

$^{13}N \epsilon+\beta^+ \text{ decay}$

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	J. H. Kelley, C. G. Sheu and J. E. Purcell		NDS 198,1 (2024)	1-Aug-2024

Parent: ^{13}N : E=0; $J^\pi=1/2^-$; $T_{1/2}=9.9584$ min 36; $Q(\epsilon)=2220.47$ 27; % ϵ +% β^+ decay=100

^{13}N - $T_{1/2}$: From Adopted Levels of ^{13}N .

^{13}N - $Q(\epsilon)$: From (2021Wa16).

1935Ru01: $^{13}N(\beta^+)$; $^{10}B(\alpha,n)$ was used to produce ^{13}N , which was found to decay with $T_{1/2} \approx 14$ minutes.

1939Wa09: measured $T_{1/2}=9.93$ min 3.

1948Co24: $^{13}N(\beta^+)$; measured $T_{1/2}=10.2$ min 1.

1950Ho01: $^{13}N(\beta^+)$; measured end-point energy $E_\beta(\max)=1.202$ MeV 5 and $T_{1/2}=10.05$ min 10.

1953Ch34: $^{13}N(\beta^+)$; measured $T_{1/2}=602.9$ sec 19=10.05 min 3.

1954Gr66: $^{13}N(\beta^+)$; measured $E_\beta(\max)=1.185$ MeV 25.

1955Wi43: ^{13}N ; measured $T_{1/2}=10.08$ min 4.

1957Da08: $^{13}N(\beta^+)$; measured $T_{1/2}=9.96$ min 3.

1957De22: $^{13}N(\beta^+)$; measured $T_{1/2}=10.02$ min 10.

1957No17: $^{13}N(\beta^+)$; measured $T_{1/2}=10.07$ min 6.

1958Ar15: $^{13}N(\beta^+)$; measured $T_{1/2}=9.96$ min 3.

1958Da09: $^{13}N(\beta^+)$; measured $E_\beta(\max)=1.190$ MeV 3 and $T_{1/2}$ as in (1957Da08).

1960Ja12: $^{13}N(\beta^+)$; measured $T_{1/2}=9.9965$ min 5.

1960Ki02: $^{13}N(\beta^+)$; measured $T_{1/2}=9.93$ min 5.

1961Ra06: $^{13}N(\beta^+)$; measured $T_{1/2}=12.3$ min 7 (excluded).

1965Bo42: $^{13}N(\beta^+)$; measured $T_{1/2}=10.05$ min 5.

1965Eb01: $^{13}N(\beta^+)$; measured $T_{1/2}=9.96$ min 2.

1968Ri15: $^{13}N(\beta^+)$; measured $T_{1/2}=9.963$ min 9.

1971Go40: $^{13}N(\beta^+)$; for decay to $^{13}C_{\text{g.s.}}$, $\log ft=3.667$ 1.

1973SiYS: $^{13}N(\beta^+)$; measured $T_{1/2}=10.0$ min 5.

1977Az01: $^{13}N(\beta^+)$; measured $T_{1/2}=9.965$ min 10.

1980An40: $^{13}N(\beta^+)$; measured $T_{1/2}=9.967$ min 10.

1989KaYR: $^{13}N(\beta^+)$; measured $T_{1/2}=9.962$ min 20.

2022Lo14: $^{13}N(\beta^+)$; measured $T_{1/2}=9.9508$ min 32; provided an analysis using only their value and (1968Ri15, 1977Az01) and recommended $T_{1/2}=9.9532$ min 37.

1995Va27: $^{13}N(\beta^+)$; measured β asymmetry following beam implantation in Pt; deduced beam polarization.

Theory:

1970Ko41: general model for β decay in even-odd nuclei.

1970Da21: generalized pairing-force model analysis of $\log ft$ values.

1972Ma72: calculated β shape spectra.

1973Wi04: analysis of the Axial-Vector coupling constant.

1973Su04: analysis of K-electron capture branching ratios.

1975Kr14: developed O(5) symmetry model to analyzed $\log ft$ values.

1977Ri08: Shell model analysis of $\log ft$ values.

1980An31: analysis of K-electron capture rates.

1984Ko40: analyzed isotensor component in isovectorial transition.

1991Na05: analyzed mirror nuclei decays in a search for evidence of right-handed currents.

1995Go34: analyzed β -decay polarization asymmetry data in a search for evidence of right-handed chirality.

2008Se10: analyzed half-lives, branching ratios, electron-capture probabilities; deduced ft values in mirror decays.

2008Pe13: analyzed correlations between β decays in mirror nuclei and their magnetic moments.

2012Sa50: analysis of isospin related corrections for superallowed β transitions.

2015Mo10, 2010MoZU: calculated improved beta spectra, shape factors, mean energies, experimental mean energies.

2015To02: developed parametrization of the statistical rate functions, f , for superallowed $T=1/2$ transitions.

2021Ir01: single-particle model analysis of the $^{13}N(\beta^+)$ reaction. Emphasized asymptotic normalization coefficients (ANCs) and

^{13}N $\varepsilon+\beta^+$ decay (continued)

spectroscopic factor data.

2021Da11: analyzed the role of tensor forces in β decay.

2024Fa01: analyzed decay between isobaric analog mirror states.

 ^{13}C Levels

E(level)	J $^\pi$	T _{1/2}
0	1/2 $^-$	stable

 ε, β^+ radiations

εK , εL , εM , εN : Additional information 1.
av $\text{E}\beta$: Additional information 2.

E(decay)	E(level)	I β^+ †	I ε †	Log ft	I($\varepsilon + \beta^+$) †	Comments
(2220.5 15)	0	99.803 5	0.197 5	3.67174 44	100	av $\text{E}\beta=492.21$ 12; $\varepsilon\text{K}=0.00182$ 5; $\varepsilon\text{L}=1.466\times10^{-4}$ 42 $\text{C}1=0.001$ 24 (1958Da09). $\text{Cexp(W)} = 1+\text{C}_1\text{W}$.

† Absolute intensity per 100 decays.