^{199}Pb ε decay (90 min) 1970DoZT

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 108, 79 (2007)	15-Oct-2006

Parent: ^{199}Pb: E=0.0; J$^{\pi}$=3/2^{-}; $T_{1/2}$=90 min *10*; Q(ε)=2830 *40*; %ε+%β^{+} decay=100.0

1970DoZT (also 1971DoZR,1971DoZW): ^{199}Pb prepared by ^{200}Hg(^{3}He,4n), E(^{3}He)=70 MeV, natural target, ^{203}Tl(p,5n) E(p)=41 MeV, enriched target, chemical separation. Measured Eγ, Iγ, $\gamma\gamma$, anticoincidence spectra. Results of this study also form the basis of evaluated/ compiled dataset in the 1978 Table of Isotopes (1978LeZA), prepared by the author of 1970DoZT. When differences are noted in the placement of transitions in 1970DoZT and 1971DoZW, the evaluator has adopted the placements as given by 1970DoZT.

Additional information 1.

1957An53: Produced by $^{203-205}$Tl(p,xn) E(p)=45-115 MeV, identification based upon mass separator, ce data.

^{199}Tl Levels

E(level)[†]	J$^{\pi}$[b]	$T_{1/2}$	E(level)[†]	J$^{\pi}$[b]
0.0	1/2^{+}		1977.48 *8*	1/2,3/2,5/2
366.89 *4*	3/2^{+}	<1.5[&] ns	2019.6?[‡] *2*	
720.35 *4*	(5/2)$^{+}$		2031.58[#] *10*	1/2,3/2,5/2$^{(+)}$
1120.91 *5*	1/2,3/2,5/2$^{(+)}$		2042.6?[‡] *3*	
1205.57[a] *11*	(7/2^{+})		2046.8?[‡] *6*	
1241.64 *7*	1/2,3/2,5/2		2062.5?[‡] *2*	
1482.38 *7*	1/2,3/2,5/2		2090.2?[‡] *2*	
1502.01 *5*	1/2$^{(+)}$ to 5/2$^{(+)}$		2159.57[@] *17*	1/2,3/2,5/2
1528.23[@] *9*	1/2,3/2,5/2		2206.5[@] *3*	1/2,3/2,5/2$^{(+)}$
1554.11[#] *8*	1/2,3/2,5/2		2226.48 *19*	1/2,3/2,5/2
1602.6?[‡] *9*			2237.39[#] *8*	1/2,3/2,5/2$^{(+)}$
1632.10 *12*	1/2,3/2,5/2		2244.3?[‡] *3*	
1647.2?[‡] *6*			2303.7?[‡] *3*	
1658.34 *6*	1/2,3/2,5/2$^{(+)}$		2341.6?[‡] *3*	
1695.2[@] *3*	1/2,3/2,5/2$^{(+)}$		2361.9?[‡] *3*	
1725.26 *7*	1/2,3/2,5/2		2367.38 *14*	1/2,3/2,5/2$^{(+)}$
1749.64 *6*	1/2,3/2,5/2$^{(+)}$		2399.2?[‡] *3*	
1768.60 *7*	1/2,3/2,5/2		2433.62[#] *17*	1/2,3/2,5/2$^{(+)}$
1891.06 *9*	1/2,3/2,5/2$^{(+)}$		2547.6[@] *4*	1/2,3/2,5/2$^{(+)}$
1898.13 *9*	1/2,3/2,5/2		2566.8?[‡] *4*	
1930.10[#] *10*	1/2,3/2,5/2$^{(+)}$		2643.2[@] *4*	1/2,3/2,5/2$^{(+)}$
1959.45 *8*	1/2,3/2,5/2		2751.9?[‡] *7*	

[†] From least-squares fit to Eγ′s.

[‡] Tentative level proposed (1970DoZT) from anticoincidence measurement. This level is not included in the ‘Adopted Levels’.

[#] According to 1970DoZT, existence of this level is fairly conclusive based on $\gamma\gamma$ coin data and energy sums, but not As certain As some of the other levels.

[@] Existence of this level is considered by 1970DoZT As least confident since it is mainly based on energy sum and observation of a transition In anticoincidence experiment and not on the observation of cascading transitions In $\gamma\gamma$ coin data.

[&] from 1959Jo21.

[a] Level population proposed by the evaluator based on results from (α,2nγ) dataset.

[b] From ‘Adopted Levels’.

^{199}Pb ε decay (90 min) 1970DoZT (continued)

ε,β^{+} radiations

E(decay)	E(level)	Iβ^{+} ‡	Iε‡	Log *ft*	I(ε+β^{+})†‡	Comments
(1.9×10^{2} *4*)	2643.2		0.06 *3*	6.6 *4*	0.06 *3*	εK=0.60 *12*; εL=0.29 *9*; εM+=0.11 *4*
(2.8×10^{2} *4*)	2547.6		0.06 *3*	7.1 *3*	0.06 *3*	εK=0.70 *3*; εL=0.221 *21*; εM+=0.078 *9*
(4.0×10^{2} *4*)	2433.62		0.22 *4*	6.9 *2*	0.22 *4*	εK=0.743 *11*; εL=0.192 *8*; εM+=0.065 *3*
(4.6×10^{2} *4*)	2367.38		0.49 *9*	6.8 *2*	0.49 *9*	εK=0.756 *8*; εL=0.183 *5*; εM+=0.0617 *21*
(5.9×10^{2} *4*)	2237.39		1.3 *3*	6.6 *2*	1.3 *3*	εK=0.771 *4*; εL=0.172 *3*; εM+=0.0574 *11*
(6.0×10^{2} *4*)	2226.48		0.37 *7*	7.1 *1*	0.37 *7*	εK=0.772 *4*; εL=0.171 *3*; εM+=0.0571 *11*
(6.2×10^{2} *4*)	2206.5		0.12 *6*	7.7 *3*	0.12 *6*	εK=0.774 *4*; εL=0.1697 *25*; εM+=0.0566 *10*
(6.7×10^{2} *4*)	2159.57		0.29 *6*	7.4 *1*	0.29 *6*	εK=0.777 *3*; εL=0.1673 *21*; εM+=0.0557 *8*
(8.0×10^{2} *4*)	2031.58		0.73 *14*	7.1 *1*	0.73 *14*	εK=0.7839 *19*; εL=0.1623 *14*; εM+=0.0537 *6*
(8.5×10^{2} *4*)	1977.48		1.1 *2*	7.0 *1*	1.1 *2*	εK=0.7861 *17*; εL=0.1607 *12*; εM+=0.0531 *5*
(8.7×10^{2} *4*)	1959.45		2.8 *5*	6.6 *1*	2.8 *5*	εK=0.7868 *16*; εL=0.1603 *11*; εM+=0.0529 *5*
(9.0×10^{2} *4*)	1930.10		0.37 *7*	7.5 *1*	0.37 *7*	εK=0.7878 *15*; εL=0.1595 *11*; εM+=0.0526 *4*
(9.3×10^{2} *4*)	1898.13		0.9 *2*	7.2 *1*	0.9 *2*	εK=0.7889 *14*; εL=0.1588 *10*; εM+=0.0523 *4*
(9.4×10^{2} *4*)	1891.06		0.87 *14*	7.2 *1*	0.87 *14*	εK=0.7891 *13*; εL=0.1586 *10*; εM+=0.0523 *4*
(1.06×10^{3} *4*)	1768.60		1.5 *3*	7.1 *1*	1.5 *3*	εK=0.7924 *10*; εL=0.1563 *7*; εM+=0.0514 *3*
(1.08×10^{3} *4*)	1749.64		7.2 *11*	6.4 *1*	7.2 *11*	εK=0.7928 *10*; εL=0.1559 *7*; εM+=0.0512 *3*
(1.10×10^{3} *4*)	1725.26		1.8 *3*	7.0 *1*	1.8 *3*	εK=0.7934 *9*; εL=0.1556 *7*; εM+=0.0511 *3*
(1.13×10^{3} *4*)	1695.2		0.35 *17*	7.8 *2*	0.35 *17*	εK=0.7940 *9*; εL=0.1551 *6*; εM+=0.05090 *24*
(1.17×10^{3} *4*)	1658.34		7.9 *12*	6.4 *1*	7.9 *12*	εK=0.7947 *8*; εL=0.1546 *6*; εM+=0.05069 *23*
(1.20×10^{3} *4*)	1632.10		0.8 *2*	7.5 *1*	0.8 *2*	εK=0.7952 *8*; εL=0.1542 *6*; εM+=0.05056 *22*
(1.28×10^{3} *4*)	1554.11		0.9 *2*	7.5 *1*	0.9 *2*	εK=0.7965 *7*; εL=0.1533 *5*; εM+=0.05019 *19*
(1.30×10^{3} *4*)	1528.23		0.56 *12*	7.7 *1*	0.56 *12*	εK=0.7969 *6*; εL=0.1530 *5*; εM+=0.05007 *18*
(1.33×10^{3} *4*)	1502.01		12 *2*	6.4 *1*	12 *2*	εK=0.7972 *6*; εL=0.1527 *5*; εM+=0.04996 *17*
(1.35×10^{3} *4*)	1482.38		2.6 *5*	7.1 *1*	2.6 *5*	εK=0.7975 *6*; εL=0.1525 *5*; εM+=0.04988 *17*
(1.59×10^{3} *4*)	1241.64	0.0020 *7*	1.7 *3*	7.4 *1*	1.7 *3*	av Eβ=276 *18*; εK=0.7995 *2*; εL=0.1503 *4*; εM+=0.04904 *13*
(1.62×10^{3}# *4*)	1205.57		0.90 *15*	8.7^{1u} *1*	0.90 *15*	εK=0.7838 *9*; εL=0.1622 *7*; εM+=0.0538 *3*
(1.71×10^{3} *4*)	1120.91	0.0091 *25*	3.6 *5*	7.1 *1*	3.6 *5*	av Eβ=330 *18*; εK=0.7995 *2*; εL=0.1493 *4*; εM+=0.04866 *13*
(2.11×10^{3} *4*)	720.35	0.03 *1*	2.4 *8*	7.5 *2*	2.4 *8*	av Eβ=506 *18*; εK=0.7934 *13*; εL=0.1458 *5*; εM+=0.04738 *15*
(2.46×10^{3} *4*)	366.89	0.58 *15*	16 *4*	6.8 *1*	17 *4*	av Eβ=661 *18*; εK=0.7783 *24*; εL=0.1416 *6*; εM+=0.04594 *19* Iβ^{+}: 0.94% reported by 1970DoZT.
(2.83×10^{3} *4*)	0.0	2 *1*	28 *9*	6.7 *2*	30 *10*	av Eβ=822 *18*; εK=0.752 *4*; εL=0.1357 *8*; εM+=0.04398 *25* Iε: deduced by evaluator from I(K x ray) (1970DoZT) and adopted decay scheme. The log *ft* value is consistent with systematics of log *ft* values for $s_{1/2}$ to $p_{3/2}$ transitions in this mass region, for example 7.1 for ^{199}Tl ε decay. 1970DoZT assumed No feeding to g.s..

† From intensity balance in the level scheme, unless otherwise noted.

‡ Absolute intensity per 100 decays.

Existence of this branch is questionable.

γ(^{199}Tl)

Iγ normalization: Σ Ti(to g.s.)=70 *10*, with 30% 10 ε+β^{+} feeding to g.s. note that 1970DoZT assumed No feeding to g.s., based on 5/2^{-} assignment for ^{199}Pb g.s. from observed I(K x ray) 1970DoZT actually obtained ε+β^{+} feeding of≈54% to g.s. about 50 units of relative intensity (≈3% of the intensity per 100 decays) are either unassigned or have questionable placements In the level scheme.
I(K x ray)=1450 *150* relative to Iγ(367)=790 *40* (1970DoZT).

Eγ[†]	Iγ[†c]	Ei(level)	J^π_i	Ef	J^π_f	Mult.	δ	α[d]	Comments
120.54[f] *15*	1.0 *3*	1241.64	1/2,3/2,5/2	1120.91	1/2,3/2,5/2$^{(+)}$				
[x]130.73 *20*	0.5 *2*								
[x]152.14 *20*	1.1 *4*								
[x]202.2 *3*	0.5 *2*								
222.83 *10*	1.2 *5*	1725.26	1/2,3/2,5/2	1502.01	1/2$^{(+)}$ to 5/2$^{(+)}$				Eγ: poor fit. Level-energy difference=223.25.
240.8 *2*	2.8 *2*	1482.38	1/2,3/2,5/2	1241.64	1/2,3/2,5/2				
267.6 *2*	6.9 *4*	1749.64	1/2,3/2,5/2$^{(+)}$	1482.38	1/2,3/2,5/2				
312.3[f] *7*	0.5 *2*	1554.11	1/2,3/2,5/2	1241.64	1/2,3/2,5/2				
319.2 *4*	1.6 *5*	1977.48	1/2,3/2,5/2	1658.34	1/2,3/2,5/2$^{(+)}$				
344.0 *7*	0.65 *25*	1898.13	1/2,3/2,5/2	1554.11	1/2,3/2,5/2				
353.39 *6*	169 *8*	720.35	(5/2)$^{+}$	366.89	3/2^{+}	M1+E2	0.6 *2*	0.211 *25*	α(K)= 0.169 *22*; α(L)= 0.0318 *22*; α(M)= 0.0075 *5*; α(N+..)=0.00240 *14* δ: based upon (L1+L2)/L3=^{40,}K/L=5.3 (1957An53); α(K)exp=0.144 (1970DoZT).
361.4 *6*	6.0 *20*	1482.38	1/2,3/2,5/2	1120.91	1/2,3/2,5/2$^{(+)}$				
366.90 *6*	790 *40*	366.89	3/2^{+}	0.0	1/2^{+}	M1+E2	+1.6 *2*	0.112 *10*	α(K)= 0.083 *9*; α(L)=0.0214 *9*; α(M)=0.00522 *19*; α(N+..)=0.00168 *6* δ: weighted average of δ deduced from (L1+L2)/L3=7.4, K/L=4.4 (10% uncertainty assumed by evaluator) (1957An53) and K/L=3.5 *3* (IT decay). Sign is positive from γ(θ) (1963Di10).
390.3 *4*	3.0 *5*	1632.10	1/2,3/2,5/2	1241.64	1/2,3/2,5/2				
400.54 *8*	23 *2*	1120.91	1/2,3/2,5/2$^{(+)}$	720.35	(5/2)$^{+}$				
430.9 *3*	3.5 *8*	1959.45	1/2,3/2,5/2	1528.23	1/2,3/2,5/2				
433.2 *3*	3.0 *8*	1554.11	1/2,3/2,5/2	1120.91	1/2,3/2,5/2$^{(+)}$				
476.9 *3*	3.2 *8*	1959.45	1/2,3/2,5/2	1482.38	1/2,3/2,5/2				
494.89 *10*	6.6 *10*	1977.48	1/2,3/2,5/2	1482.38	1/2,3/2,5/2				
503.15 *20*	1.9 *6*	2031.58	1/2,3/2,5/2$^{(+)}$	1528.23	1/2,3/2,5/2				
510.90[f] *10*	‡	1632.10	1/2,3/2,5/2	1120.91	1/2,3/2,5/2$^{(+)}$				
521.28 *7*	7.5 *15*	1241.64	1/2,3/2,5/2	720.35	(5/2)$^{+}$				
[x]537.0 *2*	1.2 *3*								
574.98[f] *15*	1.8 *3*	2206.5	1/2,3/2,5/2$^{(+)}$	1632.10	1/2,3/2,5/2				

$^{199}_{81}$Tl$_{118}$-3

γ(^{199}Tl) (continued)

Eγ[†]	Iγ[†c]	Ei(level)	J^{π}_{i}	Ef	J^{π}_{f}	Mult.	α[d]	Comments
605.8[ef] *6*	0.7[e] *4*	2159.57	1/2,3/2,5/2	1554.11	1/2,3/2,5/2			
605.8[ef] *6*	0.7[e] *4*	2237.39	$1/2,3/2,5/2^{(+)}$	1632.10	1/2,3/2,5/2			
641.3 *4*	1.1 *2*	2367.38	$1/2,3/2,5/2^{(+)}$	1725.26	1/2,3/2,5/2			
[x]685.2[@] *2*	1.7 *2*							γγ coin with 839γ, weak coin with 482γ.
720.24 *6*	116 *5*	720.35	$(5/2)^{+}$	0.0	$1/2^{+}$	(E2)	0.0125	α(K)=0.00958; α(L)=0.00218 Mult.: α(K)exp=0.011 (1970DoZT).
724.5[f] *4*	2.0 *4*	2206.5	$1/2,3/2,5/2^{(+)}$	1482.38	1/2,3/2,5/2			
735.4[e] *3*	2.0[e] *4*	2237.39	$1/2,3/2,5/2^{(+)}$	1502.01	$1/2^{(+)}$ to $5/2^{(+)}$			
735.4[ef] *3*	2.0[e] *4*	2367.38	$1/2,3/2,5/2^{(+)}$	1632.10	1/2,3/2,5/2			
753.92 *8*	28.4 *15*	1120.91	$1/2,3/2,5/2^{(+)}$	366.89	$3/2^{+}$			
761.98 *7*	40.0 *20*	1482.38	1/2,3/2,5/2	720.35	$(5/2)^{+}$			
777.20 *15*	5.4 *5*	1898.13	1/2,3/2,5/2	1120.91	$1/2,3/2,5/2^{(+)}$			
781.48 *7*	33.2 *20*	1502.01	$1/2^{(+)}$ to $5/2^{(+)}$	720.35	$(5/2)^{+}$			
[x]792.5 *4*	1.0 *3*							
833.83 *10*	3.3 *5*	1554.11	1/2,3/2,5/2	720.35	$(5/2)^{+}$			
838.68[#f] *10*	16.0 *12*	1205.57	$(7/2^{+})$	366.89	$3/2^{+}$			
874.77 *9*	29.2 *15*	1241.64	1/2,3/2,5/2	366.89	$3/2^{+}$			
911.80 *15*	6.6 *10*	1632.10	1/2,3/2,5/2	720.35	$(5/2)^{+}$			
937.89 *8*	37.7 *20*	1658.34	$1/2,3/2,5/2^{(+)}$	720.35	$(5/2)^{+}$			
984.4[f] *5*	1.0 *4*	2643.2	$1/2,3/2,5/2^{(+)}$	1658.34	$1/2,3/2,5/2^{(+)}$			
995.6[f] *4*	2.1 *4*	2237.39	$1/2,3/2,5/2^{(+)}$	1241.64	1/2,3/2,5/2			
1005.13 *8*	24.0 *12*	1725.26	1/2,3/2,5/2	720.35	$(5/2)^{+}$			
1029.21 *9*	28.9 *15*	1749.64	$1/2,3/2,5/2^{(+)}$	720.35	$(5/2)^{+}$			
1048.09 *9*	5.2 *8*	1768.60	1/2,3/2,5/2	720.35	$(5/2)^{+}$			
[x]1052.66 *9*	5.0 *8*							γγ coin with 367γ and 839γ.
1115.1 *4*	11.3 *10*	1482.38	1/2,3/2,5/2	366.89	$3/2^{+}$			
1121.00 *7*	26.8 *15*	1120.91	$1/2,3/2,5/2^{(+)}$	0.0	$1/2^{+}$			Additional information 2.
1135.04 *8*	140 *7*	1502.01	$1/2^{(+)}$ to $5/2^{(+)}$	366.89	$3/2^{+}$	(M1)	0.0126	α(K)=0.01034; α(L)=0.00168 Mult.: K/L≈6 (1957An53).
1161.27 *9*	15.4 *10*	1528.23	1/2,3/2,5/2	366.89	$3/2^{+}$			
1170.70 *9*	5.5 *5*	1891.06	$1/2,3/2,5/2^{(+)}$	720.35	$(5/2)^{+}$			
[x]1177.2 *4*	1.2 *3*							
1187.23 *10*	8.3 *8*	1554.11	1/2,3/2,5/2	366.89	$3/2^{+}$			
1209.60 *10*	4.6 *3*	1930.10	$1/2,3/2,5/2^{(+)}$	720.35	$(5/2)^{+}$			
[x]1215.2 *3*	1.8 *3*							
1239.12 *10*	37.8 *15*	1959.45	1/2,3/2,5/2	720.35	$(5/2)^{+}$			
1265.4 *3*	3.2 *3*	1632.10	1/2,3/2,5/2	366.89	$3/2^{+}$			
1291.50 *10*	5.5 *5*	1658.34	$1/2,3/2,5/2^{(+)}$	366.89	$3/2^{+}$			
1311.28 *10*	7.0 *10*	2031.58	$1/2,3/2,5/2^{(+)}$	720.35	$(5/2)^{+}$			
[x]1325.7[@] *3*	3.3 *5*							

γ(^{199}Tl) (continued)

E_γ[†]	I_γ[†c]	E_i(level)	J^π_i	E_f	J^π_f
1328.3 *3*	3.3 *5*	1695.2	1/2,3/2,5/2$^{(+)}$	366.89	3/2$^+$
1358.6 *3*	6.2 *8*	1725.26	1/2,3/2,5/2	366.89	3/2$^+$
1382.71 *9*	51.0 *20*	1749.64	1/2,3/2,5/2$^{(+)}$	366.89	3/2$^+$
1401.94 *10*	18.0 *10*	1768.60	1/2,3/2,5/2	366.89	3/2$^+$
1481.2 *6*	2.4 *4*	1482.38	1/2,3/2,5/2	0.0	1/2$^+$
1502.04 *8*	38.3 *15*	1502.01	1/2$^{(+)}$ to 5/2$^{(+)}$	0.0	1/2$^+$
1506.2 *4*	3.8 *4*	2226.48	1/2,3/2,5/2	720.35	(5/2)$^+$
1517.12 *10*	8.3 *6*	2237.39	1/2,3/2,5/2$^{(+)}$	720.35	(5/2)$^+$
1524.10 *15*	2.9 *7*	1891.06	1/2,3/2,5/2$^{(+)}$	366.89	3/2$^+$
1531.23 *10*	9.2 *6*	1898.13	1/2,3/2,5/2	366.89	3/2$^+$
1553.3[&] *3*	1.5 *3*	1554.11	1/2,3/2,5/2	0.0	1/2$^+$
^{x}1563.30 *15*	1.4 *3*				
^{x}1577.5 *5*	1.0 *2*				
1592.58 *15*	4.7 *5*	1959.45	1/2,3/2,5/2	366.89	3/2$^+$
1602.6[f] *9*	7.3 *6*	1602.6?		0.0	1/2$^+$
1610.67 *10*	10.2 *7*	1977.48	1/2,3/2,5/2	366.89	3/2$^+$
1631.8 *3*	1.6 *3*	1632.10	1/2,3/2,5/2	0.0	1/2$^+$
1647.2[ef] *6*	2.0[e] *4*	1647.2?		0.0	1/2$^+$
1647.2[e] *6*	2.0[e] *4*	2367.38	1/2,3/2,5/2$^{(+)}$	720.35	(5/2)$^+$
1658.43 *9*	100	1658.34	1/2,3/2,5/2$^{(+)}$	0.0	1/2$^+$
1695.28[f] *10*	6.0 *5*	1695.2	1/2,3/2,5/2$^{(+)}$	0.0	1/2$^+$
1725.3 *5*	1.2 *4*	1725.26	1/2,3/2,5/2	0.0	1/2$^+$
1749.70 *10*	41.4 *20*	1749.64	1/2,3/2,5/2$^{(+)}$	0.0	1/2$^+$
1768.48 *15*	4.0 *10*	1768.60	1/2,3/2,5/2	0.0	1/2$^+$
1793.10 *20*	4.0 *7*	2159.57	1/2,3/2,5/2	366.89	3/2$^+$
1840.0[f] *4*	1.4 *2*	2206.5	1/2,3/2,5/2$^{(+)}$	366.89	3/2$^+$
1859.3 *3*	2.3 *5*	2226.48	1/2,3/2,5/2	366.89	3/2$^+$
1891.3 *3*	7.2 *5*	1891.06	1/2,3/2,5/2$^{(+)}$	0.0	1/2$^+$
1898.7 *6*	1.5 *5*	1898.13	1/2,3/2,5/2	0.0	1/2$^+$
1930.69 *20*	2.0 *5*	1930.10	1/2,3/2,5/2$^{(+)}$	0.0	1/2$^+$
1959.50 *20*	1.2 *2*	1959.45	1/2,3/2,5/2	0.0	1/2$^+$
1978.5[a] *3*	1.3 *2*	1977.48	1/2,3/2,5/2	0.0	1/2$^+$
2000.61 *15*	3.3 *3*	2367.38	1/2,3/2,5/2$^{(+)}$	366.89	3/2$^+$
2019.60[f] *15*	1.7 *3*	2019.6?		0.0	1/2$^+$
2031.4 *5*	4.2 *8*	2031.58	1/2,3/2,5/2$^{(+)}$	0.0	1/2$^+$
2042.6[f] *3*	2.3 *6*	2042.6?		0.0	1/2$^+$
2046.8[f] *6*	2.3 *6*	2046.8?		0.0	1/2$^+$
2062.50[f] *20*	1.8 *2*	2062.5?		0.0	1/2$^+$
2066.95 *20*	1.2 *1*	2433.62	1/2,3/2,5/2$^{(+)}$	366.89	3/2$^+$
^{x}2078.4[@] *2*	1.8 *2*				
2090.20[f] *20*	2.9 *3*	2090.2?		0.0	1/2$^+$
^{x}2100.3[@] *3*	0.8 *2*				
2158.6[bf] *3*	0.8 *2*	2159.57	1/2,3/2,5/2	0.0	1/2$^+$
2180.2[f] *4*	0.77 *20*	2547.6	1/2,3/2,5/2$^{(+)}$	366.89	3/2$^+$
2206.5 *3*	1.5 *3*	2206.5	1/2,3/2,5/2$^{(+)}$	0.0	1/2$^+$
2226.7 *3*	0.5 *3*	2226.48	1/2,3/2,5/2	0.0	1/2$^+$
2237.29 *10*	11.0 *7*	2237.39	1/2,3/2,5/2$^{(+)}$	0.0	1/2$^+$
2244.3[f] *3*	0.6 *2*	2244.3?		0.0	1/2$^+$
2303.7[f] *3*	0.9 *2*	2303.7?		0.0	1/2$^+$
2341.6[f] *3*	2.7 *2*	2341.6?		0.0	1/2$^+$
2361.9[f] *3*	1.6 *3*	2361.9?		0.0	1/2$^+$
2367.0 *5*	1.5 *3*	2367.38	1/2,3/2,5/2$^{(+)}$	0.0	1/2$^+$
2399.2[@f] *3*	1.4 *2*	2399.2?		0.0	1/2$^+$
2433.1 *3*	2.7 *2*	2433.62	1/2,3/2,5/2$^{(+)}$	0.0	1/2$^+$
2547.6 *4*	0.5 *2*	2547.6	1/2,3/2,5/2$^{(+)}$	0.0	1/2$^+$
2566.8[f] *4*	0.5 *2*	2566.8?		0.0	1/2$^+$
2643.2 *4*	0.6 *2*	2643.2	1/2,3/2,5/2$^{(+)}$	0.0	1/2$^+$
2751.9[f] *7*	0.3 *2*	2751.9?		0.0	1/2$^+$

[†] From 1970DoZT (also 1971DoZR,1971DoZW).

[‡] Annihilation radiation, I($\gamma^\pm$)=29 *3*. The intensity may include a 511.1γ deexciting 1632 level. From this measured I($\gamma^\pm$), one obtains I$\beta^+\leq$0.8% which does not agree with Iβ^+=2.9 *9* deduced from the level scheme and the theoretical β^+/ε ratios.

[#] Placement proposed (by the evaluator) based on results from (α,2nγ) dataset.

[@] Weak $\gamma\gamma$ coin with 367γ.

[&] Placement, according to 1970DoZT, is less certain.

[a] Level-energy difference=1977.5.

$^{199}_{81}$Tl$_{118}$-5

[b] Level-energy difference=2159.6.

[c] For absolute intensity per 100 decays, multiply by 0.056 *8*.

[d] 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.

[e] Multiply placed with undivided intensity.

[f] Placement of transition in the level scheme is uncertain.

[x] γ ray not placed in level scheme.

$^{199}_{81}$Tl$_{118}$-6

^{199}Pb ε decay (90 min) 1970DoZT

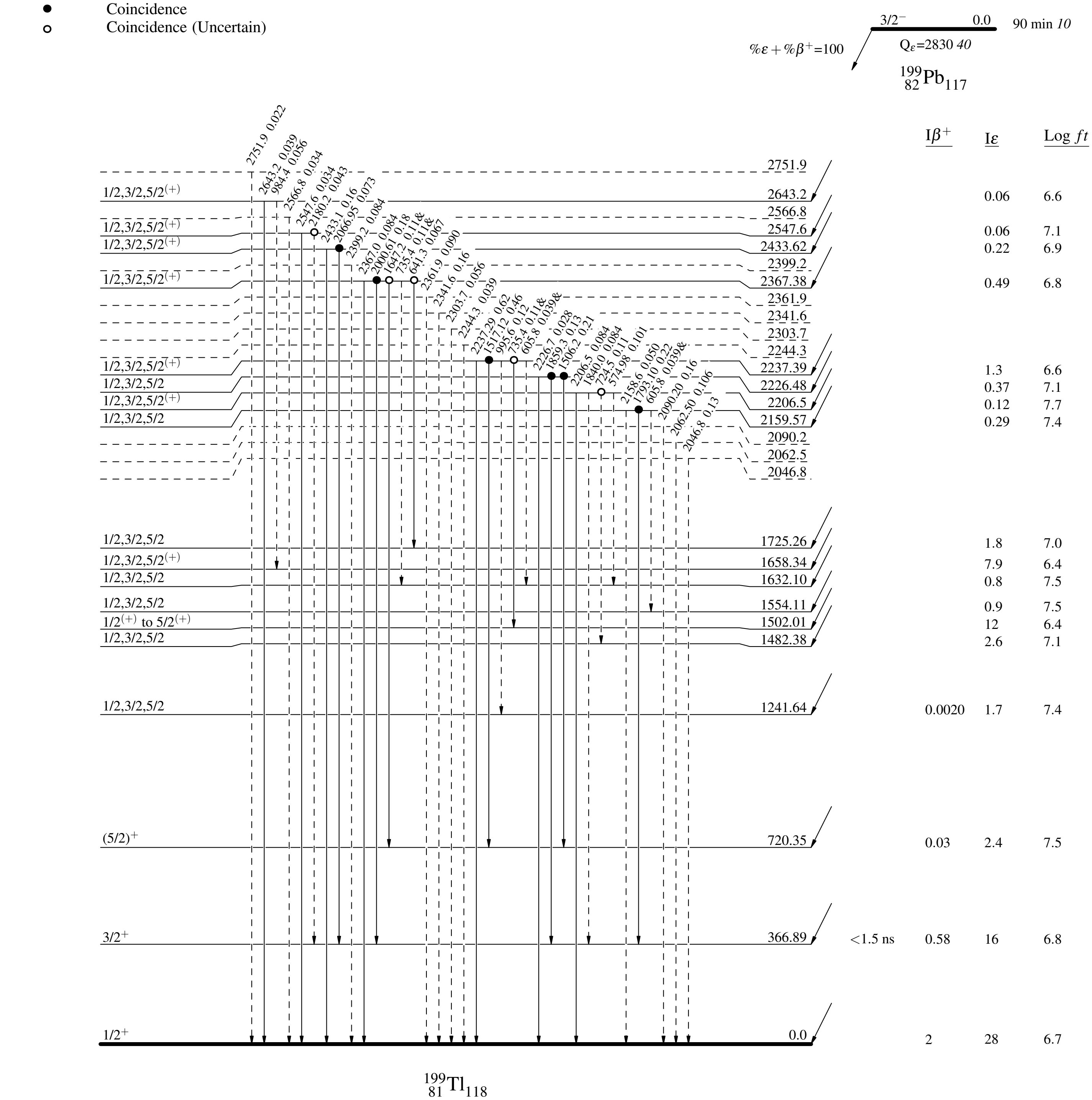
Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)
- ● Coincidence
- ○ Coincidence (Uncertain)

Decay Scheme

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

& Multiply placed: undivided intensity given



^{199}Pb ε decay (90 min) 1970DoZT

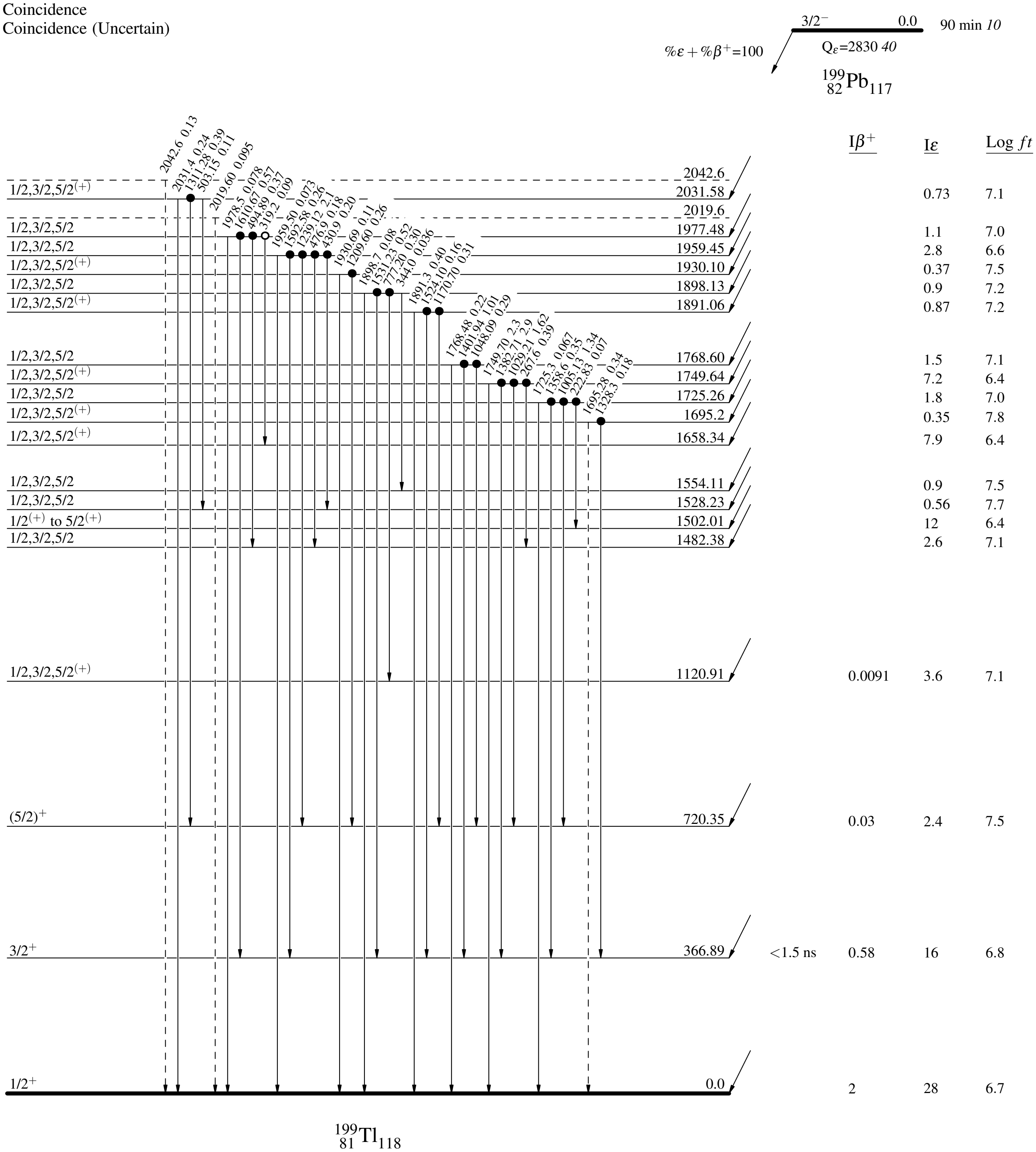
Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)
- ● Coincidence
- ○ Coincidence (Uncertain)

Decay Scheme (continued)

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

& Multiply placed: undivided intensity given



^{199}Pb ε decay (90 min) 1970DoZT

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given