^{55}Ti β^- decay (1.3 s) 2003Ma56

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	30-Apr-2022

Parent: ^{55}Ti: E=0.0; $J^\pi=(1/2)^-$; $T_{1/2}$=1.3 s *1*; Q(β^-)=7290 *40*; %β^- decay=100.0

^{55}Ti-J^π,$T_{1/2}$: From ^{55}Ti Adopted Levels, where $T_{1/2}$ is adopted from 2003Ma56.

^{55}Ti-Q(β^-): From 2021Wa16.

2003Ma56: measured Eγ, Iγ, $\gamma\gamma$-coin, $\beta\gamma$-coin, half-life using an array of six segmented Ge detectors. ^{55}Ti produced in fragmentation of 140-MeV $^{86}Kr^{34+}$ beam incident on a ^{9}Be target at NSCL-MSU. The secondary fragments were selected in the A1900 fragment recoil-separator, and implanted in a double-sided Si microstrip detector to detect β particles from decay of fragments. Comparison with shell-model calculations.

1996Do23: ^{55}Ti produced and identified in ^{9}Be(^{65}Cu,X), E=64.5 MeV/nucleon reaction using LISE3 separator at GANIL facility. Measured γ spectrum, (implants)β and (implants)$\beta\gamma$-correlated events from which half-life of ^{55}Ti decay was extracted. Two γ rays of 0.3 MeV and 0.7 MeV, of almost equal intensity were measured using BGO detector. Deduced g.s. to g.s. β feeding.

^{55}V Levels

E(level)[†]	J^π[‡]	$T_{1/2}$[‡]
0.0	$(7/2^-)$	6.54 s *15*
323.3 *4*	$(5/2^-)$	
672.6 *4*	$(3/2^-)$	
1330.1 *5*		
1500.9 *6*		
2152.8 *6*		

[†] From least-squares fit to Eγ data.

[‡] From the Adopted Levels.

β^- radiations

E(decay)	E(level)	Iβ^-[†#]	Log *ft*[‡]	Comments
$(5.14\times10^3$ *4*)	2152.8	16 *2*	4.9	av Eβ=2330 *20*
$(5.79\times10^3$ *4*)	1500.9	5 *3*	5.6	av Eβ=2649 *20*
$(5.96\times10^3$ *4*)	1330.1	12 *2*	5.3	av Eβ=2732 *20*
$(6.62\times10^3$ *4*)	672.6	31 *5*	5.1	av Eβ=3054 *20*
$(6.97\times10^3$[@] *4*)	323.3	12 *3*	5.6	av Eβ=3225 *20* Iβ^-: no feeding is expected for ΔJ=2, $\Delta\pi$=no. Apparent feeding of 12% *3* in 2003Ma56 may be from unobserved γ rays from higher levels.
$(7.29\times10^3$[@] *4*)	0.0			av Eβ=3383 *20* Iβ^-: 2003Ma56 give Iβ=24 *5*, but no feeding is expected from $(1/2)^-$ parent state to $(7/2^-)$ g.s. in ^{55}V. It would seem that this apparent feeding is to higher unobserved levels. Other: 60% (1996Do23, from a comparison of the number of $\beta\gamma$-coincidences and β singles) would also be for higher levels, not the g.s. of ^{55}V.

[†] From 2003Ma56, deduced from absolute γ-intensity balance for excited states. For the ground state, β feeding is 100−(summed feeding to excited states), but as stated for the g.s. of ^{55}V, no feeding is expected from $(1/2)^-$ parent state of ^{55}Ti to $(7/2^-)$ g.s. in ^{55}V. All the values should be considered as upper limits due to possible existence of unobserved decays. Note that 1262.5γ with Iγ=5% *1* is unplaced, which may affect β feeding to certain levels.

[‡] Deduced by evaluator. As mentioned by 2003Ma56, values should be considered as lower limits due to possible existence of unobserved decays.

Continued on next page (footnotes at end of table)

^{55}Ti β^- decay (1.3 s) 2003Ma56 (continued)

β^- radiations (continued)

[#] Absolute intensity per 100 decays.
[@] Existence of this branch is questionable.

$\gamma(^{55}V)$

Iγ normalization: γ-ray intensities in 2003Ma56 are per 100 decays, determined from the number of observed ^{55}Ti γ rays, the simulated γ-ray efficiency curve, and the number of ^{55}Ti implants correlated with β decays.

E_γ[†]	I_γ[†‡]	E_i(level)	J_i^π	E_f	J_f^π	Comments
323.4 *4*	20 *2*	323.3	(5/2$^-$)	0.0	(7/2$^-$)	E_γ: other: 0.3 MeV *1* (1996Do23).
349.3 *6*	3 *1*	672.6	(3/2$^-$)	323.3	(5/2$^-$)	
651.6 *7*	5 *1*	2152.8		1500.9		
672.5 *4*	44 *4*	672.6	(3/2$^-$)	0.0	(7/2$^-$)	E_γ: other: 0.7 MeV *1* (1996Do23).
828.1 *5*	10 *2*	1500.9		672.6	(3/2$^-$)	
[x]1262.5 *6*	5 *1*					
1330.1 *5*	12 *2*	1330.1		0.0	(7/2$^-$)	
1480.0 *8*	6 *1*	2152.8		672.6	(3/2$^-$)	
1830.0 *8*	5 *1*	2152.8		323.3	(5/2$^-$)	

[†] From 2003Ma56.
[‡] Absolute intensity per 100 decays.
[x] γ ray not placed in level scheme.

^{55}Ti β^- decay (1.3 s) 2003Ma56

Decay Scheme

Intensities: I_γ per 100 parent decays