^{154}Hf IT decay (9 μs) 1993Mc03,1989Mc07

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 200,2 (2025)	22-Aug-2022

Parent: ^{154}Hf: E=2713; J^π=(10$^+$); $T_{1/2}$=9 μs *4*; %IT decay=100

Produced in the ^{102}Pd(^{54}Fe,2n) reaction with 240-245 MeV ^{54}Fe ions on a 1-mg/cm^2 ^{102}Pd target. The reaction products were separated using the Daresbury Recoil Mass Separator. The source material was collected on an Al catcher foil. γ radiation was studied using a LEPS and four large Ge detectors. The time relationships between the signals from a position-sensitive detector and the γ-ray detectors were used for mass, $T_{1/2}$ and $\gamma\gamma$ coincidence determinations.

^{154}Hf Levels

E(level)[†]	J^π[‡]	$T_{1/2}$	Comments
0	0$^+$	2 s *1*	$T_{1/2}$: from Adopted Levels.
1513	(2$^+$)		
2011	(3$^-$)		
2146	(5$^-$)		
2457	(7$^-$)		
2671	(8$^+$)#&		
2713	(10$^+$)@&	9 μs *4*	$T_{1/2}$: from γ(t) (1989Mc07).

[†] The ordering of the γ's, and thus the level energies, is based on the systematics of the lighter doubly even nuclides, especially ^{150}Er and ^{152}Yb.

[‡] Adopted values, based on the systematics of the level schemes of the N=82 lighter-mass nuclides ^{148}Dy, ^{150}Er, and ^{154}Yb.

[#] Configuration=$(\pi\ h_{11/2})^6(\pi\ h_{11/2})^2_{8+}$, seniority=2.

[@] Configuration=$(\pi\ h_{11/2})^6(\pi\ h_{11/2})^2_{10+}$, seniority=2.

[&] This is the most likely configuration, with the eight valence protons beyond Z=64 all being in the $\pi\ h_{11/2}$ spherical shell-model state (1989Mc07).

γ(^{154}Hf)

E_γ[†]	E_i(level)	J^π_i	E_f	J^π_f	Mult.	α[‡]	Comments
≈42	2713	(10$^+$)	2671	(8$^+$)	[E2]	≈166	E_γ: From the systematics of the energy separation of the 8$^+$ and 10$^+$ states in the lighter-mass doubly even N=82 nuclides, 1989Mc07 estimate that the energy of the unobserved 10$^+$ → 8$^+$ transition lies between 14 and 70 keV.
135	2146	(5$^-$)	2011	(3$^-$)			
214	2671	(8$^+$)	2457	(7$^-$)			
311	2457	(7$^-$)	2146	(5$^-$)			
498	2011	(3$^-$)	1513	(2$^+$)			
1513	1513	(2$^+$)	0	0$^+$			

[†] The existence and energies of the γ-rays were established on the basis of peaks having only a few (typically 4-6) counts in the spectra. These presumably represent only the dominant decay path of the isomer.

[‡] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with "Frozen Orbitals" approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

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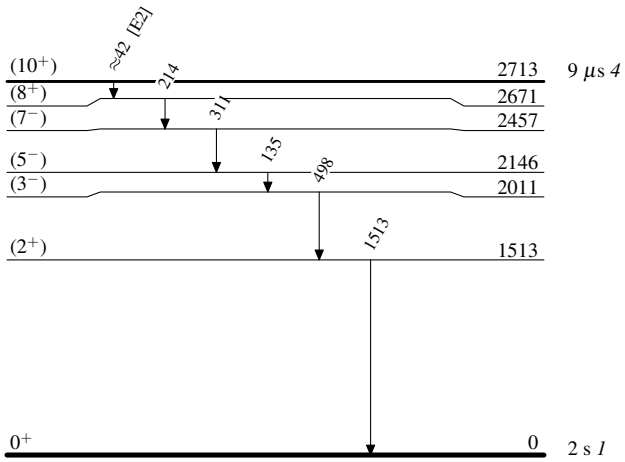
Decay Scheme

%IT=100



$^{154}_{72}Hf_{82}$