

**Adopted Levels, Gammas**

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	S. -c. Wu	NDS 108,1057 (2007)	1-Mar-2007

Q( $\beta^-$ )=-2154 17; S(n)=5958 17; S(p)=1679 14; Q( $\alpha$ )=9235 7 [2012Wa38](#)  
 Note: Current evaluation has used the following Q record -2182 30 5960 30 1700 28 9235 6 [2003Au03](#).

Calculations:  
 Spontaneous emission of heavy ions: [1986Po06](#).

<sup>216</sup>Ac Levels

Cross Reference (XREF) Flags

- A (HI,xny)
- B <sup>220</sup>Pa  $\alpha$  decay

E(level)	J <sup><math>\pi</math></sup> †	T <sub>1/2</sub> ‡	XREF	Comments
0	(1 <sup>-</sup> )	440 $\mu$ s 16	B	% $\alpha$ =100 XREF: B(?). % $\epsilon$ : % $\epsilon$ +% $\beta^+$ $\approx 7 \times 10^{-5}$ from gross $\beta$ -decay strength function ( <a href="#">1973Ta30</a> ). Note that for log ft>5.9 for a possible 1 <sup>-</sup> to 0 <sup>+</sup> (g.s.) transition, % $\epsilon$ +% $\beta^+$ <1.0 $\times 10^{-8}$ . T <sub>1/2</sub> : from <a href="#">2000He17</a> , <a href="#">1970To18</a> state that T <sub>1/2</sub> is the same as T <sub>1/2</sub> (48 level) within the experimental error. Other: 390 $\mu$ s 60 from <a href="#">2005Li17</a> . E $\alpha$ =9052 keV 10 ( <a href="#">2000He17</a> ); 9072 keV 8 ( <a href="#">1970To18</a> , <a href="#">1991Ry01</a> ) to the ground state of <sup>212</sup> Fr.
48 7	(9 <sup>-</sup> )	441 $\mu$ s 7	B	% $\alpha$ =100 XREF: B(?). % $\epsilon$ : % $\epsilon$ +% $\beta^+$ $\approx 7 \times 10^{-5}$ from gross $\beta$ -decay strength function ( <a href="#">1973Ta30</a> ). E(level): unweighted average of Ex=59 14 from <a href="#">2000He17</a> and Ex=37 10 from <a href="#">1970To18</a> , both calculated by the evaluator, from alpha-particle energy difference for the decay to g.s. from <sup>216</sup> Ac(441 $\mu$ s) and <sup>216</sup> Ac(440 $\mu$ s), corrected for recoil. T <sub>1/2</sub> : weighted average of 443 $\mu$ s 7 and 432 $\mu$ s 17 ( <a href="#">2000He17</a> ). Others: 0.33 ms 2 ( <a href="#">1970To18</a> ); 0.39 ms 3 ( <a href="#">1966Ro12</a> ); 390 $\mu$ s 60 from <a href="#">2005Li17</a> . E $\alpha$ =9105 keV 7 ( <a href="#">2004Ku24</a> ); 9110 keV 10 ( <a href="#">2000He17</a> ) and 9108 keV 5 ( <a href="#">1970To18</a> ) to the ground state of <sup>212</sup> Fr.
0.0+x 322+x		$\approx 300$ ns	A A	J <sup><math>\pi</math></sup> : probably a high J state.

† [1970To18](#) suggest J <sup>$\pi$</sup> (g.s.)=1<sup>-</sup> and J <sup>$\pi$</sup> (48)=(9<sup>-</sup>) on the basis of analogy with <sup>212</sup>At and <sup>214</sup>Fr. The low relative cross section and the shift to lower energy of the peak in the excitation function suggest, again in analogy with <sup>212</sup>At and <sup>214</sup>Fr, that the ground state is the low-spin member of the two activities. Probable configuration=(( $\pi$  1h<sub>9/2</sub>)( $\nu$  2g<sub>9/2</sub>)).

‡ Many  $\alpha$ -decay works, except that of [2000He17](#), are unable to separate the peaks decaying from the two states, hence the T<sub>1/2</sub>'s measured are not adopted.

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**Adopted Levels, Gammas (continued)** $\gamma(^{216}\text{Ac})$ 

<u><math>E_i(\text{level})</math></u>	<u><math>E_\gamma</math></u>	<u><math>E_f</math></u>
322+x	322	0.0+x

**Adopted Levels, Gammas****Level Scheme**