## $^{56}$Sc $\beta^-$ decay (26 ms+75 ms) 2004Li75

History

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

Parent: $^{56}$Sc: E=0; $J^\pi$=(1$^+$); $T_{1/2}$=26 ms *6*; Q($\beta^-$)=1391×10$^1$ *28*; %$\beta^-$ decay=100.0

Parent: $^{56}$Sc: E=0+x; $J^\pi$=(5$^+$,6$^+$); $T_{1/2}$=75 ms *6*; Q($\beta^-$)=1391×10$^1$ *28*; %$\beta^-$ decay=100.0

$^{56}$Sc(0)-E,$J^\pi$,$T_{1/2}$: From $^{56}$Sc Adopted Levels, where $T_{1/2}$ is from 2010Cr02. Other $T_{1/2}$=35 ms *5* and 38 ms 5 (2004Li12).

$^{56}$Sc(0)-Q($\beta^-$): From 2021Wa16.

$^{56}$Sc(0+x)-E,$J^\pi$,$T_{1/2}$: From $^{56}$Sc Adopted Levels, where $T_{1/2}$ is from 2010Cr02. Other $T_{1/2}$=60 ms *7* (2004Li12, decay curves of the 690$\gamma$ and 1161$\gamma$).

$^{56}$Sc(0+x)-Q($\beta^-$): From 2021Wa16.

2004Li75 (also 2005Ma93,2004Li12): $^{56}$Sc isotope produced in $^9$Be($^{86}$Kr$^{34+}$,X) fragmentation reaction at E=140 MeV/nucleon, followed by separation of fragments using A1900 fragment separator at NSCL-MSU. Measured E$\gamma$, I$\gamma$, $\gamma\gamma$-coin, $\beta\gamma$-coin, $\beta\gamma$(t), $T_{1/2}$ using a double-sided Si microstrip detector (DSSD) and segmented Germanium Array (SeGA). Identification of particle from energy loss and time-of-flight from a PIN detector, the NSCL $\beta$ calorimeter, and a scintillator. The SeGA array with 12 Ge detectors was arranged around the $\beta$ counting system.

2004Li75 estimated 83% *11* contribution from low-spin isomer and 20% *4* from the high-spin isomer, based on absolute $\gamma$-ray intensities and deduced $\beta$ feeding to the $^{56}$Ti g.s.

All data are from 2004Li75.

### $^{56}$Ti Levels

| E(level)[†] | $J^\pi$[‡] | $T_{1/2}$[‡] |
|---|---|---|
| 0.0 | 0$^+$ | 200 ms *5* |
| 1128.2 *4* | 2$^+$ | |
| 1879.6 *5* | | |
| 2288.2 *7* | (4$^+$) | |
| 2978.4 *8* | (6$^+$) | |

[†] From E$\gamma$ values.
[‡] From the Adopted Levels.

### $\beta^-$ radiations

| E(decay) | E(level) |
|---|---|
| (1.09×10$^4$ *3*) | 2978.4 |

### $\gamma$($^{56}$Ti)

| E$_\gamma$[†] | I$_\gamma$[†‡#] | E$_i$(level) | $J_i^\pi$ | E$_f$ | $J_f^\pi$ | Comments |
|---|---|---|---|---|---|---|
| [x]592.3 *5* | 7 *2* | | | | | E$_\gamma$: 2004Li75 identify a 592.3 *5* (I$\gamma$=7% *2*) $\gamma$-ray as possibly from $\beta$-delayed neutron branch to a level in $^{55}$Ti, while 2010Cr02 confirmed the assignment through a 591.7 *3* (I$\gamma$=14% *2* $\gamma$ emitted by the longer-lived activity of $^{56}$Sc from a 592 level in $^{55}$Ti. |
| 690.2 *4* | 19 *4* | 2978.4 | (6$^+$) | 2288.2 | (4$^+$) | |
| 751.5 *5* | 9 *3* | 1879.6 | | 1128.2 | 2$^+$ | Placement of a 750.9 *4* $\gamma$ by 2010Cr02; unplaced in 2004Li75. |
| 1128.2 *4* | 48 *11* | 1128.2 | 2$^+$ | 0.0 | 0$^+$ | |
| 1160.0 *5* | 21 *5* | 2288.2 | (4$^+$) | 1128.2 | 2$^+$ | |

[†] From 2004Li75.

Continued on next page (footnotes at end of table)

**$^{56}$Sc $\beta^-$ decay (26 ms+75 ms) 2004Li75 (continued)**

$\gamma(^{56}Ti)$ (continued)

‡ Absolute $\gamma$-ray intensities were deduced from the number of observed $^{56}$Ti $\gamma$-rays, the simulated $\gamma$-ray efficiency curve, and the number of $^{56}$Sc implants correlated with $\beta$ decays (2004Li75).
# Absolute intensity per 100 decays.
x $\gamma$ ray not placed in level scheme.

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### Decay Scheme

Intensities: $I_\gamma$ per 100 parent decays