Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	C. J. Chiara and F. G. Kondev	NDS 111,141 (2010)	1-Oct-2009

Q(β^-)=763.75 *18*; S(n)=6656.1 *3*; S(p)=6365.8 *13*; Q(α)=4.7×10^2 *3* 2012Wa38
Note: Current evaluation has used the following Q record 763.76 18 *6656.1 3* 6365.8 *13* 500 50 2003Au03.
Additional information 1.

^{204}Tl Levels

Cross Reference (XREF) Flags

A	^{204}Tl IT decay (61.7 μs)	F	^{205}Tl(p,d)
B	^{9}Be(^{238}U,Xγ)	G	^{205}Tl(d,t)
C	^{203}Tl(n,γ) E=thermal	H	^{206}Pb(d,α)
D	^{203}Tl(d,p)	I	^{207}Pb(μ^-,3nγ)
E	^{205}Tl(n,2nγ)		

E(level)†	J$^\pi$	T$_{1/2}$	XREF	Comments
0	2$^-$	3.783 y *12*	A CDEFGHI	%β^-=97.08 *7*; %ε+%β^+=2.92 *7* μ=0.09 *1* (1976Ek03,2005St24) Branching from I(K x ray)=1.64% *4* by 1990Sc08, K fluorescence yield=0.962 *4* from 1996Sc06, and εK/ε=0.5836 *14* (based on Q=344.3 *13* and theory for first forbidden unique ε decay). Additional information 2. J$^\pi$: atomic beam; β^- to ^{204}Pb unique shape. T$_{1/2}$: Weighted average of 3.754 y *4* (1965An07), 3.825 y *3* (1968Ho07), 3.774 y *5* (1969Bo24), 3.7730 y *19* (1969Jo02), and 3.793 y *5* (1970Ha32). Others: 4.11 y *13* (1958Ed17), 3.78 y *4* (1959Fi27), 3.91 y *2* (1959Wa13), 3.57 y *4* (1961Wy01), 3.81 y *4* (1962Le05), 3.91 y *9* (1962Ni01), 3.80 y *2* (1963Ha17), 3.78 y *7* (1964Sp11), 3.68 y *5* (1965Fl02), and 3.85 y *4* (1968La10). μ: From 1976Ek03 using the atomic beam magnetic resonance technique. Proposed configuration=$\pi[(s_{1/2})^{-1}]\nu[(f_{5/2})^{-1}](\nu^{-2})_{0+}$.
139.97 *4*	(1)$^-$‡		CDEFG I	XREF: G(130?). J$^\pi$: L=1 in (d,p) and (p,d); excitation function in ^{205}Tl(n,2nγ) and comparison with ^{202}Tl level scheme. Note, that a level at 130-keV was populated in (d,t) (no energy uncertainty was quoted) and L=3 was assigned. Proposed configuration=$\pi[(s_{1/2})^{-1}]\nu[(p_{1/2})^{-1}](\nu^{-2})_{0+}$.
145.89 *5*	(0$^-$)	18.7 ns *14*	C E	J$^\pi$: Excitation function in ^{205}Tl(n,2nγ); T$_{1/2}$ consistent with RUL. Additional information 3. T$_{1/2}$: From $\gamma\gamma$(t) with planar Ge(Li) and NaI(Tl) detectors in (n,γ). Proposed configuration=$\pi[(s_{1/2})^{-1}]\nu[(p_{1/2})^{-1}](\nu^{-2})_{0+}$.
300.14 *4*	(1,2)$^-$		Cd F	XREF: d(310). J$^\pi$: L=1 in (p,d); 154.01γ to (0$^-$). Proposed configuration=$\pi[(s_{1/2})^{-1}]\nu[(p_{3/2})^{-1}](\nu^{-2})_{0+}$.
318.86 *4*	1$^-$,2$^-$		Cd FG I	XREF: d(310)F(320)G(320). J$^\pi$: L=1 in (p,d) and (d,t); 553.56γ from the 872.52-keV level (J$^\pi$=(3,4)$^-$) rules out 0$^-$. Additional information 4. Proposed configuration=$\pi[(s_{1/2})^{-1}]\nu[(p_{3/2})^{-1}](\nu^{-2})_{0+}$.
347.79 *8*	(3,4)$^-$		C F I	J$^\pi$: L=3 in (p,d); lack of feeding by primary γ from J$^\pi$=0$^+$,1$^+$ in (n,γ) may rule out 2$^-$. Additional information 5.
413.99 *17*	(4$^-$)	<6 ns	A E I	J$^\pi$: Excitation function in ^{205}Tl(n,2nγ) and comparison with ^{202}Tl level

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Adopted Levels, Gammas (continued)

^{204}Tl Levels (continued)

E(level)[†]	J$^{\pi}$	T$_{1/2}$	XREF	Comments
				scheme. Additional information 6. T$_{1/2}$: from 1958Du80 in IT decay. Proposed configuration=$\pi[(d_{3/2})^{-1}]\nu[(f_{5/2})^{-1}](\nu^{-2})_{0+}$.
415.5 4	(1,2$^-$)		E	J$^{\pi}$: Excitation function in ^{205}Tl(n,2nγ); 269.6γ to (0$^-$).
424.80 6	(1,2)$^-$		C F I	XREF: F(428). J$^{\pi}$: L=1 in (p,d); tentative 278.8γ to (0$^-$). Additional information 7.
428 2	4$^-$		F H	XREF: F(428)H(420). J$^{\pi}$: L=3 in (p,d), L=5 in (d,α). Additional information 8.
431.88 5	(1,2)$^-$[‡]		C	J$^{\pi}$: 286.88γ to (0$^-$).
471.94 4	(1,2)$^-$[‡]		CD FG	XREF: D(470)F(473)G(460). Additional information 9. J$^{\pi}$: L=1 in (p,d), (d,p), and (d,t); 326.1γ to (0$^-$).
488.11 5	0$^-$,1$^-$,2$^-$[‡]		C F	J$^{\pi}$: L=1 in (p,d).
535.60 6	(1,2)$^-$		C F	J$^{\pi}$: L=1 in (p,d); 389.48γ to (0$^-$).
626.31 6	(1$^-$,2$^-$)		Cd fg	XREF: d(610)f(628)g(610,660?). Additional information 10. J$^{\pi}$: Possible L=1 in (d,t) and (p,d); 278.33γ to (3,4)$^-$.
629.40 5	(1$^-$,2$^-$)		Cd fg	XREF: d(610)f(628)g(610,660?). Additional information 11. J$^{\pi}$: Possible L=1 in (d,t) and (p,d); 483.29γ to (0$^-$).
677.96 7	(2,3)$^-$		C Fg	XREF: F(675)g(660?). J$^{\pi}$: L=3 in (p,d); non-observation in IT decay favors J<4; possible L=1 in (d,t) favors 2$^-$, but lack of observed feeding by primary γ from J^{π}=0$^+$,1$^+$ in (n,γ) suggests J>2. Additional information 12.
736.28 25	(0$^-$,1$^-$,2$^-$)		Cd fg	XREF: d(750)f(735)g(720). Additional information 13. J$^{\pi}$: Possible L=1 in (p,d) and (d,t).
737.10 5	(1$^-$,2$^-$)[‡]		Cd fg	XREF: d(750)f(735)g(720). J$^{\pi}$: Possible L=1 in (p,d) and (d,t); 591.13γ to (0$^-$).
764.30 5	0$^-$,1$^-$,2$^-$		Cd FG	XREF: d(750)F(762)G(800). J$^{\pi}$: L=1 in (p,d) and (d,t).
859 3	(2$^-$)		F	J$^{\pi}$: L=(1+3) in (p,d).
872.52 10	(3,4)$^-$		C F	XREF: F(870). J$^{\pi}$: L=3 in (p,d); not fed by primary γ from J^{π}=0$^+$,1$^+$ in (n,γ). Additional information 14.
905.99 8	2$^-$		C FG	XREF: F(904)G(910). J$^{\pi}$: L=1+3 in (p,d); L=1 in (d,t).
966 3	(3,4)$^-$		F	J$^{\pi}$: L=3 in (p,d); not seen in (n,γ).
1013.22 5	0$^-$,1$^-$,2$^-$[‡]		C F	XREF: F(1012). J$^{\pi}$: L=1 in (p,d).
1046 3	(3,4)$^-$		F	J$^{\pi}$: L=3 in (p,d); not seen in (n,γ).
1051.18 6	0$^-$,1$^-$,2$^-$[‡]		C	
1058.7 6			E	J$^{\pi}$: ≈4 from excitation function in ^{205}Tl(n,2nγ).
1100.1 6			E	J$^{\pi}$: ≈4 from excitation function in ^{205}Tl(n,2nγ).
1103.9 3	(7)$^+$	61.7 μs 10	A EFGH	μ=+1.187 6 (1972Ma59) XREF: F(1103)G(1120)H(1120). J$^{\pi}$: L=6 in (p,d), (d,t), and (d,α), with (d,α) favoring 7$^+$; T$_{1/2}$ consistent with RUL for 689.9γ E3 decay to (4$^-$).

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Adopted Levels, Gammas (continued)

^{204}Tl Levels (continued)

E(level)†	J^π	XREF	Comments
			Additional information 15. $T_{1/2}$: Weighted average of 60.7 *12* μs in 2008Fo03, 65 *3* μs in 1975Uy01, 63 *2* μs in 1966MoZZ, and 62 *5* μs in 1958Du80. μ: From 1972Ma59 using the time-differential perturbed angular distribution method, not corrected for Knight shift or diamagnetic shielding; these corrections are expected to mostly cancel, but yield a larger uncertainty than was quoted in 1972Ma59. Proposed dominant configuration=$\pi[(s_{1/2})^{-1}]\nu[(i_{13/2})^{-1}](\nu^{-2})_{0+}$. For pure configuration, μ=+0.70 (1980Sc26) indicating substantial configuration mixing.
1121.34 *7*	$0^-,1^-,2^-$‡	C F	XREF: F(1118). J^π: L=1 in (p,d).
1134.03 *9*	$0^-,1^-,2^-$	C F	XREF: F(1133). J^π: L=1 in (p,d).
1180.7 *6*	$(3,4)^-$	EF	XREF: F(1176). J^π: L=3 in (p,d); not seen in (n,γ); ≈4 from excitation function in ^{205}Tl(n,2nγ).
1204.35 *8*	$0^-,1^-,2^-$‡	C F	J^π: L=1 in (p,d).
1250.22 *5*	$0^-,1^-,2^-$‡	C F	J^π: L=1 in (p,d).
1285.7 *5*	$(6)^+$	EFG	XREF: F(1289)G(1270). J^π: L=6 in (d,t) and (p,d); excitation function in ^{205}Tl(n,2nγ) and comparison with ^{202}Tl level scheme. Possible configuration=$\pi[(s_{1/2})^{-1}]\nu[(i_{13/2})^{-1}](\nu^{-2})_{0+}$. Additional information 16.
1374.71 *7*	$(2)^-$‡	C E	E(level): May be two distinct levels. In (n,γ), only a 1234.69γ decay was observed, whereas in ^{205}Tl(n,2nγ), only 961.0γ decay. J^π: 1234.69γ to $(1)^-$, 961.0γ to (4^-) (assuming one unique level); J≈4 from excitation function in ^{205}Tl(n,2nγ) may support the existence of a second nearby level.
1393.21 *14*	$(2)^-$‡	C F	XREF: F(1388). J^π: L=3(+1) in (p,d).
1399.4 *6*	(4,5)	E	J^π: 985.4γ to (4^-); J≈4 from excitation function in ^{205}Tl(n,2nγ). This level is likely distinct from the 1405 level in (p,d), as a higher J value is expected here than is possible through L=1 transfer.
1405 *6*	$0^-,1^-,2^-$	F	J^π: L=1 in (p,d).
1416.3 *3*		C	
1424 *8*	$(2)^-$	F	J^π: L=1(+3) in (p,d).
1453.8 *5*	(8^+)	E	J^π: Excitation function in ^{205}Tl(n,2nγ) and comparison with ^{202}Tl level scheme; 349.9γ to $(7)^+$, 168.1γ to $(6)^+$.
1463 *8*		F	
1474.33 *5*	$0^-,1^-,2^-$‡	C	
1482.4 *7*	(2^-)	C F	XREF: F(1489). J^π: L=(3) in (p,d); fed by primary γ from $J^\pi=0^+,1^+$ in (n,γ).
1499.6 *7*		C	Additional information 17.
1516 *8*	$0^-,1^-,2^-$	F	J^π: L=1 in (p,d).
1524.27 *21*		C	Additional information 18.
1545 *6*	$0^-,1^-,2^-$	F	J^π: L=1 in (p,d).
1584 *5*		F	Additional information 19.
1640.09 *16*		C	Additional information 20.
1649.9 *5*	$(8,9^+)$	E	J^π: Excitation function in ^{205}Tl(n,2nγ); 546.0γ to $(7)^+$, 196.0γ to (8^+).
1652 *5*	$0^-,1^-,2^-$	F	J^π: L=1 in (p,d).
1673.48 *19*		C	
1683 *5*	$0^-,1^-,2^-$	F	J^π: L=1 in (p,d).
1709 *5*		F	J^π: Populated via L=5 or 6 in (p,d), this level differs from the 1709.7-keV level populated by primary γ from $J^\pi=0^+,1^+$ in (n,γ).
1709.7 *7*		C	Additional information 21.
1731.1 *7*	(8,9)	E	J^π: Excitation function in ^{205}Tl(n,2nγ); 277.3γ to (8^+).
1741.04 *6*	$0^-,1^-,2^-$‡	C F	XREF: F(1753).

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Adopted Levels, Gammas (continued)

^{204}Tl Levels (continued)

E(level)†	Jπ	$T_{1/2}$	XREF	Comments
1787.2 *6*			C	Additional information 22.
1813.30 *16*			C F	XREF: F(1810). Additional information 23.
1830	(7)$^+$		H	Jπ: L=6 in (d,α).
1834 *5*	2$^-$,3$^-$,4$^-$		F	Jπ: L=3 in (p,d).
1850.3 *4*	2$^-$		C G	XREF: G(1850). Jπ: L=3 in (d,t); primary γ from Jπ=0$^+$,1$^+$ in (n,γ).
1902.46 *12*	(2)$^-$‡		C F	XREF: F(1908). Jπ: L=(1+3) in (p,d).
1939.4 *4*	2$^-$		C F	XREF: F(1933). Jπ: L=3 in (p,d); primary γ from Jπ=0$^+$,1$^+$ in (n,γ).
1948.88 *15*	2$^-$		C F	XREF: F(1951). Jπ: L=3 in (p,d); primary γ from Jπ=0$^+$,1$^+$ in (n,γ).
1967.13 *13*	2$^-$‡		C F	XREF: F(1969). Jπ: L=3(+1) in (p,d).
1980	2$^-$,3$^-$,4$^-$		G	Jπ: L=3 in (d,t).
1997 *5*			F	
2045.4 *7*	(≤3)		C f	XREF: f(2049). Jπ: Primary γ from Jπ=0$^+$,1$^+$ in (n,γ); possible L=3 in (p,d) would make a 2$^-$ assignment likely.
2053.76 *17*	(≤3)		C fg	XREF: f(2049)g(2060). Jπ: Primary γ from Jπ=0$^+$,1$^+$ in (n,γ); possible L=3 in (p,d) and (d,t) would make a 2$^-$ assignment likely.
2084.7 *3*	(≤3)		C Fg	XREF: F(2084)g(2060). Jπ: Primary γ from Jπ=0$^+$,1$^+$ in (n,γ); possible L=3 in (d,t) would make a 2$^-$ assignment likely.
2114.09 *16*	(≤3)		C f	XREF: f(2116). Jπ: Primary γ from Jπ=0$^+$,1$^+$ in (n,γ); possible L=3 in (p,d) would make a 2$^-$ assignment likely.
2117.3 *7*			Ef	XREF: f(2116). Additional information 24.
2134.5 *7*			C	
2146 *5*	(2$^-$)		F	Jπ: L=(1+3) in (p,d).
2158.97 *14*	(0,1,2)$^-$		C F	XREF: F(2166). Jπ: Primary γ from Jπ=0$^+$,1$^+$ in (n,γ); L=1(+3) in (p,d).
2188.5 *7*			C F	XREF: F(2191).
2205.9 *7*	(≤3)		C g	XREF: g(2210). Jπ: Primary γ from Jπ=0$^+$,1$^+$ in (n,γ); possible L=3 in (d,t) would make a 2$^-$ assignment likely.
2214.44 *10*	(≤3)		C g	XREF: g(2210). Jπ: Primary γ from Jπ=0$^+$,1$^+$ in (n,γ); possible L=3 in (d,t) would make a 2$^-$ assignment likely.
2228 *5*	2$^-$,3$^-$,4$^-$		F	Jπ: L=3 in (p,d).
2252.11 *16*	(2$^-$,3$^-$,4$^-$)		C F	XREF: F(2243). Jπ: L=(3) in (p,d).
2261.9 *7*	(≤3)		C f	XREF: f(2271). Jπ: Primary γ from Jπ=0$^+$,1$^+$ in (n,γ); possible L=3 in (p,d) would make a 2$^-$ assignment likely.
2274.3 *7*	(≤3)		C f	XREF: f(2271). Jπ: Primary γ from Jπ=0$^+$,1$^+$ in (n,γ); possible L=3 in (p,d) would make a 2$^-$ assignment likely.
2311.15 *13*			C	
2318.8 *7*			E	Jπ: 668.9γ to (8,9$^+$) rules out this being the same as the 2320-keV level populated by L=(3) in (p,d).
2318.8+x	(12$^-$)	2.6 μs *2*	B H	XREF: H(2310).

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Adopted Levels, Gammas (continued)

^{204}Tl Levels (continued)

E(level)†	J^π	$T_{1/2}$	XREF	Comments
				Additional information 25. E(level): The 350γ and 668γ reported in ^{9}Be(^{238}U,Xγ) as being from the decay of an unplaced (12$^-$) isomer are also observed in ^{205}Tl(n,2nγ). Strong population of a J=12 level is not expected in the n-induced reaction, and these γ′s are likely from a level below the isomer. Thus, the energy of the proposed (12$^-$) level is above 2318.8 keV. J^π: L=11 in (d,α); J^π=(12$^-$) proposed by 1998Pf02 based on analogy with ^{206}Tl. Proposed configuration=$\pi[(h_{11/2})^{-1}]\nu[(i_{13/2})^{-1}](\nu^{-2})_{0+}$. $T_{1/2}$: From 350γ(t) and 668γ(t) by 1998Pf02 in ^{9}Be(^{238}U,Xγ). The possibility that feeding from the higher-lying 1.6−μs isomer may influence the lifetime fit for this level was not discussed in 1998Pf02.
2318.8+y		1.6 μs *2*	B	Additional information 26. E(level): Based on the relative population of the 1.6- and 2.6−μs isomers in 1998Pf02, the former is expected to be at a higher energy. $T_{1/2}$: From γ(t) in ^{9}Be(^{238}U,Xγ).
2320 *9*	(2$^-$,3$^-$,4$^-$)		F	J^π: L=(3) in (p,d).
2345.71 *25*			C	
2368.4 *8*	2$^-$		C F	XREF: F(2374). J^π: L=3 in (p,d); primary γ from J^π=0$^+$,1$^+$ in (n,γ).
2395.8 *8*	2$^-$		C F	XREF: F(2397). J^π: L=3 in (p,d); primary γ from J^π=0$^+$,1$^+$ in (n,γ).
2429.25 *18*	(≤3)		C F	XREF: F(2420). J^π: Primary γ from J^π=0$^+$,1$^+$ in (n,γ); possible L=3 in (p,d) would make a 2$^-$ assignment likely.
2458.74 *15*			C	
2475 *9*	2$^-$,3$^-$,4$^-$		F	J^π: L=3 in (p,d).
2493.39 *13*	2$^-$		C F	XREF: F(2492). J^π: L=3 in (p,d); primary γ from J^π=0$^+$,1$^+$ in (n,γ).
2526.9 *7*			C	
2539.64 *18*			C	
2553.3 *4*			C	
2578.0 *6*	2$^-$		C F	XREF: F(2570). J^π: L=3 in (p,d); primary γ from J^π=0$^+$,1$^+$ in (n,γ).
2585.7 *7*			C	
2618.8 *7*			C	
2637.3 *7*	(≤3)		C f	XREF: f(2642). J^π: Primary γ from J^π=0$^+$,1$^+$ in (n,γ); possible L=3 in (p,d) would make a 2$^-$ assignment likely.
2645.6 *7*	(≤3)		C f	XREF: f(2642). J^π: Primary γ from J^π=0$^+$,1$^+$ in (n,γ); possible L=3 in (p,d) would make a 2$^-$ assignment likely.
2650	(9)$^+$		H	J^π: L=8 in (d,α).
2673 *6*	2$^-$,3$^-$,4$^-$		F	J^π: L=3 in (p,d).
2705 *8*	2$^-$,3$^-$,4$^-$		F	J^π: L=3 in (p,d).
2728 *8*	2$^-$,3$^-$,4$^-$		F	J^π: L=3 in (p,d).
2796 *10*	2$^-$,3$^-$,4$^-$		F	J^π: L=3 in (p,d).
2807 *10*	2$^-$,3$^-$,4$^-$		F	J^π: L=3(+1) in (p,d). Additional information 27.
2831 *10*	(0$^-$,1$^-$,2$^-$)		F	J^π: L=(1) in (p,d).
2880	(9)$^+$		H	J^π: L=8 in (d,α).
2934 *10*			F	
2968 *10*			F	
2986 *15*			F	
3002 *15*			F	

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Adopted Levels, Gammas (continued)

^{204}Tl Levels (continued)

E(level)†	J$^{\pi}$	XREF	Comments
3045 *10*	(2$^-$,3$^-$,4$^-$)	F	J$^{\pi}$: L=(3) in (p,d).
3067 *10*		F	
3093 *10*		F	
3117 *15*		F	
3142 *20*		F	
3530		H	J$^{\pi}$: L=(5,6) in (d,α).
(6654.76 *5*)	0$^+$,1$^+$	C	

† From a least-squares fit to Eγ.

‡ Level fed by strong primary γ from 0$^+$,1$^+$ in ^{203}Tl(n,γ) E=thermal, favoring J^{π}=0$^-$,1$^-$,2$^-$.

Adopted Levels, Gammas (continued)

γ(^{204}Tl)

E_i(level)	J_i^π	E_γ‡	I_γ‡	E_f	J_f^π	Mult.	α†	Comments
139.97	(1)$^-$	139.94 *9*	100	0	2$^-$			
145.89	(0$^-$)	(5.9 *1*)	≈6.5	139.97	(1)$^-$	[M1]	≈1.59×10^3	E_γ: γ not observed, but inferred to exist by 1975RaYX in (n,γ). Eγ and ΔEγ come from the difference in level energies. Additional information 28. I_γ: From branching ratio of I(γ+ce)(145.88)/I(γ+ce)(5.9)=0.022 *12* in (n,γ) by 1975RaYX.
		145.88 *10*	100 *9*	0	2$^-$	[E2]	1.289	α(K)=0.341 *5*; α(L)=0.708 *11*; α(M)=0.185 *3*; α(N+..)=0.0547 *8* α(N)=0.0464 *7*; α(O)=0.00804 *12*; α(P)=0.000288 *5* B(E2)(W.u.)≈0.1
300.14	(1,2)$^-$	154.01 *9*	100.0 *18*	145.89	(0$^-$)			
		299.91 *24*	2.9 *8*	0	2$^-$			
318.86	1$^-$,2$^-$	178.78 *11*	1.54 *15*	139.97	(1)$^-$			
		318.88 *8*	100.0 *19*	0	2$^-$			
347.79	(3,4)$^-$	347.84$^{\#}$ *21*	100	0	2$^-$			
413.99	(4$^-$)	414.03$^{\#}$ *18*	100	0	2$^-$	[E2]	0.0451	B(E2)(W.u.)>0.10 α(K)=0.0304 *5*; α(L)=0.01112 *16*; α(M)=0.00278 *4*; α(N+..)=0.000833 *12* α(N)=0.000699 *10*; α(O)=0.0001268 *18*; α(P)=7.82×10^{-6} *11*
415.5	(1,2$^-$)	269.6$^{@}$ *5*		145.89	(0$^-$)			
		275.6$^{@}$ *5*		139.97	(1)$^-$			
424.80	(1,2)$^-$	77.07 *22*	9 *4*	347.79	(3,4)$^-$			
		278.8$^{\&}$ *5*		145.89	(0$^-$)			
		284.81 *12*	4.3 *4*	139.97	(1)$^-$			
		424.81 *8*	100.0 *21*	0	2$^-$			
431.88	(1,2)$^-$	132.11 *14*	100 *16*	300.14	(1,2)$^-$			
		286.88 *11*	94 *8*	145.89	(0$^-$)			
471.94	(1,2)$^-$	152.93 *11*	12.4 *5*	318.86	1$^-$,2$^-$			
		171.88 *9*	9.4 *4*	300.14	(1,2)$^-$			
		326.1 *5*		145.89	(0$^-$)			
		331.76 *9*	32.0 *9*	139.97	(1)$^-$			
		471.90 *8*	100 *3*	0	2$^-$			
488.11	0$^-$,1$^-$,2$^-$	169.1 *5*		318.86	1$^-$,2$^-$			
		188.09 *20*	0.50 *11*	300.14	(1,2)$^-$			
		348.3 *5*	≤100	139.97	(1)$^-$			
		488.11 *8*	26.6 *11*	0	2$^-$			
535.60	(1,2)$^-$	47.4$^{\&}$ *5*		488.11	0$^-$,1$^-$,2$^-$			
		216.7 *5*		318.86	1$^-$,2$^-$			
		235.7 *5*		300.14	(1,2)$^-$			
		389.48 *11*	9.2 *8*	145.89	(0$^-$)			
		395.62 *8*	100.0 *23*	139.97	(1)$^-$			

$^{204}_{81}$Tl$_{123}$-7

Adopted Levels, Gammas (continued)

$\gamma(^{204}Tl)$ (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ[‡]	E_f	J^π_f
626.31	$(1^-,2^-)$	194.5[&] *5*		431.88	$(1,2)^-$
		278.33 *21*	4.6 *13*	347.79	$(3,4)^-$
		325.85 *8*	78 *3*	300.14	$(1,2)^-$
		626.54 *8*	100 *3*	0	2^-
629.40	$(1^-,2^-)$	157.32 *10*	15.0 *12*	471.94	$(1,2)^-$
		198.33 *8*	100.0 *25*	431.88	$(1,2)^-$
		310.31 *9*	60 *3*	318.86	$1^-,2^-$
		329.05[&] *8*	30.9 *22*	300.14	$(1,2)^-$
		483.29 *12*	20.1 *25*	145.89	(0^-)
		489.26 *24*	20 *7*	139.97	$(1)^-$
		629.12 *8*	95.1 *25*	0	2^-
677.96	$(2,3)^-$	253.17 *15*	7.8 *14*	424.80	$(1,2)^-$
		330.09 *9*	74 *3*	347.79	$(3,4)^-$
		678.01 *8*	100 *4*	0	2^-
736.28	$(0^-,1^-,2^-)$	596.31 *24*	100	139.97	$(1)^-$
737.10	$(1^-,2^-)$	108.0[&] *5*		629.40	$(1^-,2^-)$
		110.72 *15*	1.5 *3*	626.31	$(1^-,2^-)$
		249.06 *12*	3.0 *4*	488.11	$0^-,1^-,2^-$
		418.27 *11*	12.0 *10*	318.86	$1^-,2^-$
		437.11 *9*	25.5 *10*	300.14	$(1,2)^-$
		591.13 *9*	19.1 *9*	145.89	(0^-)
		737.12 *8*	100 *4*	0	2^-
764.30	$0^-,1^-,2^-$	228.9[&] *5*		535.60	$(1,2)^-$
		276.2 *5*		488.11	$0^-,1^-,2^-$
		292.26 *8*	100.0 *20*	471.94	$(1,2)^-$
		416.91 *17*	7.0 *12*	347.79	$(3,4)^-$
		624.46 *8*	42.0 *10*	139.97	$(1)^-$
		764.13 *9*	32.2 *12*	0	2^-
872.52	$(3,4)^-$	336.96 *10*	100 *8*	535.60	$(1,2)^-$
		553.56 *15*	68 *9*	318.86	$1^-,2^-$
905.99	2^-	169.23 *12*	34 *6*	737.10	$(1^-,2^-)$
		369.65 *24*	43 *11*	535.60	$(1,2)^-$
		587.01 *10*	100 *9*	318.86	$1^-,2^-$
		606.8 *5*		300.14	$(1,2)^-$
1013.22	$0^-,1^-,2^-$	383.99 *8*	20.3 *7*	629.40	$(1^-,2^-)$
		541.22 *8*	28.5 *9*	471.94	$(1,2)^-$
		713.06 *8*	35.4 *12*	300.14	$(1,2)^-$
		873.16 *8*	100.0 *24*	139.97	$(1)^-$
		1013.27 *9*	12.9 *7*	0	2^-
1051.18	$0^-,1^-,2^-$	424.3 *2*		626.31	$(1^-,2^-)$
		563.21 *8*	43.4 *18*	488.11	$0^-,1^-,2^-$

γ(^{204}Tl) (continued)

E_i(level)	J_i^π	E_γ‡	I_γ‡	E_f	J_f^π	Mult.	α†	Comments
1051.18	$0^-,1^-,2^-$	618.86 *18*	3.9 *7*	431.88	$(1,2)^-$			
		732.09 *9*	78 *4*	318.86	$1^-,2^-$			
		911.4 *1*	100 *11*	139.97	$(1)^-$			
1058.7		644.7@ *5*	100@	413.99	(4^-)			
1100.1		686.1@ *5*	100@	413.99	(4^-)			
1103.9	$(7)^+$	689.9 *2*	100@	413.99	(4^-)	[E3]	0.0365	B(E3)(W.u.)=0.1033 *17* α(K)=0.0242 *4*; α(L)=0.00932 *13*; α(M)=0.00235 *4*; α(N+..)=0.000709 *10* α(N)=0.000593 *9*; α(O)=0.0001089 *16*; α(P)=7.48×10^{-6} *11* E_γ: From 1975Uy01 in IT decay. Mult.: based on RUL, mult cannot be M3, E4, or higher.
1121.34	$0^-,1^-,2^-$	1121.29 *7*	100	0	2^-			
1134.03	$0^-,1^-,2^-$	1134.01 *9*	100	0	2^-			
1180.7	$(3,4)^-$	766.7@ *5*	100@	413.99	(4^-)			
1204.35	$0^-,1^-,2^-$	714.86 *24*	14.2 *23*	488.11	$0^-,1^-,2^-$			
		885.89 *8*	100.0 *23*	318.86	$1^-,2^-$			
1250.22	$0^-,1^-,2^-$	818.14 *8*	58.3 *21*	431.88	$(1,2)^-$			
		931.39 *8*	54 *3*	318.86	$1^-,2^-$			
		949.88 *8*	100 *3*	300.14	$(1,2)^-$			
		1110.37 *8*	86 *3*	139.97	$(1)^-$			
		1250.47 *9*	35.1 *21*	0	2^-			
1285.7	$(6)^+$	181.8@ *5*	100@	1103.9	$(7)^+$			
1374.71	$(2)^-$	961.0@ *5*		413.99	(4^-)			I_γ: see comment for 1374.71 level.
		1234.69 *7*		139.97	$(1)^-$			I_γ: see comment for 1374.71 level.
1399.4	(4,5)	985.4@ *5*	100@	413.99	(4^-)			
1453.8	(8^+)	168.1@ *5*		1285.7	$(6)^+$			
		349.9@ *5*		1103.9	$(7)^+$			
1474.33	$0^-,1^-,2^-$	1002.21 *14*	9.8 *17*	471.94	$(1,2)^-$			
		1042.75 *12*	16.7 *12*	431.88	$(1,2)^-$			
		1155.43 *7*	100 *3*	318.86	$1^-,2^-$			
		1334.37 *10*	29.4 *20*	139.97	$(1)^-$			
		1474.29 *9*	56 *3*	0	2^-			
1524.27		1524.5 *4*	100	0	2^-			
1649.9	$(8,9^+)$	196.0@ *5*		1453.8	(8^+)			
		546.0@ *5*		1103.9	$(7)^+$			
1673.48		1183.8 *5*	100	488.11	$0^-,1^-,2^-$			
1731.1	(8,9)	277.3@ *5*	100@	1453.8	(8^+)			
1741.04	$0^-,1^-,2^-$	1205.39 *8*	100 *4*	535.60	$(1,2)^-$			
		1253.2 *5*		488.11	$0^-,1^-,2^-$			

Adopted Levels, Gammas (continued)

$\gamma(^{204}Tl)$ (continued)

E_i(level)	J_i^π	E_γ ‡	I_γ ‡	E_f	J_f^π
1741.04	$0^-,1^-,2^-$	1269.5 4		471.94	$(1,2)^-$
		1307.5 5		431.88	$(1,2)^-$
		1422.8 2		318.86	$1^-,2^-$
		1440.40 21	10.3 20	300.14	$(1,2)^-$
		1741.01 8	71 3	0	2^-
2117.3		663.5@ 5	100@	1453.8	(8^+)
2214.44	(≤3)	1093.02 8	100	1121.34	$0^-,1^-,2^-$
2318.8		668.9@ 5	100@	1649.9	$(8,9^+)$
2493.39	2^-	1756.27 12	100	737.10	$(1^-,2^-)$
(6654.76)	$0^+,1^+$	4009.1 7	2.72 13	2645.6	(≤3)
		4017.4 7	3.21 16	2637.3	(≤3)
		4035.9 7	0.90 13	2618.8	
		4069.0 7	1.15 13	2585.7	
		4076.7 6	2.50 13	2578.0	2^-
		4101.4 4	2.05 13	2553.3	
		4115.08 17	5.7 3	2539.64	
		4127.8 7	0.67 13	2526.9	
		4160.9 7	1.38 13	2493.39	2^-
		4195.98 14	11.9 6	2458.74	
		4225.47 17	15.5 8	2429.25	(≤3)
		4258.9 8	0.90 13	2395.8	2^-
		4286.3 8	1.83 13	2368.4	2^-
		4309.00 24	7.1 4	2345.71	
		4343.56 12	13.9 7	2311.15	
		4380.4 7	1.83 13	2274.3	(≤3)
		4392.8 7	1.15 13	2261.9	(≤3)
		4402.60 15	3.21 16	2252.11	$(2^-,3^-,4^-)$
		4439.3 3	2.50 13	2214.44	(≤3)
		4448.8 7	0.90 13	2205.9	(≤3)
		4466.2 7	0.67 13	2188.5	
		4495.74 13	15.3 8	2158.97	$(0,1,2)^-$
		4520.2 7	0.67 13	2134.5	
		4540.62 15	11.2 5	2114.09	(≤3)
		4570.0 3	7.1 4	2084.7	(≤3)
		4600.95 16	9.8 5	2053.76	(≤3)
		4609.3 7	3.88 19	2045.4	(≤3)
(6654.76)	$0^+,1^+$	4687.58 12	34.6 16	1967.13	2^-
		4705.83 14	20.5 10	1948.88	2^-
		4715.3 4	5.7 3	1939.4	2^-
		4752.24 11	45.5 22	1902.46	$(2)^-$
		4804.4 4	4.78 22	1850.3	2^-
		4841.40 15	13.9 7	1813.30	
		4867.5 6	2.28 13	1787.2	
		4913.57 11	53 3	1741.04	$0^-,1^-,2^-$
		4945.0 7	10.9 5	1709.7	
		4980.97 20	6.8 4	1673.48	
		5014.61 15	19.2 10	1640.09	
		5130.50 23	15.5 8	1524.27	
		5155.1 7	2.05 13	1499.6	
		5172.3 7	6.6 3	1482.4	(2^-)
		5180.38 12	46.5 22	1474.33	$0^-,1^-,2^-$
		5238.4 3	6.2 3	1416.3	
		5261.48 13	25.6 13	1393.21	$(2)^-$
		5279.86 12	65 3	1374.71	$(2)^-$
		5404.41 12	42.3 22	1250.22	$0^-,1^-,2^-$
		5451.07 14	22.8 13	1204.35	$0^-,1^-,2^-$
		5520.3 4	7.3 4	1134.03	$0^-,1^-,2^-$
		5533.35 13	40.7 19	1121.34	$0^-,1^-,2^-$
		5603.28 13	88 4	1051.18	$0^-,1^-,2^-$
		5641.57 12	100 5	1013.22	$0^-,1^-,2^-$
		5749.8 7	0.87 13	905.99	2^-
		5890.2 4	2.50 13	764.30	$0^-,1^-,2^-$
		5917.48 16	27.6 13	737.10	$(1^-,2^-)$
		6025.21 24	7.8 4	629.40	$(1^-,2^-)$
		6118.79 23	6.4 3	535.60	$(1,2)^-$
		6166.61 14	56 3	488.11	$0^-,1^-,2^-$
		6183.05 15	26.0 13	471.94	$(1,2)^-$
		6222.57 16	22.8 13	431.88	$(1,2)^-$
		6336.11 22	7.3 4	318.86	$1^-,2^-$
		6355.4 7	0.67 13	300.14	$(1,2)^-$
		6514.57 15	42.6 22	139.97	$(1)^-$
		6654.71 25	3.21 16	0	2^-

† Additional information 29.

‡ From $^{203}Tl(n,\gamma)$ E=thermal, unless otherwise noted.

$^{204}_{81}Tl_{123}$-10

γ(^{204}Tl) (continued)

[#] From ^{207}Pb(μ^-,3nγ).
[@] From ^{205}Tl(n,2nγ).
[&] Placement of transition in the level scheme is uncertain.

$^{204}_{81}$Tl$_{123}$-11

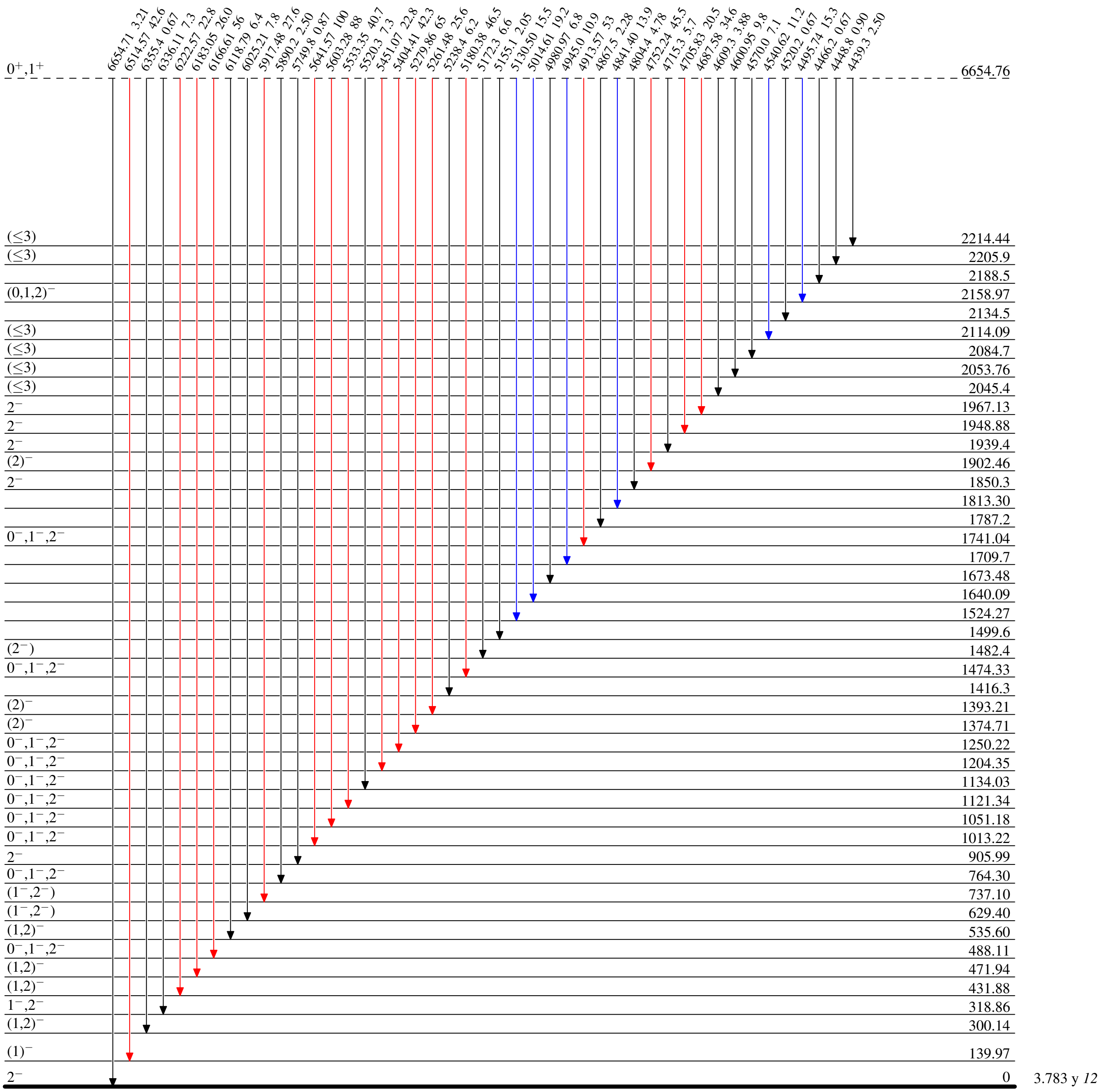
Adopted Levels, Gammas

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$

Level Scheme

Intensities: Type not specified

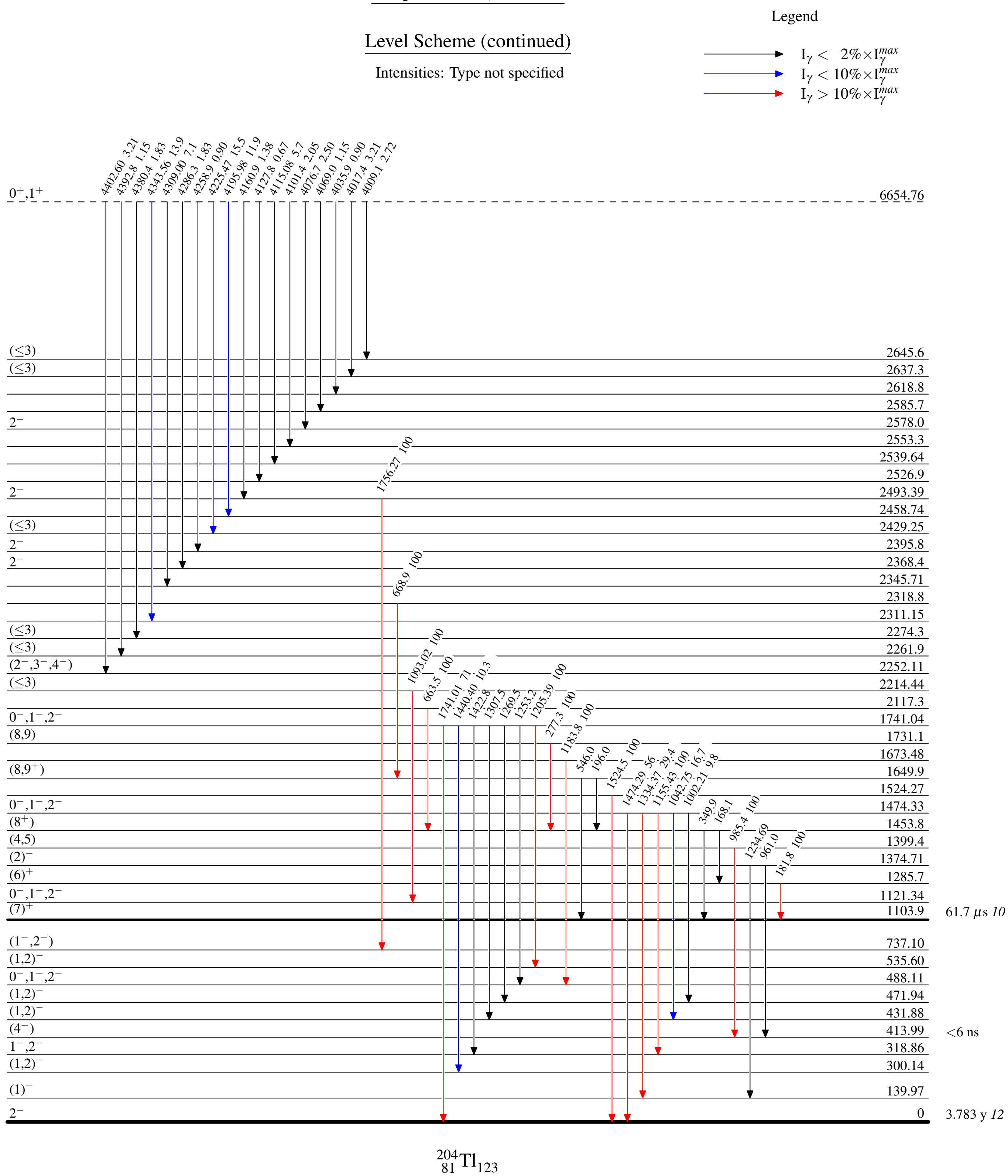


$^{204}_{81}Tl_{123}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified

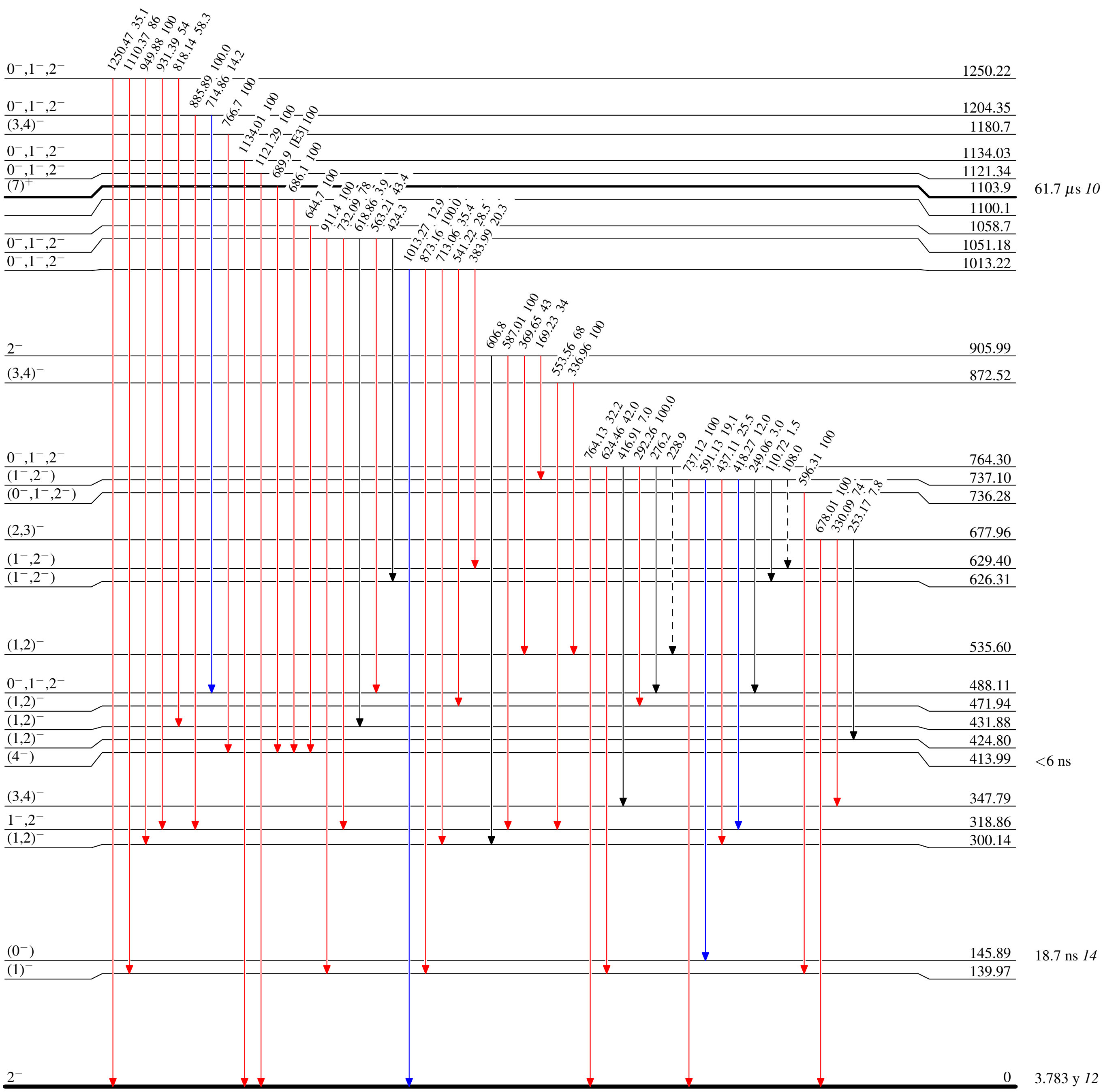
Legend

$I_\gamma < 2\% \times I_\gamma^{max}$

$I_\gamma < 10\% \times I_\gamma^{max}$

$I_\gamma > 10\% \times I_\gamma^{max}$

γ Decay (Uncertain)



$^{204}_{81}$Tl$_{123}$

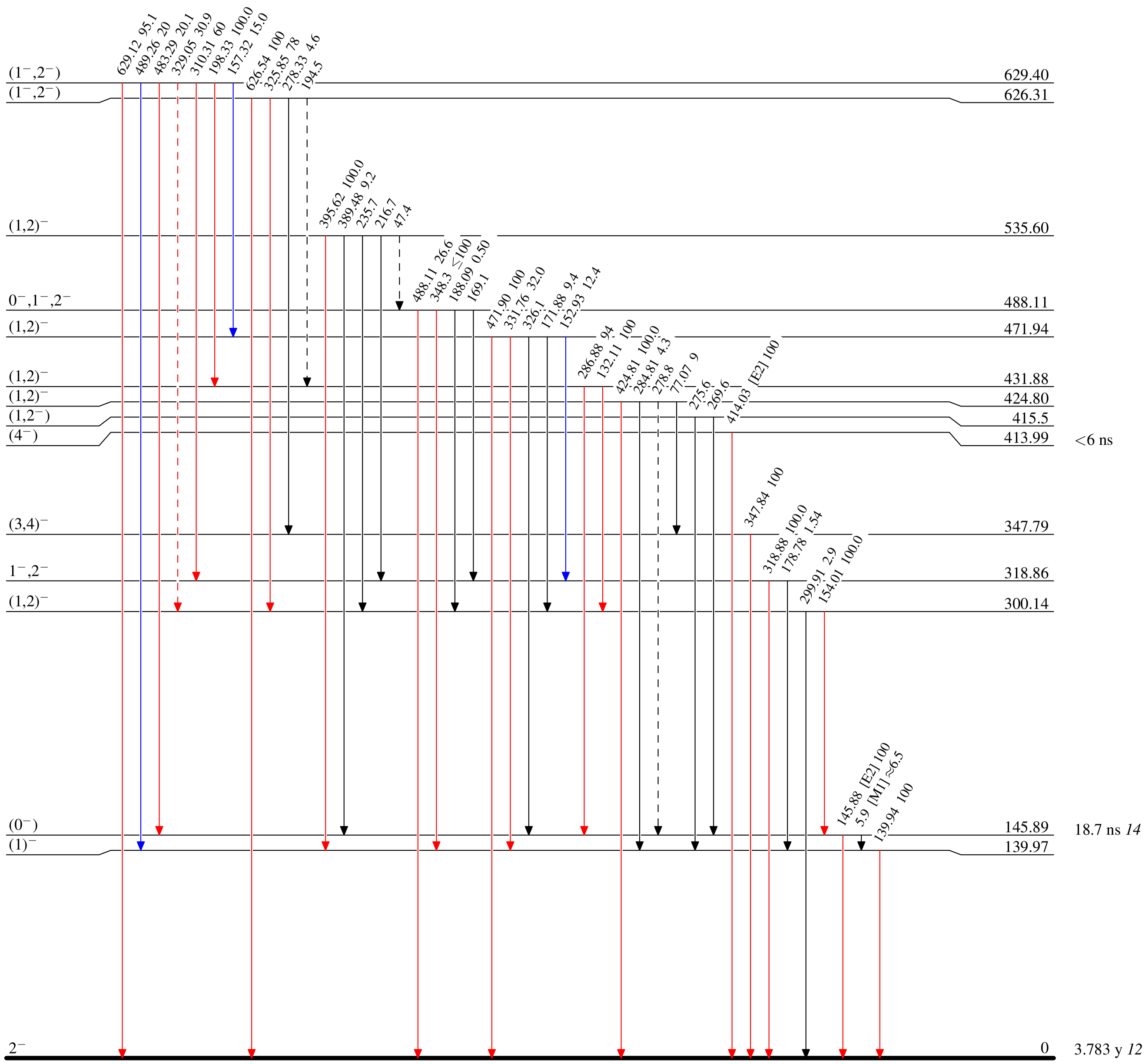
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified

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)



$^{204}_{81}Tl_{123}$