^{172}Hf IT decay (163 ns) 1994Wa07

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 75,199 (1995)	31-May-1995

Parent: ^{172}Hf: E=2005.8 *4*; $J^\pi=(8^-)$; $T_{1/2}$=163 ns *3*; %IT decay=?

^{160}Gd(^{16}O,4nγ) E=75 MeV. Measured delayed γ, $\gamma\gamma$.

Level schemes from the decay of the 163-ns and 4.8-ns isomers are established in this study.

^{172}Hf Levels

E(level)‡	Jπ†	E(level)‡	Jπ†	E(level)‡	Jπ†	$T_{1/2}$#
0.0	0^+	1304.6 *4*	(4^+)	1684.6 *3*	(6^+)	4.8 ns *4*
95.2 *2*	2^+	1462.8 *4*	(5^+)	1727.5 *4*	(7^-)	
309.2 *3*	4^+	1503.5 *3*	(5^-)	1856.8 *4*	(6^-)	
628.3 *3*	6^+	1597.4 *4*	(6^-)	1878.0 *4*	$(7^+,8^+,9^+)$	
1037.4 *4*	8^+	1621.4 *4*	(6^+)	2005.8 *4*	(8^-)	163 ns *3*

† From Adopted Levels.
‡ From least-squares fit to Eγ's, assuming 0.2 keV uncertainty for Eγ's.
# From Adopted Levels.

γ(^{172}Hf)

The level scheme is not normalized for γ-ray intensities per 100 parent decays. 1994Wa07 give Iγ(per 100 decays)=76.4 for 127.7γ from 163-ns decay and 55.3 for 1056γ from 4.8-ns decay.

E_γ	I_γ†	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α@	Comments
63.2	≈0.45	1684.6	(6^+)	1621.4	(6^+)	[M1]	2.62	α(L)=2.03; α(M)=0.458; α(N+..)=0.135 E_γ: from level energy difference. Transition required by γγ. I_γ: from Iγ(63γ)/Iγ(1375γ)=0.3/30 (table II in 1994Wa07). 1994Wa07 state that intensity of 63γ is inferred from the intensity of the 993γ, assuming mult(63γ)=M1.
87.5	3.6 *12*	1684.6	(6^+)	1597.4	(6^-)	[E1]	0.51	α(K)=0.419; α(L)=0.0727; α(M)=0.0164; α(N+..)=0.00465
94.2		1597.4	(6^-)	1503.5	(5^-)			E_γ: from γγ. Unresolved from 95.2γ.
95.2	19 *6*	95.2	2^+	0.0	0^+	E2‡	4.3	α(K)=1.06; α(L)=2.49; α(M)=0.618; α(N+..)=0.177
127.7	95 *10*	2005.8	(8^-)	1878.0	$(7^+,8^+,9^+)$	(E1)	0.190	α(K)=0.157; α(L)=0.0257; α(M)=0.00577; α(N+..)=0.00166
149.4	0.6 *3*	2005.8	(8^-)	1856.8	(6^-)	[E2]	0.80	α(K)=0.373; α(L)=0.322; α(M)=0.0794; α(N+..)=0.0227
172.4	0.8 *3*	1856.8	(6^-)	1684.6	(6^+)	[E1]	0.087	α(K)=0.0724; α(L)=0.0114; α(M)=0.00256; α(N+..)=0.00073
180.9	3.8 *6*	1684.6	(6^+)	1503.5	(5^-)	[E1]	0.077	α(K)=0.0640; α(L)=0.0100; α(M)=0.00225; α(N+..)=0.00064
193.4	75 *6*	1878.0	$(7^+,8^+,9^+)$	1684.6	(6^+)	[M1]	0.63	α(K)=0.530; α(L)=0.0819; α(M)=0.0185; α(N+..)=0.00543
214.0	130 *5*	309.2	4^+	95.2	2^+	E2‡	0.232	α(K)=0.140; α(L)=0.0702; α(M)=0.0171; α(N+..)=0.00485 I_γ: from intensity balance at 309 level (evaluator).

Continued on next page (footnotes at end of table)

^{172}Hf IT decay (163 ns) 1994Wa07 (continued)

$\gamma(^{172}Hf)$ (continued)

E_γ	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α[@]	Comments
221.6	1.6 *4*	1684.6	(6^+)	1462.8	(5^+)	[M1]	0.44	α(K)=0.363; α(L)=0.0561; α(M)=0.0126; α(N+..)=0.00370
278.2	1.9 *5*	2005.8	(8^-)	1727.5	(7^-)	[M1]	0.234	α(K)=0.195; α(L)=0.0300; α(M)=0.00674; α(N+..)=0.00197
319.1	100	628.3	6^+	309.2	4^+	E2[‡]	0.066	α(K)=0.0468; α(L)=0.0150; α(M)=0.00360; α(N+..)=0.00102
321.0	2.2[#] *6*	2005.8	(8^-)	1684.6	(6^+)	[M2]	0.61	α(K)=0.488; α(L)=0.098; α(M)=0.0228; α(N+..)=0.00669
353.4	1.8 *5*	1856.8	(6^-)	1503.5	(5^-)	[M1]	0.123	α(K)=0.103; α(L)=0.0156; α(M)=0.00352; α(N+..)=0.00103
380.0	2.2 *5*	1684.6	(6^+)	1304.6	(4^+)	[E2]	0.040	α(K)=0.0297; α(L)=0.00813; α(M)=0.00193; α(N+..)=0.00055
408.4	3.1 *10*	2005.8	(8^-)	1597.4	(6^-)	[E2]	0.033	α(K)=0.0247; α(L)=0.00639; α(M)=0.00151; α(N+..)=0.00043
409.2	5.0 *10*	1037.4	8^+	628.3	6^+	E2[‡]	0.033	α(K)=0.0246; α(L)=0.00634; α(M)=0.00150; α(N+..)=0.00043
647.4	3.3 *7*	1684.6	(6^+)	1037.4	8^+	[E2]	0.010	α(K)=0.0083; α(L)=0.00161
834.3	1.2[#] *4*	1462.8	(5^+)	628.3	6^+			
875.4	5.1 *9*	1503.5	(5^-)	628.3	6^+			
968.2	1.2[#] *4*	2005.8	(8^-)	1037.4	8^+			
993.1	4.4[#] *8*	1621.4	(6^+)	628.3	6^+			
995.4	3.9 *10*	1304.6	(4^+)	309.2	4^+			
1056.3	82 *4*	1684.6	(6^+)	628.3	6^+			
1099.1	2.2 *7*	1727.5	(7^-)	628.3	6^+			
1153.5	1.4 *5*	1462.8	(5^+)	309.2	4^+			
1194.3	5.1 *11*	1503.5	(5^-)	309.2	4^+			
1375.5	44 *3*	1684.6	(6^+)	309.2	4^+			

[†] For delayed (out-of-beam) γ rays in coincidence with 214γ.
[‡] From adopted gammas.
[#] From $\gamma\gamma$ with 319.1γ.
[@] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

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Decay Scheme

Intensities: Relative $I_{(\gamma+ce)}$

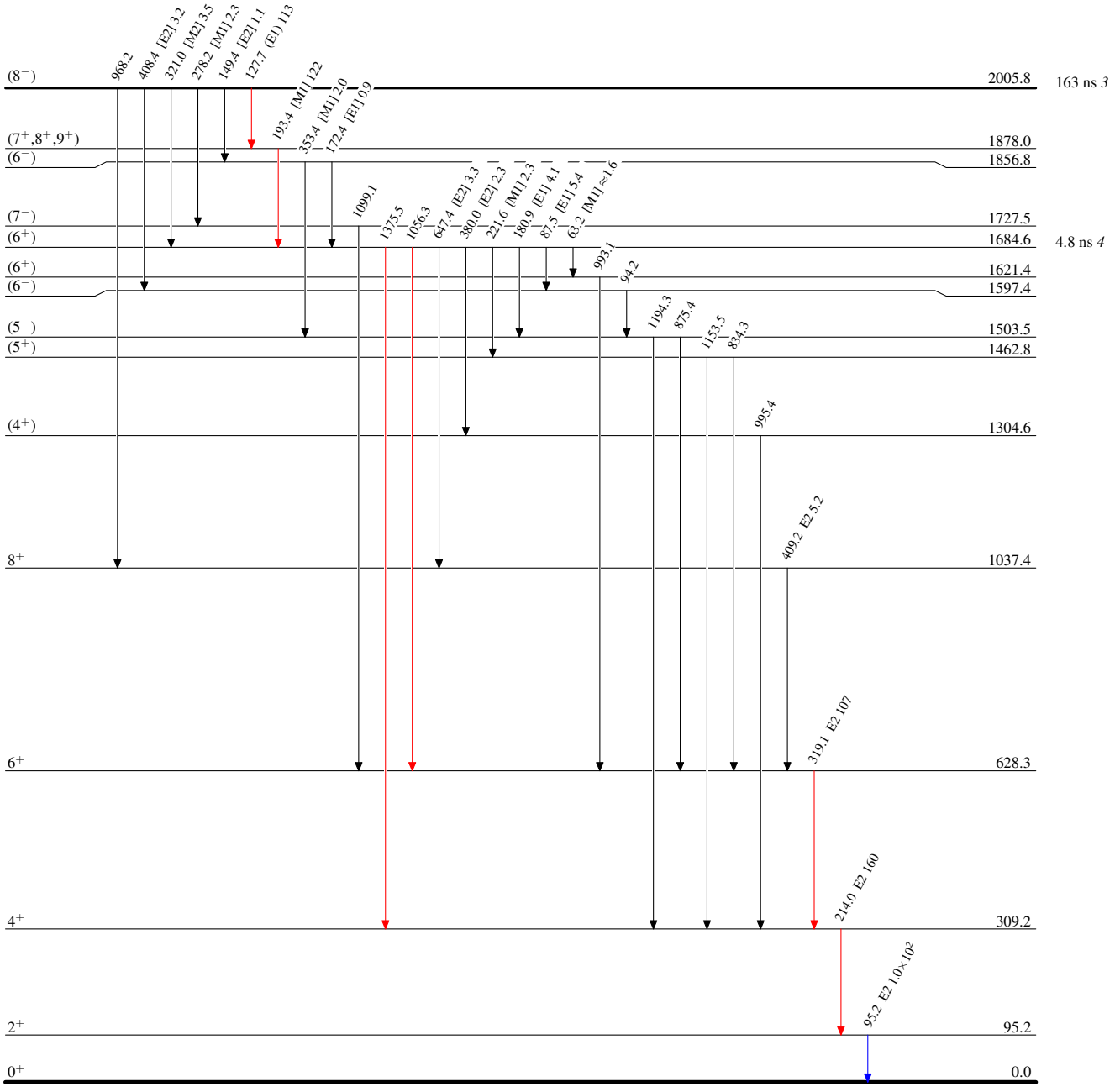
%IT=?

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$

$I_\gamma < 10\% \times I_\gamma^{max}$

$I_\gamma > 10\% \times I_\gamma^{max}$



$^{172}_{72}Hf_{100}$