^{230}U α decay

		History	
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Y. A. Akovali	NDS 77,433 (1996)	1-Feb-1996

Parent: ^{230}U: E=0.0; $J^{\pi}=0^+$; $T_{1/2}$=20.8 d *21*; Q(α)=5992.7 *7*; %α decay=100.0
αγ: (230γ)(5663α) 1963Le17.
γγ: see 1976Ku08.
Ag(θ):(α)(230γ)(θ), (α)(72γ)(θ) 1971He19,1954St02.
Ag(t): (α)(ce 72γ)(t) $T_{1/2}$(72 level)=0.395 ns *20* 1960Be25.

^{226}Th Levels

E(level)	Jπ	T$_{1/2}$
0.0[†]	0^+	30.57 min *10*
72.20[†] *4*	2^+	0.395 ns *20*
226.43[†] *5*	4^+	
230.37[‡] *5*	1^-	
307.5[‡] *2*	3^-	
351 *2*		
362 *3*		
447.3[†] *6*	6^+	
450.5[‡] *2*	5^-	
805.2 *4*	(0^+)[#]	
847.8 *4*	(2^+)[#]	

[†] Band(A): $K^{\pi}=0^+$ ground-state band.
[‡] Band(B): $K^{\pi}=0^-$ octupole-vibrational band.
[#] $J^{\pi}=0^+$ and 2^+ were proposed for 805 and 847 levels, respectively, by 1976Ku08 from analogy to K=0 states in neighboring nuclei.

α radiations

The hindrance factor for the s-wave α transition (0^+ to 0^+) was calculated by 1986Da03. See also 1985Ch32 for calculations of reduced α widths.

Eα[†]	E(level)	Iα[‡][a]	HF[#]
(5056[@] *2*)	847.8	≈0.000069[&]	≈19
(5097.1[@] *4*)	805.2	≈0.00030[&]	≈8
(5445.8[@] *9*)	450.5	≈0.00025[&]	≈1200
(5448.7[@] *10*)	447.3	≈0.00007[&]	≈4300
5533 *2*	362	≈0.0001	≈8900
5543 *1*	351	0.00054 *5*	1900
5586.0 *7*	307.5	0.0115 *10*	150
5662.4 *7*	230.37	0.26 *3*	17
5667.0 *7*	226.43	0.38 *4*	12
5817.5 *7*	72.20	32.0 *2*	0.9
5888.4 *7*	0.0	67.4 *4*	1.0

[†] The α energies to the g.s. and to the 72.2 level are given as recommended by 1991Ry01 from measured energies of 1966Ba14 and 1956As38. The Eα′s to all other excited states are from 1966Ba14. The original energies have been increased by 1.5 keV because of changes in calibration energies, as recommended by 1991Ry01. Other measurements: 1956As38, 1963Le17.
[‡] α intensities per 100 ^{230}U α decays. Iα′s are measurements by 1956As38 and 1966Ba14, except where noted.
[#] Requirement of Hf(5888.4α)=1.0 yields r_0(^{226}Th)=1.531 *5*. The half life of ^{230}U was measured to be 20.8 d, however, its uncertainty was not given. The evaluator assumed arbitrarily a 10% error, and $\Delta T_{1/2}$(^{230}U) is taken as 2.1 d in calculating Δr_0.
[@] α was not observed. Eα has been calculated from Eα(0) and the level energy.
[&] Deduced from level scheme.
[a] Absolute intensity per 100 decays.

^{230}U α decay (continued)

γ(^{226}Th)

E_γ[†]	I_γ[‡@]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	α[&]	Comments
72.20 *4*	0.60 *4*	72.20	2^+	0.0	0^+	E2	53.5	α(L)=38.9; α(M)=10.67; α(N+..)=3.94 I_γ: absolute intensity was determined to be Iγ=0.60% *4* by 1969Pe17 ($\alpha\gamma$) and Iγ=0.59% *9* by 1956As38 (renormalized by 1961Ru06). Mult.: α(72γ)=53 *3* was deduced by 1969Pe17 from $\alpha\gamma$ data. See also ^{226}Ac β^- decay.
81.0 *5*	0.00048 *11*	307.5	3^-	226.43	4^+	(E1)	0.208	Mult.: intensity balance at the 307.5-keV level suggests E1 multipolarity for 81.0 and 235.3 γ's.
154.23 *3*	0.125 *7*	226.43	4^+	72.20	2^+	(E2)	1.83	α(K)=0.239; α(L)=1.16; α(M)=0.316; α(N+..)=0.117 Mult.: intensity balance at the 226-keV level suggests E2 for 154γ.
158.18 *3*	0.070 *5*	230.37	1^-	72.20	2^+	E1	0.167	α(K)=0.131; α(L)=0.0273; α(M)=0.00656; α(N+..)=0.00233 Mult.: from ^{226}Ac β^- decay.
221.0 *5*	0.00005 *1*	447.3	6^+	226.43	4^+	[E2]	0.470	
223.9 *3*	0.00024 *6*	450.5	5^-	226.43	4^+	[E1]	0.0729	
230.37 *5*	0.122 *6*	230.37	1^-	0.0	0^+	E1	0.0683	α(K)=0.0543; α(L)=0.0106; α(M)=0.00255; α(N+..)=0.00090 Mult.: from ^{226}Ac β^- decay.
235.3 *1*	0.0117 *8*	307.5	3^-	72.20	2^+	(E1)	0.0651	
539 *1*	0.000035 *15*	847.8	(2^+)	307.5	3^-	[E1]	0.0109	
574.8 *3*	0.00030 *4*	805.2	(0^+)	230.37	1^-	[E1]	0.00964	
617 *1*	0.000040 *20*	847.8	(2^+)	230.37	1^-	[E1]	0.0084	

[†] From 1976Ku08. Other measurements: 1956As38, 1956Sm88, 1970Lo02.

[‡] From 1976Ku08. The original Iγ's have been renormalized by the evaluator to Iγ(72.20γ)=0.60% ^{4,}Asmeasured by 1969Pe17 the authors of 1976Ku08 had normalized their photon intensities to Iγ of its daughter: Iγ(324γ of ^{222}Ra decay)=2.77%.

[#] Multipolarities in square brackets are from the level scheme.

[@] Absolute intensity per 100 decays.

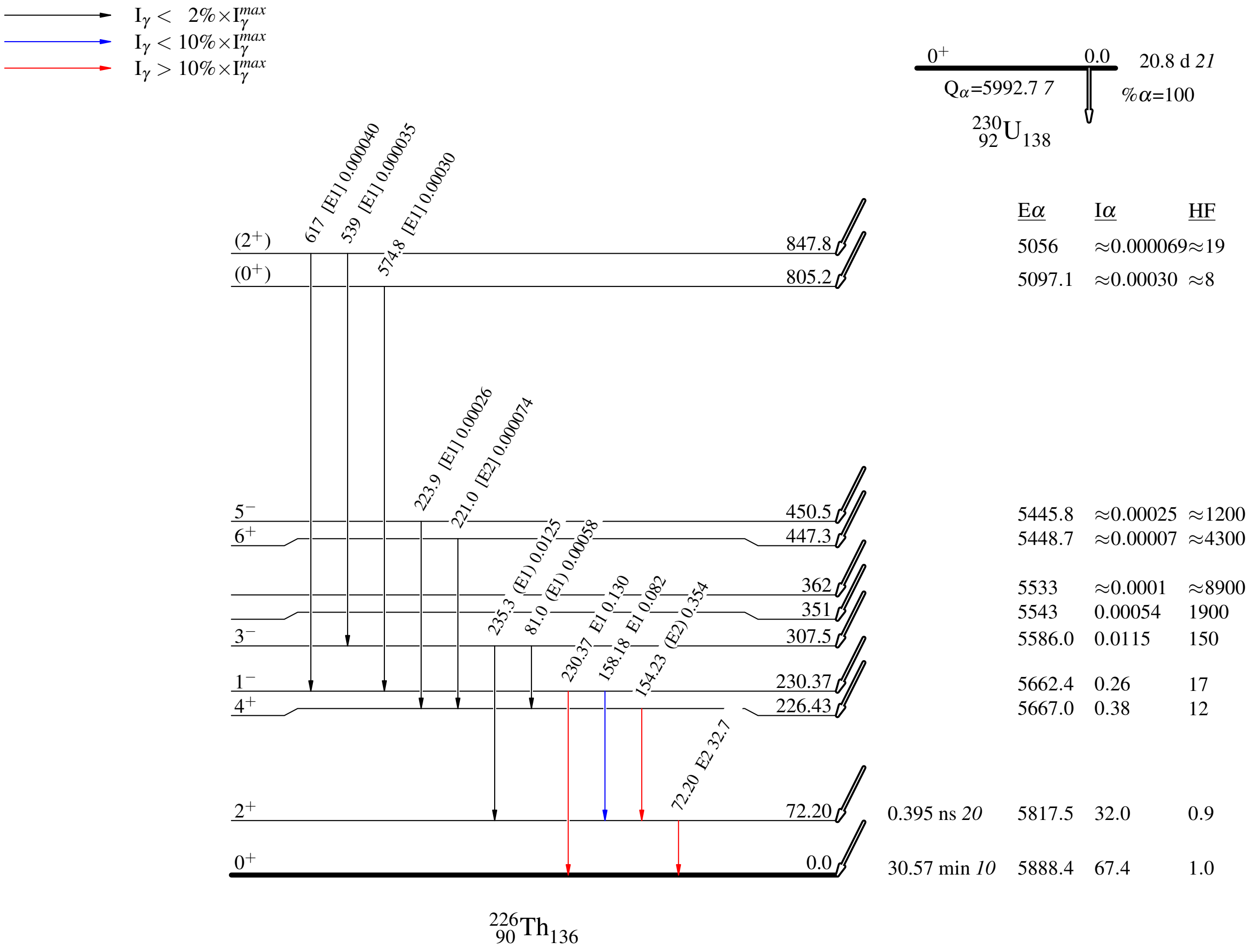
[&] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

^{230}U α decay

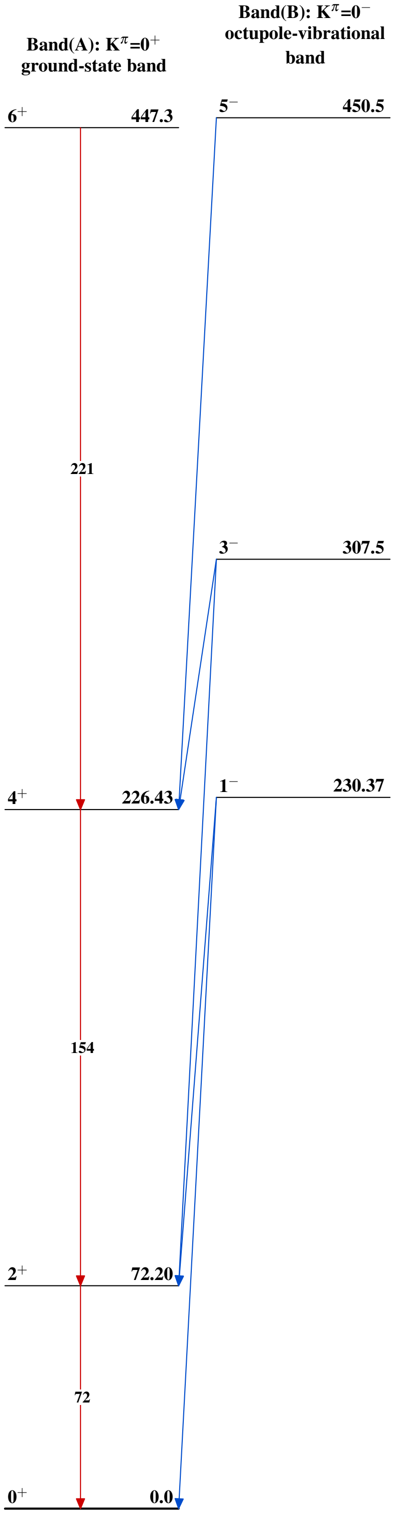
Decay Scheme

Legend

Intensities: $I_{(\gamma+ce)}$ per 100 decays through this branch



^{230}U α decay



$^{226}_{90}$Th$_{136}$