Adopted Levels

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia	NDS 143, 1 (2017)	31-Mar-2017

Q(β^-)=−9110 *30*; S(n)=11060 *40*; S(p)=−714 *24*; Q(α)=7572 *7* 2017Wa10
Identification: parent of ^{189}Bi; produced by heavy ion induced fusion (^{56}Fe+^{141}Pr, E=265 MeV) (1995Le15).

^{193}At Levels

Level properties from ^{193}At α decay (2003Ke08). Levels populated by the ^{141}Pr(^{56}Fe,4nγ) reaction, at E(target)=264-272 MeV; recoil fragment mass separation; measurement using recoil-tagged α-α and α-γ coincidences, and considering α-decay links to levels in the daughter nuclides ^{189}Bi and ^{185}Tl.

E(level)†	J$^\pi$	$T_{1/2}$‡	Comments
0.0	(1/2$^+$)	28 ms *+5−4*	%α≈100 This level decays by an 7235-keV α particle to the 187 keV *9* 1/2$^+$ level in ^{189}Bi (2003Ke08). Based on the properties of this transition, 2003Ke08 propose this level as the ^{193}At g.s. In the ^{189}Bi Adopted Levels, 1/2$^+$ state located at 184 keV *8* (2017Jo05). J$^\pi$: Spin-parity assigned from 2003Ke08 on the basis of observed favored α decay to the (1/2$^+$) level in ^{189}Bi, and subsequent favored α transition to the 1/2$^+$ g.s. of ^{185}Tl. For the underlying configuration 2003Ke08 suggest a π(4p-1h) 1/2$^+$ intruder state, originated by the promotion of an $s_{1/2}$ proton across the Z=82 shell gap. This is similar to the case of the ^{191}At ground state, which is also assigned J^π=(1/2$^+$).
5 *10*	(7/2$^-$)	21 ms *5*	%α≈100 (2003Ke08) This level is proposed as the first excited state in ^{193}At by 2003Ke08, based on the α-decay properties to both the 7/2$^-$ 100-keV level in ^{189}Bi and the 9/2$^-$ ^{189}Bi g.s., as well as on the α-γ coincidences. Two α branches deexcite this state to levels in ^{189}Bi: a) E(α)=7325 *5* keV, I(α)=98 *2* %, HF=1.1 *3*, to the (7/2$^-$) 100-keV level in ^{189}Bi; b) E(α)=7423 *5* keV, I(α)=2 *2* %, HF = 64 *64*, to the ^{189}Bi g.s. The hindrance factors imply an ΔL=0 unhindered α transition in the first case. Note that the quoted HF values are as given in 2003Ke08, based on their reinterpretation of the observed values, by assuming the existence of an unobserved ≈34−keV γ ray connecting the ^{193}At 13/2$^+$ isomeric state at 39 *7* keV, with the 5-keV isomeric level. E(level): The uncertainty in the excitation energy, obtained from α-particle energy differences, is too great to establish the actual sequence of the 1/2$^+$ and 7/2$^-$ levels. The adopted ordering is that suggested in 2003Ke08, with support from the α-decay properties to levels in ^{189}Bi, and the observed α particle coincidences with the 100-keV γ ray in ^{189}Bi (2003Ke08).
39 *7*	(13/2$^+$)	27 ms *+4−3*	%α=24 *10*; %IT=76 *10* (2003Ke08) This level depopulates via a 7106 *5* keV α decay to the 13/2$^+$ 358-keV state in ^{189}Bi. The hindrance factor calculated in 2003Ke08 for this transition, assuming an 100% α branch, is 0.24 *4*. To explain this anomalously low value of HF, 2003Ke08 propose that there exists an IT decay branch deexciting this state to the 7/2$^-$ level, taking about 76 *10* % of the decay strength, and thus leaving 24 *10* % for the α intensity. The unobserved ≈34−keV IT branch would probably have an E3 character, consistent with the observed half-life for the level. J$^\pi$: Proposed in 2003Ke08, based on observed 7106 *5* keV α-decay to the 13/2$^+$ level in ^{189}Bi.

† From 2003Ke08, based on α-particle energy difference.
‡ Values from 2003Ke08.