^{148}Dy ε decay 1985ZuZX

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 117, 1 (2014)	1-Oct-2013

Parent: ^{148}Dy: E=0.0; J$^\pi$=0$^+$; T$_{1/2}$=3.3 min *2*; Q(ε)=2678 *10*; %ε+%β^+ decay=100.0

Measured: γ, ce (1985ZuZX,1985Kl05,1975Gr35,1975To03,1974La32,1974La28,1974GrYZ); γ, $\gamma\gamma$, (K x ray)γ (1988To03,1985ZuZX,1985Kl05); ε/β^+ (1985Sc09,1981Sp03,1981Sc21); γ, β, x-rays, Gamow-Teller resonance (total absorption spectrometer, 2004Al35; see also 2007EsZX,2004AlZY,2003NaZV,2001AlZY).

Decay scheme is from 1985ZuZX. Shown also In tables are data from 2004Al35 (total absorption spectrometer).

^{148}Tb Levels

E(level)	J$^\pi$†	T$_{1/2}$	Comments
0.0	2$^-$	60 min *1*	
109.6 *9*	4$^-$		
178.5 *5*	2$^+$		
195.5 *10*	3$^-$		J=(3,4)$^-$ (1985ZuZX).
280.9 *7*	3$^+$		J=(2,3)$^+$ (1985ZuZX).
620.241 *10*	1$^+$	≤0.25 ns	J$^\pi$: 1$^+$ (1985ZuZX). T$_{1/2}$: from 1975AlZE, 1975VaYY.
657.8 *7*	(3$^-$)		(2,3)$^-$ (1985ZuZX).
794.8 *5*	2$^-$		J$^\pi$: 2$^-$, (1)$^-$ (1985ZuZX).
950.6 *6*	(2$^-$,1$^-$)		J=2$^-$,(1)$^-$ (1985ZuZX).
1247.3 *6*	1$^+$		J$^\pi$: 1$^+$ from log *ft*=5.4 from 0$^+$; 1$^+$ (1985ZuZX).
1276.2 *8*	1		J$^\pi$: 1 (1985ZuZX).
1332.7 *10*	1		J$^\pi$: 1 (1985ZuZX).
1366.1 *7*	1		J$^\pi$: 1 (1985ZuZX).
1642.5 *7*	1$^+$		J$^\pi$: 1$^+$ from log *ft*=5.9 from 0$^+$; 1$^-$, (0)$^-$ (1985ZuZX).
1828.3 *9*	1		J$^\pi$: 1.
1840.5 *7*	1$^+$		J$^\pi$: 1$^+$ from log *ft*=5.4 from 0$^+$; 1$^-$, (0)$^-$ (1985ZuZX).

† Adopted values. Supporting arguments from this data set and the assignments by 1985ZuZX are given in comments. Some J$^\pi$ assignments by 1985ZuZX are not supported by log *ft* values.

ε,β^+ radiations

ε/β^+=22.2 *20*, Q+=2680 *30* (1985Sc09). Others: ε/β^+=21.7 *39*, Q+=2652 keV *+65−50* (1981Sc21); ε/β^+=14.7 *27*, Q+=2800 *60* (1981Sp03).

I($\varepsilon+\beta^+$) and log *ft* data from 2004Al35 are given In comments In the table below, together with same data from 1985Kl05 for comparison.

E(decay)	E(level)	Iβ^+ †	Iε†	Log *ft*	I($\varepsilon+\beta^+$)†	Comments
(838 *10*)	1840.5		0.52	5.4	0.52	εK=0.8271 *2*; εL=0.13343 *15*; εM+=0.03944 *6*
(850 *10*)	1828.3		0.05	6.4	0.05	εK=0.8274 *2*; εL=0.13325 *15*; εM+=0.03937 *5*
(1036 *10*)	1642.5		0.25	5.9	0.25	εK=0.8302 *2*; εL=0.1311 *1*; εM+=0.03864 *4*
(1312 *10*)	1366.1		0.07	6.6	0.07	εK=0.8327; εL=0.12909 *7*; εM+=0.03793 *3* I($\varepsilon+\beta^+$)=0.07, log *ft*=6.7 (1985Kl05).
(1345 *10*)	1332.7		0.14	6.4	0.14	εK=0.8328; εL=0.12889 *7*; εM+=0.03786 *2* I($\varepsilon+\beta^+$)=0.14, log *ft*=6.4 (1985Kl05, to 1333 alone); I($\varepsilon+\beta^+$)=0.31 *3*, log *ft*=5.99 (2004Al35, to 1333+1366).
(1402 *10*)	1276.2		0.19	6.3	0.19	εK=0.8328; εL=0.12854 *7*; εM+=0.03774 *2* I($\varepsilon+\beta^+$)=0.19, log *ft*=6.3 (1985Kl05).
(1431 *10*)	1247.3	0.0019	1.6	5.4	1.6	av Eβ=198.1 *45*; εK=0.8328; εL=0.12836 *7*; εM+=0.03769 *2*

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^{148}Dy ε decay 1985ZuZX (continued)

ϵ,β^+ radiations (continued)

E(decay)	E(level)	Iβ^+ †	Iε†	Log *ft*	I($\varepsilon+\beta^+$)†	Comments
						I(ε+β^+)=1.6, log *ft*=5.4 (1985Kl05, to 1247 alone); I(ε+β^+)=1.90 *4*, log *ft*=5.28 (2004Al35, to 1247+1277).
(1727 *10*)	950.6	<0.0004	<0.04	>7.1	<0.04	av Eβ=329.0 *44*; εK=0.8269 *4*; εL=0.1261 *1*; εM+=0.03696 *3* I(ε+β^+)<0.04, log *ft*>7.1 (1985Kl05); I(ε+β^+)=0.0070 *3*, log *ft*=7.90 (2004Al35).
(1883 *10*)	794.8	0.002	0.09	6.9	0.09	av Eβ=397.3 *44*; εK=0.8187 *7*; εL=0.12430 *14*; εM+=0.03641 *4* I(ε+β^+)=0.09, log *ft*=6.9 (1985Kl05); I(ε+β^+)=0.0 (2004Al35).
(2020 *10*)	657.8	<0.001	<0.04	>7.3	<0.04	av Eβ=457.5 *44*; εK=0.8078 *10*; εL=0.12225 *17*; εM+=0.03579 *6* I(ε+β^+)<0.04, log *ft*>7.3 (1985Kl05); I(ε+β^+)=0.0 (2004Al35).
2032 *60*	620.241	3.75	93.1	3.9	96.8	av Eβ=474.0 *44*; εK=0.8041 *11*; εL=0.12160 *18*; εM+=0.03560 *6* I(ε+β^+)=96.8, log *ft*=3.95 (1985Kl05); I(ε+β^+)=96.2 *2*, log *ft*=3.92 (2004Al35).
(2397 *10*)	280.9	<0.004	<0.04	>7.5	<0.04	av Eβ=623.7 *45*; εK=0.7578 *18*; εL=0.1139 *3*; εM+=0.03331 *9* I(ε+β^+)<0.4, log *ft*>7.5 (1985Kl05); I(ε+β^+)=0.0070 *1*, log *ft*=8.21 (2004Al35).
(2483 *10*)	195.5	<0.01	<0.09	>7.1	<0.1	av Eβ=661.6 *45*; εK=0.7425 *19*; εL=0.1114 *3*; εM+=0.03259 *9* I(ε+β^+)<0.1, log *ft*>7.1 (1985Kl05); I(ε+β^+)=0.0 (2004Al35).
(2500 *10*)	178.5	<0.02	<0.2	>6.8	<0.2	av Eβ=669.2 *45*; εK=0.7393 *20*; εL=0.1109 *3*; εM+=0.03244 *9* I(ε+β^+)<0.2, log *ft*>6.8 (1985Kl05); I(ε+β^+)=0.0 (2004Al35).
(2568 *10*)	109.6	<0.003	<0.02	>7.8	<0.02	av Eβ=699.8 *45*; εK=0.7258 *21*; εL=0.1088 *4*; εM+=0.03181 *10* I(ε+β^+)<0.2, log *ft*>7.9 (1985Kl05); I(ε+β^+)=0.0 (2004Al35).

† Absolute intensity per 100 decays.

γ(^{148}Tb)

Iγ normalization: Ti(g.s.)=100 assuming that the g.s. feeding is zero.

E$_\gamma$	I$_\gamma$†@	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$	Mult.‡	α#	Comments
85.8	4	195.5	3$^-$	109.6	4$^-$	M1	3.41	α(K)=2.88 *4*; α(L)=0.420 *6*; α(M)=0.0918 *13* α(N)=0.0212 *3*; α(O)=0.00327 *5*; α(P)=0.000214 *3*
102.3	3	280.9	3$^+$	178.5	2$^+$	M1	2.06	α(K)=1.735 *25*; α(L)=0.253 *4*; α(M)=0.0552 *8* α(N)=0.01277 *18*; α(O)=0.00197 *3*; α(P)=0.0001292 *18*
109.4	5	109.6	4$^-$	0.0	2$^-$	E2	1.88	α(K)=0.903 *13*; α(L)=0.751 *11*; α(M)=0.1781 *25* α(N)=0.0400 *6*; α(O)=0.00519 *8*; α(P)=4.51×10^{-5} *7*
136.9	13	794.8	2$^-$	657.8	(3$^-$)	(M1)	0.898	α(K)=0.758 *11*; α(L)=0.1100 *16*; α(M)=0.0240 *4* α(N)=0.00555 *8*; α(O)=0.000855 *12*; α(P)=5.64×10^{-5} *8*
156.0	1	950.6	(2$^-$,1$^-$)	794.8	2$^-$			
178.3	54	178.5	2$^+$	0.0	2$^-$	E1	0.0637	α(K)=0.0538 *8*; α(L)=0.00777 *11*; α(M)=0.001690 *24* α(N)=0.000386 *6*; α(O)=5.73×10^{-5} *8*; α(P)=3.23×10^{-6} *5*
339.6	4	620.241	1$^+$	280.9	3$^+$			
442.0	13	620.241	1$^+$	178.5	2$^+$	(M1)	0.0376	α(K)=0.0319 *5*; α(L)=0.00449 *7*; α(M)=0.000978 *14* α(N)=0.000226 *4*; α(O)=3.49×10^{-5} *5*; α(P)=2.33×10^{-6} *4*
462.1	11	657.8	(3$^-$)	195.5	3$^-$	(M1)	0.0335	α(K)=0.0284 *4*; α(L)=0.00400 *6*; α(M)=0.000871 *13* α(N)=0.000201 *3*; α(O)=3.11×10^{-5} *5*; α(P)=2.08×10^{-6} *3*
616.2	1	794.8	2$^-$	178.5	2$^+$			

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^{148}Dy ε decay 1985ZuZX (continued)

γ(^{148}Tb) (continued)

E_γ	I_γ †@	E_i(level)	J_i^π	E_f	J_f^π	Mult.‡	α#	Comments
620.24 *1*	10000	620.241	1^+	0.0	2^-	E1	0.00308	α(K)=0.00263 *4*; α(L)=0.000354 *5*; α(M)=7.65×10^{-5} *11* α(N)=1.762×10^{-5} *25*; α(O)=2.69×10^{-6} *4*; α(P)=1.735×10^{-7} *25* Mult.: α(K)exp=265×10^{-5} *30* (1975Gr35). E_γ: from 1985Kl05.
627	7	1247.3	1^+	620.241	1^+			
657.8	17	657.8	(3^-)	0.0	2^-	(M1)	0.01373	α(K)=0.01167 *17*; α(L)=0.001620 *23*; α(M)=0.000352 *5* α(N)=8.15×10^{-5} *12*; α(O)=1.260×10^{-5} *18*; α(P)=8.48×10^{-7} *12*
691.9	17	1642.5	1^+	950.6	$(2^-,1^-)$		0.0124	M1 (1985ZuZX); contradicts Δπ.
772.0	1	950.6	$(2^-,1^-)$	178.5	2^+			
794.9	21	794.8	2^-	0.0	2^-	(M1)	0.00860	α(K)=0.00732 *11*; α(L)=0.001009 *15*; α(M)=0.000219 *3* α(N)=5.07×10^{-5} *8*; α(O)=7.85×10^{-6} *11*; α(P)=5.30×10^{-7} *8*
847.1	8	1642.5	1^+	794.8	2^-			M1 (1985ZuZX); contradicts Δπ.
890.0	25	1840.5	1^+	950.6	$(2^-,1^-)$			M1 (1985ZuZX); contradicts Δπ.
950.8	40	950.6	$(2^-,1^-)$	0.0	2^-	(M1)	0.00557	α(K)=0.00474 *7*; α(L)=0.000650 *9*; α(M)=0.0001410 *20* α(N)=3.26×10^{-5} *5*; α(O)=5.05×10^{-6} *7*; α(P)=3.42×10^{-7} *5*
1045.9	29	1840.5	1^+	794.8	2^-			M1 (1985ZuZX); contradicts Δπ.
1068.9	8	1247.3	1^+	178.5	2^+			
1085.4	4	1366.1	1	280.9	3^+			
1097	1	1276.2	1	178.5	2^+			
1187.5	3	1366.1	1	178.5	2^+			
1247.2	150	1247.3	1^+	0.0	2^-	E1	8.42×10^{-4}	α(K)=0.000684 *10*; α(L)=8.92×10^{-5} *13*; α(M)=1.92×10^{-5} *3* α(N)=4.44×10^{-6} *7*; α(O)=6.84×10^{-7} *10*; α(P)=4.59×10^{-8} *7*; α(IPF)=4.51×10^{-5} *7*
1276.9	19	1276.2	1	0.0	2^-			
1332.7	15	1332.7	1	0.0	2^-			
1366	2	1366.1	1	0.0	2^-			
1547	1	1828.3	1	280.9	3^+			
1642.9	1	1642.5	1^+	0.0	2^-			
1650.2	4	1828.3	1	178.5	2^+			
1840.1	6	1840.5	1^+	0.0	2^-			

† I(178.5γ+950.6γ+1247.3γ)≈2.5% of I(620γ) (1988To03).

‡ From adopted gammas; supported by α(K)exp whose values and normalization are not given by authors (1985ZuZX). These are considered to be tentative especially since there are inconsistencies between J^π deduced from log *ft* and multipolarities of γ transitions.

\# Additional information 1.

@ For absolute intensity per 100 decays, multiply by 0.009639.

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Decay Scheme

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