^{215}Th α decay 2005Ku31,2000He17,1968Va18

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	D. Abriola, P. Demetriou, M. Hassanvand, M. Hussain	NDS 114, 661 (2013)	28-Feb-2013

Parent: ^{215}Th: E=0.0; J^π=(1/2$^-$); $T_{1/2}$=1.2 s *2*; Q(α)=7665 *4*; %α decay=100.0

^{215}Th-Q(α): From 2012Wa38. From average Eα of α feeding g.s. of ^{211}Ra evaluators obtain the same value.

^{215}Th-%α decay: %α=100 from Adopted Levels of ^{215}Th in ENSDF database.

2005Ku31: ^{215}Th recoils from the ^{170}Er(^{50}Ti,5n) reaction were separated from the beam using a velocity filter SHIP at GSI and implanted into a position-sensitive 16-strip PIPS semiconductor detector. Measured (recoil)-γ-α-γ coincidences-correlations and γ-rays. Ge-Clover detector was used for γ measurements. Measured Eα, Eγ, Iγ.

2000He17: ^{215}Th recoils from the ^{170}Er(^{51}V,p5n) reaction were separated from the beam using a velocity filter and implanted into a position-sensitive semiconductor detector. Measured Eα, Eγ, α-γ coin. Detector: Ge for γ rays.

1973Mi03: ^{215}Th recoils from the ^{182}W(^{35}Cl,pn) reaction were separated with the JAERI recoil separator and implanted into a PSSD. Measured Eα, $T_{1/2}$.

1968Va18: Activity produced by ^{206}Pb(^{16}O,7n). Measured Eα, Iα. Semiconductor detector.

^{211}Ra Levels

E(level)†	J^π†	$T_{1/2}$†
0.0	5/2$^{(-)}$	13 s *2*
133.86 *10*	(1/2$^-$)	
194.54 *13*	(3/2$^-$)	
295.1 *3*	(3/2$^-$)	

† From Adopted Levels.

α radiations

Eα†	E(level)	Iα‡@	HF#	Comments
7236 *7*	295.1	1.0 *4*	28 *13*	α decay measured only by 2005Ku31.
7334 *4*	194.54	7.9 *30*	8 *4*	2005Ku31 were unable to measure Iα but determined that Iα>6.
7392 *3*	133.86	51.5 *30*	1.9 *4*	2005Ku31 were unable to measure Iα but determined that Iα>41.
7522 *4*	0.0	39.6 *30*	7.1 *14*	Eα: weighted average of values from 1968Va18, 1997Mi03, 2000He17, and 2005Ku31. 2005Ku31 were unable to measure Iα but determined that Iα<52.

† From weighted average of values from 2005Ku31, 2000He17, 1968Va18, unless otherwise stated.

‡ From 1968Va18, unless otherwise stated.

Using r_0(^{211}Ra)=1.479 *11*; interpolated value deduced from r_0(^{212}Ra)=1.466 *6* and r_0(^{210}Ra)=1.492 *16* (1998Ak04).

@ Absolute intensity per 100 decays.

γ(^{211}Ra)

α(exp): determined from ratio of observed α-γ coincidences and calculated ones for a given α line (2005Ku31).

E_γ†	I_γ#	E_i(level)	J^π_i	E_f	J^π_f	Mult.‡	α@	$I_{(\gamma+ce)}$#	Comments
60.9 *3*	1.5 *4*	194.54	(3/2$^-$)	133.86	(1/2$^-$)	(M1,E2)	57 *44*	87 *23*	α(L)=47 *37*; α(M)=11 *9*; α(N)=3.0 *24*; α(O)=0.6 *5*; α(P)=0.09 *7*; α(Q)=0.0012 *8*; α(N+..)=4 *3* γ observed only by 2005Ku31. I_γ: from Iγ(60.9)/Iγ(194.5)=11 *4*/100 *6*.

Continued on next page (footnotes at end of table)

^{215}Th α decay 2005Ku31,2000He17,1968Va18 (continued)

γ(^{211}Ra) (continued)

E_γ[†]	I_γ[#]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[‡]	α[@]	$I_{(\gamma+ce)}$[#]	Comments
133.88 *10*	100 *3*	133.86	(1/2⁻)	0.0	5/2$^{(-)}$	E2	2.78	378 *11*	α(exp)=2.5 *5* α(K)=0.296 *5*; α(L)=1.82 *3*; α(M)=0.496 *8*; α(N)=0.1310 *19*; α(O)=0.0279 *4*; α(P)=0.00407 *6* α(Q)=2.20×10^{-5} *4*; α(N+..)=0.1630 *24* I(K X ray)=77 *7* relative to Iγ(133.9)=100 *3*.
194.49 *14*	14 *2*	194.54	(3/2⁻)	0.0	5/2$^{(-)}$	M1	2.37	47 *7*	α(exp)=3.8 *17* α(K)=1.90 *3*; α(L)=0.352 *5*; α(M)=0.0840 *12*; α(N)=0.0222 *4*; α(O)=0.00506 *8* α(P)=0.000881 *13*; α(Q)=6.91×10^{-5} *10*; α(N+..)=0.0282 *4*
295.1 *3*	1.2 *4*	295.1	(3/2⁻)	0.0	5/2$^{(-)}$	(M1)	0.742	2.1 *7*	α(exp)=1.0 *5* α(K)=0.597 *9*; α(L)=0.1096 *16*; α(M)=0.0262 *4*; α(N)=0.00690 *10*; α(O)=0.001574 *23* α(P)=0.000275 *4*; α(Q)=2.15×10^{-5} *3*; α(N+..)=0.00877 *13* γ observed only by 2005Ku31. Mult.: from comparison of α(exp) with α(M1,theory)=0.742 and α^{E3}(theo)=1.1, M1 and E3 are possible; Weisskopf half-life estimates for M1 $T_{1/2}$=8.57×10^{-7} μs *7* and E3 $T_{1/2}$=2.36 ms *4* rule out E3 since γ ray is observed to be prompt according to 2005Ku31.

† From weighted average of values from 2005Ku31 and 2000He17, unless otherwise stated.

‡ From comparison of α(exp) and α from BrIcc.

For absolute intensity per 100 decays, multiply by 0.1404.

@ 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