# $^{85}$Br $\beta^-$ decay (2.90 min) 1975Nu03,1975Hu02,1971Er15

History

| Type | Author | Citation | Literature Cutoff Date |
|---|---|---|---|
| Full Evaluation | Balraj Singh and Jun Chen | NDS 116, 1 (2014) | 31-Dec-2013 |

Parent: $^{85}$Br: E=0.0; $J^\pi=3/2^-$; $T_{1/2}$=2.90 min *6*; Q($\beta^-$)=2905 *4*; %$\beta^-$ decay=100.0

$^{85}$Br-$J^\pi$,$T_{1/2}$: From $^{85}$Br Adopted Levels.

$^{85}$Br-Q($\beta^-$): From 2012Wa38.

0.18% decay to $^{85}$Kr(10.756 y), 99.82% decay to $^{85}$Kr (4.480 h).

1975Nu03: $^{85}$Br source prepared by fast chemical separation of $^{235}$U fission products. Contributions from $^{85}$Br decay were enhanced by varying the separation time. Measured E$\gamma$, I$\gamma$, I$\beta$. Deduced levels, J, $\pi$, $\beta$ branches, log *ft*.

1975Hu02: irradiations were carried out in a beam hole of the LIDO reactor at Atomic Energy Research Establishment, Harwell, Didcot, Berkshire. Measured E$\gamma$, I$\gamma$. Deduced levels, $\gamma$ branching ratios.

1971Er15: samples containing 2.0 mg of 93.5% enriched $^{235}$U were irradiated in the MIT reactor. Measured E$\gamma$, I$\gamma$. Deduced levels, $\gamma$ branching ratios.

For $\beta^-$ measurements see 1977AlYV.

Others: 1979Al05, 1975Al11, 1974Gr29, 1966Wi19.

## $^{85}$Kr Levels

| E(level) | $J^\pi$[†] | $T_{1/2}$[†] | Comments |
|---|---|---|---|
| 0.0 | $9/2^+$ | 10.739 y *14* | |
| 304.88 *7* | $1/2^-$ | 4.480 h *8* | %IT=21.2 *5*; %$\beta^-$=78.8 *5* |
| 1107.32 *9* | $1/2^-$,$3/2^-$ | | |
| 1140.74 *8* | $5/2^+$ | | |
| 1166.69 *8* | (1/2,3/2,5/2$^-$) | | |
| 1223.99 *10* | ($5/2^-$) | | |
| 1342.62 *8* | ($3/2^+$) | | |
| 1416.58 *10* | ($5/2^+$) | | |
| 1873.57 *17* | $(5/2)^+$ | | |
| 1938.83 *11* | (1/2$^+$,3/2,5/2) | | |
| 2031.96 *8* | 1/2$^-$,3/2$^-$,5/2$^-$ | | |
| 2137.35 *9* | $(3/2,5/2)^-$ | | |

[†] From Adopted Levels.

## $\beta^-$ radiations

| E(decay) | E(level) | I$\beta^-$[†] | Log *ft* | Comments |
|---|---|---|---|---|
| (768 *4*) | 2137.35 | 0.42 *3* | 5.39 *4* | av E$\beta$=261.4 *16* |
| (873 *4*) | 2031.96 | 2.23 *16* | 4.87 *4* | av E$\beta$=304.2 *17* |
| (966 *4*) | 1938.83 | 0.110 *11* | 6.34 *5* | av E$\beta$=342.9 *17* |
| (1488 *4*) | 1416.58 | 0.066 *8* | 7.29 *6* | av E$\beta$=569.8 *18* |
| (1562 *4*) | 1342.62 | 0.048 *14* | 7.5 *1* | av E$\beta$=602.9 *18* |
| (1681 *4*) | 1223.99 | 0.52 *5* | 6.60 *5* | av E$\beta$=656.5 *19* |
| (1764 *4*) | 1140.74 | 0.025 *8* | 8.0 *2* | av E$\beta$=694.4 *19* |
| (1798 *4*) | 1107.32 | 0.83 *10* | 6.52 *6* | av E$\beta$=709.6 *19* |
| (2600 *4*) | 304.88 | 96 *2* | 5.12 *2* | av E$\beta$=1082.7 *19* |
| | | | | E(decay): measured $\beta$ end-point energy=2565 *19*. |

[†] Absolute intensity per 100 decays.

## $^{85}$Br $\beta^-$ decay (2.90 min) 1975Nu03,1975Hu02,1971Er15 (continued)

### $\gamma(^{85}Kr)$

I$\gamma$ normalization: From I$\gamma$(924$\gamma$)=1.63 *10* per 100 decays of $^{85}$Br measured relative to I$\gamma$(151$\gamma$) in the $^{85}$Kr $\beta^-$ decay (4.48 h).

| E$_\gamma$ [†] | I$_\gamma$ [†#] | E$_i$(level) | J$_i^\pi$ | E$_f$ | J$_f^\pi$ | Mult. | $\alpha$ [@] | Comments |
|---|---|---|---|---|---|---|---|---|
| [x]96.87 *7* | 2.31 *14* | | | | | | | |
| [x]147.63 *17* | 2.4 *6* | | | | | | | |
| 175.91 *7* | 3.54 *19* | 1342.62 | (3/2$^+$) | 1166.69 | (1/2,3/2,5/2$^-$) | | | |
| 201.87 *9* | 1.45 *11* | 1342.62 | (3/2$^+$) | 1140.74 | 5/2$^+$ | | | |
| 235.58 *25* | 0.52 *16* | 1342.62 | (3/2$^+$) | 1107.32 | 1/2$^-$,3/2$^-$ | | | |
| 249.94 *10* | 1.26 *7* | 1416.58 | (5/2$^+$) | 1166.69 | (1/2,3/2,5/2$^-$) | | | |
| 263.84 *17* | 0.65 *20* | 2137.35 | (3/2,5/2)$^-$ | 1873.57 | (5/2)$^+$ | | | |
| [x]272.05 *10* | 4.42 *22* | | | | | | | |
| 304.87 *9* | | 304.88 | 1/2$^-$ | 0.0 | 9/2$^+$ | M4 | 0.511 | $\alpha$(K)=0.434; $\alpha$(L)=0.0658; $\alpha$(M)=0.01089; $\alpha$(N)=0.001043 |
| [x]421.7 *3* | 5.6 *4* | | | | | | | |
| [x]433.73 *16* | 0.90 *11* | | | | | | | |
| [x]455.62 *15* | 1.26 *18* | | | | | | | |
| [x]541.67[‡] *18* | 1.28 *20* | | | | | | | |
| [x]546.6 *3* | 0.96 *19* | | | | | | | |
| [x]600.91 *21* | 1.2 *3* | | | | | | | |
| 689.39 *8* | 2.5 *4* | 2031.96 | 1/2$^-$,3/2$^-$,5/2$^-$ | 1342.62 | (3/2$^+$) | | | |
| 766.4 *3* | 0.72 *19* | 1873.57 | (5/2)$^+$ | 1107.32 | 1/2$^-$,3/2$^-$ | | | |
| 771.7 *4* | 0.74 *21* | 1938.83 | (1/2$^+$,3/2,5/2) | 1166.69 | (1/2,3/2,5/2$^-$) | | | |
| 794.78 *10* | 6.4 *5* | 2137.35 | (3/2,5/2)$^-$ | 1342.62 | (3/2$^+$) | | | |
| 798.35 *18* | 2.9 *4* | 1938.83 | (1/2$^+$,3/2,5/2) | 1140.74 | 5/2$^+$ | | | |
| 802.41 *10* | 156.9 *16* | 1107.32 | 1/2$^-$,3/2$^-$ | 304.88 | 1/2$^-$ | | | |
| [x]810.00 *18* | 0.89 *20* | | | | | | | |
| [x]824.09[‡] *21* | 0.75 *17* | | | | | | | |
| 831.48 *7* | 3.1 *3* | 1938.83 | (1/2$^+$,3/2,5/2) | 1107.32 | 1/2$^-$,3/2$^-$ | | | |
| 861.76 *8* | 14.0 *8* | 1166.69 | (1/2,3/2,5/2$^-$) | 304.88 | 1/2$^-$ | | | |
| 865.22 *8* | 10.9 *6* | 2031.96 | 1/2$^-$,3/2$^-$,5/2$^-$ | 1166.69 | (1/2,3/2,5/2$^-$) | | | |
| 913.31 *9* | 8.2 *5* | 2137.35 | (3/2,5/2)$^-$ | 1223.99 | (5/2$^-$) | | | |
| 919.06 *8* | 39.9 *20* | 1223.99 | (5/2$^-$) | 304.88 | 1/2$^-$ | | | |
| 924.63 *8* | 100 *5* | 2031.96 | 1/2$^-$,3/2$^-$,5/2$^-$ | 1107.32 | 1/2$^-$,3/2$^-$ | | | |
| [x]946.2[‡] *3* | 1.12 *22* | | | | | | | |
| 1029.7 *3* | 1.4 *3* | 2137.35 | (3/2,5/2)$^-$ | 1107.32 | 1/2$^-$,3/2$^-$ | | | |
| [x]1031.87 *12* | 3.3 *3* | | | | | | | |
| 1037.83 *8* | 6.3 *5* | 1342.62 | (3/2$^+$) | 304.88 | 1/2$^-$ | | | |
| [x]1047.42[&] *18* | 1.31 *21* | | | | | | | |
| [x]1072.20 *16* | 1.83 *20* | | | | | | | |
| [x]1131.62 *15* | 1.92 *23* | | | | | | | |
| 1140.78 *9* | 5.9 *3* | 1140.74 | 5/2$^+$ | 0.0 | 9/2$^+$ | | | |
| [x]1260.45 *13* | 2.89 *25* | | | | | | | |
| 1416.48 *13* | 4.1 *4* | 1416.58 | (5/2$^+$) | 0.0 | 9/2$^+$ | | | |
| 1727.02 *11* | 23.4 *10* | 2031.96 | 1/2$^-$,3/2$^-$,5/2$^-$ | 304.88 | 1/2$^-$ | | | |
| [x]1808.23[‡] *24* | 1.00 *25* | | | | | | | |
| 1832.50 *10* | 9.2 *5* | 2137.35 | (3/2,5/2)$^-$ | 304.88 | 1/2$^-$ | | | |
| [x]2438.6 *4* | 1.10 *22* | | | | | | | |
| [x]2463.4[‡&] *4* | 1.03 *24* | | | | | | | |

[†] Unless noted otherwise, E$\gamma$ and I$\gamma$ data given are from 1975Nu03. 1971Er15 and 1975Hu02 observed $\gamma$ rays at 802, 832, and 925 keV. The 832$\gamma$ is ascribed by 1975Hu02 to $^{90}$Rb decay but, according to 1975Nu03, it contains weak contributions from both $^{85}$Br and $^{87}$Br.

Continued on next page (footnotes at end of table)

**$^{85}$Br $\beta^-$ decay (2.90 min) 1975Nu03,1975Hu02,1971Er15 (continued)**

$\gamma(^{85}Kr)$ (continued)

‡ Assignment to $^{85}$Br is uncertain.
# For absolute intensity per 100 decays, multiply by 0.0163 *10*.
@ 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.
& Placement of transition in the level scheme is uncertain.
x $\gamma$ ray not placed in level scheme.

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### Decay Scheme

Intensities: $I_\gamma$ per 100 parent decays