

Adopted Levels

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 110,265 (2009)	15-Nov-2008

$Q(\beta^-) = -1.033 \times 10^4$ 9; $S(n) = 1.156 \times 10^4$ syst; $S(p) = -7.5 \times 10^2$ 5; $Q(\alpha) = 6710$ 5 [2012Wa38](#)

Note: Current evaluation has used the following Q record -10.300 syst 11.62E3SY -730 506718 8 [2003Au03](#).

Uncertainty is 200 keV and 120 keV in $Q(\beta^-)$ and $S(n)$, respectively ([2003Au03](#)).

$Q(\alpha)$: $E\alpha = 6569$ 10 implies $Q(\alpha) = 6719$ 10 (cf. $Q(\alpha) = 6718$ 8 in [2003Au03](#)) assuming the observed 6569 α is a g.s. to g.s. transition. α decay from ¹⁷⁹Tl.

A 6569 10 α from ¹⁷⁹Tl(g.s.), and 7096 10 and 7213 10 α 's from a 0.0+x level are observed, and all are correlated with a 6435 α from ¹⁷⁵Au ([1998To14](#)). Thus, α 's from the 0.0+x level feed ¹⁷⁵Au levels separated by 120 14 keV. Further, [1998To14](#) suggest that, unless the 6435 α from ¹⁷⁵Au is a doublet, the 6569 α and 7213 α feed either the same level in ¹⁷⁵Au or levels connected by a prompt γ . However, from systematics, both 1/2⁺ and 11/2⁻ isomeric states should exist in ¹⁷⁵Au, and [2002Ro17](#) report both a 6438 α and a 6412 α from ¹⁷⁵Au. Therefore, it seems probable that the 6435 α of [1998To14](#) is indeed a doublet. Correlation data from [2002Ro17](#) imply that the stronger α from ¹⁷⁹Tl(0+x) (i.e., the 7213 α) feeds ¹⁷⁵Au(11/2⁻) and the 6569 α from ¹⁷⁹Tl(g.s.) feeds ¹⁷⁵Au(1/2⁺). If the 6569 α is a g.s. to g.s. transition, then $x \geq 659$ keV for the 0.0+x level of ¹⁷⁹Tl.

¹⁷⁹Tl Levels

E(level)	J ^{π}	T _{1/2}	Comments
0.0	(1/2 ⁺)	0.23 s 4	$\% \alpha < 100$; $\% \epsilon + \% \beta^+ = ?$; $\% p = ?$ $\% \alpha$: Only α decay has been observed. Theory predicts a partial T _{1/2} of 0.7 s (1997Mo25), implying $\% \alpha \approx 70$. J ^{π} : from J ^{π} (g.s.) systematics for heavier odd-A Tl isotopes. T _{1/2} : from 6569 α (t) (1998To14). Others: 0.42 s 6 (2002Ro17 , 6568 α), 0.43 s 35 (1996Pa01 , 6568 α), 0.16 s +9-4 (1983Sc24 , 6560 α).
0.0+x	(11/2 ⁻) [†]	1.5 ms 3	$\% \alpha \leq 100$; $\% IT = ?$; $\% \epsilon + \% \beta^+ = ?$; $\% p = ?$ $\% \alpha$: Only α decay has been observed. E(level): ≥ 659 ; see comment above concerning α decay from ¹⁷⁹ Tl. T _{1/2} : weighted average of 1.7 ms 2 (2002Ro17 , 7201 α (t)), 1.8 ms 4 (1998To14 , 7213 α (t)), 1.6 ms 8 (1998To14 , 7096 α (t)), 0.7 ms +6-4 (1996Pa01 , 7201 α (t)) and 1.4 ms 5 (1983Sc24 , 7200 α (t)).

[†] ¹⁸⁷Tl, ¹⁸⁵Tl, ¹⁸³Tl have isomeric h_{9/2} states at 336, 454, 625, respectively, which deexcite via E3 transitions to a d_{3/2} level at E=250-300 keV. These energy systematics suggest that the corresponding states in ¹⁸¹Tl and ¹⁷⁹Tl may occur near 850 and 1100 keV; from the E3 transition energy and T_{1/2} systematics, [1998To14](#) predict a T_{1/2} value for E3 deexcitation which is close to the level T_{1/2} observed for ¹⁸¹Tl but very much lower than T_{1/2}=1.5 ms adopted for the 0.0+x level of ¹⁷⁹Tl. [1998To14](#) suggest, therefore, that the h_{11/2} orbital may lie below the h_{9/2} orbital in ¹⁷⁹Tl, allowing α decay to compete successfully with M4 γ deexcitation. Note that ¹⁷⁷Tl has an isomeric (11/2⁻) level at E=807 18 ([1999Po09](#)).