^{197}Pb ε decay (43 min) 1979CoZI

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Huang Xiaolong, Zhou Chunmei	NDS 104, 283 (2005)	1-Jan-2002

Parent: ^{197}Pb: E=319.31; J$^{\pi}$=13/2^{+}; T$_{1/2}$=43 min *1*; Q(ε)=3592 *17*; %ε+%β^{+} decay=100.0

^{197}Pb-%ε+%β^{+} decay: ε/IT=4.3 *3* from ce(K)(234γ,M4)/ce(K)(222γ,E3)=0.77 (1957An53). Uncertainty estimated by the author on the basis of experiment (1957An53).

Others: 1957An53, 1957An54, 1972Ho09, 1974Ne16, 1978Li10, 1980Hi04.

Source: E(^{16}O)≈120 MeV on natural rhenium target for ≈50 min; on-line ms; mixed 10-min + 44-min activity close to equilibrium (1979CoZI).

Approximate level I(γ+ce) balance obtained; see drawings.

^{197}Tl Levels

J^{π},T$_{1/2}$: from Adopted Levels.

E(level)[†]	J$^{\pi}$	T$_{1/2}$	Comments
0.0	1/2^{+}	2.84 h *4*	
385.85 *10*	3/2^{+}		
608.60[‡] *15*	9/2^{-}	0.54 s *1*	1U-transition rate (log $f^{1u}t$=8.3) derived from level intensity balance is exceptionally fast.
996.21[‡] *15*	11/2^{-}		
1304.23[‡] *16*	13/2^{-}		Branching: Iγ(695γ)/Iγ(308γ)=3.2 *5* (1979CoZI) disagrees with reaction data.
1382.91 *16*	11/2^{-}		
1502.07 *16*	9/2^{-},11/2^{-}		Branching: Iγ(506γ)/Iγ(893γ)=0.5 *1* (1979CoZI).
1553.76 *17*	(13/2)$^{-}$		
1720.27[‡] *16*	15/2^{-}		Branching: Iγ(416γ)/Iγ(724γ)=0.6 *1* (1979CoZI).
1803.45 *18*	(11/2^{-},13/2^{-})		
1954.01 *16*	11/2^{-}		Branching: Iγ(649γ):Iγ(957γ):Iγ(1345γ)=12 *2*:100:15 *2*.
1994.89 *17*	13/2^{-}		
1999.44 *18*	11/2^{-},13/2^{-}		
2011.04 *16*	13/2^{-}		
2019.31[‡] *18*	17/2^{-}		Branching: Iγ(299γ)/Iγ(715γ)=0.25 *6* (1979CoZI).
2033.79 *17*	11/2^{-},13/2^{-}		
2041.41 *17*	(17/2)$^{-}$		Branching: Iγ(321γ)/Iγ(737γ)=0.27 *4* (1979CoZI).
2113.90 *16*	13/2^{-}		Branching: Iγ(394γ):Iγ(612γ):Iγ(810γ):Iγ(1118γ)=18 *4*:26 *4*:16 *2*:100.
2175.41 *19*			
2218.67 *19*	11/2^{-},13/2^{-},15/2^{-}		
2303.17 *19*	(11/2)$^{-}$,(13/2)$^{-}$		
2327.93 *19*	(11/2)$^{-}$,(13/2)$^{-}$		
2367.94 *17*	(11/2^{-},13/2^{-})		
2412.37 *21*	(11/2^{-},13/2^{-})		
2457.24 *18*	11/2^{-},13/2^{-}		
2499.21 *17*	11/2^{-},13/2^{-}		
2570.03 *20*	15/2^{-}		
2783.68 *17*	11/2^{-},13/2^{-}		
2820.62 *18*			

† From decay scheme and γ's by using least-squares fit to data.

‡ Band(A): regular dipole band 1. ΔJ=1 sequence populated up to 17/2^{-}.

^{197}Pb ε decay (43 min) 1979CoZI (continued)

ε,β^+ radiations

Iβ,Iε: from β^+/ε theoretical calculations and γ-ray intensity imbalance.

E(decay)	E(level)	Iβ^+ †	Iε†	Log *ft*	I($\varepsilon+\beta^+$)†	Comments
(1091 *17*)	2820.62		1.06 *22*	6.92 *10*	1.06 *22*	εK=0.7931 *4*; εL=0.1558 *3*; εM+=0.05116 *11*
(1128 *17*)	2783.68		1.9 *4*	6.70 *10*	1.9 *4*	εK=0.7938 *4*; εL=0.1552 *3*; εM+=0.05094 *10*
(1341 *17*)	2570.03		1.02 *22*	7.13 *10*	1.02 *22*	εK=0.7974 *3*; εL=0.15258 *18*; εM+=0.04991 *7*
(1412 *17*)	2499.21		2.2 *5*	6.84 *10*	2.2 *5*	εK=0.7982 *2*; εL=0.15187 *17*; εM+=0.04963 *7*
(1454 *17*)	2457.24		1.4 *3*	7.07 *10*	1.4 *3*	εK=0.7987 *2*; εL=0.15148 *16*; εM+=0.04948 *6*
(1499 *17*)	2412.37		0.65 *15*	7.43 *11*	0.65 *15*	εK=0.7990 *2*; εL=0.1511 *2*; εM+=0.04933 *6*
(1543 *17*)	2367.94	0.0016 *6*	1.9 *6*	6.99 *14*	1.9 *6*	av Eβ=256.3 *77*; εK=0.7993 *1*; εL=0.1507 *2*; εM+=0.04918 *6*
(1583 *17*)	2327.93	0.00092 *12*	0.809 *18*	7.383 *18*	0.810 *18*	av Eβ=274.2 *76*; εK=0.7995; εL=0.1504 *2*; εM+=0.04905 *6*
(1608 *17*)	2303.17	0.0016 *4*	1.17 *25*	7.24 *10*	1.17 *25*	av Eβ=285.3 *76*; εK=0.7995; εL=0.1502 *2*; εM+=0.04897 *6*
(1693 *17*)	2218.67	0.0024 *6*	1.04 *22*	7.34 *10*	1.04 *22*	av Eβ=322.8 *76*; εK=0.7995; εL=0.1495 *2*; εM+=0.04871 *6*
(1736 *17*)	2175.41	0.0027 *7*	0.93 *24*	7.41 *12*	0.93 *24*	av Eβ=341.9 *75*; εK=0.79939 *9*; εL=0.1491 *2*; εM+=0.04858 *6*
(1797 *17*)	2113.90	0.022 *5*	5.4 *11*	6.68 *9*	5.4 *11*	av Eβ=369.3 *75*; εK=0.7990 *2*; εL=0.1486 *2*; εM+=0.04839 *6*
(1870 *17*)	2041.41	0.00057 *15*	0.53 *13*	8.81^{1u} *11*	0.53 *13*	av Eβ=412.1 *74*; εK=0.7877 *2*; εL=0.15878 *21*; εM+=0.05241 *9*
(1878 *17*)	2033.79	0.010 *2*	1.8 *4*	7.19 *10*	1.8 *4*	av Eβ=404.2 *77*; εK=0.7982 *3*; εL=0.1479 *2*; εM+=0.04814 *6*
(1892 *17*)	2019.31	0.0014 *4*	1.2 *3*	8.48^{1u} *11*	1.2 *3*	av Eβ=421.6 *74*; εK=0.7880 *2*; εL=0.15851 *21*; εM+=0.05230 *8*
(1900 *17*)	2011.04	0.009 *3*	1.5 *5*	7.28 *15*	1.5 *5*	av Eβ=414.2 *75*; εK=0.7979 *3*; εL=0.14773 *15*; εM+=0.04807 *6*
(1912 *17*)	1999.44	0.0048 *14*	0.73 *21*	7.60 *13*	0.73 *21*	av Eβ=419.2 *75*; εK=0.7977 *3*; εL=0.14762 *15*; εM+=0.04804 *6*
(1916 *17*)	1994.89	0.020 *4*	2.9 *6*	7.00 *9*	2.9 *6*	av Eβ=421.2 *75*; εK=0.7976 *3*; εL=0.14758 *15*; εM+=0.04802 *6*
(1957 *17*)	1954.01	0.055 *12*	6.8 *15*	6.65 *10*	6.9 *15*	av Eβ=439.2 *75*; εK=0.7970 *4*; εL=0.14722 *16*; εM+=0.04789 *6*
(2108 *17*)	1803.45	0.0092 *22*	0.68 *16*	7.72 *11*	0.69 *16*	av Eβ=505.1 *75*; εK=0.7934 *5*; εL=0.14578 *18*; εM+=0.04738 *6*
(2191 *17*)	1720.27	0.060 *14*	3.4 *8*	7.05 *10*	3.5 *8*	av Eβ=541.4 *75*; εK=0.7908 *6*; εL=0.14491 *19*; εM+=0.04708 *7*
(2358 *17*)	1553.76	0.094 *22*	3.4 *8*	7.12 *10*	3.5 *8*	av Eβ=614.3 *75*; εK=0.7839 *9*; εL=0.14296 *22*; εM+=0.04641 *8*
(2409 *17*)	1502.07	0.009 *3*	1.1 *4*	8.95^{1u} *16*	1.1 *4*	av Eβ=640.8 *72*; εK=0.7889 *2*; εL=0.15310 *17*; εM+=0.05022 *7*
(2528 *17*)	1382.91	0.24 *6*	5.9 *15*	6.94 *12*	6.1 *16*	av Eβ=689.1 *75*; εK=0.7744 *11*; εL=0.14064 *25*; εM+=0.04563 *9*
(2607 *17*)	1304.23	0.20 *6*	4.2 *13*	7.12 *14*	4.4 *14*	av Eβ=723.6 *75*; εK=0.7692 *12*; εL=0.1395 *3*; εM+=0.04523 *9*
(2915 *17*)	996.21	0.34 *24*	4 *3*	7.2 *3*	4.3 *30*	av Eβ=859.2 *75*; εK=0.7440 *17*; εL=0.1341 *4*; εM+=0.04345 *11*
(3303 *17*)	608.60	1.1 *4*	22 *8*	8.21^{1u} *16*	23 *8*	av Eβ=1016.6 *72*; εK=0.7642 *9*; εL=0.14326 *23*; εM+=0.04673 *8*

† Absolute intensity per 100 decays.

γ(^{197}Tl)

Iγ normalization: From I(γ+ce)(222γ)=81 *2*.
Eγ, Iγ, $\gamma\gamma$-coin, I(ce) measured (1979CoZI) semi.

E_γ	I_γ[†&]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[‡#]	δ[@]	α[a]	Comments
222.75 *10*	98 *7*	608.60	9/2$^-$	385.85	3/2$^+$	E3		2.27	α(K)= 0.357; α(L)= 1.407; α(M)= 0.381; α(N+..)= 0.1242 E$_\gamma$: others: 222.45 *5* (1957An54), 222.4 *3* (1972Ho09), 222.8 *1* (1977Ve02), 222.5 *2* (1978Li10), 222.4 *2* (1980Hi04). α(K)exp=0.38 *6*. K/L1+L2/L3=7.7 *15*/24 *4*/10 (1979CoZI).
274.50[b] *11*	1.42 *14*	1994.89	13/2$^-$	1720.27	15/2$^-$				
290.95 *11*	4.5 *4*	2011.04	13/2$^-$	1720.27	15/2$^-$	M1		0.443	α(K)= 0.363; α(L)= 0.0615; α(M)=0.01432; α(N+..)=0.00458 α(L)exp=0.062 *22*.
298.96 *20*	1.1 *2*	2019.31	17/2$^-$	1720.27	15/2$^-$	(M1+E2)	≈−0.14	≈0.406	α(K)= 0.332; α(L)= 0.0567; α(M)=0.01321; α(N+..)=0.00422 δ: from 299$\gamma(\theta)$ A$_2$=−0.52 *4* (α,4nγ). α(K)exp=0.26 *15*.
301.05 *16*	1.5 *2*	1803.45	(11/2$^-$,13/2$^-$)	1502.07	9/2$^-$,11/2$^-$	(M1)		0.404	α(K)= 0.331; α(L)= 0.0560; α(M)=0.01303; α(N+..)=0.00417 α(K)exp=0.32 *9*.
307.9 *2*	11.9 *16*	1304.23	13/2$^-$	996.21	11/2$^-$	M1+E2	−0.17 *3*	0.372 *3*	α(K)= 0.304 *3*; α(L)=0.05207 *22*; α(M)=0.01214 *5*; α(N+..)=0.00388 E$_\gamma$: from (α,4nγ). Others: 308.0 *4* (1972Ho09), 307.7 (1974Ne16), 308.1 *2* (1980Hi04). I$_\gamma$: ^{197}Hg fraction subtracted. δ: from 308$\gamma(\theta)$ A$_2$=−0.32 *2* (α,4nγ).
321.17 *11*	0.78 *8*	2041.41	(17/2)$^-$	1720.27	15/2$^-$	M1+E2	≈−0.09	≈0.337	α(K)= 0.276; α(L)= 0.0468; α(M)=0.01088; α(N+..)=0.00348 δ: from 321$\gamma(\theta)$ A$_2$=−0.38 *4* (α,4nγ).
385.85 *10*	293 *CA*	385.85	3/2$^+$	0.0	1/2$^+$	M1+E2	+1.7 *3*	0.094 *13*	α(K)= 0.070 *11*; α(L)= 0.0180 *12*; α(M)=0.00437 *25*; α(N+..)=0.00140 *8* E$_\gamma$: others: 385.6 *4* (1972Ho09), 385.7 (1974Ne16), 385.8 *3* (1977Ve02), 385.6 *2* (1978Li10), 385.7 *2* (1980Hi04). I$_\gamma$: 350 *27* measurement includes ^{197}Pb isomer+g.s. decays at equilibrium. Iγ=293 calculated from I(γ+ce)(222γ,E3)=I(γ+ce)(385.8γ) required for level intensity balance.

γ(^{197}Tl) (continued)

E_γ	I_γ †&	E_i(level)	J^π_i	E_f	J^π_f	Mult.‡#	δ@	αa	Comments
									α(K)exp=0.068 *11* (1979CoZI), 0.076 ce(K)(1957An53)/Iγ(1974Ne16), 0.077 (1972Ho09). δ: from I(γ+ce)(386γ)=I(γ+ce)(222γ) and $\gamma\gamma(\theta)$ via 0.54-s ^{197}Tl decay; other: 1.8 *4* from α(K)exp=0.068.
387.72 *11*	100 *9*	996.21	11/2$^-$	608.60	9/2$^-$	M1+E2	−0.50 *16*	0.174 *16*	α(K)= 0.141 *14*; α(L)= 0.0253 *15*; α(M)= 0.0059 *4*; α(N+..)=0.00190 *10* E_γ: others: 387.7 (1974Ne16), 388.0 *3* (1977Ve02), 387.6 *2* (1978Li10), 387.7 *2* (1980Hi04). α(K)exp=0.16 *3* (1979CoZI), 0.17 ce(K)(1957An53)/Iγ(1974Ne16). δ: from 388$\gamma(\theta)$ A_2=−0.59 *2* (α,4nγ). Other δ≈0.25 from α(K)exp=0.16.
393.74 *16*	2.3 *4*	2113.90	13/2$^-$	1720.27	15/2$^-$	M1		0.1954	α(K)= 0.1601; α(L)= 0.0270; α(M)=0.00627; α(N+..)=0.00201 α(K)exp=0.23 *7*.
400.68 *13*	0.77 *10*	1954.01	11/2$^-$	1553.76	(13/2)$^-$				
413.7 *3*	1.16 *33*	2367.94	(11/2$^-$,13/2$^-$)	1954.01	11/2$^-$	(M1)		0.1712	α(K)= 0.1404; α(L)=0.02361; α(M)=0.00549; α(N+..)=0.00176 α(K)exp=0.25 *8*.
416.21 *11*	9.1 *8*	1720.27	15/2$^-$	1304.23	13/2$^-$	M1		0.1685	α(K)= 0.1381; α(L)=0.02322; α(M)=0.00540; α(N+..)=0.00173 α(K)exp=0.15 *3*.
446.26 *13*	2.28 *25*	2457.24	11/2$^-$,13/2$^-$	2011.04	13/2$^-$	M1		0.1400	α(K)= 0.1149; α(L)=0.01924; α(M)=0.00448; α(N+..)=0.00144 α(K)exp=0.12 *5*.
456.7 *12*		2011.04	13/2$^-$	1553.76	(13/2)$^-$				I_γ: doublet <4.2.
457.9		2457.24	11/2$^-$,13/2$^-$	1999.44	11/2$^-$,13/2$^-$				
^{x}485.43 *11*	0.41 *4*								
488.24 *10*	5.5 *4*	2499.21	11/2$^-$,13/2$^-$	2011.04	13/2$^-$	M1		0.1104	α(K)= 0.0906; α(L)=0.01512; α(M)=0.00353; α(N+..)=0.00114 α(K)exp=0.10 *2*.
492.95 *12*	3.0 *3*	1994.89	13/2$^-$	1502.07	9/2$^-$,11/2$^-$	E2		0.0294	α(K)=0.02087; α(L)=0.00640; α(M)=0.00158; α(N+..)=0.00051 α(K)exp=0.022 *8*.
499.60 *13*	1.6 *3*	2499.21	11/2$^-$,13/2$^-$	1999.44	11/2$^-$,13/2$^-$	M1		0.1039	α(K)= 0.0853; α(L)=0.01422; α(M)=0.00332; α(N+..)=0.00107 α(K)exp=0.13 *4*.
506.00 *10*	4.2 *4*	1502.07	9/2$^-$,11/2$^-$	996.21	11/2$^-$	M1+E2	1.0 *+7−4*	0.064 *18*	α(K)= 0.051 *16*; α(L)= 0.0098 *19* α(K)exp=0.050 *15*.
^{x}515.06 *12*	1.5 *2*					E2(+M1)		0.04	Additional information 1. α(K)exp=0.032 *19*.

$\gamma(^{197}$Tl) (continued)

E_γ	I_γ †&	E_i(level)	J_i^π	E_f	J_f^π	Mult. ‡#	δ @	α a	Comments
528.68 *14*	1.7 *2*	2570.03	15/2⁻	2041.41	(17/2)⁻	M1		0.0898	α(K)= 0.0736; α(L)=0.01223 α(K)exp=0.082 *19*.
545.29 *12*	0.78 *20*	2499.21	11/2⁻,13/2⁻	1954.01	11/2⁻	(M1)		0.0828	α(K)= 0.0678; α(L)=0.01127 I_γ: ^{197}Hg fraction subtracted. α(K)exp=0.11 *3*.
550.69 *14*	1.06 *15*	2570.03	15/2⁻	2019.31	17/2⁻	M1		0.0807	α(K)= 0.0661; α(L)=0.01098 α(K)exp=0.076 *26*.
557.80 *10*	14.0 *11*	1553.76	(13/2)⁻	996.21	11/2⁻	M1+E2	−0.8 *2*	0.056 *7*	α(K)= 0.045 *6*; α(L)= 0.0082 *8* E_γ: others: 558.0 *9* (1972Ho09), 558.3 *1* (1977Ve02), 557.6 *2* (1978Li10). α(K)exp=0.049 *10*. δ: from 558$\gamma(\theta)$ A_2=−0.71 *2* (α,4nγ). Other δ=0.7 *4* from α(K)exp=0.049.
574.7 *10*	1.0 *2*	2570.03	15/2⁻	1994.89	13/2⁻	M1		0.0722	α(K)= 0.0591; α(L)=0.00981 α(K)exp=0.078 *29*.
^{x}608.5 b *9*									E_γ: from 1972Ho09. Others: 608.4 (1979CoZI), 608.0 *2* (1980Hi04); peak interpreted as coincident summing of 222.8γ and 385.8γ (1979CoZI).
611.79 *14*	3.3 *4*	2113.90	13/2⁻	1502.07	9/2⁻,11/2⁻	E2		0.01777	α(K)=0.01328; α(L)=0.00338 α(K)exp=0.018 *6*.
616.42 *10*	4.4 *4*	1999.44	11/2⁻,13/2⁻	1382.91	11/2⁻	M1(+E2)	0.41 *+35−41*	0.054 *10*	α(K)= 0.044 *8*; α(L)= 0.0075 *11* Additional information 4. α(K)exp=0.044 *8*.
627.87 *18*	1.33 *19*	2011.04	13/2⁻	1382.91	11/2⁻	(M1)		0.0573	α(K)= 0.0469; α(L)=0.00777 α(K)exp=0.087 *22*.
649.59 *12*	2.8 *3*	1954.01	11/2⁻	1304.23	13/2⁻	(M1+E2)	≥0.2	0.032 *19*	α(K)= 0.026 *16*; α(L)= 0.0048 *22* Additional information 2. α(K)exp=0.026 *16*.
651.09 *11*	3.8 *4*	2033.79	11/2⁻,13/2⁻	1382.91	11/2⁻	M1		0.0521	α(K)= 0.0427; α(L)=0.00707 α(K)exp=0.047 *10*.
695.62 *10*	38 *3*	1304.23	13/2⁻	608.60	9/2⁻	E2		0.01343	α(K)=0.01026; α(L)=0.00238 E_γ: others: 695.0 *10* (1972Ho09), 695.4 *2* (1978Li10). Mult.: from 695$\gamma(\theta)$ A_2=0.27 *2* (α,4nγ).
706.84 *11*	6.3 *8*	2011.04	13/2⁻	1304.23	13/2⁻	M1		0.0421	α(K)= 0.0345; α(L)=0.00570 α(K)exp=0.039 *7*.
715.07 *12*	4.4 *4*	2019.31	17/2⁻	1304.23	13/2⁻	E2		0.01266	α(K)=0.00971; α(L)=0.00222 α(K)exp=0.0079 *17*.
724.11 *10*	14.9 *11*	1720.27	15/2⁻	996.21	11/2⁻	E2		0.01233	α(K)=0.00948; α(L)=0.00215 Mult.: from 724$\gamma(\theta)$ A_2=0.30 *2* (α,4nγ); α(K)exp=0.016 *3* suggests δ=1.6.
737.19 *11*	2.9 *2*	2041.41	(17/2)⁻	1304.23	13/2⁻	E2		0.01188	α(K)=0.00915; α(L)=0.00205

$^{197}_{81}$Tl$_{116}$-5

γ(^{197}Tl) (continued)

E_γ	I_γ[†&]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡#]	δ[@]	α[a]	Comments
									Mult.: from 737$\gamma(\theta)$ A_2=0.34 *3* (α,4nγ); α(K)exp=0.021 *5* suggests δ=0.9.
774.26 *10*	56 *4*	1382.91	11/2$^-$	608.60	9/2$^-$	M1+E2	0.7 *3*	0.026 *5*	α(K)= 0.021 *4*; α(L)= 0.0036 *6* α(K)exp=0.021 *4*.
792.50 *10*	3.7 *6*	2175.41		1382.91	11/2$^-$				I_γ: ^{197}Hg fraction subtracted.
809.74 *12*	2.0 *2*	2113.90	13/2$^-$	1304.23	13/2$^-$	M1		0.0297	α(K)=0.02437; α(L)=0.00401 α(K)exp=0.038 *10*.
829.93 *24*	1.2 *3*	2783.68	11/2$^-$,13/2$^-$	1954.01	11/2$^-$	M1		0.0279	α(K)=0.02289; α(L)=0.00376 α(K)exp=0.035 *14*.
835.76 *10*	4.1 *3*	2218.67	11/2$^-$,13/2$^-$,15/2$^-$	1382.91	11/2$^-$	E2		0.00916	α(K)=0.00717; α(L)=0.00150 α(K)exp=0.0078 *32*.
893.28 *10*	8.5 *10*	1502.07	9/2$^-$,11/2$^-$	608.60	9/2$^-$	M1+E2	1.1 *+7−5*	0.015 *5*	α(K)= 0.012 *4*; α(L)= 0.0021 *6* I_γ: ^{197}Hg fraction subtracted. α(K)exp=0.0125 *33*.
[x]896.09 *10*	3.2 *7*								I_γ: from $\gamma\gamma$-coin; Iγ=8.8 *7* via ^{197}Pb isomer+g.s. decay at equilibrium.
920.25 *10*	4.6 *4*	2303.17	(11/2)$^-$,(13/2)$^-$	1382.91	11/2$^-$	E2(+M1)	≥0.8	0.011 *5*	α(K)= 0.009 *4*; α(L)= 0.0017 *6* Additional information 5. α(K)exp=0.0093 *37*.
945.02 *11*	3.2 *3*	2327.93	(11/2)$^-$,(13/2)$^-$	1382.91	11/2$^-$	E2(+M1)	≥0.8	0.011 *4*	α(K)= 0.009 *4*; α(L)= 0.0016 *5* Additional information 6. α(K)exp=0.0091 *35*.
957.70 *10*	23.4 *18*	1954.01	11/2$^-$	996.21	11/2$^-$	M1+E2	1.1 *+5−3*	0.0126 *22*	α(K)= 0.0102 *18*; α(L)= 0.0018 *3* E_γ: others: 958.2 *5* (1977Ve02), 957.9 *2* (1980Hi04). α(K)exp=0.0102 *18*.
985.02 *14*	1.64 *17*	2367.94	(11/2$^-$,13/2$^-$)	1382.91	11/2$^-$				
998.59 *10*	9.5 *7*	1994.89	13/2$^-$	996.21	11/2$^-$	M1+E2	1.2 *+9−5*	0.011 *3*	α(K)= 0.0089 *24*; α(L)= 0.0015 *4* α(K)exp=0.0087 *20*.
1014.74 *17*	0.27 *8*	2011.04	13/2$^-$	996.21	11/2$^-$				
1029.46 *13*	2.58 *24*	2412.37	(11/2$^-$,13/2$^-$)	1382.91	11/2$^-$	(M1+E2)	1.0 *+60−8*	0.011 *5*	α(K)= 0.009 *4*; α(L)= 0.0015 *6* Additional information 7. α(K)exp=0.009 *4*.
1037.43 *14*	1.6 *2*	2033.79	11/2$^-$,13/2$^-$	996.21	11/2$^-$				
1063.77 *11*	2.8 *17*	2367.94	(11/2$^-$,13/2$^-$)	1304.23	13/2$^-$	(E2)		0.00567	α(K)=0.00454; α(L)=0.00085 I_γ: from $\gamma\gamma$-coin; Iγ=3.4 *3* via ^{197}Pb isomer+g.s. decay at equilibrium. Doublet α(K)exp=0.0040.
1074.31 *11*	3.0 *3*	2457.24	11/2$^-$,13/2$^-$	1382.91	11/2$^-$	M1(+E2)	0.58 *+81−58*	0.012 *4*	α(K)= 0.010 *3*; α(L)= 0.0017 *5* Additional information 8. α(K)exp=0.010 *3*.
[x]1080.4 *2*	0.72 *11*					(M1)		0.01426	α(K)=0.01172; α(L)=0.00191 α(K)exp=0.024 *13*.

γ(^{197}Tl) (continued)

E_γ	I_γ[†&]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡#]	δ[@]	α[a]	Comments
1117.66 *10*	12.8 *10*	2113.90	13/2⁻	996.21	11/2⁻	M1+E2	1.2 *+7−4*	0.0084 *16*	α(K)= 0.0069 *14*; α(L)=0.00117 *20* α(K)exp=0.0069 *13*.
1195.03 *12*	0.63 *8*	1803.45	(11/2⁻,13/2⁻)	608.60	9/2⁻				
[x]1278.80 *18*	1.6 *3*								
1345.46 *10*	3.5 *4*	1954.01	11/2⁻	608.60	9/2⁻	E2(+M1)	≥0.5	0.004 *4*	α(K)= 0.003 *3*; α(L)= 0.0005 *5* Additional information 3. α(K)exp=0.0032 *27*.
1371.69 *14*	1.21 *13*	2367.94	(11/2⁻,13/2⁻)	996.21	11/2⁻				
[x]1376.41 *15*	0.87 *12*								
1425.05 *12*	1.39 *13*	2033.79	11/2⁻,13/2⁻	608.60	9/2⁻				
[x]1455.24 *11*	2.23 *19*								
1479.21 *11*	3.9 *3*	2783.68	11/2⁻,13/2⁻	1304.23	13/2⁻	(E2)		0.00304	α(K)=0.00248; α(L)=0.00042 α(K)exp<0.0024. Mult.: from α(K)exp upper limit; π(initial)=π(final) precludes E1.
1505.21 *15*	0.47 *13*	2113.90	13/2⁻	608.60	9/2⁻				
1516.37 *15*	1.14 *13*	2820.62		1304.23	13/2⁻				
[x]1571.74 *15*	0.84 *11*								
1759.4 *5*	0.63 *9*	2367.94	(11/2⁻,13/2⁻)	608.60	9/2⁻				
1787.59 *18*	1.09 *13*	2783.68	11/2⁻,13/2⁻	996.21	11/2⁻				
1824.41 *11*	2.17 *19*	2820.62		996.21	11/2⁻				
2175.31 *14*	1.15 *12*	2783.68	11/2⁻,13/2⁻	608.60	9/2⁻				
2212.07 *14*	0.91 *11*	2820.62		608.60	9/2⁻				

† Relative intensity normalized to Iγ(387.72γ)=100 *9*.

‡ α(K)exp=ce(K)/Iγ normalized to α(K)(695.6γ)=0.0103 (E2 theory).

\# Deduced from α(K)exp, except as noted.

@ From α(K)exp (1979CoZI), except as noted.

& For absolute intensity per 100 decays, multiply by 0.253 *20*.

a 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.

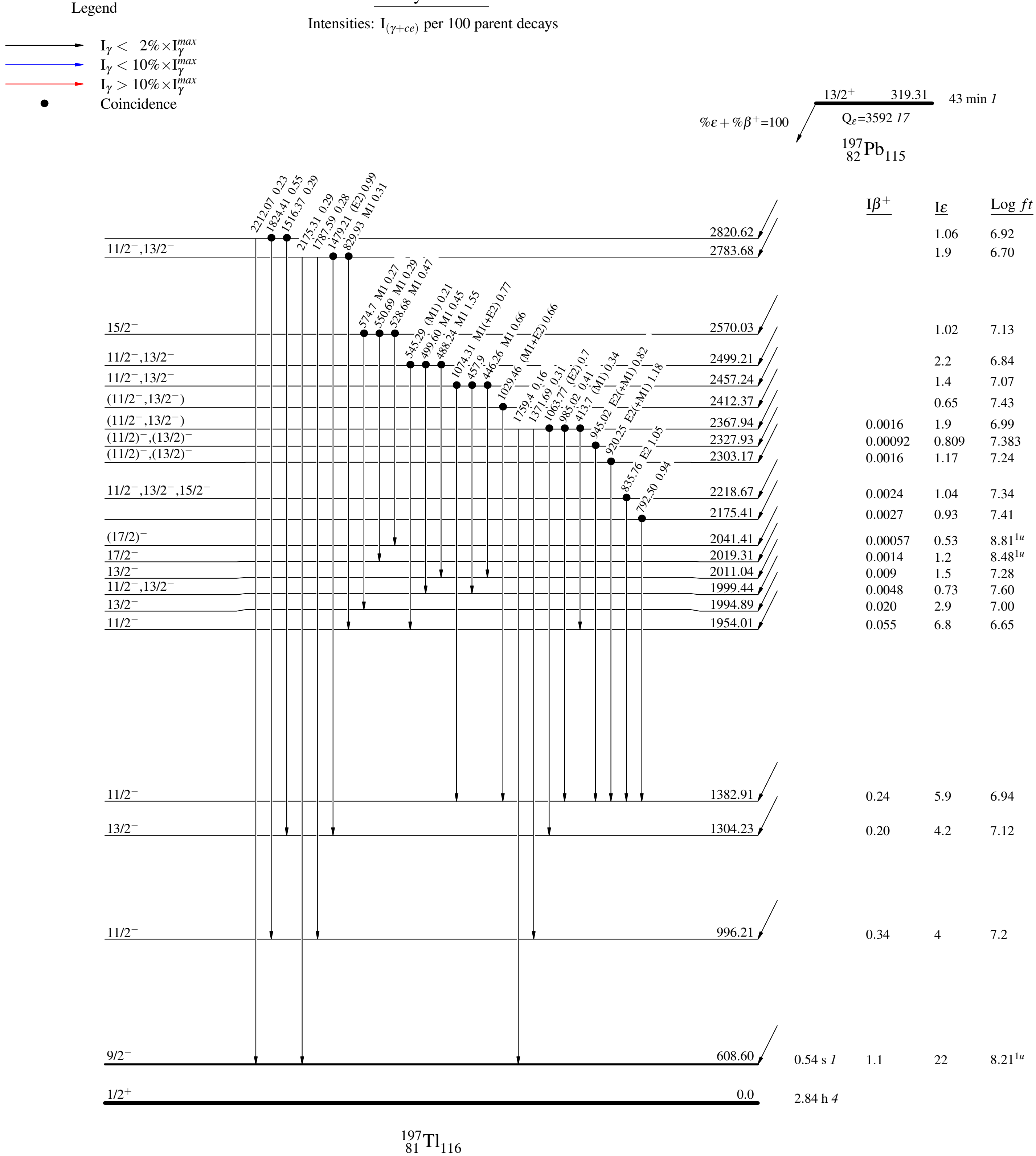
b Placement of transition in the level scheme is uncertain.

x γ ray not placed in level scheme.

$^{197}_{81}$Tl$_{116}$-7

^{197}Pb ε decay (43 min) 1979CoZI

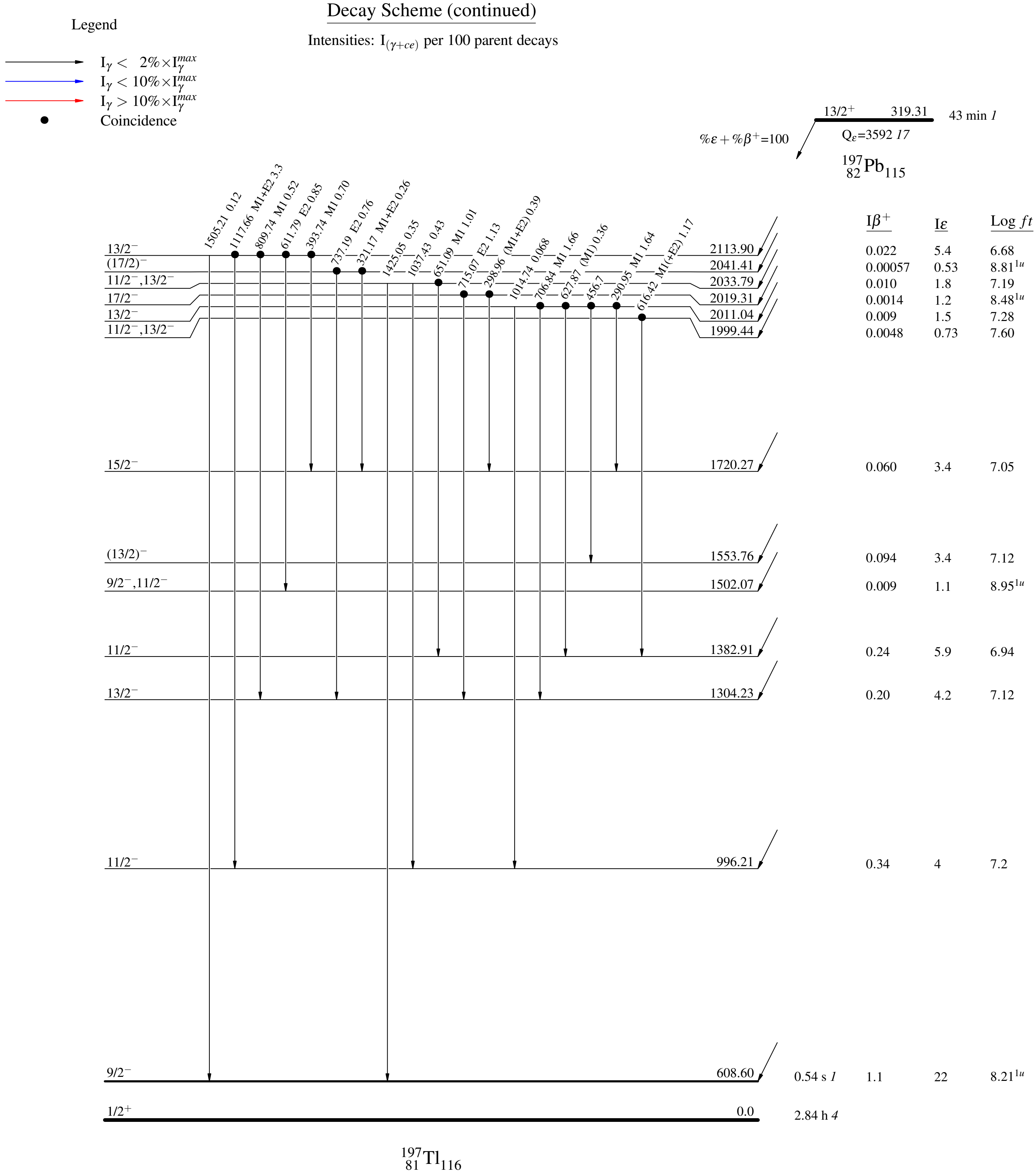
Decay Scheme



^{197}Pb ε decay (43 min) 1979CoZI

Decay Scheme (continued)

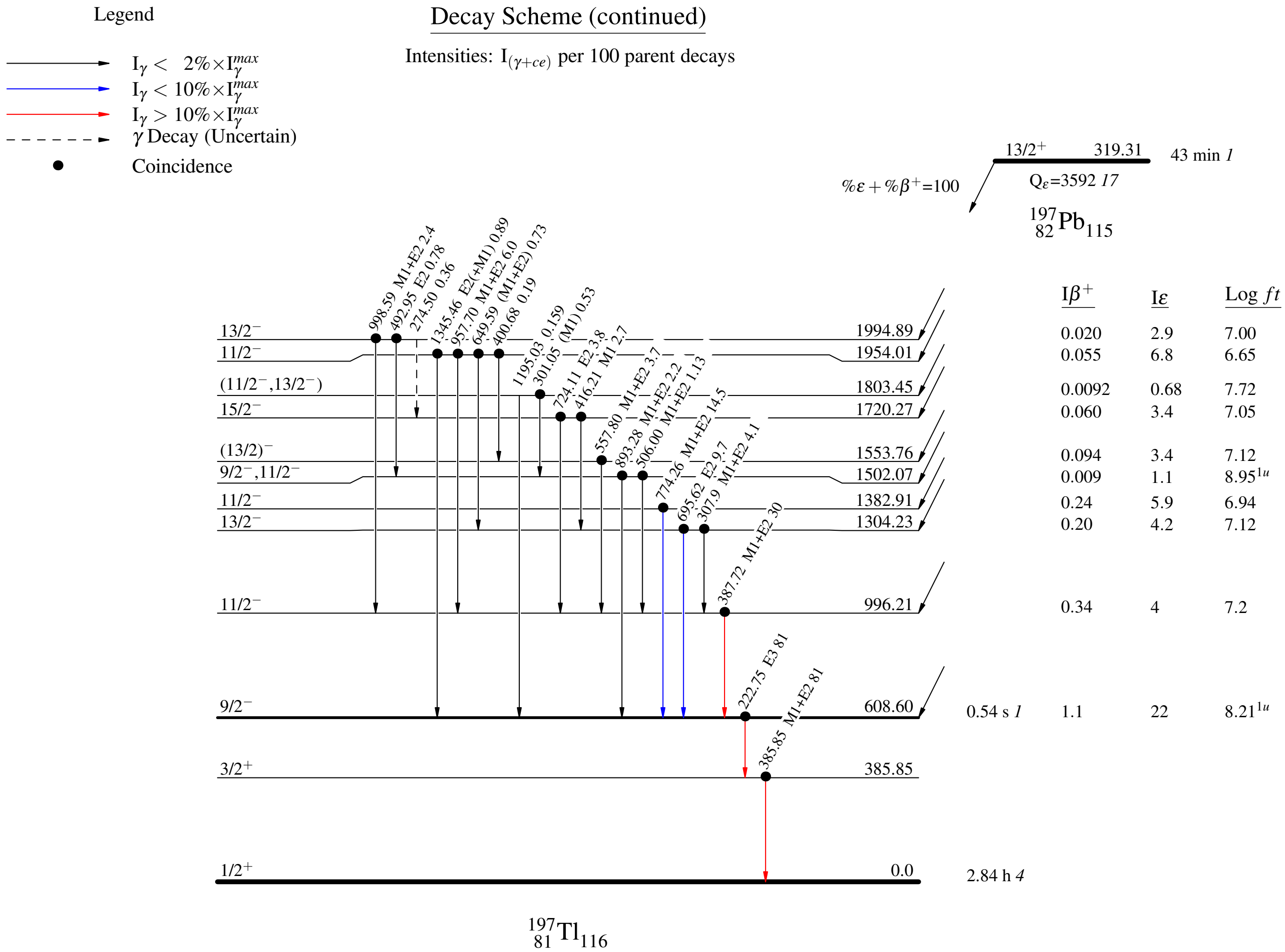
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays



^{197}Pb ε decay (43 min) 1979CoZI

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays



^{197}Pb ε decay (43 min) 1979CoZI