## $^{205}$Tl(n,2n$\gamma$) 2008Fo03

History

| Type | Author | Citation | Literature Cutoff Date |
|---|---|---|---|
| Full Evaluation | C. J. Chiara and F. G. Kondev | NDS 111,141 (2010) | 1-Oct-2009 |

2008Fo03: Target consisted of 2.2 g of Tl oxide powder enriched to 97.0% $^{205}$Tl, encased in polystyrene disk; E(n) = 1 to 25 MeV, established by N ToF; pulsed beam with beam on for 775−$\mu$s bursts every 16.7 ms, with each beam burst comprised of sub-ns pulses every 1.8 $\mu$s; GEANIE array of 11 Compton-suppressed Ge LEPS, nine Compton-suppressed coaxial Ge, and six unsuppressed coaxial Ge detectors; measured E$\gamma$, $\gamma\gamma$-coin, $\gamma$ excitation functions, $\gamma$(t) for isomer half-life in beam-off mode.
The high-spin structure shows similarities to that of $^{202}$Tl.

### $^{204}$Tl Levels

Additional information 1.

| E(level)† | J$^\pi$‡ | $T_{1/2}$ | Comments |
|---|---|---|---|
| 0.0 | $2^-$ | | |
| 139.9 *5* | $(1)^-$ | | |
| 146.0 *5* | $(0^-)$ | | |
| 414.1 *5* | $(4^-)$ | | |
| 415.6 *5* | $(1^-,2^-)$ | | |
| 1058.8 *7* | | | J$^\pi$: Similar excitation function to 414.1-keV level suggests J≈4. |
| 1100.2 *7* | | | J$^\pi$: Similar excitation function to 414.1-keV level suggests J≈4. |
| 1104.0 *7* | $(7)^+$ | 60.7 $\mu$s *12* | $T_{1/2}$: from 689.9$\gamma$(t) in beam-off mode (2008Fo03); 414.1$\gamma$(t) was also measured to be 61.4 *24* $\mu$s, but feeding from other levels possibly influencing the half-life could not be excluded by 2008Fo03. The 689.9$\gamma$ directly de-excites the $(7)^+$ isomer. |
| 1180.8 *7* | | | J$^\pi$: Similar excitation function to 414.1-keV level suggests J≈4. |
| 1285.8 *9* | $(6)^+$ | | |
| 1375.1 *7* | | | J$^\pi$: Similar excitation function to 414.1-keV level suggests J≈4. |
| 1399.5 *7* | | | J$^\pi$: Similar excitation function to 414.1-keV level suggests J≈4. |
| 1453.9 *8* | $(8^+)$ | | |
| 1650.0 *9* | $(8^+,9^+)$ | | |
| 1731.2 *10* | $(8^+,9^+)$ | | |
| 2117.4 *10* | | | |
| 2318.9 *10* | | | |

† From a least-squares fit to E$\gamma$.
‡ From 2008Fo03 based on excitation functions and comparison with $^{202}$Tl level scheme.

### $\gamma$($^{204}$Tl)

| E$_\gamma$† | E$_i$(level) | J$_i^\pi$ | E$_f$ | J$_f^\pi$ | E$_\gamma$† | E$_i$(level) | J$_i^\pi$ | E$_f$ | J$_f^\pi$ |
|---|---|---|---|---|---|---|---|---|---|
| 139.9 *5* | 139.9 | $(1)^-$ | 0.0 | $2^-$ | 546.0 *5* | 1650.0 | $(8^+,9^+)$ | 1104.0 | $(7)^+$ |
| 146.0 *5* | 146.0 | $(0^-)$ | 0.0 | $2^-$ | 644.7 *5* | 1058.8 | | 414.1 | $(4^-)$ |
| 168.1 *5* | 1453.9 | $(8^+)$ | 1285.8 | $(6)^+$ | 663.5 *5* | 2117.4 | | 1453.9 | $(8^+)$ |
| 181.8 *5* | 1285.8 | $(6)^+$ | 1104.0 | $(7)^+$ | 668.9 *5* | 2318.9 | | 1650.0 | $(8^+,9^+)$ |
| 196.0 *5* | 1650.0 | $(8^+,9^+)$ | 1453.9 | $(8^+)$ | 686.1 *5* | 1100.2 | | 414.1 | $(4^-)$ |
| 269.6 *5* | 415.6 | $(1^-,2^-)$ | 146.0 | $(0^-)$ | 689.9 *5* | 1104.0 | $(7)^+$ | 414.1 | $(4^-)$ |
| 275.6 *5* | 415.6 | $(1^-,2^-)$ | 139.9 | $(1)^-$ | 766.7 *5* | 1180.8 | | 414.1 | $(4^-)$ |
| 277.3 *5* | 1731.2 | $(8^+,9^+)$ | 1453.9 | $(8^+)$ | 961.0 *5* | 1375.1 | | 414.1 | $(4^-)$ |
| 349.9 *5* | 1453.9 | $(8^+)$ | 1104.0 | $(7)^+$ | 985.4 *5* | 1399.5 | | 414.1 | $(4^-)$ |
| 414.1 *5* | 414.1 | $(4^-)$ | 0.0 | $2^-$ | | | | | |

† Uncertainty is stated by 2008Fo03 as 0.2 to 0.5 keV; evaluators assign 0.5 keV for each $\gamma$ ray.

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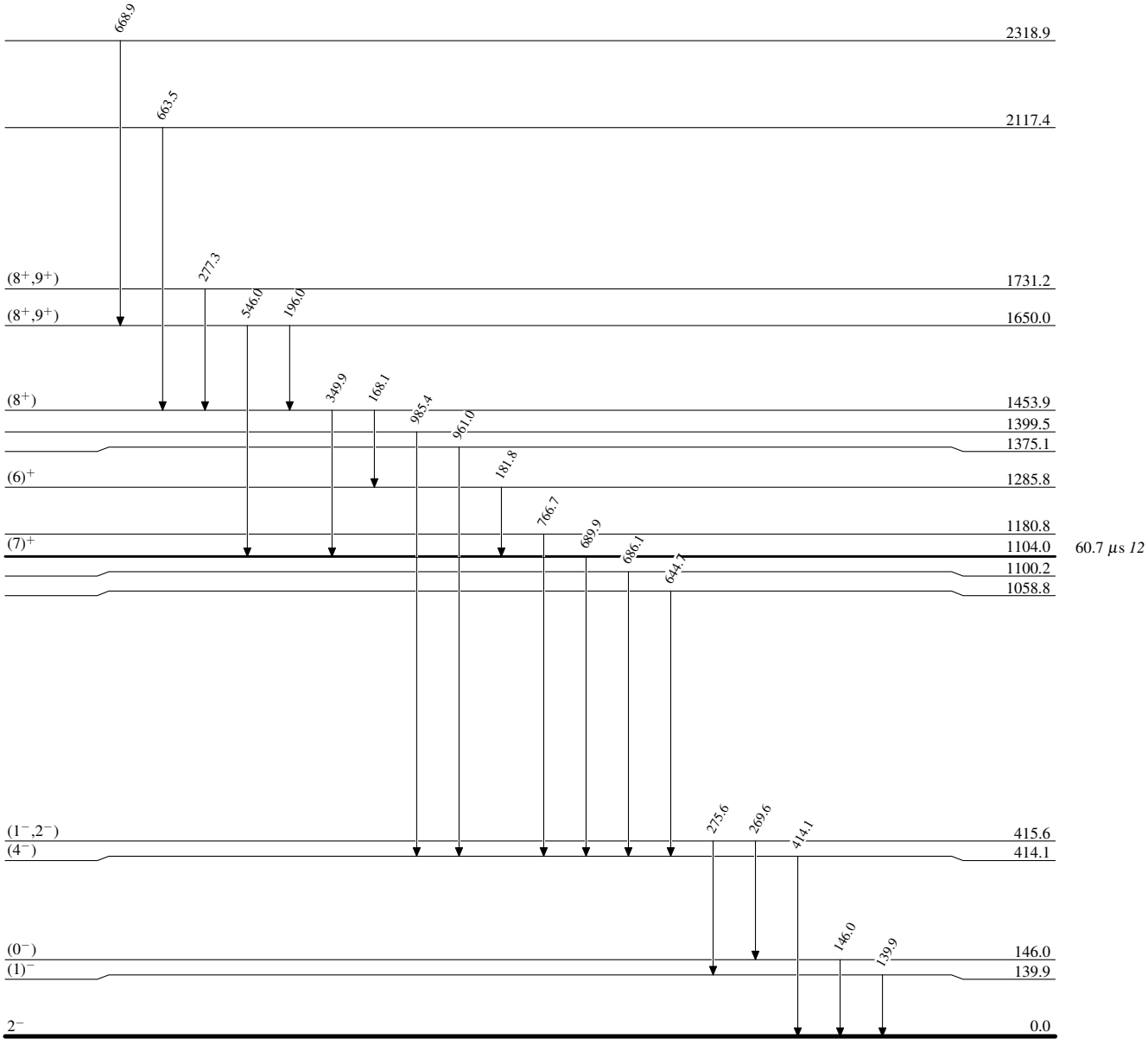
Level Scheme




$^{204}_{81}Tl_{123}$