^{153}Tm ε decay (1.48 s) 1989Ko02,1988ScZV

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 170, 1 (2020)	16-Aug-2020

Parent: ^{153}Tm: E=0.0; J$^{\pi}$=(11/2$^-$); T$_{1/2}$=1.48 s *1*; Q(ε)=6495 *13*; %ε+%β^+ decay=9 *3*

^{153}Tm-%ε+%β^+ decay: From ^{153}Tm Adopted Levels and from 1989Ko02.

Source produced in ^{92}Mo(^{64}Zn,n2p)^{153}Yb(ε) and (^{64}Zn,3p) followed by mass separation. Measured event-mode coincidence of particles, γ rays, x rays and β+′s tagged with time.

^{153}Er Levels

Since the decay energy is over 6 MeV, this decay scheme with only a few γ rays is certainly not complete.

E(level)	J$^{\pi}$ †	Comments
0.0	(7/2$^-$)	From log*ft* systematics (1998Si17), for ΔJ=2, no feeding log*ft* > 10.6, so I(ε+β^+) < 6x10^{-5}%.
299.3 *1*	(9/2$^-$)	
765.8 *2*	(11/2$^-$)	
971.0 *3*	(13/2$^+$)	
1011.9 *4*		
1110.5 *4*	(13/2$^-$)	
1132.7 *5*		
1731.1 *4*		

† From Adopted Levels.

ε,β^+ radiations

Values given are calculated from the intensity balances at each level. However, this decay scheme is very incomplete, so it should be expected that the actual I(ε+β^+) are less than those given here, and that the actual log*ft* values are larger.

E(decay)	E(level)	Iβ^+ †	Iε †	Log *ft*	I(ε+β^+) †	Comments
(4764 *13*)	1731.1	5.9	3.3	5.1	9.2	av Eβ=1699.4 *61*; εK=0.2967 *20*; εL=0.0452 *3*; εM+=0.01339 *9*
(5362 *13*)	1132.7	1.57	0.561	6.0	2.13	av Eβ=1977.9 *61*; εK=0.2201 *15*; εL=0.03343 *22*; εM+=0.00991 *7*
(5385 *13*)	1110.5	4.7	1.7	5.5	6.4	av Eβ=1988.3 *61*; εK=0.2177 *14*; εL=0.03306 *22*; εM+=0.00980 *7*
(5483 *13*)	1011.9	3.5	1.1	5.7	4.6	av Eβ=2034.4 *61*; εK=0.2075 *14*; εL=0.03150 *21*; εM+=0.00934 *6*
(5524 *13*)	971.0	5.4	1.7	5.5	7.1	av Eβ=2053.5 *61*; εK=0.2034 *13*; εL=0.03087 *20*; εM+=0.00915 *6*
(5729 *13*)	765.8	4.0	1.1	5.8	5.1	av Eβ=2149.7 *61*; εK=0.1842 *12*; εL=0.02795 *18*; εM+=0.00828 *6*
(6196 *13*)	299.3	53	12	4.8	65	av Eβ=2369.2 *62*; εK=0.1481 *9*; εL=0.02244 *14*; εM+=0.00665 *4*

† For absolute intensity per 100 decays, multiply by 0.09 *3*.

γ(^{153}Er)

Iγ normalization: Calculated by assuming zero g.s. ε+β^+ branching (1989Ko02).

E$_\gamma$ †	I$_\gamma$ †#	E$_i$(level)	J$^{\pi}_i$	E$_f$	J$^{\pi}_f$	Mult.	α ‡	Comments
205.2 *2*	9.6 *9*	971.0	(13/2$^+$)	765.8	(11/2$^-$)	[E1]	0.0486	%Iγ=0.62 *21* α(K)=0.0409 *6*; α(L)=0.00605 *9*; α(M)=0.001337 *19*

Continued on next page (footnotes at end of table)

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γ(^{153}Er) (continued)

E_γ †	I_γ †#	E_i(level)	J^π_i	E_f	J^π_f	Mult.	α ‡	Comments
								α(N)=0.000308 *5*; α(O)=4.27×10^{-5} *6*; α(P)=2.03×10^{-6} *3*
299.3 *1*	100.01 *1*	299.3	(9/2$^-$)	0.0	(7/2$^-$)	[M1,E2]	0.102 *33*	%Iγ=6.4 *21* α(K)=0.082 *31*; α(L)=0.0155 *12*; α(M)=0.00352 *16* α(N)=0.00081 *5*; α(O)=0.000112 *13*; α(P)=4.8×10^{-6} *22*
712.6 *3*	6.5 *8*	1011.9		299.3	(9/2$^-$)			%Iγ=0.42 *15*
765.8 *2*	30 *3*	765.8	(11/2$^-$)	0.0	(7/2$^-$)	[E2]	0.00594	%Iγ=1.9 *7* α(K)=0.00490 *7*; α(L)=0.000809 *12*; α(M)=0.000181 *3* α(N)=4.20×10^{-5} *6*; α(O)=5.88×10^{-6} *9*; α(P)=2.78×10^{-7} *4*
811.2 *3*	8.9 *10*	1110.5	(13/2$^-$)	299.3	(9/2$^-$)	[E2]	0.00523	%Iγ=0.57 *20* α(K)=0.00433 *6*; α(L)=0.000702 *10*; α(M)=0.0001571 *22* α(N)=3.64×10^{-5} *6*; α(O)=5.11×10^{-6} *8*; α(P)=2.46×10^{-7} *4*
833.4 *4*	≈3	1132.7		299.3	(9/2$^-$)			%Iγ≈0.192
965.3 *3*	12.9 *15*	1731.1		765.8	(11/2$^-$)			%Iγ=0.83 *29*

† From 1989Ko02.
‡ Additional information 1.
\# For absolute intensity per 100 decays, multiply by 0.064 *22*.

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Decay Scheme