^{153}Yb ε decay (4.2 s) 1989Ko02,1988Wi05

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

Parent: ^{153}Yb: E=0.0; J^π=(7/2$^-$); $T_{1/2}$=4.2 s *2*; Q(ε)=677×10[1] *20*; %ε+%β^+ decay=?

^{153}Yb-Uncertainty of Q(g.s.) is 200 (syst,2017Wa10).

^{153}Yb-%ε+%β^+ decay: 90% from ^{153}Yb Adopted Levels, 100−%α where %α is based on calculations.

1989Ko02: Source produced by ^{92}Mo(^{64}Zn,n2p) followed by mass separation. Measured coincidences of particles, γ rays, x rays, and positrons.

Decay scheme is very incomplete; with a Q values of over 6 MeV, many more levels will be populated.

^{153}Tm Levels

Proton emission has been observed (1988Wi05) from excited levels in ^{153}Tm. These protons have a continuous energy spectrum from 2.8 to 5.2 MeV with a mean energy of 3.9 MeV. The emission is from levels in ^{153}Tm from 4 to 6 MeV and occur following 8×10^{-3}% *2* of the decays of ^{153}Yb. (This uncertainty is statistical only and does not include several contributions.) From p-γ coincidences, these protons populate the following levels in ^{152}Er: 0 keV, 0$^+$, 57% *17*; 808 keV, 2$^+$, 40% *12*; and 1481 keV, 4$^+$, 3% *3*.

E(level)[†]	J^π[‡]	$T_{1/2}$[#]	Comments
0.0	(11/2$^-$)	1.48 s *1*	Configuration=π $h_{11/2}$.
43.10 *24*	(1/2$^+$)	2.5 s *2*	Configuration=π $s_{1/2}$. E(level): Deduced from Eγ for γ cascades from 1101-keV level to this level and the ground state. E(level): Level decays primary by α emission and secondarily by ε+β+ decay; the γ decay to the ground state is expected to be negligible.
134.90 *22*	(3/2$^+$)		Configuration=π $d_{3/2}$.
504.49 *22*	(5/2$^+$)		Configuration=π $d_{5/2}$.
547.37 *8*	(7/2$^-$,9/2$^-$)		
674.12 *8*	(7/2$^-$,9/2$^-$)		
804.7 *3*			
843.3 *3*			
887.21 *24*			
892.2 *3*			
908.67 *13*			
938.9 *4*			
961.51 *24*			
1020.2 *3*			
1101.70 *16*			
1133.97 *13*			
1152.1 *4*			
1327.3 *5*			
1364.60 *11*			
1455.95 *16*			
1616.9 *4*			
1775.60 *16*			
1853.88 *15*			
2035.0 *4*			
2039.3 *3*			

[†] From least-squares fit to γ energies.

[‡] Adopted values (same as those from 1989Ko02) based on ε and γ decay modes along with shell-model arguments.

[#] Adopted values.

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γ(^{153}Tm)

Iγ normalization: Additional information 3.

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α†	Comments
91.8 *1*	19 *2*	134.90	(3/2$^+$)	43.10	(1/2$^+$)	[M1,E2]	4.11 *17*	α(K)=2.3 *11*; α(L)=1.40 *90*; α(M)=0.34 *23* α(N)=0.077 *51*; α(O)=0.0093 *56*; α(P)=1.29×10^{-4} *76*
126.7 *2*	2.2 *4*	674.12	(7/2$^-$,9/2$^-$)	547.37	(7/2$^-$,9/2$^-$)	[M1,E2]	1.43 *16*	α(K)=0.95 *37*; α(L)=0.36 *17*; α(M)=0.086 *42* α(N)=0.0198 *95*; α(O)=0.00247 *98*; α(P)=5.3×10^{-5} *28*
264.8 *3*	5.5 *6*	938.9		674.12	(7/2$^-$,9/2$^-$)			
361.3 *1*	9.4 *9*	908.67		547.37	(7/2$^-$,9/2$^-$)			
369.6 *1*	32 *3*	504.49	(5/2$^+$)	134.90	(3/2$^+$)	[M1,E2]	0.061 *23*	α(K)=0.050 *21*; α(L)=0.0088 *16*; α(M)=0.0020 *3* α(N)=0.00046 *8*; α(O)=6.4×10^{-5} *14*; α(P)=2.9×10^{-6} *14*
427.6 *2*	2.1 *4*	1101.70		674.12	(7/2$^-$,9/2$^-$)			
515.7 *2*	4.8 *7*	1020.2		504.49	(5/2$^+$)			
547.4 *1*	100	547.37	(7/2$^-$,9/2$^-$)	0.0	(11/2$^-$)	[M1,E2]	0.022 *8*	α(K)=0.0181 *72*; α(L)=0.00290 *78*; α(M)=6.5×10^{-4} *17* α(N)=1.52×10^{-4} *40*; α(O)=2.14×10^{-5} *62*; α(P)=1.06×10^{-6} *46*
554.3 *2*	3.5 *5*	1101.70		547.37	(7/2$^-$,9/2$^-$)			
586.6 *1*	20 *2*	1133.97		547.37	(7/2$^-$,9/2$^-$)			
597.3 *2*	8.5 *9*	1101.70		504.49	(5/2$^+$)			
669.8 *2*	3.7 *6*	804.7		134.90	(3/2$^+$)			
674.1 *1*	61 *5*	674.12	(7/2$^-$,9/2$^-$)	0.0	(11/2$^-$)	[M1,E2]	0.013 *5*	α(K)=0.0108 *41*; α(L)=0.00167 *49*; α(M)=3.7×10^{-4} *11* α(N)=8.7×10^{-5} *25*; α(O)=1.24×10^{-5} *38*; α(P)=6.4×10^{-7} *26*
690.7 *3*	4.8 *7*	1364.60		674.12	(7/2$^-$,9/2$^-$)			
708.4 *2*	3.9 *8*	843.3		134.90	(3/2$^+$)			
752.3 *1*	8.0 *8*	887.21		134.90	(3/2$^+$)			
757.3 *2*	4.2 *8*	892.2		134.90	(3/2$^+$)			
781.6 *2*	4.9 *7*	1455.95		674.12	(7/2$^-$,9/2$^-$)			
817.2 *1*	10 *1*	1364.60		547.37	(7/2$^-$,9/2$^-$)			
826.6 *1*	8.0 *8*	961.51		134.90	(3/2$^+$)			
908.8 *2*	25 *2*	1455.95		547.37	(7/2$^-$,9/2$^-$)			
942.8 *3*	5.2 *7*	1616.9		674.12	(7/2$^-$,9/2$^-$)			
966.7 *2*	8.8 *9*	1101.70		134.90	(3/2$^+$)			
1017.2 *3*	3.2 *7*	1152.1		134.90	(3/2$^+$)			
1101.5 *2*	10 *1*	1775.60		674.12	(7/2$^-$,9/2$^-$)			
1179.7 *2*	4 *1*	1853.88		674.12	(7/2$^-$,9/2$^-$)			
1192.4 *4*	2 *1*	1327.3		134.90	(3/2$^+$)			
1228.2 *2*	10 *1*	1775.60		547.37	(7/2$^-$,9/2$^-$)			
1306.6 *2*	5.1 *7*	1853.88		547.37	(7/2$^-$,9/2$^-$)			
1364.6 *2*	5.2 *7*	1364.60		0.0	(11/2$^-$)			
1534.8 *2*	15 *2*	2039.3		504.49	(5/2$^+$)			
1853.7 *4*	2.5 *5*	1853.88		0.0	(11/2$^-$)			
1900.1 *3*	6.5 *8*	2035.0		134.90	(3/2$^+$)			
1904.4 *2*	8.5 *9*	2039.3		134.90	(3/2$^+$)			

† Additional information 1.

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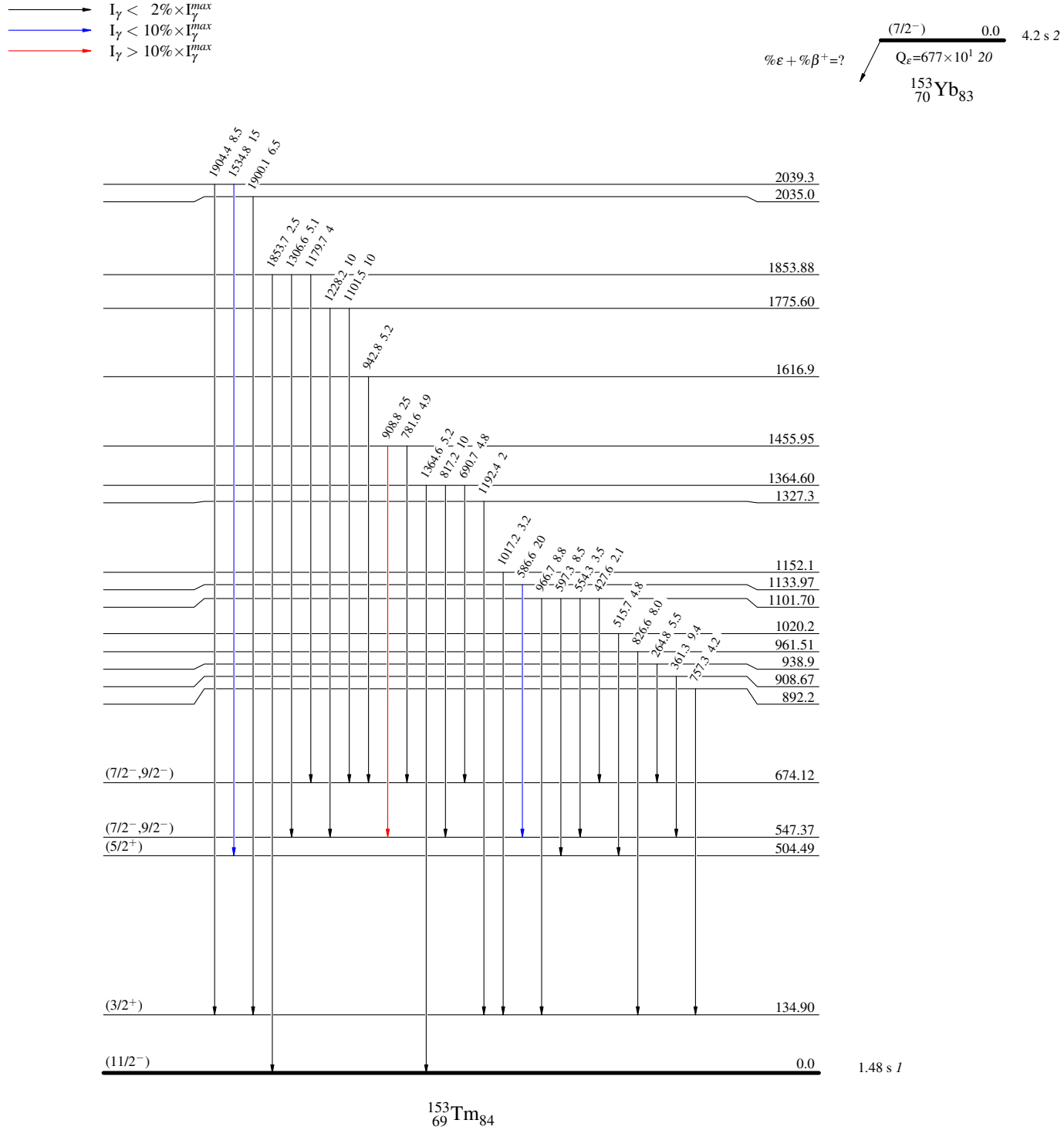
Decay Scheme

Intensities: Relative I_γ

Legend

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



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Decay Scheme (continued)

Intensities: Relative I_γ