^{43}Ti ε decay (509 ms) 1987Ho14

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen[#]	NDS 126, 1 (2015)	31-Mar-2015

Parent: ^{43}Ti: E=0; J$^{\pi}$=7/2$^-$; $T_{1/2}$=509 ms *5*; Q(ε)=6867 *7*; %ε+%β^+ decay=100.0
^{43}Ti-J$^{\pi}$,$T_{1/2}$: From Adopted Levels of ^{43}Ti.
^{43}Ti-Q(ε): From 2012Wa38.
1987Ho14: ^{43}Ti nuclides were produced by the ^{40}Ca(α,n) reaction with an 18 MeV alpha beam from the MC-20 cyclotron of the University of Jyvaskyla. β-rays were detected by a 500 μm, 300 mm^2 Si(Au) surface-barrier detector and γ-rays by a 15.5% Ge detector. Measured Eγ, Iγ, E(β). Deduced levels, β- and γ-branchings, $T_{1/2}$. Comparison with shell-model calculations.
Others:
$T_{1/2}$ and isotopic identification: 1967Al08, 1963Va37, 1961Ja22 (also 1960Ja12), 1954Ty33, 1948Sc20.
β^+: 1969Va41 (also 1963Va37), 1961Ja22.
γ: 1971BlZH.

^{43}Sc Levels

E(level)[†]	J$^{\pi}$[‡]	Comments
0	7/2$^-$	
151.25 *14*	3/2$^+$	
472.7[#] *3*	3/2$^-$	
845.17 *9*	5/2$^-$	
1408.03 *9*	7/2$^-$	
1882.5 *3*	(5/2,9/2)$^-$	
1963.0 *4*	(3/2,5/2)$^-$	J$^{\pi}$: log *ft*=6.35 *20* from 7/2$^-$ parent state disfavors 3/2, but the level is weakly populated and this argument is not strong enough to reject 3/2 which is supported by L-transfers in other experiments.
2288.40 *10*	5/2$^-$	
2335.47 *10*	5/2$^-$	
2458.68 *10*	(5/2 to 9/2)$^-$	
2760.10 *10*	(5/2 to 9/2)$^-$	
3259.7 *10*	(7/2,9/2)$^-$	
3631.7? *10*	(5/2$^-$,7/2$^-$,9/2$^-$)	

† From least-squares fit to Eγ data.
‡ From Adopted Levels.
\# Intensity balance gives apparent β^+ feeding of 0.11% *6*.

ε,β^+ radiations

There is an apparent β^+ feeding of 0.11% *6* to the 3/2$^-$ at 472.7 giving an unrealistic log *ft*=6.3 for 7/2$^-$ to 3/2$^-$. This imbalance is due either to missing γ transitions to the 472.7 level or to intensity problems in the γ-rays involved. Due to the large difference between the Q-value and the energy of highest populated level, this decay scheme seems incomplete.

E(decay)	E(level)	Iβ^+ [†]	Iε[†]	Log *ft*	I(ε+β^+)[†]	Comments
(3235[‡] *7*)	3631.7?	0.016 *4*	0.00026 *7*	5.40 *11*	0.016 *4*	av Eβ=974.0 *33*; εK=0.01470 *15*; εL=0.001478 *15*; εM+=0.0002518 *2*
(3607 *7*)	3259.7	0.011 *2*	0.00011 *2*	5.86 *8*	0.011 *2*	av Eβ=1149.0 *34*; εK=0.00924 *8*; εL=0.000929 *8*; εM+=0.0001583 *1*
(4107 *7*)	2760.10	0.20 *3*	0.0012 *2*	4.94 *7*	0.20 *3*	av Eβ=1386.5 *34*; εK=0.00546 *4*; εL=0.000549 *4*; εM+=9.34$\times10^{-5}$ *7*

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^{43}Ti ε decay (509 ms) 1987Ho14 (continued)

ϵ,β^+ radiations (continued)

E(decay)	E(level)	Iβ^+ [†]	Iε[†]	Log *ft*	I($\varepsilon+\beta^+$)[†]	Comments
(4408 *7*)	2458.68	0.91 *13*	0.0042 *6*	4.46 *7*	0.91 *13*	av Eβ=1530.9 *34*; εK=0.00414 *3*; εL=0.000416 *3*; εM+=7.08×10^{-5} *5*
(4532 *7*)	2335.47	0.38 *6*	0.0016 *3*	4.91 *7*	0.38 *6*	av Eβ=1590.1 *34*; εK=0.003718 *23*; εL=0.0003737 *2*; εM+=6.36×10^{-5} *4*
(4579 *7*)	2288.40	4.6 *7*	0.018 *3*	3.85 *7*	4.6 *7*	av Eβ=1612.7 *34*; εK=0.003574 *21*; εL=0.0003592 *2*; εM+=6.12×10^{-5} *4*
(4904 *7*)	1963.0	0.022 *10*	7.×10^{-5} *3*	6.35 *20*	0.022 *10*	av Eβ=1769.5 *34*; εK=0.002755 *15*; εL=0.0002768 *1*; εM+=4.71×10^{-5} *3*
(4985 *7*)	1882.5	0.26 *5*	0.00075 *15*	5.32 *9*	0.26 *5*	av Eβ=1808.4 *34*; εK=0.002592 *14*; εL=0.0002605 *1*; εM+=4.436×10^{-5} *24*
(5459 *7*)	1408.03	0.67 *10*	0.0014 *2*	5.13 *7*	0.67 *10*	av Eβ=2038.5 *34*; εK=0.001853 *9*; εL=0.0001862 *9*; εM+=3.171×10^{-5} *15*
(6022 *7*)	845.17	2.6 *4*	0.0038 *6*	4.78 *7*	2.6 *4*	av Eβ=2312.8 *35*; εK=0.001300 *6*; εL=0.0001306 *6*; εM+=2.225×10^{-5} *10*
(6716[‡] *7*)	151.25	<0.07	<0.0001	>8.5^{1u}	<0.07	av Eβ=2663.5 *34*; εK=0.001872 *8*; εL=0.0001883 *8*; εM+=3.207×10^{-5} *13*
(6867 *7*)	0	90.2 *14*	0.0826 *16*	3.554 *9*	90.3 *14*	av Eβ=2726.7 *35*; εK=0.000819 *3*; εL=8.22×10^{-5} *3*; εM+=1.400×10^{-5} *5* I($\varepsilon+\beta^+$): 100-summed feeding to higher levels.

† Absolute intensity per 100 decays.
‡ Existence of this branch is questionable.

γ(^{43}Sc)

Iγ normalization: Iγ(845γ)(per 100 decays)=2.8 *4*, from comparison of γ-ray yield to the yield of 0.5-s component of $\gamma^{\pm}$ radiation (1987Ho14).

E$_\gamma$	I$_\gamma$[#]	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$	Mult.[†]	δ[†]
(151.9)	2.9[‡] *12*	151.25	3/2$^+$	0	7/2$^-$		
472.7 *4*	4.8 *10*	472.7	3/2$^-$	0	7/2$^-$		
562.9 *2*	2.8 *5*	1408.03	7/2$^-$	845.17	5/2$^-$		
845.2 *1*	62.9 *19*	845.17	5/2$^-$	0	7/2$^-$	M1+E2	+0.15 *4*
880.7 *5*	1.1 *2*	2288.40	5/2$^-$	1408.03	7/2$^-$		
936.0 *8*	1.0 *2*	1408.03	7/2$^-$	472.7	3/2$^-$		
1408.0 *1*	12.6 *4*	1408.03	7/2$^-$	0	7/2$^-$	M1+E2	+0.15 *5*
1443.5 *3*	1.3 *3*	2288.40	5/2$^-$	845.17	5/2$^-$		
1490.2 *2*	0.5 *2*	1963.0	(3/2,5/2)$^-$	472.7	3/2$^-$	M1+E2	+0.21 *6*
1815.4 *4*	0.9 *5*	2288.40	5/2$^-$	472.7	3/2$^-$		
1882.5 *3*	5.9 *8*	1882.5	(5/2,9/2)$^-$	0	7/2$^-$		
2137.1 *1*	2.1 *4*	2288.40	5/2$^-$	151.25	3/2$^+$		
2288.3 *1*	100 *4*	2288.40	5/2$^-$	0	7/2$^-$	M1+E2	+0.08 *5*
2335.4 *1*	8.7 *7*	2335.47	5/2$^-$	0	7/2$^-$		
2458.6 *1*	20.7 *8*	2458.68	(5/2 to 9/2)$^-$	0	7/2$^-$		
2760.0 *1*	4.5 *3*	2760.10	(5/2 to 9/2)$^-$	0	7/2$^-$		
3259.6 *10*	0.24 *4*	3259.7	(7/2,9/2)$^-$	0	7/2$^-$		
3631.5[@] *10*	0.36 *6*	3631.7?	(5/2$^-$,7/2$^-$,9/2$^-$)	0	7/2$^-$		

† Multipolarities and mixing ratios from Adopted Gammas.

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^{43}Ti ε decay (509 ms) 1987Ho14 (continued)

$\gamma(^{43}Sc)$ (continued)

‡ Estimated (evaluators) from log $f^{1u}t$>8.5 and Iγ(2137γ).
# For absolute intensity per 100 decays, multiply by 0.044 *6*.
@ Placement of transition in the level scheme is uncertain.

^{43}Ti ε decay (509 ms) 1987Ho14

Decay Scheme

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