^{146}Tb ε decay (8 s) 1989KlZY,1982No08,1983Al06

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Yu. Khazov, A. Rodionov and G. Shulyak	NDS 136, 163 (2016)	14-Jul-2016

Parent: ^{146}Tb: E=0.0; $J^\pi=1^+$; $T_{1/2}$=8 s *4*; Q(ε)=8320 *40*; %ε+%β^+ decay=100.0

^{146}Tb-from 2012Au07, 2012Wa38; $T_{1/2}$ from Iγ(t) ^{146}Dy ε decay (1982No08).

1989KlZY: ^{146}Tb(1^+) ε decay [from Gd(^{3}He,xn)^{146}Dy(0^+) ε decay, E=280 MeV]; measured Eγ, Eγ, $\gamma\gamma$, γ(X-ray) coin. ^{146}Gd; deduced levels, J^π, ε branchings, log *ft*. ISOCELE-II on-line mass-separator.

1995GoZV,1996GoZZ: ^{146}Tb(1^+) ε decay [from Ta(p,X), E=660 MeV]; Eγ, Iγ, ce, ε branching. ^{146}Gd; deduced level, J^π. Synchrocyclotron, β spectrometer on-line YaSNAPP-2 facility.

The ^{146}Gd level scheme is from 1989KlZY, constructed on the basis of measurement of $\gamma\gamma$ and γ(X-ray) coincidences and of using the (p,t) (1989Ma28) and (α,2n) (1986Ya06,1987Ya13) results.

Measured: γ(t) (1993VaZW,1983Al06,1982No08,1981StZO,1980To06), β^+ (1983Al06).

^{146}Gd Levels

E(level)†	J^π‡	$T_{1/2}$	Comments
0.0	0^+	48.27 d *9*	$T_{1/2}$: from 'Adopted Levels'.
1579.55 *15*	3^-		
1972.02 *7*	2^+		
2164.72 *12*	0^+		
2986.4 *2*	2^+		
3185.95 *10*	2^+		
3232.5 *4*	2^+		
3484.93 *21*	0^+		

† From 'Adopted Levels'.

‡ From 1989KlZY.

ε,β^+ radiations

E(decay)	E(level)	Iβ^+ †	Iε†	Log *ft*	I($\varepsilon+\beta^+$)†	Comments
(4.84×10^3 *4*)	3484.93	0.27 *8*	0.10 *3*	6.2 *3*	0.37 *11*	av Eβ=1735 *24*; εK=0.230 *7*; εL=0.0337 *10*; εM+=0.0097 *3*
(5.09×10^3 *4*)	3232.5	0.53 *8*	0.16 *3*	6.05 *23*	0.69 *11*	av Eβ=1853 *24*; εK=0.200 *6*; εL=0.0293 *9*; εM+=0.00847 *24*
(5.13×10^3 *4*)	3185.95	0.98 *14*	0.29 *4*	5.80 *23*	1.27 *18*	av Eβ=1875 *24*; εK=0.195 *6*; εL=0.0286 *8*; εM+=0.00825 *23*
(5.33×10^3 *4*)	2986.4	0.29 *7*	0.077 *19*	6.42 *25*	0.37 *9*	av Eβ=1969 *24*; εK=0.175 *5*; εL=0.0256 *7*; εM+=0.00740 *21*
(6.16×10^3 *4*)	2164.72	2.5 *3*	0.40 *6*	5.83 *23*	2.9 *4*	av Eβ=2356 *24*; εK=0.115 *3*; εL=0.0168 *5*; εM+=0.00485 *12*
(6.35×10^3 *4*)	1972.02	7.8 *16*	1.1 *2*	5.41 *24*	8.9 *18*	av Eβ=2448 *24*; εK=0.105 *3*; εL=0.0153 *4*; εM+=0.00442 *11*
(6.74×10^3 *4*)	1579.55	1.4 *6*	0.17 *7*	6.3^{1u} *3*	1.6 *7*	av Eβ=2634 *24*; εK=0.0875 *20*; εL=0.0128 *3*; εM+=0.00369 *9*
(8.32×10^3 *4*)	0.0	79 *2*	4.6 *1*	5.03 *22*	84 *2*	av Eβ=3391 *24*; εK=0.0458 *9*; εL=0.00666 *13*; εM+=0.00192 *4*

† Absolute intensity per 100 decays.

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γ(^{146}Gd)

I(γ+ce) normalization: from 84% *2* ε-feeding to ^{146}Gd ground state (1989KlZY).

E_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	α[@]	$I_{(\gamma+ce)}$[†&]	Comments
192.5	2164.72	0^+	1972.02	2^+	E2	0.252	7	ce(K)/(γ+ce)=0.1386 *17*; ce(L)/(γ+ce)=0.0487 *7*; ce(M)/(γ+ce)=0.01125 *16* ce(N)/(γ+ce)=0.00253 *4*; ce(O)/(γ+ce)=0.000346 *5*; ce(P)/(γ+ce)=7.89×10^{-6} *12* α(K)=0.1736 *25*; α(L)=0.0610 *9*; α(M)=0.01409 *20* α(N)=0.00317 *5*; α(O)=0.000433 *6*; α(P)=9.88×10^{-6} *14* $I_{(\gamma+ce)}$: I(2165,E0)/Iγ(193,E2)=4.5 *9* (1989KlZY). If I(2165,E0)=20, I(γ+ce) of 193γ, calculated by the evaluators, equals 5.6 (in fig. 1 this value stated as 7).
392.6	1972.02	2^+	1579.55	3^-			1	
1213.9	3185.95	2^+	1972.02	2^+			≈2	
1261[‡a]	3232.5	2^+	1972.02	2^+			≈1	
1407[‡]	2986.4	2^+	1579.55	3^-			<3	
1512.9	3484.93	0^+	1972.02	2^+			≈3	
1579.40 *5*	1579.55	3^-	0.0	0^+	E3	0.00216	32	α(K)exp=0.00177 *13* (1995GoZV) ce(K)/(γ+ce)=0.001773 *25*; ce(L)/(γ+ce)=0.000261 *4*; ce(M)/(γ+ce)=5.69×10^{-5} *8* ce(N)/(γ+ce)=1.307×10^{-5} *19*; ce(O)/(γ+ce)=2.01×10^{-6} *3*; ce(P)/(γ+ce)=1.276×10^{-7} *18*; α(IPF)/$T_{1/2}$=4.63×10^{-5} *7* α(K)=0.001777 *25*; α(L)=0.000262 *4*; α(M)=5.71×10^{-5} *8* α(N)=1.310×10^{-5} *19*; α(O)=2.01×10^{-6} *3*; α(P)=1.278×10^{-7} *18*; α(IPF)=4.64×10^{-5} *7*
1606.5	3185.95	2^+	1579.55	3^-			9	
1653.3	3232.5	2^+	1579.55	3^-			5	
1972.1	1972.02	2^+	0.0	0^+	E2	1.01×10^{-3}	95	ce(K)/(γ+ce)=0.000628 *9*; ce(L)/(γ+ce)=8.34×10^{-5} *12*; ce(M)/(γ+ce)=1.80×10^{-5} *3* ce(N)/(γ+ce)=4.13×10^{-6} *6*; ce(O)/(γ+ce)=6.41×10^{-7} *9*; ce(P)/(γ+ce)=4.35×10^{-8} *6*; α(IPF)/$T_{1/2}$=0.000274 *4* α(K)=0.000629 *9*; α(L)=8.35×10^{-5} *12*; α(M)=1.80×10^{-5} *3* α(N)=4.13×10^{-6} *6*; α(O)=6.42×10^{-7} *9*; α(P)=4.36×10^{-8} *7*; α(IPF)=0.000274 *4*
2164.6	2164.72	0^+	0.0	0^+	E0		20	
2986.4[‡]	2986.4	2^+	0.0	0^+			2	
3186.1[‡]	3185.95	2^+	0.0	0^+			1	

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γ(^{146}Gd) (continued)

E_γ †	E_i(level)	J_i^π	E_f	J_f^π	$I_{(\gamma+ce)}$ †&
3233‡*a*	3232.5	2^+	0.0	0^+	<1
3485	3484.93	0^+	0.0	0^+	<1

† From fig. 1 of 1989KlZY. ΔI(γ+ce)=10% is assumed by evaluators.
‡ Placed from energy fit in 1989KlZY.
# From ce and γ measurement at ISCELE II on-line mass-separator (1989KlZY).
@ Additional information 1.
& For absolute intensity per 100 decays, multiply by 0.106 *15*.
a Placement of transition in the level scheme is uncertain.

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Legend

γ Decay (Uncertain)

Decay Scheme