^{44}V ε decay (111 ms) 1997Ha04

History

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

Parent: ^{44}V: E=0.0; $J^\pi=(2)^+$; $T_{1/2}$=111 ms *7*; Q(ε)=13749 *7*; %ε+%β^+ decay=100

^{44}V-E,J^π,$T_{1/2}$: From the Adopted Levels of ^{44}V.

^{44}V-Q(ε): From Adopted Levels of ^{44}V based on newly measured mass of ^{44}V by 2022Wa39. Other: 13741 *7* from 2021Wa16.

1997Ha04: ^{44}V produced by ^{40}Ca(^{6}Li,2n) E=35 MeV at the TASCC facility of the Chalk River Laboratories. 68% efficient HPGe detectors for detecting γ-rays and scintillators for detecting positrons. Measured Eγ, Iγ, $\gamma\gamma$, $T_{1/2}$(^{44}V g.s.), $\gamma\beta\beta$ and $\gamma\gamma\beta$ coin. Deduced levels, branching ratios, log *ft*.

1994Ke07: ^{44}V produced by Ni(^{58}Ni,X) with E=69 MeV/nucleon ^{58}Ni beam produced from the GANIL cyclotrons on a natural nickel target of 50 mg/cm^2. A telescope of two 150 μm silicon detectors for detecting product nuclei, a plastic scintillator for detecting positrons and four germanium detectors for detecting γ-rays. Measured $T_{1/2}$, $\beta\gamma$ coin. Deduced an isomeric ratio of 25% in ^{44}V.

1971Ce02: ^{44}V produced by ^{40}Ca(^{6}Li,2n) with 18.5 and 21.5 MeV ^{6}Li beam produced from the second tandem of the Brookhaven National Laboratory three-stage MP tandem Van de Graaff. A semiconductor telescope of surface barrier detectors for detecting β-delayed α particles. Measured $T_{1/2}$ of ^{44}V (90 ms *25*). Delayed α decay.

^{44}Ti Levels

E(level)[†]	J^π[‡]	$T_{1/2}$[‡]	Comments
0.0	0^+	59.1 y *3*	
1083.09 *10*	2^+	2.57 ps *37*	
2530.98 *14*	2^+	1.02 ps *14*	
4115.3 *6*	2^+	111 fs *49*	
6606.4 *5*	2^+		
8.18×10^3 *20*			E(level): from 1971Ce02, $\beta^+\alpha$ (delayed α decay) proposed. J^π: 2^+ proposed by 1971Ce02.

[†] From a least-squares fit to γ-ray energies.
[‡] From the Adopted Levels.

ε,β^+ radiations

E(decay)	E(level)	Iβ^+ [‡]	Iε[‡]	Log *ft*	I($\varepsilon+\beta^+$)[†‡]	Comments
(7143 *7*)	6606.4	30 *5*	<0.25	3.47 *8*	30 *5*	av Eβ=2846.6 *34*; εK=8.75×10^{-4} *10*; εL=9.52×10^{-5} *11*; εM+=1.559×10^{-5} *20* Superallowed transition.
(9634 *7*)	4115.3	14.7 *22*	<0.07	4.47 *7*	14.7 *22*	av Eβ=4065.9 *34*; εK=3.280×10^{-4} *34*; εL=3.570×10^{-5} *38*; εM+=5.84×10^{-6} *7*
(11218 *7*)	2530.98	23 *3*	<0.07	4.63 *6*	23 *3*	av Eβ=4844.8 *34*; εK=2.034×10^{-4} *20*; εL=2.214×10^{-5} *23*; εM+=3.624×10^{-6} *43*
(12666 *7*)	1083.09	33 *13*	<0.24	4.75 *17*	33 *13*	av Eβ=5558.3 *35*; εK=1.404×10^{-4} *13*; εL=1.528×10^{-5} *15*; εM+=2.502×10^{-6} *30*

[†] From γ intensity balance at each level.
[‡] Absolute intensity per 100 decays.

^{44}V ε decay (111 ms) 1997Ha04 (continued)

γ(^{44}Ti)

Iγ normalization: Σ(I(γ+ce) to g.s.)=100, assuming no ε+β$^+$ decay to the g.s., and ignoring statistical feeding.

E_γ [†]	I_γ [†#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[‡]	Comments
1083.08 *10*	91 *11*	1083.09	2$^+$	0.0	0$^+$	E2		
1447.88 *13*	21.7 *22*	2530.98	2$^+$	1083.09	2$^+$	E2+M1	−7.5 *+25−80*	Iγ(1448γ)/Iγ(1083γ)=1/4 (1994Ke07).
2530.86 *25*	9.2 *15*	2530.98	2$^+$	0.0	0$^+$	E2		
[x]2947.9 *4*	6.6 *11*							Tentative γ ray.
3032.1 *6*	14.7 *22*	4115.3	2$^+$	1083.09	2$^+$			
4075.2 *5*	7.7 *15*	6606.4	2$^+$	2530.98	2$^+$			
5523.1 *12*	22 *5*	6606.4	2$^+$	1083.09	2$^+$			

† From 1997Ha04.
‡ From the Adopted Gammas.
# Absolute intensity per 100 decays.
x γ ray not placed in level scheme.

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Decay Scheme

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