

¹⁶⁷Hf ε decay 1973Me09

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 90, 431 (2000)	5-Jul-2000

Parent: ¹⁶⁷Hf: E=0.0; J^π=(5/2)⁻; T_{1/2}=2.05 min 5; Q(ε)=4000 SY; %ε+%β⁺ decay=100.0

Others: 1969Ar23, 1970At01, 1987Es08, 1989Br19.

Sources from ¹⁷⁰Yb(³He,6n); Yb oxide targets enriched to 67% in ¹⁷⁰Yb; chemical separation; measured E_γ, I_γ, (Compton-suppression Ge(Li) spectrometer (FWHM=1.9 keV at 1332 keV)), K x ray (surface-barrier Ge(Li) detector (FWHM=0.8 keV at 122 keV)), Ice (Si(Li)).

The decay scheme is tentative, and most certainly very incomplete; only three γ rays were observed, although Q+=4000 suggests there might be many more.

¹⁶⁷Lu Levels

E(level)	J ^π †	T _{1/2}	Comments
0.0‡	7/2 ⁺	51.5 min 10	T _{1/2} : from Adopted Levels.
139.87‡ 15	(9/2 ⁺)		
315.25# 10	(7/2) ⁻		

† Adopted values.

‡ Band(A): π 7/2[404] band.

Band(B): π 7/2[523] band.

ε,β⁺ radiations

1973Me09 estimate>65% ε+β⁺ branching to 315.2 level from I_γ(K x ray)=58 29 and I(γ[±])=60 30, relative to I_γ=100 for 315.2γ. Intensity imbalance at 139.9 level indicates very little, if any, ε+β⁺ feeding of that level (1.4% 17).

E(decay)	E(level)	Iβ ⁺ †	Iε †	Log ft	I(ε+β ⁺) †	Comments
(3684 SY)	315.25	>22	>43	<4.8	>65	av Eβ= 1203; εK=0.546; εL=0.0862; εM+=0.0262
(4000‡ SY)	0.0	<15	<20	>5.2	<35	av Eβ=1347; εK=0.481; εL=0.0758; εM+=0.0230

† Absolute intensity per 100 decays.

‡ Existence of this branch is questionable.

γ(¹⁶⁷Lu)

I_γ normalization: From K x ray intensity (corrected for internal conversion) and γ[±] intensity. However, see comment concerning tentative status of decay scheme.

I_γ(K x ray)=58 29, I(γ[±])=60 30, relative to I_γ=100 for 315.2γ.

E _γ	I _γ †	E _i (level)	J _i ^π	E _f	J _f ^π	Mult.	α‡	Comments
139.9 2	3.8 8	139.87	(9/2 ⁺)	0.0	7/2 ⁺	[M1,E2]	1.21 24	α(K)=0.8 4; α(L)=0.29 11; α(M)=0.07 3; α(N+..)=0.019 8
175.4 2	6 1	315.25	(7/2) ⁻	139.87	(9/2 ⁺)	[E1]	0.0809	α(K)=0.0674; α(L)=0.0105; α(M)=0.00234; α(N+..)=0.00063
315.24 10	100	315.25	(7/2) ⁻	0.0	7/2 ⁺	E1	0.0184	α(K)=0.0154; α(L)=0.00229; α(M)=0.00051; α(N+..)=0.00016

Continued on next page (footnotes at end of table)

 ^{167}Hf ε decay [1973Me09](#) (continued) $\gamma(^{167}\text{Lu})$ (continued)

<u>E_γ</u>	<u>$E_i(\text{level})$</u>	<u>Comments</u>
		Mult.: from $\alpha(\text{K})_{\text{exp}}=0.0143$, as deduced from a simultaneous measurement of $\text{Ic}(315.2\gamma)$ and $\text{I}\gamma(315.2\gamma)$ (detector calibration from $\alpha(\text{L})=0.0823$ (E2 theory) for 198.8γ in ^{168}Yb).

† For absolute intensity per 100 decays, multiply by 1.05.

‡ 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.

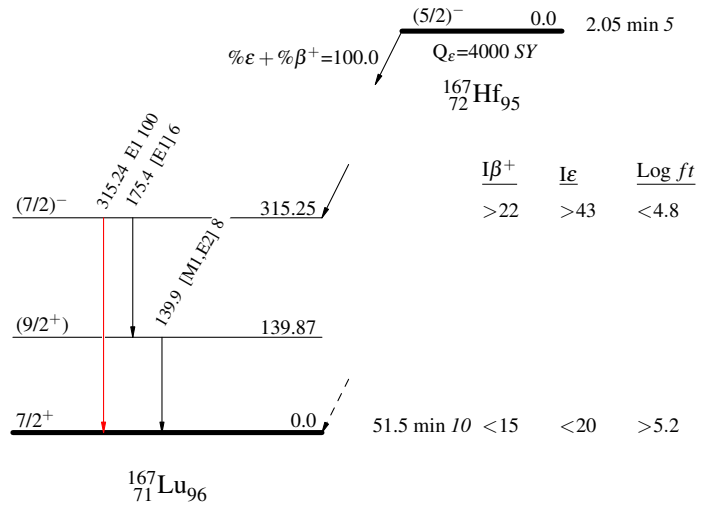
^{167}Hf ϵ decay 1973Me09

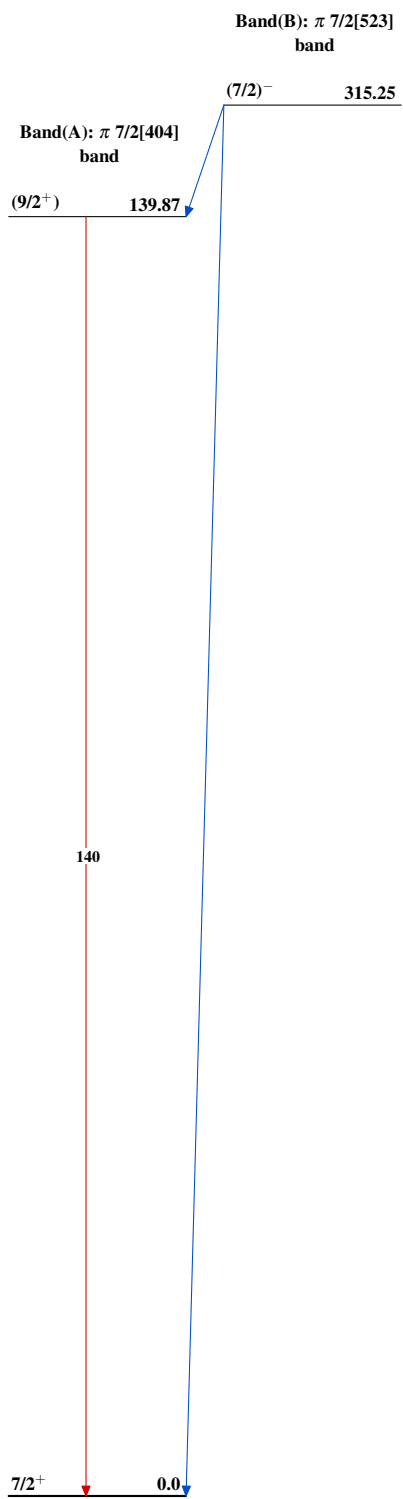
Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays

Legend

- $I_{\gamma} < 2\% \times I_{\gamma}^{max}$
- $I_{\gamma} < 10\% \times I_{\gamma}^{max}$
- $I_{\gamma} > 10\% \times I_{\gamma}^{max}$



^{167}Hf ε decay 1973Me09 $^{167}_{71}\text{Lu}_{96}$