

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 111,275 (2010)	1-Oct-2009

$Q(\beta^-) = -5822.24$; $S(n) = 8357.23$; $S(p) = 358.22$; $Q(\alpha) = 6.30 \times 10^3$ 3 [2012Wa38](#)

Note: Current evaluation has used the following Q record -5840 50 8370 50 370 50 6290 50 [2003Au03,2009AuZZ](#).

The odd-odd ^{186}Tl - ^{198}Tl isotopes all exhibit isomer pairs. ^{184}Tl ε decay apparently populates both high and low spin states ($J^\pi = 2^+$, 4^+ , 6^+ and 8^+). Mutually consistent values of half-life have been reported for both α and ε decay, suggesting either that the isomer and ground state have comparable half-lives, or that an unidentified isomeric transition populates the ground state which is in equilibrium. See [1990Va15](#) for calculation of level energies and configuration for the heavier odd-odd Tl isotopes.

 ^{184}Tl Levels
Cross Reference (XREF) Flags

- A** ^{188}Bi α decay (265 ms)
B ^{188}Bi α decay (60 ms)

E(level) [†]	J^π	$T_{1/2}$	XREF	Comments
0 [‡]		10.1 s 5		$\% \varepsilon + \% \beta^+ = 97.9$ 7; $\% \alpha = 2.1$ 7 (1976To06) $T_{1/2}$: weighted average of 9.7 s 6 from $\alpha(t)$ and $\beta(t)$ (1993BoZK), 10 s 2 from both 6162 $\alpha(t)$ and 5988 $\alpha(t)$, and 11 s 2 from $\gamma(t)$ following ε decay (1976To06), and 11 s 1 (1976Co24).
0.0+x [‡]	(7 ⁺)		A	J^π : likely configuration: $\pi 3s_{1/2}^{-1} \otimes \nu 1i_{13/2}$ (2003An26); systematics for heavier odd-odd Tl isotopes.
0.0+y	(2 ⁻)		B	J^π : E1 117.5 γ from (3 ⁺) 117.5+y; systematics for heavier odd-odd Tl isotopes. Likely configuration: $\pi 3s_{1/2}^{-1} \otimes \nu 3p_{3/2}$ (2003An26).
70.6+x 5	(6 ⁺)		A	J^π : M1 70.5 γ to (7 ⁺) 0.0+x. Likely configuration: $\pi 3s_{1/2}^{-1} \otimes \nu 1i_{13/2}$ (2003An26).
117.5+y 5	(3 ⁺)		B	J^π : unhindered α decay from (3 ⁺) ^{188}Bi . Likely configuration: $\pi 1h_{9/2} \otimes \nu 3p_{3/2}$ (2003An26).
216.5+y 7	(2 ⁻ , 3 ⁻ , 4 ⁻)		B	J^π : (E1) 99 γ to (3 ⁺) 117.5+y.
319.8+x 8			A	
500+x 7	(10 ⁻)		A	E(level): from energy difference between α feeding this level and that feeding 0.0+x level in ^{188}Bi α decay (265 ms). J^π : unhindered α decay from (10 ⁻) ^{188}Bi . Likely configuration: $\pi 1h_{9/2} \otimes \nu 1i_{13/2}$ (2003An26).

[†] From least-squares fit to E_γ , except as noted.

[‡] From ^{188}Bi α decay (265 ms). It is possible that x=0, in which case the 0.0+x (7⁺) level would be the g.s..

 $\gamma(^{184}\text{Tl})$

$E_i(\text{level})$	J_i^π	E_γ [†]	I_γ	E_f	J_f^π	Mult.	$\alpha^\#$	Comments
70.6+x	(6 ⁺)	70.5 5	100	0.0+x	(7 ⁺)	M1	4.36 11	Mult.: from $\alpha(\text{exp})$ in ^{188}Bi α decay (265 ms).
117.5+y	(3 ⁺)	117.5 [‡] 5	100	0.0+y	(2 ⁻)	E1	0.287 5	Mult.: from $\alpha(\text{K})\text{exp}$ in ^{188}Bi α decay (60 ms).
216.5+y	(2 ⁻ , 3 ⁻ , 4 ⁻)	99.0 [‡] 5	100	117.5+y	(3 ⁺)	(E1)	0.441 9	Mult.: from $\alpha(\text{K})\text{exp}$ in ^{188}Bi α decay (60 ms).
319.8+x		249 1		70.6+x	(6 ⁺)			
		320 1		0.0+x	(7 ⁺)			

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Adopted Levels, Gammas (continued) $\gamma(^{184}\text{Tl})$ (continued)

† From ^{188}Bi α decay (265 ms), except as noted.

‡ From ^{188}Bi α decay (60 ms).

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

Adopted Levels, GammasLevel Scheme

Intensities: Relative photon branching from each level

