

Coulomb excitation [1995Mo30,1971Ej01,1963Bj04](#)

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	E. Browne, Huo Junde		NDS 87, 15 (1999)	1-Nov-1998

Additional information 1.

A new technique called "INVERSE kinematic fusion reactions" was used to produce a radioactive beam of ^{174}Hf ($K^\pi=8^-$). This beam bombarded a target of ^{208}Pb to Coulomb excite levels in ^{174}Hf ($K^\pi=8^-$). The γ rays associated with these levels were studied using an array of NaI and hyperpure Ge detectors. The g.s. rotational band is populated from the decay of the ^{174}Hf ($K^\pi=8^-$) isomer ([1995Go18,1995Mo30](#)).

Primary target: ^9Be , primary projectile: ^{170}Er , $E=1.2$ GeV. The $^{174}\text{Hf}(K^\pi=8^-)$ isomer was produced by the $^9\text{Be}(^{170}\text{Er},5n)$ reaction ([1995Go18,1995Mo30](#)).

Secondary target: ^{208}Pb , secondary projectile: ^{174}Hf ($K^\pi=8^-$) isomer, E (recoil) ≈ 939 MeV. Measured γ rays. Detectors: array of 24 NaI scintillator detectors, and 2 hyperpure Ge detectors. Deduced $B(E2)$ for transition between $J^\pi=8^-$ and $J^\pi=9^-$ levels ([1995Go18,1995Mo30](#)).

Target: enriched ^{174}Hf . Projectile: α , $E=15$ MeV. Measured scattered α 's at $\theta=90^\circ$. Detector: magnetic spectrograph, FWHM=20 keV ([1971Ej01](#)).

Target: 99% enriched ^{174}Hf . Projectiles: p, d. Measured scattered protons and deuterons ([1963Bj04](#)).

 ^{174}Hf Levels

E(level) ^{&}	J^π ^a	$T_{1/2}$	Comments
0.0 [†]	0 ⁺		
92.0 [†]	2 ⁺	1.38 ns 9	$T_{1/2}$: from $B(E2)=5.30$ 25 (average of 5.35 35 (1971Ej01) and 5.26 35 (1963Bj04)) and $\alpha=5.21$ for 91γ (theory,E2).
298 [†]	4 ⁺		
608 [†]	6 ⁺		
901 [‡]	2 ⁺	2.2 ps 5	Observed in Coul. ex. of ^{174}Hf ($K^\pi=0^+$) only (1971Ej01,1963Bj04). $T_{1/2}$: calculated by evaluator from $B(E2)$ and an adopted branching of 0.29 4. $B(E2)=0.062$ 10 (1971Ej01).
1008 [†]	8 ⁺		
1229 [#]	2 ⁺	0.36 ps 6	Observed in Coul. ex. of ^{174}Hf ($K^\pi=0^+$) only (1971Ej01,1963Bj04). $T_{1/2}$: calculated by evaluator from $B(E2)$ and an adopted branching of 0.49 5. $B(E2)=0.138$ 20 (1971Ej01).
1797.5 [@]	(8 ⁻)	2.39 μs 4	E(level), $T_{1/2}$: from Adopted Levels.
2029.5 [@]	(9 ⁻)	0.5 ps 3	$B(E2)=2$ 1 (1995Go18,1995Mo30). $T_{1/2}$: deduced by evaluator from $B(E2)$.

[†] Band(A): $K^\pi=0^+$ band.

[‡] Band(B): $K^\pi=0^+$ β -vibrational band.

[#] Band(C): $K^\pi=2^+$ γ -vibrational band.

[@] Band(D): $K^\pi=(8^-)$ band.

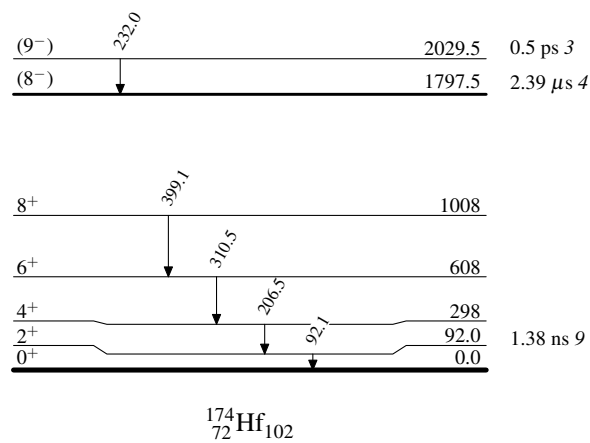
[&] From [1995Go18](#) and [1995Mo30](#), unless otherwise specified.

^a From Adopted Levels.

Coulomb excitation 1995Mo30,1971Ej01,1963Bj04 (continued) $\gamma(^{174}\text{Hf})$

E_γ^\dagger	$E_i(\text{level})$	J_i^π	E_f	J_f^π
92.1	92.0	2 ⁺	0.0	0 ⁺
206.5	298	4 ⁺	92.0	2 ⁺
232.0	2029.5	(9 ⁻)	1797.5	(8 ⁻)
310.5	608	6 ⁺	298	4 ⁺
399.1	1008	8 ⁺	608	6 ⁺

[†] From 1995Go18.

Coulomb excitation 1995Mo30,1971Ej01,1963Bj04Level Scheme

Coulomb excitation 1995Mo30,1971Ej01,1963Bj04