^{141}Pm ε decay 1976Za03

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 187,1 (2023)	12-Oct-2022

Parent: ^{141}Pm: E=0.0; $J^\pi=5/2^+$; $T_{1/2}$=20.90 min *5*; Q(ε)=3669 *14*; %ε+%$β^+$ decay=100
^{141}Pm-Q(ε): From 2021Wa16.
Measured: γ, γγ (1976Za03,1975Ya04,1970Ch29), $γ^±γ$ coin (1975Ya04), ce (1970Ch29), $β^+$ (1970Ch29,1952Ki25).
Decay scheme is that of 1976Za03; no uncertainties in Iε were given.

^{141}Nd Levels

E(level)†	J^π‡	$T_{1/2}$‡	Comments
0.0	$3/2^+$	2.49 h *3*	
193.72 *3*	$1/2^+$	1.17 ns *15*	$T_{1/2}$: from 1970Ch29.
756.64 *9*	$11/2^-$	62.0 s *8*	
1223.30 *3*	$5/2^+$		
1345.48 *4*	$7/2^+$		
1403.54 *13*	$(7/2^-)$		
1564.64 *5*	$(3/2)^+$		
1581.66 *8*			
1597.00 *5*	$(5/2,3/2)^+$		
1808.38? *9*			
1820.49 *5*	$5/2^+,3/2^+$		
1897.27 *8*			
1967.56 *5*	$7/2^+$		
2066.41 *7*	$3/2^+,5/2^+$		
2073.72 *7*	$(3/2^+,5/2^+)$		
2109.54 *5*	$3/2^+,5/2^+$		
2145.32 *20*			
2246.57 *5*	$(7/2^-,5/2^-)$		
2265.22 *20*			
2303.63 *5*	$7/2^+$		
2311.68 *11*	$7/2^+,(9/2^+)$		
2336.02 *20*	$(7/2^+)$		
2354.38 *15*	$(3/2,5/2^+)$		
2388.53 *10*	$7/2^+$		
2429.62 *20*			
2463.45 *10*			
2505.43 *8*	$3/2^+,5/2^+$		
2514.82 *20*	$(7/2)^+$		
2619.03 *20*			
2732.53 *20*			
2803.9 *4*	$(3/2^+,5/2^+)$		
2865.3 *4*			
2944.70 *11*	$3/2^+,5/2^+$		
3056.08 *7*	$7/2^+$		

† From least-squares fit to Eγ.
‡ Adopted values, except where noticed.

^{141}Pm ε decay 1976Za03 (continued)

ε,β+ radiations

ε+β+ feeding of g.s. was determined from total annihilation intensity and intensity balance for each level using ε/β+ from theory.

E(decay)	E(level)	Iβ+ †	Iε†	Log *ft*	I(ε+β+)†	Comments
(613 *14*)	3056.08		0.027	7.0	0.027	εK=0.8322 *5*; εL=0.1301 *4*; εM+=0.03770 *11*
(724 *14*)	2944.70		0.0110	7.5	0.0110	εK=0.8351 *3*; εL=0.12796 *23*; εM+=0.03699 *8*
(804 *14*)	2865.3		0.0021	8.4	0.0021	εK=0.8366 *3*; εL=0.12683 *19*; εM+=0.03660 *7*
(865 *14*)	2803.9		0.019	7.5	0.019	εK=0.8375 *2*; εL=0.12611 *16*; εM+=0.03636 *6*
(937 *14*)	2732.53		0.0030	8.3	0.0030	εK=0.8385 *2*; εL=0.12540 *13*; εM+=0.03612 *5*
(1050 *14*)	2619.03		0.023	7.6	0.023	εK=0.8397 *2*; εL=0.1245 *1*; εM+=0.03581 *4*
(1154 *14*)	2514.82		0.0038	8.4	0.0038	εK=0.8406 *1*; εL=0.12379 *9*; εM+=0.03558 *3*
(1164 *14*)	2505.43		0.137	6.9	0.137	εK=0.8407 *1*; εL=0.12374 *9*; εM+=0.03556 *3*
(1206 *14*)	2463.45		0.023	7.7	0.023	εK=0.84097 *9*; εL=0.12350 *8*; εM+=0.03548 *3*
(1239 *14*)	2429.62		0.023	7.7	0.023	εK=0.8412; εL=0.12331 *8*; εM+=0.03541 *3*
(1281 *14*)	2388.53		0.085	7.2	0.085	εK=0.8413; εL=0.12309 *8*; εM+=0.03534 *3*
(1315 *14*)	2354.38		0.045	7.5	0.045	εK=0.8414; εL=0.12291 *8*; εM+=0.03528 *3*
(1333 *14*)	2336.02		0.0106	8.1	0.0106	εK=0.8414; εL=0.12281 *8*; εM+=0.03525 *3*
(1365 *14*)	2303.63		0.253	6.8	0.253	εK=0.8413; εL=0.12263 *8*; εM+=0.03519 *3*
(1404 *14*)	2265.22	4.2×10^{-5}	0.030	7.7	0.030	av Eβ=183.6 *63*; εK=0.8411 *2*; εL=0.12242 *9*; εM+=0.03512 *3*
(1422 *14*)	2246.57	0.00065	0.38	6.6	0.38	av Eβ=191.9 *64*; εK=0.8409 *2*; εL=0.12231 *9*; εM+=0.03509 *3*
(1524 *14*)	2145.32	6.3×10^{-5}	0.015	8.1	0.015	av Eβ=236.5 *62*; εK=0.8393 *4*; εL=0.1216 *1*; εM+=0.03488 *4*
(1560 *14*)	2109.54	0.0134	2.42	5.9	2.43	av Eβ=252.2 *62*; εK=0.8383 *5*; εL=0.1214 *2*; εM+=0.03479 *4*
(1595 *14*)	2073.72	0.0059	0.83	6.4	0.84	av Eβ=268.0 *62*; εK=0.8372 *6*; εL=0.12107 *13*; εM+=0.03470 *4*
(1603 *14*)	2066.41	0.00043	0.058	7.5	0.058	av Eβ=271.2 *62*; εK=0.8369 *6*; εL=0.12100 *13*; εM+=0.03468 *4*
(1701 *14*)	1967.56	0.012	0.89	6.4	0.90	av Eβ=314.4 *62*; εK=0.8322 *9*; εL=0.12000 *17*; εM+=0.03438 *5*
(1772 *14*)	1897.27	0.0018	0.091	7.4	0.093	av Eβ=345.2 *62*; εK=0.8276 *11*; εL=0.11913 *20*; εM+=0.03412 *6*
(1849 *14*)	1820.49	0.0062	0.22	7.1	0.23	av Eβ=378.8 *62*; εK=0.8212 *14*; εL=0.11800 *23*; εM+=0.03379 *7*
(1861 *14*)	1808.38?	0.0026	0.087	7.5	0.090	av Eβ=384.2 *62*; εK=0.8201 *14*; εL=0.11780 *24*; εM+=0.03373 *7*
(2072 *14*)	1597.00	0.082	1.28	6.4	1.36	av Eβ=477.0 *62*; εK=0.7936 *22*; εL=0.1135 *4*; εM+=0.03249 *10*
(2104 *14*)	1564.64	0.051	0.71	6.7	0.76	av Eβ=491.3 *62*; εK=0.7884 *24*; εL=0.1127 *4*; εM+=0.03226 *11*
(2324 *14*)	1345.48	0.022	0.17	7.4	0.19 *8*	av Eβ=588.1 *63*; εK=0.746 *4*; εL=0.1063 *5*; εM+=0.03040 *14*
(2446 *14*)	1223.30	0.32	1.8	6.4	2.1	av Eβ=642.5 *63*; εK=0.717 *4*; εL=0.1021 *6*; εM+=0.02918 *15*
3730 *40*	0.0	50.0	39.9	5.4	89.9	av Eβ=1196.3 *65*; εK=0.376 *4*; εL=0.0530 *5*; εM+=0.01512 *14*

Additional information 1.

† Absolute intensity per 100 decays.

^{141}Pm ε decay 1976Za03 (continued)

γ(^{141}Nd)

Iγ normalization: from Iγ($\gamma^{\pm}$)=2385 (1975Ya04, with no unc), balance of Iγ from each level and theoretical ε/β^+. 4% of relative unc was considered by the evaluator (by comparison with 1976Za03, who listed about 2% of relative unc for Iγ($\gamma^{\pm}$)) which still rather underestimates the uncertainty on Iγ normalization and the derived unc on %Iγ listed in the comments.

Iγ normalization: Additional information 3.

α(K)exp were derived from Iγ (1976Za03) and Ice(K) (1970Ch29) and normalized to α(K)=0.191 for M1+E2 194γ with δ=0.39 *2*.

E_γ	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	δ	α[†]	Comments
180.2 *1*	0.68 *7*	2246.57	(7/2$^-$,5/2$^-$)	2066.41	3/2$^+$,5/2$^+$				%Iγ=0.0288 *32*
193.67 *5*	33.9 *17*	193.72	1/2$^+$	0.0	3/2$^+$	M1+E2	0.39 *2*	0.2213 *31*	%Iγ=1.43 *9* α(K)=0.1851 *26*; α(L)=0.0285 *5*; α(M)=0.00611 *10* α(N)=0.001362 *22*; α(O)=0.0002023 *31*; α(P)=1.165×10^{-5} *17* Mult.,δ: K/L+=4.92 *10*, E2/M1=0.15 *4* (1970Ch29).
289.0 *2*	3.2 *3*	2109.54	3/2$^+$,5/2$^+$	1820.49	5/2$^+$,3/2$^+$				%Iγ=0.135 *14*
403.2 *2*	0.45 *6*	1967.56	7/2$^+$	1564.64	(3/2)$^+$				%Iγ=0.0190 *26*
432.2 *2*	0.31 *6*	2505.43	3/2$^+$,5/2$^+$	2073.72	(3/2$^+$,5/2$^+$)				%Iγ=0.0131 *26*
538.0 *2*	1.4 *2*	2505.43	3/2$^+$,5/2$^+$	1967.56	7/2$^+$				%Iγ=0.059 *9*
544.9 *1*	1.1 *1*	2109.54	3/2$^+$,5/2$^+$	1564.64	(3/2)$^+$				%Iγ=0.047 *5*
597.1 *1*	1.2 *1*	1820.49	5/2$^+$,3/2$^+$	1223.30	5/2$^+$				%Iγ=0.051 *5*
622.01 *5*	18.0 *9*	1967.56	7/2$^+$	1345.48	7/2$^+$			0.00244	%Iγ=0.76 *5* α(K)=0.00209; α(L)=0.00027 Mult.: (E1) from α(K)exp=0.0040 *+12−6* in conflict with placement.
646.9 *1*	1.4 *2*	1403.54	(7/2$^-$)	756.64	11/2$^-$				%Iγ=0.059 *9*
706.0 *1*	0.5 *1*	2303.63	7/2$^+$	1597.00	(5/2,3/2)$^+$				%Iγ=0.021 *4*
739.1 *1*	0.59 *6*	2303.63	7/2$^+$	1564.64	(3/2)$^+$				%Iγ=0.0250 *27*
744.3 *1*	0.9 *1*	1967.56	7/2$^+$	1223.30	5/2$^+$				%Iγ=0.038 *4*
756.7 *1*	1.8 *2*	756.64	11/2$^-$	0.0	3/2$^+$	M4		0.0915 *13*	%Iγ=0.076 *9* α(K)=0.0740 *10*; α(L)=0.01371 *19*; α(M)=0.00302 *4* α(N)=0.000676 *9*; α(O)=0.0001003 *14*; α(P)=5.75×10^{-6} *8* Mult.: from ^{141}Nd IT decay.
886.22 *5*	51.4 *26*	2109.54	3/2$^+$,5/2$^+$	1223.30	5/2$^+$	E2		0.00291 *4*	%Iγ=2.17 *14* α(K)=0.002473 *35*; α(L)=0.000347 *5*; α(M)=7.37×10^{-5} *10* α(N)=1.644×10^{-5} *23*; α(O)=2.464×10^{-6} *34*; α(P)=1.493×10^{-7} *21* Mult.: α(K)exp=0.0020 *5*.
901.1 *1*	1.2 *1*	2246.57	(7/2$^-$,5/2$^-$)	1345.48	7/2$^+$				%Iγ=0.051 *5*
958.5 *1*	1.4 *1*	2303.63	7/2$^+$	1345.48	7/2$^+$				%Iγ=0.059 *5*
966.2 *1*	1.9 *2*	2311.68	7/2$^+$,(9/2$^+$)	1345.48	7/2$^+$				%Iγ=0.080 *9*
1023.2 *1*	3.1 *3*	2246.57	(7/2$^-$,5/2$^-$)	1223.30	5/2$^+$				%Iγ=0.131 *14*

^{141}Pm ε decay 1976Za03 (continued)

γ(^{141}Nd) (continued)

E_γ	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α[†]	Comments
1029.60 *5*	7.0 *7*	1223.30	$5/2^+$	193.72	$1/2^+$			%Iγ=0.296 *32*
1043.1 *1*	0.8 *1*	2388.53	$7/2^+$	1345.48	$7/2^+$			%Iγ=0.034 *4*
1051.8 *1*	2.1 *2*	1808.38?		756.64	$11/2^-$			%Iγ=0.089 *9*
1080.6 *1*	1.1 *1*	2303.63	$7/2^+$	1223.30	$5/2^+$			%Iγ=0.047 *5*
1088.4 *1*	0.32 *6*	3056.08	$7/2^+$	1967.56	$7/2^+$			%Iγ=0.0135 *26*
1118.0 *1*	0.27 *6*	2463.45		1345.48	$7/2^+$			%Iγ=0.0114 *26*
1223.26 *5*	100 *5*	1223.30	$5/2^+$	0.0	$3/2^+$	E2,M1	0.00181 *32*	%Iγ=4.23 *27* α(K)=0.00154 *28*; α(L)=0.000202 *34*; α(M)=4.3×10^{-5} *7* α(N)=9.6×10^{-6} *16*; α(O)=1.45×10^{-6} *25*; α(P)=9.5×10^{-8} *19*; α(IPF)=8.87×10^{-6} *17* Mult.: α(K)exp=0.0013 *4*.
1235.4 *1*	0.15 *3*	3056.08	$7/2^+$	1820.49	$5/2^+$,$3/2^+$			%Iγ=0.0063 *13*
1282.0 *1*	0.44 *9*	2505.43	$3/2^+$,$5/2^+$	1223.30	$5/2^+$			%Iγ=0.019 *4*
1345.52 *5*	28.0 *14*	1345.48	$7/2^+$	0.0	$3/2^+$			%Iγ=1.18 *7* Mult.: α(K)exp=0.0036 *10*. This value is much greater than calculated values for M1, E2 and E1, and E0 is not allowed by ΔJ(levels); therefore no mult is adopted.
1363.1 *1*	0.08 *2*	2944.70	$3/2^+$,$5/2^+$	1581.66				%Iγ=0.0034 *9*
1371.0 *1*	2.3 *2*	1564.64	$(3/2)^+$	193.72	$1/2^+$			%Iγ=0.097 *9*
1403.14 *6*	15.9 *8*	1597.00	$(5/2,3/2)^+$	193.72	$1/2^+$	E2,M1	0.00138 *21*	%Iγ=0.67 *4* α(K)=0.00115 *18*; α(L)=0.000149 *23*; α(M)=3.1×10^{-5} *5* α(N)=7.0×10^{-6} *11*; α(O)=1.07×10^{-6} *17*; α(P)=7.1×10^{-8} *12*; α(IPF)=4.68×10^{-5} *12* Mult.: α(K)exp=0.0016 *10*.
1474.7 *1*	0.13 *3*	3056.08	$7/2^+$	1581.66				%Iγ=0.0055 *13*
1564.68 *7*	17.8 *9*	1564.64	$(3/2)^+$	0.0	$3/2^+$	M1+(E0)	1.32×10^{-3}	%Iγ=0.75 *5* α(K)=0.001041 *15*; α(L)=0.0001340 *19*; α(M)=2.82×10^{-5} *4* α(N)=6.32×10^{-6} *9*; α(O)=9.67×10^{-7} *14*; α(P)=6.50×10^{-8} *9*; α(IPF)=0.0001053 *15* Mult.: α(K)exp=0.0049 *10*.
1582.0 *1*	0.22 *4*	1581.66		0.0	$3/2^+$			%Iγ=0.0093 *17*
1596.87 *7*	16.7 *8*	1597.00	$(5/2,3/2)^+$	0.0	$3/2^+$	(E2)	9.89×10^{-4} *14*	%Iγ=0.71 *4* α(K)=0.000753 *11*; α(L)=9.79×10^{-5} *14*; α(M)=2.062×10^{-5} *29* α(N)=4.61×10^{-6} *6*; α(O)=7.01×10^{-7} *10*; α(P)=4.57×10^{-8} *6*; α(IPF)=0.0001118 *16* Mult.: α(K)exp=0.0014 *8*.
1626.70 *7*	6.0 *6*	1820.49	$5/2^+$,$3/2^+$	193.72	$1/2^+$			%Iγ=0.254 *27*
1703.6 *1*	1.2 *1*	1897.27		193.72	$1/2^+$			%Iγ=0.051 *5*
1808.3 *1*	0.03 *1*	1808.38?		0.0	$3/2^+$			%Iγ=0.0013 *4*
1820.5 *1*	1.6 *2*	1820.49	$5/2^+$,$3/2^+$	0.0	$3/2^+$			%Iγ=0.068 *9*

$^{141}_{60}Nd_{81}$-4

^{141}Pm ε decay 1976Za03 (continued)

γ(^{141}Nd) (continued)

E_γ	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	Comments
1872.7 *1*	0.56 *6*	2066.41	$3/2^+,5/2^+$	193.72	$1/2^+$		%Iγ=0.0237 *27*
1880.0 *1*	6.9 *7*	2073.72	$(3/2^+,5/2^+)$	193.72	$1/2^+$	D,E2	%Iγ=0.292 *32* Mult.: α(K)exp<0.0018.
1897.2 *1*	1.0 *1*	1897.27		0.0	$3/2^+$		%Iγ=0.042 *5*
1967.6 *1*	3.6 *4*	1967.56	$7/2^+$	0.0	$3/2^+$		%Iγ=0.152 *18*
2052.9 *1*	2.6 *3*	2246.57	$(7/2^-,5/2^-)$	193.72	$1/2^+$		%Iγ=0.110 *13*
2066.4 *1*	1.5 *2*	2066.41	$3/2^+,5/2^+$	0.0	$3/2^+$		%Iγ=0.063 *9*
2073.79 *9*	13.3 *13*	2073.72	$(3/2^+,5/2^+)$	0.0	$3/2^+$	D,E2	%Iγ=0.56 *6* Mult.: α(K)exp<0.0012.
2109.6 *1*	1.6 *2*	2109.54	$3/2^+,5/2^+$	0.0	$3/2^+$		%Iγ=0.068 *9*
2145.3 *2*	0.36 *7*	2145.32		0.0	$3/2^+$		%Iγ=0.0152 *30*
2160.6 *2*	0.18 *4*	2354.38	$(3/2,5/2^+)$	193.72	$1/2^+$		%Iγ=0.0076 *17*
2246.5 *1*	1.5 *2*	2246.57	$(7/2^-,5/2^-)$	0.0	$3/2^+$		%Iγ=0.063 *9*
2265.2 *2*	0.72 *7*	2265.22		0.0	$3/2^+$		%Iγ=0.0305 *32*
2303.5 *1*	2.4 *3*	2303.63	$7/2^+$	0.0	$3/2^+$		%Iγ=0.102 *13*
2311.7 *2*	0.49 *10*	2505.43	$3/2^+,5/2^+$	193.72	$1/2^+$		%Iγ=0.021 *4*
2336.0 *2*	0.25 *5*	2336.02	$(7/2^+)$	0.0	$3/2^+$		%Iγ=0.0106 *22*
2354.4 *2*	0.89 *9*	2354.38	$(3/2,5/2^+)$	0.0	$3/2^+$		%Iγ=0.038 *4*
2388.3 *2*	1.2 *1*	2388.53	$7/2^+$	0.0	$3/2^+$		%Iγ=0.051 *5*
[x]2418.6 *2*	0.16 *3*						%Iγ=0.0068 *13*
2429.6 *2*	0.55 *6*	2429.62		0.0	$3/2^+$		%Iγ=0.0233 *27*
2463.3 *2*	0.27 *6*	2463.45		0.0	$3/2^+$		%Iγ=0.0114 *26*
2505.3 *2*	0.59 *6*	2505.43	$3/2^+,5/2^+$	0.0	$3/2^+$		%Iγ=0.0250 *27*
2514.8 *2*	0.09 *2*	2514.82	$(7/2)^+$	0.0	$3/2^+$		%Iγ=0.0038 *9*
[x]2601.7 *2*	0.27 *5*						%Iγ=0.0114 *22*
2619.0 *2*	0.55 *6*	2619.03		0.0	$3/2^+$		%Iγ=0.0233 *27*
2732.5 *2*	0.07 *2*	2732.53		0.0	$3/2^+$		%Iγ=0.0030 *9*
2750.8 *2*	0.06 *1*	2944.70	$3/2^+,5/2^+$	193.72	$1/2^+$		%Iγ=0.0025 *4*
2803.9 *4*	0.46 *9*	2803.9	$(3/2^+,5/2^+)$	0.0	$3/2^+$		%Iγ=0.019 *4*
2865.3 *4*	0.05 *1*	2865.3		0.0	$3/2^+$		%Iγ=0.0021 *4*
2943.9 *5*	0.12 *3*	2944.70	$3/2^+,5/2^+$	0.0	$3/2^+$		%Iγ=0.0051 *13*
3056.5 *5*	0.05 *1*	3056.08	$7/2^+$	0.0	$3/2^+$		%Iγ=0.0021 *4*

[†] Additional information 2.
[‡] For absolute intensity per 100 decays, multiply by 0.0423 *16*.
[x] γ ray not placed in level scheme.

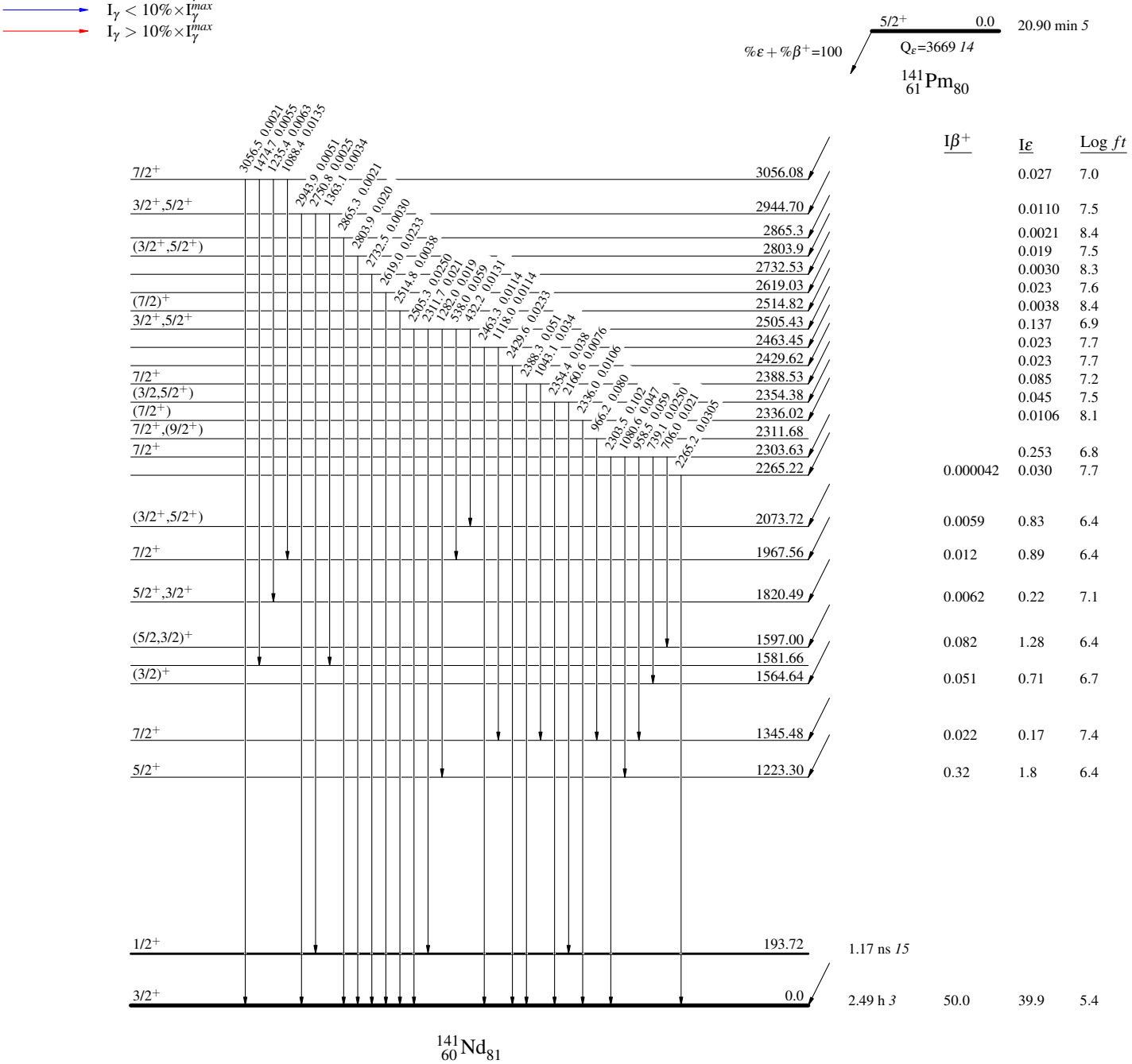
^{141}Pm ε decay 1976Za03

Decay Scheme

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

Legend

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



^{141}Pm ε decay 1976Za03

Decay Scheme (continued)

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