^{142}Tb IT decay (25 μs) 2006Ta08

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	T. D. Johnson, D. Symochko(a), M. Fadil(b), and J. K. Tuli	NDS 112,1949 (2011)	1-Jun-2010

Parent: ^{142}Tb: E=652.1 *6*; $J^\pi=8^+$; $T_{1/2}$=25 μs *1*; %IT decay=100

^{142}Tb isotope formed by ^{92}Mo(^{54}Fe,n3p) reaction at 250 MeV. The recoil products were separated in mass/charge ratio by recoil-mass separator (RMS). Measured Eγ, Iγ, γγ, conversion electrons using two segmented Ge Clover detectors for γ rays and Si(Li) conversion electron spectrometer (BESCA) at Oak Ridge HRIBF.

1989ZyZZ: Measured γ, x.

2001Sc09: Using delayed coincidences (10-30 μs time window), established transitions feeding the isomer.

The evaluators note that this is a significant change for the level scheme. Earlier measurements (1989ZyZZ) placed the position of the isomer at 621 keV. The current measurement places this level at 652 keV.

^{142}Tb Levels

E(level)	J^π	$T_{1/2}$ †	Comments
0.0			
279.8 *4*	5^-	303 ms *7*	$T_{1/2}$: from 1991Fi03.
312.0 *5*	6^-		
395.6 *5*	6^-		
477.3 *5*	6^-		
615.0 *5*	7^-		
652.1 *6*	8^+	25 μs *1*	$T_{1/2}$: from γ(t) (2006Ta08).

† Earlier measured at 15 μs 1989ZyZZ.

γ(^{142}Tb)

Iγ normalization: from %IT=100.

Iγ normalization: Calculated using relative intensities from 2006Ta08 and internal conversion coefficients from BrIcc. Theoretical conversion coefficients are from BrIcc code.

E_γ	I_γ ‡	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α †	Comments
32.2 *3*	13 *1*	312.0	6^-	279.8	5^-	M1	9.5 *3*	α(exp)=15 *8* ce(N)/(γ+ce)=0.0358 *15*; ce(O)/(γ+ce)=0.00549 *24*; ce(P)/(γ+ce)=0.000359 *16* $I_{(\gamma+ce)}$: 136 from Iγ and α disagrees with 178 from table II of 2006Ta08.
37.2 *3*	77 *6*	652.1	8^+	615.0	7^-	E1	0.786 *21*	α(exp)=1.5 *5* ce(L)/(γ+ce)=0.345 *7*; ce(M)/(γ+ce)=0.0758 *21*; ce(N+)/(γ+ce)=0.0192 *6* ce(N)/(γ+ce)=0.0169 *5*; ce(O)/(γ+ce)=0.00225 *7*; ce(P)/(γ+ce)=8.58×10^{-5} *23* $I_{(\gamma+ce)}$: 138 from Iγ and α disagrees with 196 from table II of 2006Ta08.
81.5 *3*	3 *1*	477.3	6^-	395.6	6^-	M1	3.96 *7*	α(exp)=3.6 *9* ce(K)/(γ+ce)=0.673 *7*; ce(L)/(γ+ce)=0.0984 *21*; ce(M)/(γ+ce)=0.0215 *5*; ce(N+)/(γ+ce)=0.00578 *13* ce(N)/(γ+ce)=0.00497 *12*; ce(O)/(γ+ce)=0.000765 *18*; ce(P)/(γ+ce)=5.02×10^{-5} *12* Mult.: M1+E2 shown in figure 15 of 2006Ta08.
83.7 *3*	3 *1*	395.6	6^-	312.0	6^-	M1+E2	4.4 *8*	α(exp)=6.3 *27* ce(K)/(γ+ce)=0.45 *8*; ce(L)/(γ+ce)=0.28 *15*; ce(M)/(γ+ce)=0.07 *5*; ce(N+)/(γ+ce)=0.017 *12*

Continued on next page (footnotes at end of table)

^{142}Tb IT decay (25 μs) 2006Ta08 (continued)

$\gamma(^{142}Tb)$ (continued)

E_γ	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α[†]	Comments
								ce(N)/(γ+ce)=0.015 *11*; ce(O)/(γ+ce)=0.0020 *14*; ce(P)/(γ+ce)=2.9×10^{-5} *14* Mult.: α(exp) consistent with E2, but admixture cannot be ruled out.
115.8 *3*	3 *1*	395.6	6$^-$	279.8	5$^-$	M1+E2	1.49 *5*	α(L)exp=0.38 *3* ce(K)/(γ+ce)=0.40 *6*; ce(L)/(γ+ce)=0.15 *7*; ce(M)/(γ+ce)=0.035 *20*; ce(N+)/(γ+ce)=0.009 *5* ce(N)/(γ+ce)=0.008 *5*; ce(O)/(γ+ce)=0.0011 *6*; ce(P)/(γ+ce)=2.6×10^{-5} *11*
137.7 *3*	38 *3*	615.0	7$^-$	477.3	6$^-$	M1+E2	0.85 *4*	α(K)exp=0.53 *1*; α(L)exp=0.10 *2*; K/L=5.1 *2* ce(K)/(γ+ce)=0.33 *5*; ce(L)/(γ+ce)=0.10 *4*; ce(M)/(γ+ce)=0.024 *11*; ce(N+)/(γ+ce)=0.006 *3* ce(N)/(γ+ce)=0.0053 *24*; ce(O)/(γ+ce)=0.0007 *3*; ce(P)/(γ+ce)=2.2×10^{-5} *9*
165.4 *3*	34 *3*	477.3	6$^-$	312.0	6$^-$	M1+E2	0.48 *5*	α(K)exp=0.33 *1*; α(L)exp=0.07 *1*; K/L=5.0 *2* ce(K)/(γ+ce)=0.24 *5*; ce(L)/(γ+ce)=0.063 *19*; ce(M)/(γ+ce)=0.014 *5*; ce(N+)/(γ+ce)=0.0038 *12* ce(N)/(γ+ce)=0.0033 *11*; ce(O)/(γ+ce)=0.00046 *13*; ce(P)/(γ+ce)=1.6×10^{-5} *6*
197.6 *3*	5 *1*	477.3	6$^-$	279.8	5$^-$	M1+E2	0.28 *5*	α(K)exp=0.23 *2*; α(L)exp=0.06 *4*; K/L=4.2 *6* ce(K)/(γ+ce)=0.17 *4*; ce(L)/(γ+ce)=0.038 *8*; ce(M)/(γ+ce)=0.0087 *20*; ce(N+)/(γ+ce)=0.0023 *5* ce(N)/(γ+ce)=0.0020 *5*; ce(O)/(γ+ce)=0.00028 *5*; ce(P)/(γ+ce)=1.2×10^{-5} *5*
219.4 *3*	13 *1*	615.0	7$^-$	395.6	6$^-$	M1+E2	0.21 *4*	α(K)exp=0.14 *1*; α(L)exp=0.04 *1*; K/L=3.7 *4* ce(K)/(γ+ce)=0.13 *3*; ce(L)/(γ+ce)=0.028 *4*; ce(M)/(γ+ce)=0.0064 *11*; ce(N+)/(γ+ce)=0.00167 *25* ce(N)/(γ+ce)=0.00145 *23*; ce(O)/(γ+ce)=0.000209 *21*; ce(P)/(γ+ce)=9.E−6 *4*
302.9 *3*	100 *8*	615.0	7$^-$	312.0	6$^-$	M1+E2	0.081 *21*	α(K)exp=0.05 *1*; α(L)exp=0.011 *1*; K/L=4.8 *3* ce(K)/(γ+ce)=0.061 *18*; ce(L)/(γ+ce)=0.0109 *5*; ce(M)/(γ+ce)=0.00243 *7*; ce(N+)/(γ+ce)=0.000644 *25* ce(N)/(γ+ce)=0.000557 *18*; ce(O)/(γ+ce)=8.2×10^{-5} *6*; ce(P)/(γ+ce)=4.2×10^{-6} *16*
335.1 *6*	1 *1*	615.0	7$^-$	279.8	5$^-$	E2	0.0446 *7*	ce(N)/(γ+ce)=0.000393 *6*; ce(O)/(γ+ce)=5.56×10^{-5} *9*; ce(P)/(γ+ce)=2.09×10^{-6} *4*
340.1 *6*	1 *1*	652.1	8$^+$	312.0	6$^-$	M2	0.290 *5*	α(K)exp=0.3 *1* ce(K)/(γ+ce)=0.1835 *23*; ce(L)/(γ+ce)=0.0322 *5*; ce(M)/(γ+ce)=0.00722 *12*; ce(N+)/(γ+ce)=0.00194 *3* ce(N)/(γ+ce)=0.00167 *3*; ce(O)/(γ+ce)=0.000255 *4*; ce(P)/(γ+ce)=1.594×10^{-5} *25* $I_{(\gamma+ce)}$: 1.3 from Iγ and α disagrees with 4 from table II of 2006Ta08.

[†] Additional information 1.
[‡] For absolute intensity per 100 decays, multiply by 0.720 *58*.

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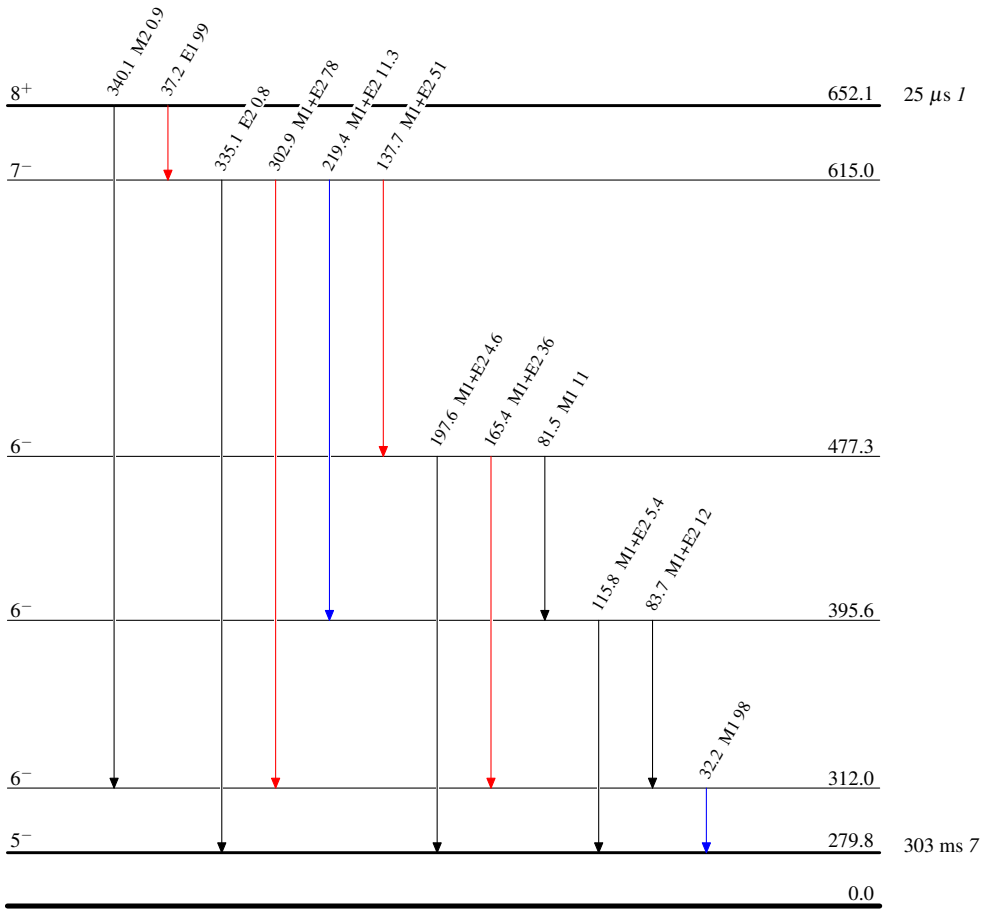
Decay Scheme

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

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



$^{142}_{65}Tb_{77}$