

**$^{133}\text{Pm}$   $\epsilon$  decay [1995Br21](#),[1993BrZS](#)**

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Yu. Khazov and A. Rodionov, F. G. Kondev		NDS 112, 855 (2011)	31-Oct-2010

Parent:  $^{133}\text{Pm}$ : E=0.0;  $J^\pi=(3/2^+)$ ;  $T_{1/2}=13.5$  s 21;  $Q(\epsilon)=6925$  69;  $\% \epsilon + \% \beta^+$  decay=100.0

Parent:  $^{133}\text{Pm}$ : E=129.7 7;  $J^\pi=(11/2^-)$ ;  $T_{1/2}<8.8$  s;  $Q(\epsilon)=6925$  69;  $\% \epsilon + \% \beta^+$  decay<100.0

[1995Br21](#),[1993BrZS](#),[1995BrZZ](#):  $^{133}\text{Pm}(\epsilon+\beta^+)$  [mass-separated sources from  $^{92}\text{Mo}(^{46}\text{Ti},2n3p)$ , E=246 MeV]; measured  $\gamma$ ,  $I_\gamma$   $\gamma\gamma(t)$ , x-rays, ce,  $x\gamma(t)$ ,  $E\gamma(t)$ ,  $ce\gamma(t)$ ,  $xce(t)$ ,  $T_{1/2}$ . Deduced levels,  $J^\pi$ ,  $\gamma$ -multipolarities. HPGe, Si(Li) detectors, tape transport system, mass-separator; particle plus triaxial rotor model calculations.

Others: [1977Bo02](#): isotopic identification of  $^{133}\text{Nd}$ , measured  $T_{1/2}$ .

Since low- and high-spin states are populated in  $^{133}\text{Pm}$   $\epsilon$  decay, it seems likely that two parent decaying states are involved. The decay scheme cannot be normalized and it should be considered as tentative.

$^{133}\text{Nd}$  Levels

E(level) <sup>†</sup>	$J^\pi$ <sup>‡</sup>	$T_{1/2}$	Comments
0.0	(7/2 <sup>+</sup> )	70 s 10	$\% \epsilon + \% \beta^+ = 100$ $T_{1/2}$ : from <a href="#">1977Bo02</a> .
127.97 12	(1/2 <sup>+</sup> )	≈70 s	$\% \epsilon + \% \beta^+ = ?$ ; $\% IT = ?$ $T_{1/2}$ : Value quoted in <a href="#">1995Br21</a> , but a direct evidence was not presented.
173.05 10	(3/2 <sup>+</sup> )		
176.10 10	(9/2 <sup>-</sup> )	>100 ns	$T_{1/2}$ : from 176.1 $\gamma(t)$ in <a href="#">1995Br21</a> .
245.49 10	(9/2 <sup>+</sup> )		
291.37 8	(5/2 <sup>+</sup> )		
338.87 22	(11/2 <sup>-</sup> )		
345.23 9	(3/2 <sup>+</sup> )		
353.62 13	(3/2 <sup>-</sup> )	46 ns 9	$T_{1/2}$ : from 180.6 $\gamma(t)$ in <a href="#">1995Br21</a> .
397.93 12	(5/2 <sup>+</sup> )		
399.81 20	(1/2 <sup>+</sup> ,3/2 <sup>+</sup> )		
442.51 14	(7/2 <sup>-</sup> ,9/2 <sup>-</sup> ,11/2 <sup>-</sup> )		
444.66 15	(1/2,3/2,5/2 <sup>+</sup> )		
472.13 14	(3/2 <sup>+</sup> ,5/2 <sup>+</sup> ,7/2 <sup>+</sup> )		
483.51 13	(7/2 <sup>+</sup> )		
491.86 25	(7/2 <sup>+</sup> )		
492.29 22	(7/2 <sup>-</sup> )		
523.82 16	(5/2 <sup>-</sup> )		
554.98 14	(1/2 <sup>+</sup> ,3/2 <sup>+</sup> ,5/2 <sup>+</sup> )		
585.4 4			
587.1 5			
628.3 4			
660.25 22	(1/2,3/2,5/2 <sup>+</sup> )		
674.60 16	(5/2 <sup>+</sup> )		
738.83 23			
787.82 14	(3/2 <sup>+</sup> ,5/2,7/2 <sup>+</sup> )		
806.44 21			
837.5 5			
879.37 17	(5/2 <sup>+</sup> ,7/2 <sup>+</sup> )		
932.2 6			
937.08 18			
979.8 7			
985.90 16	(1/2 <sup>+</sup> ,3/2,5/2 <sup>+</sup> )		
999.2 5			
1007.0 5			
1013.66 15	(3/2 <sup>+</sup> ,5/2 <sup>+</sup> )		
1120.20 23	(5/2 <sup>+</sup> ,7/2 <sup>+</sup> )		
1154.5 3			
1183.1 6			

Continued on next page (footnotes at end of table)

$^{133}\text{Pm}$   $\varepsilon$  decay [1995Br21](#),[1993BrZS](#) (continued) $^{133}\text{Nd}$  Levels (continued)

<u>E(level)<sup>†</sup></u>	<u>J<sup>π</sup><sup>‡</sup></u>	<u>E(level)<sup>†</sup></u>	<u>J<sup>π</sup><sup>‡</sup></u>	<u>E(level)<sup>†</sup></u>
1195.6 5		1280.4 7		1886.5 4
1206.0 7		1595.8 4	(3/2 <sup>+</sup> , 5/2, 7/2 <sup>+</sup> )	2005.0 4
1209.1 4		1770.5 5		2043.4 4
1230.1 5	(5/2 <sup>+</sup> , 7/2 <sup>-</sup> )	1834.3 8		2076.7 4
				2451.2 3

<sup>†</sup> From a least-squares fit to E $\gamma$ 's.

<sup>‡</sup> From Adopted Levels.

<sup>133</sup>Pm ε decay **1995Br21,1993BrZS** (continued)

E <sub>γ</sub> <sup>‡</sup>	I <sub>γ</sub> <sup>‡</sup>	E <sub>i</sub> (level)	J <sub>i</sub> <sup>π</sup>	E <sub>f</sub>	J <sub>f</sub> <sup>π</sup>	Mult.#	γ( <sup>133</sup> Nd)		Comments
							δ	α <sup>†</sup>	
45.1 1	32 4	173.05	(3/2 <sup>+</sup> )	127.97	(1/2 <sup>+</sup> )	M1		14.03 22	α(L)exp<12; α(M+...)exp<1.4 α(N)=0.0810 13; α(O)=0.01227 19; α(P)=0.000788 13
54.0 2	1.5 5	345.23	(3/2 <sup>+</sup> )	291.37	(5/2 <sup>+</sup> )				
62.3 3	2.4 8	353.62	(3/2 <sup>-</sup> )	291.37	(5/2 <sup>+</sup> )				
118.3 1	31 4	291.37	(5/2 <sup>+</sup> )	173.05	(3/2 <sup>+</sup> )	M1		0.877	ce(K)=26 5; ce(L)=3.8 7; α(K)exp=0.83 17; L/K=0.15 3 α(K)=0.746 11; α(L)=0.1036 15; α(M)=0.0220 4; α(N+..)=0.00572 9 α(N)=0.00492 7; α(O)=0.000748 11; α(P)=4.83×10 <sup>-5</sup> 7 ce(K)=11 2; α(K)exp=18 10; L/K=0.25 25 α(K)=24.4 6; α(L)=10.7 3; α(M)=2.55 8; α(N+..)=0.654 19 α(N)=0.571 17; α(O)=0.0800 23; α(P)=0.00338 9 α(K)=0.455 7; α(L)=0.181 3; α(M)=0.0409 7; α(N+..)=0.01007 16 α(N)=0.00888 14; α(O)=0.001172 18; α(P)=2.13×10 <sup>-5</sup> 4 ce(K)=3.8 7, ce(L)=2.2 4, ce(M)=0.57 9, α(K)exp=0.48 10, L/K=0.55 15, (M+N)/K=0.19 7§.
127.9 6	0.6 3	127.97	(1/2 <sup>+</sup> )	0.0	(7/2 <sup>+</sup> )	M3		38.4 10	
138.7 2	8.0 8	492.29	(7/2 <sup>-</sup> )	353.62	(3/2 <sup>-</sup> )	E2		0.687	
157.2 2	1.8 3	554.98	(1/2 <sup>+</sup> ,3/2 <sup>+</sup> ,5/2 <sup>+</sup> )	397.93	(5/2 <sup>+</sup> )				
162.8 2	2.5 7	338.87	(11/2 <sup>-</sup> )	176.10	(9/2 <sup>-</sup> )				
170.2 1	8.5 9	523.82	(5/2 <sup>-</sup> )	353.62	(3/2 <sup>-</sup> )	E2		0.339	α(K)=0.241 4; α(L)=0.0767 11; α(M)=0.01716 25; α(N+..)=0.00425 6 α(N)=0.00374 6; α(O)=0.000501 8; α(P)=1.181×10 <sup>-5</sup> 17 ce(K)=1.9 4, ce(L)=0.62 7, ce(M)=0.17 3, α(K)exp=0.22 5, L/K=0.32 6, (M+N)/K=0.089 20.
176.1 1	50 5	176.10	(9/2 <sup>-</sup> )	0.0	(7/2 <sup>+</sup> )	E1		0.0553	ce(K)=2.3 4; ce(L)=0.32 5; α(K)exp=0.046 10; L/K=0.14 3 α(K)=0.0471 7; α(L)=0.00644 9; α(M)=0.001359 20; α(N+..)=0.000348 5 α(N)=0.000301 5; α(O)=4.43×10 <sup>-5</sup> 7; α(P)=2.52×10 <sup>-6</sup> 4 ce(K)=4.0 7; ce(L)=0.61 12; α(K)exp=0.040 8; L/K=0.15 4 α(K)=0.0440 7; α(L)=0.00601 9; α(M)=0.001267 18; α(N+..)=0.000325 5 α(N)=0.000281 4; α(O)=4.14×10 <sup>-5</sup> 6; α(P)=2.36×10 <sup>-6</sup> 4 L/K: calculated by evaluators; <0.20 in <b>1995Br21</b> . α(K)=0.214 15; α(L)=0.046 15; α(M)=0.010 4; α(N+..)=0.0025 8 α(N)=0.0022 8; α(O)=0.00031 9; α(P)=1.23×10 <sup>-5</sup> 25 Mult.: ce(K)=1.5 3, ce(L)=0.61 13, α(K)exp=0.33 10 and L/K=0.41 12. δ: Deduced by evaluators from ce(K), ce(L) and α(K)exp and the BriccMixing program.
180.6 1	100 5	353.62	(3/2 <sup>-</sup> )	173.05	(3/2 <sup>+</sup> )	E1		0.0516	
180.8 5	4.5 10	472.13	(3/2 <sup>+</sup> ,5/2 <sup>+</sup> ,7/2 <sup>+</sup> )	291.37	(5/2 <sup>+</sup> )	M1+E2	<0.6	0.272 6	
192.1 1	14 2	483.51	(7/2 <sup>+</sup> )	291.37	(5/2 <sup>+</sup> )	M1+E2	2.0 10	0.225	ce(K)=2.9 5; ce(L)=0.73 15; α(K)exp=0.21 5; L/K=0.25 6 α(K)=0.170 9; α(L)=0.043 7; α(M)=0.0095 15;

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<sup>133</sup>Pm ε decay **1995Br21,1993BrZS** (continued)

γ(<sup>133</sup>Nd) (continued)

<u>E<sub>γ</sub><sup>‡</sup></u>	<u>I<sub>γ</sub><sup>‡</sup></u>	<u>E<sub>i</sub>(level)</u>	<u>J<sub>i</sub><sup>π</sup></u>	<u>E<sub>f</sub></u>	<u>J<sub>f</sub><sup>π</sup></u>	<u>Mult.#</u>	<u>δ</u>	<u>α<sup>†</sup></u>	<u>Comments</u>
200.5 4	11 3	491.86	(7/2 <sup>+</sup> )	291.37	(5/2 <sup>+</sup> )	M1+E2	0.0 6	0.202 4	α(N+..)=0.0024 4 α(N)=0.0021 3; α(O)=0.00029 4; α(P)=9.1×10 <sup>-6</sup> 13 δ: calculated by evaluators using BrIccMixing program. ce(K)=1.8 4; ce(L)=0.61 12; α(K)exp=0.16 3; L/K=0.34 10 α(K)=0.172 8; α(L)=0.024 5; α(M)=0.0050 10; α(N+..)=0.00130 24 α(N)=0.00112 22; α(O)=0.000170 24; α(P)=1.11×10 <sup>-5</sup> 11 δ: calculated by evaluators using BrIccMixing program.
215.6 6 224.9 1	6.8 9 53 8	660.25 397.93	(1/2,3/2,5/2 <sup>+</sup> ) (5/2 <sup>+</sup> )	444.66 173.05	(1/2,3/2,5/2 <sup>+</sup> ) (3/2 <sup>+</sup> )	M1		0.1476	ce(K)=7.0 11; ce(L)=0.77 16; α(K)exp=0.13 3; L/K=0.11 4 α(K)=0.1258 18; α(L)=0.01723 25; α(M)=0.00365 6; α(N+..)=0.000951 14 α(N)=0.000818 12; α(O)=0.0001244 18; α(P)=8.10×10 <sup>-6</sup> 12
245.5 1	15 2	245.49	(9/2 <sup>+</sup> )	0.0	(7/2 <sup>+</sup> )	E2(+M1)		0.0994	ce(K)=1.2 3; α(K)exp=0.078 16 α(K)=0.0765 11; α(L)=0.0180 3; α(M)=0.00396 6; α(N+..)=0.000993 14
266.4 1	16 2	442.51	(7/2 <sup>-</sup> ,9/2 <sup>-</sup> ,11/2 <sup>-</sup> )	176.10	(9/2 <sup>-</sup> )	M1+E2	0.0 5	0.094 4	α(N)=0.000868 13; α(O)=0.0001201 17; α(P)=4.05×10 <sup>-6</sup> 6 ce(K)=1.9 4; α(K)exp=0.12 4; L/K=0.26 6 α(K)=0.080 5; α(L)=0.0109 5; α(M)=0.00231 13; α(N+..)=0.00060 3
270.0 4	49 9	397.93	(5/2 <sup>+</sup> )	127.97	(1/2 <sup>+</sup> )	E2		0.0731	α(N)=0.00052 3; α(O)=7.86×10 <sup>-5</sup> 24; α(P)=5.1×10 <sup>-6</sup> 4 δ: calculated by evaluators using BrIccMixing program. ce(K)=4.0 6; ce(L)=1.0 5; α(K)exp=0.081 20; L/K=0.25 10 α(K)=0.0571 9; α(L)=0.01258 19; α(M)=0.00277 5; α(N+..)=0.000695 11 α(N)=0.000607 10; α(O)=8.46×10 <sup>-5</sup> 13; α(P)=3.08×10 <sup>-6</sup> 5
271.4 4 271.9 4	21 5 70 14	444.66 399.81	(1/2,3/2,5/2 <sup>+</sup> ) (1/2 <sup>+</sup> ,3/2 <sup>+</sup> )	173.05 127.97	(3/2 <sup>+</sup> ) (1/2 <sup>+</sup> )	M1		0.0887	ce(K)=5.8 9; α(K)exp=0.083 17 α(K)=0.0756 11; α(L)=0.01030 15; α(M)=0.00218 4; α(N+..)=0.000568 9 α(N)=0.000489 8; α(O)=7.44×10 <sup>-5</sup> 11; α(P)=4.86×10 <sup>-6</sup> 7
274.7 6 289.6 5 291.4 1	2.1 3 1.4 2 85 8	674.60 628.3 291.37	(5/2 <sup>+</sup> ) (5/2 <sup>+</sup> )	399.81 338.87 0.0	(1/2 <sup>+</sup> ,3/2 <sup>+</sup> ) (11/2 <sup>-</sup> ) (7/2 <sup>+</sup> )	M1		0.0738	ce(K)=4.5 7; ce(L)=0.61 9; α(K)exp=0.053 11; L/K=0.14 5 α(K)=0.0629 9; α(L)=0.00856 12; α(M)=0.00181 3; α(N+..)=0.000472 7
299.1 1	24 3	472.13	(3/2 <sup>+</sup> ,5/2 <sup>+</sup> ,7/2 <sup>+</sup> )	173.05	(3/2 <sup>+</sup> )	E2		0.0529	α(N)=0.000406 6; α(O)=6.18×10 <sup>-5</sup> 9; α(P)=4.04×10 <sup>-6</sup> 6 ce(K)=1.9 2; α(K)exp=0.044 9 α(K)=0.0418 6; α(L)=0.00866 13; α(M)=0.00190 3; α(N+..)=0.000478 7 α(N)=0.000417 6; α(O)=5.87×10 <sup>-5</sup> 9; α(P)=2.30×10 <sup>-6</sup> 4
316.7 1 318.8 4	25 6 6 3	444.66 491.86	(1/2,3/2,5/2 <sup>+</sup> ) (7/2 <sup>+</sup> )	127.97 173.05	(1/2 <sup>+</sup> ) (3/2 <sup>+</sup> )				

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<sup>133</sup>Pm ε decay **1995Br21,1993BrZS** (continued)

γ(<sup>133</sup>Nd) (continued)

<u>E<sub>γ</sub><sup>‡</sup></u>	<u>I<sub>γ</sub><sup>‡</sup></u>	<u>E<sub>i</sub>(level)</u>	<u>J<sub>i</sub><sup>π</sup></u>	<u>E<sub>f</sub></u>	<u>J<sub>f</sub><sup>π</sup></u>	<u>Mult.#</u>	<u>α<sup>†</sup></u>	<u>Comments</u>
329.4 2	10 1	674.60	(5/2 <sup>+</sup> )	345.23	(3/2 <sup>+</sup> )			
334.5 3	5.1 5	806.44		472.13	(3/2 <sup>+</sup> ,5/2 <sup>+</sup> ,7/2 <sup>+</sup> )			
340.9 2	6 2	738.83		397.93	(5/2 <sup>+</sup> )			
345.2 1	65 7	345.23	(3/2 <sup>+</sup> )	0.0	(7/2 <sup>+</sup> )	E2	0.0340	ce(K)=1.6 3; α(K)exp=0.025 5 α(K)=0.0273 4; α(L)=0.00524 8; α(M)=0.001142 16; α(N+..)=0.000289 4 α(N)=0.000252 4; α(O)=3.58×10 <sup>-5</sup> 5; α(P)=1.534×10 <sup>-6</sup> 22
361.7 4	4 1	806.44		444.66	(1/2,3/2,5/2 <sup>+</sup> )			
381.9 1	27 6	554.98	(1/2 <sup>+</sup> ,3/2 <sup>+</sup> ,5/2 <sup>+</sup> )	173.05	(3/2 <sup>+</sup> )	M1+E2	0.031 6	ce(K)=0.71 2; α(K)exp=0.026 5 α(K)=0.026 6; α(L)=0.00396 24; α(M)=0.00085 4; α(N+..)=0.000218 13 α(N)=0.000189 11; α(O)=2.79×10 <sup>-5</sup> 24; α(P)=1.6×10 <sup>-6</sup> 5
387.5 4	2 1	879.37	(5/2 <sup>+</sup> ,7/2 <sup>+</sup> )	491.86	(7/2 <sup>+</sup> )			
389.9 2	4.4 4	787.82	(3/2 <sup>+</sup> ,5/2,7/2 <sup>+</sup> )	397.93	(5/2 <sup>+</sup> )			
392.8 4	4 1	837.5		444.66	(1/2,3/2,5/2 <sup>+</sup> )			
406.5 4	4 1	806.44		399.81	(1/2 <sup>+</sup> ,3/2 <sup>+</sup> )			
408.4 4	6 2	806.44		397.93	(5/2 <sup>+</sup> )			
409.4 4	16 5	585.4		176.10	(9/2 <sup>-</sup> )			
413.9 4	2.5 7	999.2		585.4				
414.0 4	21 5	587.1		173.05	(3/2 <sup>+</sup> )			
421.6 2	2.5 3	1007.0		585.4				
427.0 4	21 5	554.98	(1/2 <sup>+</sup> ,3/2 <sup>+</sup> ,5/2 <sup>+</sup> )	127.97	(1/2 <sup>+</sup> )			
429.1 4	10 2	674.60	(5/2 <sup>+</sup> )	245.49	(9/2 <sup>+</sup> )			
442.5 2	3.5 4	787.82	(3/2 <sup>+</sup> ,5/2,7/2 <sup>+</sup> )	345.23	(3/2 <sup>+</sup> )			
452.1 4	4.6 9	628.3		176.10	(9/2 <sup>-</sup> )			
472.2 @ 2	10 2	472.13	(3/2 <sup>+</sup> ,5/2 <sup>+</sup> ,7/2 <sup>+</sup> )	0.0	(7/2 <sup>+</sup> )			
483.5 @ 2	7.7 8	483.51	(7/2 <sup>+</sup> )	0.0	(7/2 <sup>+</sup> )			
487.2 2	10 3	660.25	(1/2,3/2,5/2 <sup>+</sup> )	173.05	(3/2 <sup>+</sup> )			
491.9 @ 3	4.4 5	491.86	(7/2 <sup>+</sup> )	0.0	(7/2 <sup>+</sup> )			
514.9 8	8 2	806.44		291.37	(5/2 <sup>+</sup> )			
521.5 4	1.9 2	1013.66	(3/2 <sup>+</sup> ,5/2 <sup>+</sup> )	492.29	(7/2 <sup>-</sup> )			
529.9 3	1.8 2	1013.66	(3/2 <sup>+</sup> ,5/2 <sup>+</sup> )	483.51	(7/2 <sup>+</sup> )			
532.7 @ 6	0.8 2	660.25	(1/2,3/2,5/2 <sup>+</sup> )	127.97	(1/2 <sup>+</sup> )			
537.3 3	1.2 6	937.08		399.81	(1/2 <sup>+</sup> ,3/2 <sup>+</sup> )			
539.1 4	1.5 7	937.08		397.93	(5/2 <sup>+</sup> )			
546.6 4	5 2	674.60	(5/2 <sup>+</sup> )	127.97	(1/2 <sup>+</sup> )			
556.4 6	6 3	999.2		442.51	(7/2 <sup>-</sup> ,9/2 <sup>-</sup> ,11/2 <sup>-</sup> )			
565.8 7	5 2	738.83		173.05	(3/2 <sup>+</sup> )			
586.1 6	2 1	985.90	(1/2 <sup>+</sup> ,3/2,5/2 <sup>+</sup> )	399.81	(1/2 <sup>+</sup> ,3/2 <sup>+</sup> )			
587.0 6	4 1	932.2		345.23	(3/2 <sup>+</sup> )			
588.0 6	2 1	879.37	(5/2 <sup>+</sup> ,7/2 <sup>+</sup> )	291.37	(5/2 <sup>+</sup> )			
588.1 6	8 2	985.90	(1/2 <sup>+</sup> ,3/2,5/2 <sup>+</sup> )	397.93	(5/2 <sup>+</sup> )			

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<sup>133</sup>Pm ε decay **1995Br21,1993BrZS** (continued)

γ(<sup>133</sup>Nd) (continued)

<u>E<sub>γ</sub><sup>‡</sup></u>	<u>I<sub>γ</sub><sup>‡</sup></u>	<u>E<sub>i</sub>(level)</u>	<u>J<sub>i</sub><sup>π</sup></u>	<u>E<sub>f</sub></u>	<u>J<sub>f</sub><sup>π</sup></u>	<u>E<sub>γ</sub><sup>‡</sup></u>	<u>I<sub>γ</sub><sup>‡</sup></u>	<u>E<sub>i</sub>(level)</u>	<u>J<sub>i</sub><sup>π</sup></u>	<u>E<sub>f</sub></u>	<u>J<sub>f</sub><sup>π</sup></u>
591.9 8	2.7 4	937.08		345.23	(3/2 <sup>+</sup> )	874.7 5	3 1	1120.20	(5/2 <sup>+</sup> ,7/2 <sup>+</sup> )	245.49	(9/2 <sup>+</sup> )
614.8 4	4 1	787.82	(3/2 <sup>+</sup> ,5/2,7/2 <sup>+</sup> )	173.05	(3/2 <sup>+</sup> )	876.5 5	3.4 8	1230.1	(5/2 <sup>+</sup> ,7/2 <sup>-</sup> )	353.62	(3/2 <sup>-</sup> )
626.2 6	3 1	979.8		353.62	(3/2 <sup>-</sup> )	879.2 5	6.6 7	879.37	(5/2 <sup>+</sup> ,7/2 <sup>+</sup> )	0.0	(7/2 <sup>+</sup> )
632.4 3	5 2	985.90	(1/2 <sup>+</sup> ,3/2,5/2 <sup>+</sup> )	353.62	(3/2 <sup>-</sup> )	885.7 2	12 1	1013.66	(3/2 <sup>+</sup> ,5/2 <sup>+</sup> )	127.97	(1/2 <sup>+</sup> )
633.9 2	3.7 4	879.37	(5/2 <sup>+</sup> ,7/2 <sup>+</sup> )	245.49	(9/2 <sup>+</sup> )	926.8 6	1.8 3	1280.4		353.62	(3/2 <sup>-</sup> )
636.5 5	1.0 5	1120.20	(5/2 <sup>+</sup> ,7/2 <sup>+</sup> )	483.51	(7/2 <sup>+</sup> )	984.5 8	0.9 9	1230.1	(5/2 <sup>+</sup> ,7/2 <sup>-</sup> )	245.49	(9/2 <sup>+</sup> )
645.7 2	11 3	937.08		291.37	(5/2 <sup>+</sup> )	1013.7 4	2.3 5	1013.66	(3/2 <sup>+</sup> ,5/2 <sup>+</sup> )	0.0	(7/2 <sup>+</sup> )
660.1 2	3.7 4	1013.66	(3/2 <sup>+</sup> ,5/2 <sup>+</sup> )	353.62	(3/2 <sup>-</sup> )	1041.1 9	0.9 9	1595.8	(3/2 <sup>+</sup> ,5/2,7/2 <sup>+</sup> )	554.98	(1/2 <sup>+</sup> ,3/2 <sup>+</sup> ,5/2 <sup>+</sup> )
674.6 4	8.3 8	674.60	(5/2 <sup>+</sup> )	0.0	(7/2 <sup>+</sup> )	1154.5 4	2.7 5	1154.5		0.0	(7/2 <sup>+</sup> )
706.3 4	2 1	879.37	(5/2 <sup>+</sup> ,7/2 <sup>+</sup> )	173.05	(3/2 <sup>+</sup> )	1251.0 5	3.1 4	1595.8	(3/2 <sup>+</sup> ,5/2,7/2 <sup>+</sup> )	345.23	(3/2 <sup>+</sup> )
713.7 6	1.7 2	1206.0		492.29	(7/2 <sup>-</sup> )	1425.3 5	2.4 5	1770.5		345.23	(3/2 <sup>+</sup> )
720.5 4	1.3 7	1120.20	(5/2 <sup>+</sup> ,7/2 <sup>+</sup> )	399.81	(1/2 <sup>+</sup> ,3/2 <sup>+</sup> )	1489.1 8	1.3 9	1834.3		345.23	(3/2 <sup>+</sup> )
722.2 4	9 2	1013.66	(3/2 <sup>+</sup> ,5/2 <sup>+</sup> )	291.37	(5/2 <sup>+</sup> )	1532.7 4	2.9 8	1886.5		353.62	(3/2 <sup>-</sup> )
722.3 4	2 1	1120.20	(5/2 <sup>+</sup> ,7/2 <sup>+</sup> )	397.93	(5/2 <sup>+</sup> )	1541.6 6	1.5 9	1886.5		345.23	(3/2 <sup>+</sup> )
788.0 3	3.2 4	787.82	(3/2 <sup>+</sup> ,5/2,7/2 <sup>+</sup> )	0.0	(7/2 <sup>+</sup> )	1595.2 5	3.8 6	1595.8	(3/2 <sup>+</sup> ,5/2,7/2 <sup>+</sup> )	0.0	(7/2 <sup>+</sup> )
812.9 2	23 4	985.90	(1/2 <sup>+</sup> ,3/2,5/2 <sup>+</sup> )	173.05	(3/2 <sup>+</sup> )	1651.4 3	3.7 8	2005.0		353.62	(3/2 <sup>-</sup> )
828.8 7	4.5 5	1120.20	(5/2 <sup>+</sup> ,7/2 <sup>+</sup> )	291.37	(5/2 <sup>+</sup> )	1689.8 3	7.1 8	2043.4		353.62	(3/2 <sup>-</sup> )
829.5 5	2.5 5	1183.1		353.62	(3/2 <sup>-</sup> )	1723.1 3	5.4 7	2076.7		353.62	(3/2 <sup>-</sup> )
842.0 4	5 1	1195.6		353.62	(3/2 <sup>-</sup> )	2051.5 5	3 1	2451.2		399.81	(1/2 <sup>+</sup> ,3/2 <sup>+</sup> )
855.5 3	5 2	1209.1		353.62	(3/2 <sup>-</sup> )	2053.0 5	4 1	2451.2		397.93	(5/2 <sup>+</sup> )
857.8 2	8.5 9	985.90	(1/2 <sup>+</sup> ,3/2,5/2 <sup>+</sup> )	127.97	(1/2 <sup>+</sup> )	2160.0 5	2 1	2451.2		291.37	(5/2 <sup>+</sup> )
863.1 4	1.5 4	1154.5		291.37	(5/2 <sup>+</sup> )						

† Additional information 1.

‡ From 1995Br21. The assignment to <sup>133</sup>Nd is based on x-ray coin and multiscaling data.

# From α(K)exp, α(L)exp, α(M)exp and sub-shell ratios in 1995Br21.

@ Placement of transition in the level scheme is uncertain.

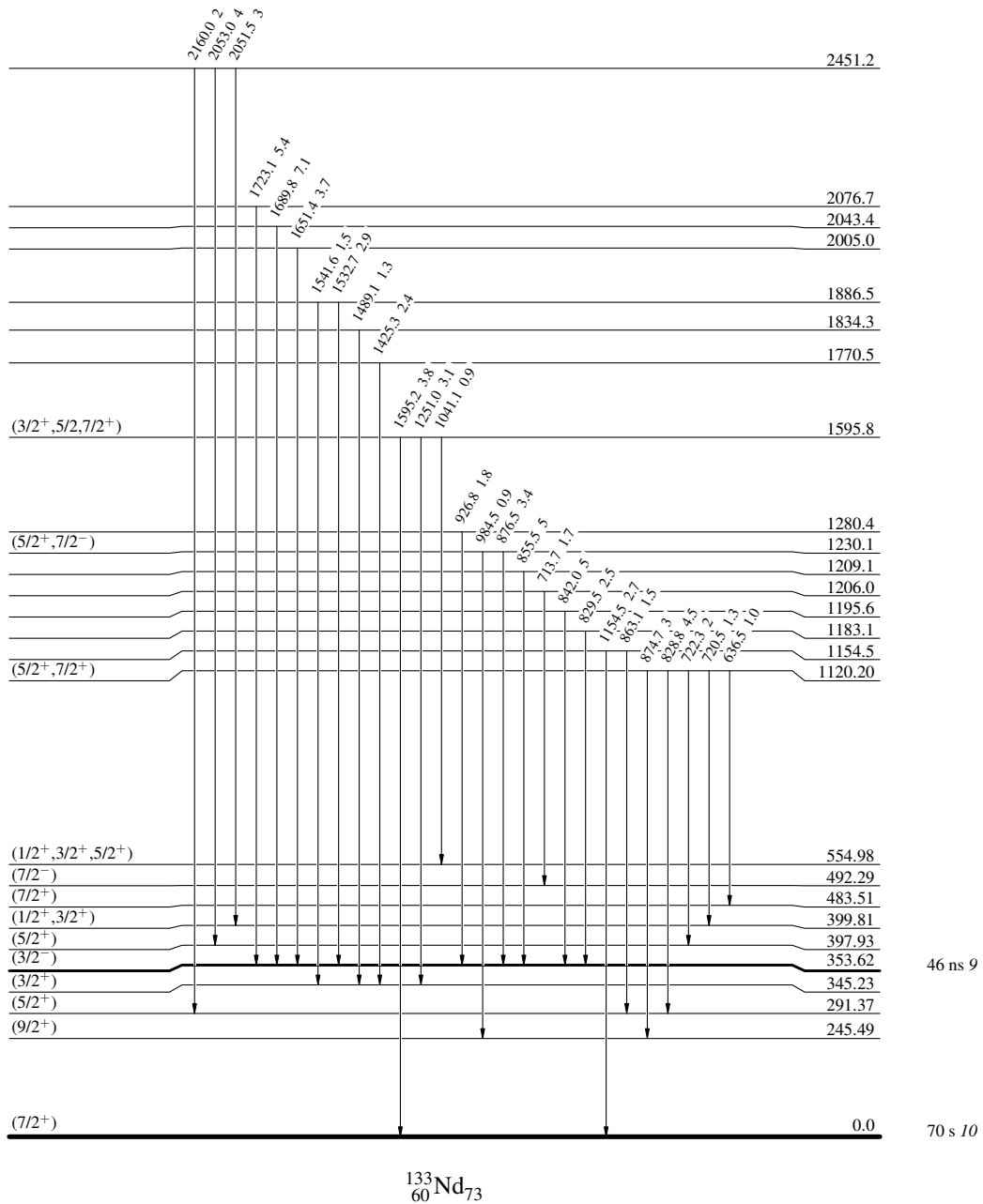
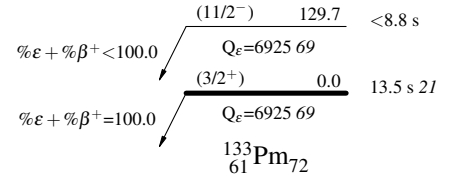
$^{133}\text{Pm}$   $\epsilon$  decay 1995Br21,1993BrZS

Decay Scheme

Legend

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

Intensities: Relative  $I_\gamma$



$^{133}\text{Nd}_{73}$

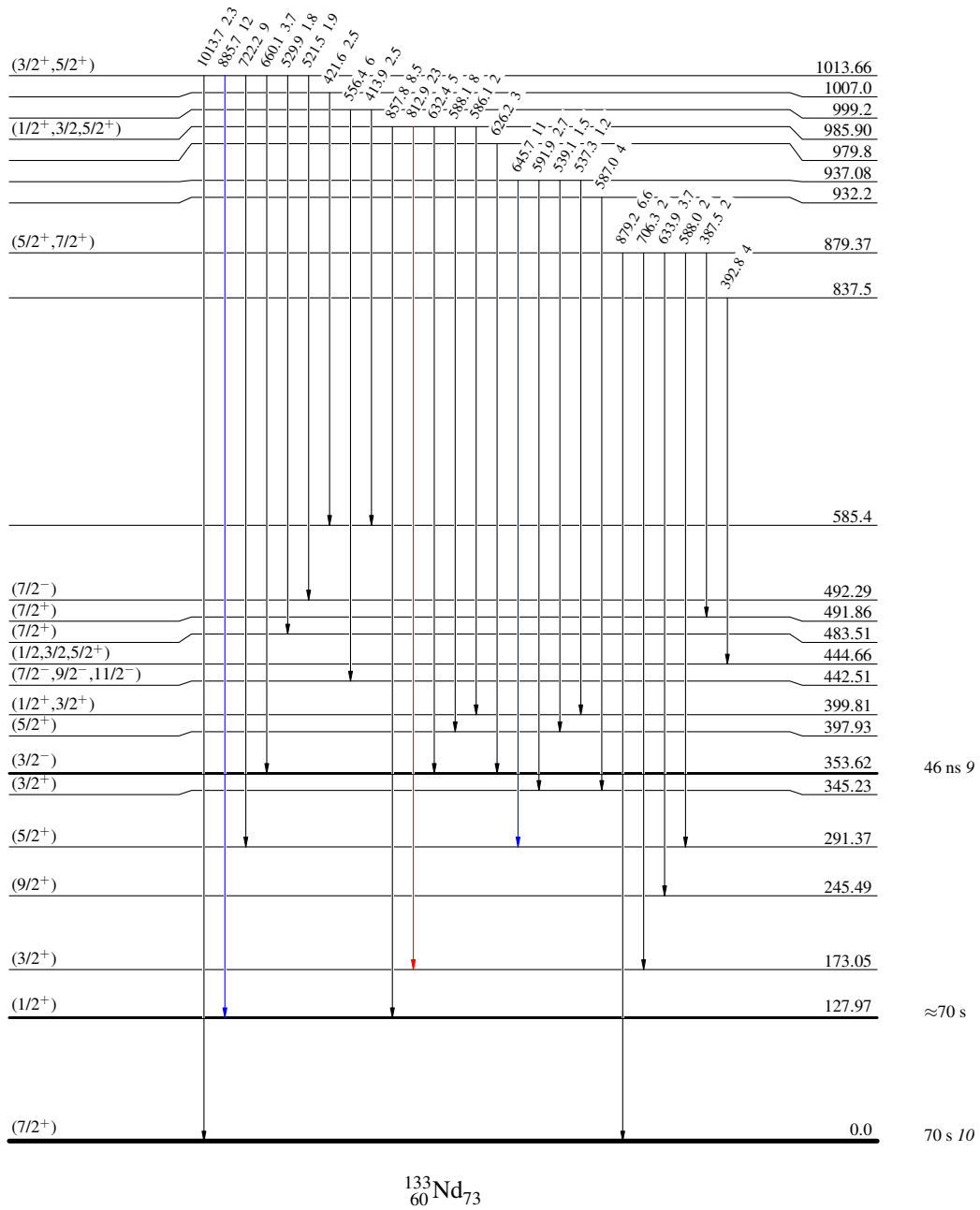
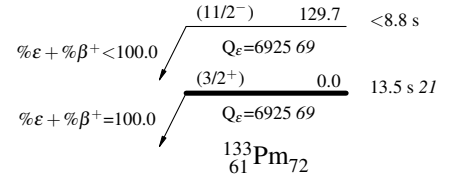
$^{133}\text{Pm}$   $\epsilon$  decay 1995Br21,1993BrZS

Decay Scheme (continued)

Legend

Intensities: Relative  $I_\gamma$

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



$^{133}_{60}\text{Nd}_{73}$



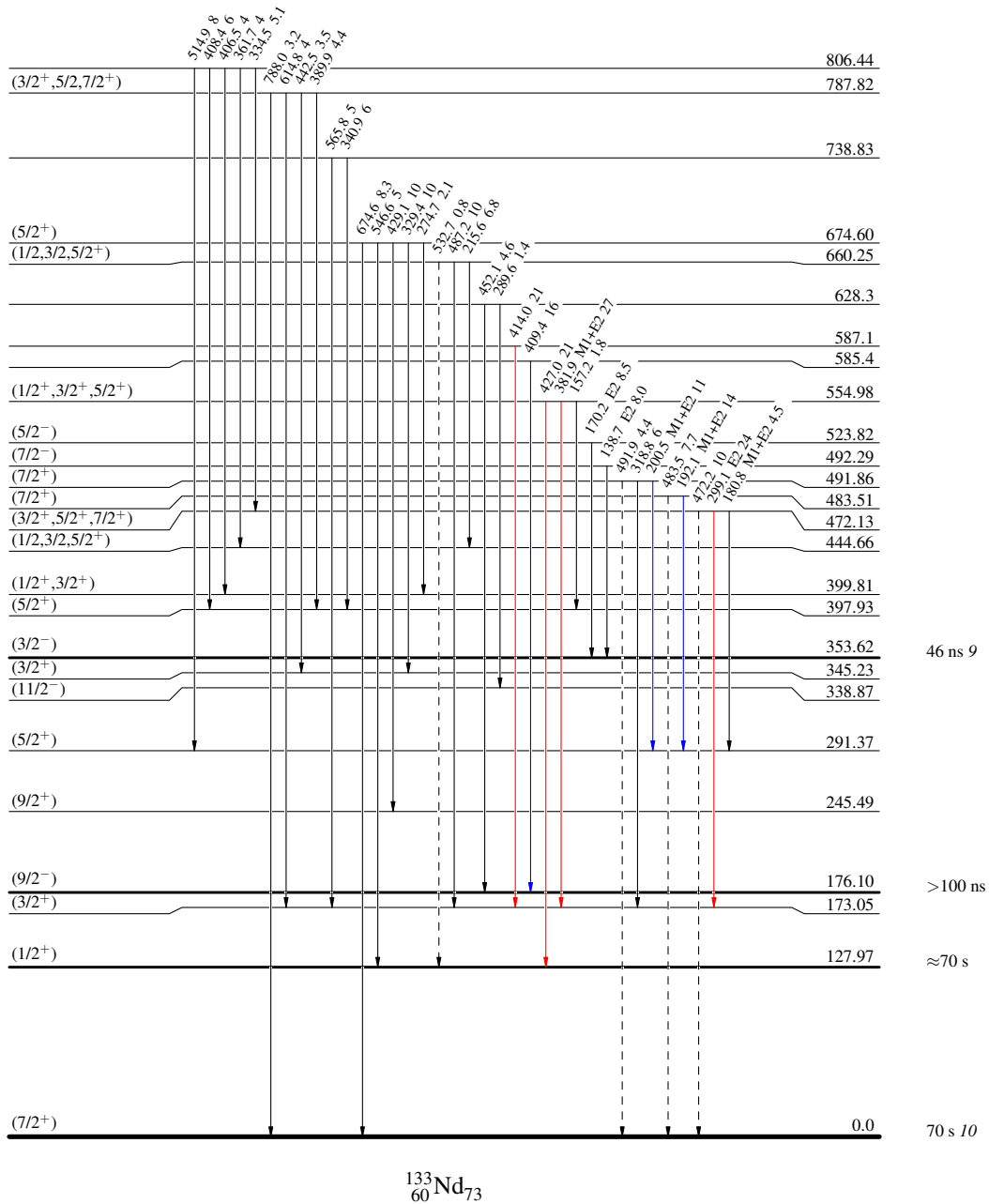
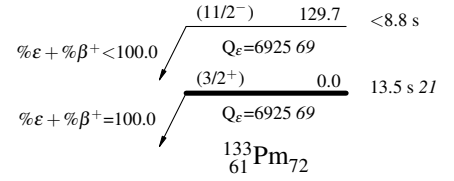
$^{133}\text{Pm}$   $\epsilon$  decay 1995Br21,1993BrZS

Decay Scheme (continued)

Legend

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

Intensities: Relative  $I_\gamma$



$^{133}\text{Nd}_{73}$

$^{133}\text{Pm}$   $\epsilon$  decay 1995Br21,1993BrZS

Decay Scheme (continued)

