## $^{25}$Ne $\beta^-$ decay (603 ms) 1973Go11

History

| Type | Author | Citation | Literature Cutoff Date |
|---|---|---|---|
| Full Evaluation | M. Shamsuzzoha Basunia, Anagha Chakraborty | NDS 205,1 (2025) | 31-May-2025 |

Parent: $^{25}$Ne: E=0.0; $J^\pi=1/2^+$; $T_{1/2}$=603 ms *8*; Q($\beta^-$)=7334 *8*; %$\beta^-$ decay=100

$^{25}$Ne-$J^\pi$,$T_{1/2}$: from $^{25}$Ne Adopted Levels.

$^{25}$Ne-Q($\beta^-$): from 2021Wa16.

Source produced by $^{9}$Be($^{18}$O,2p) E=44 MeV; Ge(Li) detector, NE102 scintillator. Measured E$\gamma$, I$\gamma$, $\gamma$-$\beta$ coincidence; deduced $\beta$ feeding, log *ft*, $^{25}$Ne half-life, etc.

### $^{25}$Na Levels

| E(level)[†] | $J^\pi$ | $T_{1/2}$[‡] |
|---|---|---|
| 0 | $5/2^+$ | 59.3 s *9* |
| 89.53 *10* | $3/2^+$ | 5.1 ns *3* |
| 1069.32 *19* | $1/2^+$ | 1.27 ps *14* |
| 2202.1 *10* | $3/2^+$ | 23 fs *4* |
| 3688 *3* | $(3/2)^+$ | 18 fs *8* |
| 4290 *3* | $1/2^+$ | |

† From a least-squares fit to E$\gamma$ ignoring the calculated E$\gamma$.

‡ From Adopted Levels.

### $\beta^-$ radiations

av E$\beta$: Additional information 1.

| E(decay) | E(level) | I$\beta^-$[†‡] | Log *ft* | Comments |
|---|---|---|---|---|
| (3044[#] *9*) | 4290 | >0.52 | <4.9 | av E$\beta$=1328.8 *43*<br>I$\beta^-$: tentatively proposed limit (≥0.52 *15*) by authors based on the I$\gamma$(3220) in 1973Go11, since total $\gamma$ branch from the level is not known. Other: 0.53 *15* from intensity balance. |
| (3646 *9*) | 3688 | 1.2 *3* | 4.87 *11* | av E$\beta$=1618.6 *43*<br>I$\beta^-$: other: 1.18 *30* (1973Go11). |
| (5132 *8*) | 2202.1 | 2.1 *5* | 5.3 *1* | av E$\beta$=2340.8 *39*<br>I$\beta^-$: other: 2.3 *5* (1973Go11). |
| (6265 *8*) | 1069.32 | 20.0 *20* | 4.72 *5* | av E$\beta$=2895.1 *39*<br>I$\beta^-$: other: 19.2 *20* (1973Go11). |
| (7245 *8*) | 89.53 | 76.8 *21* | 4.43 *1* | av E$\beta$=3375.1 *39*<br>I$\beta^-$: other: 76.8 *19* (1973Go11). |
| (7334 *8*) | 0 | | | I$\beta^-$: In 1973Go11, an upper limit of ≤20 (at the 85% confidence level) g.s. feeding was proposed based on their measured value of $\beta_0/\beta_1$=0.17 *9*. For a g.s. feeding of I$\beta$=10 *10*, the log *ft*=4.43 *1* can be obtainted, which would indicate an allowed transition, whereas for a $1/2^+$ to $5/2^+$ non-unique 2nd forbidden $\beta$ transition log *ft*≥10.95 (2023Tu02) can be expected. Only a very small branch like I$\beta$≤0.004 can satisfy the log *ft* limit. The evaluator assumes a "zero" g.s. $\beta$ feeding. |

† From intensity balance at each level, except where noted otherwise. The values of 1973Go11 are listed in the comments.

‡ Absolute intensity per 100 decays.

# Existence of this branch is questionable.

## $^{25}$Ne $\beta^-$ decay (603 ms) 1973Go11 (continued)

### $\gamma(^{25}Na)$

Iγ normalization: authors report Iγ per 100 decay in 1973Go11 (calculated assuming Σ(Iγ) to the g.s.=100 and no β feeding to the g.s.). Note that in the abstract the same Iγ′s are mentioned as relative intensity, in fact it is relative in absolute scale, i.e. per 100 decay.

| $E_\gamma$ | $I_\gamma$[†][@] | $E_i$(level) | $J_i^\pi$ | $E_f$ | $J_f^\pi$ | Mult.[‡] | $\delta$[‡] | $\alpha$[#] | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 89.55 *10* | 95.5 *6* | 89.53 | $3/2^+$ | 0 | $5/2^+$ | M1(+E2) | +0.074 *74* | 0.0027 *15* | $\alpha$(K)=0.0026 *14*; $\alpha$(L)=1.6×10$^{-4}$ *9*; $\alpha$(M)=3.4×10$^{-6}$ *19*<br>$E_\gamma$: from Adopted Gammas. Other: 89.53 *10* (1973Go11). |
| 979.77 *16* | 18.1 *19* | 1069.32 | $1/2^+$ | 89.53 | $3/2^+$ | | | | |
| 1069.30 *19* | 2.34 *38* | 1069.32 | $1/2^+$ | 0 | $5/2^+$ | [E2] | | | $E_\gamma$: calculated value (89.53 *10* + 979.77 *16*) in 1973Go11. |
| 1132.8 *10* | 0.4 *3* | 2202.1 | $3/2^+$ | 1069.32 | $1/2^+$ | M1(+E2) | +0.05 *9* | 9.97×10$^{-6}$ *16* | $\alpha$(K)=7.88×10$^{-6}$ *12*; $\alpha$(L)=4.73×10$^{-7}$ *7*;<br>$\alpha$(M)=1.059×10$^{-8}$ *17*<br>$\alpha$(IPF)=1.60×10$^{-6}$ *5*<br>$E_\gamma$: calculated value (2202.0 *10* − 1069.30) in 1973Go11. |
| 2112.5 *10* | 0.62 *19* | 2202.1 | $3/2^+$ | 89.53 | $3/2^+$ | | | | $E_\gamma$: calculated value (2202.0 *10* − 89.53) in 1973Go11. |
| 2202.0 *10* | 1.1 *3* | 2202.1 | $3/2^+$ | 0 | $5/2^+$ | | | | |
| 3220[&] *3* | 0.53 *15* | 4290 | $1/2^+$ | 1069.32 | $1/2^+$ | | | | |
| 3599 *3* | 0.22 *16* | 3688 | $(3/2)^+$ | 89.53 | $3/2^+$ | | | | $E_\gamma$: calculated value (3688 *3* − 89) in 1973Go11. |
| 3688 *3* | 0.96 *24* | 3688 | $(3/2)^+$ | 0 | $5/2^+$ | | | | |

† From 1973Go11.
‡ From Adopted Gammas.
# Additional information 2.
@ Absolute intensity per 100 decays.
& Placement of transition in the level scheme is uncertain.





$^{25}_{11}Na_{14}$-2

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### Decay Scheme

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