

^{37}Al β^- 2n decay (11.4 ms) 2013StZY

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Lijie Sun and Jun Chen		NDS 211,1 (2026)	30-Sep-2025

Parent: ^{37}Al : $E=0$; $J^\pi=(5/2^+)$; $T_{1/2}=11.4$ ms 4; $Q(\beta^-2n)=8.06\times 10^3$ 18; $\% \beta^-2n$ decay ≥ 0

^{37}Al - J^π : From shell-model predictions (2013StZY).

^{37}Al - $T_{1/2}$: Weighted average of 10.7 ms 13 (2004Gr20,2003Gr22, implant- β correlation), 11.5 ms 4 (2013StZY, implant- $\beta\gamma$ correlation). Other: 11.8 ms 1 (stat) +22-34 (syst) (2013StZY, implant- β correlation).

^{37}Al - $Q(\beta^-2n)$: Deduced from mass excesses in 2021Wa16.

^{37}Al - $\% \beta^-2n$ decay: $\% \beta^-2n \geq 1$ 1 (2013StZY).

2013StZY: ^{37}Al was produced via the projectile fragmentation of a 345-MeV/nucleon, 70-pnA $^{48}\text{Ca}^{20+}$ primary beam from the linear accelerator RILAC and the four cyclotrons RRC, fRC, IRC, and SRC at RIKEN impinging on an 15-mm-thick ^9Be target. The secondary cocktail beam was selected by the BigRIPS separator and the zero-degree spectrometer (ZDS) using the $B\rho$ - ΔE -ToF method, and implanted into the Cylindrical Active Implantation Target for Exotic Nuclei (CAITEN) consisting of a segmented movable hollow-cylindrical-shaped plastic scintillator and a stationary ring of 24 position-sensitive photomultiplier tubes (PSPMTs) arranged on a ring inside the scintillator at the height of the beam line. To reduce background buildup, the scintillator barrel was rotated quickly and axially-moved slowly in vertical direction, resulting in a helix-shaped motion. β particles were detected by the CAITEN and γ rays were detected using three HPGe clover detectors. Measured E_γ , $\beta\gamma$ -coin, and implant- β correlation, and deduced $T_{1/2}$. Comparisons with QRPA and shell-model calculations.

 ^{35}Si Levels

<u>E(level)</u>	<u>J^π[†]</u>	<u>$T_{1/2}$[†]</u>
0	$(7/2)^-$	0.78 s 12
910	$(3/2)^-$	55 ps 14

[†] From the Adopted Levels of ^{35}Si .

 $\gamma(^{35}\text{Si})$

<u>E_γ</u>	<u>E_i(level)</u>	<u>J_i^π</u>	<u>E_f</u>	<u>J_f^π</u>	<u>Comments</u>
910	910	$(3/2)^-$	0	$(7/2)^-$	I_γ : 2013StZY reports 2 3 relative to $I_\gamma=100$ for the 156 γ in ^{37}Si from ^{37}Al decay.

 ^{37}Al β^{-2n} decay (11.4 ms) 2013StZYDecay Scheme