^{179}Lu β^- decay 1976Hi07

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 110, 265 (2009)	15-Nov-2008

Parent: ^{179}Lu: E=0.0; $J^\pi=7/2^+$; $T_{1/2}$=4.59 h *6*; Q(β^-)=1408 *5*; %β^- decay=100.0
Others: 1963St06, 1961Ku10.

^{179}Hf Levels

E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡
0.0#	$9/2^+$	518.43& *15*	$5/2^-$	1073.49 *7*	$7/2^-$
122.73# *6*	$11/2^+$	616.90& *21*	$7/2^-$	1105.91 *9*	$(7/2^+)$
214.33@ *4*	$7/2^-$	870.16a *6*	$7/2^-$	1121.1 *4*	$9/2^+$
337.70@ *4*	$9/2^-$	1003.35b *15*	$5/2^+$	1168.25 *12*	$(9/2^+)$
				1199.50 *14*	$(7/2^+)$

† From least-squares fit to Eγ.
‡ From Adopted Levels.
# Band(A): 9/2[624] band.
@ Band(B): 7/2[514] band.
& Band(C): 5/2[512] band.
a Band(D): 7/2[503] band.
b Band(E): $K^\pi=5/2^+$ g.s. γ-vibrational band.

β^- radiations

E(decay)	E(level)	Iβ−†	Log *ft*	Comments
(209 *5*)	1199.50	0.014 *4*	7.68 *13*	av Eβ=56.8 *15*
(240 *5*)	1168.25	0.010 *3*	8.02 *14*	av Eβ=66.1 *15*
(287 *5*)	1121.1	0.0011 *5*	9.23 *20*	av Eβ=80.5 *16*
(302 *5*)	1105.91	0.039 *11*	7.75 *13*	av Eβ=85.2 *16*
(335 *5*)	1073.49	0.12 *4*	7.41 *15*	av Eβ=95.4 *16*
(405 *5*)	1003.35	0.012 *4*	8.68 *15*	av Eβ=118.0 *17*
(538 *5*)	870.16	0.092 *24*	8.20 *12*	av Eβ=162.9 *18*
(791 *5*)	616.90	0.0023 *9*	10.38 *17*	av Eβ=254.4 *19*
(890 *5*)	518.43	0.0068 *24*	10.09 *16*	av Eβ=291.7 *20*
(1070 *5*)	337.70	1.9 *6*	7.93 *14*	av Eβ=362.2 *20*
1080 *70*	214.33	11 *3*	7.34 *12*	av Eβ=411.6 *21* E(decay): from 1963St06. Measured Iβ−=13% 3 from 1963St06 (scin).
1350 *41*	0.0	87 *3*	6.707 *17*	av Eβ=499.3 *21* E(decay): weighted average of 1350 *50* (1961Ku10) and 1350 *70* (1963St06). Iβ from 1963St06 (scin).

† Absolute intensity per 100 decays.

$\gamma(^{179}Hf)$

Iγ normalization: from Ti(g.s.)=13% 3, based on I(β^- to g.s.)=87% 3 from 1963St06.
1976Hi07: measured Eγ, Iγ, γγ coin. Detectors:Ge(Li).

E_γ[†]	I_γ[†#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[‡]	α[@]	Comments
122.79 *7*	5.4 *10*	122.73	11/2$^+$	0.0	9/2$^+$	M1+E2	−0.27 *3*	2.18 *4*	α(K)=1.77 *3*; α(L)=0.321 *9*; α(M)=0.0737 *21*; α(N+..)=0.0202 *6* α(N)=0.0174 *5*; α(O)=0.00260 *6*; α(P)=0.000149 *3*
123.38 *4*	16.5 *17*	337.70	9/2$^-$	214.33	7/2$^-$	E2		1.582	α(K)=0.600 *9*; α(L)=0.747 *11*; α(M)=0.186 *3*; α(N+..)=0.0487 *7* α(N)=0.0431 *6*; α(O)=0.00550 *8*; α(P)=3.64×10^{-5} *6*
214.33 *4*	420 *40*	214.33	7/2$^-$	0.0	9/2$^+$	E1		0.063 *4*	α(K)=0.0412 *6*; α(L)=0.00637 *9*; α(M)=0.001434 *20*; α(N+..)=0.000389 *6* Mult.: anomalous E1. See ^{179}Hf IT decay (18.67 s). α: experimental value from (n,γ) E=thermal.
215.01 *10*	17 *6*	337.70	9/2$^-$	122.73	11/2$^+$	[E1]		0.0490	α(K)=0.0409 *6*; α(L)=0.00632 *9*; α(M)=0.001422 *20*; α(N+..)=0.000386 *6* α(N)=0.000337 *5*; α(O)=4.96×10^{-5} *7*; α(P)=2.77×10^{-6} *4*
279.2 *2*	0.07 *2*	616.90	7/2$^-$	337.70	9/2$^-$	M1+E2	0.69 *+12−11*	0.185 *10*	α(K)=0.149 *10*; α(L)=0.0274 *6*; α(M)=0.00631 *10*; α(N+..)=0.00173 *3* α(N)=0.001493 *25*; α(O)=0.000221 *5*; α(P)=1.23×10^{-5} *9*
304.03 *15*	0.23 *5*	518.43	5/2$^-$	214.33	7/2$^-$	M1+E2	0.67 *+7−6*	0.147 *5*	α(K)=0.120 *5*; α(L)=0.0213 *4*; α(M)=0.00489 *8*; α(N+..)=0.001338 *23* α(N)=0.001156 *20*; α(O)=0.000172 *4*; α(P)=9.9×10^{-6} *5*
337.67 *5*	6.7 *7*	337.70	9/2$^-$	0.0	9/2$^+$	E1		0.01608	α(K)=0.01349 *19*; α(L)=0.00201 *3*; α(M)=0.000452 *7*; α(N+..)=0.0001234 *18* α(N)=0.0001066 *15*; α(O)=1.592×10^{-5} *23*; α(P)=9.52×10^{-7} *14*
532.51 *20*	0.15 *3*	870.16	7/2$^-$	337.70	9/2$^-$	M1		0.0409	α(K)=0.0342 *5*; α(L)=0.00515 *8*; α(M)=0.001158 *17*; α(N+..)=0.000320 *5* α(N)=0.000275 *4*; α(O)=4.23×10^{-5} *6*; α(P)=2.85×10^{-6} *4*
655.85 *10*	1.00	870.16	7/2$^-$	214.33	7/2$^-$	M1(+E2)		0.017 *7*	α(K)=0.014 *6*; α(L)=0.0023 *8*; α(M)=0.00052 *16*; α(N+..)=0.00014 *5* α(N)=0.00012 *4*; α(O)=1.8×10^{-5} *7*; α(P)=1.1×10^{-6} *6*
680.2 *5*	0.02 *1*	1199.50	(7/2$^+$)	518.43	5/2$^-$				
735.78 *15*	0.62 *10*	1073.49	7/2$^-$	337.70	9/2$^-$	M1+E2	1.1 *+9−4*	0.0119 *23*	α(K)=0.0099 *20*; α(L)=0.00159 *25*; α(M)=0.00036 *6*; α(N+..)=9.9×10^{-5} *16* α(N)=8.6×10^{-5} *13*; α(O)=1.29×10^{-5} *21*; α(P)=8.0×10^{-7} *17*
789.4 *6*	0.008 *5*	1003.35	5/2$^+$	214.33	7/2$^-$	(E1)		0.00256 *4*	α(K)=0.00217 *3*; α(L)=0.000306 *5*; α(M)=6.83×10^{-5} *10*; α(N+..)=1.88×10^{-5} *3* α(N)=1.617×10^{-5} *23*; α(O)=2.46×10^{-6} *4*; α(P)=1.604×10^{-7} *23*

$^{179}_{72}Hf_{107}$-2

^{179}Lu β^- decay 1976Hi07 (continued)

$\gamma(^{179}Hf)$ (continued)

E_γ[†]	I_γ[†#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[‡]	α[@]	Comments
									α(O)=2.46×10^{-6} *4*; α(P)=1.604×10^{-7} *23*
830.37 *20*	0.10 *3*	1168.25	(9/2$^+$)	337.70	9/2$^-$				
859.16 *6*	3.7 *4*	1073.49	7/2$^-$	214.33	7/2$^-$	M1+E2	0.43 *+11−13*	0.0111 *5*	α(K)=0.0093 *5*; α(L)=0.00139 *6*; α(M)=0.000314 *13*; α(N+..)=8.7×10^{-5} *4* α(N)=7.5×10^{-5} *3*; α(O)=1.14×10^{-5} *5*; α(P)=7.6×10^{-7} *4*
870.14 *7*	2.10 *25*	870.16	7/2$^-$	0.0	9/2$^+$	E1		0.00212 *3*	α(K)=0.00180 *3*; α(L)=0.000253 *4*; α(M)=5.63×10^{-5} *8*; α(N+..)=1.551×10^{-5} *22* α(N)=1.334×10^{-5} *19*; α(O)=2.03×10^{-6} *3*; α(P)=1.335×10^{-7} *19*
891.5 *3*	0.08 *2*	1105.91	(7/2$^+$)	214.33	7/2$^-$				
953.9 *3*	0.049 *15*	1168.25	(9/2$^+$)	214.33	7/2$^-$				
983.17 *20*	0.33 *6*	1105.91	(7/2$^+$)	122.73	11/2$^+$				
999.1 *6*	0.010 *5*	1121.1	9/2$^+$	122.73	11/2$^+$	M1+E2	0.9 *+13−6*	0.0064 *17*	α(K)=0.0054 *14*; α(L)=0.00082 *19*; α(M)=0.00018 *4*; α(N+..)=5.1×10^{-5} *12* α(N)=4.4×10^{-5} *10*; α(O)=6.7×10^{-6} *16*; α(P)=4.4×10^{-7} *12*
1003.32 *15*	0.43 *8*	1003.35	5/2$^+$	0.0	9/2$^+$	E2		0.00406 *6*	α(K)=0.00336 *5*; α(L)=0.000546 *8*; α(M)=0.0001239 *18*; α(N+..)=3.40×10^{-5} *5* α(N)=2.93×10^{-5} *5*; α(O)=4.40×10^{-6} *7*; α(P)=2.63×10^{-7} *4*
1045.63 *20*	0.14 *3*	1168.25	(9/2$^+$)	122.73	11/2$^+$				
1073.5[&]	<0.01	1073.49	7/2$^-$	0.0	9/2$^+$				E_γ: not included In Adopted Gammas.
1076.9 *2*	0.30 *6*	1199.50	(7/2$^+$)	122.73	11/2$^+$				
1105.92 *10*	0.99 *10*	1105.91	(7/2$^+$)	0.0	9/2$^+$				
1120.8 *4*	0.03 *1*	1121.1	9/2$^+$	0.0	9/2$^+$	M1+E0		0.00628 *9*	α(K)=0.00528 *8*; α(L)=0.000775 *11*; α(M)=0.0001738 *25*; α(N+..)=4.88×10^{-5} *7* α(N)=4.13×10^{-5} *6*; α(O)=6.37×10^{-6} *9*; α(P)=4.33×10^{-7} *6*; α(IPF)=6.72×10^{-7} *14* α(M1) is given here.
1168.4 *3*	0.051 *15*	1168.25	(9/2$^+$)	0.0	9/2$^+$				
1199.5 *2*	0.18 *4*	1199.50	(7/2$^+$)	0.0	9/2$^+$				

[†] From 1976Hi07.
[‡] From Adopted Gammas.
[#] For absolute intensity per 100 decays, multiply by 0.028 *7*.
[@] 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.
[&] Placement of transition in the level scheme is uncertain.

$^{179}_{72}Hf_{107}$-3

^{179}Lu β^- decay 1976Hi07

Decay Scheme

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

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

$7/2^+$ 0.0 4.59 h *6*

Q_{β^-}=1408 *5* $\%\beta^-$=100

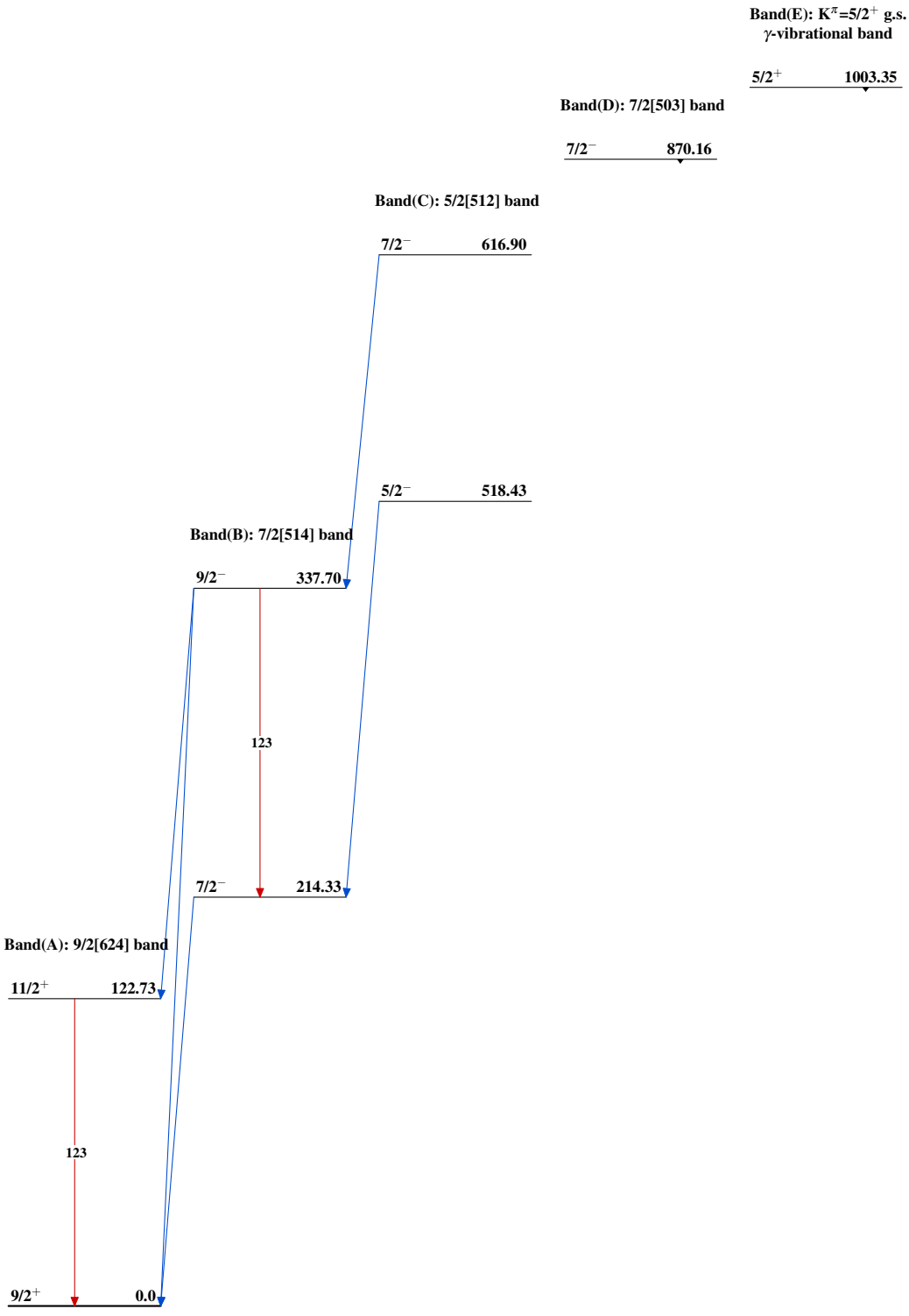
$^{179}_{71}Lu_{108}$

$I\beta^-$	Log *ft*		
0.014	7.68	$(7/2^+)$	1199.50
0.010	8.02	$(9/2^+)$	1168.25
0.0011	9.23	$9/2^+$	1121.1
0.039	7.75	$(7/2^+)$	1105.91
0.12	7.41	$7/2^-$	1073.49
0.012	8.68	$5/2^+$	1003.35
0.092	8.20	$7/2^-$	870.16
0.0023	10.38	$7/2^-$	616.90
0.0068	10.09	$5/2^-$	518.43
1.9	7.93	$9/2^-$	337.70
11	7.34	$7/2^-$	214.33
		$11/2^+$	122.73
87	6.707	$9/2^+$	0.0

1199.5 0.0050; 1076.9 0.008; 680.2 0.0008; 1168.4 0.0014; 1045.63 0.0039; 953.9 0.0014; 830.37 0.0028; 1120.8 M1+E0 0.0008; 999.1 M1+E2 0.00028; 1105.92 0.028; 983.17 0.009; 891.5 0.0025; 1073.5 <0.00028; 859.16 M1+E2 0.10; 735.78 M1+E2 0.018; 1003.32 E2 0.012; 789.4 (E1) 0.00022; 870.14 E1 0.059; 655.85 M1(+E2) 0.028; 532.51 M1 0.0044; 279.2 M1+E2 0.0023; 304.03 M1+E2 0.0074; 337.67 E1 0.19; 215.01 [E1] 0.50; 123.38 E2 1.2; 214.33 E1 13; 122.79 M1+E2 0.48

$^{179}_{72}Hf_{107}$

^{179}Lu β^- decay 1976Hi07



$^{179}_{72}Hf_{107}$