## $^{156}$Gd($^{34}$S,4n$\gamma$),$^{170}$Yb($^{20}$Ne,4n$\gamma$) 1984JaZS,1983Ja18,1974Pr02

History

| Type | Author | Citation | Literature Cutoff Date |
|---|---|---|---|
| Full Evaluation | J. C. Batchelder and A. M. Hurst, M. S. Basunia | NDS 183, 1 (2022) | 1-Mar-2022 |

1983Ja18: $^{156}$Gd($^{34}$S,4n$\gamma$), E not stated; measured E$\gamma$, I$\gamma$, $\gamma\gamma$ coin, $\gamma(\theta)$, excit. See also: 1984JaZS.
1974Pr02: $^{170}$Yb($^{20}$Ne,4n$\gamma$), E=108 MeV; measured recoil-distance Doppler shifts; deduced $T_{1/2}$.

### $^{186}$Hg Levels

| E(level) | J$^\pi$‡ | $T_{1/2}$† | Comments |
|---|---|---|---|
| 0.0@ | $0^+$ | | |
| 405.3@ | $2^+$ | 18 ps *3* | |
| 620.3& | $2^+$ | | |
| 807.9& | $4^+$ | 9 ps *3* | |
| 1080.2@ | $(4)^+$ | | |
| 1164.5& | $6^+$ | 5 ps *2* | |
| 1228.0 | | | |
| 1577.4 | | | |
| 1588.7& | $8^+$ | ≈3 ps | |
| 1676.3@ | $(6^+)$ | | |
| 1975.2 | | | |
| 2077.6& | $10^+$ | | |
| 2184.8 | | | |
| 2216.9 | | 82 $\mu$s *5* | $T_{1/2}$: from 1984JaZS. |
| 2251.4?@ | | | Level not confirmed by other reaction studies; not adopted. |
| 2619.6& | $12^+$ | | |
| 2833.2[a] | $10^+$ | | |
| 3088.7[a] | $12^+$ | | J$^\pi$: $11^-$ in Adopted Levels. |
| 3201.2& | $14^+$ | | |
| 3470.5#[a] | $14^+$ | | J$^\pi$: $13^-$ in Adopted Levels. |
| 3812.2& | $16^+$ | | |
| 3827.2[a] | $16^+$ | | |
| 4268.2[a] | $18^+$ | | J$^\pi$: $(17^-)$ in Adopted Levels. |
| 4448.8& | $18^+$ | | |
| 4775.1[a] | $20^+$ | | J$^\pi$: $(19^-)$ in Adopted Levels. |
| 5115.6& | $20^+$ | | |
| 5347.4[a] | $(22^+)$ | | J$^\pi$: $(21^-)$ in Adopted Levels. |

† From recoil-distance Doppler shift (1974Pr02).
‡ Values suggested by 1983Ja18, based on $\gamma(\theta)$ and apparent band structure.
# The order of the 356.7$\gamma$ and the 381.8$\gamma$ is uncertain, so E(level) may alternatively be 3445.5.
@ Band(A): K$^\pi$=0$^+$ oblate g.s. band. Weakly populated; no $\gamma(\theta)$ data for transitions in this band.
& Band(B): K$^\pi$=0$^+$ prolate band.
[a] Band(C): Possible $\pi$=+, $\Delta$J=2 band (1983Ja18). However, the band is shown to have negative parity in (1993Ma02) due to an assignment of $\Delta$J =1 for the 255 keV $\gamma$ transition.

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### $\gamma(^{186}Hg)$

| $E_\gamma$ † | $I_\gamma$ † | $E_i$(level) | $J_i^\pi$ | $E_f$ | $J_f^\pi$ | Mult. ‡ | Comments |
|---|---|---|---|---|---|---|---|
| (32.1#) | | 2216.9 | | 2184.8 | | | From level energy difference. |
| 187.8# | | 807.9 | $4^+$ | 620.3 | $2^+$ | | |
| 210#a | | 2184.8 | | 1975.2 | | | |
| 214.7# | | 620.3 | $2^+$ | 405.3 | $2^+$ | | |
| 241.6# | @ | 2216.9 | | 1975.2 | | | |
| 255.5 | 11.1 | 3088.7 | $12^+$ | 2833.2 | $10^+$ | Q | Mult.: differs from adopted mult=E1. |
| 349.2# | @ | 1577.4 | | 1228.0 | | | |
| 356.7 | ≈81 | 1164.5 | $6^+$ | 807.9 | $4^+$ | Q& | |
| 356.7 | ≈15 | 3827.2 | $16^+$ | 3470.5 | $14^+$ | & | See comment on 3471 level. |
| 381.8 | 16.6 | 3470.5 | $14^+$ | 3088.7 | $12^+$ | Q | |
| 386.4# | | 1975.2 | | 1588.7 | $8^+$ | | |
| 397.8# | @ | 1975.2 | | 1577.4 | | | In ($^{36}$S,4n$\gamma$) and ($^{28}$Si,4n$\gamma$), the 398$\gamma$ is a doublet; it is likely that it is a doublet in this reaction also since adopted branching indicates that I(398$\gamma$) is roughly half I(811$\gamma$), contrary to relative I$\gamma$ indicated in figure of 1984JaZS. |
| 402.6 | 84.2 | 807.9 | $4^+$ | 405.3 | $2^+$ | Q | |
| 405.3 | 100 | 405.3 | $2^+$ | 0.0 | $0^+$ | Q | |
| 412.9# | | 1577.4 | | 1164.5 | $6^+$ | | |
| 424.2 | 73.3 | 1588.7 | $8^+$ | 1164.5 | $6^+$ | Q | |
| 441.0 | 13.7 | 4268.2 | $18^+$ | 3827.2 | $16^+$ | Q | |
| 459.5# | | 1080.2 | $(4)^+$ | 620.3 | $2^+$ | | |
| 488.9 | 57.5 | 2077.6 | $10^+$ | 1588.7 | $8^+$ | Q | |
| 497.1# | | 1577.4 | | 1080.2 | $(4)^+$ | | |
| 506.9 | 11.0 | 4775.1 | $20^+$ | 4268.2 | $18^+$ | Q | |
| 542.0 | 33.9 | 2619.6 | $12^+$ | 2077.6 | $10^+$ | Q | |
| 572.3 | 6.2 | 5347.4 | $(22^+)$ | 4775.1 | $20^+$ | (Q) | |
| 575.1a | 2.7 | 2251.4? | | 1676.3 | $(6^+)$ | | |
| 581.6 | 25.0 | 3201.2 | $14^+$ | 2619.6 | $12^+$ | Q | |
| 596.1 | ≈5 | 1676.3 | $(6^+)$ | 1080.2 | $(4)^+$ | | |
| 607.4# | | 1228.0 | | 620.3 | $2^+$ | | |
| 607.4# | @ | 2184.8 | | 1577.4 | | | |
| 611.0 | 10.1 | 3812.2 | $16^+$ | 3201.2 | $14^+$ | Q | |
| 628.2# | | 2216.9 | | 1588.7 | $8^+$ | | |
| 636.6 | 9.6 | 4448.8 | $18^+$ | 3812.2 | $16^+$ | Q | |
| 666.8 | 5.9 | 5115.6 | $20^+$ | 4448.8 | $18^+$ | Q | |
| 675.2 | 8.5 | 1080.2 | $(4)^+$ | 405.3 | $2^+$ | | |
| 755.6 | 9.2 | 2833.2 | $10^+$ | 2077.6 | $10^+$ | D+Q | Mult.: $A_2$=+0.33 *20*, $A_4$=−0.11 *21* (1983Ja18); interpreted as D+Q, ΔJ=0 by authors. |
| 769.8# | | 1577.4 | | 807.9 | $4^+$ | | |
| 810.7# | | 1975.2 | | 1164.5 | $6^+$ | | |
| 1011.1 | 4.4 | 3088.7 | $12^+$ | 2077.6 | $10^+$ | Q | Mult.: $A_2$=+0.34 *29* (1983Ja18); interpreted by authors as stretched Q, but does not rule out D+Q ΔJ=0,1 or D ΔJ=0. However, adopted level scheme requires D ΔJ=1. |
| 1244.5 | 3.6 | 2833.2 | $10^+$ | 1588.7 | $8^+$ | Q | |

† From 1983Ja18, unless noted otherwise; uncertainties not stated by authors. There is no mention if the quoted I$\gamma$ values include the expected contribution from internal conversion.

‡ From unenumerated $\gamma(\theta)$ data of 1983Ja18 and band structure. Transitions were assigned as stretched E2.

# From 1984JaZS.

Continued on next page (footnotes at end of table)

**$^{156}$Gd($^{34}$S,4n$\gamma$),$^{170}$Yb($^{20}$Ne,4n$\gamma$) 1984JaZS,1983Ja18,1974Pr02 (continued)**

$\gamma(^{186}Hg)$ (continued)

@ 1984JaZS do not give I$\gamma$; however, relative intensities are indicated on their figure by the widths of lines connecting levels; from this, evaluators estimate that this is the strongest of the gammas deexciting its parent level.

& $\gamma(\theta)$ for doublet compatible with stretched Q for both components. The dominant component (1165 to 808 transition) is known from adopted gammas to be E2.

a Placement of transition in the level scheme is uncertain.

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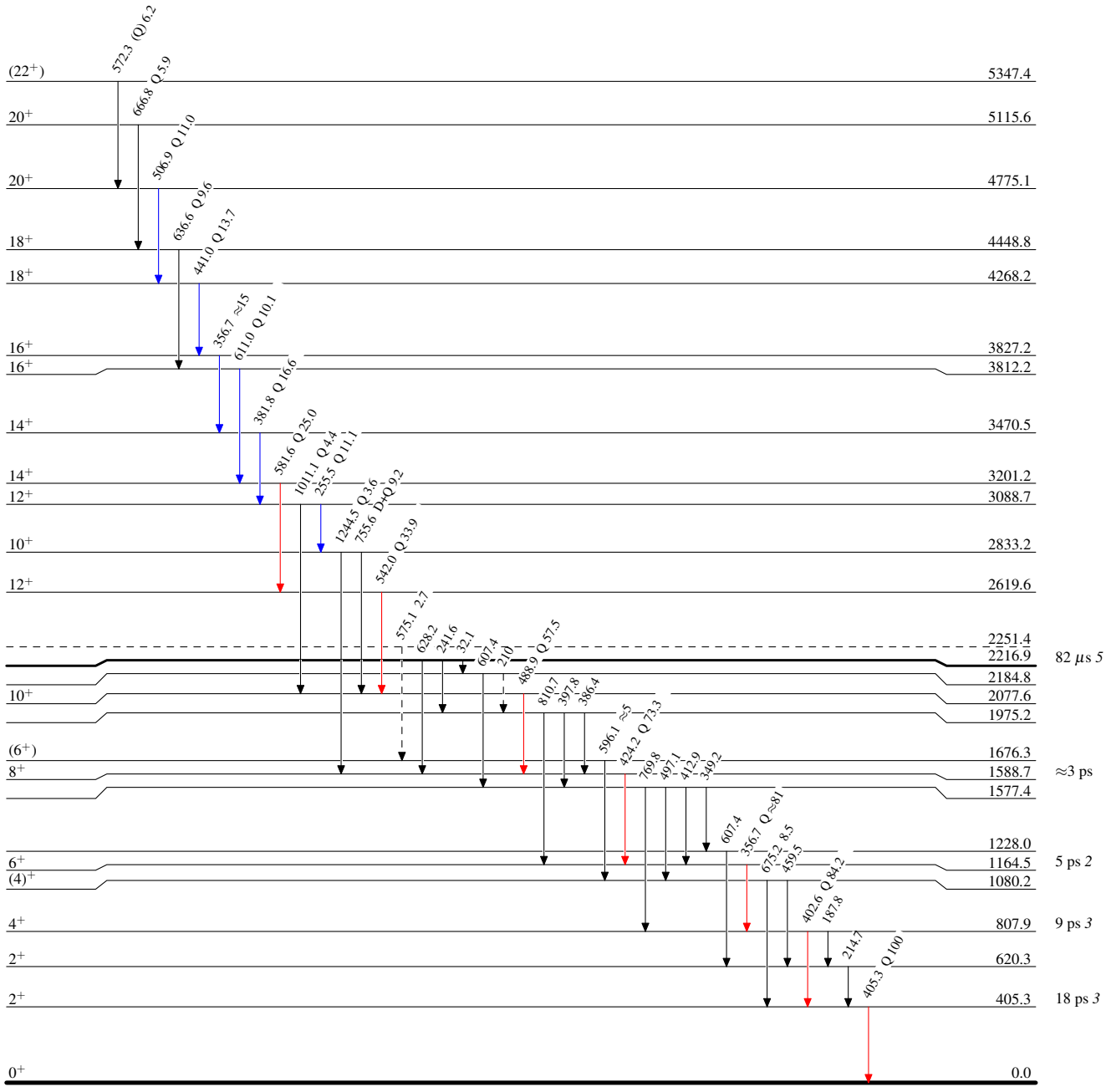
Legend

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

### Level Scheme

Intensities: Relative I$\gamma$ from ($^{34}$S,4n$\gamma$).




$^{186}_{80}Hg_{106}$

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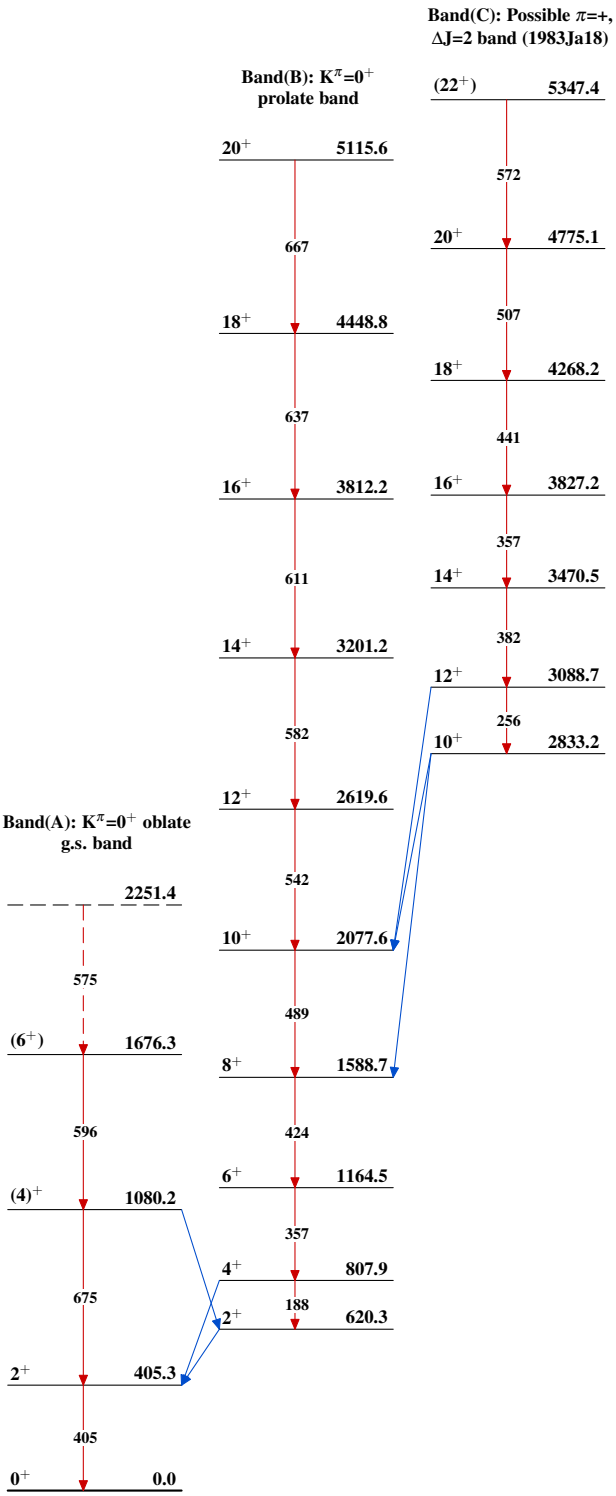


$^{186}_{80}Hg_{106}$