^{178}Lu β^- decay (28.4 min) 1975Ka15,1973Or03

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. Achterberg, O. A. Capurro, G. V. Marti	NDS 110, 1473 (2009)	31-May-2008

Parent: ^{178}Lu: E=0.0; $J^\pi=1^{(+)}$; $T_{1/2}$=28.4 min *2*; Q(β^-)=2101.3 *20*; %β^- decay=100.0

^{178}Lu-Q(β^-) from 2003Au03. $T_{1/2}$ from 1973Or03.

Measured Eγ, Iγ, $\gamma\gamma$ coin, Eβ, Iβ, $\gamma\beta$ coin. Detectors: Ge(Li), scin.

^{178}Hf Levels

E(level)†	J^π	Comments
0.0	0^+	
93.179 *4*	2^+	
306.613 *6*	4^+	
1174.34 *24*	2^+	
1199.3 *3*	0^+	
1260.18 *20*	2^-	
1276.9 *4*	2^+	
1309.91 *7*	1^-	
1322.4 *3*	3^-	
1362.43 *17*	2^-	
1433.98 *20*	0^+	
1443.78 *20*	0^+	
1496.06 *7*	2^+	
1513.66 *12*		Additional information 1. Additional information 2.
1561.41 *15*	2^+	
1566.47 *17*	2^-	
1772.01 *17*	0^+	
1818.2 *3*	2^+	
2021.5? *3*	(0^+)	

† From a least-squares fit to γ-ray energies.

β^- radiations

E(decay)	E(level)	Iβ^-†	Log *ft*	Comments
(283.1 *20*)	1818.2	0.027 *1*	6.834 *20*	av Eβ=79.31 *63*
(329.3 *20*)	1772.01	0.27 *1*	6.046 *19*	av Eβ=93.72 *64*
(534.8 *20*)	1566.47	0.6 *1*	6.39 *8*	av Eβ=161.82 *70*
(539.9 *20*)	1561.41	0.37 *3*	6.62 *4*	av Eβ=163.65 *70*
(587.6 *20*)	1513.66	0.7 *1*	6.46 *7*	av Eβ=180.36 *71*
(605.2 *20*)	1496.06	1.1 *1*	6.31 *4*	av Eβ=186.57 *71*
(657.5 *20*)	1443.78	0.051 *3*	7.77 *3*	av Eβ=205.31 *73*
(667.3 *20*)	1433.98	3.2 *1*	5.994 *15*	av Eβ=208.87 *73*
(738.9 *20*)	1362.43	0.63 *7*	6.85 *5*	av Eβ=234.98 *75*
(778.9 *20*)	1322.4	<0.03	>8.6[1u]	av Eβ=258.24 *72*
(791.4 *20*)	1309.91	1.1 *1*	6.71 *4*	av Eβ=254.54 *75*
(824.4 *21*)	1276.9	0.03 *1*	8.34 *15*	av Eβ=266.96 *77*
(841.1 *20*)	1260.18	0.08 *3*	7.95 *17*	av Eβ=273.28 *77*
(902.0 *20*)	1199.3	0.12 *1*	7.88 *4*	av Eβ=296.51 *78*
(927.0 *20*)	1174.34	0.08 *1*	8.09 *6*	av Eβ=306.12 *78*
(2008.1 *20*)	93.179	29 *15*	6.79 *23*	av Eβ=754.19 *87* E(decay): Eβ=1960 *100* (1967Ta09).
(2101.3 *20*)	0.0	63 *15*	6.53 *11*	av Eβ=794.63 *87*

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^{178}Lu β^- decay (28.4 min) 1975Ka15,1973Or03 (continued)

β^- radiations (continued)

E(decay)	E(level)	Comments
		Eβ=2050 *50*, Iβ(93)/Iβ(g.s.)=0.45 *9* (1975Ka15); Eβ=2050 *100* (1967Ta09); Eβ=2000 *50* (1973Or03).

† Absolute intensity per 100 decays.

γ(^{178}Hf)

Iγ normalization: From Iβ(93)/Iβ(g.s.)=0.45 *9* (1975Ka15) and decay scheme intensity balance at the 93 keV level.

E_γ †	I_γ †&	E_i(level)	J_i^π	E_f	J_f^π	Mult.	δ	α[a]	Comments
93.179 *4*	100 *25*	93.179	2^+	0.0	0^+	E2		4.66	E_γ: Adopted in 1975Ka15 from 1975Mo13.
151.2@ *3*	1.1 *4*	1513.66		1362.43	2^-				
203.8 *2*	5.1 *14*	1513.66		1309.91	1^-				Additional information 3.
204.1@ *2*	1.1 *3*	1566.47	2^-	1362.43	2^-				
213.434 *4*	2 *1*	306.613	4^+	93.179	2^+	E2		0.232	E_γ: Adopted in 1975Ka15 from 1975Mo13.
244.2‡b *3*	0.3 *2*	1566.47	2^-	1322.4	3^-				
256.6 *2*	1.5 *4*	1566.47	2^-	1309.91	1^-	M1+E2	0.58 *17*	0.244 *18*	
x268.9‡b *6*	0.3 *2*								
307‡b *1*	0.6 *4*	1566.47	2^-	1260.18	2^-				
x962.2@ *3*	0.76 *9*								
970.4@ *6*	0.08 *6*	1276.9	2^+	306.613	4^+				
1081.4@ *4*	0.74 *10*	1174.34	2^+	93.179	2^+				
1106.1@ *3*	2.06 *12*	1199.3	0^+	93.179	2^+				
1167.0 *2*	1.9 *2*	1260.18	2^-	93.179	2^+				
1174.2@ *3*	0.59 *7*	1174.34	2^+	0.0	0^+				
1183.7@ *5*	0.30 *6*	1276.9	2^+	93.179	2^+				
1189.3@ *5*	0.43 *7*	1496.06	2^+	306.613	4^+				
1216.8 *2*	3.4 *2*	1309.91	1^-	93.179	2^+				
1229.2@ *3*	0.59 *6*	1322.4	3^-	93.179	2^+				
1254.76 *19*	3.6 *4*	1561.41	2^+	306.613	4^+				
1269.2 *2*	15.5 *6*	1362.43	2^-	93.179	2^+				
1276.6@ *8*	0.07 *4*	1276.9	2^+	0.0	0^+				
1309.9 *5*	19 *4*	1309.91	1^-	0.0	0^+				
1340.8 *2*	57.4 *18*	1433.98	0^+	93.179	2^+				
1350.6 *2*	0.85 *5*	1443.78	0^+	93.179	2^+				
1403.2 *5*	7.9 *21*	1496.06	2^+	93.179	2^+				
1420.5 *2*	2.03 *7*	1513.66		93.179	2^+				
x1436.4# *5*	1.4 *4*								
1468.3 *3*	1.42 *6*	1561.41	2^+	93.179	2^+				
1473.3 *3*	1.62 *6*	1566.47	2^-	93.179	2^+				
1496.1 *5*	4.8 *8*	1496.06	2^+	0.0	0^+				
1513.6 *2*	2.12 *7*	1513.66		0.0	0^+				
1561.4 *3*	1.12 *4*	1561.41	2^+	0.0	0^+				
1678.8 *7*	4.4 *9*	1772.01	0^+	93.179	2^+				

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^{178}Lu β^- decay (28.4 min) 1975Ka15,1973Or03 (continued)

$\gamma(^{178}Hf)$ (continued)

E_γ [†]	I_γ [†&]	E_i(level)	J_i^π	E_f	J_f^π
1725.0 *3*	0.45 *2*	1818.2	2^+	93.179	2^+
1928.3[@] *3*	0.16 *2*	2021.5?	(0^+)	93.179	2^+

[†] Weighted averages of data from 19730r03 and 1975Ka15, unless otherwise specified.
[‡] Observed by 1973Or03 only.
[#] Observed by 1971Gu01 only.
[@] Observed by 1975Ka15 only.
[&] For absolute intensity per 100 decays, multiply by 0.06 *3*.
[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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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
- Coincidence (Uncertain)