

**<sup>216</sup>Th IT decay (0.74 μs) 2001Ha46,2005Ku31**

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	C. Morse	NDS 209,409 (2026)	5-Aug-2025

Parent: <sup>216</sup>Th: E=3680.4 7; J<sup>π</sup>=(14<sup>+</sup>); T<sub>1/2</sub>=0.74 μs 7; %IT decay=100

**2001Ha46:** <sup>216</sup>Th produced in two experiments at the Accelerator Laboratory of the University of Jyväskylä. The reactions used were <sup>180</sup>Hf(<sup>40</sup>Ar,4n) at 185 MeV beam energy and <sup>172</sup>Yb(<sup>48</sup>Ca,4n) at 217 MeV. Fusion-evaporation residues were identified at the focal plane of RITU by the recoil-decay technique according to their characteristic α decays. Measured prompt γ rays at the target position using JURO-SPHERE II and delayed γ rays using five Compton-suppressed Ge detectors at the focal plane of RITU.

**2005Ku31:** <sup>216</sup>Th produced via the <sup>170</sup>Er(<sup>50</sup>Ti,4n) reaction at GSI. Evaporation residues were separated by SHIP and implanted into a position-sensitive PIPS detector. Evaporation residues were identified using the recoil-decay technique and delayed γ rays measured with a HPGe clover detector placed behind the silicon detector.

<sup>216</sup>Th Levels

E(level) <sup>†</sup>	J <sup>π</sup> <sup>‡</sup>	T <sub>1/2</sub>	Comments
2039 7	(8 <sup>+</sup> )		configuration=h <sub>9/2</sub> f <sub>7/2</sub> (2005Ku31).
2129.50 23	(8 <sup>+</sup> )		configuration=h <sub>9/2</sub> <sup>2</sup> (2005Ku31).
2645.80 10	(11 <sup>-</sup> )	580 ns 26	configuration=h <sub>9/2</sub> i <sub>13/2</sub> (2001Ha46). T <sub>1/2</sub> : Weighted average of 570 ns 30 and 615 ns 55 (2001Ha46).
3529.2 4	(12 <sup>+</sup> )		
3680.4 7	(14 <sup>+</sup> )	0.74 μs 7	T <sub>1/2</sub> : From 2005Ku31. Other: >130 ns (2001Ha46).

<sup>†</sup> From a least-squares fit to E<sub>γ</sub>. The uncertainty in the (8<sup>+</sup>) level energy is determined from α-decay; the uncertainty in the level energies above the (8<sup>+</sup>) level is due only to the γ-ray energies without propagating the uncertainty in the (8<sup>+</sup>) energy.

<sup>‡</sup> From Adopted Levels.

γ(<sup>216</sup>Th)

E <sub>γ</sub> <sup>†</sup>	I <sub>γ</sub> <sup>†</sup>	E <sub>i</sub> (level)	J <sub>i</sub> <sup>π</sup>	E <sub>f</sub>	J <sub>f</sub> <sup>π</sup>	Mult. <sup>#</sup>	α <sup>@</sup>	Comments
(90.5)		2129.50	(8 <sup>+</sup> )	2039	(8 <sup>+</sup> )			E <sub>γ</sub> : Deduced from level energies, as this transition is not observed.
151.2 6		3680.4	(14 <sup>+</sup> )	3529.2	(12 <sup>+</sup> )	(E2)	1.94 4	α(K)=0.2396 35; α(L)=1.244 28; α(M)=0.341 8; α(N)=0.0914 21; α(O)=0.0204 5 α(P)=0.00342 8; α(Q)=2.63×10 <sup>-5</sup> 5
<sup>x</sup> 466 <sup>‡</sup>		2645.80	(11 <sup>-</sup> )	2129.50	(8 <sup>+</sup> )	(E3)	0.1428 20	α(K)=0.0631 9; α(L)=0.0585 8; α(M)=0.01585 22; α(N)=0.00427 6; α(O)=0.000972 14 α(P)=0.0001708 24; α(Q)=5.44×10 <sup>-6</sup> 8
<sup>x</sup> 517 <sup>‡</sup>		2645.80	(11 <sup>-</sup> )	2039	(8 <sup>+</sup> )	(E3)	0.0876 12	α(K)=0.0454 6; α(L)=0.0310 4; α(M)=0.00831 12; α(N)=0.002235 31; α(O)=0.000511 7 α(P)=9.08×10 <sup>-5</sup> 13; α(Q)=3.51×10 <sup>-6</sup> 5
883.4 3	5 1	3529.2	(12 <sup>+</sup> )	2645.80	(11 <sup>-</sup> )	(E1)	0.00431 6	α(K)=0.00353 5; α(L)=0.000588 8; α(M)=0.0001391 19; α(N)=3.69×10 <sup>-5</sup> 5; α(O)=8.68×10 <sup>-6</sup> 12 α(P)=1.668×10 <sup>-6</sup> 23; α(Q)=1.515×10 <sup>-7</sup> 21

<sup>†</sup> From 2005Ku31, unless noted otherwise.

<sup>‡</sup> Reported in 2001Ha46; not observed in 2005Ku31. An additional 665-keV γ ray is seen in prompt spectroscopy.

<sup>#</sup> From Adopted Gammas.

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$^{216}\text{Th}$  IT decay (0.74  $\mu\text{s}$ ) 2001Ha46,2005Ku31 (continued) $\gamma(^{216}\text{Th})$  (continued)

@ [Additional information 1.](#)

<sup>x</sup>  $\gamma$  ray not placed in level scheme.

 $^{216}\text{Th}$  IT decay (0.74  $\mu\text{s}$ ) 2001Ha46,2005Ku31