^{158}Ho ε decay (21.3 min) 1979GoZU,1975Al13,1970ScZO

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 141, 1 (2017)	1-Feb-2017

Parent: ^{158}Ho: E=180 *SY*; $J^\pi=(9^+)$; $T_{1/2}$=21.3 min *23*; Q(ε)=4220 *27*; %ε+%$β^+$ decay≥93.0

^{158}Ho-E: Based on syst from 2012Au07 with ΔE=70.

^{158}Ho produced in spallation of Ta by protons (1979GoZU,1975Al13) and by ^{159}Tb(α,5n) (1970ScZO).

Scheme is primarily from 1979GoZU, but includes the placements of only a few γ's. Scheme is not complete. 1970ScZO report the population of the 6^+ of the γ band which they place at 1552 (adopted value is 1547) fed by a 977 γ from 2528 level and depopulated by a 915 γ. Here the 977 γ is placed elsewhere and the 915 γ is omitted.

E_γ measured by 1970ScZO, 1975Al13, 1979GoZU, and I_γ measured by 1975Al13, 1979GoZU.

I_{ce}(K)(162):I_{ce}(K)(166):I_{ce}(K)(187)=20:10:24 (1979GoZU).

The energy of the parent level, with $J^\pi=(9^+)$ and a configuration of (π,7/2[523])+(ν,11/2[505]), has not been measured, but it has been calculated by 1986So02 to be ≈ 180 keV and this value is used for log *ft* calculations.

The high spin of the parent suggests that the decay be to a few levels, such as those at 2528 and 3237 keV. However, the low log *ft* value for the decay to the 2528 level suggests that most of the decay may be missing.

α: Additional information 1.

^{158}Dy Levels

E(level)	J^π[†]	Comments
0.0	0^+	
98.9	2^+	
317.1	4^+	
637.6	6^+	
1043.7	8^+	
1044.2[#]	3^+	
1476.8		
1520.5	10^+	
2021.6	5^+	
2096.4		
2208.6		
2362.0		There is a serious intensity imbalance at this level with a feeding of ≥ 55 and depopulation of 31 to 37.
2528.2	(8^+)	
3237[‡]		J^π: In ^{158}Dy Adopted Levels, $J^\pi=(6^+)$ based on the 2920 γ to the 4^+ level at 317 keV, but this is inconsistent with ε feeding from 9^+ parent. So, there is a problem with this scheme or the Adopted J^π.

[†] From ^{158}Dy Adopted Levels.
[‡] From 1970ScZO.
[#] From Adopted Levels and included to provide for deexcitation of 2021 level.

ε,$β^+$ radiations

E(decay)	E(level)	Iβ+ [†]	Iε[†]	Log *ft*	I(ε+β+)[†]	Comments
(1.16×10^3 *3*)	3237		5 *5*	5.5 *5*	5 *5*	εK=0.8298 *9*; εL=0.1313 *7*; εM+=0.03889 *22*
(1.87×10^3 *3*)	2528.2	1.7 *6*	93 *5*	4.68 *7*	95 *5*	av Eβ=393 *33*; εK=0.819 *5*; εL=0.1257 *10*; εM+=0.0371 *3*

[†] Absolute intensity per 100 decays.

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γ(^{158}Dy)

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	α	Comments
98.9[@]		98.9	2^+	0.0	0^+	E2	2.83	α(K)=1.154 *17*; α(L)=1.286 *18*; α(M)=0.308 *5*; α(N)=0.0691 *10*; α(O)=0.00830 *12* α(P)=4.78×10^{-5} *7*
153.1	16.2	2362.0		2208.6				
[x]162.6	19.6							
166.4	55.4	2528.2	(8^+)	2362.0				
187.0	37.2	2208.6		2021.6	5^+			
[x]204.4	21.2							
[x]206.5	21.4							
218.2[@]		317.1	4^+	98.9	2^+	E2	0.1772	α(K)=0.1225 *18*; α(L)=0.0422 *6*; α(M)=0.00987 *14*; α(N)=0.00223 *4*; α(O)=0.000284 *4* α(P)=5.97×10^{-6} *9*
266.2	15.6	2362.0		2096.4				
320.5[@]		637.6	6^+	317.1	4^+	E2	0.0528	α(K)=0.0401 *6*; α(L)=0.00989 *14*; α(M)=0.00227 *4*; α(N)=0.000516 *8*; α(O)=6.83×10^{-5} *10* α(P)=2.11×10^{-6} *3*
406.0	100	1043.7	8^+	637.6	6^+	E2	0.0266	α(K)=0.0209 *3*; α(L)=0.00441 *7*; α(M)=0.001002 *14*; α(N)=0.000229 *4*; α(O)=3.10×10^{-5} *5* α(P)=1.143×10^{-6} *16*
476.0[@]		1520.5	10^+	1043.7	8^+	E2	0.01724	α(K)=0.01381 *20*; α(L)=0.00267 *4*; α(M)=0.000602 *9*; α(N)=0.0001377 *20*; α(O)=1.89×10^{-5} *3* α(P)=7.69×10^{-7} *11*
708[&]		3237		2528.2	(8^+)			
731.5	22.0	2208.6		1476.8				
838.9	84.3	1476.8		637.6	6^+			
(977.4[@])		2021.6	5^+	1044.2	3^+	E2	0.00319	α(K)=0.00268 *4*; α(L)=0.000401 *6*; α(M)=8.82×10^{-5} *13*; α(N)=2.03×10^{-5} *3*; α(O)=2.92×10^{-6} *4* α(P)=1.546×10^{-7} *22*
1007[a]		2528.2	(8^+)	1520.5	10^+			
1053.2	11.8	2096.4		1043.7	8^+			
1484.1	66.2	2528.2	(8^+)	1043.7	8^+			
2194[&]		3237		1043.7	8^+			
2600[&]		3237		637.6	6^+			
2920[&]		3237		317.1	4^+			E_γ: If this 3237 level is fed from the 9^+ parent, it must have J ≈ 8, so placement of this 2920-keV γ to the 4^+ level at 317 is doubtful.

[†] From 1979GoZU, except as otherwise noted.
[‡] From 1979GoZU.
[#] From ^{158}Dy Adopted γ radiations.
[@] Nominal values from ^{158}Dy Adopted γ's.
[&] From 1970ScZO.
[a] From 1975Al13.
[x] γ ray not placed in level scheme.

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Decay Scheme

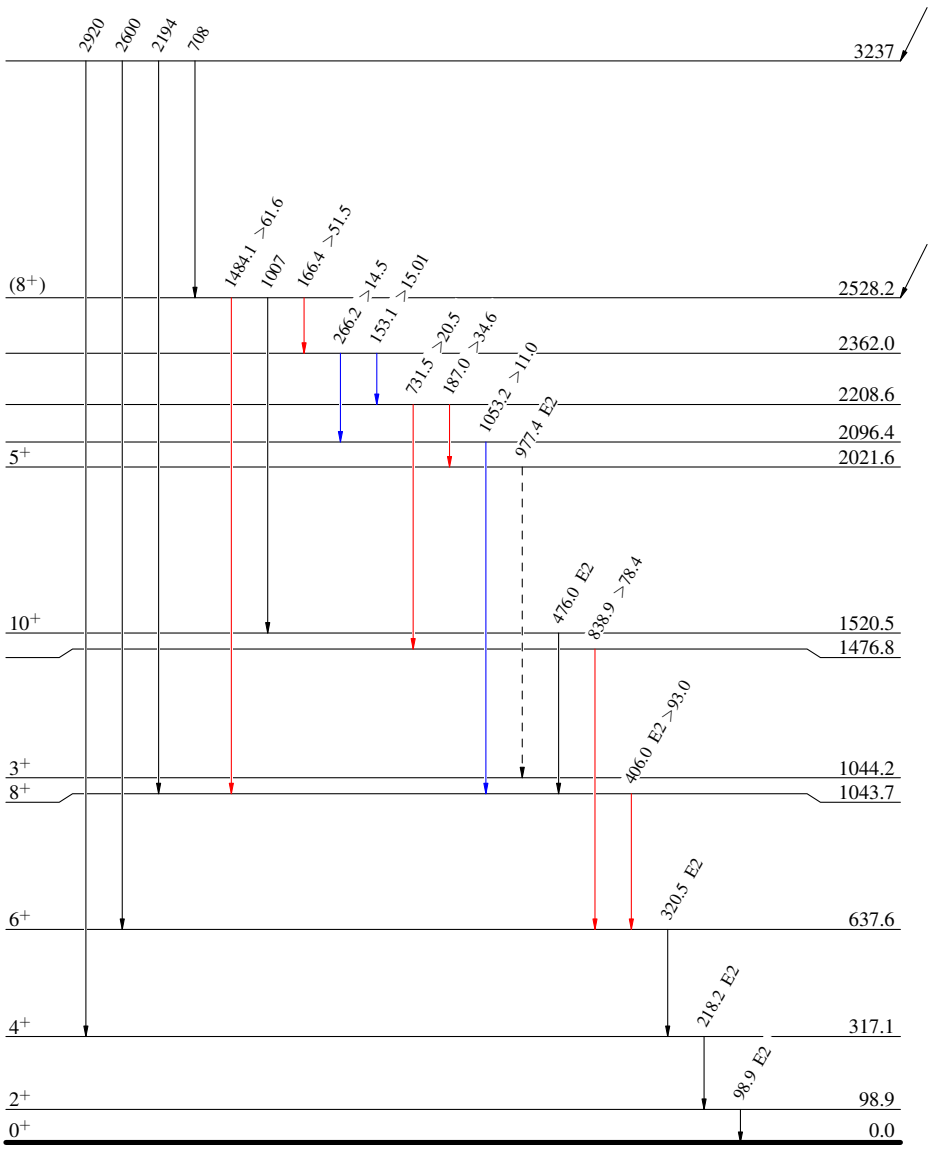
Intensities: I_γ per 100 parent decays

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)

(9^+) 180 21.3 min *23*

$\%\varepsilon + \%\beta^+ > 93.0$ Q_ε=4220 *27*

$^{158}_{67}Ho_{91}$



	Iβ+	Iε	Log *ft*
3237		5	5.5
2528.2	1.7	93	4.68

$^{158}_{66}Dy_{92}$