^{190}Tl ε decay (2.6 min) 1976Bi09,1991Ko03,1994De25

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh, [1] and Jun Chen[2]	NDS 169, 1 (2020)	15-Oct-2020

Parent: ^{190}Tl: E=0.0; J$^{\pi}$=2^{-}; $T_{1/2}$=2.6 min *3*; Q(ε)=6999 *18*; %ε+%β^{+} decay=100.0
^{190}Tl-E,J$^{\pi}$,$T_{1/2}$: From ^{190}Tl Adopted Levels.
^{190}Tl-Q(ε): From 2017Wa10.
1976Bi09 (also 1974Ha10): Measured γ, γγ, ce, β^{+}, $T_{1/2}$.
1991Ko03: Measured Eγ, Iγ, γγ, ce for part of the level scheme related to the population of the excited 0^{+} band.
1994De25: Measured Eγ, Iγ, γγ. Data for selected transitions and levels.
1975Va20 (also 1970Va27): Measured γ, γγ, ce, $T_{1/2}$. Source produced by mass separation of products from spallation reaction on Pb with 600 MeV protons, ce data obtained with Si(Li) detector.
See ^{190}Tl ε decay (3.7 min) for most details of the γ-ray and conversion electron data and the complete level scheme.
The decay scheme seems incomplete (in evaluators′ opinion) in view of the large gap of 5.1 MeV between Q value and the highest established level. Feedings to different levels are thus considered as poorly known, and given as limits only.

^{190}Hg Levels

E(level)†	J$^{\pi}$‡
0.0	0^{+}
416.38 *14*	2^{+}
1041.79 *18*	4^{+}
1099.98 *17*	2^{+}
1278.68 *20*	0^{+}
1558.76 *19*	2^{+}
1571.35 *18*	2^{+}
1657.08 *21*	3^{+}
1975.17 *22*	4^{+}

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

ε,β^{+} radiations

E(decay)	E(level)	Iβ^{+} †	Iε†	Log *ft*	I(ε+β^{+})†	Comments
(5024‡ *18*)	1975.17	<0.45	<1.4	>8.9^{1u}	<1.8	av Eβ=1758.2 *79*; εK=0.6067 *22*; εL=0.1088 *4*; εM+=0.03507 *14*
(5342 *18*)	1657.08	<0.77	<0.73	>7.3	<1.5	av Eβ=1952.3 *83*; εK=0.3935 *24*; εL=0.0685 *5*; εM+=0.02196 *14*
(5428 *18*)	1571.35	<0.4	<0.4	>7.6	<0.8	av Eβ=1991.7 *83*; εK=0.3822 *24*; εL=0.0665 *5*; εM+=0.02132 *14*
(5440 *18*)	1558.76	<3.1	<2.7	>6.7	<5.8	av Eβ=1997.5 *83*; εK=0.3805 *24*; εL=0.0662 *5*; εM+=0.02123 *14*
(5720‡ *18*)	1278.68	<0.13	<0.24	>9.9^{1u}	<0.37	av Eβ=2064.5 *80*; εK=0.5228 *22*; εL=0.0931 *4*; εM+=0.02997 *13*
(5899 *18*)	1099.98	<11	<7.2	>6.4	<18	av Eβ=2208.9 *84*; εK=0.3248 *21*; εL=0.0564 *4*; εM+=0.01808 *12*
(5957‡ *18*)	1041.79	<5.1	<7.9	>8.4^{1u}	<13	av Eβ=2169.5 *80*; εK=0.4943 *22*; εL=0.0879 *4*; εM+=0.02827 *13*
(6583 *18*)	416.38	<45	<20	>6.0	<65	av Eβ=2526.1 *84*; εK=0.2561 *16*; εL=0.0444 *3*; εM+=0.01421 *9* E(decay): 6720 *400* from E(β^{+})=5700 *400* (1976Bi09).

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^{190}Tl ε decay (2.6 min) 1976Bi09,1991Ko03,1994De25 (continued)

ϵ,β^+ radiations (continued)

E(decay)	E(level)	Iβ^+ †	Iε†	Log *ft*	I($\varepsilon+\beta^+$)†	Comments
(6999‡ *18*)	0.0	<11	<9.3	>8.7[1u]	<20	av Eβ=2635.4 *81*; εK=0.3784 *19*; εL=0.0668 *4*; εM+=0.02146 *11*

† Absolute intensity per 100 decays.
‡ Existence of this branch is questionable.

γ(^{190}Hg)

Iγ normalization: from Summed I(γ+ce) to g.s.=90 *10*. ε, β^+ feeding to g.s. assumed as <20%, for a possible first-forbidden unique transition. 15% uncertainty is assigned to the γ-normalization factor to account for uncertainty is β^++ε feeding to the g.s. and for possible unobserved γ-feedings to the low-lying levels in ^{190}Hg.

E_γ[†]	I_γ[‡b]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	δ[#]	α[c]	$I_{(\gamma+ce)}$[b]	Comments
292.6[a] *3*	0.03[a] *2*	1571.35	2^+	1278.68	0^+	[E2]		0.1147		
403.8[&] *3*	0.28 *8*	1975.17	4^+	1571.35	2^+	E2		0.0462		α(K)=0.0313 *5*; α(L)=0.01127 *16*; α(M)=0.00281 *4* α(N)=0.000700 *10*; α(O)=0.0001230 *18*; α(P)=4.12×10^{-6} *6*
416.4 *2*	100	416.38	2^+	0.0	0^+	E2		0.0427		α(K)=0.0292 *5*; α(L)=0.01017 *15*; α(M)=0.00253 *4* α(N)=0.000630 *9*; α(O)=0.0001110 *16*; α(P)=3.85×10^{-6} *6*
458.7 *3*	1.0[@] *1*	1558.76	2^+	1099.98	2^+	[M1,E2]		0.07 *4*		
516.8 *3*	0.7[@] *1*	1558.76	2^+	1041.79	4^+	[E2]		0.0235		E_γ,I_γ: from 1994De25.
529.7 *3*	0.18 *7*	1571.35	2^+	1041.79	4^+	[E2]		0.0235		
557.0[&] *2*	<1.6	1657.08	3^+	1099.98	2^+	E2+M1	3.5 *10*	0.024 *3*		α(K)=0.019 *3*; α(L)=0.0045 *4*; α(M)=0.00109 *8* α(N)=0.000271 *19*; α(O)=4.9×10^{-5} *4*; α(P)=2.5×10^{-6} *4*
615.3[&] *3*	<1.0	1657.08	3^+	1041.79	4^+	E2+M1	1.3 *2*	0.030 *3*		α(K)=0.024 *3*; α(L)=0.0046 *4*; α(M)=0.00109 *8* α(N)=0.000272 *19*; α(O)=5.1×10^{-5} *4*; α(P)=3.3×10^{-6} *4*
625.4 *2*	14 *3*	1041.79	4^+	416.38	2^+	E2		0.01602		α(K)=0.01216 *17*; α(L)=0.00294 *5*; α(M)=0.000712 *10* α(N)=0.0001778 *25*; α(O)=3.21×10^{-5} *5*; α(P)=1.613×10^{-6} *23*
683.5 *2*	11 *2*	1099.98	2^+	416.38	2^+	E2+M1	2.0 *+10−5*	0.019 *3*		α(K)=0.015 *3*; α(L)=0.0029 *4*; α(M)=0.00070 *8* α(N)=0.000174 *20*; α(O)=3.2×10^{-5} *4*; α(P)=2.0×10^{-6} *4*
862.2 *3*	0.42 *3*	1278.68	0^+	416.38	2^+	[E2]		0.0081		
933.4[&] *3*	0.48 *15*	1975.17	4^+	1041.79	4^+	E0+M1+E2		0.066 *7*		Mult.,α: from ce data in ^{190}Tl ε decay (3.7 min).
1099.9 *3*	9 *2*	1099.98	2^+	0.0	0^+	E2		0.00502		α(K)=0.00406 *6*; α(L)=0.000733 *11*; α(M)=0.0001722 *25* α(N)=4.31×10^{-5} *6*; α(O)=8.00×10^{-6} *12*; α(P)=5.32×10^{-7} *8*
1142.5 *3*	3.8[@] *4*	1558.76	2^+	416.38	2^+	E2(+M1)	>2	0.0053 *7*		α(K)=0.0043 *6*; α(L)=0.00075 *8*; α(M)=0.000176 *18* α(N)=4.4×10^{-5} *5*; α(O)=8.2×10^{-6} *9*; α(P)=5.7×10^{-7} *8*; α(IPF)=8.9×10^{-7} *7*
1155.0 *3*	0.69 *6*	1571.35	2^+	416.38	2^+	E0+M1+E2		0.052 *7*		Mult.,α: from ce data in ^{190}Tl ε decay (3.7 min).
1240.9[&] *3*	<0.3	1657.08	3^+	416.38	2^+	(E2)		0.00399		

$^{190}_{80}$Hg$_{110}$-3

γ(^{190}Hg) (continued)

E_γ[†]	I_γ[‡b]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	$I_{(\gamma+ce)}$[b]	Comments
1278.7[a] 3	[a]	1278.68	0^+	0.0	0^+	E0	0.012	α(K)exp>0.30 (1991Ko03) $I_{(\gamma+ce)}$: from Ice(K)=0.01 (1991Ko03).
1558.8[&] 3	1.22 9	1975.17	4^+	416.38	2^+			
1558.9 3	1.0[@] 1	1558.76	2^+	0.0	0^+			
1571.2 3	0.21 12	1571.35	2^+	0.0	0^+			

† Generally from 1976Bi09. Averages taken when values are also available from 1994De25. Uncertainty of 0.2 keV for strong γ rays (Iγ≥5) and 0.3 keV for weaker and poorly resolved lines (evaluator).
‡ Uncertainty≥10% (1976Bi09). See other details in ^{190}Tl ε decay (3.7 min).
\# From ce data (see ^{190}Tl ε decay (3.7 min) for details). Assignments and values are the same as in the Adopted dataset.
@ γ with 2.6-min ^{190}Tl decay or 3.7-min ^{190}Tl decay. Iγ from a source containing ≈90% of 3.7-min isomer and ≈10% 2.6-min isomer.
& γ mainly belongs with 3.7-min isomer but a small fraction may also be associated with the 2.6-min isomer.
a From 1991Ko03. The γ ray belongs to the decay of either or both the 3.7-min and 2.6-min isomers.
b For absolute intensity per 100 decays, multiply by 0.79 12.
c Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

$^{190}_{80}Hg_{110}$-4

^{190}Tl ε decay (2.6 min) 1976Bi09,1991Ko03,1994De25