

$^{172}\text{Ho } \beta^-$  decay (25 s)    1991Be04

Type	Author	Citation	History Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	08-Dec-2015

Parent:  $^{172}\text{Ho}$ : E=0.0;  $T_{1/2}=25$  s 3;  $Q(\beta^-)=5000$  SY; % $\beta^-$  decay=100.0

$^{172}\text{Ho-Q}(\beta^-)$ : 5000 200 (syst, 2012Wa38).

1991Be04:  $^{172}\text{Ho}$  produced and identified by mass separation of products from reaction  $^{186}\text{W}(^{136}\text{Xe},\text{X})$  at E=11.6 MeV/nucleon.

Enriched (99.8%) target of  $^{186}\text{W}$  was used. Measured  $\gamma$ ,  $\gamma\gamma$ ,  $\beta\gamma$ ,  $\gamma(\text{x rays}, T_{1/2})$ .

2000GrZV: a reconstructed decay scheme proposed based on gamma-ray singles and coincidence data in 1991Be04, and known levels from (t,p) in 1980Sh14. The author postulated low-spin ( $1^-$ ) and high-spin ( $7^+$ ) activities of  $^{172}\text{Ho}$ , both of  $\approx 25$  s half-life. The evaluator considers the decay scheme of  $^{172}\text{Ho}$  to  $^{172}\text{Er}$  as incomplete, and the one proposed by 2000GrZV (using data from 1991Be04) as unconfirmed, until further experiments are carried out to prove the hypothesis of isomerism in  $^{172}\text{Ho}$ .

 $^{172}\text{Er}$  Levels

E(level)	J $^\pi$
0.0	$0^+$
77.0 4	( $2^+$ )
255.0 5	( $4^+$ )
834.2 7	
961.4 4	( $1,2^+$ )
1033.7 5	( $3^+$ )
1125.3 7	
1263.1 5	( $4^-$ )
1396.7 5	( $3^+,4^+,5^+$ )

 $\beta^-$  radiations

E(decay)	E(level)	I $\beta^-$ <sup>†</sup>	Log ft	Comments
(3603 SY)	1396.7	$\approx 44$	$\approx 5.7$	av $E\beta=1417$ syst
(3736 <sup>‡</sup> SY)	1263.1			$I\beta^-$ : 6 6 (from intensity balance).
(4038 SY)	961.4	$\approx 21$	$\approx 6.2$	av $E\beta=1615$ syst
(4745 SY)	255.0	$\approx 15$	$\approx 6.7$	av $E\beta=1937$ syst

<sup>†</sup> Absolute intensity per 100 decays.

<sup>‡</sup> Existence of this branch is questionable.

 $\gamma(^{172}\text{Er})$ 

$I\gamma$  normalization: From summed transition intensity to g.s.=100, assuming no  $\beta^-$  feeding of g.s. Apparent strong feeding of ( $4^+$ ) precludes any significant branch to g.s. A first-forbidden unique transition would give  $I\beta(\text{g.s.})<0.6\%$ .

E $\gamma$	I $\gamma$ <sup>‡</sup>	E $_i$ (level)	J $^\pi_i$	E $f$	J $^\pi_f$	Mult.	$\alpha$ <sup>†</sup>	Comments
77.0 5	26 6	77.0	( $2^+$ )	0.0	$0^+$	[E2]	8.13 25	$\alpha(K)=1.79$ 3; $\alpha(L)=4.85$ 17; $\alpha(M)=1.18$ 4 $\alpha(N)=0.267$ 10; $\alpha(O)=0.0310$ 11; $\alpha(P)=8.04\times 10^{-5}$ 16
<sup>x</sup> 103.7 5	20 6							Coin with Er K x ray, $134\gamma$ , $178\gamma$ , (291 $\gamma$ ), (1008 $\gamma$ ); but no placement is suggested. 2000GrZV proposed placement from a 1500.4, $5^+$ level.
133.6 3	100	1396.7	( $3^+,4^+,5^+$ )	1263.1	( $4^-$ )	(E1)	0.1507 23	$\alpha(K)=0.1259$ 20; $\alpha(L)=0.0194$ 3; $\alpha(M)=0.00428$

Continued on next page (footnotes at end of table)

**$^{172}\text{Ho}$   $\beta^-$  decay (25 s)    1991Be04 (continued)** $\gamma(^{172}\text{Er})$  (continued)

$E_\gamma$	$I_\gamma^\ddagger$	$E_i(\text{level})$	$J_i^\pi$	$E_f$	$J_f^\pi$	Mult.	$\alpha^\dagger$	Comments
137.8 6	20 5	1263.1	(4 <sup>-</sup> )	1125.3		[D,E2]	0.64 51	<sup>7</sup> $\alpha(N)=0.000983$ 15; $\alpha(O)=0.0001338$ 21; $\alpha(P)=5.91\times 10^{-6}$ 9 Mult.: from $\alpha(\text{exp})<0.5$ deduced from intensity balance at 1263 level, assuming mult=D,E2 for 138 $\gamma$ and 229 $\gamma$ . $\alpha(K)=0.54$ 42; $\alpha(L)=0.080$ 63; $\alpha(M)=0.018$ 14 $\alpha(N)=0.0041$ 33; $\alpha(O)=6.0\times 10^{-4}$ 48; $\alpha(P)=3.2\times 10^{-5}$ 27 <a href="#">2000GrZV</a> proposed placement from a 1638.2, 6 <sup>+</sup> level. Coin with (Er K x ray), 104 $\gamma$ , (757 $\gamma$ ); but no placement is suggested. <a href="#">2000GrZV</a>
<sup>x</sup> 153.7 5	22 6							proposed placement from a 1781.7, 7 <sup>+</sup> level. $\alpha(K)=0.227$ 4; $\alpha(L)=0.1118$ 18; $\alpha(M)=0.0268$ 5
178.0 3	64 11	255.0	(4 <sup>+</sup> )	77.0 (2 <sup>+</sup> )	[E2]	0.373		$\alpha(N)=0.00609$ 10; $\alpha(O)=0.000743$ 12; $\alpha(P)=1.041\times 10^{-5}$ 16
229.4 6	37 9	1263.1	(4 <sup>-</sup> )	1033.7 (3 <sup>+</sup> )	[D,E2]	0.16 12		$\alpha(K)=0.13$ 10; $\alpha(L)=0.019$ 15; $\alpha(M)=0.0043$ 33
291.1 5	44 11	1125.3		834.2	[D,E2]	0.082 63		<a href="#">2000GrZV</a> proposed placement from a 1781.7, 7 <sup>+</sup> level.
757.2 7	49 10	834.2		77.0 (2 <sup>+</sup> )				<a href="#">2000GrZV</a> proposed placement from a 2548.9, 8 <sup>+</sup> level, but no such level seen in the high-spin study by <a href="#">2010Dr02</a> .
884.4 5	25 7	961.4	(1,2 <sup>+</sup> )	77.0 (2 <sup>+</sup> )				
956.7 5	22 6	1033.7	(3 <sup>+</sup> )	77.0 (2 <sup>+</sup> )				
961.4 5	34 8	961.4	(1,2 <sup>+</sup> )	0.0	0 <sup>+</sup>			
1008.1 5	36 9	1263.1	(4 <sup>-</sup> )	255.0 (4 <sup>+</sup> )				
1033.7 6	7 5	1033.7	(3 <sup>+</sup> )	0.0	0 <sup>+</sup>	[M3]		
1141.7 5	11 4	1396.7	(3 <sup>+</sup> ,4 <sup>+</sup> ,5 <sup>+</sup> )	255.0 (4 <sup>+</sup> )				
1186.1 6	23 7	1263.1	(4 <sup>-</sup> )	77.0 (2 <sup>+</sup> )				

<sup>†</sup> From BrIcc v2.3b (16-Dec-2014) [2008Ki07](#), “Frozen Orbitals” appr. When no  $\delta$  value given, value overlaps listed multipolarities.

<sup>‡</sup> For absolute intensity per 100 decays, multiply by  $\approx 0.36$ .

<sup>x</sup>  $\gamma$  ray not placed in level scheme.

