^{202}Tl $\varepsilon+\beta^+$ decay 1965Le04,1966Le06,1984Ta09

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	F. G. Kondev	NDS 196,342 (2024)	1-Sep-2023

Parent: ^{202}Tl: E=0; J$^\pi$=2$^-$; T$_{1/2}$=12.4706 d *55*; Q(ε)=1364.9 *18*; %ε+%β^+ decay=100

1965Le04: ^{202}Tl was produced by irradiating ^{nat}Hg with deuteron beam. A long lens β spectrometer was used to measure the K-conversion electrons. A NaI(Tl) detector was used to detect the γ rays.

1966Le06: ^{202}Tl was produced by irradiation of ^{nat}HgO with deuteron beam. Tl was chemically separated and built into the lattice of NaI single crystals. The NaI(^{202}Tl) was used to measure all the radiations from ^{202}Tl decay. The escaped γ ray was detected with NaI(Tl) detector.

1984Ta09: ^{202}Tl was produced by ^{nat}Tl(n,2n). E(n)=14.6 MeV. Ge(Li) detector was used to measure the γ rays.

Others: 1953Be79, 1957Ha97, 1959Bo47, 1967Cl05, 1973BeYM, 1975Co19.

^{202}Hg Levels

E(level)†	J$^\pi$‡	T$_{1/2}$
0.0	0$^+$	
439.512 *8*	2$^+$	27.35 ps *23*
959.92 *5*	2$^+$	13.5 ps *28*

† From a least-squares fit to Eγ.
‡ From Adopted Levels.

ε,β^+ radiations

E(decay)	E(level)	Iε†	Log *ft*	I($\varepsilon+\beta^+$)†	Comments
(405.0 *21*)	959.92	0.68 *4*	8.74 *3*	0.68 *4*	εK=0.7499 *4*; εL=0.1869 *3*; εM+=0.06317 *11* εL(exp)/εK(exp)=0.305 *20* (1966Le06) compared to εL/εK=0.248 *5* from theory.
(925.4 *21*)	439.512	94.3 *10*	7.410 *5*	94.3 *10*	εK=0.7917; εL=0.15693 *4*; εM+=0.05136 *2* εL(exp)/εK(exp)=0.196 *2*, εM(exp)/εL(exp)=0.269 *7* (1966Le06).
(1364.9 *23*)	0.0	5.0 *10*	9.86^{1u} *9*	5.0 *10*	εK=0.7805; εL=0.16491 *4*; εM+=0.05458 *2* Iβ^+: 5% *1* in 1966Le06. εL(exp)/εK(exp)=0.220 *+20−15* (1966Le06).

† Absolute intensity per 100 decays.

γ(^{202}Hg)

Iγ normalization: Using ΣI(γ+ce)[g.s.]=95% *1*, deduced from Iε[g.s to g.s]=5% *1* (1966Le06).

E$_\gamma$†	I$_\gamma$‡@	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$	Mult.	α#	Comments
439.56 *1*	100	439.512	2$^+$	0.0	0$^+$	E2	0.0371 *5*	α(K)=0.0259 *4*; α(L)=0.00851 *12*; α(M)=0.002108 *30* α(N)=0.000526 *7*; α(O)=9.29×10^{-5} *13*; α(P)=3.42×10^{-6} *5* %Iγ=91.5 *10* Mult.: From K/L(exp)=2.6 and (L1+L2)/L3(exp)=3.5 (1953Be79), and α(K)exp=0.03, α(exp)=0.041, α(L1)exp=0.0078, α(L2)exp=0.0011, α(L3)exp=0.0025 (1957Ha97).

Continued on next page (footnotes at end of table)

^{202}Tl $\varepsilon+\beta^+$ decay 1965Le04,1966Le06,1984Ta09 (continued)

$\gamma(^{202}Hg)$ (continued)

E_γ †	I_γ ‡@	E_i(level)	J^π_i	E_f	J^π_f	Mult.	δ	α #	Comments
520.13 *7*	0.636 *35*	959.92	2^+	439.512	2^+	M1+E2	+0.9 *1*	0.0566 *34*	α(K)=0.0456 *29*; α(L)=0.0084 *4*; α(M)=0.00198 *8* α(N)=0.000497 *21*; α(O)=9.3×10^{-5} *4*; α(P)=6.3×10^{-6} *4* %Iγ=0.582 *33* I_γ: Others: 0.410 *6* (1959Bo47), 1.0 *3* (1966Le06). Mult.,δ: From 520γ-439$\gamma(\theta)$ in 1973BeYM [A_2=−0.27 *3*, A_4=+0.13 *5*].
960.1 *1*	0.0744 *38*	959.92	2^+	0.0	0^+	E2		0.00654 *9*	α(K)=0.00524 *7*; α(L)=0.000996 *14*; α(M)=0.0002354 *33* α(N)=5.89×10^{-5} *8*; α(O)=1.088×10^{-5} *15*; α(P)=6.89×10^{-7} *10* %Iγ=0.068 *4* I_γ: Weighted average of 0.075 *6* (1984Ta09) and 0.074 *5* (1965Le04). Others: 0.13 *3* (1966Le06), 0.053 *8* (1959Bo47). Mult.: From α(K)exp(439γ)/ α(K)exp(961γ)=5.5 *7* (1965Le04).

† From 1975Co19.
‡ From 1984Ta09, unless otherwise stated.
# Additional information 1.
@ For absolute intensity per 100 decays, multiply by 0.915 *10*.

^{202}Tl ε decay 1965Le04,1966Le06,1984Ta09

Decay Scheme