^{89}Tc ε decay (12.9 s) 1991He04,1983OxZZ

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	30-Nov-2021

Parent: ^{89}Tc: E=62.6; $J^\pi=(1/2^-)$; $T_{1/2}$=12.9 s *8*; Q(ε)=7620 *5*; %ε+%β^+ decay=100.0
^{89}Tc-E,J^π,$T_{1/2}$: From ^{89}Tc Adopted Levels.
^{89}Tc-Q(ε): From 2021Wa16.
1991He04: ^{89}Tc formed by ^{60}Ni(^{32}S,p2n) E=95 MeV and ^{58}Ni(^{35}Cl,2p2n) E=135 MeV. Measured γ, $\beta\gamma$ coin. Deduced Q(ε)=7510 *210*.
1983OxZZ (also 1981OxZZ): ^{89}Tc identified from ^{92}Mo(p,4n) E=61 MeV reaction. Measured Eγ, Iγ, $\gamma\gamma$.
The decay scheme is mostly unknown.

^{89}Mo Levels

E(level)†	J^π‡	$T_{1/2}$‡
0.0	$(9/2^+)$	2.11 min *10*
118.8	$(7/2^+)$	
387.3	$(1/2^-)$	190 ms *15*

† From Eγ data.
‡ From the Adopted Levels.

γ(^{89}Mo)

E$_\gamma$†	E$_i$(level)	J_i^π	E$_f$	J_f^π	Mult.	α‡	Comments
118.8	118.8	$(7/2^+)$	0.0	$(9/2^+)$			E$_\gamma$: 118.6 *3* (1983OxZZ).
268.5	387.3	$(1/2^-)$	118.8	$(7/2^+)$	(E3)	0.1494 *22*	α(K)=0.1222 *18*; α(L)=0.0223 *4*; α(M)=0.00407 *6*; α(N)=0.000581 *9*; α(O)=1.92×10^{-5} *3* E$_\gamma$: 268.8 *3* (1983OxZZ). Iγ(269γ)/Iγ(119γ)=115 *30*/100 (1983OxZZ) for the composite activity. Mult.: α(K)exp=0.28 *6* (1991He04) in ^{89}Tc ε decay (12.9 s) gives δ(M4/E3)=0.39 *12*, but this admxiture of M4 gives unrealistically large B(M4)(W.u.). RUL=10 for B(M4)(W.u.) suggests negligible δ(M4/E3). Value of α(K)exp=0.28 *6* (1991He04) agrees better with M3. Multipolarity assignment here is essentially from systematics supporting $1/2^-$ for the isomer and dominant E3 multipolarity to $7/2^+$ level, and only marginally supported by large value of α(K)exp.

† From 1991He04.
‡ 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