^{161}Hf ε decay 1995Hi12,1989Br19

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	C. W. Reich	NDS 112,2497 (2011)	1-Jun-2011

Parent: ^{161}Hf: E=0; $T_{1/2}$=18.2 s *5*; Q(ε)=6244 *36*; %ε+%$β^+$ decay>99.9

^{161}Hf-E: Additional information 1.

^{161}Hf-$T_{1/2}$: Additional information 2.

^{161}Hf-Q(ε): Additional information 3.

^{161}Hf-%ε+%$β^+$ decay: %α<0.13.

Additional information 4.

Level scheme essentially based on the low-lying level structure shown by 2006Br12 In ^{139}La(^{28}Si,6nγ) and As listed In the XUNDL data file. The γ-ray placements are consistent with coincidence data of 1995Hi12.

1995Hi12: ^{161}Hf produced through bombardment of BaF_2 targets with 240-MeV S ions. Reaction products were thermalized and swept out using He-jet gas flow and deposited in a tape-transport system. γ radiation was studied with two high-resolution Ge detectors in a close geometry. α radiation was studied using a 450-mm^2 Si surface-barrier detector placed between the γ detectors. Measured excitation functions, Eγ,Iγ,Eα,γγ and Xγ coin. Mass assignment made on the basis of excitation functions.

1989Br19: ^{161}Hf produced in the ^{144}Sm(^{22}Ne,5n) and the ^{147}Sm(^{20}Ne,6n) reactions with 163-MeV ^{20}Ne ions. Reaction products were transported using a gas-jet transport system and absorbed in a solution, where chemical separation was performed. γ radiation was studied using a 2.1-cm^3 HPGe detector and a 35-cm^3 Ge(Li) detector. The authors report $T_{1/2}$ and 2 γ′s, having Eγ=135.6 and 180.0. 1995Hi12, however, assign this latter γ to the ^{165}Hf decay.

The data are from 1995Hi12. The level scheme is based on low-lying level structure established by 2006Br12 in ^{139}La(^{28}Si,6nγ) study, where several γ-ray energies are found to be similar to those in 1995Hi12.

^{161}Lu Levels

E(level)†	Jπ‡	Comments
0#	1/2+	Level not reported in the ε decay, but expected from the decay of the first excited state.
0+x#	(3/2+)	Additional information 5. E(level): x ≈ 15 keV based on systematics (see comment In the Adopted Levels).
66.7+x# *7*	(5/2+)	
135.6+x *3*	(5/2+)	
226.8+x *6*	(7/2+)	
275.9+x? *5*	(7/2+)	
335.2+x# *5*	(7/2+)	
444.4+x *7*	(9/2+)	

† The level energies are based on those in the Adopted Levels, which are essentially from 2006Br12 in ^{139}La(^{28}Si,6nγ).

‡ From adopted values.

Band(A): 1/2[411] band.

γ(^{161}Lu)

An 180 γ, previously assigned to the ^{161}Hf decay, has been assigned instead by 1995Hi12 to the ^{165}Hf decay.

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Comments
91.2 *5*	5 *1*	226.8+x	(7/2+)	135.6+x	(5/2+)	
135.6 *3*	100	135.6+x	(5/2+)	0+x	(3/2+)	
199.6 *4*	15 *4*	335.2+x	(7/2+)	135.6+x	(5/2+)	
209.2† *5*	20 *3*	275.9+x?	(7/2+)	66.7+x	(5/2+)	
217.6 *4*	9 *4*	444.4+x	(9/2+)	226.8+x	(7/2+)	the ordering of 217.6-91.2 cascade follows from the work of 2006Br12

Continued on next page (footnotes at end of table)

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γ(^{161}Lu) (continued)

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Comments
						In ^{139}La(^{28}Si,6nγ). I_γ: corrected (by 1995Hi12) for the contribution of a 215.8 γ from the decay of ^{160}Yb.
275.9† *5*	21 *3*	275.9+x?	(7/2$^+$)	0+x	(3/2$^+$)	

† Placement based on low-lying level structure shown In ^{139}La(^{28}Si,6nγ) by 2006Br12. γ unplaced by 1995Hi12.

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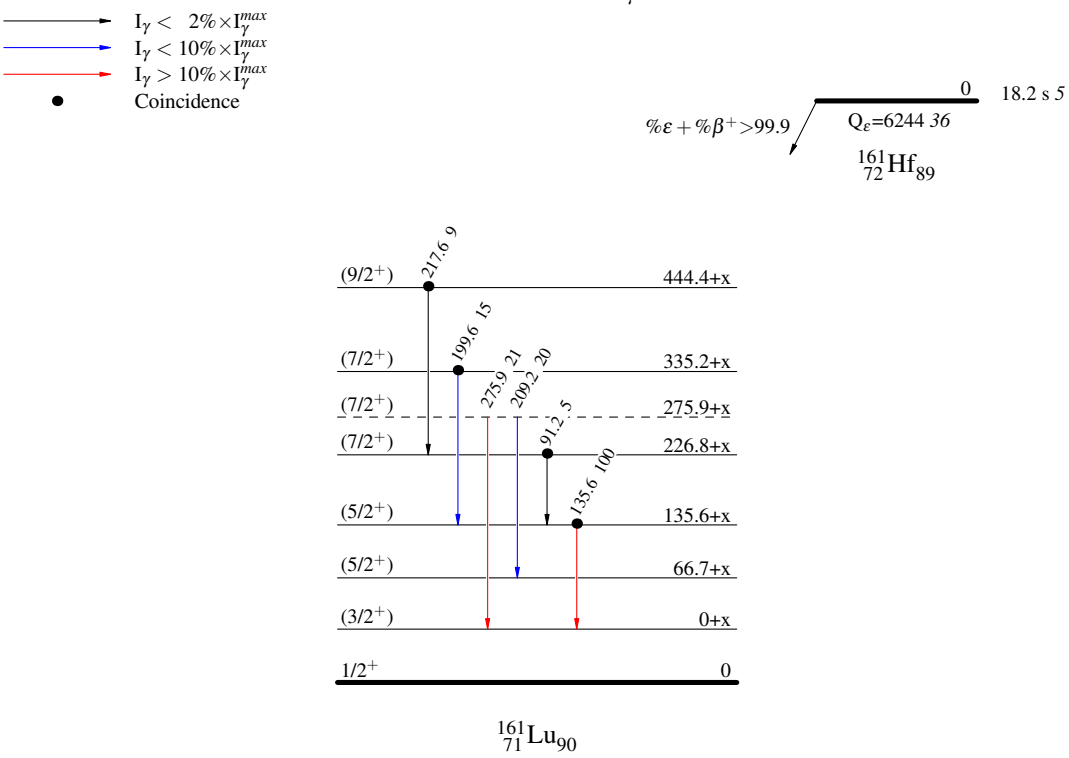
Decay Scheme

Intensities: Relative I_γ



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Band(A): 1/2[411] band

$(7/2^+)$ **335.2+x**

$(5/2^+)$ **66.7+x**

$(3/2^+)$ **0+x**

$1/2^+$ **0**

$^{161}_{71}Lu_{90}$