^{198}Pb ε decay 1959Ju39,1971DoZZ

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Huang Xiaolong and Kang Mengxiao	NDS 133, 221 (2016)	1-Dec-2015

Parent: ^{198}Pb: E=0.0; J$^{\pi}$=0^{+}; $T_{1/2}$=2.4 h *1*; Q(ε)=145×10^{1} *8*; %ε+%β^{+} decay=100.0
1959Ju39: measured Eγ, Iγ, and I(ce).
1971DoZZ: ^{200}Hg(t,5nγ), E(t)=45 MeV; measured Eγ, Iγ, and I(ce).
Others: 1976MaYU, 1957An53.
For (ce)(ce)-coin from 1957An53, see drawings.

^{198}Tl Levels

E(level)[†]	J$^{\pi}$[#]	$T_{1/2}$[@]	Comments
0.0	2^{-}	5.3 h *5*	
173.40 *8*	0^{-},1^{-}	4.5 ns *10*	$T_{1/2}$: From (K x-ray)(173γ)(t) (1959Jo21) scintillation.
259.49 *7*	(2)$^{-}$		
290.31 *7*	1^{-}		
382.10 *7*	1^{-}		
397.67 *9*	1^{-},2^{-},3^{-}		
648.90 *8*	1^{-}		
655.71 *12*	0^{-},1^{-}		
865.33 *8*	1^{-}		
1140.7[‡] *3*	0^{-},1^{-}		
1230.3?[‡]			

† From decay scheme and Eγ's by using least-squares fit to the Eγ values, except 1140.7 and 1230.3 levels proposed by 1976MaYU.
‡ Proposed by 1976MaYU.
\# From Adopted Levels.
@ From Adopted Levels, except 173.40 level from (K x-ray)(173.4γ)(t) (1959Jo21).

ε,β^{+} radiations

E(decay)	E(level)	Iε[†‡]	Log *ft*	I($\varepsilon+\beta^{+}$)[‡]	Comments
(3.1×10^{2} *8*)	1140.7	1.9 *4*	5.9 *4*	1.9 *4*	εK=0.71 *6*; εL=0.21 *5*; εM+=0.074 *18*
(5.8×10^{2} *8*)	865.33	10.5 *11*	5.85 *16*	10.5 *11*	εK=0.770 *9*; εL=0.172 *7*; εM+=0.058 *3*
(7.9×10^{2} *8*)	655.71	24 *5*	5.79 *14*	24 *5*	εK=0.783 *5*; εL=0.163 *3*; εM+=0.0539 *12*
(8.0×10^{2} *8*)	648.90	2.9 *3*	6.71 *12*	2.9 *3*	εK=0.784 *4*; εL=0.162 *3*; εM+=0.0538 *12*
(1.05×10^{3} *8*)	397.67	1.7 *8*	7.20 *22*	1.7 *8*	εK=0.7920 *22*; εL=0.1565 *16*; εM+=0.0515 *6*
(1.07×10^{3} *8*)	382.10	5.9 *10*	6.68 *11*	5.9 *10*	εK=0.7924 *21*; εL=0.1562 *15*; εM+=0.0513 *6*
(1.16×10^{3} *8*)	290.31	27 *8*	6.09 *15*	27 *8*	εK=0.7944 *18*; εL=0.1548 *13*; εM+=0.0508 *5*
(1.19×10^{3} *8*)	259.49	3.2 *16*	7.7^{1u} *3*	3.2 *16*	εK=0.770 *4*; εL=0.172 *3*; εM+=0.0577 *12*
(1.28×10^{3} *8*)	173.40	22.8 *21*	6.26 *8*	22.8 *21*	εK=0.7964 *14*; εL=0.1533 *10*; εM+=0.0502 *4*

† From intensity imbalance at each level (no feeding to g.s. assumed, as for ^{200}Pb decay).
‡ Absolute intensity per 100 decays.

$\gamma(^{198}Tl)$

Iγ normalization: From I(γ+ce)(to g.s.)=100, assuming no $\varepsilon+\beta^+$ feeding to g.s.

E_γ [#]	I_γ [@c]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [a]	δ [‡a]	α [†]	Comments
30.8 *1*	0.42 [&] *10*	290.31	1^-	259.49	$(2)^-$	M1		49.8 *9*	α(L)=38.1 *7*; α(M)=8.92 *16* α(N)=2.25 *4*; α(O)=0.437 *8*; α(P)=0.0413 *7* Mult.: From L1:L2:L3=10:1:0.13, M1:M2:M3=10:1: ≈0.3.
107.3	0.04 [&]	397.67	$1^-,2^-,3^-$	290.31	1^-	[M1] [b]		7.03	α(K)=5.74 *8*; α(L)=0.987 *14*; α(M)=0.231 *4* α(N)=0.0583 *9*; α(O)=0.01131 *16*; α(P)=0.001068 *15*
116.9 *1*	6.5 *10*	290.31	1^-	173.40	$0^-,1^-$	M1		5.50	α(K)=4.49 *7*; α(L)=0.771 *11*; α(M)=0.180 *3* α(N)=0.0455 *7*; α(O)=0.00884 *13*; α(P)=0.000835 *12* Mult.: From L1:L2:L3=10:0.6:<0.1, α(L)exp=1.3, α(K)exp=9.
122.6 *1*	0.63 *10*	382.10	1^-	259.49	$(2)^-$	M1		4.80	α(K)=3.92 *6*; α(L)=0.673 *10*; α(M)=0.1572 *23* α(N)=0.0397 *6*; α(O)=0.00771 *11*; α(P)=0.000728 *11* Mult.: From L1:L2:L3=10:<1.3:<0.4, α(K)exp≥5.
138.3	0.8 [&]	397.67	$1^-,2^-,3^-$	259.49	$(2)^-$	[M1] [b]		3.41	α(K)=2.78 *4*; α(L)=0.476 *7*; α(M)=0.1113 *16* α(N)=0.0281 *4*; α(O)=0.00546 *8*; α(P)=0.000515 *8*
173.4 *1*	100	173.40	$0^-,1^-$	0.0	2^-	E2		0.677	α(K)=0.235 *4*; α(L)=0.330 *5*; α(M)=0.0862 *13* α(N)=0.0216 *3*; α(O)=0.00376 *6*; α(P)=0.0001453 *21* Mult.: From K:L1,2:L3=10 *1*:9.1 *9*:4.8 *5*. Additional information 1.
216.5	0.23 [&]	865.33	1^-	648.90	1^-	[M1] [b]		0.964	α(K)=0.789 *11*; α(L)=0.1340 *19*; α(M)=0.0313 *5* α(N)=0.00790 *11*; α(O)=0.001535 *22*; α(P)=0.0001451 *21*
259.5 *1*	32 *4*	259.49	$(2)^-$	0.0	2^-	M1		0.584	α(K)=0.478 *7*; α(L)=0.0809 *12*; α(M)=0.0189 *3* α(N)=0.00477 *7*; α(O)=0.000927 *13*; α(P)=8.76×10^{-5} *13* α(K)exp=0.43 *7*, α(L1)exp=0.08 *1*, L1,2/L3>14.
266.7 *1*	4.8	648.90	1^-	382.10	1^-	(M1+E2)	≈5.0	≈0.1734	α(K)≈0.0986; α(L)≈0.0561; α(M)≈0.01434 α(N)≈0.00360; α(O)≈0.000640; α(P)≈3.25×10^{-5} α(K)exp≈0.10. α(K)exp=0.08 *3*.
275.4	1.5 *3*	1140.7	$0^-,1^-$	865.33	1^-	[M1] [b]		0.496	α(K)=0.406 *6*; α(L)=0.0687 *10*; α(M)=0.01602 *23* α(N)=0.00405 *6*; α(O)=0.000786 *11*; α(P)=7.43×10^{-5} *11* I_γ: From Ice(K)=0.95, α(K)=0.43.
290.3 *1*	200 *30*	290.31	1^-	0.0	2^-	M1+E2	2.2 *+8−4*	0.175 *22*	α(K)=0.118 *21*; α(L)=0.0432 *16*; α(M)=0.0108 *3* α(N)=0.00272 *8*; α(O)=0.000493 *18*; α(P)=3.0×10^{-5} *3* α(K)exp=0.12 *2*, α(L1)exp=0.023 *4*, L12/L3>24.
365.4 *1*	107 *17*	655.71	$0^-,1^-$	290.31	1^-	M1		0.230	α(K)=0.188 *3*; α(L)=0.0316 *5*; α(M)=0.00738 *11* α(N)=0.00186 *3*; α(O)=0.000362 *5*; α(P)=3.43×10^{-5} *5* Mult.: From K/L=6.0 *6*, L12/L3>65.
382.0 *1*	31 *4*	382.10	1^-	0.0	2^-	M1(+E2)	1.20 *+31−24*	0.117 *17*	α(K)=0.090 *15*; α(L)=0.0201 *16*; α(M)=0.0049 *4* α(N)=0.00122 *9*; α(O)=0.000230 *18*; α(P)=1.83×10^{-5} *23* α(K)exp=0.093 *15*, α(L1)exp=0.018 *2*, L12/L3>20.

γ(^{198}Tl) (continued)

E_γ[#]	I_γ[@c]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[a]	δ[‡a]	α[†]	Comments
396.5	1.2 *2*	655.71	0$^-$,1$^-$	259.49	(2)$^-$	[M1][b]		0.184	α(K)=0.1513 *22*; α(L)=0.0254 *4*; α(M)=0.00591 *9* α(N)=0.001493 *21*; α(O)=0.000290 *4*; α(P)=2.75×10^{-5} *4*
397.7 *1*	16 *3*	397.67	1$^-$,2$^-$,3$^-$	0.0	2$^-$	M1(+E2)	0.8 *+5−4*	0.13 *4*	α(K)=0.10 *3*; α(L)=0.020 *4*; α(M)=0.0048 *7* α(N)=0.00122 *18*; α(O)=0.00023 *4*; α(P)=2.0×10^{-5} *5* I_γ: Unresolved 396.5γ component subtracted. α(K)exp=0.11 *3*, K/L3>80.
467.8 *2*	4 *1*	865.33	1$^-$	397.67	1$^-$,2$^-$,3$^-$	(M1)		0.1187	α(K)=0.0975 *14*; α(L)=0.01626 *23*; α(M)=0.00379 *6* α(N)=0.000956 *14*; α(O)=0.000186 *3*; α(P)=1.761×10^{-5} *25* Mult.: From α(L1)exp=0.018 *8*.
575.0 *1*	17 *2*	865.33	1$^-$	290.31	1$^-$	M1		0.0689	α(K)=0.0566 *8*; α(L)=0.00939 *14*; α(M)=0.00219 *3* α(N)=0.000552 *8*; α(O)=0.0001072 *15*; α(P)=1.018×10^{-5} *15* α(K)exp=0.051 *8*.
605.9 *4*	3.1 *15*	865.33	1$^-$	259.49	(2)$^-$	[M1][b]		0.0601	α(K)=0.0494 *7*; α(L)=0.00818 *12*; α(M)=0.00190 *3* α(N)=0.000480 *7*; α(O)=9.34×10^{-5} *14*; α(P)=8.86×10^{-6} *13* α(K)exp≈0.14.
649.0 *1*	10 *1*	648.90	1$^-$	0.0	2$^-$	M1		0.0502	α(K)=0.0413 *6*; α(L)=0.00682 *10*; α(M)=0.001587 *23* α(N)=0.000401 *6*; α(O)=7.79×10^{-5} *11*; α(P)=7.40×10^{-6} *11* α(K)exp=0.036 *8*.
743.0 *3*	8.1 *15*	1140.7	0$^-$,1$^-$	397.67	1$^-$,2$^-$,3$^-$	M1		0.0353	α(K)=0.0291 *4*; α(L)=0.00479 *7*; α(M)=0.001113 *16* α(N)=0.000281 *4*; α(O)=5.46×10^{-5} *8*; α(P)=5.19×10^{-6} *8* α(K)exp=0.030.
865.3 *1*	33 *3*	865.33	1$^-$	0.0	2$^-$	M1(+E2)	0.8 *3*	0.018 *3*	α(K)=0.0146 *25*; α(L)=0.0025 *4*; α(M)=0.00058 *9* α(N)=0.000147 *21*; α(O)=2.8×10^{-5} *4*; α(P)=2.6×10^{-6} *5* α(K)exp=0.015 *2*.

[†] Additional information 2.
[‡] If No value given it was assumed δ=1.00 for E2/M1, δ=1.00 for E3/M2 and δ=0.10 for the other multipolarities.
[#] From 1959Ju39; for unassigned ce lines, see 1959Ju39.
[@] From 1971DoZZ, except where noted.
[&] If no photon data available, Iγ deduced from Ice(K)/α(K) or Ice(L)/α(L) normalized to Ice(K)(173.4γ)=23.8.
[a] Deduced from α(K)exp, except as noted. α(K)exp=Ice(K)/Iγ normalized to α(K)(173.4γ)=0.235(E2 theory).
[b] From ΔJ^π between transition levels.
[c] For absolute intensity per 100 decays, multiply by 0.182 *13*.

^{198}Pb ε decay 1959Ju39,1971DoZZ