^{153}Yb IT decay (15 μs) 1989Mc01,1993Mc03

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

Parent: ^{153}Yb: E=2578.2+x; J^π=(27/2$^-$); $T_{1/2}$=15 μs *1*; %IT decay=100.0

1989Mc01,1993Mc03: ^{102}Pd(^{54}Fe,2pn) at 245 MeV followed by mass separation; measured γ's with Ge detector array.

^{153}Yb Levels

E(level)†	J^π‡	$T_{1/2}$#	Comments
0.0	(7/2$^-$)		
566.98 *15*	(9/2$^-$)		
1201.66 *14*	(13/2$^+$)	≈6 ns	$T_{1/2}$: from γ(t) (1993Mc03).
1459.27 *16*	(9/2$^-$)		
1490.71 *16*	(11/2$^-$)		
1762.53 *15*	(11/2$^+$)		
2030.19 *17*	(13/2$^+$)		
2137.43 *18*	(15/2$^+$)		
2152.9 *3*	(15/2$^-$)		
2246.94 *19*	(17/2$^+$)		
2481.34 *24*	(19/2$^-$)		
2504.53 *22*	(19/2$^+$)		
2527.4 *3*	(21/2$^+$)		
2578.2 *3*	(23/2$^-$)		
2578.2+x	(27/2$^-$)	15 μs *1*	Additional information 1. $T_{1/2}$: from γ(t) (1993Mc03, 1989Mc01).

† From least-squares fits to γ-ray energies.

‡ From authors and based primarily on systematics of N=83 nuclides. See Adopted Levels for configuration assignments.

Adopted values.

γ(^{153}Yb)

Iγ normalization: From %IT=100 of the isomeric state giving 100% feeding to the ground state.

E_γ	I_γ‡	E_i(level)	J^π_i	E_f	J^π_f	Mult.	α†	$I_{(\gamma+ce)}$‡	Comments
x		2578.2+x	(27/2⁻)	2578.2	(23/2⁻)			139 *6*	Unobserved γ ray expected to decay from the 15 μs isomer. Of all known levels of this nucleus, the only one with ΔJ ≤ 2 relative to the isomer is 2578.2, therefore assumed to be the final level (other decay patterns not excluded if new γ′s could be discovered). $I_{(\gamma+ce)}$: From total γ feeding to g.s.
(23)		2527.4	(21/2⁺)	2504.53	(19/2⁺)			104 *11*	E_γ: γ not observed, but required by γγ coincidences. $I_{(\gamma+ce)}$: From intensity balance.
50.8 *2*	76 *8*	2578.2	(23/2⁻)	2527.4	(21/2⁺)	E1	0.391 *7*		α(L)=0.305 *6*; α(M)=0.0687 *13* α(N)=0.0156 *3*; α(O)=0.00193 *4*; α(P)=6.32×10^{-5} *11* Mult.: From α=0.54 *25* from intensity balances.
96.8 *2*	5.0 *4*	2578.2	(23/2⁻)	2481.34	(19/2⁻)	(E2)	3.64 *6*		α(K)=1.091 *16*; α(L)=1.94 *4*; α(M)=0.480 *9* α(N)=0.1094 *19*; α(O)=0.01255 *22*; α(P)=4.66×10^{-5} *7* Mult.: From intensity balances and ΔJ^π.
107.2 *2*	6.7 *4*	2137.43	(15/2⁺)	2030.19	(13/2⁺)	M1	2.77		α(K)=2.31 *4*; α(L)=0.354 *6*; α(M)=0.0792 *12* α(N)=0.0186 *3*; α(O)=0.00266 *4*; α(P)=0.0001414 *22* Mult.: From α=2.8 *3* from intensity balances.
109.5 *2*	9.8 *5*	2246.94	(17/2⁺)	2137.43	(15/2⁺)	M1	2.60		α(K)=2.18 *4*; α(L)=0.333 *5*; α(M)=0.0745 *12* α(N)=0.0175 *3*; α(O)=0.00250 *4*; α(P)=0.0001330 *20* Mult.: From α=2.4 *6* from intensity balances.
234.4 *2*	22.6 *11*	2481.34	(19/2⁻)	2246.94	(17/2⁺)	(E1)	0.0369		α(K)=0.0309 *5*; α(L)=0.00464 *7*; α(M)=0.001035 *15* α(N)=0.000240 *4*; α(O)=3.30×10^{-5} *5*; α(P)=1.529×10^{-6} *22* Mult.: From intensity balances.
257.6 *2*	62 *3*	2504.53	(19/2⁺)	2246.94	(17/2⁺)	M1,E2	0.178 *60*		α(K)=0.140 *60*; α(L)=0.0295 *7*; α(M)=0.00681 *15* α(N)=0.001584 *25*; α(O)=0.000211 *15*; α(P)=8.0×10^{-6} *41* Mult.: From α=0.19 *8* from intensity balances.
267.7 *2*	9.0 *4*	2030.19	(13/2⁺)	1762.53	(11/2⁺)	M1	0.214		α(K)=0.179 *3*; α(L)=0.0270 *4*; α(M)=0.00603 *9* α(N)=0.001417 *20*; α(O)=0.000203 *3*; α(P)=1.086×10^{-5} *16* Mult.: From α=0.26 *+15−9* from intensity balances.
271.7 *4*	0.6 *1*	1762.53	(11/2⁺)	1490.71	(11/2⁻)	[E1]	0.0254		α(K)=0.0214 *3*; α(L)=0.00317 *5*; α(M)=0.000707 *11* α(N)=0.0001643 *24*; α(O)=2.27×10^{-5} *4*; α(P)=1.073×10^{-6} *16*
280.5 *3*	1.2 *2*	2527.4	(21/2⁺)	2246.94	(17/2⁺)	[E2]	0.0907		α(K)=0.0635 *9*; α(L)=0.0209 *3*; α(M)=0.00498 *8* α(N)=0.001149 *17*; α(O)=0.0001432 *21*; α(P)=3.20×10^{-6} *5*
303.0 *2*	4.4 *4*	1762.53	(11/2⁺)	1459.27	(9/2⁻)	[E1]	0.0194		α(K)=0.01635 *23*; α(L)=0.00241 *4*; α(M)=0.000536 *8* α(N)=0.0001248 *18*; α(O)=1.729×10^{-5} *25*; α(P)=8.29×10^{-7} *12*
328.4 *3*	1.7 *2*	2481.34	(19/2⁻)	2152.9	(15/2⁻)	[E2]	0.0565		α(K)=0.0412 *6*; α(L)=0.01175 *17*; α(M)=0.00278 *4* α(N)=0.000641 *10*; α(O)=8.13×10^{-5} *12*; α(P)=2.14×10^{-6} *3*
367.1 *2*	38.4 *19*	2504.53	(19/2⁺)	2137.43	(15/2⁺)	[E2]	0.0409		α(K)=0.0306 *5*; α(L)=0.00796 *12*; α(M)=0.00187 *3* α(N)=0.000433 *7*; α(O)=5.56×10^{-5} *8*; α(P)=1.619×10^{-6} *23*

From ENSDF

γ(^{153}Yb) (continued)

E_γ	I_γ‡	E_i(level)	J^π_i	E_f	J^π_f	Mult.	α†	Comments
539.4 *2*	14.2 *7*	2030.19	(13/2$^+$)	1490.71	(11/2$^-$)	[E1]	0.00514	α(K)=0.00435 *6*; α(L)=0.000617 *9*; α(M)=0.0001369 *20* α(N)=3.20×10^{-5} *5*; α(O)=4.50×10^{-6} *7*; α(P)=2.30×10^{-7} *4*
561.0 *2*	4.1 *4*	1762.53	(11/2$^+$)	1201.66	(13/2$^+$)	[M1,E2]	0.0219 *86*	α(K)=0.0182 *75*; α(L)=0.00293 *84*; α(M)=6.6×10^{-4} *18* α(N)=1.55×10^{-4} *43*; α(O)=2.17×10^{-5} *67*; α(P)=1.06×10^{-6} *47*
567.6 *2*	18.9 *9*	566.98	(9/2$^-$)	0.0	(7/2$^-$)	[M1,E2]	0.0213 *83*	α(K)=0.0176 *73*; α(L)=0.00284 *82*; α(M)=6.4×10^{-4} *18* α(N)=1.50×10^{-4} *42*; α(O)=2.10×10^{-5} *65*; α(P)=1.03×10^{-6} *46*
635.1 *2*	16.0 *8*	1201.66	(13/2$^+$)	566.98	(9/2$^-$)	[M2]	0.0633	α(K)=0.0520 *8*; α(L)=0.00871 *13*; α(M)=0.00198 *3* α(N)=0.000465 *7*; α(O)=6.62×10^{-5} *10*; α(P)=3.45×10^{-6} *5*
935.8 *2*	47.3 *24*	2137.43	(15/2$^+$)	1201.66	(13/2$^+$)	[M1,E2]	0.0063 *21*	α(K)=0.0053 *18*; α(L)=8.0×10^{-4} *24*; α(M)=1.78×10^{-4} *51* α(N)=4.2×10^{-5} *12*; α(O)=5.9×10^{-6} *18*; α(P)=3.1×10^{-7} *12*
951.2 *3*	1.3 *2*	2152.9	(15/2$^-$)	1201.66	(13/2$^+$)	[E1]	1.64×10^{-3}	α(K)=0.001398 *20*; α(L)=0.000192 *3*; α(M)=4.25×10^{-5} *6* α(N)=9.94×10^{-6} *14*; α(O)=1.415×10^{-6} *20*; α(P)=7.52×10^{-8} *11*
1045.3 *2*	61 *3*	2246.94	(17/2$^+$)	1201.66	(13/2$^+$)	[E2]	0.00339	α(K)=0.00282 *4*; α(L)=0.000440 *7*; α(M)=9.89×10^{-5} *14* α(N)=2.31×10^{-5} *4*; α(O)=3.24×10^{-6} *5*; α(P)=1.590×10^{-7} *23*
1196.0 *3*	2.2 *2*	1762.53	(11/2$^+$)	566.98	(9/2$^-$)	[E1]	1.10×10^{-3}	α(K)=0.000922 *13*; α(L)=0.0001254 *18*; α(M)=2.77×10^{-5} *4* α(N)=6.48×10^{-6} *9*; α(O)=9.26×10^{-7} *13*; α(P)=4.98×10^{-8} *7*; α(IPF)=1.98×10^{-5} *3*
1201.4 *2*	100 *5*	1201.66	(13/2$^+$)	0.0	(7/2$^-$)	[E3]	0.00534	α(K)=0.00434 *6*; α(L)=0.000773 *11*; α(M)=0.0001764 *25* α(N)=4.12×10^{-5} *6*; α(O)=5.71×10^{-6} *8*; α(P)=2.60×10^{-7} *4*; α(IPF)=1.393×10^{-6} *21*
1459.0 *2*	4.7 *4*	1459.27	(9/2$^-$)	0.0	(7/2$^-$)	[M1,E2]	0.0024 *6*	α(K)=0.0020 *5*; α(L)=0.00028 *7*; α(M)=6.3×10^{-5} *15* α(N)=1.5×10^{-5} *4*; α(O)=2.1×10^{-6} *5*; α(P)=1.13×10^{-7} *30*; α(IPF)=6.6×10^{-5} *8*
1490.6 *2*	14.8 *7*	1490.71	(11/2$^-$)	0.0	(7/2$^-$)	[E2]	1.76×10^{-3}	α(K)=0.001430 *20*; α(L)=0.000208 *3*; α(M)=4.64×10^{-5} *7* α(N)=1.087×10^{-5} *16*; α(O)=1.544×10^{-6} *22*; α(P)=8.04×10^{-8} *12*; α(IPF)=6.79×10^{-5} *10*

† Additional information 2.
‡ For absolute intensity per 100 decays, multiply by 0.72 *3*.

$^{153}_{70}$Yb$_{83}$-3

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Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
%IT=100.0

Legend
- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)