

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	E. A. Mccutchan	NDS 126, 151 (2015)	1-Feb-2015

$Q(\beta^-)=3100$ 70; $S(n)=5690$ 70; $S(p)=7430$ SY; $Q(\alpha)=270$ 120 [2012Wa38](#)

$\Delta S(p)=210$ ([2012Wa38](#)).

$S(2n)=12480$ 70; $S(2p)=17140$ syst 410; $Q(\beta^-n)=-4280$ 70 ([2012Wa38](#)).

Other reactions:

$^{181}\text{Ta}(\pi^-,p)$, $^{181}\text{Ta}(\pi^+,p)$: [1976De39](#), [1977Ab09](#), [1977Ja10](#), [1977Ja15](#), [1980Do07](#), [1980Mc03](#), [1981Mc09](#), [1982Br32](#), [1984Fr08](#), [2000De57](#).

Muons on ^{181}Ta : [1978Li11](#), [1980Li16](#).

No evidence for a ^{180}Lu isomer was observed with $T_{1/2}$ between 10 s and 5 min ([1986Le19](#)), $T_{1/2}>100$ s ([1986Ke19](#)), $T_{1/2}<1$ min ([1987Ru040](#)).

For theoretical predictions of isomer energies in ^{180}Lu see: [1990SoZZ](#), [1989Ry04](#), [1986Ke19](#), [1986Le19](#).

[Additional information 1.](#)

α : [Additional information 2.](#)

 ^{180}Lu LevelsCross Reference (XREF) Flags

A ^{180}Yb β^- decay
B $^{180}\text{Hf}(^{238}\text{U}, X\gamma)$

E(level) [†]	J^π	$T_{1/2}$	XREF	Comments
0.0 [#]	5 ⁺	5.7 min 1	AB	$\% \beta^- = 100$ $T_{1/2}$: weighted average of 4.5 min 10 (1960At01), 5.3 min 3 (1971Gu02), 5.8 min 2 (1971Sw01), and 5.7 min 1 (1973KaYQ). Other: 2.5 min 5 (1961Ta08). Configuration= $\pi 9/2[514]\nu 1/2[510]$. J^π : $\log ft \approx 5.2$ and 5.9 to $J^\pi=(4)^+$ and $J^\pi=(5)^+$ levels, respectively, in ^{180}Hf . See comment on 13.9-keV level.
13.9 3	3 ⁻		A	J^π : calculation of quasiparticle states predicts close-lying states of 3 ⁻ and 5 ⁺ . The 375.2-172.9 keV γ cascade from the 562.0 keV ($J^\pi=1^+$) state are the strongest γ 's following ^{180}Yb β -decay, indicating the 13.9-keV level is the 3 ⁻ state. Therefore $J^\pi=5^+$ for the ground state. Configuration $\pi 7/2[404]\nu 1/2[510]$.
102.83 17	(4 ⁺)		A	J^π : (M1+E2) 103 γ to 5 ⁺ , 339 γ from 3 ⁺ .
141.0 [#] 3	(6 ⁺) [‡]		B	
186.8 3	(2,3 ⁺ ,1 ⁻)		A	J^π : 173 γ to 3 ⁻ , 375 γ from 1 ⁺ .
306.0 [#] 3	(7 ⁺) [‡]		B	
442.27 17	3 ⁺		A	J^π : (E2) 120 γ from 1 ⁺ , 442 γ to 5 ⁺ .
453.2 3	2 ⁺		A	J^π : M1(+E2) 109 γ from 1 ⁺ , 439 γ to 3 ⁻ .
496.0 [#] 3	(8 ⁺) [‡]		B	
562.0 3	1 ⁺		A	J^π : $\log ft \approx 5.4$ in ^{180}Yb β^- decay ($J^\pi=0^+$).
624.0 5	(9 ⁻)	≥ 1 ms	B	E(level): $K^\pi=9^-$ isomer. Possible configuration= $\pi 9/2[514]\nu 9/2[624]$. J^π : E1 128 γ to (8 ⁺). $T_{1/2}$: from $^{180}\text{Hf}(^{238}\text{U}, X\gamma)$.
947.8 4	1 ⁺		A	J^π : $\log ft \approx 5.3$ in ^{180}Yb β^- decay ($J^\pi=0^+$).
981.6 4	1 ⁺		A	J^π : $\log ft \approx 4.9$ in ^{180}Yb β^- decay ($J^\pi=0^+$).

[†] From least-squares fit to $E\gamma$'s by evaluator; $\Delta E=0.3$ keV is assumed when not explicitly given.

Adopted Levels, Gammas (continued) ^{180}Lu Levels (continued)

‡ From assumed band structure (2001Wh02).

Band(A): $K^\pi=5^+$ band. Possible configuration= $\pi 9/2[514]\nu 1/2[510]$.

$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult.‡	α	Comments
13.9	3^-	(14)	100	0.0	5^+	[M2]	7.11×10^4	$\alpha(\text{L})=5.32 \times 10^4$ 8; $\alpha(\text{M})=1.406 \times 10^4$ 20; $\alpha(\text{N})=3.36 \times 10^3$ 5; $\alpha(\text{O})=463$ 7; $\alpha(\text{P})=20.5$ 3
102.83	(4^+)	102.8	100	0.0	5^+	(M1+E2)	3.21 20	$\alpha(\text{K})=1.9$ 10; $\alpha(\text{L})=1.0$ 6; $\alpha(\text{M})=0.25$ 15; $\alpha(\text{N})=0.06$ 4; $\alpha(\text{O})=0.007$ 4; $\alpha(\text{P})=0.00013$ 9
141.0	(6^+)	141.2 [#]	100	0.0	5^+			
186.8	$(2,3^+,1^-)$	172.9 2	100	13.9	3^-			Mult.: E1 is favored from intensity balance in ^{180}Yb β^- decay.
306.0	(7^+)	165.3 [#]		141.0	(6^+)			
		306.3 [#]		0.0	5^+			
442.27	3^+	339.4 2	100 13	102.83	(4^+)			
		442.3	13 4	0.0	5^+	[E2]	0.0255	$\alpha(\text{K})=0.0196$ 3; $\alpha(\text{L})=0.00459$ 7; $\alpha(\text{M})=0.001075$ 15; $\alpha(\text{N})=0.000251$ 4; $\alpha(\text{O})=3.42 \times 10^{-5}$ 5
								$\alpha(\text{P})=1.302 \times 10^{-6}$ 19
453.2	2^+	266.4 2	100 27	186.8	$(2,3^+,1^-)$			
		439.3	47 20	13.9	3^-			
496.0	(8^+)	189.6 [#]		306.0	(7^+)			
		355.2 [#]		141.0	(6^+)			
562.0	1^+	108.8 3	11 3	453.2	2^+	M1(+E2)	2.66 24	$\alpha(\text{K})=1.6$ 8; $\alpha(\text{L})=0.8$ 5; $\alpha(\text{M})=0.19$ 11; $\alpha(\text{N})=0.04$ 3; $\alpha(\text{O})=0.006$ 3; $\alpha(\text{P})=0.00011$ 7
		119.7	23 3	442.27	3^+	(E2)	1.698	$\alpha(\text{K})=0.657$ 10; $\alpha(\text{L})=0.794$ 12; $\alpha(\text{M})=0.196$ 3; $\alpha(\text{N})=0.0452$ 7; $\alpha(\text{O})=0.00551$ 8
								$\alpha(\text{P})=3.46 \times 10^{-5}$ 5
		375.2 2	100 14	186.8	$(2,3^+,1^-)$			
624.0	(9^-)	128.0 [#]	100 [#]	496.0	(8^+)	E1	0.183	$\alpha(\text{K})=0.1518$ 22; $\alpha(\text{L})=0.0244$ 4; $\alpha(\text{M})=0.00549$ 8; $\alpha(\text{N})=0.001275$ 18; $\alpha(\text{O})=0.0001769$ 25
								$\alpha(\text{P})=8.46 \times 10^{-6}$ 12
								Mult.: from $\alpha(\text{exp})=0.3$ 1 in $^{180}\text{Hf}(^{238}\text{U},\text{X}\gamma)$.
947.8	1^+	385.8 3	100	562.0	1^+			
981.6	1^+	419.6 3	100	562.0	1^+			

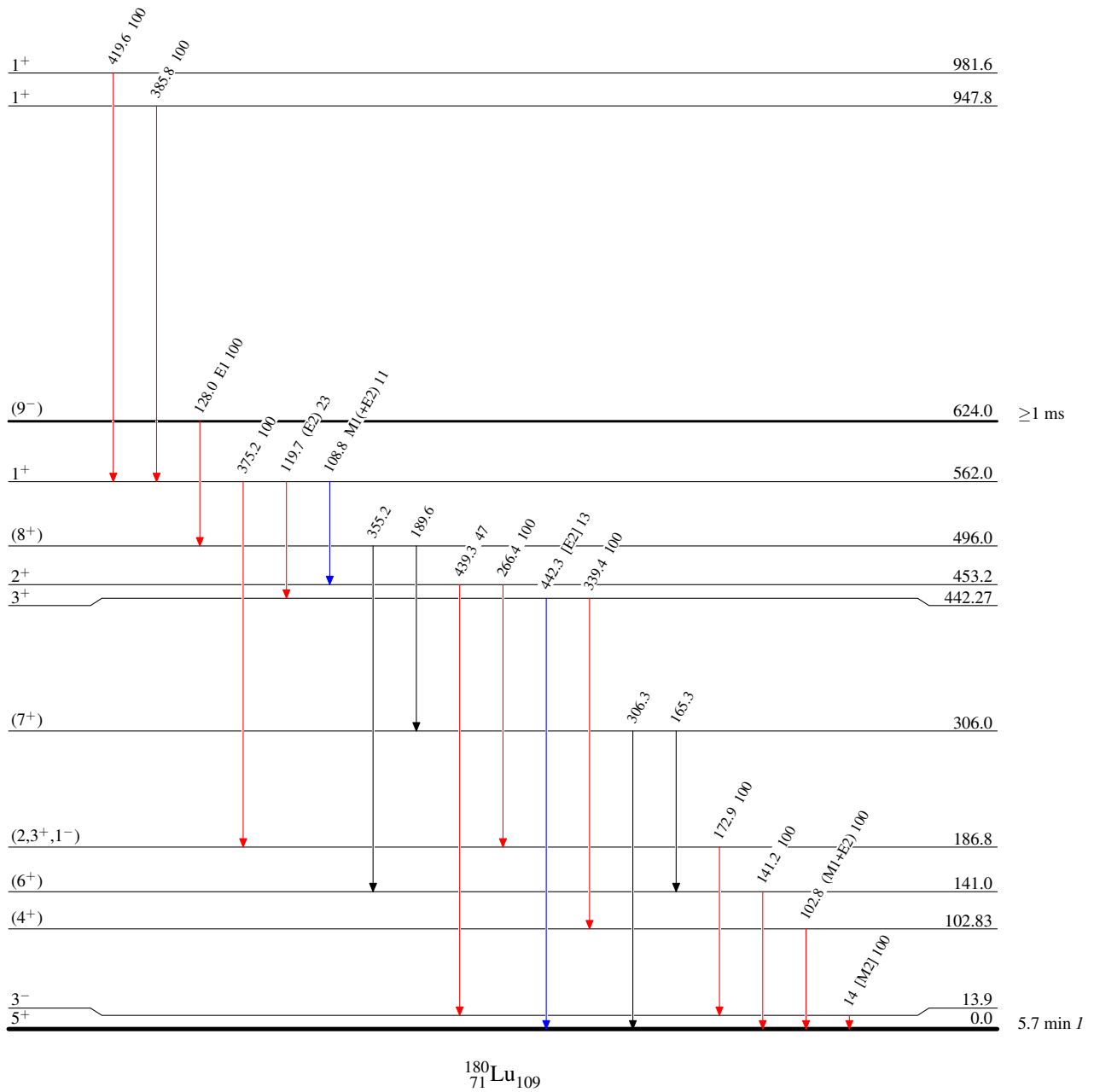
† From ^{180}Yb β^- decay, except as noted.‡ From ce measurements in ^{180}Yb β^- decay, except where noted.# From $^{180}\text{Hf}(^{238}\text{U},\text{X}\gamma)$.

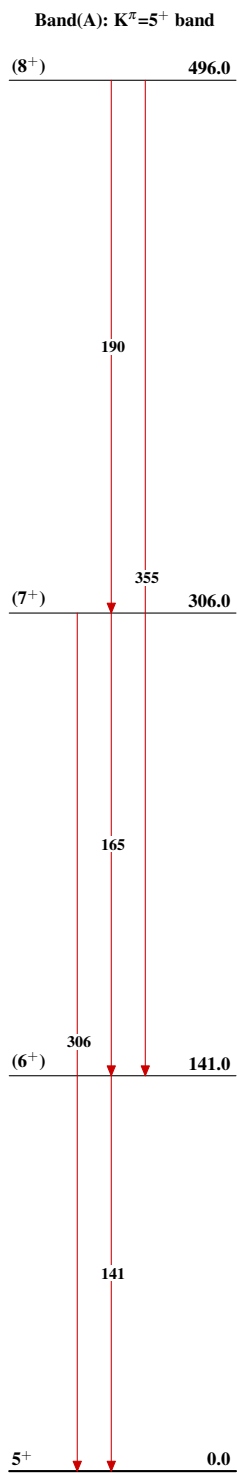
Adopted Levels, Gammas**Level Scheme**

Intensities: Type not specified

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)



Adopted Levels, Gammas $^{180}_{71}\text{Lu}_{109}$