^{87}Nb β^+ decay (3.75 min) 1974Vo03,1986CoZQ,1977Ko05

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	T. D. Johnson and W. D. Kulp(a)	NDS 129, 1 (2015)	27-Jul-2015

Parent: ^{87}Nb: E=0.0; J^π=(1/2$^-$); $T_{1/2}$=3.75 min *9*; Q(β^+)=5473 *8*; %β^+ decay=100.0

Although the strongest decay branch has probably been reported, since the decay energy is over 5 MeV and only levels below 350 keV have been observed, higher energy states should be expected.

1974Vo03: spallation by 660-MeV protons on silver and chemical separation; measured γ singles and $\gamma\gamma$ coincidences with parent activity separated by $T_{1/2}$ for each γ ray.

1986CoZQ: ^{58}Ni(^{32}S,3p), E(^{32}S)=110 MeV; measured γ singles and $\gamma\gamma$ coincidences.

1977Ko05: ^{58}Ni(^{32}S,n2p)^{87}Mo and ^{58}Ni(^{32}S,3p)^{87}Nb, E=111 MeV; measured γ singles and $\gamma\gamma$ coincidences.

1971Do01: ^{58}Ni(^{32}S,3p), E(^{32}S)=90-100 MeV; measured γ singles.

1972Tu03: ^{90}Zr(p,4n); measured γ singles and $\gamma\gamma$ coincidences.

^{87}Zr Levels

E(level)	J^π[†]
0.0	9/2$^+$
201.2 *2*	7/2$^+$
336.4 *3*	1/2$^-$

[†] From ^{87}Zr Adopted Levels.

ε,β^+ radiations

E(decay)	E(level)	Iβ^+[†]	Iε[†]	Log *ft*	I($\varepsilon+\beta^+$)[†]	Comments
(5137 *8*)	336.4	96.90 *4*	3.10 *4*	5.344 *11*	100	av Eβ=1886.6 *39*; εK=0.02705 *16*; εL=0.003208 *18*; εM+=0.000719 *4*

[†] Absolute intensity per 100 decays.

$\gamma(^{87}Zr)$

Iγ normalization: see comment for I$_\gamma$.
coin: from 1972Tu03.

E$_\gamma$[†]	I$_\gamma$[‡&]	E$_i$(level)	J_i^π	E$_f$	J_f^π	Mult.[#]	δ[#]	α[@]	Comments
135.2 *3*	27.2 *6*	336.4	1/2$^-$	201.2	7/2$^+$	E3		2.66 *5*	α(K)=1.97 *4*; α(L)=0.568 *10*; α(M)=0.1014 *18* α(N)=0.01286 *22*; α(O)=0.000313 *5* α: α(K)exp=2.02 *12* and K/L+M=3.02 *3* from a β^+ study in 1991Mi15. This confirms the E3 character.
201.2 *2*	96.4	201.2	7/2$^+$	0.0	9/2$^+$	(M1+E2)	−0.35	0.0370	α(K)=0.0323 *5*; α(L)=0.00386 *6*; α(M)=0.000671 *10* α(N)=9.41×10^{-5} *14*; α(O)=6.17×10^{-6} *9* α: α(K)exp=0.049 *5* and K/L+M=7.07 *36* from a β^+ study in 1991Mi15. From this, the authors infer δ=0.72 *10*. a re-analysis yields δ=0.4 *4*.

Continued on next page (footnotes at end of table)

^{87}Nb β^+ decay (3.75 min) 1974Vo03,1986CoZQ,1977Ko05 (continued)

$\gamma(^{87}Zr)$ (continued)

† Weighted average from 1974Vo03, 1977Ko05, and 1972Tu03.

‡ From $I_\gamma(1+\alpha)=100$ for each γ ray. This gives $I_\gamma(135)/I_\gamma(201)=0.282$, which compares favorably to the measured value of 0.285 *8* (1972Tu03); others: 0.20 *5* (1971Do01) and 0.27 *3* (1974Vo03). No significant ε feeding is expected to the ground state and the 201 level since they would be unique 3rd forbidden and 3rd forbidden, respectively, with expected log*ft* values of ≈ 21 and ≈ 17 (1998Si17), compared to the allowed transition to the 335 level.

From Adopted Levels.

@ Additional information 1.

& Absolute intensity per 100 decays.

^{87}Nb β^+ decay (3.75 min) 1974Vo03,1986CoZQ,1977Ko05

Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays