^{227}U α decay **1991Ho05**

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	E. Browne	NDS 93, 846 (2001)	1-May-2001

Parent: ^{227}U: E=0.0; J^π=(3/2$^+$); $T_{1/2}$=1.1 min *1*; Q(α)=7211 *14*; %α decay=100.0

Additional information 1.

^{227}U activity was produced by ^{208}Pb(^{22}Ne,3n), E=110 Mev, and identified by Th K x ray and by the expected reaction cross section. Others: ^{231}Pa(p,5n), E=34-54 MeV, activity identified by excitation functions (1969Ha32); ^{232}Th(α,9n), E=150 MeV, activity identified by chemical separation of U, reaction yields, and systematics of α-particle energies (1952Me13). Measured Eγ, Iγ, $\alpha\gamma$ coin, (α)(ce) coin, Eα, Iα. Deduced γ-ray multipolarities. Detectors: high-purity germanium, Si(Li), surface barrier Si.

^{223}Th Levels

E(level)†	J^π‡	$T_{1/2}$
0.0	(5/2)$^+$	0.60 s *2*
51.3 *5*	(7/2)$^+$	
209 *1*	(7/2)$^+$	
247 *1*	(3/2)$^+$	
310 *1*	(5/2)$^+$	

† Deduced by evaluator from γ-ray energies using 1-keV uncertainties for values reported by 1991Ho05.

‡ Spin and parity assignments are based on γ-ray multipolarities, and on the similarity of the level structure, γ-ray decay pattern, and relative α-decay hindrance factors in the isotone ^{221}Ra.

α radiations

Eα	E(level)	Iα‡	HF†	Comments
6740 *50*	310	16 *4*	1.1	Iα: Iα=14 *4*, from γ-ray transition intensity balance.
6860 *30*	247	50 *6*	0.64	Eα: other values: 6870 keV *20*, semi (1969Ha32); 6800 keV *100*, ion chamber (1952Me13). Iα: Iα=51 *7*, from γ-ray transition intensity balance.
6905 *60*	209	14 *3*	3.2	Iα: Iα=18 *5*, from γ-ray transition intensity balance.
7060 *60*	51.3	≈20		Eα: deduced by evaluator from Eα=6905 keV *60* to 209 level. Iα: includes intensity to g.s.

† Using r_0(^{223}Th)=1.523, average of r_0(^{222}Th)=1.522 *22* and r_0(^{224}Th)=1.524 *9* (1998Ak04). 1991Ho05 used r_0=1.552, therefore their hindrance factors differ from those presented here.

‡ Absolute intensity per 100 decays.

γ(^{223}Th)

Iγ normalization: from Σ I(γ+ce) (g.s. + 51 level)=80% 10, with Iα(g.s. + 51 level)≈20%.

E_γ	I_γ†	E_i(level)	J^π_i	E_f	J^π_f	Mult.	δ	α‡	Comments
51.3 *5*		51.3	(7/2)$^+$	0.0	(5/2)$^+$	M1+E2	0.214 *10*	39.2 *10*	α(L)= 29.2 *7*; α(M)= 7.32 *18*; α(N+..)= 2.69 *7* E$_\gamma$,Mult.,δ: from adopted gammas.
158	14 *5*	209	(7/2)$^+$	51.3	(7/2)$^+$	M1+E2	1.3 +7−4	3.0 *4*	α(K)= 1.7 *5*; α(L)= 0.96 *11*; α(M)= 0.25 *3*; α(N+..)= 0.093 *4* Mult.,δ: from α(K)exp=1.72 *66*.

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^{227}U α decay 1991Ho05 (continued)

γ(^{223}Th) (continued)

E_γ	I_γ †	E_i(level)	J^π_i	E_f	J^π_f	Mult.	δ	α ‡	Comments
209	14 *5*	209	(7/2)$^+$	0.0	(5/2)$^+$	M1+E2	1.3 +*14*−*5*	1.27 *25*	α(K)= 0.82 *24*; α(L)= 0.33 *5*; α(M)= 0.086 *11*; α(N+..)= 0.0316 *8* Mult.,δ: from α(K)exp=0.80 *44*. α(L)exp=0.69 *28*.
247	100 *13*	247	(3/2)$^+$	0.0	(5/2)$^+$	M1		1.53	α(K)= 1.22; α(L)= 0.231; α(M)= 0.0555; α(N+..)= 0.0202 Mult.: from α(K)exp=1.24 *28*, α(L)exp=0.297 *74*, α(M)exp=0.074 *28*.
259	15 *6*	310	(5/2)$^+$	51.3	(7/2)$^+$	(M1)		1.34	α(K)= 1.07; α(L)= 0.202; α(M)= 0.0487; α(N+..)= 0.0177 Mult.: from α(K)exp=1.58 *75*. α(L)exp=0.46 *28*.
310	18 *6*	310	(5/2)$^+$	0.0	(5/2)$^+$	M1		0.815	α(K)= 0.652; α(L)= 0.123; α(M)= 0.0295; α(N+..)= 0.0107 Mult.: from α(K)exp=0.65 *24*, α(L)exp=0.092 *46*.

† For absolute intensity per 100 decays, multiply by 0.20 *3*.

‡ 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.

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Decay Scheme