# $^{97}$Nb $\beta^-$ decay 1970Ar11,1969Si03,1968Gr05

| Type | Author | History Citation | Literature Cutoff Date |
|---|---|---|---|
| Full Evaluation | N. Nica | NDS 111, 525 (2010) | 19-Nov-2009 |

Parent: $^{97}$Nb: E=0.0; $J^\pi=9/2^+$; $T_{1/2}$=72.1 min *7*; Q($\beta^-$)=1934.8 *18*; %$\beta^-$ decay=100.0

$^{97}$Nb-ADOPTED values for $^{97}$Nb.

Level scheme as proposed by 1968Gr05 and modified by 1969Si03 and 1970Ar11. Measured E$\gamma$, I$\gamma$, $\gamma\gamma$ (only coin detected: a very weak (658)(856)). Additional information from: 1965Hu02: $\beta\gamma$(t); 1970Be28: $\beta\gamma(\theta$,CP); 1976Kr01: $\gamma(\theta)$ from polarized nuclei.

Other: 1970Ho01.

## $^{97}$Mo Levels

| E(level)[†] | $J^\pi$[‡] | $T_{1/2}$ | Comments |
|---|---|---|---|
| 0.0 | $5/2^+$ | stable | |
| 657.97 *9* | $7/2^+$ | 2.0 ps *5* | $J^\pi$: J ≠ 9/2, $\beta\gamma(\theta$,CP) (1970Be28).<br>$T_{1/2}$: adopted value 2.0 ps *5*;<21 ps from $\beta\gamma$(t) (1965Hu02). |
| 719.49 *13* | $5/2^+$ | | |
| 1024.4 *3* | $7/2^+$ | | |
| 1117.03 *18* | $9/2^+$ | | |
| 1268.65 *10* | $7/2^+$ | | |
| 1515.56 *15* | $9/2^+$ | | |
| 1629.06 *15* | $7/2^+$ | | |

[†] Least squares fit to E$\gamma$.
[‡] From Adopted Levels.

## $\beta^-$ radiations

| E(decay) | E(level) | I$\beta^-$[†] | Log *ft* | Comments |
|---|---|---|---|---|
| (305.7 *18*) | 1629.06 | 0.065 *10* | 6.34 *7* | av E$\beta$=88.80 *60* |
| (419.2 *18*) | 1515.56 | 0.167 *15* | 6.38 *4* | av E$\beta$=127.30 *64* |
| (666.2 *18*) | 1268.65 | 0.196 *22* | 7.01 *5* | av E$\beta$=218.37 *70* |
| (817.8 *18*) | 1117.03 | 0.085 *8* | 7.69 *5* | av E$\beta$=278.09 *73* |
| (910.4 *18*) | 1024.4 | 1.09 *7* | 6.75 *3* | av E$\beta$=315.69 *75* |
| (1215.3[‡] *18*) | 719.49 | <0.016 | >9.1 | av E$\beta$=444.07 *78* |
| (1276.8 *18*) | 657.97 | 98.39 *9* | 5.353 *5* | av E$\beta$=470.67 *79*<br>I$\beta^-$: GTOL upper limit (method 1): 0.19. |

[†] Absolute intensity per 100 decays.
[‡] Existence of this branch is questionable.

## $\gamma(^{97}$Mo)

I$\gamma$ normalization: Σ (I$\gamma$ to g.s.)=100. No $\beta^-$ decay to g.s. ($1/2^+$ to $5/2^+$ transition).

| E$_\gamma$[†] | I$_\gamma$[†#] | E$_i$(level) | $J_i^\pi$ | E$_f$ | $J_f^\pi$ |
|---|---|---|---|---|---|
| [x]178.0[‡] *3* | 0.05[‡] *1* | | | | |
| [x]238.4[‡] *3* | 0.05[‡] *1* | | | | |
| 549.25 *20* | 0.05 *1* | 1268.65 | $7/2^+$ | 719.49 | $5/2^+$ |

Continued on next page (footnotes at end of table)

## $^{97}$Nb $\beta^-$ decay 1970Ar11,1969Si03,1968Gr05 (continued)

### $\gamma(^{97}Mo)$ (continued)

| $E_\gamma$ [†] | $I_\gamma$ [†#] | $E_i$(level) | $J_i^\pi$ | $E_f$ | $J_f^\pi$ | Mult. | $\delta$ | $\alpha$ [@] | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 657.94 *9* | 100 | 657.97 | $7/2^+$ | 0.0 | $5/2^+$ | M1+E2 | −0.05 *3* | 0.00204 | $\alpha$(K)=0.00179 *3*; $\alpha$(L)=0.000202 *3*; $\alpha$(M)=3.60×10$^{-5}$ *5*; $\alpha$(N+..)=5.81×10$^{-6}$ *9* $\alpha$(N)=5.49×10$^{-6}$ *8*; $\alpha$(O)=3.14×10$^{-7}$ *5* Mult.,$\delta$: from 1976Kr01. |
| 719.53 *19* | 0.092 *9* | 719.49 | $5/2^+$ | 0.0 | $5/2^+$ | | | | |
| 857.46 *21* | 0.046 *7* | 1515.56 | $9/2^+$ | 657.97 | $7/2^+$ | | | | |
| 909.55 *14* | 0.041 *7* | 1629.06 | $7/2^+$ | 719.49 | $5/2^+$ | | | | |
| 1024.4 *3* | 1.11 *7* | 1024.4 | $7/2^+$ | 0.0 | $5/2^+$ | | | | |
| 1117.02 *18* | 0.087 *8* | 1117.03 | $9/2^+$ | 0.0 | $5/2^+$ | | | | |
| [x]1148.6[‡] *3* | 0.05[‡] *1* | | | | | | | | |
| 1268.62 *10* | 0.15 *2* | 1268.65 | $7/2^+$ | 0.0 | $5/2^+$ | | | | |
| 1515.66 *19* | 0.124 *13* | 1515.56 | $9/2^+$ | 0.0 | $5/2^+$ | | | | |
| 1629.09 *22* | 0.025 *7* | 1629.06 | $7/2^+$ | 0.0 | $5/2^+$ | | | | |

[†] Weighted average of data from 1968Gr05, 1969Si03, 1970Ar11.
[‡] From 1970Ar11.
[#] For absolute intensity per 100 decays, multiply by 0.9823 *8*.
[@] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on $\gamma$-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.
[x] $\gamma$ ray not placed in level scheme.

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### Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 decays through this branch