Adopted Levels, Gammas

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	25-Mar-2022

Q(β^-)=676×10^1 *19*; S(n)=566×10^1 *10*; S(p)=1587×10^1 *12*; Q(α)=−758×10^1 *10* 2021Wa16
Q(β^-n)=1630 *100*, S(2n)=9820 *100*, S(2p)=28840 *110* (2021Wa16).

1990Tu01, 1994Se12: ^{56}Ti produced in proton-induced fragmentation and fission reactions on natural Thorium using the high-intensity proton beam of the Los Alamos Meson Physics Facility. Measured mass excess of g.s. of ^{56}Ti using Time-of-Flight Isochronous (TOFI) spectrometer.

1996Do23: ^{56}Ti produced and identified in the fragmentation of 64.5 MeV/nucleon ^{65}Cu beam with 90 mg/cm^2 ^{9}Be target and separation of fragments using LISE3 spectrometer at GANIL. Measured β singles, $\beta\gamma$-coin, and $T_{1/2}$ of decay of ^{56}Ti.

Additional information 1.

1998Am04 (also 1997AmZZ thesis): ^{56}Ti produced and identified in the fragmentation of 500 MeV/nucleon ^{86}Kr beam with 2 g/cm^2 ^{9}Be target and separation of fragments using FRS spectrometer at GSI facility. Measured (implants)β-correlations, and $T_{1/2}$ of decay of ^{56}Ti.

2003Ma56: ^{56}Ti isotope produced in ^{9}Be(^{86}Kr^{34+},X) at E=140 MeV/nucleon, followed by separation of fragments using A1900 fragment separator at NSCL-MSU. Measured Eγ, Iγ, $\gamma\gamma$-coin, $\beta\gamma$-coin, $T_{1/2}$ of ^{56}Ti decay using a double-sided Si microstrip detector (DSSD) and Segmented Germanium Array (SeGA) arranged around the β counting system.

Mass measurements: 2020Me06, 2019Xu09 (also 2015Xu14), 1994Se12 (also 1995ViZX), 1990Tu01.

Theoretical calculations: 36 primary reference extracted from the NSR database (www.nndc.bnl.gov/nsr/), listed here under document records.

^{56}Ti Levels

Cross Reference (XREF) Flags

A	^{56}Sc β^- decay (26 ms+75 ms)	D	^{238}U(^{48}Ca,Xγ)
B	^{56}Sc β^- decay (26 ms)	E	Coulomb excitation
C	^{56}Sc β^- decay (75 ms)		

E(level)†	J$^\pi$	$T_{1/2}$	XREF	Comments
0.0‡	0$^+$	200 ms *5*	ABCDE	%β^-=100; %β^-n=? Theoretical $T_{1/2}$=364 ms, %β^-n=0 (2019Mo01). Theoretical $T_{1/2}$=321 ms, %β^-n=0.23, 0.12 (2021Mi17). No evidence for β-delayed neutron decay from search for γ rays from the decay of ^{56}Ti to ^{55}V (2003Ma56), consistent with predicted %β^-n=0 in 2019Mo01, and %β^-n=0.23, 0.12 in 2021Mi17. $T_{1/2}$: from 2003Ma56 ($\beta\gamma$-coin decay curves). Others: 0.15 s *3* (1996Do23) and 0.19 s *4* (1998Am04) are in agreement within the uncertainties, but less precise.
1128.6‡ *4*	2$^+$	2.6 ps *+13−7*	ABCDE	B(E2)↑=0.0599 *197* (2005Di05) J$^\pi$: level is Coulomb excited from 0$^+$ g.s. $T_{1/2}$: deduced by evaluator from measured B(E2)(up) (2005Di05).
1879.7 *5*			AB	J$^\pi$: 750.9γ to (2$^+$) suggests 0$^+$ to 4$^+$. If allowed β feeding from (1$^+$) parent state, as suggested by 2010Cr02 is proved, then J^π=0$^+$,1$^+$,2$^+$.
2288.2‡ *7*	(4$^+$)		A CD	J$^\pi$: 1161γ to 2$^+$; band member.
2978.4‡ *8*	(6$^+$)		A CD	J$^\pi$: 690.2γ to (4$^+$); band member.
4209.8? *14*			D	J$^\pi$: 1230γ to (6$^+$) and expected yrast-pattern of population in ((^{48}Ca,Xγ) suggests (6,7,8$^+$).
4473.7 *6*			C	J$^\pi$: 1494.8γ to (6$^+$) and possible β feeding from (5$^+$,6$^+$) suggests suggests (4$^+$,5,6,7).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{56}Ti Levels (continued)

† From Eγ values.
‡ Band(A): Yrast sequence.

γ(^{56}Ti)

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Comments
1128.6	2^+	1128.6 *3*	100	0.0	0^+	B(E2)(W.u.)=9.4 *31* E_γ: weighted average of 1128.2 *4* (^{56}Sc β^- decay (26 ms+75 ms), 2004Li75); 1128.7 *3* (^{56}Sc β^- decay (26 ms),2010Cr02); 1128.8 *5* ((^{48}Ca,Xγ),2004Fo09).
1879.7		751.1 *4*	100	1128.6	2^+	E_γ: weighted average of 751.5 *5* (^{56}Sc β^- decay (26 ms+75 ms), 2004Li75); 750.9 *4* (^{56}Sc β^- decay (26 ms),2010Cr02).
2288.2	(4^+)	1160.6 *3*	100	1128.6	2^+	E_γ: weighted average of 1160.0 *5* (^{56}Sc β^- decay (26 ms+75 ms), 2004Li75); 1160.6 *3* (^{56}Sc β^- decay (75 ms),2010Cr02); 1161.0 *5* ((^{48}Ca,Xγ),2004Fo09).
2978.4	(6^+)	690.2 *4*	100	2288.2	(4^+)	E_γ: weighted average of 690.2 *4* (^{56}Sc β^- decay (26 ms+75 ms), 2004Li75); 689.6 *3* (^{56}Sc β^- decay (75 ms),2010Cr02); 690.0 *5* ((^{48}Ca,Xγ),2004Fo09).
4209.8?		1230† *1*	100	2978.4	(6^+)	E_γ: from ((^{48}Ca,Xγ),2004Fo09).
4473.7		1494.8 *3*	100	2978.4	(6^+)	E_γ: from ^{56}Sc β^- decay (75 ms) (2010Cr02).

† Placement of transition in the level scheme is uncertain.

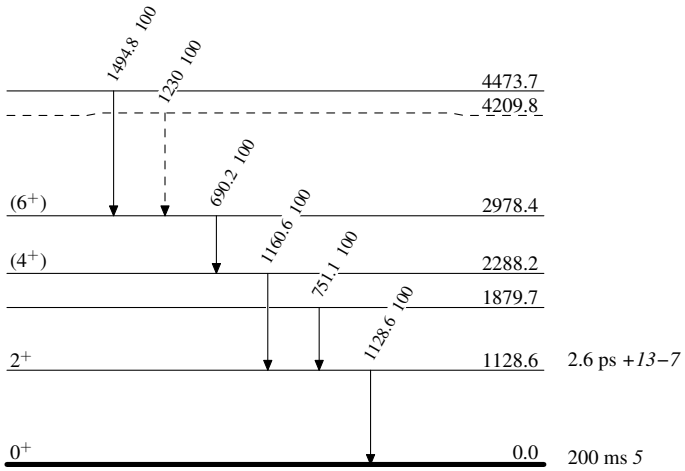
Adopted Levels, Gammas

Legend

Level Scheme

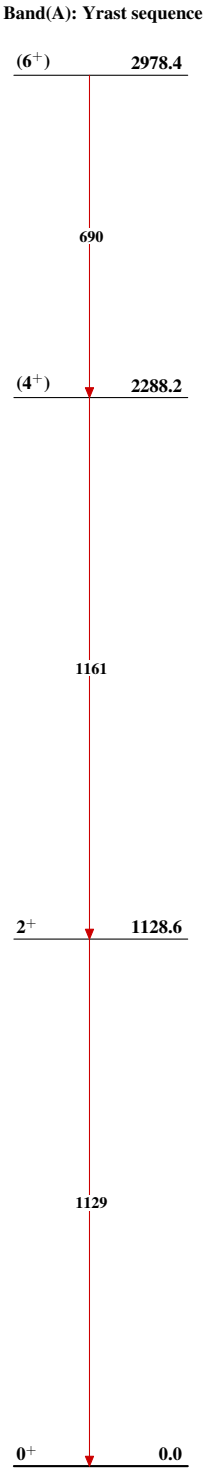
Intensities: Relative photon branching from each level

- - - - - - ► γ Decay (Uncertain)



$^{56}_{22}Ti_{34}$

Adopted Levels, Gammas



$^{56}_{22}Ti_{34}$