

Adopted Levels, Gammas

| Type | Author | History | Citation | Literature Cutoff Date |
|-----------------|----------------------------|---------|---------------------|------------------------|
| Full Evaluation | J. Chen # and F. G. Kondev | | NDS 126, 373 (2015) | 30-Sep-2013 |

$Q(\beta^-)=3976$ 8; $S(n)=4960$ 8; $S(p)=7660$ 30; $Q(\alpha)=2710$ SY 2012Wa38
 $\Delta(Q_\alpha)=200$ keV (syst,2012Wa38).

 ^{209}Tl LevelsCross Reference (XREF) Flags

- A ^{209}Hg β^- decay
- B ^{213}Bi α decay
- C $^9\text{Be}(^{238}\text{U}, X\gamma)$
- D $^{210}\text{Pb}(t, \alpha)$

| E(level) [†] | J ^π | T _{1/2} | XREF | Comments |
|-----------------------|-----------------------------------|------------------|------|--|
| 0.0 | 1/2 ⁺ | 2.162 min 7 | ABCD | %β ⁻ =100 J ^π : L(t,α)=(0); analogy to the g.s. of ^{207}Tl (J ^π =1/2 ⁺). T _{1/2} : weighted average of 2.20 min 7 from 1950Ha64, 2.161 min 7 from 1993El08 (the value repeated by the same authors in 1994Ar23 and 1998Ar03), and 2.25 min 14 from 1998Zh22. |
| 323.81 5 | 3/2 ⁺ | | ABCD | configuration: π(s _{1/2}) ⁻¹ . XREF: D(325). J ^π : 323.70γ M1+E2 to 1/2 ⁺ , L(t,α)=(2); analogy to E=350 keV 6 level in ^{207}Tl ($^{208}\text{Pb}(t, \alpha)$). |
| 738.4 4 | | | A D | configuration: π(d _{3/2}) ⁻¹ . XREF: D(739). |
| 946.6 8 | | | A D | XREF: D(947). |
| 984.3 | (7/2 ⁺) [‡] | | C | |
| 984.3+x | (9/2 ⁺) [‡] | | C | E(level): decays via an unobserved γ-ray transition to the 984.3-keV level. |
| 1121.1+x | (13/2 ⁺) [‡] | | C | |
| 1121.1+z | (17/2 ⁺) [‡] | 95 ns 11 | C | E(level): decays via an unobserved γ-ray transition to the 1121.1+x-keV. T _{1/2} : from 661.2γ(t), 323.1γ(t) and 136.8γ(t) (2009Al29). configuration: π(s _{1/2}) ⁻¹ ⊗ν(g _{9/2}) ⁺² . The assignment is tentative. |
| 1230 10 | | | D | |
| 1369 10 | (11/2 ⁻) | | D | J ^π : L(t,α)=(5); analogy to E=1341 keV 6 level in ^{207}Tl ($^{208}\text{Pb}(t, \alpha)$). configuration: π(h _{11/2}) ⁻¹ . The assignment is tentative. |
| 1748.2 6 | (5/2 ⁺) | | A D | XREF: D(1748). J ^π : L(t,α)=(2); analogy to E=1674 keV 6 level in $^{207}\text{Tl}(t, \alpha)$ ($^{208}\text{Pb}(t, \alpha)$). configuration: π(d _{5/2}) ⁻¹ . The assignment is tentative. |

[†] From a least-squares fit to Eγ.

[‡] From $^9\text{Be}(^{238}\text{U}, X\gamma)$ (2009Al29), based on comparison of the observed levels with shell-model predictions.

Adopted Levels, Gammas (continued)

| $\gamma(^{209}\text{Tl})$ | | | | | | | | | |
|---------------------------|------------|----------------------|---------------------|----------|------------|-------|-------------|------------------|---|
| $E_i(\text{level})$ | J_i^π | E_γ^\ddagger | I_γ^\ddagger | E_f | J_f^π | Mult. | δ | α^\dagger | Comments |
| 323.81 | $3/2^+$ | 323.70 2 | 100 | 0.0 | $1/2^+$ | M1+E2 | 1.30 +23-19 | 0.174 18 | $\alpha(\text{K})=0.131$ 16; $\alpha(\text{L})=0.0330$ 15; $\alpha(\text{M})=0.0080$ 3 $\alpha(\text{N})=0.00202$ 8; $\alpha(\text{O})=0.000377$ 17; $\alpha(\text{P})=2.80 \times 10^{-5}$ 25 E_γ, I_γ : from ^{213}Bi α decay. Mult., δ : from $\alpha(\text{K})\text{exp}=0.131$ 15 in ^{213}Bi α decay (2000Gr35). |
| 738.4 | | 738.4 [#] 4 | 100 [#] | 0.0 | $1/2^+$ | | | | |
| 946.6 | | 208.2 [#] 6 | 100 [#] | 738.4 | | | | | |
| 984.3 | $(7/2^+)$ | 661.2 | 100 | 323.81 | $3/2^+$ | | | | |
| 984.3+x | $(9/2^+)$ | x [@] | | 984.3 | $(7/2^+)$ | | | | |
| 1121.1+x | $(13/2^+)$ | 136.8 | 100 | 984.3+x | $(9/2^+)$ | E2 | | 1.652 | $\alpha(\text{K})=0.386$ 6; $\alpha(\text{L})=0.945$ 14; $\alpha(\text{M})=0.248$ 4; $\alpha(\text{N}+..)=0.0731$ 11 $\alpha(\text{N})=0.0620$ 9; $\alpha(\text{O})=0.01072$ 15; $\alpha(\text{P})=0.000374$ 6 Mult.: $\alpha(\text{exp})=1.5$ 4 (2009A129) from intensity balances in $^9\text{Be}(^{238}\text{U}, X\gamma)$. |
| 1121.1+z | $(17/2^+)$ | y [@] | | 1121.1+x | $(13/2^+)$ | | | | |
| 1748.2 | $(5/2^+)$ | 1424.2 4 | 100 | 323.81 | $3/2^+$ | | | | |

[†] Additional information 1.

[‡] From $^9\text{Be}(^{238}\text{U}, X\gamma)$ (2009A129), unless otherwise stated.

[#] From ^{209}Hg β^- decay.

[@] Not observed directly, but required by the coincidence relationships. A low-energy transition (less than 85.6 keV, which is the binding energy of the K-shell electrons) is expected to depopulate this state, as indicated by the low intensity of the observed K_α x-rays in $^9\text{Be}(^{238}\text{U}, X\gamma)$ (2009A129).

Adopted Levels, GammasLevel Scheme

Intensities: Relative photon branching from each level

