

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	B. Singh	NDS 114, 2023 (2013)	23-Sep-2013

$Q(\beta^-)=-6950$  70;  $S(n)=7862$  18;  $S(p)=2812$  18;  $Q(\alpha)=7665$  4 [2012Wa38](#)  
 $S(2n)=17340$  70,  $S(2p)=4014$  22,  $Q(\epsilon p)=3540$  10 ([2012Wa38](#)).

$^{215}\text{Th}$  evaluated by **B. Singh**.

[1968Va18](#): activity was produced by  $^{206}\text{Pb}(^{16}\text{O},7n)$ ,  $E=90$ -160 MeV, and identified by excitation functions, genetic relationship to daughter nuclei, and agreement with  $\alpha$ -particle energy decay systematics.

[Additional information 1](#).

[2000He17](#): activity was produced by  $^{170}\text{Er}(^{51}\text{V},\text{P5N})$ ,  $E=214$ -286 MeV, and separated from the beam with a velocity filter. The activity was identified by excitation functions, and by its genetic relationship to daughter nuclei. Measured  $E\alpha$ ,  $\alpha\gamma$  coin. Detectors: Ge, Si.

[2007Le14](#):  $^{215}\text{Th}$  produced in  $^{182}\text{W}(^{40}\text{Ar},\text{X})$ ,  $E=191,197$  MeV at JYFL, Jyvaskyla facility, RITU separator, GREAT spectrometer for particle detection. Measured  $\alpha$ -particle spectrum and half-life.

 $^{215}\text{Th}$  LevelsCross Reference (XREF) Flags

- A**  $^{219}\text{U}$   $\alpha$  decay (42  $\mu\text{s}$ )
- B**  $^{170}\text{Er}(^{50}\text{Ti},5n\gamma)$

E(level)	$J^\pi$	$T_{1/2}$	XREF	Comments
0.0	(1/2 <sup>-</sup> )	1.2 s 2	<b>AB</b>	$\% \alpha=100$ No $\epsilon$ decay observed (<1.5% in <a href="#">1968Va18</a> ). $T_{1/2}$ : from <a href="#">1968Va18</a> . Other: 0.63 s +126-21 ( <a href="#">2007Le14</a> ). $J^\pi$ : from $\alpha$ -decay systematics of $N=125$ , $J^\pi=1/2^-$ isotones $^{209}\text{Po}$ , $^{211}\text{Rn}$ , and $^{213}\text{Ra}$ . These nuclei strongly populate a 5/2 <sup>-</sup> g.s., and, 1/2 <sup>-</sup> and 3/2 <sup>-</sup> excited states. The hindrance factors for $^{215}\text{Th}$ $\alpha$ decay are: 7.0 (5/2 <sup>-</sup> ), 2.0 (1/2 <sup>-</sup> ), and 7.8 (3/2 <sup>-</sup> ), using $r_0(^{211}\text{Ra})=1.479$ , from adjacent even-even nuclei. Expected shell-model configuration= $\pi p_{1/2}$ .
560.8 2	(5/2 <sup>-</sup> )		<b>B</b>	$J^\pi$ : from systematics of neighboring nuclides ( <a href="#">2005Ku31</a> ).
1421.3 <sup>†</sup> 3	<sup>†</sup>		<b>B</b>	
1421.3+x? <sup>†</sup>	<sup>†</sup>	0.77 $\mu\text{s}$ 6	<b>B</b>	$\%IT \approx 100$ $T_{1/2}$ : from $\gamma(t)$ ( <a href="#">2005Ku31</a> ) in $^{170}\text{Er}(^{50}\text{Ti},5n\gamma)$ .

<sup>†</sup> From comparison of energies and half-lives of 9/2<sup>-</sup> isomers in neighboring nuclei, 9/2<sup>-</sup> is ruled out. Two possibilities have been discussed by [2005Ku31](#): 860.5 $\gamma$  may be E3 transition from 11/2<sup>+</sup> to 1/2<sup>-</sup>, which gives half-life consistent with Weisskopf estimates; or there is a level above 1421.3 keV from which a low-energy highly converted transition is omitted. [2005Ku31](#) could not rule out any of these two possibilities.

Adopted Levels, Gammas (continued) $\gamma(^{215}\text{Th})$ 

$E_i(\text{level})$	$J_i^\pi$	$E_\gamma$	$E_f$	$J_f^\pi$
560.8	(5/2 <sup>-</sup> )	560.8 2	0.0	(1/2 <sup>-</sup> )
1421.3		860.5 2	560.8	(5/2 <sup>-</sup> )
1421.3+x?		x	1421.3	

Adopted Levels, GammasLevel Scheme