^{179}Hf IT decay (25.05 d) 1970Hu04,1970Hu15,1975Hu15

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 110, 265 (2009)	15-Nov-2008

Parent: ^{179}Hf: E=1105.74 *16*; J^π=25/2$^-$; $T_{1/2}$=25.05 d *25*; %IT decay=100.0

Isomer production: Ta(α,d), Eα=30 MeV (1975Hu15); ^{176}Yb(α,n), Eα=33 MeV (1970Hu04); ^{176}Yb(α,n), Eα=30 MeV (1970Hu15).

1975Hu15: measured $\gamma(\theta$,H,T) and $\gamma\gamma(\theta$,H); deduced μ for Hf(25.05 d), δ.

1970Hu04: measured Eγ, Iγ, Ice, $\gamma\gamma$ coin, γ(t). Detectors:Ge(Li), scin, Si(Li).

1970Hu15: measured ce. Detectors: Si(Li), magnetic spectrograph.

^{179}Hf Levels

E(level)†	J^π‡	$T_{1/2}$	Comments
0.0#	9/2$^+$		
122.70# *7*	11/2$^+$		
268.85# *8*	13/2$^+$		
438.64# *10*	15/2$^+$		
631.33# *12*	17/2$^+$		
848.39# *15*	19/2$^+$		
1084.85# *17*	21/2$^+$		
1105.84 *19*	25/2$^-$	25.05 d *25*	μ=7.4 *3* (1975Hu15) μ: from static nuclear orientation; measured relative to ^{177}Hf(113 level). $T_{1/2}$: weighted average of 25.3 d *3* (1970KaZV) and 24.8 d *3* (1973Ch18). Other value: 29 d *1* (1970Hu04).

† From least-squares fit to Eγ.
‡ From Adopted Levels.
# Band(A): 9/2[624] g.s. band.

$\gamma(^{179}Hf)$

Iγ normalization: from decay scheme assuming Ti(257.3γ+236.4γ+453.4γ)=100%.

Experimental conversion coefficients of 1970Hu15 were recalculated by evaluator assuming α(K)exp(453.6γ)=0.0190 (E2 theory).

E$_\gamma$†	I$_\gamma$‡@	E$_i$(level)	J_i^π	E$_f$	J_f^π	Mult.	δ#	α&	Comments
21.03 *14*	12.2×10^{-3} *6*	1105.84	25/2$^-$	1084.85	21/2$^+$	M2		1.15×10^4 *4*	α(L)=8.6×10^3 *3*; α(M)=2.25×10^3 *8*; α(N+..)=623 *22* α(N)=542 *19*; α(O)=78 *3*; α(P)=3.79 *13* I$_\gamma$: I(γ+ce)=140 *5* from intensity balance at 1084 level. Iγ from I(γ+ce) and α. E$_\gamma$: from 1970Hu15. Mult.: from ce(L1)/ce(L3) exp≈1 and ce(L2)<<ce(L1) (1970Hu15).
122.70 *7*	40.8 *17*	122.70	11/2$^+$	0.0	9/2$^+$	M1+E2	−0.27 *3*	2.19 *4*	α(K)=1.77 *3*; α(L)=0.322 *9*;

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^{179}Hf IT decay (25.05 d) 1970Hu04,1970Hu15,1975Hu15 (continued)

γ(^{179}Hf) (continued)

E_γ[†]	I_γ[‡@]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	δ[#]	α[&]	Comments
									α(M)=0.0739 *22*; α(N+..)=0.0202 *6* α(N)=0.0175 *5*; α(O)=0.00260 *6*; α(P)=0.000150 *3* Mult.: from α(L)exp=0.32 *5* (1970Hu15). α(M)exp=0.07 *4* (1970Hu15). δ: from Adopted Gammas.
146.15 *7*	39.9 *17*	268.85	13/2$^+$	122.70	11/2$^+$	M1+E2	−0.39 *4*	1.291 *22*	α(K)=1.033 *23*; α(L)=0.199 *5*; α(M)=0.0459 *13*; α(N+..)=0.0125 *4* α(N)=0.0109 *3*; α(O)=0.00160 *4*; α(P)=8.65×10^{-5} *22* Mult.: from α(L)exp=0.17 *2*, α(M)exp=0.06 *2* (1970Hu15). α(K)exp=1.49 *16* (1970Hu15) is inconsistent with α(L)exp, possibly indicating presence of impurity in ce(K) (*e.g.*, ^{175}Lu(89 ce(L))). δ: from Adopted Gammas. δ=−0.33 *8* from γ(θ) (1975Hu15).
169.78 *7*	28.6 *13*	438.64	15/2$^+$	268.85	13/2$^+$	M1+E2	−0.33 *5*	0.852 *17*	α(K)=0.695 *17*; α(L)=0.122 *3*; α(M)=0.0278 *7*; α(N+..)=0.00764 *17* α(N)=0.00659 *16*; α(O)=0.000987 *19*; α(P)=5.83×10^{-5} *16* Mult.: from α(K)exp=0.67 *11* (1970Hu15). α(L)exp=0.12 *2* (1970Hu15). δ: from γ(θ) (1975Hu15). Other δ:≤0.8 from α(K)exp;≤0.46 from α(L)exp.
192.66 *11*	31.7 *28*	631.33	17/2$^+$	438.64	15/2$^+$	M1+E2	−0.26 *6*	0.606 *13*	α(K)=0.500 *13*; α(L)=0.0823 *14*; α(M)=0.0187 *4*; α(N+..)=0.00515 *10* α(N)=0.00444 *9*; α(O)=0.000672 *11*; α(P)=4.21×10^{-5} *12* Mult.: from α(K)exp=0.53 *10* (1970Hu15). α(L)exp=0.06 *2* (1970Hu15). δ: from γ(θ) (1975Hu15). Other δ:≤0.66 from α(K)exp,≤0.79 from α(L)exp.
217.04 *12*	13.3 *10*	848.39	19/2$^+$	631.33	17/2$^+$	M1+E2	−0.37 *3*	0.422 *8*	α(K)=0.346 *7*; α(L)=0.0588 *9*; α(M)=0.01341 *20*; α(N+..)=0.00368 *6* α(N)=0.00318 *5*; α(O)=0.000478 *7*; α(P)=2.89×10^{-5} *6* Mult.: from α(K)exp=0.43 *7* (1970Hu15). δ: from γ(θ) (1975Hu15). δ≤0.33 from α(K)exp.
236.48 *14*	27.7 *8*	1084.85	21/2$^+$	848.39	19/2$^+$	M1+E2	−0.30 *3*	0.339 *6*	α(K)=0.280 *5*; α(L)=0.0457 *7*; α(M)=0.01037 *15*; α(N+..)=0.00286 *4* α(N)=0.00246 *4*; α(O)=0.000373 *6*;

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^{179}Hf IT decay (25.05 d) 1970Hu04,1970Hu15,1975Hu15 (continued)

$\gamma(^{179}Hf)$ (continued)

E_γ[†]	I_γ[‡@]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α[&]	Comments
								α(P)=2.35×10^{-5} *5* Mult.: from α(K)exp=0.29 *5* (1970Hu15). α(L)exp=0.02 *1* (1970Hu15). δ: from $\gamma(\theta)$ (1975Hu15). Other δ:≤0.48 from α(K)exp.
257.38 *17*	4.8 *8*	1105.84	25/2$^-$	848.39	19/2$^+$	E3	0.669	α(K)=0.248 *4*; α(L)=0.318 *5*; α(M)=0.0810 *12*; α(N+..)=0.0214 *3* α(N)=0.0189 *3*; α(O)=0.00245 *4*; α(P)=2.29×10^{-5} *4* Mult.: from α(K)exp=0.42 *7*, α(L)exp=0.47 *6*, α(M)exp=0.18 *4* (1970Hu15).
268.85 *14*	16.6 *10*	268.85	13/2$^+$	0.0	9/2$^+$	E2	0.1107	α(K)=0.0739 *11*; α(L)=0.0282 *4*; α(M)=0.00682 *10*; α(N+..)=0.00181 *3* α(N)=0.001592 *23*; α(O)=0.000214 *3*; α(P)=5.17×10^{-6} *8* Mult.: from α(K)exp=0.08 *2* (1970Hu15).
315.93 *14*	29.9 *5*	438.64	15/2$^+$	122.70	11/2$^+$	E2	0.0679	α(K)=0.0478 *7*; α(L)=0.01542 *22*; α(M)=0.00370 *6*; α(N+..)=0.000988 *14* α(N)=0.000866 *13*; α(O)=0.0001184 *17*; α(P)=3.45×10^{-6} *5* Mult.: from α(K)exp=0.06 *2* (1970Hu15). α(L)exp=0.005 *4* (1970Hu15).
362.55 *15*	58.4 *13*	631.33	17/2$^+$	268.85	13/2$^+$	E2	0.0456	α(K)=0.0333 *5*; α(L)=0.00947 *14*; α(M)=0.00226 *4*; α(N+..)=0.000604 *9* α(N)=0.000529 *8*; α(O)=7.32×10^{-5} *11*; α(P)=2.46×10^{-6} *4* Mult.: from α(K)exp=0.027 *19* (1970Hu15).
409.72 *20*	31.7 *8*	848.39	19/2$^+$	438.64	15/2$^+$	E2	0.0325	α(K)=0.0244 *4*; α(L)=0.00627 *9*; α(M)=0.001484 *21*; α(N+..)=0.000399 *6* α(N)=0.000348 *5*; α(O)=4.88×10^{-5} *7*; α(P)=1.83×10^{-6} *3* Mult.: from α(L)exp=0.006 *2* (1970Hu15). α(M)exp=0.001 *1* (1970Hu15).
453.59 *20*	100 *4*	1084.85	21/2$^+$	631.33	17/2$^+$	E2	0.0248	α(K)=0.0190 *3*; α(L)=0.00452 *7*; α(M)=0.001063 *15*; α(N+..)=0.000287 *4* α(N)=0.000250 *4*; α(O)=3.54×10^{-5} *5*; α(P)=1.438×10^{-6} *21* %Iγ=67.6 *12*. Mult.: from α(K)exp:α(L)exp:α(M)exp=0.0191: 0.005 *1*:0.0012 *4* (1970Hu15).

[†] Weighted average of Eγ values from 1970Hu04 and 1970Hu15.
[‡] From 1970Hu04.
[#] From Adopted Gammas if not noted to the contrary.
[@] For absolute intensity per 100 decays, multiply by 0.678 *20*.
[&] 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: $I_{(\gamma+ce)}$ per 100 parent decays

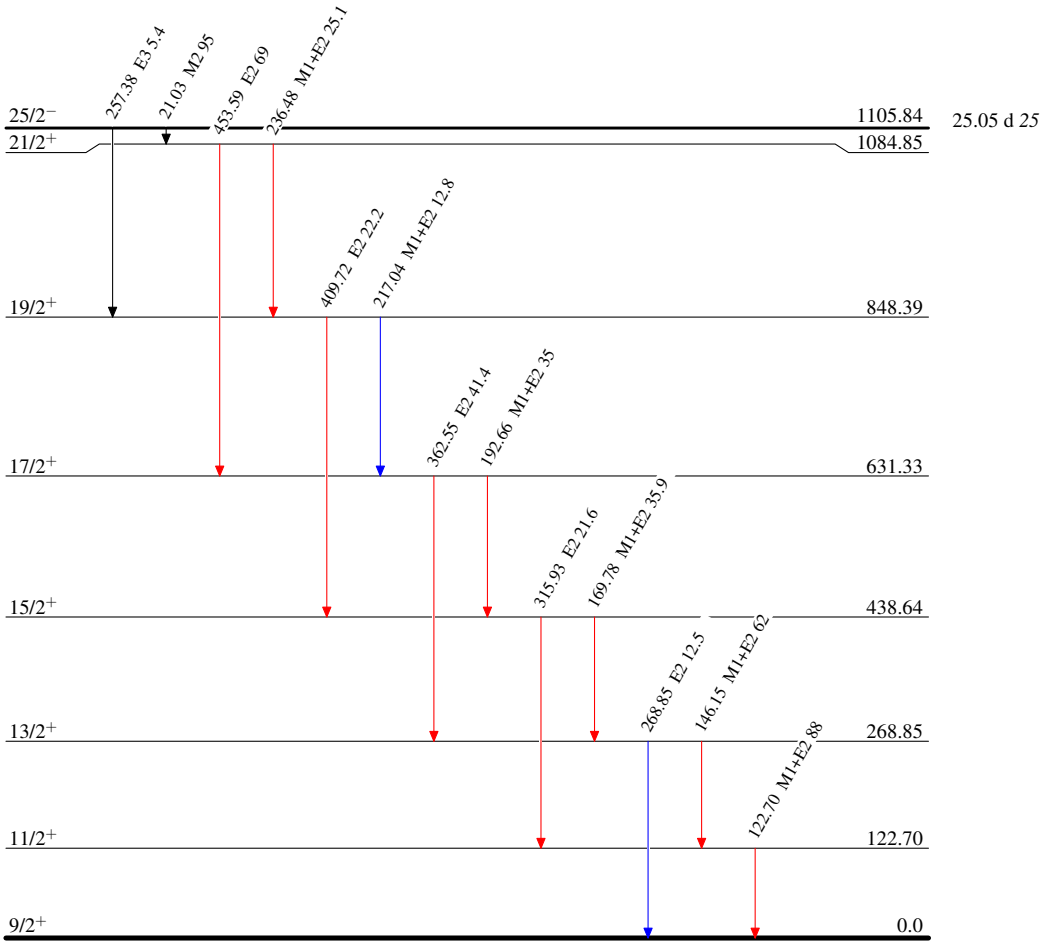
%IT=100.0

Legend

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

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

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



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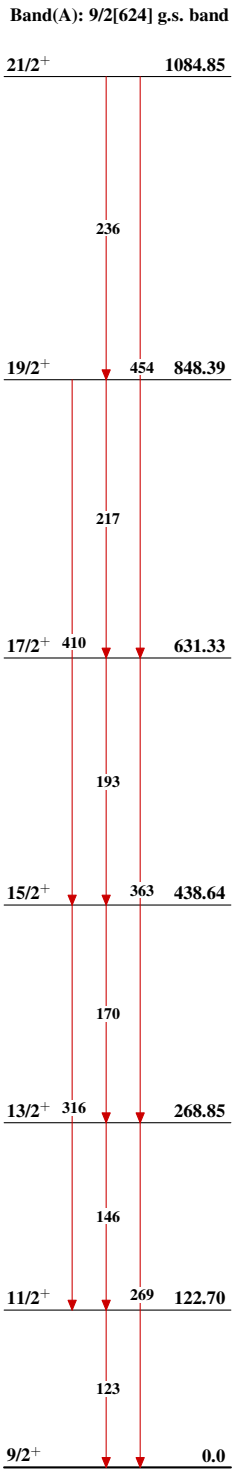

$^{179}_{72}Hf_{107}$