

$^{165}\text{Hf } \varepsilon + \beta^+ \text{ decay (76 s) } 1989\text{Hi04}$

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen		NDS 194,460 (2024)	31-Oct-2022

Parent: ^{165}Hf : $E=0.0$; $J^\pi=(5/2^-)$; $T_{1/2}=76 \text{ s } 4$; $Q(\varepsilon)=4810 \text{ 40}$; $\% \varepsilon + \% \beta^+ \text{ decay}=100$

^{165}Hf - $J^\pi, T_{1/2}$: From ^{165}Hf Adopted Levels.

^{165}Hf - $Q(\varepsilon)$: From 2021Wa16.

1989Hi04: ^{165}Hf source was prepared via $^{36,40}\text{Ar} + ^{133}\text{Cs}$ reactions with $E=212 \text{ MeV } ^{36}\text{Ar}$ or ^{40}Ar beams from the VICKSI accelerator of the Hahn-Meitner Institut, Berlin on thin ^{133}Cs targets. γ rays were detected with two Ge(Li) detectors and a Ge x-ray detector; charged-particles were detected with a surface-barrier detector. Measured E_γ , I_γ , $\gamma\gamma$ -coin, K x-rays , $\gamma(t)$. Deduced levels, parent $T_{1/2}$.

1981Br30, 1981LiZM: measured E_γ , K x-rays , $T_{1/2}$.

1992HeZV: measured $T_{1/2}(^{165}\text{Hf g.s.})=77 \text{ s } 4$.

The level scheme is based on 772.7-180.0 coincidence and low-lying level structure shown in the Adopted Levels. The decay scheme is considered incomplete.

 $^{165}\text{Lu Levels}$

E(level)	J^π^\dagger	Comments
0.0+x [†]	(3/2 ⁺)	E(level): $x \approx 20 \text{ keV}$; see the Adopted Levels for comments.
5.4+x [†]	(5/2 ⁺)	
23.5+x [†]	(7/2 ⁺)	
141.2+x?	(7/2 ⁺)	
181.8+x?	(9/2 ⁺)	
203.2+x 3		J^π : $\pi 7/2[523]$ proposed by 1989Hi04 is suspect in view of another low-lying (7/2 ⁻) at 54.8+x reported in $^{139}\text{La}(^{30}\text{Si}, 4n\gamma)$.
234.2+x?	(9/2 ⁻)	
975.9+x		

[†] From Adopted Levels. Energies are rounded values.

 $\gamma(^{165}\text{Lu})$

$I_\gamma/100$ decays cannot be calculated since the decay scheme is incomplete.

E_γ	I_γ	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Comments
x83.5 [†]						
135.8 ^{†‡}		141.2+x?	(7/2 ⁺)	5.4+x	(5/2 ⁺)	
158.6 ^{†‡}		181.8+x?	(9/2 ⁺)	23.5+x	(7/2 ⁺)	
180.0 3	100	203.2+x		23.5+x	(7/2 ⁺)	
211 ^{†‡}	<7	234.2+x?	(9/2 ⁻)	23.5+x	(7/2 ⁺)	I_γ : from 1989Hi04. $I_\gamma \approx 10$ (1981Br30).
772.7 5	1.4 2	975.9+x		203.2+x		

[†] Tentative gamma ray from 1981Br30 only.

[‡] Placement of transition in the level scheme is uncertain.

^x γ ray not placed in level scheme.

^{165}Hf ϵ decay (76 s) **1989Hi04**

Decay Scheme

Intensities: Relative I_γ

- Legend
- \longrightarrow $I_\gamma < 2\% \times I_\gamma^{max}$
 - \longrightarrow $I_\gamma < 10\% \times I_\gamma^{max}$
 - \longrightarrow $I_\gamma > 10\% \times I_\gamma^{max}$
 - $-----\longrightarrow$ γ Decay (Uncertain)

