^{193}At α decay (21 ms) 2003Ke08

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	31-Aug-2021

Parent: ^{193}At: E=5 *10*; J^π=(7/2$^-$); $T_{1/2}$=21 ms *5*; Q(α)=7572 *7*; %α decay≈100.0

^{193}At-Q(α): From 2021Wa16.

^{193}At-E,J^π,$T_{1/2}$: From ^{193}At Adopted Levels in the ENSDF database (March 2017 update), where values are taken from 2003Ke08. No new references since the 2017 evaluation. Energy of this state is given as 8 keV *9* in 2021Ko07 evaluation. Note that the measured value of half-life in 2003Ke08 was 31.8 ms *+15−13*, but was adjusted to account for assumed feeding by an E3 transition from a 27-ms (13/2$^+$) level to the (7/2$^-$) level in the parent. See 2003Ke08 for details.

^{193}At-%α decay: %α≈100 for ^{193}At isomer decay.

2003Ke08: ^{193}At produced in ^{141}Pr(^{56}Fe,4nγ) reaction, at E=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.

1995Le15: source produced by ^{141}Pr(^{56}Fe,4n) E=265 MeV. Gas-filled mass separator. Measured position-correlated α events. Half-life measured as ≈40 ms, Eα=7.34-7.40 MeV in coin with 680-ms ^{189}Bi decay. 2005Ke10, 2005Uu03 and 2007DoZW are conference reports from the same group as 2003Ke08.

^{189}Bi Levels

E(level)	J^π[†]	$T_{1/2}$[†]	Comments
0	(9/2$^-$)	658 ms *22*	
99.6 *5*	(7/2$^-$)	<10 ns	J^π: hindrance factor of ≈1.8 suggests favored α decay with the same J^π values for this level and the 5-keV level in ^{193}At parent. $T_{1/2}$: from $\alpha\gamma$(t) (2003Ke08).

[†] From Adopted Levels.

α radiations

Eα	E(level)	Iα[‡]	HF[†]	Comments
7325 *5*	99.6	98 *2*	≈1.9	HF: 1.1 *3* (2003Ke08).
7423 *5*	0	2 *2*	≈190	HF: 64 *64* (2003Ke08).

[†] The nuclear radius parameter r_0(^{189}Bi)=1.5519 *62* is deduced from interpolation (or unweighted average) of radius parameters of the adjacent even-even nuclides, evaluated in 2020Si16. Values from 2003Ke08 are given under comments.

[‡] For absolute intensity per 100 decays, multiply by ≈1.0.

γ(^{189}Bi)

E$_\gamma$	I$_\gamma$[†]	E$_i$(level)	J_i^π	E$_f$	J_f^π	Mult.	δ	α[‡]	I$_{(\gamma+ce)}$[†]	Comments
99.6 *5*	9.1 *5*	99.6	(7/2$^-$)	0	(9/2$^-$)	M1(+E2)	<0.6	9.8 *5*	98 *2*	α(K)=8.36 *21*; α(L)=1.48 *3*; α(M)=0.348 *7*; α(N)=0.0890 *18*; α(O)=0.0182 *4*; α(P)=0.00216 *5* E$_\gamma$: from 2003Ke08, seen in coin with α particles. I$_{(\gamma+ce)}$: from Iα=98 *2* per 100 α decays. I$_\gamma$: from I(γ+ce) and α. Mult.: from α(K)exp=8.7 *20* (2003Ke08), from Iγ and I(K x-ray).

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$\gamma(^{189}Bi)$ (continued)

† For absolute intensity per 100 decays, multiply by ≈1.0.

‡ 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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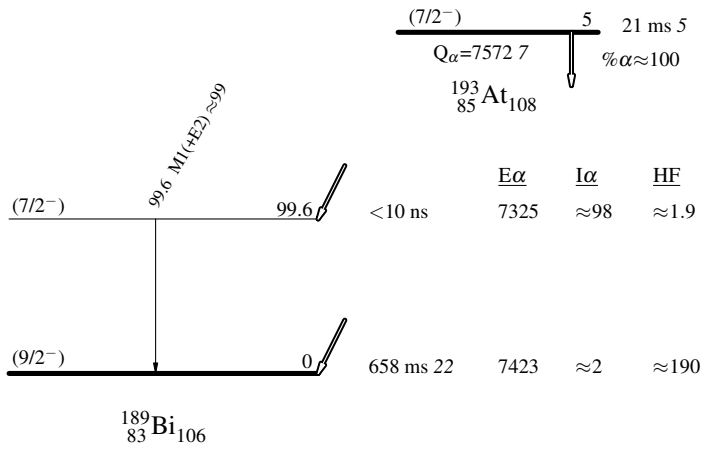
Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays



	Eα	Iα	HF
<10 ns	7325	≈98	≈1.9
658 ms 22	7423	≈2	≈190