^{133}Nd ε decay (≈70 s) 1995Br24

History

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

Parent: ^{133}Nd: E=127.97 *11*; J$^{\pi}$=(1/2$^+$); $T_{1/2}$≈70 s; Q(ε)=5605 *48*; %ε+%β^+ decay>97.3

1995Br24,1993BrZS: ^{133}Nd(ε) [from ^{92}Mo(^{46}Ti,4p1n)^{133}Nd, ^{92}Mo(^{46}Ti,3p2n)^{133}Pm E=246 MeV] measured γ, ce, $\gamma\gamma$(t), (ce)γ(t), xγ(t), ex(t), deduced ^{133}Pr levels, $T_{1/2}$, α(exp). Tandem, mass-separator, tape transport system, Ge, Si detectors; particle plus triaxial rotor model calculation. The assignment of transitions to decay of the isomer was made by comparison with the ^{133}Nd decay studies (1989Li22) where source contained ≈ 8 times less isomer. The main ^{133m}Nd isomer decay leads to a direct feeding of the 402 keV excited state.

^{133}Pr Levels

E(level)†	J$^{\pi}$‡	$T_{1/2}$‡	E(level)†	J$^{\pi}$‡	E(level)†	J$^{\pi}$‡
0.0	(3/2$^+$)	6.5 min *3*	402.78 *10*	(1/2$^+$,3/2$^+$)	744.00 *8*	(1/2$^+$,3/2)
61.67 *8*	(5/2$^+$)		489.80? *20*	(3/2)	898.81 *18*	
166.68 *8*	(5/2$^+$,7/2$^+$)		586.30 *12*	(3/2$^+$)	1041.99 *22*	(1/2,3/2)
192.03 *17*	(11/2$^-$)	1.1 s *2*	639.05 *12*	(1/2,3/2)	1221.9 *5*	
295.59 *13*	(7/2$^-$)		656.4 *4*			

† From a least squares fit to Eγ′s.
‡ From Adopted Levels.

γ(^{133}Pr)

The isomer to ground state ε+β^+ decay is unknown and therefore the decay scheme cannot be normalized. Most of the feeding is expected into the 402-keV level.

E$_\gamma$†	I$_\gamma$†	E$_i$(level)	J$^{\pi}_i$	E$_f$	J$^{\pi}_f$	Mult.‡	α#	Comments
61.7 *1*	5 *2*	61.67	(5/2$^+$)	0.0	(3/2$^+$)	M1	5.22	α(L)exp=0.67 *15*; α(M)exp=0.30 *13*; M/L=0.27 *8* α(K)=4.44 *7*; α(L)=0.617 *10*; α(M)=0.1300 *20*; α(N+..)=0.0341 *5* α(N)=0.0291 *5*; α(O)=0.00467 *7*; α(P)=0.000342 *5*
103.6 *2*	1.0 *5*	295.59	(7/2$^-$)	192.03	(11/2$^-$)	E2	1.87	α(L)exp=0.75 *20*; α(M)exp=0.23 *8*; L/K=0.70 *20*; M/L=0.30 *9*; M/K=0.19 *6* α(K)=1.093 *17*; α(L)=0.604 *10*; α(M)=0.1361 *23*; α(N+..)=0.0336 *6* α(N)=0.0294 *5*; α(O)=0.00412 *7*; α(P)=5.75×10^{-5} *9*
105.1 *2*	4 *1*	166.68	(5/2$^+$,7/2$^+$)	61.67	(5/2$^+$)	M1+E2	1.4 *4*	α(K)exp<1.7; α(L)exp=0.23 *7*; L/K=0.19 *6*; M/L=0.28 *9*; M/K=0.066 *20* α(K)=1.00 *5*; α(L)=0.35 *22*; α(M)=0.08 *5*; α(N+..)=0.019 *13* α(N)=0.017 *11*; α(O)=0.0024 *15*; α(P)=6.4×10^{-5} *10*
130.4 *2*	0.6 *2*	192.03	(11/2$^-$)	61.67	(5/2$^+$)	E3	7.60 *12*	α(L)exp=4.1 *6*; α(M)exp=1.3 *2*; L/K=1.7 *3*; M/K=0.54 *12*; M/L=0.30 *8* α(K)=2.40 *4*; α(L)=4.02 *7*; α(M)=0.943 *16*; α(N+..)=0.232 *4* α(N)=0.204 *4*; α(O)=0.0279 *5*; α(P)=0.0001277 *19*

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^{133}Nd ε decay (≈70 s) 1995Br24 (continued)

γ(^{133}Pr) (continued)

E_γ†	I_γ†	E_i(level)	J_i^π	E_f	J_f^π	Mult.‡	α#	Comments
								α(exp): α(K)exp=2.4 is equal to theoretical value and is used for normalization of Iγ to Ice.
154.6 4	1.0 3	898.81		744.00	(1/2$^+$,3/2)			
166.7 1	0.5 2	166.68	(5/2$^+$,7/2$^+$)	0.0	(3/2$^+$)			
233.9 1	1.0 4	295.59	(7/2$^-$)	61.67	(5/2$^+$)			
341.0 3	3 1	402.78	(1/2$^+$,3/2$^+$)	61.67	(5/2$^+$)			
360.8 3	3.0 3	656.4		295.59	(7/2$^-$)			
402.8 1	100	402.78	(1/2$^+$,3/2$^+$)	0.0	(3/2$^+$)	M1	0.0292	α(K)exp=0.028 6; α(L)exp=0.0042 8; M/L=0.15 3 α(K)=0.0250 4; α(L)=0.00333 5; α(M)=0.000699 10; α(N+..)=0.000184 3 α(N)=0.0001564 22; α(O)=2.53×10^{-5} 4; α(P)=1.89×10^{-6} 3
419.6 1	5.8 6	586.30	(3/2$^+$)	166.68	(5/2$^+$,7/2$^+$)	M1+E2	0.022 4	α(K)exp=0.019 4 α(K)=0.019 4; α(L)=0.00279 21; α(M)=0.00059 4; α(N+..)=0.000154 12 α(N)=0.000132 10; α(O)=2.08×10^{-5} 20; α(P)=1.4×10^{-6} 4
472.1 3	1.6 6	639.05	(1/2,3/2)	166.68	(5/2$^+$,7/2$^+$)			
489.8& 2	11 2	489.80?	(3/2)	0.0	(3/2$^+$)			
496.1 4	0.3 3	898.81		402.78	(1/2$^+$,3/2$^+$)			
524.7 3	3.6 7	586.30	(3/2$^+$)	61.67	(5/2$^+$)			
577.4@ 1	4.2@ 8	639.05	(1/2,3/2)	61.67	(5/2$^+$)			
577.4@ 1	1.9@ 6	744.00	(1/2$^+$,3/2)	166.68	(5/2$^+$,7/2$^+$)			
586.4 4	2 1	586.30	(3/2$^+$)	0.0	(3/2$^+$)			
639.1 4	2.2 6	639.05	(1/2,3/2)	0.0	(3/2$^+$)			
639.2 2	0.5 2	1041.99	(1/2,3/2)	402.78	(1/2$^+$,3/2$^+$)			
682.3 2	1.8 3	744.00	(1/2$^+$,3/2)	61.67	(5/2$^+$)			
732.1@ 3	0.7@ 3	898.81		166.68	(5/2$^+$,7/2$^+$)			
732.1@& 6	1.2@ 5	1221.9		489.80?	(3/2)			
743.9 1	5.0 5	744.00	(1/2$^+$,3/2)	0.0	(3/2$^+$)			
836.9 4	1.0 4	898.81		61.67	(5/2$^+$)			
899.2 4	3.8 4	898.81		0.0	(3/2$^+$)			

† From 1995Br24.
‡ From internal conversion electron measurements in 1995Br24.
# 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.
@ Multiply placed with intensity suitably divided.
& Placement of transition in the level scheme is uncertain.

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Decay Scheme

Legend

Intensities: Relative I_γ

@ Multiply placed: intensity suitably divided