

^{87}Ga β^- n decay (27 ms) 2023Yo04

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	A. Negret and B. Singh		NDS 203,283 (2025)	20-Jan-2025

Parent: ^{87}Ga : $E=0$; $T_{1/2}=27$ ms 6; $Q(\beta^-n)=12460$ syst; $\% \beta^-n$ decay=72 9

^{87}Ga - $T_{1/2}$: From 2023Yo04, based on binned maximum likelihood fitting including contributions from parent, daughter, β^-1n , and β^-2n daughter as well as a linear background (2023Yo04). Quoted $T_{1/2}$ are from β^- (neutron) correlated decay curves, as $1n$ spectra have a smaller component from decays of descendant nuclei than the $0n$ spectra and greater statistics than the $2n$ spectra. $T_{1/2}$ value from 2023Yo04 is a weighted average of two measurements: 31 ms 9 in one run and 24 ms 8 in the second run. Others: 26 ms +17-11 (2014XuZZ).

^{87}Ga - $Q(\beta^-n)$: 12460 670 (syst, 2021Wa16).

^{87}Ga - $\% \beta^-n$ decay: $\% \beta^-n=72$ 9, $\% \beta^-2n=8.7$ 29 (2023Yo04) for the decay of ^{87}Ga .

2023Yo04,2019Yo03,2020ToZY: ^{86}Ga produced in the $^9\text{Be}(^{238}\text{U},F)$ reaction at $E(^{238}\text{U})=345$ MeV/nucleon on a 4-mm thick ^9Be production target followed by the separation and identification of fragments of interest by A/Q on the basis of magnetic rigidity $B\rho$, time-of-flight (tof) and energy loss (ΔE) using the BigRIPS in-flight separator, plastic scintillation counters, and position-sensitive parallel-plate avalanche counters (PPACs), finally implanted into active stoppers: AIDA in one run (described in 2020ToZY), and WAS3Abi in a second run (2019Yo03), both consisting of double-sided silicon strip detectors (DSSDs) at the RIBF-RIKEN facility. Measured E_γ , I_γ , E_β , I_β , $E(n)$, $I(n)$, ion- β correlations, (neutron)ion- β -coin, $n\beta\gamma$ -coin, $(2n)\beta\gamma$ -coin, $\gamma\gamma$ -coin using two clover HPGe detectors for γ rays, and the BRIKEN detector consisting of 140 proportional counters filled with ^3He gas for neutrons. Deduced half-life of ^{86}Ga decay, $\% \beta^-n$ or $P1n$, $\% \beta^-2n$ or $P2n$, and the decays of ^{86}Ga to ^{86}Ge , ^{85}Ge , and ^{84}Ge . Also, deduced a 0.32- μs isomer in ^{86}Ga .

Evaluators' note: 2019Yo03 and 2020ToZY provide results from two different runs carried out at BRIKEN-RIKEN facility, with independent analysis methodology (per e-mail communications with J.L. Tain and A. Tolosa-Delgado, January 14-18, 2023). 2023Yo04 presents common results from the two runs superseding the previous reports.

 ^{86}Ge Levels

$E(\text{level})^\dagger$	J^π
0.0	0^+
527.2 5	(2^+)
1313.3 7	(4^+)

† From E_γ data.

 $\gamma(^{86}\text{Ge})$

I_γ normalization: 2023Yo04 give $I_\gamma/100$ decays of ^{87}Ga .

$E_\gamma^\dagger$	$I_\gamma^{\ddagger}$	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Comments
^x 178.2 7	5.1 30					
527.2 5	58 12	527.2	(2^+)	0.0	0^+	$\%I_\gamma=58$ 12
786.1 5	7.9 37	1313.3	(4^+)	527.2	(2^+)	$\%I_\gamma=7.9$ 37

† From 2023Yo04. Uncertainties calculated by evaluators based on the systematic and statistical uncertainties given by authors.

‡ Absolute intensity per 100 decays.

^x γ ray not placed in level scheme.

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Decay Scheme

Intensities: I_γ per 100 parent decays

