^{230}Pa β^- decay 1994Ac02,1972Va24

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	C. Morse	NDS 197,259 (2024).	26-Sep-2023

Parent: ^{230}Pa: E=0.0; $J^\pi=2^-$; $T_{1/2}$=17.4 d *4*; Q(β^-)=559 *5*; %β^- decay=7.7 *7*
^{230}Pa-Q(β^-): From 2021Wa16.

^{230}U Levels

E(level)†	Jπ‡	$T_{1/2}$	Comments
0.0	0^+	20.23 d *2*	
51.737 *23*	2^+	0.26 ns *3*	$T_{1/2}$: From $\beta\gamma$(t), β(ce 51.7γ)(t) (1960Be25).
169.35 *4*	4^+		
366.654 *18*	1^-		
435.20 *3*	3^-		

† Deduced by evaluator from a least-squares fit to γ-ray energies.
‡ From Adopted Levels.

β^- radiations

E(decay)	E(level)	Iβ−†	Log *ft*	Comments
(124 *5*)	435.20	0.046 *6*	8.92 *9*	av Eβ=32.4 *14*
(192 *5*)	366.654	0.153 *19*	8.99 *8*	av Eβ=51.6 *15*
(507 *5*)	51.737	7.7 *13*	8.63 *9*	av Eβ=148.7 *17*
				E(decay)=509 measured by 1970Lo02 (semi). Other measurements: 1955On07.

† Absolute intensity per 100 decays.

$\gamma(^{230}U)$

Iγ normalization: Decay-scheme normalization as well as β branchings have been deduced by evaluator using relative γ-ray intensities, conversion coefficients, assuming no β^- or ε direct feeding to the g.s. of ^{230}Th and ^{230}U, respectively, and Σ(I$_{\gamma+\varepsilon}$ to g.s.)=100%. No β^- to g.s. was seen by 1970Lo02; Also, log $f^{1u}t$>8.5 yields I(β to g.s.)<18%). See also ^{230}Pa ε decay.

E_γ†	I_γ†@	E_i(level)	J_i^π	E_f	J_f^π	Mult.‡	α#	Comments
51.75 *4*	4.4 *4*	51.737	2^+	0.0	0^+	[E2]	307 *4*	α(L)=223.7 *32*; α(M)=61.9 *9*; α(N)=16.77 *24*; α(O)=3.84 *6*; α(P)=0.623 *9*; α(Q)=0.001583 *23* E_γ: Weighted average of 51.77 keV *5* (1970Lo02) and 51.72 keV *5* (1971Ku25). Other value: 52.4 keV *1* (1972Va24). I_γ: From 1972Va24. Others: 4.8 (1970Lo02), 3.8 (1971Ku25).
(117.8 *2*)	0.30 *5*	169.35	4^+	51.737	2^+	E2	6.43 *10*	Mult.: from L2/L3=0.8 (1958Hi78). α(K)=0.1894 *29*; α(L)=4.55 *7*; α(M)=1.261 *20*; α(N)=0.342 *5*; α(O)=0.0787 *13* α(P)=0.01293 *21*; α(Q)=6.15×10^{-5} *9* γ ray was not observed in ^{230}Pa β^- decay. Eγ and multipolarity are from 1983Ha31, observed in (α,4nγ) reaction. I_γ: From intensity balance at the 169.4-keV level, assuming no β feeding to this level.

Continued on next page (footnotes at end of table)

^{230}Pa β^- decay 1994Ac02,1972Va24 (continued)

$\gamma(^{230}U)$ (continued)

E_γ [†]	I_γ [†@]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [‡]	α [#]	Comments
265.85 *3*	2.1 *2*	435.20	3^-	169.35	4^+	E1	0.0513 *7*	α(K)=0.0407 *6*; α(L)=0.00801 *11*; α(M)=0.001935 *27*; α(N)=0.000517 *7* α(O)=0.0001233 *17*; α(P)=2.261×10^{-5} *32*; α(Q)=1.410×10^{-6} *20* E_γ: Other values: 266.0 keV *5* (1970Lo02), 266.0 keV (1987Ze07). I_γ: Other values: 1.3 (1970Lo02). Iγ=2.1 *3* (1987Ze07), relative to Iγ(315γ)=14.2, renormalized by evaluators.
314.92 *2*	14.2 *7*	366.654	1^-	51.737	2^+	E1	0.0353 *5*	α(K)=0.0281 *4*; α(L)=0.00540 *8*; α(M)=0.001301 *18*; α(N)=0.000348 *5*; α(O)=8.31×10^{-5} *12* α(P)=1.535×10^{-5} *21*; α(Q)=9.93×10^{-7} *14* E_γ: Other value: 315.0 keV *3* (1972Va24).
366.65 *2*	11.5 *6*	366.654	1^-	0.0	0^+	E1	0.0254 *4*	α(K)=0.02038 *29*; α(L)=0.00383 *5*; α(M)=0.000920 *13*; α(N)=0.0002463 *34* α(O)=5.90×10^{-5} *8*; α(P)=1.096×10^{-5} *15*; α(Q)=7.31×10^{-7} *10* E_γ: Other values: 366.56 keV *10* (1970Lo02), 366.8 keV *3* (1972Va24), 366.5 keV *5* (1971Ku25). I_γ: Other value: 11 (1970Lo02).
383.46 *2*	5.6 *3*	435.20	3^-	51.737	2^+	E1	0.02315 *32*	α(K)=0.01857 *26*; α(L)=0.00347 *5*; α(M)=0.000833 *12*; α(N)=0.0002229 *31* α(O)=5.34×10^{-5} *7*; α(P)=9.94×10^{-6} *14*; α(Q)=6.68×10^{-7} *9* E_γ: Other value: 383.6 keV (1987Ze07). I_γ: Other value: 5.4 *4* (1987Ze07), relative to Iγ(315γ)=14.2, renormalized by evaluators. A 369.5-keV γ transition, which observed by 1970Lo02 and placed between the 3^- and the 2^+ states, was absent in the spectra measured by 1987Ze07.

[†] From 1994Ac02, unless otherwise noted. Iγ are relative to Iγ(443.8γ)=1000 (with ^{230}Pa ε decay). Others: 1970Lo02, 1969Br31, 1987Ze07.
[‡] From γ-ray angular correlations and conversion-electron measurements (1994Ac02).
[#] Additional information 1.
[@] For absolute intensity per 100 decays, multiply by 0.0058 *7*.

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Decay Scheme

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