## $^{137}$Ba(n,n′γ) 1995Bo03

History

| Type | Author | Citation | Literature Cutoff Date |
|---|---|---|---|
| Full Evaluation | E. Browne, J. K. Tuli | NDS 108,2173 (2007) | 1-Oct-2006 |

Measured: γ, γ(θ) (1984BoZR), γ (1983Bo37,1978AhZX), fast reactor neutrons.
1997WaZZ: E(n)=1 MeV. Measured γ, HPGe.

### $^{137}$Ba Levels

| E(level) | Jπ† | E(level) | Jπ† | E(level) | Jπ† | E(level) | Jπ† |
|---|---|---|---|---|---|---|---|
| 0.0 | 3/2+ | 1463.8 *7* | 3/2+ | 1907.5 *7* | 3/2+ | 2529.9 *8* | 7/2+ |
| 283.53 *4* | 1/2+ | 1481.8 *6* | (3/2+,5/2+) | 2041.5 *7* | (5/2)+ | 2874.7 *8* | (5/2)− |
| 661.7 *8* | 11/2− | 1798.4 *8* | 7/2− | 2228.9 *7* | 7/2+ | | |
| 1251.8 *6* | 7/2+ | 1837.6 *7* | 1/2+ | 2230.0 *13* | (13/2−) | | |
| 1294.0 *6* | 5/2+ | 1899.3 *6* | 3/2+ | 2270.9 *6* | (3/2+,5/2) | | |

† Adopted values.

### γ($^{137}$Ba)

γ(θ) ($A_2$ and $A_4$) given are from 1984BoZR.

| Eγ† | Iγ† | Ei(level) | Jiπ | Ef | Jfπ | Mult.‡ | α# | Comments |
|---|---|---|---|---|---|---|---|---|
| 230.0 *4* | | 1481.8 | (3/2+,5/2+) | 1251.8 | 7/2+ | | | |
| 283.53 *4* | 100 | 283.53 | 1/2+ | 0.0 | 3/2+ | | | Eγ: from 1997WaZZ; the authors find no evidence for previously reported 279γ. Mult.: $A_2$=0.0 *7*, $A_4$=0.0 *7*. |
| 371.3 | 7 | 2270.9 | (3/2+,5/2) | 1899.3 | 3/2+ | | | |
| 504.0 | 2 | 1798.4 | 7/2− | 1294.0 | 5/2+ | | | |
| 578.0 | 8 | 2041.5 | (5/2)+ | 1463.8 | 3/2+ | | | |
| 622.2 | 13 | 2529.9 | 7/2+ | 1907.5 | 3/2+ | | | |
| 661.65 | 100 | 661.7 | 11/2− | 0.0 | 3/2+ | | | |
| 731.1 | 17 | 2529.9 | 7/2+ | 1798.4 | 7/2− | | | |
| 747.43& | 26& | 2041.5 | (5/2)+ | 1294.0 | 5/2+ | | | |
| 747.5& | 40& | 2228.9 | 7/2+ | 1481.8 | (3/2+,5/2+) | | | |
| 766.1a | 45 | 2228.9 | 7/2+ | 1463.8 | 3/2+ | | | |
| 934.9 | 15 | 2228.9 | 7/2+ | 1294.0 | 5/2+ | | | |
| x949.0 *2* | 30 *2* | | | | | | | Mult.: $A_2$=−0.11 *29*, $A_4$=−0.2 *3*. |
| 976.8@ | | 2228.9 | 7/2+ | 1251.8 | 7/2+ | | | |
| 976.8@ | 40 | 2270.9 | (3/2+,5/2) | 1294.0 | 5/2+ | | | |
| 1019.0 | 15 | 2270.9 | (3/2+,5/2) | 1251.8 | 7/2+ | | | |
| 1067.8a | 8 | 2529.9 | 7/2+ | 1463.8 | 3/2+ | | | |
| 1076.29 *13* | 100 | 2874.7 | (5/2)− | 1798.4 | 7/2− | | | |
| 1136.69 | 99 | 1798.4 | 7/2− | 661.7 | 11/2− | Q | | Mult.: $A_2$=+0.30 *12*, $A_4$=+0.19 *11*. |
| 1180.6 | 5 *4* | 1463.8 | 3/2+ | 283.53 | 1/2+ | D | | Mult.: $A_2$=−0.11 *20*, $A_4$=−0.26 *20*. |
| 1198.33 | 40 | 1481.8 | (3/2+,5/2+) | 283.53 | 1/2+ | | | Mult.: $A_2$=−0.10 *20*, $A_4$=−0.11 *19*. |
| x1220.5 *1* | 85 *3* | | | | | | | Mult.: $A_2$=−0.44 *17*, $A_4$=−0.42 *20*. |
| 1236.4 | 24 | 2529.9 | 7/2+ | 1294.0 | 5/2+ | | | |
| 1251.81 | 100 *20* | 1251.8 | 7/2+ | 0.0 | 3/2+ | E2 | $1.14\times10^{-3}$ | α(K)=0.000974 *14*; |

Continued on next page (footnotes at end of table)

## $^{137}$Ba(n,n′γ) 1995Bo03 (continued)

### γ($^{137}$Ba) (continued)

| $E_\gamma$ [†] | $I_\gamma$ [†] | $E_i$(level) | $J_i^\pi$ | $E_f$ | $J_f^\pi$ | Mult. [‡] | Comments |
|---|---|---|---|---|---|---|---|
| | | | | | | | $\alpha$(L)=0.0001245 *18*; $\alpha$(M)=2.56×10$^{-5}$ *4*; $\alpha$(N+..)=1.98×10$^{-5}$ *3* $\alpha$(N)=5.51×10$^{-6}$ *8*; $\alpha$(O)=8.41×10$^{-7}$ *12*; $\alpha$(P)=6.06×10$^{-8}$ *9*; $\alpha$(IPF)=1.341×10$^{-5}$ *19* Mult.: $A_2$=+0.26 *10*, $A_4$=−0.03 *9*. |
| 1293.90 | 100 | 1294.0 | 5/2$^+$ | 0.0 | 3/2$^+$ | | |
| [x]1356.9 *1* | 47 *2* | | | | | | Mult.: $A_2$=−0.31 *23*, $A_4$=−0.41 *20*. |
| [x]1388.0 *1* | 40 *2* | | | | | | Mult.: $A_2$=+0.48 *24*, $A_4$=+0.59 *20*. |
| [x]1404.6 *2* | 62 *5* | | | | | | Mult.: $A_2$=+0.04 *29*, $A_4$=−0.10 *29*. |
| 1463.91 | 95 | 1463.8 | 3/2$^+$ | 0.0 | 3/2$^+$ | | |
| 1481.66 | 60 | 1481.8 | (3/2$^+$,5/2$^+$) | 0.0 | 3/2$^+$ | | Mult.: $A_2$=−0.08 *16*, $A_4$=−0.07 *18*. |
| 1553.64 | 69 | 1837.6 | 1/2$^+$ | 283.53 | 1/2$^+$ | | Mult.: $A_2$=+0.09 *27*, $A_4$=+0.08 *26*. |
| 1568.3 | 100 | 2230.0 | (13/2$^-$) | 661.7 | 11/2$^-$ | | |
| 1615.8 | 46 | 1899.3 | 3/2$^+$ | 283.53 | 1/2$^+$ | | |
| 1623.10[a] *22* | | 2874.7 | (5/2)$^-$ | 1251.8 | 7/2$^+$ | | |
| 1623.32 | 50 | 1907.5 | 3/2$^+$ | 283.53 | 1/2$^+$ | | Mult.: $A_2$=+0.28 *25*, $A_4$=+0.56 *22*. |
| 1838.0 | 31 | 1837.6 | 1/2$^+$ | 0.0 | 3/2$^+$ | | |
| 1868.8[a] | 38 | 2529.9 | 7/2$^+$ | 661.7 | 11/2$^-$ | | |
| [x]1892.6 *2* | 106 *6* | | | | | | $A_2$=+0.35 *23*, $A_4$=+0.28 *21*. |
| 1899.0 | 54 *6* | 1899.3 | 3/2$^+$ | 0.0 | 3/2$^+$ | D | Mult.: $A_2$=−0.12 *26*, $A_4$=+0.26 *24*. |
| 1908.0 | 50 | 1907.5 | 3/2$^+$ | 0.0 | 3/2$^+$ | | |
| [x]2041.1 *2* | 39 *3* | | | | | | Mult.: $A_2$=+0.11 *21*, $A_4$=+0.20 *20*. |
| 2041.1 | 65 | 2041.5 | (5/2)$^+$ | 0.0 | 3/2$^+$ | | |
| [x]2065.0 *2* | 59 *4* | | | | | | Mult.: $A_2$=+0.29 *29*, $A_4$=+0.27 *27*. |
| [x]2177.9 *2* | 42 *4* | | | | | | Mult.: $A_2$=+0.1 *4*, $A_4$=0.0 *3*. |
| 2271.4 | 38 | 2270.9 | (3/2$^+$,5/2) | 0.0 | 3/2$^+$ | | |

[†] From 1995Bo03 based on their earlier work, 1983Bo37. Relative photon branching from each level are given. E values are derived from the average values of (n,γ), (n,n′γ) given in 1995Bo03. The uncertainties in Eγ are either from (n,γ) or not given by the authors. The unplaced γ′s and their relative intensities are from 1984BoZR.

[‡] From 1984BoZR, unless given otherwise.

[#] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

[@] Multiply placed.

[&] Multiply placed with intensity suitably divided.

[a] Placement of transition in the level scheme is uncertain.

[x] γ ray not placed in level scheme.

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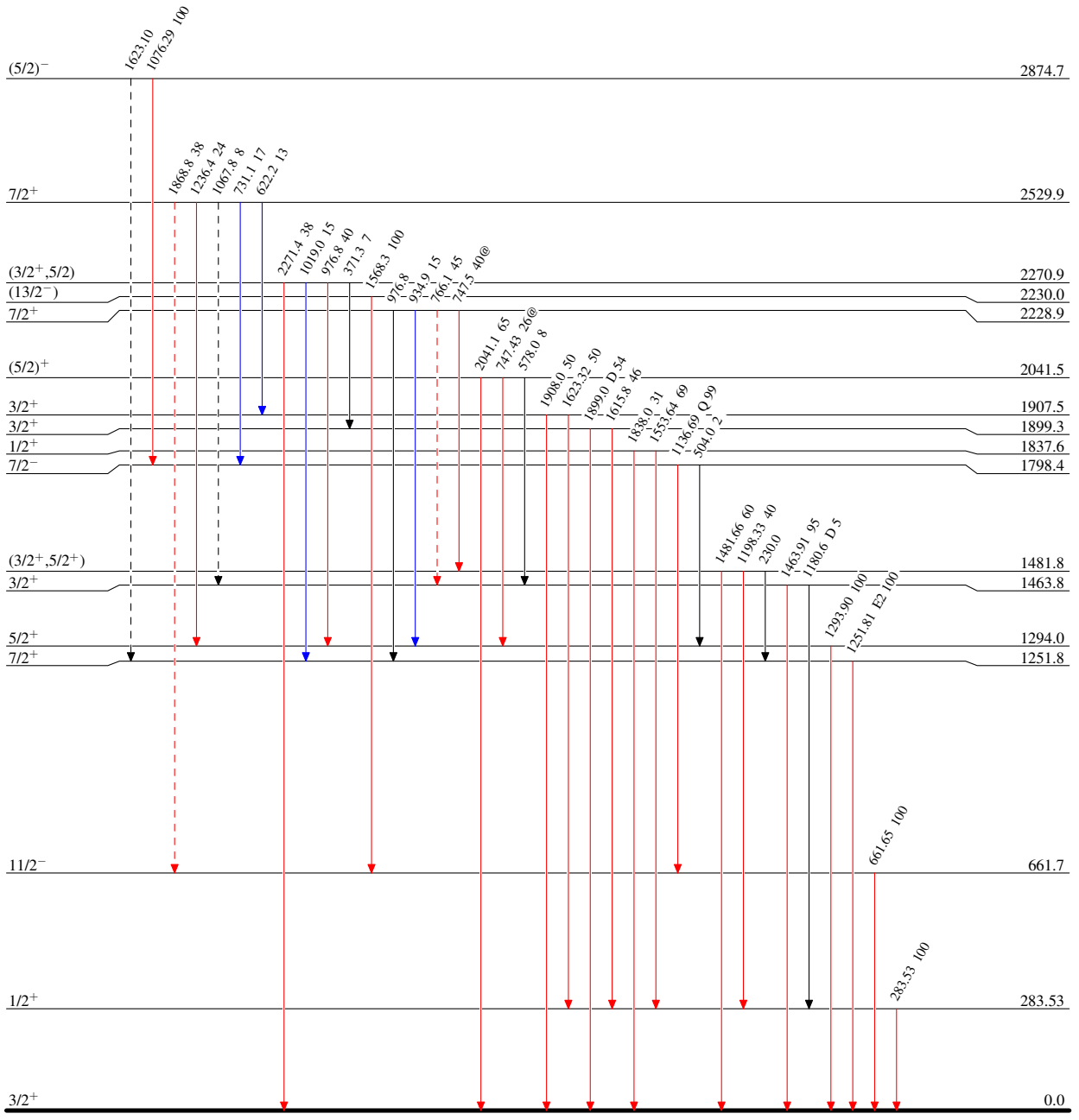
### Level Scheme

Intensities: Type not specified
@ Multiply placed: intensity suitably divided

Legend
$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$
γ Decay (Uncertain)




$^{137}_{56}Ba_{81}$