^{128}Te(^{48}Ca,6nγ) 1999Cu01

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	C. M. Baglin[1], E. A. Mccutchan[2], S. Basunia[1]	NDS 153, 1 (2018)	1-Oct-2018

E=200 MeV; thick ^{128}Te target with ^{197}Au backing; GAMMASPHERE array of 64 Compton-suppressed Ge detectors; measured Eγ, Iγ (prompt and delayed), $\gamma\gamma$ coin, $\gamma\gamma(\theta)$(DCO), $\gamma\gamma$(t).

^{170}Hf Levels

E(level)[†]	J$^\pi$[‡]	Comments
0.0[#]	0^+	
100.70[#] *10*	2^+	
321.60[#] *15*	4^+	
642.42[#] *16*	6^+	
1042.51[#] *19*	8^+	
1158.77 *17*	(4^+)	
1372.70 *16*	(6^+)	
1444.11 *18*	6^+	
1504.5[#] *11*	10^+	
1544.02 *16*	$5^{(-)}$	
1773.36 *16*	6^+	K$^\pi$=6$^+$ bandhead.
1965.97 *19*	7^+	
2015.5[#] *15*	12^+	
2182.58[@] *21*	8^-	
2404.68[&] *23*	9^-	
2565.5[#] *18*	14^+	
2643.4[@] *3*	10^-	
2905.8[&] *3*	11^-	
3177.8[@] *5*	12^-	
3459.7[&] *6*	13^-	
3750.0[@] *6*	14^-	
4043.4[&] *6*	15^-	
4338.7[@] *6*	16^-	
4632.5[&] *9*	(17^-)	

[†] From least-squares fit to Eγ, assuming 1 keV uncertainty in Eγ values for which authors do not state uncertainty.
[‡] As proposed by 1999Cu01.
[#] Band(A): g.s. band.
[@] Band(B): K$^\pi$=8$^-$, (π 9/2[514])+(π 7/2[404]), α=0 band. Assignment based on $(g_K-g_R)/Q_0$ values deduced by 1999Cu01 from observed In-band cascade to crossover transition intensity ratios.
[&] Band(b): K$^\pi$=8$^-$, (π 9/2[514])+(π 7/2[404]), α=1 band. Signature partner of K$^\pi$=8$^-$, (π 9/2[514])+(π 7/2[404]), α=0 band; please see comments on that band.

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$\gamma(^{170}Hf)$

E_γ [†]	I_γ [‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	α[a]	Comments
100.7 *1*	9 *1*	100.70	2^+	0.0	0^+	(E2)	3.43	DCO=0.9 *3*. Mult.: α(exp)=10.7 *16* from intensity balance At 101 level rules out E1 and M2 or higher. Band structure favors E2 over M1.
192.6 *1*	34.2 *2*	1965.97	7^+	1773.36	6^+	D		DCO=0.55 *11*.
213.8 *2*	1.6 *8*	1372.70	(6^+)	1158.77	(4^+)			
216.6 *1*	49.0 *24*	2182.58	8^-	1965.97	7^+	(D)		DCO=0.72 *13*.
220.9 *1*	80 *8*	321.60	4^+	100.70	2^+	[E2]	0.207	
222.1 *1*		2404.68	9^-	2182.58	8^-			Iγ(prompt): 126 *10*.
229.2 *1*	9.0 *6*	1773.36	6^+	1544.02	$5^{(-)}$	D		DCO=0.56 *18*.
238.7 *1*		2643.4	10^-	2404.68	9^-			Iγ(prompt): 100 *9*.
x247[@]								
x254[@]								
262.1 *6*		2905.8	11^-	2643.4	10^-			Iγ(prompt): 58 *7*.
272.1 *6*		3177.8	12^-	2905.8	11^-			Iγ(prompt): 69 *6*.
281.9 *4*		3459.7	13^-	3177.8	12^-			Iγ(prompt): 37 *6*.
286.2 *3*	0.9 *3*	1444.11	6^+	1158.77	(4^+)			
289.7 *9*		3750.0	14^-	3459.7	13^-			Iγ(prompt): 47 *7*.
291.6 *9*		4043.4	15^-	3750.0	14^-			Iγ(prompt): 47 *7*.
293[&b]		4632.5	(17^-)	4338.7	16^-			
294.8 *5*		4338.7	16^-	4043.4	15^-			Iγ(prompt): 42 *7*.
320.5 *1*	62 *6*	642.42	6^+	321.60	4^+	(Q)		DCO=1.02 *23*.
329.3 *1*	5.7 *5*	1773.36	6^+	1444.11	6^+			
400.1 *1*	22 *2*	1042.51	8^+	642.42	6^+			
400.4 *1*	11.4 *9*	1773.36	6^+	1372.70	(6^+)			
462[&]		1504.5	10^+	1042.51	8^+			
501.2 *2*		2905.8	11^-	2404.68	9^-			Iγ(prompt): 33 *8*.
511[&]		2015.5	12^+	1504.5	10^+			
534.0 *7*		3177.8	12^-	2643.4	10^-			Iγ(prompt): 32 *8*.
550[&]		2565.5	14^+	2015.5	12^+			
554.3 *8*		3459.7	13^-	2905.8	11^-			Iγ(prompt): 22 *7*.
572.1 *3*		3750.0	14^-	3177.8	12^-			Iγ(prompt): 16 *5*.
584.1 *5*		4043.4	15^-	3459.7	13^-			
588.7 *2*		4338.7	16^-	3750.0	14^-			
590[&b]		4632.5	(17^-)	4043.4	15^-			
614.5 *1*	10.1 *13*	1773.36	6^+	1158.77	(4^+)			
730.1 *3*	2.0 *5*	1372.70	(6^+)	642.42	6^+			DCO=0.97 *26*; assigned by authors as D, ΔJ=0.
801.5 *2*	4.3 *9*	1444.11	6^+	642.42	6^+			DCO=1.10 *23*; assigned by authors as D, ΔJ=0.
837.1 *2*	6.2 *6*	1158.77	(4^+)	321.60	4^+			
901.5 *2*	3.3 *6*	1544.02	$5^{(-)}$	642.42	6^+			DCO=1.14 *24*; assigned by authors as D, ΔJ=1.
1050.9 *1*	9.2 *13*	1372.70	(6^+)	321.60	4^+	(Q)		DCO=1.05 *22*.
1122.3 *8*	0.5 *4*	1444.11	6^+	321.60	4^+	(Q)		DCO=0.99 *19*.
1130.7 *1*	26.3 *14*	1773.36	6^+	642.42	6^+			DCO=0.99 *19*; assigned by authors as D, ΔJ=0.
1141 *1*	0.8 *2*	2182.58	8^-	1042.51	8^+			ΔK=8, ΔJ=0 transition.
1222.3 *1*	5.0 *9*	1544.02	$5^{(-)}$	321.60	4^+	(D)		DCO=0.75 *15*.
1452.4 *1*	0.8 *1*	1773.36	6^+	321.60	4^+			E_γ: based on least-squares adjustment, this Eγ fits its placement poorly.

[†] From table I or II of 1999Cu01, except As noted.

[‡] Relative photon intensities from matrix of events occurring 20-63 ns after each beam pulse (table I of 1999Cu01). The relative intensities of prompt transitions within the $K^\pi=8^-$ band (table II of 1999Cu01) are given separately in comments on the relevant transitions.

Continued on next page (footnotes at end of table)

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$\gamma(^{170}Hf)$ (continued)

Based on measured DCO ratios, except As noted.
@ From text of 1999Cu01; observed in prompt coincidence with transitions connecting lower-spin members of $K^{\pi}=8^{-}$ band.
& From level scheme (fig. 1) of 1999Cu01.
a 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.
b Placement of transition in the level scheme is uncertain.
x γ ray not placed in level scheme.

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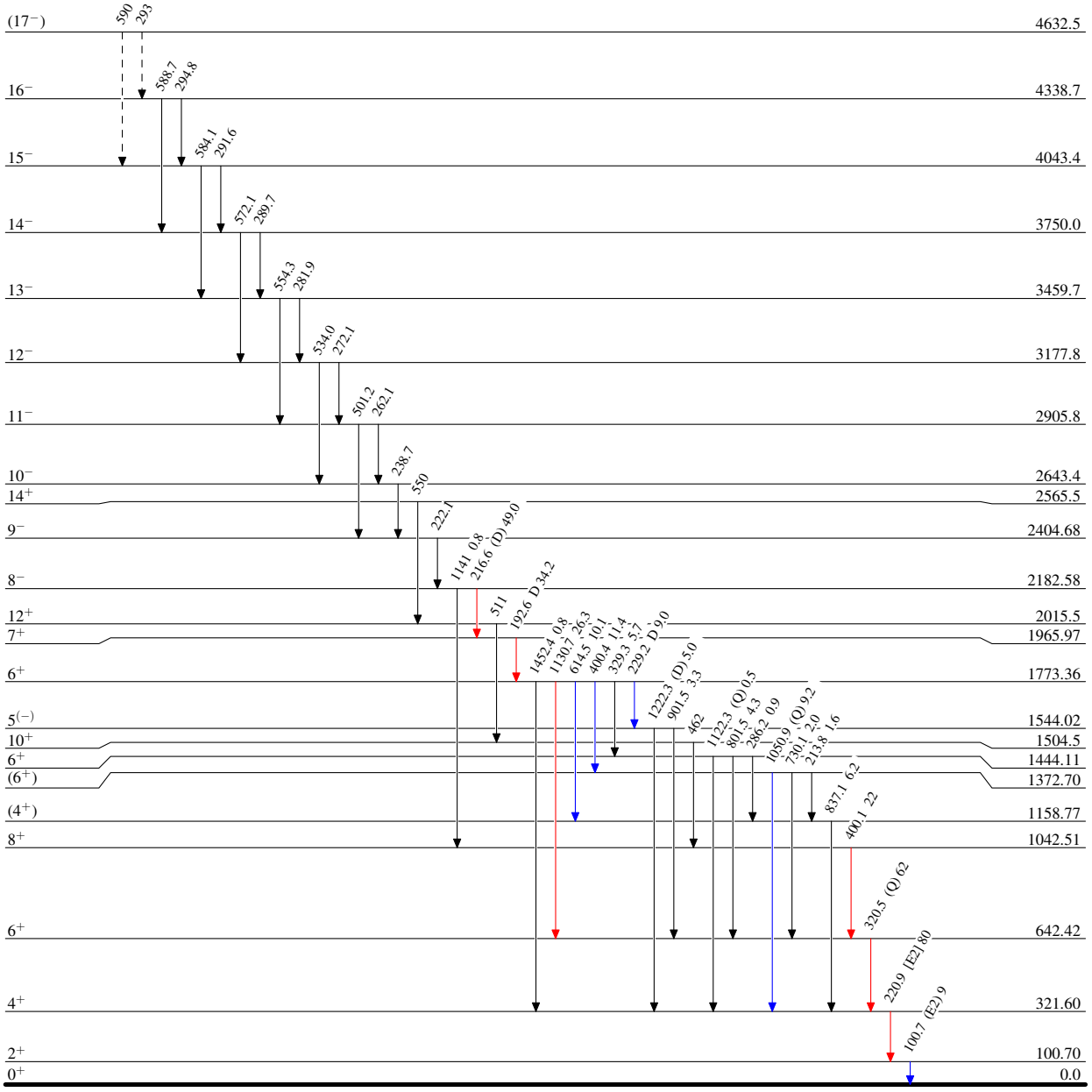
Level Scheme

Intensities: Relative I_γ

Legend

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



$^{170}_{72}Hf_{98}$

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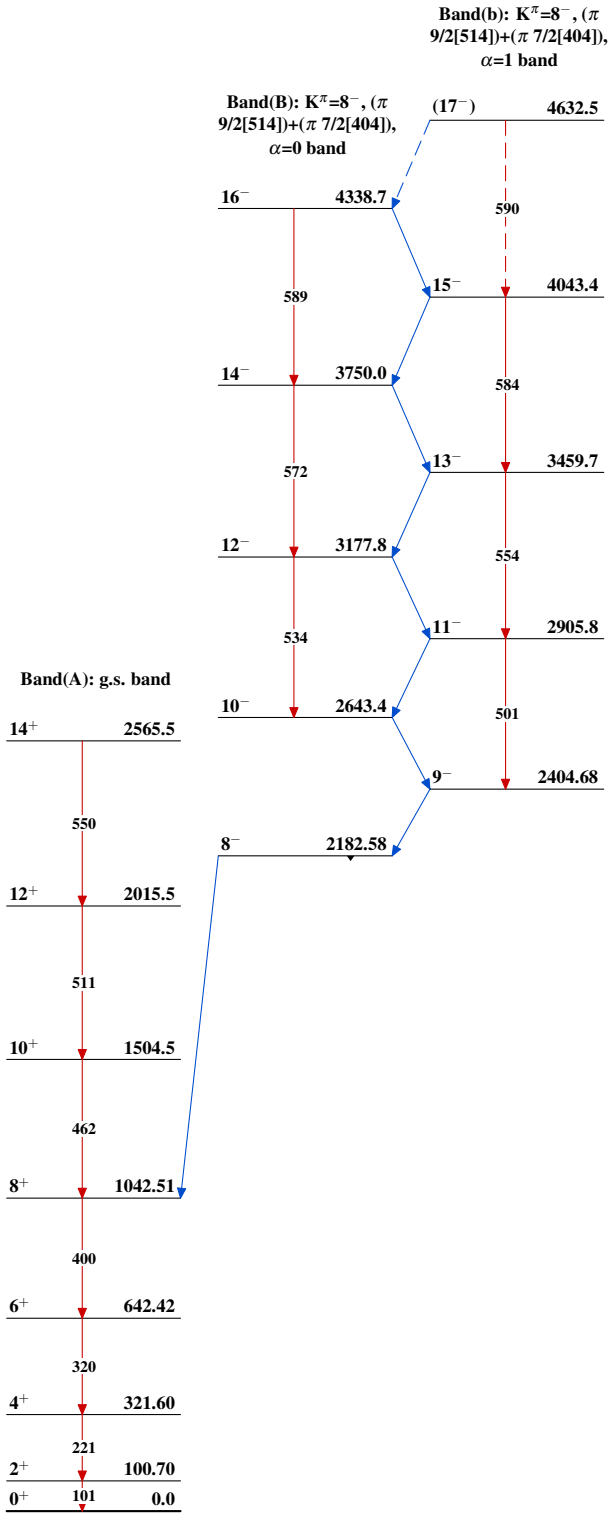

$^{170}_{72}Hf_{98}$