^{44}Sc IT decay (58.61 h) 1990Me15,1976Co06,1968Wa21

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen and Balraj Singh	NDS 190,1 (2023)	20-Jun-2023

Parent: ^{44}Sc: E=271.241 *10*; $J^\pi=6^+$; $T_{1/2}$=58.61 h *10*; %IT decay=98.77 *1*

^{44}Sc-%IT decay: From 100−%ε+%β^+, with $\varepsilon+\beta^+$ branching of 1.23 *1* from Iγ(1001.8γ)/ΣIγ(γ to g.s.)=0.0123 *1* in 1990Me15 and 1976Co06, where 1001.8γ is only from the decay this isomer and γ rays to g.s. are from $\varepsilon+\beta^+$ decays of g.s. and all isomers of ^{44}Sc. Others: the ratio is 0.0120 *7* in 1968Wa21, 0.01237 *13* (1983Gu11), 0.0114 *25* (1974HeYW).

1990Me15,1976Co06: Source of ^{44}Sc was prepared by the (γ,n) reactions on natural Sc at the Livermore linear accelerator or by the (α,dxn) reaction on natural Ca metal at the Berkeley 88-inch cyclotron. γ rays were detected with a Ge(Li) detector. Measured Eγ, Iγ. Deduced levels, branching ratios.

Additional information 1.

1968Wa21: ^{44m}Sc produced by irradiation of 40 mg Sc_2O_3 with bremsstrahlung of 40 MeV beam from Darmstadt linear accelerator. NaI(Tl) and Ge(Li) for detecting γ-rays. Measured Eγ, Iγ, $\gamma\gamma$-coin, $\gamma\gamma(\theta)$. Deduced levels for ^{44}Ca and isomeric state for ^{44}Sc.

Others:

$T_{1/2}$(^{44}Sc isomer) and isotopic assignment: 1956Ru45, 1954An25, 1952Ru23, 1951Ba84, 1950Br52, 1945Hi05, 1942Sm01, 1940Wa01, 1938Co01, 1938Bu05, 1937Wa07, 1937Wa03.

γ: 1983Gu11, 1955Bl23, 1950Br52, 1942Sm01, 1941He01.

^{44}Sc Levels

E(level)†	J^π†	$T_{1/2}$†	Comments
0.0	2^+	4.0420 h *25*	
271.241 *10*	6^+	58.61 h *10*	%IT=98.77 *1*; %$\varepsilon+\beta^+$=1.23 *1*

† From the Adopted Levels.

γ(^{44}Sc)

Eγ	Iγ†	E$_i$(level)	J_i^π	E$_f$	J_f^π	Mult.	α‡	I$_{(\gamma+ce)}$†	Comments
271.251 *10*	87.8	271.241	6^+	0.0	2^+	(E4)	0.1390 *19*	100	ce(K)/(γ+ce)=0.1097 *14*; ce(L)/(γ+ce)=0.01090 *15*; ce(M)/(γ+ce)=0.001331 *19* ce(N)/(γ+ce)=6.50×10^{-5} *9* α(K)=0.1250 *17*; α(L)=0.01242 *17*; α(M)=0.001516 *21* α(N)=7.40×10^{-5} *10* Eγ: from 1990Me15. Other: 271.260 *18* (1983Gu11), 271.15 *20* (1974HeYW). Iγ: deduced from I(γ+ce)=100 and calculated α=0.139 from BrIcc. Mult.: from α(exp)=0.139 *3* (1955Bl23).

† For absolute intensity per 100 decays, multiply by 0.9877 *1*.

‡ 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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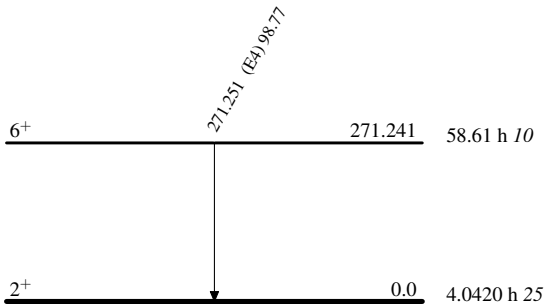
Decay Scheme

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

%IT=98.77 *1*



$^{44}_{21}Sc_{23}$