Adopted Levels, Gammas

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

Q(β^-)=−2836 *13*; S(n)=7185 *7*; S(p)=5730 *7*; Q(α)=6450.9 *23* 2012Wa38

Note: Current evaluation has used the following Q record −2834 13 *7187* 8 *5733* 9 *6451.2 10* 1995Au04.

Wave functions and energies of K=0^-,2^+,2^-,3^- and second 0^- octupole-vibrational states were calculated by 1975Iv03. See 1985Bo43, 1983Pi04, 1983Da28 for calculations of K=0^-, 0^+ vibrational states energies for various nuclear potentials; see 1970Ne08 for calculated energies of K=0^-,1^-,2^- and 3^- bands. See 1972Va20 for a noncollective description of a low-lying 0^+ state and its calculated energy.

See 1995De13 and 1995La01 for calculations of the 0^+ and 0^- rotational band energies.

For calculations of equilibrium deformation parameters see, for example, 1970Ga12, 1975Iv03, 1981Gy03, 1982Du16, 1982Le19, 1983Ro14, 1984Na22 and 1985Na07.

For calculations of electric quadrupole and hexadecapole moments see, for example, 1970Ga12, 1975Iv03 and 1983Ro14.

See 1970Ne08 and 1985Bo43 for calculated B(E3; 0^+ to 3^-); 1977Ba45 for calculated B(E3; 0^+ to 3^-) and B(E1; 0^+ to 1^-) values for K=0^- band; 1995La01 for transition matrix elements for 1^- to 0^+, 2^+ to 0^+, 3^- to 1^- and 3^- to 0^+ γ transitions.

The fermion dynamic symmetry model was used by 1992Ch20 to calculate the properties of the predicted superdeformed state. See 1992Ch20 for the calculated potential well, level energies and deformations.

^{226}Th Levels

Cross Reference (XREF) Flags

A ^{230}U α decay
B ^{226}Ac β^- decay
C (HI,xnγ)

E(level)	J$^\pi$[@]	$T_{1/2}$	XREF	Comments
0.0[†]	0^+	30.57 min *10*	ABC	%α=100 $T_{1/2}$: measured by 1987Mi10. Other measurement: 30.9 min (1948St42).
72.20[†] *4*	2^+	0.395 ns *20*	ABC	J$^\pi$: 72.20γ to 0^+ is E2. $T_{1/2}$: by (α)(ce 72γ)(t) in ^{230}U α decay (1960Be25).
226.43[†] *5*	4^+		ABC	J$^\pi$: intensity balance at 226.43-keV level suggests that 154.23γ to 2^+ level is E2; α hindrance factor is consistent with $J^\pi=4^+$ of the g.s. band.
230.37[‡] *5*	1^-		ABC	J$^\pi$: 230.37γ to 0^+ g.s. is E1.
307.5[‡] *2*	3^-		ABC	J$^\pi$: intensity balance at the 307.5 level in ^{230}U α decay suggests that 81.0 and 235.3 γ's to 4^+ and 2^+ levels are E1.
351 *2*			A	
362 *3*			A	
447.3[†] *2*	6^+		A C	J$^\pi$: 220.9γ to 4^+ level of g.s. band; energy fit to the rotational band.
450.5[‡] *2*	5^-		A C	J$^\pi$: γ to 4^+ state; energy fit to the K=0^- band.
657.9[‡] *2*	7^-		C	
721.9[†] *2*	8^+		C	
805.2[#] *4*	(0^+)		AB	J$^\pi$: in analogy to 831.7-keV, 0^+ level in ^{228}Th, 1976Ku08 proposed $J^\pi=0^+$. γ transition to 1^- state, hindrance factor ≈8 for the α transition from ^{230}U and log *ft*=8.9 *1* for the β^- decay J=(1) ^{226}Ac are consistent with this assignment.
847.8[#] *4*	(2^+)		AB	J$^\pi$: log *ft* for β^- decay from J=(1) ^{226}Ac and γ to 3^- level limit J^π to 1^-, 2^+. Intensity ratio of photons deexciting 847.8-keV level is in agreement with the Alaga rule for K=0, J=2.
923.1[‡] *3*	9^-		C	
1040.3[†] *3*	10^+		C	

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Adopted Levels, Gammas (continued)

^{226}Th Levels (continued)

E(level)	J$^{\pi}$ [@]	XREF	E(level)	J$^{\pi}$ [@]	XREF	E(level)	J$^{\pi}$ [@]	XREF
1238.4[‡] *4*	11$^-$	C	1781.5[†] *5*	14$^+$	C	2412.8[‡] *6*	17$^-$	C
1395.2[†] *4*	12$^+$	C	1989.4[‡] *5*	15$^-$	C	2635.1[†] *7*	18$^+$	C
1596.0[‡] *5*	13$^-$	C	2195.8[†] *6*	16$^+$	C	2861.1[‡] *7*	19$^-$	C
						3097.1[†] *8*	20$^+$	C

[†] Band(A): K$^{\pi}$=0$^+$ ground-state band.
[‡] Band(B): K$^{\pi}$=0$^-$ octupole-vibrational band.
[#] Band(C): K$^{\pi}$=0$^+$ β-vibrational band.
[@] Assignments for J≥8 and J≥7 members of the g.s. and the octupole-vibrational bands, respectively, are based on (HI,xnγ) data.

γ(^{226}Th)

E$_i$(level)	J$_i^{\pi}$	E$_{\gamma}$[†]	I$_{\gamma}$[#]	E$_f$	J$_f^{\pi}$	Mult.[‡]	α[&]	Comments
72.20	2$^+$	72.20 *4*	100[@]	0.0	0$^+$	E2	53.5	B(E2)(W.u.)=164 *10*
226.43	4$^+$	154.23 *3*	100[@]	72.20	2$^+$	(E2)	1.83	
230.37	1$^-$	158.18 *3*	60 *5*	72.20	2$^+$	E1	0.167	
		230.37 *5*	100 *5*	0.0	0$^+$	E1	0.0683	
307.5	3$^-$	81.0 *5*	4.1 *10*	226.43	4$^+$			
		235.3 *1*	100 *7*	72.20	2$^+$			
447.3	6$^+$	220.9 *1*	100[@]	226.43	4$^+$	[E2]	0.461	
450.5	5$^-$	224.1 *2*	100[@]	226.43	4$^+$	[E1]	0.0723	
657.9	7$^-$	207.4 *1*		450.5	5$^-$			
		210.7 *1*		447.3	6$^+$			
721.9	8$^+$	63.9 *1*	0.13 *5*	657.9	7$^-$			
		274.6 *1*	1.0	447.3	6$^+$			
805.2	(0$^+$)	574.8 *3*		230.37	1$^-$			
847.8	(2$^+$)	540.4 *3*	100 *20*	307.5	3$^-$			
		617.4 *4*	90 *20*	230.37	1$^-$			
923.1	9$^-$	201.3 *1*	400 *40*	721.9	8$^+$			
		265.2 *1*	100	657.9	7$^-$			
1040.3	10$^+$	116.9 *2*	27.6 *21*	923.1	9$^-$			
		318.4 *2*	100	721.9	8$^+$			
1238.4	11$^-$	198.2 *2*	161 *12*	1040.3	10$^+$			
		315.2 *2*	100	923.1	9$^-$			
1395.2	12$^+$	156.7 *2*	42 *3*	1238.4	11$^-$			
		354.9 *2*	100	1040.3	10$^+$			
1596.0	13$^-$	200.9 *2*		1395.2	12$^+$			
		357.6 *2*		1238.4	11$^-$			
1781.5	14$^+$	185.5 *2*	40 *4*	1596.0	13$^-$			
		386.3 *2*	100	1395.2	12$^+$			
1989.4	15$^-$	208.0 *2*	61 *10*	1781.5	14$^+$			
		393.4 *2*	100	1596.0	13$^-$			
2195.8	16$^+$	206.3 *3*		1989.4	15$^-$			
		414.3 *3*		1781.5	14$^+$			
2412.8	17$^-$	216.9 *3*	43 *7*	2195.8	16$^+$			
		423.5 *3*	100	1989.4	15$^-$			
2635.1	18$^+$	439.3 *3*		2195.8	16$^+$			
2861.1	19$^-$	226.0 *3*	42 *10*	2635.1	18$^+$			
		448.3 *3*	100	2412.8	17$^-$			
3097.1	20$^+$	462.0 *3*		2635.1	18$^+$			

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Adopted Levels, Gammas (continued)

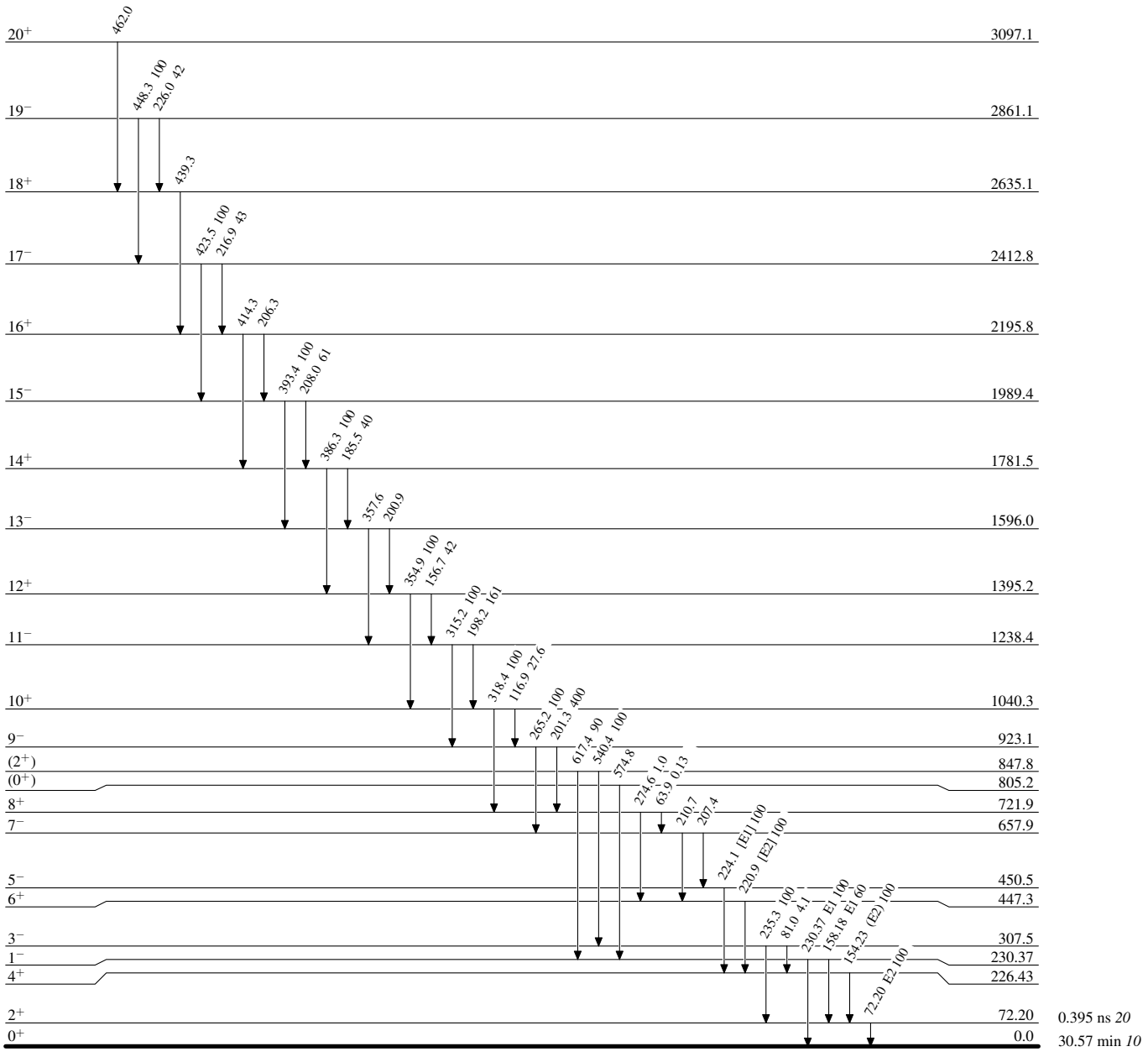
$\gamma(^{226}Th)$ (continued)

† From ^{230}U α decay and ^{226}Ac β^- decay.
‡ From ce measurements in ^{226}Ac β^- decay.
# Relative photon intensity from each level.
@ Set to 100 (β. Singh).
& 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.

Adopted Levels, Gammas

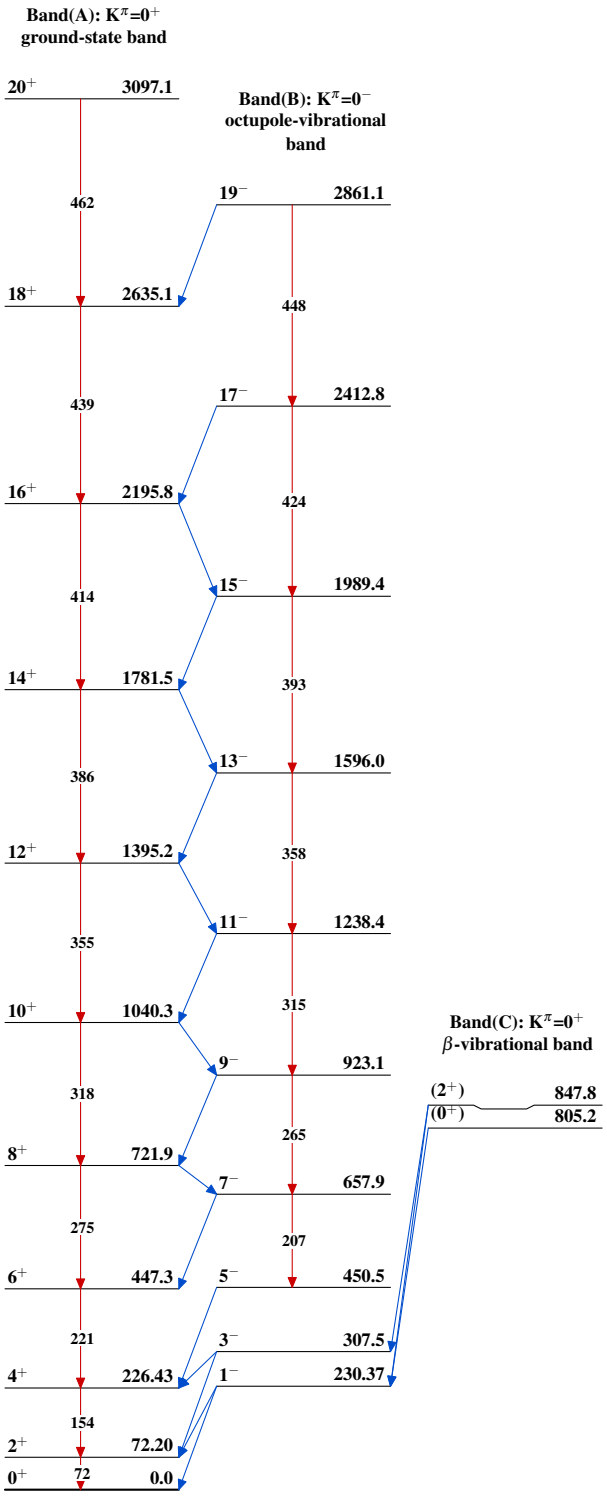
Level Scheme

Intensities: Relative photon branching from each level



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

Adopted Levels, Gammas



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