^{133}Sm ε decay (3.5 s) 2006Xu07,1993BrZS

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}Sm: E=0+y; J^π=(1/2$^-$); $T_{1/2}$=3.5 s *4*; Q(ε)=8139; %ε+%$β^+$ decay=100.0

2006Xu07, 2001Xu04: ^{133}Sm(ε+$β^+$) [from ^{96}Ru(^{40}Ca,n2p) E=180 MeV]; measured γ, x-rays, delayed proton spectra, pγ, γγ, xγ, xp coin.; ^{133}Pm; deduced levels, J^π. Cyclotron, tape transport system, enriched target, Si(Li), HPGe detectors, calculations using statistical model and Woods-Saxon-Strutinsky method.

1993BrZS: ^{133}Sm(ε+$β^+$) [from ^{92}Mo(^{46}Ti,3n2p), E=246 MeV]; measured γ, x-rays, γγ, xγ coin. ^{133}Pm; deduced γ transitions, deduced ^{133}Sm $T_{1/2}$. Tandem, mass-separator, tape transport system. The ^{133}Pm ε+$β^+$ decay was studied for the first time.

^{133}Sm decays by ε+$β^+$ into ^{133}Pm and by β-delayed protons into ^{132}Nd. In 2006Xu07 there were determined, that β-delayed γ-lines are separated into two groups which correspond to ε decays of two ^{133}Sm states with $T_{1/2}$=3.4 *s* and $T_{1/2}$=2.8 *s*.

The proposed decay scheme should be considered as tentative, since the observed γ-rays were not observed in the (HI,xnγ) work. The parent state is proposed J^π=1/2$^-$, originating from the 1/2[541] ($h_{9/2}$) configuration, but in well deformed nuclei J^π=5/2$^-$ level is frequently observed as a band-head, owing to the large decoupling parameter and strong Coriolis mixing.

^{133}Pm Levels

E(level)†	Comments
0+x	Additional information 1.
32.7+x *5*	
129.6+x *7*	
286.4+x *9*	
402.3+x *7*	

† From a least-squares fit to Eγ.

γ(^{133}Pm)

E_γ†	I_γ†	E_i(level)	E_f	Comments
32.7 *5*	194 *25*	32.7+x	0+x	
96.9 *5*	22 *4*	129.6+x	32.7+x	
156.8 *5*	13 *2*	286.4+x	129.6+x	E_γ: reported also by 1993BrZS.
369.6 *5*	100	402.3+x	32.7+x	E_γ: reported also by 1993BrZS.

† From 2006Xu07 and 2001Xu04. ΔEγ=0.5 keV, as reported by the authors.

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Decay Scheme

Intensities: Relative I_γ