3*, A_4G_4=−0.02 *7* (1986Ii01). Data are corrected by 1986Ii01 for unresolved components 74.6γ and 75.7γ. (208γ)(189γ)(θ): A_2G_2=0.00 *1*, A_4G_4=0.02 *2* (1986Ii01).
211.309 *7*	100 *4*	211.308	$5/2^+$	0.0	$7/2^+$	M1+E2	−0.41 *3*	0.1874 *27*	%Iγ=26.0 *10* α(N)=0.001168 *20*; α(O)=0.0001725 *27*;

^{149}Nd β^- decay (1.726 h) 1979Sc12,1986Ii01,2003Me01 (continued)

$\gamma(^{149}Pm)$ (continued)

E_γ [‡]	I_γ [#k]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	δ[†]	α[l]	Comments
									α(P)=9.79×10^{-6} *16* α(K)=0.1567 *23*; α(L)=0.0242 *4*; α(M)=0.00521 *9* Eγ=211.4403 *20*, Iγ=100.0 *18* (2003Me01). δ: from $\gamma\gamma(\theta)$ (1986Ii01). Others: −0.44 *10* from A$_2$=−0.35 *3* in $\gamma(\theta)$ (1987Si13); 0.39 *15* from K/L=6.5 *8*, α(K)exp=0.146 *15* and (L1+L2)/L3=15 *+15−5*.
213.947 *16*	1.54 *10*	425.276	7/2$^+$	211.308	5/2$^+$	M1,E2		0.173 *12*	%Iγ=0.400 *29* α(K)=0.138 *19*; α(L)=0.027 *5*; α(M)=0.0060 *13* α(N)=0.00133 *28*; α(O)=0.000188 *30*; α(P)=8.1×10^{-6} *20* Eγ=213.9414 *20*, Iγ=1.159 *7* (2003Me01). δ: +0.34 *5* or +8 *+4−2* from (230γ)(214γ)(θ) (1986Ii01). α(K)exp=0.15 *5* is consistent with all δ.
224.49[jn] *6*	0.092 *9*	1181.30?		956.87?					%Iγ=0.0239 *24*
226.847 *19*	0.63 *2*	415.449	3/2$^+$	188.631	3/2$^+$	[M1,E2]		0.145 *12*	%Iγ=0.164 *7* α(K)=0.117 *17*; α(L)=0.022 *4*; α(M)=0.0049 *9* α(N)=0.00108 *19*; α(O)=0.000154 *20*; α(P)=6.8×10^{-6} *17* Eγ=227.072 *9*, Iγ=0.544 *6* (2003Me01).
229.566 *9*	1.86 *5*	654.843	7/2$^-$	425.276	7/2$^+$	E1		0.0282 *4*	%Iγ=0.483 *20* α(K)=0.02409 *34*; α(L)=0.00328 *5*; α(M)=0.000696 *10* α(N)=0.0001555 *22*; α(O)=2.289×10^{-5} *32*; α(P)=1.310×10^{-6} *18* Eγ=229.630 *3*, Iγ=1.771 *9* (2003Me01). δ(M2/E1)=+0.06 to +1.1 from A$_2$=−0.74 *15* in $\gamma(\theta)$ (1987Si13); <0.14 from α(K)exp=0.024 *14*. (230γ)(214γ)(θ): A$_2$=0.13 *3*, A$_4$=0.00 *5* (1986Ii01).
[x]238.611[j] *3*	3.432 *11*								%Iγ=0.891 *27* E$_\gamma$: probably from background.
239.6[gh]	0.05[g]	786.72	(3/2$^+$,5/2$^+$)	547.126	(5/2,7/2$^+$)				%Iγ=0.0130 *4*
240.220 *7*	15.2 *6*	240.215	11/2$^-$	0.0	7/2$^+$	M2		0.664 *9*	%Iγ=3.95 *19* α(K)=0.540 *8*; α(L)=0.0966 *14*; α(M)=0.02126 *30* α(N)=0.00480 *7*; α(O)=0.0007142 *99*; α(P)=4.21×10^{-5} *6* Eγ=240.4660 *18*, Iγ=12.289 *22* (2003Me01). $\gamma(\theta)$: A$_2$U$_2$B$_2$=−0.11 *2* (1989SiZQ). Mult.: from α(K)exp=0.47 *4* and K/L=5.2 *9*.
245.5	0.8[a] *4*	515.645	(9/2)$^-$	270.170	7/2$^-$	[M1,E2]		0.115 *12*	%Iγ=0.21 *10* α(K)=0.093 *15*; α(L)=0.0170 *21*; α(M)=0.0037 *5* α(N)=0.00083 *11*; α(O)=0.000119 *10*; α(P)=5.5×10^{-6} *14* Eγ=244.89 *15*, Iγ=0.36 *12* (2003Me01). δ: −0.16 *24* or −5 *2* from $\gamma\gamma(\theta)$ (1986Ii01). (245γ)(270γ)(θ): A$_2$=−0.17 *15*, A$_4$=0.02 *21* (1986Ii01).
245.72 *5*	3.1 *8*	360.046	7/2$^+$	114.313	5/2$^+$	M1+E2	+0.23 *2*	0.1255 *18*	%Iγ=0.81 *21*

^{149}Nd β^- decay (1.726 h) 1979Sc12,1986Ii01,2003Me01 (continued)

$\gamma(^{149}Pm)$ (continued)

E_γ[‡]	I_γ[#k]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	δ[†]	α[l]	Comments
									α(K)=0.1063 *15*; α(L)=0.01509 *21*; α(M)=0.00323 *5* α(N)=0.000726 *10*; α(O)=0.0001091 *15*; α(P)=6.74×10^{-6} *10* Eγ=245.847 *21*, Iγ=3.618 *15* (2003Me01). (246γ)(114γ)(θ): A_2=−0.02 *4*, A_4=−0.01 *5* (1986Ii01). E_γ: deduced from 245.699 *8* for doublet (1968He19) and Iγ (1979Sc12). δ: from $\gamma\gamma(\theta)$ (1986Ii01). $\gamma\gamma(\theta)$ also gives δ>+30 but is inconsistent with δ<1.1 from α(K)exp=0.13 *4*.
250.826 *31*	0.13 *1*	462.191	3/2$^-$	211.308	5/2$^+$	[E1]		0.02239 *31*	%Iγ=0.0338 *28* α(K)=0.01911 *27*; α(L)=0.00259 *4*; α(M)=0.000550 *8* α(N)=0.0001229 *17*; α(O)=1.813×10^{-5} *25*; α(P)=1.048×10^{-6} *15* Eγ=250.82 *3*, Iγ=0.106 *27* (2003Me01).
254.228 *22*	0.33 *1*	651.021	(5/2$^+$)	396.774	5/2$^+$	[M1+E2]		0.104 *12*	%Iγ=0.086 *4* α(K)=0.084 *14*; α(L)=0.0152 *16*; α(M)=0.0033 *4* α(N)=0.00074 *9*; α(O)=0.000106 *7*; α(P)=5.0×10^{-6} *13* Eγ=254.783 *15*, Iγ=0.369 *12* (2003Me01).
258.067 *13*	1.45 *4*	654.843	7/2$^-$	396.774	5/2$^+$	E1		0.02079 *29*	%Iγ=0.377 *15* α(K)=0.01775 *25*; α(L)=0.002403 *34*; α(M)=0.000510 *7* α(N)=0.0001140 *16*; α(O)=1.683×10^{-5} *24*; α(P)=9.75×10^{-7} *14* Eγ=258.144 *3*, Iγ=1.573 *20* (2003Me01). δ(M2/E1)<0.26 from α(K)exp<0.046. (258γ)(208γ)(θ): A_2=0.04 *1*, A_4=−0.01 *2* (1986Ii01).
263.4[gh]	0.09[g]	651.021	(5/2$^+$)	387.559	1/2$^+$	[E2]		0.0819 *11*	%Iγ=0.023 α(K)=0.0631 *9*; α(L)=0.01470 *21*; α(M)=0.00326 *5* α(N)=0.000721 *10*; α(O)=9.92×10^{-5} *14*; α(P)=3.35×10^{-6} *5*
267.693 *8*	23.3 *6*	537.863	5/2$^-$	270.170	7/2$^-$	M1+E2	+0.24 *7*	0.0994 *16*	%Iγ=6.05 *24* α(N)=0.000573 *9*; α(O)=8.61×10^{-5} *12*; α(P)=5.34×10^{-6} *11* α(K)=0.0843 *15*; α(L)=0.01191 *18*; α(M)=0.00255 *4* Eγ=267.7873 *16*, Iγ=21.811 *8* (2003Me01). δ: average of δ=+0.20 *8* ($\gamma\gamma(\theta)$,1986Ii01) and +0.28 *7* ($\gamma(\theta$,H,t), 1987Si13). α(K)exp=0.076 *8* and K/L=7.5 *12* give 0.5 *3*. $\gamma(\theta)$: A_2=0.50 *7* (1987Si13,1989SiZQ). (268γ)(156γ)(θ): A_2=0.25 *6*, A_4=−0.02 *2* (1986Ii01). Others: A_2=0.173 *12*, A_4=0.00 (1970Se11); A_2=−0.142 *9*, A_4=0.020 *11* (1970Be67). (268γ)(270γ)(θ): A_2=−0.28 *6*, A_4=−0.01 *1* (1986Ii01). Others: 1970Se11, 1970Be67, 1966Sv01, 1966Go05, 1965Ch09.
270.166 *7*	41.4 *11*	270.170	7/2$^-$	0.0	7/2$^+$	E1(+M2)	−0.07 *5*	0.021 *4*	%Iγ=10.8 *4* α(K)=0.0175 *33*; α(L)=0.0024 *6*; α(M)=0.00052 *13* α(N)=0.000116 *28*; α(O)=1.7×10^{-5} *4*; α(P)=1.00×10^{-6} *25* Eγ=270.2449 *16*, Iγ=38.513 *11* (2003Me01).

$^{149}_{61}Pm_{88}$-12

^{149}Nd β^- decay (1.726 h) 1979Sc12,1986Ii01,2003Me01 (continued)

$\gamma(^{149}Pm)$ (continued)

E_γ[‡]	I_γ[#k]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	δ[†]	α[l]	Comments
									δ: from A_2=−0.34 *3* in $\gamma(\theta)$ (1987Si13). Other: <0.05 from α(K)exp=0.014 *2*.
273.24[h] *4*	0.7[a] *3*	387.559	1/2$^+$	114.313	5/2$^+$	[E2]		0.0728 *10*	%Iγ=0.18 *8* α(K)=0.0565 *8*; α(L)=0.01283 *18*; α(M)=0.00284 *4* α(K)exp=0.10 *5* α(N)=0.000628 *9*; α(O)=8.67×10^{-5} *12*; α(P)=3.02×10^{-6} *4*
273.5[h]	0.32[a] *15*	462.191	3/2$^-$	188.631	3/2$^+$	[E1]		0.01789 *25*	%Iγ=0.08 *4* α(K)=0.01528 *21*; α(L)=0.002063 *29*; α(M)=0.000438 *6* α(N)=9.79×10^{-5} *14*; α(O)=1.447×10^{-5} *20*; α(P)=8.44×10^{-7} *12*
275.437 *11*	2.51 *6*	515.645	(9/2)$^-$	240.215	11/2$^-$	M1(+E2)		0.082 *11*	%Iγ=0.652 *25* α(K)=0.067 *12*; α(L)=0.0117 *8*; α(M)=0.00254 *22* α(N)=0.00057 *4*; α(O)=8.18×10^{-5} *27*; α(P)=4.0×10^{-6} *11* Eγ=275.469 *5*, Iγ=1.529 *8* (2003Me01). $\gamma(\theta)$: A_2=0.7 *3* (1989SiZQ), probably includes 277.0γ also. δ: +0.23 *23*, >+2.4 or <−15 from $\gamma\gamma(\theta)$ (1986Ii01). α(K)exp=0.071 *21* is consistent with all δ. $\gamma(\theta)$ in (p,2nγ) forbids pure E2.
276.960 *17*	1.32 *4*	547.126	(5/2,7/2$^+$)	270.170	7/2$^-$	[D,E2]		0.055 *38*	%Iγ=0.343 *15* Eγ=276.89 *8*, Iγ=1.009 *8* (2003Me01).
282.4[e]	0.065[a] *25*	744.579	(3/2,5/2$^+$)	462.191	3/2$^-$				%Iγ=0.017 *7* Eγ=281.958 *14*, Iγ=0.688 *21* (2003Me01).
282.456 *10*	2.38[a] *6*	396.774	5/2$^+$	114.313	5/2$^+$	M1+E2	+0.65 *20*	0.0808 *30*	%Iγ=0.618 *24* α(K)=0.0674 *31*; α(L)=0.01055 *21*; α(M)=0.00228 *5* α(N)=0.000510 *11*; α(O)=7.50×10^{-5} *11*; α(P)=4.14×10^{-6} *26* Eγ=282.5292 *25*, Iγ=2.071 *12* (2003Me01). δ: from $\gamma\gamma(\theta)$ (1986Ii01). $\gamma\gamma(\theta)$ also allows >+5 or <−11 but is inconsistent with +0.8 *7* from A_2=−0.70 *11* in $\gamma(\theta)$ (1987Si13) and <3.5 from α(K)exp=0.071 *18*. (282γ)(114γ)(θ): A_2=0.08 *4*, A_4=−0.02 *5* (1986Ii01).
287.7	0.05[a] *2*	558.15	(9/2)$^+$	270.170	7/2$^-$	[E1]		0.01572 *22*	%Iγ=0.013 *5* α(K)=0.01342 *19*; α(L)=0.001808 *25*; α(M)=0.000384 *5* α(N)=8.58×10^{-5} *12*; α(O)=1.270×10^{-5} *18*; α(P)=7.45×10^{-7} *10* Eγ=286.034, Iγ=1.531 *13* (2003Me01); probably an impurity line (evaluators).
288.194 *10*	2.67[a] *7*	288.208	9/2$^+$	0.0	7/2$^+$	M1+E2	+0.78 *7*	0.0747 *14*	%Iγ=0.693 *28* α(K)=0.0620 *13*; α(L)=0.01001 *15*; α(M)=0.002165 *33* α(N)=0.000484 *7*; α(O)=7.08×10^{-5} *10*; α(P)=3.77×10^{-6} *10*

$^{149}_{61}Pm_{88}$-13

^{149}Nd β^- decay (1.726 h) 1979Sc12,1986Ii01,2003Me01 (continued)

$\gamma(^{149}Pm)$ (continued)

E_γ[‡]	I_γ[#k]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	δ[†]	α[l]	Comments
									Eγ=288.2516 *25*, Iγ=2.331 *14* (2003Me01). Mult.: from ce data and $\gamma(\theta)$ in ^{150}Nd(p,2nγ). δ: from $\gamma\gamma(\theta)$ (1986Ii01). δ=+1.9 *2* is also possible from $\gamma\gamma(\theta)$. Others: δ=+0.74 *17* or +2.0 *6* from A_2=−0.71 *9* in $\gamma(\theta)$ (1989SiZQ); α(K)exp=0.062 *16* is consistent with all δ.
x290.374[j] *20*	0.243 *6*								%Iγ=0.0631 *25* Proposed placement (2003Me01): 651.1-360.1. Poor fit (evaluators).
294.802 *10*	2.20 *6*	654.843	7/2$^-$	360.046	7/2$^+$	E1		0.01477 *21*	%Iγ=0.571 *23* α(N)=8.06×10^{-5} *11*; α(O)=1.193×10^{-5} *17*; α(P)=7.01×10^{-7} *10* α(K)=0.01262 *18*; α(L)=0.001697 *24*; α(M)=0.000360 *5* Eγ=294.969 *7*, Iγ=3.33 *7* (2003Me01). δ(M2/E1)=−0.11 *22* from A_2=−0.34 *9* in $\gamma(\theta)$ (1987Si13), <0.26 from α(K)exp<0.03. (295γ)(245γ)(θ): A_2=0.05 *1*, A_4=0.00 *2* (1986Ii01).
301.128 *14*	1.45 *4*	415.449	3/2$^+$	114.313	5/2$^+$	M1,E2		0.064 *10*	%Iγ=0.377 *15* α(K)=0.052 *10*; α(L)=0.00880 *24*; α(M)=0.00191 *8* α(N)=0.000427 *15*; α(O)=6.19×10^{-5} *11*; α(P)=3.1×10^{-6} *9* Eγ=301.097 *9*, Iγ=1.24 *4* (2003Me01). $\gamma(\theta)$: A_2=−0.1 *3* (1989SiZQ). δ: +0.02 *11* or +3.1 *+16−9* from A_2=0.15 *6*, A_4=−0.01 *8* (1986Ii01) for (301γ)(114γ)(θ). α(K)exp=0.040 *25* is consistent with all δ.
310.979 *13*	1.97 *5*	425.276	7/2$^+$	114.313	5/2$^+$	M1+E2	+0.23 *12*	0.0667 *15*	%Iγ=0.512 *20* α(K)=0.0566 *14*; α(L)=0.00790 *11*; α(M)=0.001686 *24* α(N)=0.000380 *5*; α(O)=5.72×10^{-5} *8*; α(P)=3.59×10^{-6} *11* Eγ=311.059 *3*, Iγ=1.76 *3* (2003Me01). δ: from $\gamma\gamma(\theta)$ (1986Ii01). $\gamma\gamma(\theta)$ also allows +2.6 *9* but is inconsistent with δ=+0.22 *13* or >8 from A_2=−0.08 *11* in $\gamma(\theta)$ (1987Si13). α(K)exp=0.047 *11* is consistent with all δ. (311γ)(114γ)(θ): A_2=−0.06 *4*, A_4=−0.01 *6* (1986Ii01).
x318.2[e] *3*	0.033 *17*								%Iγ=0.009 *4* Eγ=318.02 *12*, Iγ=0.615 *18* (2003Me01). Proposed placement (2003Me01): 556.2 − 240.4. Very poor fit (evaluators).
326.554 *10*	17.6 *4*	537.863	5/2$^-$	211.308	5/2$^+$	E1(+M2)	−0.07 *6*	0.0125 *27*	%Iγ=4.57 *17* α(K)=0.0107 *22*; α(L)=0.0015 *4*; α(M)=3.1×10^{-4} *8* α(N)=7.0×10^{-5} *18*; α(O)=1.03×10^{-5} *28*; α(P)=6.2×10^{-7} *17* Eγ=326.6331 *17*, Iγ=16.589 *16* (2003Me01). δ: from A_2=−0.36 *6* in $\gamma(\theta)$ (1987Si13). α(K)exp=0.011 *3*

$^{149}_{61}Pm_{88}$-14

^{149}Nd β^- decay (1.726 h) 1979Sc12,1986Ii01,2003Me01 (continued)

$\gamma(^{149}Pm)$ (continued)

E_γ[‡]	I_γ[#k]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	α[l]	Comments
								gives <0.14. (327γ)(97γ)(θ): A_2=0.22 *3*, A_4=−0.01 *6* (1986Ii01). (326γ)(211γ)(θ): A_2=0.14 *1*, A_4=0.00 *1* (1986Ii01). Others: A_2=0.109 *6*, A_4=−0.020 *10* (1966Go05); A_2=−0.230 *12*, A_4=−0.007 *9* (1970Be67).
329.18[hbf]	0.08 *4*	744.579	(3/2,5/2$^+$)	415.449	3/2$^+$			%Iγ=0.021 *10* I_γ: 0.007 (1986Ii01).
332.167[jn] *18*	0.068 *4*	1363.85?		1031.68	(7/2$^+$)			%Iγ=0.0177 *12*
342.81 *10*	0.32 *7*	768.188	(5/2,7/2$^+$)	425.276	7/2$^+$			%Iγ=0.083 *18* Eγ=343.12 *5*, Iγ=0.14 *4* (2003Me01). I_γ: 0.14 (1986Ii01).
347.843 *18*	0.62 *2*	744.579	(3/2,5/2$^+$)	396.774	5/2$^+$			%Iγ=0.161 *7* Eγ=347.654 *19*, Iγ=2.38 *3* (2003Me01).
349.231 *9*	5.31 *14*	537.863	5/2$^-$	188.631	3/2$^+$	E1	0.00966 *14*	%Iγ=1.38 *6* α(K)=0.00826 *12*; α(L)=0.001103 *15*; α(M)=0.0002338 *33* α(N)=5.24×10^{-5} *7*; α(O)=7.78×10^{-6} *11*; α(P)=4.65×10^{-7} *7* Eγ=349.365 *4*, Iγ=8.540 *10* (2003Me01). δ(M2/E1)=+0.04 *4* from A_2=0.29 *4* in γ(θ) (1987Si13). α(K)exp=0.017 *5* gives <0.3. (349γ)(189γ)(θ): A_2=0.032 *7*, A_4=0.007 *15* (1970Be67).
[x]351.632[j] *3*	4.51 *6*							%Iγ=1.17 *4* E_γ: probably from background.
352.78[h] *3*	0.21 *1*	768.188	(5/2,7/2$^+$)	415.449	3/2$^+$			%Iγ=0.0545 *31*
357.03 *4*	0.18 *1*	744.579	(3/2,5/2$^+$)	387.559	1/2$^+$			%Iγ=0.0467 *30* Eγ=357.111 *22*, Iγ=0.282 *14* (2003Me01).
358.49[eh] *10*	0.04 *2*	547.126	(5/2,7/2$^+$)	188.631	3/2$^+$			%Iγ=0.010 *5*
360.052 *18*	0.59 *2*	360.046	7/2$^+$	0.0	7/2$^+$	[M1,E2]	0.039 *7*	%Iγ=0.153 *7* α(K)=0.032 *7*; α(L)=0.00509 *27*; α(M)=0.00110 *4* α(N)=0.000246 *12*; α(O)=3.61×10^{-5} *29*; α(P)=1.9×10^{-6} *5* Eγ=359.889 *20*, Iγ=0.593 *15* (2003Me01). γ(θ): A_2=0.7 *5* (1989SiZQ).
361.4[be]	0.025 *10*	721.23?	7/2$^+$	360.046	7/2$^+$			%Iγ=0.0065 *26* Eγ=361.76 *3*, Iγ=0.514 *13* (2003Me01).
366.634 *14*	2.09 *6*	654.843	7/2$^-$	288.208	9/2$^+$	E1	0.00857 *12*	%Iγ=0.543 *23* α(K)=0.00733 *10*; α(L)=0.000977 *14*; α(M)=0.0002070 *29* α(N)=4.64×10^{-5} *6*; α(O)=6.90×10^{-6} *10*; α(P)=4.14×10^{-7} *6* Eγ=366.682 *3*, Iγ=1.858 *17* (2003Me01). δ(M2/E1)=−0.04 *11* from A_2=0.09 *8* in γ(θ) (1987Si13); <0.31 from α(K)exp<0.021. α(K)exp also gives E2 but inconsistent with γ(θ) data. (367γ)(288γ)(θ): A_2=−0.22 *1*, A_4=0.00 *2* (1986Ii01).
371.92[jn] *6*	0.086 *10*	1328.81?		956.87?				%Iγ=0.0223 *27*

^{149}Nd β^- decay (1.726 h) 1979Sc12,1986Ii01,2003Me01 (continued)

$\gamma(^{149}Pm)$ (continued)

E_γ[‡]	I_γ[#k]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	α[l]	Comments
376.9[be]	0.030 *15*	1031.68	(7/2$^+$)	654.843	7/2$^-$	[E1]	0.00801 *11*	%Iγ=0.008 *4* α(K)=0.00686 *10*; α(L)=0.000912 *13*; α(M)=0.0001934 *27* α(N)=4.33×10^{-5} *6*; α(O)=6.45×10^{-6} *9*; α(P)=3.88×10^{-7} *5* Eγ=376.69 *10*, Iγ=0.043 *11* (2003Me01).
380.66 *5*	0.20 *1*	651.021	(5/2$^+$)	270.170	7/2$^-$	[E1]	0.00782 *11*	%Iγ=0.0519 *30* α(K)=0.00669 *9*; α(L)=0.000890 *12*; α(M)=0.0001887 *26* α(N)=4.23×10^{-5} *6*; α(O)=6.29×10^{-6} *9*; α(P)=3.79×10^{-7} *5* Eγ=380.962 *22*, Iγ=0.163 *4* (2003Me01). E_γ: others: 380.79 (1986Ii01), 380.93 *7* (1968He19).
384.687 *16*	1.03 *3*	654.843	7/2$^-$	270.170	7/2$^-$	[M1,E2]	0.032 *7*	%Iγ=0.267 *11* α(K)=0.027 *6*; α(L)=0.00419 *32*; α(M)=0.00090 *6* α(N)=0.000202 *14*; α(O)=2.97×10^{-5} *30*; α(P)=1.6×10^{-6} *5* Eγ=384.703 *4*, Iγ=0.937 *5* (2003Me01). γ(θ): A_2=−0.24 *18* (1989SiZQ).
390.9[be]	0.03 *1*	1141.528	5/2$^+$	750.41	(7/2$^-$,9/2$^+$)			%Iγ=0.0078 *26* Eγ=390.65 *16*, Iγ=0.021 *3* (2003Me01). E_γ: level-energy difference=391.1.
396.76 *4*	0.28 *1*	396.774	5/2$^+$	0.0	7/2$^+$	[M1,E2]	0.030 *6*	%Iγ=0.0727 *34* α(K)=0.025 *6*; α(L)=0.00382 *33*; α(M)=0.00082 *6* α(N)=0.000185 *15*; α(O)=2.72×10^{-5} *30*; α(P)=1.5×10^{-6} *4* Eγ=396.878 *12*, Iγ=0.298 *4* (2003Me01).
399.1[bh]	0.056 *22*	786.72	(3/2$^+$,5/2$^+$)	387.559	1/2$^+$			%Iγ=0.015 *6*
413.69[jn] *3*	0.067 *5*	1050.18		637.43?				%Iγ=0.0174 *14* E_γ: uncertainty of 0.015 increased to 0.03 (evaluators).
423.553 *10*	28.7 *15*	537.863	5/2$^-$	114.313	5/2$^+$	E1	0.00606 *8*	%Iγ=7.5 *4* α(K)=0.00519 *7*; α(L)=0.000687 *10*; α(M)=0.0001455 *20* α(N)=3.26×10^{-5} *5*; α(O)=4.86×10^{-6} *7*; α(P)=2.95×10^{-7} *4* Eγ=423.5600 *20*, Iγ=25.25 *4* (2003Me01). δ(M2/E1)=−0.03 *9* from A_2=−0.40 *5* in γ(θ) (1987Si13). α(K)exp=0.0065 *16* gives <0.17. (423γ)(114γ)(θ): A_2G_2=−0.103 *10*, A_4G_4=−0.02 *2* (1986Ii01). G_2=0.76 *8* (1986Ii01) was obtained assuming A_2=−0.135 *7* (average A_2 from 1970Se11,1970Be67,1966Sv01 and 1966Go05).
425.22 *3*	1.05 *4*	425.276	7/2$^+$	0.0	7/2$^+$	[M1,E2]	0.025 *5*	%Iγ=0.273 *13* α(K)=0.021 *5*; α(L)=0.00313 *34*; α(M)=0.00067 *7* α(N)=0.000151 *16*; α(O)=2.23×10^{-5} *29*; α(P)=1.3×10^{-6} *4* Eγ=425.86 *11*, Iγ=2.55 *3* (2003Me01). I_γ: 0.68 (1986Ii01).
432.66[bf]	0.05 *2*	547.126	(5/2,7/2$^+$)	114.313	5/2$^+$			%Iγ=0.013 *5* Eγ=432.76 *7*, Iγ=0.014 *4* (2003Me01).
434.90[jn] *7*	0.014 *4*	1156.034	(3/2$^+$,5/2,7/2$^+$)	721.23?	7/2$^+$			%Iγ=0.0036 *10*

^{149}Nd β^- decay (1.726 h) 1979Sc12,1986Ii01,2003Me01 (continued)

$\gamma(^{149}Pm)$ (continued)

E_γ [‡]	I_γ [#k]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [†]	α [l]	Comments
439.6	0.14[&] 6	651.021	(5/2$^+$)	211.308	5/2$^+$			%Iγ=0.036 16 Eγ=439.11 7, Iγ=0.145 14 (2003Me01).
441.47[jn] 13	0.122 10	956.87?		515.645	(9/2)$^-$			%Iγ=0.0317 28
443.551 11	4.44[a] 20	654.843	7/2$^-$	211.308	5/2$^+$	E1	0.00543 8	%Iγ=1.15 6 α(K)=0.00466 7; α(L)=0.000615 9; α(M)=0.0001302 18 α(N)=2.92×10^{-5} 4; α(O)=4.36×10^{-6} 6; α(P)=2.66×10^{-7} 4 Eγ=443.550 3, Iγ=4.221 25 (2003Me01). δ(M2/E1)<0.17 from α(K)exp<0.007. γ(θ): A$_2$=0.35 6 (1989SiZQ). (444γ)(211γ)(θ): A$_2$=0.083 25, A$_4$=0.11 20 (1970Be67).
443.7[h]	0.04	558.15	(9/2)$^+$	114.313	5/2$^+$			%Iγ=0.01039 31 I$_\gamma$: from 1986Ii01.
448.80[en] 20	0.031 15	637.43?		188.631	3/2$^+$			%Iγ=0.008 4 Placement from 2003Me01. Poor fit. Level-energy difference=447.88. Eγ=448.82 9, Iγ=0.038 15 (2003Me01).
462.34[e] 10	0.16 8	651.021	(5/2$^+$)	188.631	3/2$^+$			%Iγ=0.042 21 Eγ=462.354 9, Iγ=0.81 3 (2003Me01).
470.5[be]	0.04 2	758.67	(5/2$^+$,7/2,9/2$^+$)	288.208	9/2$^+$			%Iγ=0.010 5 Eγ=469.706 20, Iγ=0.049 3 (2003Me01).
480.32[i] 5	0.16 1	750.41	(7/2$^-$,9/2$^+$)	270.170	7/2$^-$			%Iγ=0.0416 29 E$_\gamma$: level-energy difference=480.24. Eγ=480.48 3, Iγ=0.129 15 (2003Me01).
483.59[i] 5	0.26 1	1234.099	(7/2)	750.41	(7/2$^-$,9/2$^+$)			%Iγ=0.0675 33 Eγ=483.713 18, Iγ=0.219 18 (2003Me01). E$_\gamma$: level-energy difference=483.69.
493.85 5	0.23 2	1031.68	(7/2$^+$)	537.863	5/2$^-$			%Iγ=0.060 5 Eγ=493.87 15, Iγ=0.18 6 (2003Me01). I$_\gamma$: 0.11 (1986Ii01).
498.06[f]	0.04 1	768.188	(5/2,7/2$^+$)	270.170	7/2$^-$			%Iγ=0.0104 26 Eγ=498.06 7, Iγ=0.119 25 (2003Me01). E$_\gamma$: other: 498.03 8 (1968He19) for a doublet. I$_\gamma$: from γγ (1979Sc12).
498.62[f]	0.14 1	923.886	(5/2$^+$,7/2)	425.276	7/2$^+$			%Iγ=0.0364 28 Eγ=499.44 13, Iγ=0.079 12 (2003Me01). I$_\gamma$: from γγ (1979Sc12).
510.30[hi] 5	0.24 6	750.41	(7/2$^-$,9/2$^+$)	240.215	11/2$^-$			%Iγ=0.062 16 E$_\gamma$: level-energy difference=510.19.
512.7[m]	0.05[m] 2	872.94?		360.046	7/2$^+$			%Iγ=0.013 5 Placement from 1986Ii01 only.
512.7[mbh]	0.05[m] 2	1234.099	(7/2)	721.23?	7/2$^+$			%Iγ=0.013 5

^{149}Nd β^- decay (1.726 h) 1979Sc12,1986Ii01,2003Me01 (continued)

$\gamma(^{149}Pm)$ (continued)

E_γ [‡]	I_γ [#k]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [†]	α [l]	Comments
515.75 *9*	0.14 *2*	515.645	$(9/2)^-$	0.0	$7/2^+$			%Iγ=0.036 *5* Eγ=515.26 *19*, Iγ=0.511 *14* (2003Me01).
527.6[be]	0.045 *12*	942.926	$(3/2^+,5/2,7/2^+)$	415.449	$3/2^+$			%Iγ=0.0117 *31* Eγ=527.2 *3*, Iγ=0.168 *11* (2003Me01).
533.20 *4*	0.35 *2*	744.579	$(3/2,5/2^+)$	211.308	$5/2^+$			%Iγ=0.091 *6* Eγ=533.130 *17*, Iγ=0.267 *4* (2003Me01).
536.6[h]	0.18[&] *8*	651.021	$(5/2^+)$	114.313	$5/2^+$			%Iγ=0.047 *21*
[x]538.15[d] *6*								
540.509 *10*	25.4 *9*	654.843	$7/2^-$	114.313	$5/2^+$	E1	0.00346 *5*	%Iγ=6.60 *31* α(K)=0.00297 *4*; α(L)=0.000389 *5*; α(M)=8.22×10^{-5} *12* α(N)=1.846×10^{-5} *26*; α(O)=2.76×10^{-6} *4*; α(P)=1.710×10^{-7} *24* Eγ=540.513 *26*, Iγ=23.911 *16* (2003Me01). δ(M2/E1)=−0.23 *28* from A_2=0.370 *25* in γ(θ) (1987Si13); <0.24 from α(K)exp=0.0038 *16*. (540γ)(114γ)(θ): A_2=0.05 *1*, A_4=0.00 *1* (1986Ii01). Others: 1970Se11, 1970Be67, 1966Sv01, 1966Go05.
[x]545.5[g]	0.035[g]							%Iγ=0.0091
[x]546.5[g]	0.034[g]							%Iγ=0.0088
547.1[c]	0.06 *3*	547.126	$(5/2,7/2^+)$	0.0	$7/2^+$			%Iγ=0.016 *8* Eγ=546.22 *24*, Iγ=0.385 *13* (2003Me01).
547.4[c]	0.04 *2*	758.67	$(5/2^+,7/2,9/2^+)$	211.308	$5/2^+$			%Iγ=0.010 *5* Eγ=548.7 *4*, Iγ=0.34 *8* (2003Me01). E_γ: probably same as 548.3 in 1986Ii01.
555.88 *9*	2.26 *12*	744.579	$(3/2,5/2^+)$	188.631	$3/2^+$			%Iγ=0.59 *4* Eγ=555.77 *3*, Iγ=1.77 *13* (2003Me01). Mult.: 1967Ba27 give α(K)exp<0.026 for the 555.88+556.83 doublet which allows E1, E2 or M1 for either or both transitions. E_γ: 1968He19 give 556.43 *5* as average energy for this doublet. γ(θ) for doublet: $A_2U_2B_2$=−0.13 *2* (1989SiZQ). (556γ)(211γ)(θ): A_2=0.13 *2*, A_4=0.02 *4* (1986Ii01).
556.83 *9*	1.68 *20*	768.188	$(5/2,7/2^+)$	211.308	$5/2^+$			%Iγ=0.44 *5* Eγ=556.71 *4*, Iγ=2.39 *9* (2003Me01). See comment for 555.88γ.
558.0[h]	0.04	558.15	$(9/2)^+$	0.0	$7/2^+$			%Iγ=0.01039 *31* I_γ: from 1986Ii01. Iγ=0.29 *10* (1979Sc12).
563.8[h]	0.036 *16*	923.886	$(5/2^+,7/2)$	360.046	$7/2^+$			%Iγ=0.009 *4*
567.56[f]	0.064 *13*	1312.106	$(5/2)$	744.579	$(3/2,5/2^+)$			%Iγ=0.0166 *34* Eγ=567.32 *14*, Iγ=0.06 *3* (2003Me01).
575.4[h] *3*	0.03 *1*	786.72	$(3/2^+,5/2^+)$	211.308	$5/2^+$			%Iγ=0.0078 *26*

$^{149}_{61}Pm_{88}$-18

$\gamma(^{149}Pm)$ (continued)

E_γ ‡	I_γ #k	E_i(level)	J_i^π	E_f	J_f^π	Mult. †	α l	Comments
579.28 *3*	0.29 *2*	1234.099	(7/2)	654.843	7/2$^-$			%Iγ=0.075 *6* Eγ=579.17 *5*, Iγ=0.12 *4* (2003Me01).
582.9	0.07 a *3*	942.926	(3/2$^+$,5/2,7/2$^+$)	360.046	7/2$^+$			%Iγ=0.018 *8* Eγ=582.144 *21*, Iγ=0.626 *19* (2003Me01).
583.03 *3*	0.19 a *5*	1234.099	(7/2)	651.021	(5/2$^+$)			%Iγ=0.049 *13* Eγ=583.055 *13*, Iγ=1.33 *4* (2003Me01).
588.5 h *3*	0.022 *8*	1239.616	(5/2$^+$,7/2)	651.021	(5/2$^+$)			%Iγ=0.0057 *21*
590.74 jn *17*	0.016 *4*	1312.106	(5/2)	721.23?	7/2$^+$			%Iγ=0.0042 *10*
594.40 *5*	0.11 *1*	1141.528	5/2$^+$	547.126	(5/2,7/2$^+$)			%Iγ=0.0286 *27* Eγ=594.54 *5*, Iγ=0.047 *7* (2003Me01).
598.06 *5*	0.11 *1*	786.72	(3/2$^+$,5/2$^+$)	188.631	3/2$^+$			%Iγ=0.0286 *27* Eγ=598.01 *4*, Iγ=0.065 *7* (2003Me01).
606.67 eh *16*	0.04 *2*	721.23?	7/2$^+$	114.313	5/2$^+$			%Iγ=0.010 *5*
617.9 hbe	0.029 *10*	1043.39	(3/2$^+$,5/2,7/2)	425.276	7/2$^+$			%Iγ=0.0075 *26*
630.237 *19*	0.73 *1*	744.579	(3/2,5/2$^+$)	114.313	5/2$^+$			%Iγ=0.190 *6* Eγ=630.225 *9*, Iγ=0.601 *12* (2003Me01).
635.7	0.26 a *5*	923.886	(5/2$^+$,7/2)	288.208	9/2$^+$			%Iγ=0.068 *13* Eγ=635.97 *4*, Iγ=0.129 *12* (2003Me01) placed from a 635.98 level. See comment for 636.2γ.
636.2 f	0.20 a *4*	750.41	(7/2$^-$,9/2$^+$)	114.313	5/2$^+$			%Iγ=0.052 *11* Eγ=634.87 *5*, Iγ=1.065 *10* (2003Me01). E_γ: other: 635.482 *25* (1968He19) for doublet.
651.0 h	0.24 & *10*	651.021	(5/2$^+$)	0.0	7/2$^+$			%Iγ=0.062 *26* I_γ: 0.051 (1986Ii01).
652.74 jn		1190.274	(5/2)	537.863	5/2$^-$			E_γ,I_γ: 2003Me01 quote Eγ=652.744 *7*, Iγ=2.646 *15*. There is no evidence of such a strong line in the spectra of 1979ScZL and 1968He19. This line is probably mainly from background or impurity. There is some γγ coin evidence of this line in table 2 of 2003Me01.
653.9 gh	0.07 g	768.188	(5/2,7/2$^+$)	114.313	5/2$^+$			%Iγ=0.0182 *5*
654.831 *13*	30.7 *15*	654.843	7/2$^-$	0.0	7/2$^+$	E1	2.28×10^{-3} *3*	%Iγ=8.0 *4* α(K)=0.001960 *27*; α(L)=0.000254 *4*; α(M)=5.38×10^{-5} *8* α(N)=1.209×10^{-5} *17*; α(O)=1.815×10^{-6} *25*; α(P)=1.137×10^{-7} *16* Eγ=654.838 *3*, Iγ=27.608 *22* (2003Me01). δ(M2/E1)<0.2 from α(K)exp=0.0022 *6*. γ(θ): A_2=−0.436 used to determine orientation parameter β_2.
657.2 hbe	0.07 *3*	1312.106	(5/2)	654.843	7/2$^-$			%Iγ=0.018 *8*
661.90 e *11*	0.020 & *8*	1412.10	(5/2,7/2)	750.41	(7/2$^-$,9/2$^+$)			%Iγ=0.0052 *21* Eγ=660.97 *3*, Iγ=0.122 *5* (2003Me01).

$^{149}_{61}Pm_{88}$-19

^{149}Nd β^- decay (1.726 h) 1979Sc12,1986Ii01,2003Me01 (continued)

$\gamma(^{149}Pm)$ (continued)

E_γ[‡]	I_γ[#k]	E_i(level)	J_i^π	E_f	J_f^π	Comments
665.22[jin] *7*	0.059 *4*	1181.30?		515.645	$(9/2)^-$	%Iγ=0.0153 *11* E_γ: level-energy difference=665.65.
671.56[h] *10*	0.040[&] *15*	1031.68	$(7/2^+)$	360.046	$7/2^+$	%Iγ=0.010 *4*
673.58[e] *7*	0.042 *10*	884.89	$(5/2^+)$	211.308	$5/2^+$	%Iγ=0.0109 *26* Eγ=674.38 *14*, Iγ=0.040 *5* (2003Me01).
675.79[i] *4*	0.098 *7*	1234.099	(7/2)	558.15	$(9/2)^+$	%Iγ=0.0255 *20* E_γ: level-energy difference=675.94. Eγ=676.17 *9*, Iγ=0.060 *7* (2003Me01).
[x]678.1[g]	0.02[g]					%Iγ=0.0052
681.34 *8*	0.031 *6*	1239.616	$(5/2^+,7/2)$	558.15	$(9/2)^+$	%Iγ=0.0081 *16* Eγ=681.47 *15*, Iγ=0.023 *4* (2003Me01). E_γ: from 1979Sc12. Others: 681.92 *9* (1968He19), 681.47 (1986Ii01).
686.943 *21*	0.34 *2*	1234.099	(7/2)	547.126	$(5/2,7/2^+)$	%Iγ=0.088 *6* Eγ=686.905 *16*, Iγ=0.340 *21* (2003Me01).
696.264 *21*	0.66 *4*	1234.099	(7/2)	537.863	$5/2^-$	%Iγ=0.171 *12* Eγ=696.191 *9*, Iγ=0.560 *11* (2003Me01).
[x]704.07[e] *10*	0.013 *6*					%Iγ=0.0034 *16*
712.59 *3*	0.27 *2*	923.886	$(5/2^+,7/2)$	211.308	$5/2^+$	%Iγ=0.070 *6* Eγ=712.542 *19*, Iγ=0.243 *8* (2003Me01).
718.43 *4*	0.19 *2*	1234.099	(7/2)	515.645	$(9/2)^-$	%Iγ=0.049 *5* Eγ=718.44 *4*, Iγ=0.120 *6* (2003Me01). I_γ: 0.11 (1986Ii01).
[x]726.822[j] *12*	0.154 *10*					%Iγ=0.0400 *29* Proposed placement (2003Me01): 1264.3 − 537.98. Poor fit (evaluators). Also no such line seen in 1979ScZL and 1968He19.
727.88[i] *5*	0.063 *7*	1190.274	(5/2)	462.191	$3/2^-$	%Iγ=0.0164 *19* Eγ=727.23 *3*, Iγ=0.255 *24* (2003Me01). E_γ: level-energy difference=728.08.
[x]736.18[j] *11*	0.071 *16*					%Iγ=0.018 *4* Proposed placement (2003Me01): 924.1 − 188.7. Poor fit (evaluators).
740.57 *3*	0.055 *1*	1156.034	$(3/2^+,5/2,7/2^+)$	415.449	$3/2^+$	%Iγ=0.0143 *5* Eγ=740.66 *7*, Iγ=0.083 *16* (2003Me01).
743.5[eh] *4*	0.010 *4*	1031.68	$(7/2^+)$	288.208	$9/2^+$	%Iγ=0.0026 *10*
749.63 *5*	0.052 *6*	750.41	$(7/2^-,9/2^+)$	0.0	$7/2^+$	%Iγ=0.0135 *16* Eγ=750.15 *14*, Iγ=0.12 *9* (2003Me01). E_γ: poor fit; level-energy difference=750.41; γγ from 2003Me01. Uncertainty was increased to 0.2 keV in the least-squares fitting procedure.
754.291 *21*	0.15 *1*	942.926	$(3/2^+,5/2,7/2^+)$	188.631	$3/2^+$	%Iγ=0.0390 *29* Eγ=754.43 *5*, Iγ=0.36 *18* (2003Me01).
758.65[mh] *8*	0.060[m] *6*	758.67	$(5/2^+,7/2,9/2^+)$	0.0	$7/2^+$	%Iγ=0.0156 *16* Eγ=759.13 *8*, Iγ=0.30 *16* (2003Me01). Placed from 872 level by 1986Ii01.

$^{149}_{61}Pm_{88}$-20

$\gamma(^{149}Pm)$ (continued)

E_γ[‡]	I_γ[#k]	E_i(level)	J_i^π	E_f	J_f^π	Comments
758.65[m] *8*	0.060[m] *6*	872.94?		114.313	$5/2^+$	%Iγ=0.0156 *16*
761.46 *5*	0.11 *1*	1031.68	$(7/2^+)$	270.170	$7/2^-$	%Iγ=0.0286 *27* Eγ=762.27 *6*, Iγ=0.070 *5* (2003Me01).
765.1[bh]	0.029 *7*	1190.274	(5/2)	425.276	$7/2^+$	%Iγ=0.0075 *18*
768.172 *21*	0.23 *2*	768.188	$(5/2,7/2^+)$	0.0	$7/2^+$	%Iγ=0.060 *5* Eγ=767.793 *13*, Iγ=0.338 *8* (2003Me01).
771.91[jn]		1234.099	(7/2)	462.191	$3/2^-$	%Iγ=0.049 *5* Eγ=771.91 *4*, Iγ=0.10 *5* (2003Me01), but no evidence of such a line in 1979ScZL and 1968He19. Intensity must be much weaker than 0.10 if this line is from ^{149}Nd decay.
774.6[bh]	0.012 *5*	1190.274	(5/2)	415.449	$3/2^+$	%Iγ=0.0031 *13* Eγ=775.97 *15*, Iγ=0.013 *3* (2003Me01) placed from 1412 level.
775.97[jn] *15*	0.013 *3*	1412.10	(5/2,7/2)	637.43?		%Iγ=0.0034 *8* E_γ: 774.6γ placed from 1190 level in 1979Sc12 and 1986Ii01.
781.40 *6*	0.015 *4*	1141.528	$5/2^+$	360.046	$7/2^+$	%Iγ=0.0039 *10* Eγ=781.32 *10*, Iγ=0.020 *3* (2003Me01).
786.73 *4*	0.039 *5*	786.72	$(3/2^+,5/2^+)$	0.0	$7/2^+$	%Iγ=0.0101 *13* Eγ=785.20 *3*, Iγ=0.070 *4* (2003Me01).
793.43 *3*	0.087 *7*	1190.274	(5/2)	396.774	$5/2^+$	%Iγ=0.0226 *19* Eγ=793.19 *3*, Iγ=0.163 *7* (2003Me01).
795.93 *9*	0.027 *4*	1156.034	$(3/2^+,5/2,7/2^+)$	360.046	$7/2^+$	%Iγ=0.0070 *11* Eγ=794.58 *3*, Iγ=0.328 *18* (2003Me01). E_γ: 796.64 (1986Ii01).
[x]806.10[j] *8*	0.097 *9*					%Iγ=0.0252 *25* Proposed placement (2003Me01): 1363.9 − 556.2. Poor fit (evaluators).
808.843 *20*	0.73 *5*	1234.099	(7/2)	425.276	$7/2^+$	%Iγ=0.190 *14* Eγ=808.892 *12*, Iγ=0.545 *20* (2003Me01).
809.6[fh]	0.06	923.886	$(5/2^+,7/2)$	114.313	$5/2^+$	%Iγ=0.0156 *5* I_γ: from 1986Ii01. E_γ: other: 810.54 *20* (1968He19) fits poorly.
813.19[n] *8*	0.044 *7*	1328.81?		515.645	$(9/2)^-$	%Iγ=0.0114 *19* Placement from 2003Me01. Eγ=813.09 *23*, Iγ=0.028 *9* (2003Me01).
818.18[hbf]	0.022 *6*	1568.60	$(5/2^+,7/2)$	750.41	$(7/2^-,9/2^+)$	%Iγ=0.0057 *16*
828.6[b]	0.033 *8*	942.926	$(3/2^+,5/2,7/2^+)$	114.313	$5/2^+$	%Iγ=0.0086 *21* Eγ=829.81 *14*, Iγ=0.071 *7* (2003Me01).
[x]829.35[d] *18*						
832.09 *5*	0.09 *1*	1043.39	$(3/2^+,5/2,7/2)$	211.308	$5/2^+$	%Iγ=0.0234 *27* Eγ=832.25 *20*, Iγ=0.051 *8* (2003Me01).
837.40 *3*	0.12 *1*	1234.099	(7/2)	396.774	$5/2^+$	%Iγ=0.0312 *28* Eγ=835.18 *6*, Iγ=0.124 *8* in 2003Me01 is probably the same γ, although 2003Me01 place it from 1391 level.

$^{149}_{61}Pm_{88}$-21

^{149}Nd β^- decay (1.726 h) 1979Sc12,1986Ii01,2003Me01 (continued)

$\gamma(^{149}Pm)$ (continued)

E_γ[‡]	I_γ[#k]	E_i(level)	J_i^π	E_f	J_f^π	Comments
[x]839.24[j] 5	0.106 8					%Iγ=0.0275 22 Proposed placement (2003Me01): 1049.6 − 211.4. Poor fit (evaluators).
842.847 23	0.20 2	1239.616	(5/2$^+$,7/2)	396.774	5/2$^+$	%Iγ=0.052 5 Eγ=842.97 4, Iγ=0.143 6 (2003Me01).
849.926[h] 25	0.084 7	1312.106	(5/2)	462.191	3/2$^-$	%Iγ=0.0218 19
854.74[hbf]	0.017 4	1412.10	(5/2,7/2)	558.15	(9/2)$^+$	%Iγ=0.0044 10 E_γ: poor fit; level-energy difference=854.06.
859.42[din] 5	0.076 7	1406.84?		547.126	(5/2,7/2$^+$)	%Iγ=0.0197 19 Iγ and placement from 2003Me01. E_γ: level-energy difference=859.72. Eγ=858.74 11 (2003Me01).
861.54 3	0.068 7	1050.18		188.631	3/2$^+$	%Iγ=0.0177 19 Eγ=860.21 3, Iγ=0.264 19 (2003Me01).
864.9	0.013[a] 5	1290.078	(3/2$^+$,5/2,7/2)	425.276	7/2$^+$	%Iγ=0.0034 13 Eγ=864.85 11, Iγ=0.068 26 (2003Me01).
865.00[h] 5	0.051[a] 25	1412.10	(5/2,7/2)	547.126	(5/2,7/2$^+$)	%Iγ=0.013 7
871.375 23	0.13 1	1141.528	5/2$^+$	270.170	7/2$^-$	%Iγ=0.0338 28 Eγ=871.45 6, Iγ=0.043 9 (2003Me01).
874.00 8	0.018 4	1234.099	(7/2)	360.046	7/2$^+$	%Iγ=0.0047 10 Eγ=875.46 14, Iγ=0.025 9 (2003Me01).
[x]877.9[e] 3	0.008 6					%Iγ=0.0021 16
886.59 8	0.021 4	1312.106	(5/2)	425.276	7/2$^+$	%Iγ=0.0055 11 Eγ=886.54 16, Iγ=0.021 9 (2003Me01).
893.3[b]	0.017 4	1290.078	(3/2$^+$,5/2,7/2)	396.774	5/2$^+$	%Iγ=0.0044 10 Eγ=892.94 9, Iγ=0.028 4 (2003Me01).
896.65 14	0.015 5	1312.106	(5/2)	415.449	3/2$^+$	%Iγ=0.0039 13 Eγ=897.09 22, Iγ=0.011 3 (2003Me01).
[x]907.69 7	0.017 3					%Iγ=0.0044 8
[x]911.3[g]	0.06[g]					%Iγ=0.016
915.35[h] 9	0.008 4	1312.106	(5/2)	396.774	5/2$^+$	%Iγ=0.0021 10
920.3[h] 2	0.015 6	1190.274	(5/2)	270.170	7/2$^-$	%Iγ=0.0039 16
923.874 23	0.39 3	923.886	(5/2$^+$,7/2)	0.0	7/2$^+$	%Iγ=0.101 8 Eγ=924.21 10, Iγ=0.254 16 (2003Me01).
929.2[gh]	<0.04[g]	1043.39	(3/2$^+$,5/2,7/2)	114.313	5/2$^+$	%Iγ<0.010
929.8[h] 3	0.042 5	1290.078	(3/2$^+$,5/2,7/2)	360.046	7/2$^+$	%Iγ=0.0109 13 E_γ: from 1979Sc12. Others: 929.43 5 (1968He19), 929.9 (1986Ii01).
[x]933.24[j] 4	0.225 20					%Iγ=0.058 5
935.90[h] 6	0.018 3	1050.18		114.313	5/2$^+$	%Iγ=0.0047 8 E_γ: 936.67 (1986Ii01).
[x]938.79[e] 5	0.023 3					%Iγ=0.0060 8

$^{149}_{61}Pm_{88}$-22

^{149}Nd β^- decay (1.726 h) 1979Sc12,1986Ii01,2003Me01 (continued)

$\gamma(^{149}Pm)$ (continued)

E_γ ‡	I_γ #k	E_i(level)	J_i^π	E_f	J_f^π	Comments
942.97[e] *17*	0.012 *4*	942.926	(3/2$^+$,5/2,7/2$^+$)	0.0	7/2$^+$	%Iγ=0.0031 *10* Eγ=943.18 *21*, Iγ=0.030 *13* (2003Me01).
945.80 *3*	0.083 *7*	1234.099	(7/2)	288.208	9/2$^+$	%Iγ=0.0216 *19* Eγ=945.83 *14*, Iγ=0.038 *15* (2003Me01).
951.3	0.010[a] *4*	1239.616	(5/2$^+$,7/2)	288.208	9/2$^+$	%Iγ=0.0026 *10* E_γ: see comment on 952.1γ. Eγ=951.06 *18*, Iγ=0.013 *7* (2003Me01).
952.0[f]	0.029[a] *10*	1312.106	(5/2)	360.046	7/2$^+$	%Iγ=0.0075 *26* E_γ: other: 951.95 *5* for doublet (1968He19). Eγ=952.61 *4*, Iγ=0.039 *9* (2003Me01).
963.95 *3*	0.097 *10*	1234.099	(7/2)	270.170	7/2$^-$	%Iγ=0.0252 *27* Eγ=964.048 *19*, Iγ=0.232 *8* (2003Me01).
967.43 *4*	0.032 *4*	1156.034	(3/2$^+$,5/2,7/2$^+$)	188.631	3/2$^+$	%Iγ=0.0083 *11* Eγ=968.372 *8*, Iγ=0.799 *12* (2003Me01). E_γ: 968.28 (1986Ii01).
x971.77[e] *9*	0.011 *3*					%Iγ=0.0029 *8*
976.2[jn] *3*	0.025 *10*	1363.85?		387.559	1/2$^+$	%Iγ=0.0065 *26*
978.8[e]	0.06[a] *2*	1394.25	3/2$^+$	415.449	3/2$^+$	%Iγ=0.016 *5* Eγ=978.43 *21*, Iγ=0.15 *4* (2003Me01).
979.013 *23*	0.30[a] *4*	1190.274	(5/2)	211.308	5/2$^+$	%Iγ=0.078 *11* Eγ=979.52 *22*, Iγ=0.12 *3* (2003Me01).
986.68[h] *10*	0.009 *2*	1412.10	(5/2,7/2)	425.276	7/2$^+$	%Iγ=0.0023 *5*
992.83[ein] *6*	0.057 *6*	1181.30?		188.631	3/2$^+$	%Iγ=0.0148 *16* Placement from 2003Me01. E_γ: level-energy difference=992.66. Eγ=992.08 *27*, Iγ=0.013 *8* (2003Me01).
993.05[bf]	0.015 *7*	1264.01	(5/2,7/2)	270.170	7/2$^-$	%Iγ=0.0039 *18* E_γ: level-energy difference=993.84. Eγ=993.56 *21*, Iγ=0.015 *9* (2003Me01). I_γ: 0.05 (1986Ii01).
1016.1[jn] *3*	0.014 *5*	1412.10	(5/2,7/2)	396.774	5/2$^+$	%Iγ=0.0036 *13*
1021.8[e]	0.010[a] *4*	1568.60	(5/2$^+$,7/2)	547.126	(5/2,7/2$^+$)	%Iγ=0.0026 *10* E_γ: level-energy difference=1021.5. Eγ=1020.99 *20*, Iγ=0.063 *8* (2003Me01).
1022.78 *3*	0.40[a] *3*	1234.099	(7/2)	211.308	5/2$^+$	%Iγ=0.104 *8* Eγ=1022.93 *4*, Iγ=0.266 *18* (2003Me01).
1027.18 *4*	0.034 *6*	1141.528	5/2$^+$	114.313	5/2$^+$	%Iγ=0.0088 *16* Eγ=1027.6 *3*, Iγ=0.012 *5* (2003Me01).
1031.77 *8*	0.017[&] *5*	1031.68	(7/2$^+$)	0.0	7/2$^+$	%Iγ=0.0044 *13* Eγ=1031.40 *21*, Iγ=0.028 *7* (2003Me01).
x1040.7[j] *4*	0.021 *7*					%Iγ=0.0055 *18* Proposed placement (2003Me01): 1156.97 − 114.35. Very poor fit (evaluators).

$^{149}_{61}Pm_{88}$-23

^{149}Nd β^- decay (1.726 h) 1979Sc12,1986Ii01,2003Me01 (continued)

$\gamma(^{149}Pm)$ (continued)

E_γ[‡]	I_γ[#k]	E_i(level)	J_i^π	E_f	J_f^π	Comments
1041.95 *3*	0.11 *1*	1312.106	(5/2)	270.170	7/2$^-$	%Iγ=0.0286 *27* Eγ=1042.36 *17*, Iγ=0.043 *15* (2003Me01).
1051.90 *11*	0.017[&] *5*	1412.10	(5/2,7/2)	360.046	7/2$^+$	%Iγ=0.0044 *13* Eγ=1051.34 *20*, Iγ=0.015 *9* (2003Me01).
1075.95 *4*	0.08 *1*	1190.274	(5/2)	114.313	5/2$^+$	%Iγ=0.0208 *27* Eγ=1076.03 *5*, Iγ=0.091 *3* (2003Me01).
1078.76 *3*	0.244 *27*	1290.078	(3/2$^+$,5/2,7/2)	211.308	5/2$^+$	%Iγ=0.063 *7* Eγ=1078.68 *23*, Iγ=0.199 *3* (2003Me01).
1100.77 *3*	0.19 *2*	1312.106	(5/2)	211.308	5/2$^+$	%Iγ=0.049 *5* Eγ=1100.68 *3*, Iγ=0.126 *26* (2003Me01).
1119.79[jn]		1234.099	(7/2)	114.313	5/2$^+$	I_γ: 0.31 *18* (2003Me01), but no evidence of such a line in 1979ScZL and 1968He19. Intensity must be much weaker than 0.31 if this line is from ^{149}Nd decay.
1123.47 *8*	0.058 *9*	1312.106	(5/2)	188.631	3/2$^+$	%Iγ=0.0151 *24* Eγ=1124.62 *4*, Iγ=0.42 *6* (2003Me01).
1125.32 *5*	0.114 *14*	1239.616	(5/2$^+$,7/2)	114.313	5/2$^+$	%Iγ=0.030 *4* Eγ=1125.40 *4*, Iγ=0.26 *3* (2003Me01).
[x]1128.56[e] *11*	0.012 *3*					%Iγ=0.0031 *8*
1135.94[h] *9*	0.008[&] *3*	1495.86	(5/2,7/2$^+$)	360.046	7/2$^+$	%Iγ=0.0021 *8*
1141.77[mhi] *16*	0.010[m] *4*	1141.528	5/2$^+$	0.0	7/2$^+$	%Iγ=0.0026 *10* E_γ: level-energy difference=1141.53. Placement from 1986Ii01.
1141.77[mh] *8*	0.010[m&] *4*	1412.10	(5/2,7/2)	270.170	7/2$^-$	%Iγ=0.0026 *10*
1150.08[hi] *8*	0.089 *9*	1264.01	(5/2,7/2)	114.313	5/2$^+$	%Iγ=0.0231 *24* I_γ: 0.01 (1986Ii01). E_γ: level-energy difference=1149.70.
1156.3[h] *4*	0.004 *2*	1156.034	(3/2$^+$,5/2,7/2$^+$)	0.0	7/2$^+$	%Iγ=0.0010 *5*
1171.97 *10*	0.015 *3*	1568.60	(5/2$^+$,7/2)	396.774	5/2$^+$	%Iγ=0.0039 *8* Eγ=1170.88 *19*, Iγ=0.068 *9* (2003Me01).
[x]1172.76[j] *19*	0.141 *17*					%Iγ=0.037 *5* Proposed placement (2003Me01): 1411.9 − 240.4. Very poor fit (evaluators); and γ with this large intensity not reported in other studies.
1175.75[h] *6*	0.013 *3*	1290.078	(3/2$^+$,5/2,7/2)	114.313	5/2$^+$	%Iγ=0.0034 *8*
1180.5[jn] *3*	0.153 *11*	1181.30?		0.0	7/2$^+$	%Iγ=0.0397 *31*
1190.28[h] *7*	0.009 *2*	1190.274	(5/2)	0.0	7/2$^+$	%Iγ=0.0023 *5*
1197.84 *6*	0.026 *4*	1312.106	(5/2)	114.313	5/2$^+$	%Iγ=0.0068 *11* Eγ=1197.47 *19*, Iγ=0.021 *4* (2003Me01).
[x]1202.29 *10*	0.006 *2*					%Iγ=0.0016 *5* Eγ=1202.1 *5*, Iγ=0.008 *4* (2003Me01).
1206.7[jn] *3*	0.015 *6*	1495.86	(5/2,7/2$^+$)	288.208	9/2$^+$	%Iγ=0.0039 *16*
1225.67[h] *11*	0.006 *2*	1495.86	(5/2,7/2$^+$)	270.170	7/2$^-$	%Iγ=0.0016 *5*
1234.12 *4*	0.100 *13*	1234.099	(7/2)	0.0	7/2$^+$	%Iγ=0.0260 *35* Eγ=1234.31 *5*, Iγ=0.083 *8* (2003Me01).

$^{149}_{61}Pm_{88}$-24

^{149}Nd β^- decay (1.726 h) 1979Sc12,1986Ii01,2003Me01 (continued)

$\gamma(^{149}Pm)$ (continued)

E_γ [‡]	I_γ [#k]	E_i(level)	J_i^π	E_f	J_f^π	Comments
1237.61[jn]		1448.24	(3/2$^+$,5/2,7/2$^+$)	211.308	5/2$^+$	I_γ: 0.149 *9* (2003Me01), but no evidence of such a line in 1979ScZL and 1968He19. Intensity must be much weaker than 0.149 if this line is from ^{149}Nd decay.
1239.5[h] *3*	0.007 *2*	1239.616	(5/2$^+$,7/2)	0.0	7/2$^+$	%Iγ=0.0018 *5* E_γ: 1238.56 (1986Ii01).
1259.62 *7*	0.016 *3*	1448.24	(3/2$^+$,5/2,7/2$^+$)	188.631	3/2$^+$	%Iγ=0.0042 *8* Eγ=1259.22 *5*, Iγ=0.0048 *22* (2003Me01).
1264.02 *6*	0.029 *5*	1264.01	(5/2,7/2)	0.0	7/2$^+$	%Iγ=0.0075 *13* Eγ=1263.8 *5*, Iγ=0.0102 *23* (2003Me01).
1280.28 *12*	0.004 *2*	1568.60	(5/2$^+$,7/2)	288.208	9/2$^+$	%Iγ=0.0010 *5* Eγ=1280.57 *6*, Iγ=0.043 *3* (2003Me01).
1284.49[h] *13*	0.006 *2*	1495.86	(5/2,7/2$^+$)	211.308	5/2$^+$	%Iγ=0.0016 *5*
1290.11[h] *6*	0.016 *3*	1290.078	(3/2$^+$,5/2,7/2)	0.0	7/2$^+$	%Iγ=0.0042 *8*
1293.4[jn] *4*	0.07 *3*	1293.4?		0.0	7/2$^+$	%Iγ=0.018 *8*
1298.32[h] *10*	0.003 *2*	1568.60	(5/2$^+$,7/2)	270.170	7/2$^-$	%Iγ=0.0008 *5*
1307.6[bh]	0.004 *2*	1495.86	(5/2,7/2$^+$)	188.631	3/2$^+$	%Iγ=0.0010 *5* E_γ: level-energy difference=1307.2.
1312.13[h] *6*	0.028 *4*	1312.106	(5/2)	0.0	7/2$^+$	%Iγ=0.0073 *11*
1357.26[h] *11*	0.008 *2*	1568.60	(5/2$^+$,7/2)	211.308	5/2$^+$	%Iγ=0.0021 *5*
1367.96[jn] *13*	0.06 *5*	1367.97?		0.0	7/2$^+$	%Iγ=0.016 *13*
1381.42[h] *8*	0.008 *2*	1495.86	(5/2,7/2$^+$)	114.313	5/2$^+$	%Iγ=0.0021 *5*
[x]1400.95[j] *9*	0.038 *4*					%Iγ=0.0099 *11*
1407.26[jin] *6*	0.058 *5*	1406.84?		0.0	7/2$^+$	%Iγ=0.0151 *14* E_γ: level-energy difference=1406.84.
1448.07 *19*	0.002 *1*	1448.24	(3/2$^+$,5/2,7/2$^+$)	0.0	7/2$^+$	%Iγ=0.00052 *26* Eγ=1449.56 *3*, Iγ=0.032 *6* (2003Me01).
1454.29[h] *12*	0.005 *2*	1568.60	(5/2$^+$,7/2)	114.313	5/2$^+$	%Iγ=0.0013 *5*
[x]1473.8[d] *3*						
1495.80 *14*	0.006 *2*	1495.86	(5/2,7/2$^+$)	0.0	7/2$^+$	%Iγ=0.0016 *5* Eγ=1495.36 *11*, Iγ=0.027 *3* (2003Me01).
1568.43 *18*	0.002 *1*	1568.60	(5/2$^+$,7/2)	0.0	7/2$^+$	%Iγ=0.00052 *26*

[†] From ce data. The α(exp) values are derived by the evaluators from Ice values of 1967Ba27 and Iγ data of 1979ScZL assuming 114γ as standard with α(K)=0.9086 *8* deduced from L1/L2 and L1/L3 ratios. Sign of δ is from $\gamma(\theta)$ (1987Si13) and/or $\gamma\gamma(\theta)$ (1986Ii01).

[‡] Weighted average of 1979Sc12 and 1968He19. In cases where 1979Sc12 have deduced Eγ from level scheme only, the value is given to 0.1 keV without uncertainty. Values from 1986Ii01 generally agree with those from 1979Sc12 and 1968He19. No uncertainties are quoted by 1986Ii01. Values from 2003Me01 are not used in averaging for reasons quoted above.

[#] From 1979Sc12 or 1979ScZL. For absolute intensities of prominent γ rays (from fission produced source) see 1969Gr32. Values given by 1969Gr32 agree well

$^{149}_{61}Pm_{88}$-25

$\gamma(^{149}Pm)$ (continued)

with those deduced from the normalization factor given here. Values from 2003Me01 are not used in averaging for reasons quoted above.

@ From ce date of 1967Ba27.

& From $\gamma\gamma$.

a Doublet, measured energy associated with stronger component and Iγ of both from $\gamma\gamma$.

b Observed only in $\gamma\gamma$.

c Doublet, seen only in $\gamma\gamma$.

d Reported only by 1968He19.

e Not reported by 1986Ii01.

f From 1986Ii01.

g γ reported by 1986Ii01 only.

h γ not reported by 2003Me01.

i Uncertainty was doubled in the least-squares fitting procedure.

j γ from 2003Me01 only; treated as uncertain by the evaluators, since with the intensity quoted by 2003Me01, this line should have been seen by 1979Sc12 and 1986Ii01. This γ is not included in the Adopted Gammas.

k For absolute intensity per 100 decays, multiply by 0.260 *8*.

l 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.

m Multiply placed with undivided intensity.

n Placement of transition in the level scheme is uncertain.

x γ ray not placed in level scheme.

^{149}Nd β^- decay (1.726 h) 1979Sc12,1986Ii01,2003Me01

Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given

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 1.726 h 5
Q_{β^-}=1688.9 25 $\%\beta^-$=100
$^{149}_{60}Nd_{89}$

Iβ⁻	Log *ft*		
0.018	6.2	(5/2⁺,7/2)	1568.60
0.010	7.1	(5/2,7/2⁺)	1495.86
0.0047	7.7	(3/2⁺,5/2,7/2⁺)	1448.24
0.032	7.1	(5/2,7/2)	1412.10
0.035	7.04		1406.84
0.016	7.4	3/2⁺	1394.25
0.016	7.6		1367.97
0.08	8.5	(7/2⁻,9/2⁺)	750.41
<0.01	>9.5		637.43
<0.02	>9.3	(9/2)⁺	558.15
<0.14	>8.5	(5/2,7/2⁺)	547.126
0.61	8.1	7/2⁺	425.276
0.16	8.6	3/2⁺	415.449
3.31	7.34	5/2⁺	396.774
<0.2	>8.6	7/2⁺	360.046
<0.02	>10.5[1u]	9/2⁺	288.208
17.5	6.78	7/2⁻	270.170 2.59 ns 2
24.7	6.70	5/2⁺	211.308 80 ps 15
<2.7	>7.7	3/2⁺	188.631 3.27 ns 5
6	7.4	5/2⁺	114.313 2.53 ns 3
<5	>7.6	7/2⁺	0.0 53.08 h 9

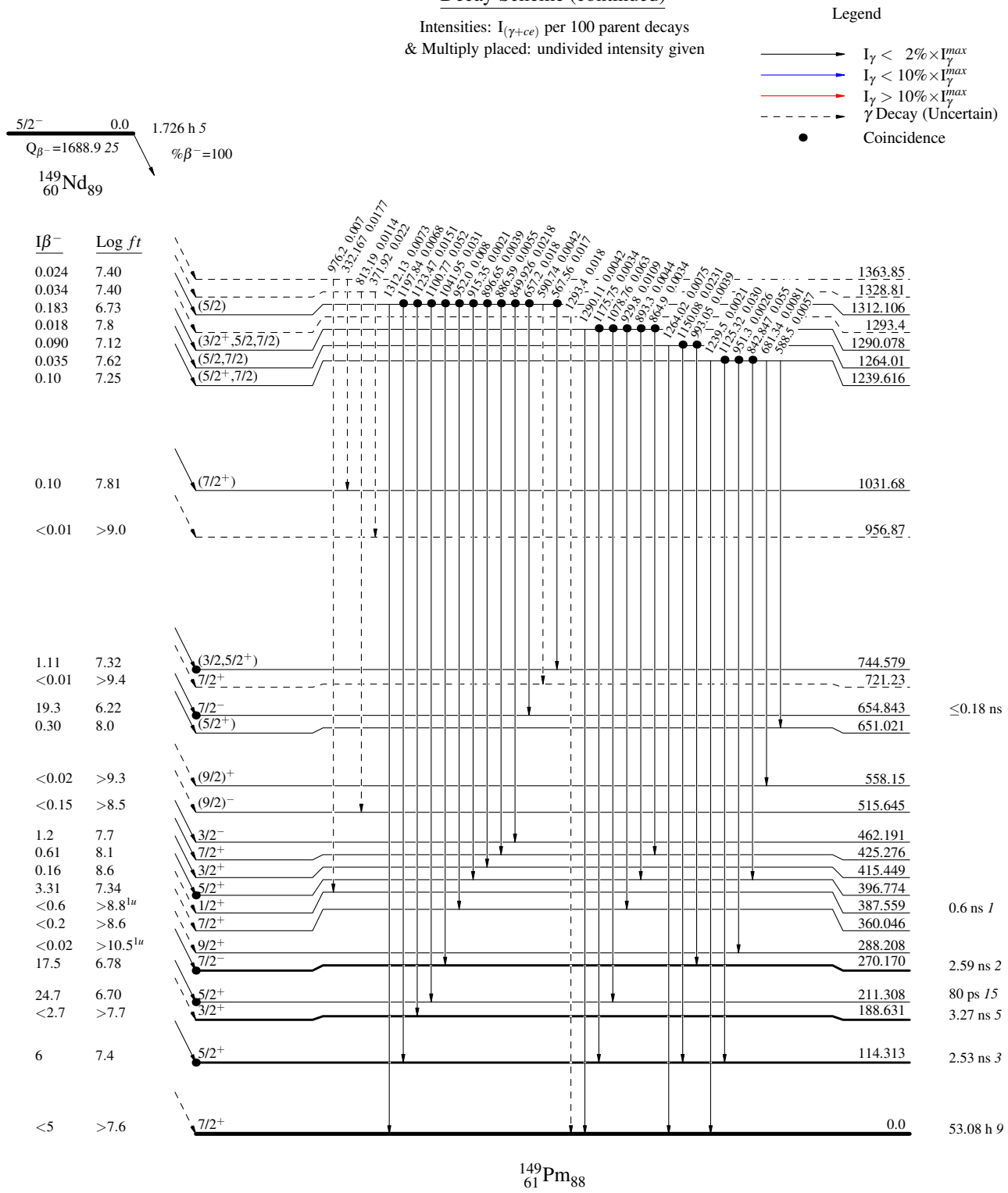
1568.43 0.0008, 1454.29 0.0016, 1357.26 0.0023, 1298.32 0.0010, 1280.28 0.0013, 1171.97 0.0039, 1021.8 0.0026, 818.18 0.0057
1495.80 0.0018, 1381.42 0.0023, 1307.6 0.0013, 1284.49 0.0018, 1225.67 0.0018, 1206.7 0.0039, 1135.94 0.0021
1448.07 0.0008, 1259.62 0.0042, 1237.61
1141.77 0.00268, 1051.90 0.0044, 1016.1 0.0036, 986.68 0.0026, 865.00 0.013, 854.74 0.0044, 775.97 0.0034, 661.90 0.0052
1407.26 0.0151, 859.42 0.0198, 978.8 0.018, 1367.96 0.016

$^{149}_{61}Pm_{88}$

^{149}Nd β^- decay (1.726 h) 1979Sc12,1986Ii01,2003Me01

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given

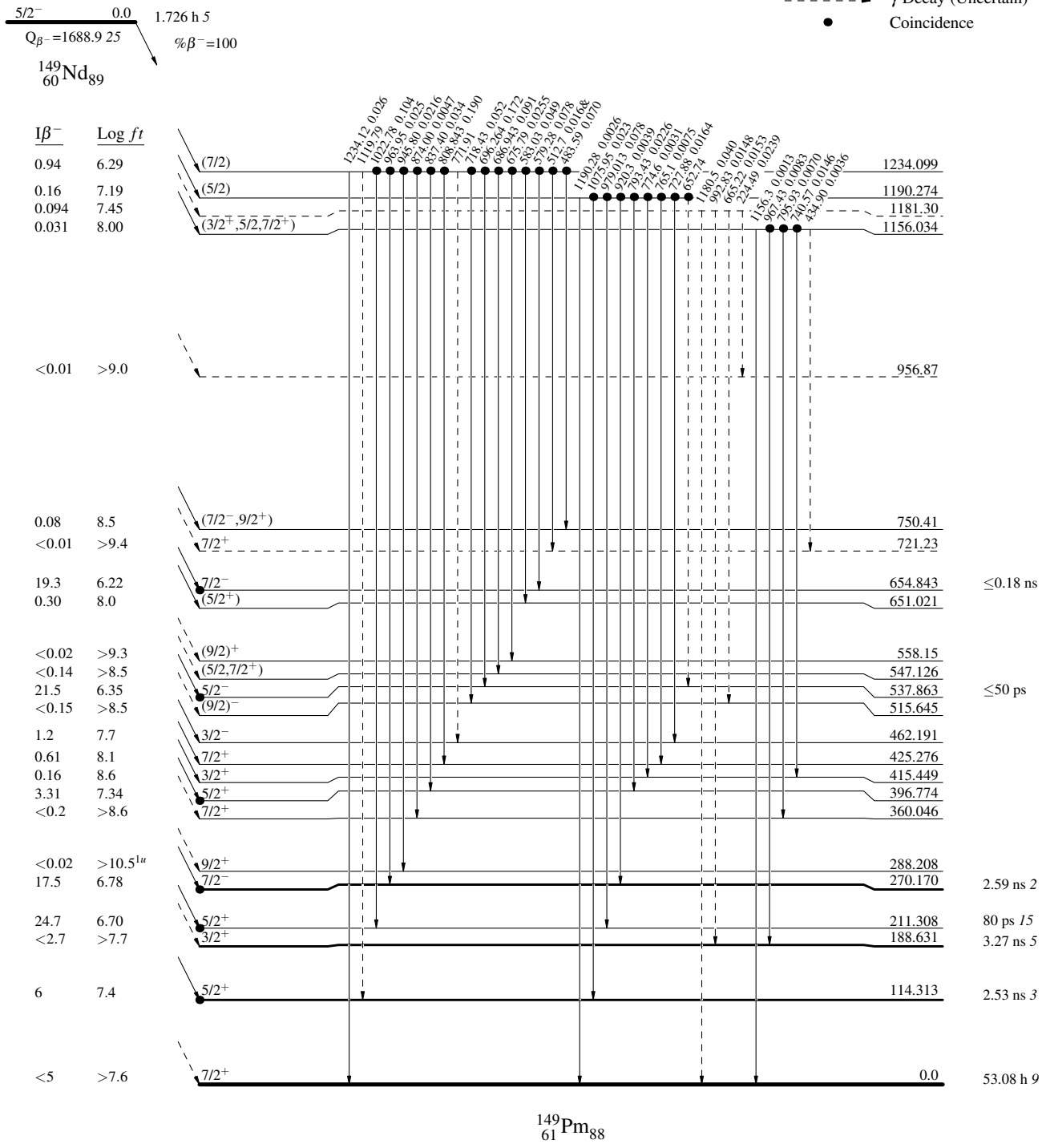


^{149}Nd β^- decay (1.726 h) 1979Sc12,1986Ii01,2003Me01

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given

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

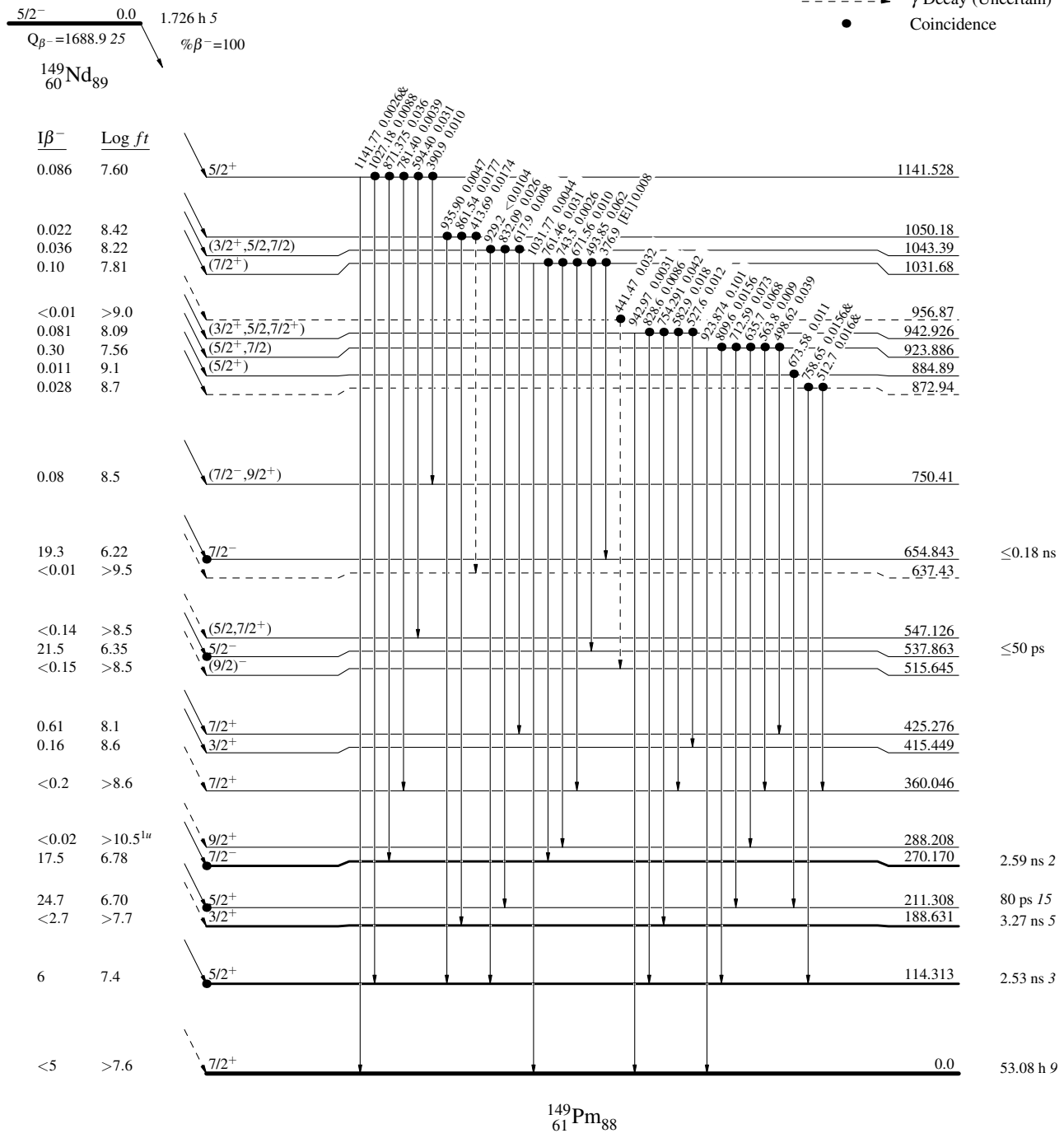


^{149}Nd β^- decay (1.726 h) 1979Sc12,1986Ii01,2003Me01

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given

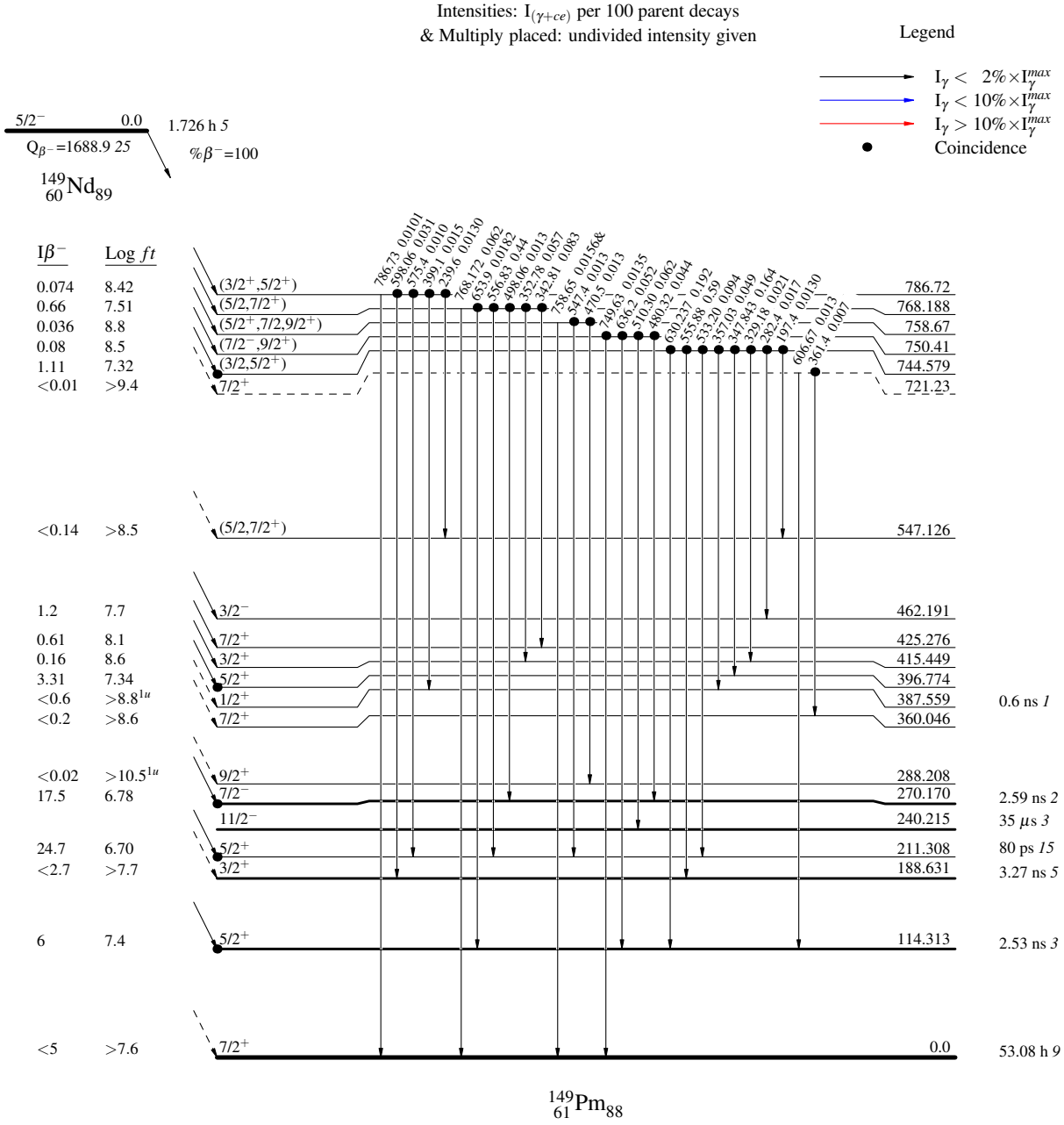
Legend
- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)
- Coincidence



^{149}Nd β^- decay (1.726 h) 1979Sc12,1986Ii01,2003Me01

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given

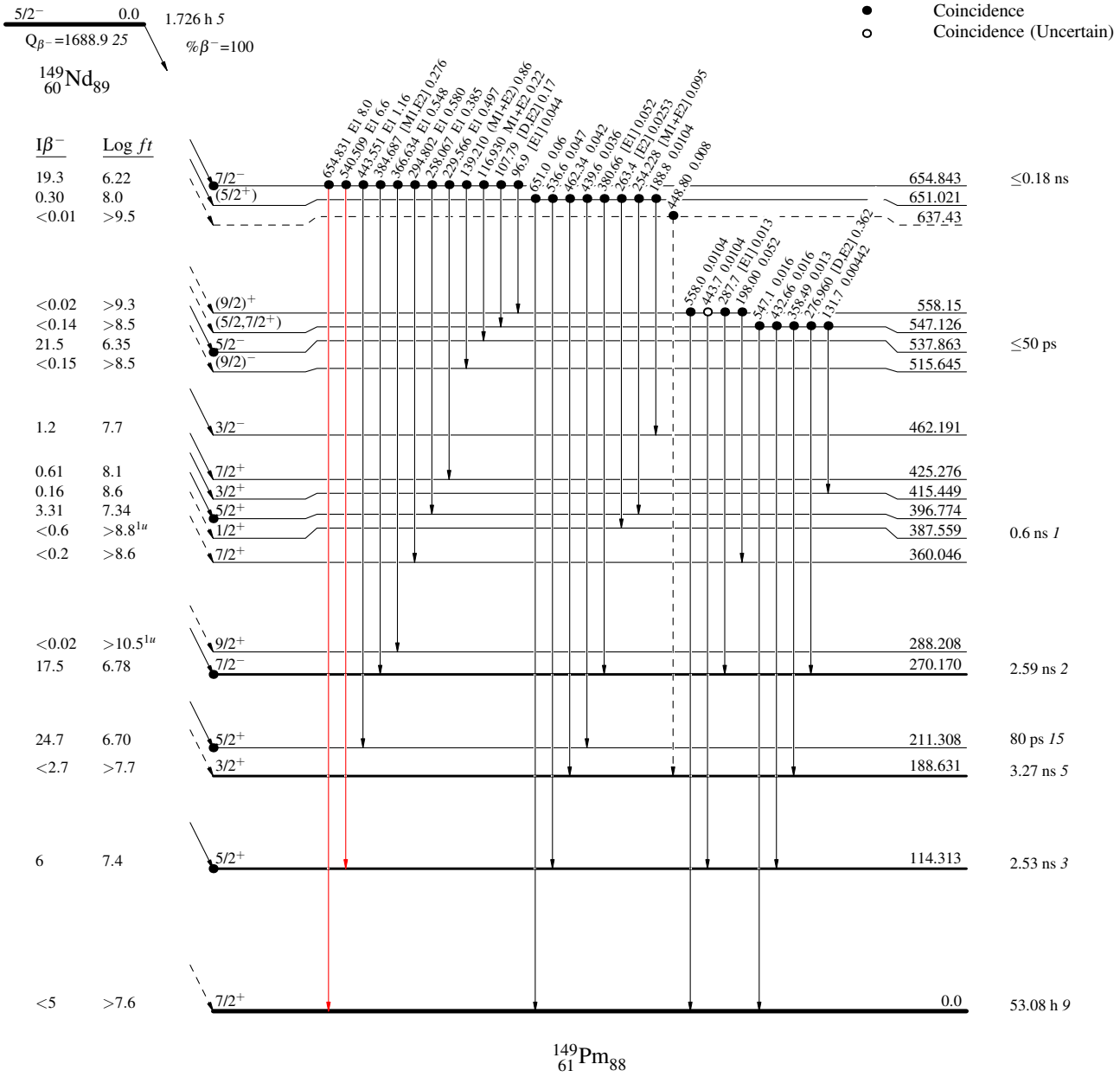


^{149}Nd β^- decay (1.726 h) 1979Sc12,1986Ii01,2003Me01

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given

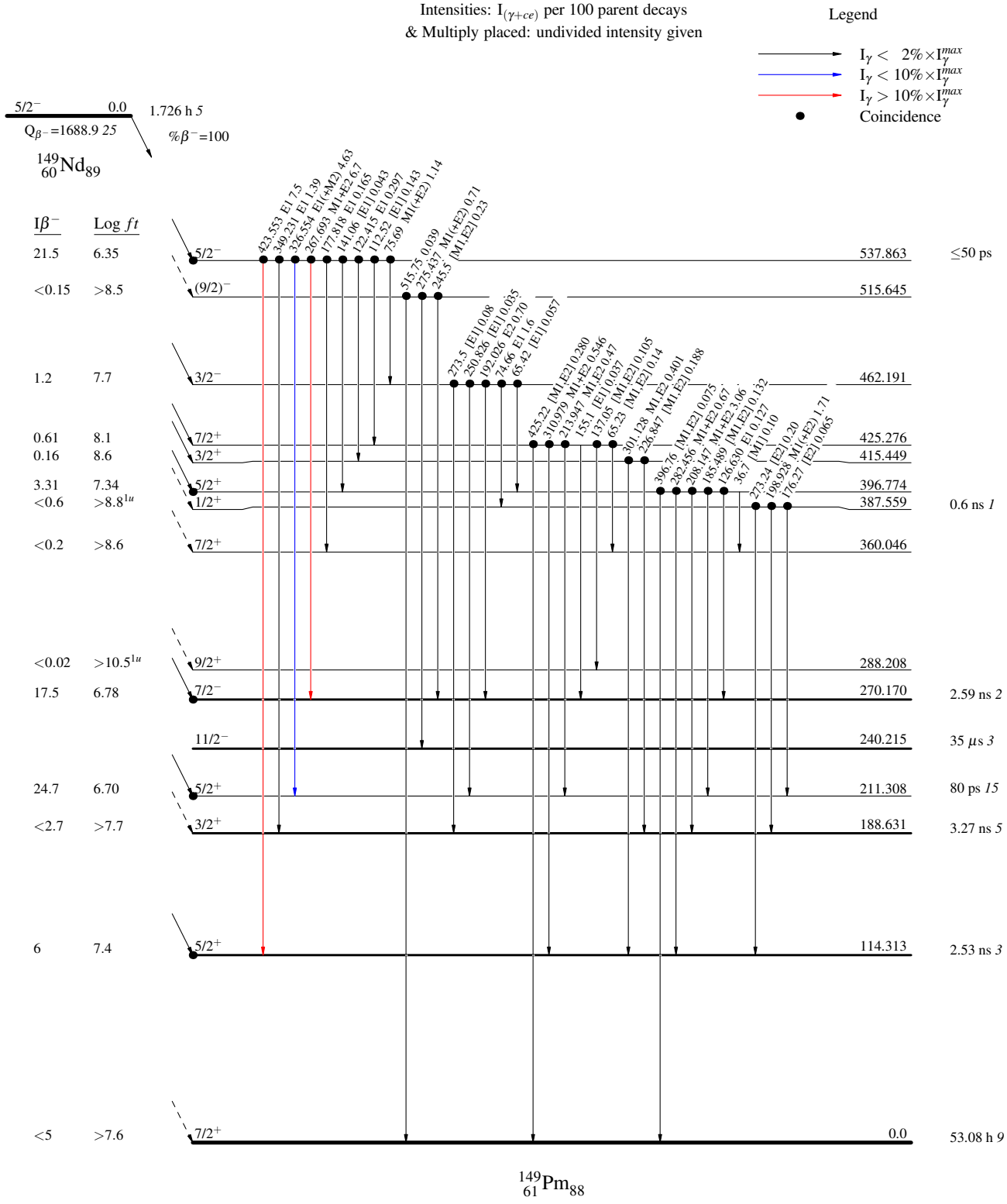
Legend
- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)
- Coincidence
- Coincidence (Uncertain)



^{149}Nd β^- decay (1.726 h) 1979Sc12,1986Ii01,2003Me01

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given



^{149}Nd β^- decay (1.726 h) 1979Sc12,1986Ii01,2003Me01

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given