^{191}Tl $\varepsilon+\beta^+$ decay (5.22 min) 1988WoZZ,1976GoZE

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. S. Basunia	NDS 195,368 (2024)	1-Dec-2023

Parent: ^{191}Tl: E=297 *7*; $J^\pi=9/2^{(-)}$; $T_{1/2}$=5.22 min *16*; Q(ε)=4309 *23*; %ε+%β^+ decay=100
^{191}Tl-E: 297 keV *7* (2021Ko07 − NUBASE).
Others: 1970FeZU, 1974Va19, 1976GoZP, 1987BoZT.

1976GoZP assigned the 5.22 min activity to the $9/2^-$ isomer on the basis of $\varepsilon+\beta^+$ population to levels with spin (assigned from ^{194}Pt(α,7nγ) (1975Li16) and systematics) consistent with the decay. Activity produced by HI reactions also indicates it belongs to ^{191}Tl($J^\pi=9/2^-$) (1975UnZZ).

1988WoZZ: Mass-separated sources. Measured Eγ, Iγ, $\gamma\gamma$ coin. Ge(Li) detectors.

1976GoZE: Mass-separated sources. Measured Eγ, Iγ, Ice, $\gamma\gamma$(t), γ ce(t). Ge(Li), Si(Li) detectors.

^{191}Hg Levels

E(level)†	J^π@	$T_{1/2}$	Comments
0.0	$3/2^{(-)}$	49 min *10*	$T_{1/2}$: from Adopted Levels.
51.59 *20*	$(5/2^-)$	0.42 ns *4*	$T_{1/2}$: from conversion-electron (ce)-γ and ce-ce delayed coincidence measurements in 1985Ab03. Also in 1976BoYC.
103.7 *4*	$(1/2^-)$		
128 *8*	$13/2^{(+)}$	50.8 min *15*	Additional information 1. E(level): from Adopted Levels. Labeled as 0.0+x in the previous evaluation (2007Va21). $T_{1/2}$,J^π: from Adopted Levels.
336.32 *17*	$(5/2^-)$		
343.96‡ *17*	$(9/2)^+$		
375.5 *4*	$(3/2^-)$		
377.9 *3*	$(7/2^-)$		
393.03‡ *17*	$(11/2)^+$		
430.3 *3*	$(5/2^-)$		J^π: 1988WoZZ suggest $(7/2^-)$. This would be inconsistent with the M1+E2 multipolarity for the 430 keV γ to the $3/2^{(-)}$ g.s.
518.3‡ *7*	$(17/2^+)$		
563.5 *4*	$(7/2^-)$		
632.3 *4*	$(9/2^-)$		
659.1 *4*	$(9/2^-)$		
662.2‡ *5*			
663.2‡ *5*	$(15/2^+)$		
691.6 *3*			
716.6‡ *4*	$(7/2)^+$		
870.7‡ *3*	$(13/2)^+$		
880.3? *9*			E(level): from weak coincidences of the deexciting 828.66 keV γ to the 51.58 keV level (1988WoZZ). Not adopted.
889.1‡ *4*	$(11/2)^+$		
911.4 *5*			
952.1 *4*	$(9/2^-)$		
953.7?			from weak coincidences of the deexciting 575.7 keV γ to the 377.9 keV level (1988WoZZ). Not adopted.
997.1 *4*	$(5/2^-,7/2^-,9/2^-)$		
1016.2 *5*	$(11/2^-)$		
1023.7? *10*			from weak coincidences of the deexciting 687.3 keV γ to the 336.32 keV level

Continued on next page (footnotes at end of table)

^{191}Tl $\varepsilon+\beta^+$ decay (5.22 min) 1988WoZZ,1976GoZE (continued)

^{191}Hg Levels (continued)

E(level)[†]	Jπ[@]	Comments
		(1988WoZZ). Not adopted.
1028.0[‡] *4*		
1075.6 *8*		from coincidences of the deexciting 739.3 keV γ to the 336.32 keV level (1988WoZZ).
1081.1 *8*		
1107.2 *5*	(7/2⁻,9/2⁻)	
1146.5 *5*		
1178.3? *9*		from coincidences of the deexciting 1126.7 keV γ to the 51.58 keV level (1988WoZZ).
1193.1 *5*		
1199.3? *10*		from weak coincidences of the deexciting 1147.7 keV γ to the 51.58 keV level (1988WoZZ). Not adopted.
1212.4 *8*	(5/2⁻,7/2⁻,9/2⁻)	
1215.7?[‡] *9*		
1233.7[‡] *7*		
1237.9?		from weak coincidences of the deexciting 859.9 keV γ to the 377.9 keV level (1988WoZZ). Not adopted.
1258.8[‡] *6*		
1261.3[‡] *5*		
1317.6 *9*	(5/2⁻,7/2⁻,9/2⁻)	
1319.6 *11*		
1321.7?[‡#] *10*		
1335.6[‡] *11*		
1363.6?		from weak coincidences of the deexciting 800.1 keV γ to the 563.5 keV level (1988WoZZ). Not adopted.
1384.6?[‡#] *10*		
1390.8?		from weak coincidences of the deexciting 1339.2 keV γ to the 51.58 keV level (1988WoZZ). Not adopted.
1446.5[‡] *8*		
1470.8? *9*		from weak coincidences of the deexciting 1092.9 keV γ to the 377.9 keV level (1988WoZZ). Not adopted.
1538.5? *10*		from weak coincidences of the deexciting 1160.6 keV γ to the 377.9 keV level (1988WoZZ). Not adopted.
1562.2[‡] *10*		
1815.8?[#]		
1816.4[‡] *11*		
1827.0?[#]		
1843.9 *11*		
2185.4?[#]		
2412.4 *21*		
2414.4[‡] *11*		
2423.3 *11*		
2427.5[‡] *20*		
2430.9[‡] *11*		
2435.5[‡] *12*		
2438.4[‡] *11*		
2440.2 *9*		
2441.5 *11*		
2443.0 *15*		
2443.1[‡] *11*		
2456.9[‡] *8*		
2459.7 *10*		

Continued on next page (footnotes at end of table)

^{191}Tl $\varepsilon+\beta^+$ decay (5.22 min) 1988WoZZ,1976GoZE (continued)

^{191}Hg Levels (continued)

E(level)†	E(level)†	E(level)†
2463.4‡ *11*	2477.0 *11*	2486.8‡ *8*
2468.2‡ *14*	2479.9‡ *11*	2489.6‡ *8*
2475.2 *21*	2483.1 *11*	2534.0‡ *20*
2476.3 *11*	2484.4‡ *10*	2536.9‡ *15*
		2543.1 *15*

† Level energies from a least-squares fit to γ-ray energies.

‡ Level energy based on the isomeric state at 128 keV *8* For total uncertainty, propagate 8 keV in quadrature. The isomeric state $13/2^{(+)}$ was labeled as 0.0+x in the previous evaluation (2007Va21).

Uncertain γ placement from tentative level, not adopted.

@ From γ-ray multipolarity and level sequences established by coincidence data and energy fits.

^{191}Tl $\varepsilon+\beta^+$ decay (5.22 min) 1988WoZZ,1976GoZE (continued)

$\gamma(^{191}Hg)$

γ rays observed only by 1976GoZE have not been included in this dataset.
Coincidence information from 1988WoZZ.

E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π	Mult.#	δ@	α&	Comments
41.7	≈5	377.9	$(7/2^-)$	336.32	$(5/2^-)$				from $\gamma\gamma$ coincidences (1988WoZZ).
49.0 *4*	≈15	393.03	$(11/2)^+$	343.96	$(9/2)^+$	E2		150 *6*	α(L)=113 *5*; α(M)=29.3 *13* α(N)=7.25 *31*; α(O)=1.19 *5*; α(P)=0.00136 *5* E_γ: from $\gamma\gamma$ coincidences (1988WoZZ). Also 49.0 in 1987BoZT. Mult.: from α(L)exp=109 and α(M)exp=33.3 (1976GoZE – Table 4-4). Other: δ=0.04 from %E2=0.2 in 1987BoZT based on ce measurements data not listed.
51.6 *3*		51.59	$(5/2^-)$	0.0	$3/2^{(-)}$	M1+E2	0.65	41.6 *13*	B(M1)(W.u.)=0.0067 *7*; B(E2)(W.u.)=3.9×10^2 *4* α(L)=31.3 *9*; α(M)=8.01 *24* α(N)=1.99 *6*; α(O)=0.335 *10*; α(P)=0.00483 *11* E_γ: Other: 52.1 (1987BoZT). δ: from α(L)exp=30.9 and α(M)exp=9.7 (1976GoZE – Table 4-4). Other: δ=0.08 from %E2=0.64 in 1987BoZT is smaller almost by an order.
103.5 *4*	2.6 *5*	103.7	$(1/2^-)$	0.0	$3/2^{(-)}$	M1+E2	0.50 *2*	6.68 *13*	α(K)=4.81 *11*; α(L)=1.43 *4*; α(M)=0.350 *10* α(N)=0.0873 *26*; α(O)=0.0156 *4*; α(P)=0.000695 *16* δ: from α(L)exp=1.35 and α(M)exp=0.39 (1976GoZE – Table 4-4).
172.3 *5*	0.90 *45*	889.1	$(11/2)^+$	716.6	$(7/2)^+$				
207.5 *4*	1.3 *5*	870.7	$(13/2)^+$	663.2	$(15/2^+)$				
215.95 *20*	100	343.96	$(9/2)^+$	128	$13/2^{(+)}$	E2		0.301 *4*	α(K)=0.1407 *20*; α(L)=0.1204 *17*; α(M)=0.0310 *5* α(N)=0.00771 *11*; α(O)=0.001307 *19*; α(P)=1.763×10^{-5} *25* Mult.: from ce(K)/ce(L) exp=1.2 *3* (1974Va19). I_e=18.8 *19* (1976GoZE) yields α(K)exp=0.188 and normalized to α(K)=0.1407 (theory).
227.1 *5*	1.3 *6*	563.5	$(7/2^-)$	336.32	$(5/2^-)$				
254.3 *7*	≈3	632.3	$(9/2^-)$	377.9	$(7/2^-)$				
261.5 *4*	1.2 *3*	691.6		430.3	$(5/2^-)$				
265.0 *2*	58 *3*	393.03	$(11/2)^+$	128	$13/2^{(+)}$	M1+E2	1.8 *3*	0.238 *25*	α(K)=0.163 *24*; α(L)=0.0567 *15*; α(M)=0.01410 *28* α(N)=0.00351 *7*; α(O)=0.000619 *17*; α(P)=2.22×10^{-5} *35* δ: from α(K)(exp)=0.16 *4*, average of 0.20 *3* (1976GoZE: I_e=15.6 *20* – overlapping electron line) and 0.12 *3* (1974Va19).
271.4 *5*	0.72 *35*	375.5	$(3/2^-)$	103.7	$(1/2^-)$				
281.2 *4*	5.7 *6*	659.1	$(9/2^-)$	377.9	$(7/2^-)$	M1+E2	0.7 *4*	0.33 *7*	α(K)=0.26 *7*; α(L)=0.053 *4*; α(M)=0.0127 *8* α(N)=0.00318 *20*; α(O)=0.00059 *5*; α(P)=3.67×10^{-5} *99* δ: from α(K)exp=0.26 *6*. I_e=2.0 *4* (1976GoZE).

$^{191}_{80}Hg_{111}$-4

^{191}Tl $\varepsilon+\beta^+$ decay (5.22 min) 1988WoZZ,1976GoZE (continued)

$\gamma(^{191}Hg)$ (continued)

E_γ[†]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	δ[@]	α[&]	Comments
284.7 *3*	5.2 *5*	336.32	(5/2$^-$)	51.59	(5/2$^-$)	M1		0.416 *6*	α(K)=0.342 *5*; α(L)=0.0571 *8*; α(M)=0.01328 *19* α(N)=0.00333 *5*; α(O)=0.000630 *9*; α(P)=4.83×10^{-5} *7* Mult.: from α(K)exp=0.43 *22*. I$_e$=3.0 *15* (1976GoZE – overlapping electron line).
318.7 *4*	2.6 *5*	662.2		343.96	(9/2)$^+$				
322.8[b] *10*	≈2[b]	659.1	(9/2$^-$)	336.32	(5/2$^-$)				Triplet. Iγ(triplet)≈6.5. Coincidences with the 336.3-keV γ (1988WoZZ).
323.6[b] *10*	≈2.5[b]	716.6	(7/2)$^+$	393.03	(11/2)$^+$				Triplet. Iγ(triplet)≈6.5. Coincidences with the 265.0 and 215.9-keV γ rays (1988WoZZ).
324.1[b] *10*	≈2[b]	375.5	(3/2$^-$)	51.59	(5/2$^-$)				Triplet. Iγ(triplet)≈6.5. Coincidences with the 536-keV γ (1988WoZZ).
326.3 *3*	77 *4*	377.9	(7/2$^-$)	51.59	(5/2$^-$)	M1+E2	0.93 *22*	0.193 *26*	α(K)=0.150 *24*; α(L)=0.0321 *20*; α(M)=0.0077 *4* α(N)=0.00192 *11*; α(O)=0.000353 *23*; α(P)=2.09×10^{-5} *34* δ: from α(K)exp=0.15 *2*. I$_e$=15.1 *15* (1976GoZE).
336.3 *2*	52 *3*	336.32	(5/2$^-$)	0.0	3/2$^{(-)}$	M1+E2	1.50 *26*	0.134 *16*	α(K)=0.100 *15*; α(L)=0.0259 *13*; α(M)=0.00632 *28* α(N)=0.00158 *7*; α(O)=0.000284 *15*; α(P)=1.37×10^{-5} *21* δ: from α(K)exp=0.10 *2*. I$_e$=6.6 *13* (1976GoZE – overlapping electron line).
354.8 *5*	0.85 *35*	691.6		336.32	(5/2$^-$)				
372.6 *4*	19.0 *19*	716.6	(7/2)$^+$	343.96	(9/2)$^+$	M1+E2	1.4 *3*	0.106 *16*	α(K)=0.081 *15*; α(L)=0.0191 *15*; α(M)=0.00461 *31* α(N)=0.00115 *8*; α(O)=0.000209 *16*; α(P)=1.11×10^{-5} *21* δ: from α(K)exp=0.08 *2*. I$_e$=2.0 *5* (1976GoZE – overlapping electron line).
375.7 *4*	16.5 *29*	375.5	(3/2$^-$)	0.0	3/2$^{(-)}$	M1		0.1962 *28*	α(K)=0.1613 *23*; α(L)=0.0268 *4*; α(M)=0.00622 *9* α(N)=0.001560 *22*; α(O)=0.000295 *4*; α(P)=2.268×10^{-5} *32* Mult.: from α(K)exp=0.16 *4*. I$_e$=3.6 *5* (1976GoZE).
378.0 *10*	≈10	377.9	(7/2$^-$)	0.0	3/2$^{(-)}$				Doublet. Iγ(doublet)=27.6 *23*. See comment for second member of doublet (378.8 keV).
378.8 *10*	≈20	430.3	(5/2$^-$)	51.59	(5/2$^-$)				Doublet. Iγ(doublet)=27.6 *23*. Coincidences with the 261.5, 521.7, and 566.8-keV γ rays (1988WoZZ).
383.9 *5*	1.9 *6*	1016.2	(11/2$^-$)	632.3	(9/2$^-$)				
390.3 *7*	2.3 *7*	518.3	(17/2$^+$)	128	13/2$^{(+)}$	(E2)		0.0506 *7*	α(K)=0.0339 *5*; α(L)=0.01266 *19*; α(M)=0.00316 *5* α(N)=0.000788 *12*; α(O)=0.0001381 *21*; α(P)=4.45×10^{-6} *6* Mult.: from adopted gammas.
430.4 *4*	5.7 *8*	430.3	(5/2$^-$)	0.0	3/2$^{(-)}$	M1(+E2)	0.8 *10*	0.10 *4*	α(K)=0.079 *33*; α(L)=0.015 *4*; α(M)=0.0035 *8* α(N)=0.00088 *20*; α(O)=1.6×10^{-4} *4*; α(P)=1.1×10^{-5} *5* δ: from α(K)exp=0.08 *4*. I$_e$=0.63 *25* (1976GoZE – overlapping electron line).
474.8 *6*	1.4 *7*	1107.2	(7/2$^-$,9/2$^-$)	632.3	(9/2$^-$)	M1+E2	1.1 *9*	0.06 *4*	α(K)=0.051 *33*; α(L)=0.010 *4*; α(M)=0.0024 *9* α(N)=6.0×10^{-4} *21*; α(O)=1.1×10^{-4} *4*; α(P)=7.E−6 *5*

$^{191}_{80}Hg_{111}$-5

$\gamma(^{191}Hg)$ (continued)

E_γ[†]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	δ[@]	α[&]	Comments
									δ: from α(K)exp=0.05 *3* (data Iγ and Ie=1.0 *3* data yield α(K)exp=0.5 *3*, indicates inconsistency either in Iγ or Ie). α(K)exp=0.0673 with overlapping electron line (1976GoZE – Table 4-4).
477.6 *4*	11.4 *12*	870.7	$(13/2)^+$	393.03	$(11/2)^+$				
480.5[c] *6*	2.6 *10*	911.4		430.3	$(5/2^-)$				
496.1 *5*	7.5 *8*	889.1	$(11/2)^+$	393.03	$(11/2)^+$	M1(+E2)	0.9 *10*	0.064 *30*	α(K)=0.051 *26*; α(L)=0.0096 *31*; α(M)=0.0023 *7* α(N)=5.7×10^{-4} *17*; α(O)=1.06×10^{-4} *34*; α(P)=7.E−6 *4* Mult.,δ: from α(K)exp=0.05 *3*. I_e=0.50 *25* (1976GoZE – overlapping electron line).
501.3 *6*	2.2 *4*	1193.1		691.6		M1(+E2)	0.3 *6*	0.086 *23*	α(K)=0.070 *20*; α(L)=0.0118 *25*; α(M)=0.0027 *5* α(N)=0.00069 *14*; α(O)=0.000130 *27*; α(P)=9.8×10^{-6} *29* Mult.: from α(K)exp=0.07 *2*. I_e=0.20 *5* (1976GoZE).
514.2 *6*	3.9 *7*	1146.5		632.3	$(9/2^-)$				
517.1 *6*	2.9 *6*	1233.7		716.6	$(7/2)^+$				
521.7 *10*	≈4	952.1	$(9/2^-)$	430.3	$(5/2^-)$				
526.6 *8*	1.4 *4*	870.7	$(13/2)^+$	343.96	$(9/2)^+$				
533.5 *6*	2.5 *6*	911.4		377.9	$(7/2^-)$				
535.2[b] *10*	5[b]	663.2	$(15/2^+)$	128	$13/2^{(+)}$	(M1+E2)		0.050 *27*	α(K)=0.040 *23*; α(L)=0.0075 *29*; α(M)=0.0018 *6* α(N)=4.4×10^{-4} *16*; α(O)=8.2×10^{-5} *32*; α(P)=5.5×10^{-6} *33* Doublet. Iγ(doublet)=10.7 *11*. Coincidences with the 207.5-keV γ ray (1988WoZZ). Mult.: from adopted gammas.
535.5[b] *10*	≈5[b]	911.4		375.5	$(3/2^-)$				Doublet. Iγ(doublet)=10.7 *11*. Coincidences with the 324.1 and 375.7-keV γ rays (1988WoZZ).
[x]539.9 *6*	2.5 *5*					(M1)		0.0749 *11*	α(K)=0.0617 *9*; α(L)=0.01013 *15*; α(M)=0.002352 *34* α(N)=0.000590 *8*; α(O)=0.0001117 *16*; α(P)=8.61×10^{-6} *12* Mult.: from α(K)exp=0.09 *8*. I_e=0.30 *25* (1976GoZE – overlapping electron line).
545.2 *9*	≈3	889.1	$(11/2)^+$	343.96	$(9/2)^+$	E2(+M1)	≈3.2	≈0.0265	α(K)≈0.02010; α(L)≈0.00485; α(M)≈0.001173 α(N)≈0.000293; α(O)≈5.31×10^{-5}; α(P)≈2.70×10^{-6} δ: from α(K)exp ≈0.02. I_e=0.069 *40* (1976GoZE).
563.5 *5*	25.5 *10*	563.5	$(7/2^-)$	0.0	$3/2^{(-)}$	E2		0.02030 *29*	α(K)=0.01509 *21*; α(L)=0.00395 *6*; α(M)=0.000964 *14* α(N)=0.0002406 *34*; α(O)=4.32×10^{-5} *6*; α(P)=2.003×10^{-6} *28* Mult.: from α(K)exp=0.016 *7*. I_e=0.55 *25* (1976GoZE – overlapping electron line).
566.8 *6*	4.9 *9*	997.1	$(5/2^-,7/2^-,9/2^-)$	430.3	$(5/2^-)$				

$^{191}_{80}Hg_{111}$-6

γ(^{191}Hg) (continued)

E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π	Mult.#	δ@	α&	Comments
575.7[a] *10*	2.0[a] *6*	911.4		336.32	(5/2$^-$)				
575.7[ac] *10*	2.0[a] *6*	953.7?		377.9	(7/2$^-$)				
580.7 *4*	45 *2*	632.3	(9/2$^-$)	51.59	(5/2$^-$)	E2		0.01894 *27*	α(K)=0.01417 *20*; α(L)=0.00363 *5*; α(M)=0.000882 *12* α(N)=0.0002201 *31*; α(O)=3.96×10^{-5} *6*; α(P)=1.881×10^{-6} *26* Mult.: from α(K)exp=0.014 *6*. I$_e$=0.83 *35* (1976GoZE – overlapping electron line).
583.0 *6*	≈3	1146.5		563.5	(7/2$^-$)				
607.4 *5*	7.4 *7*	659.1	(9/2$^-$)	51.59	(5/2$^-$)	(E2)		0.01710 *24*	α(K)=0.01291 *18*; α(L)=0.00319 *5*; α(M)=0.000774 *11* α(N)=0.0001932 *27*; α(O)=3.49×10^{-5} *5*; α(P)=1.713×10^{-6} *24* Mult.: from α(K)exp=0.017 *9*. I$_e$=0.17 *9* (1976GoZE – overlapping electron line).
615.8 *4*	14.0 *17*	952.1	(9/2$^-$)	336.32	(5/2$^-$)	(E2)		0.01659 *23*	α(K)=0.01255 *18*; α(L)=0.00307 *4*; α(M)=0.000744 *11* α(N)=0.0001858 *26*; α(O)=3.36×10^{-5} *5*; α(P)=1.665×10^{-6} *23* δ: from α(K)exp=0.019 *9*. I$_e$=0.35 *17* (1976GoZE – overlapping electron line).
619.1 *5*	6.0 *7*	997.1	(5/2$^-$,7/2$^-$,9/2$^-$)	377.9	(7/2$^-$)	M1+E2	0.8 *8*	0.038 *14*	α(K)=0.031 *12*; α(L)=0.0055 *16*; α(M)=0.00128 *35* α(N)=3.2×10^{-4} *9*; α(O)=6.0×10^{-5} *17*; α(P)=4.3×10^{-6} *17* δ: from α(K)exp=0.031 *12*. I$_e$=0.25 *9* (1976GoZE – overlapping electron line).
[x]632.1 *5*	2.4 *8*								
634.8 *5*	2.5 *8*	1028.0		393.03	(11/2)$^+$				
638.4 *5*	13.5 *27*	1016.2	(11/2$^-$)	377.9	(7/2$^-$)				
640.2 *5*	11.9 *12*	691.6		51.59	(5/2$^-$)				
660.9 *5*	5.5 *6*	997.1	(5/2$^-$,7/2$^-$,9/2$^-$)	336.32	(5/2$^-$)				
[x]677.0 *7*	2.2 *5*								
684.3 *7*	6.8 *7*	1028.0		343.96	(9/2)$^+$				α(K)=0.0333 *5*; α(L)=0.00543 *8*; α(M)=0.001259 *18* α(N)=0.000316 *4*; α(O)=5.98×10^{-5} *9*; α(P)=4.63×10^{-6} *7* Mult.: from α(K)exp=0.09 *4*. I$_e$=0.088 *55* (1976GoZE – overlapping electron line). Theory: α(K)(M1)=0.033, α(K)(E2)=0.010.
687.3[ac] *10*	2.3[a] *5*	1023.7?		336.32	(5/2$^-$)				
687.3[a] *10*	2.3[a] *5*	1319.6		632.3	(9/2$^-$)				
692.3[c] *7*	3.7 *9*	691.6		0.0	3/2$^{(-)}$				
[x]696.7 *7*	2.3 *6*								
[x]706.1 *9*	1.8 *7*								
729.5 *6*	7.2 *8*	1107.2	(7/2$^-$,9/2$^-$)	377.9	(7/2$^-$)				
739.3 *7*	<6	1075.6		336.32	(5/2$^-$)				

^{191}Tl $\varepsilon+\beta^+$ decay (5.22 min) 1988WoZZ,1976GoZE (continued)

$\gamma(^{191}Hg)$ (continued)

E_γ [†]	I_γ [†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	δ[@]	α[&]	Comments
[x]739.7 *7*	5.9 *6*					(E1)		0.00404 *6*	α(K)=0.00337 *5*; α(L)=0.000515 *7*; α(M)=0.0001183 *17* α(N)=2.95×10^{-5} *4*; α(O)=5.53×10^{-6} *8*; α(P)=4.05×10^{-7} *6* Mult.: a(K)exp=0.005 *3*. I_e=0.043 *21* (1976GoZE).
742.8 *6*	12.6 *13*	870.7	(13/2)$^+$	128	13/2$^{(+)}$	M1+E2	3.5 *8*	0.0127 *10*	α(K)=0.0100 *8*; α(L)=0.00205 *12*; α(M)=0.000488 *27* α(N)=0.000122 *7*; α(O)=2.24×10^{-5} *13*; α(P)=1.33×10^{-6} *12* δ: from α(K)exp=0.010 *4*. I_e=0.16 *6* (1976GoZE – overlapping electron line).
744.8 *7*	4.6 *8*	1081.1		336.32	(5/2$^-$)				
754.1 *8*	4.2 *13*	1317.6	(5/2$^-$,7/2$^-$,9/2$^-$)	563.5	(7/2$^-$)	M1+E2	2.4 *8*	0.0138 *28*	α(K)=0.0109 *23*; α(L)=0.00215 *32*; α(M)=0.00051 *7* α(N)=0.000127 *18*; α(O)=2.4×10^{-5} *4*; α(P)=1.47×10^{-6} *33* δ: from α(K)exp=0.011 *5*. I_e=0.060 *20* (1976GoZE).
761.1 *7*	3.9 *8*	889.1	(11/2)$^+$	128	13/2$^{(+)}$				
[x]798.1 *7*	2.0 *6*								
800.1[c] *7*	3.2 *8*	1363.6?		563.5	(7/2$^-$)				
[x]810.9 *8*	1.8 *7*								
815.4 *6*	3.9 *8*	1193.1		377.9	(7/2$^-$)				
[x]823.0 *8*	2.7 *8*								
828.7[c] *9*	1.8 *13*	880.3?		51.59	(5/2$^-$)				
834.5 *7*	4.3 *4*	1212.4	(5/2$^-$,7/2$^-$,9/2$^-$)	377.9	(7/2$^-$)	M1+E2	2.3 *10*	0.0111 *33*	α(K)=0.0089 *28*; α(L)=0.0017 *4*; α(M)=0.00040 *9* α(N)=9.9×10^{-5} *22*; α(O)=1.8×10^{-5} *4*; α(P)=1.2×10^{-6} *4* Mult.: from α(K)exp=0.009 *5*. I_e=0.051 *30* (1976GoZE – overlapping electron line).
[x]859.9[c] *8*	2.1 *5*								
859.9[c] *8*	2.1	1237.9?		377.9	(7/2$^-$)				
865.6 *9*	1.9 *9*	1258.8		393.03	(11/2)$^+$				
868.1 *9*	1.8 *9*	1261.3		393.03	(11/2)$^+$				
871.8[c] *9*	1.6 *7*	1215.7?		343.96	(9/2)$^+$				
900.5 *11*	4.8 *7*	1028.0		128	13/2$^{(+)}$	M1+E2	3.0 *16*	0.0087 *30*	α(K)=0.0070 *25*; α(L)=0.0013 *4*; α(M)=3.1×10^{-4} *8* α(N)=7.7×10^{-5} *20*; α(O)=1.4×10^{-5} *4*; α(P)=9.E−7 *4* Mult.: from α(K)exp=0.007 *5*. I_e=0.048 *30* (1976GoZE – overlapping electron line).
914.9 *7*	5.2 *9*	1258.8		343.96	(9/2)$^+$				α(K)exp=0.002 *2*. I_e=0.063 *40* (1976GoZE – overlapping electron line). Theory: α(K)(M1)=0.016, α(K)(E2)=0.0057.
917.3 *7*	5.7 *9*	1261.3		343.96	(9/2)$^+$	M1+E2	1.8 *12*	0.010 *6*	α(K)=0.008 *5*; α(L)=0.0014 *7*; α(M)=3.4×10^{-4} *16* α(N)=8.E−5 *4*; α(O)=1.6×10^{-5} *8*; α(P)=1.1×10^{-6} *7* Mult.,δ: from α(K)exp=0.008 *5*. I_e=0.063 *40* (1976GoZE – overlapping electron line) yields δ=1.8 *12*.
[x]925.8 *10*	2.2 *7*								
977.7[‡c] *12*	2.0 *7*	1321.7?		343.96	(9/2)$^+$				

$\gamma(^{191}Hg)$ (continued)

E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π
991.6[a] *10*	3.6[a] *7*	1335.6		343.96	$(9/2)^+$
991.6[a‡c] *10*	3.6[a] *7*	1384.6?		393.03	$(11/2)^+$
[x]1008.4 *8*	2.1 *5*				
[x]1022.6 *10*	2.7 *9*				
[x]1028.9 *10*	1.9				
1055.4 *8*	4.4 *5*	1107.2	$(7/2^-,9/2^-)$	51.59	$(5/2^-)$
[x]1063.0 *8*	3.0 *9*				
1080.9[c] *8*	3.2 *6*	1081.1		0.0	$3/2^{(-)}$
1092.9[c] *9*	1.5 *5*	1470.8?		377.9	$(7/2^-)$
[x]1095.3 *10*	2.0 *7*				
1102.5 *10*	2.4 *7*	1446.5		343.96	$(9/2)^+$
[x]1120.6 *10*	1.9 *7*				
1126.7 *8*	5.7 *8*	1178.3?		51.59	$(5/2^-)$
1133.4 *10*	2.0 *7*	1261.3		128	$13/2^{(+)}$
1147.7[c] *10*	1.7 *6*	1199.3?		51.59	$(5/2^-)$
[x]1153.7 *10*	2.0 *7*				
1160.6[c] *10*	1.8 *7*	1538.5?		377.9	$(7/2^-)$
[x]1173.0 *10*	2.3 *7*				
[x]1194.6[c] *12*	1.8 *9*				
1194.6[‡c] *11*	1.8	1827.0?		632.3	$(9/2^-)$
1218.2 *9*	2.4 *5*	1562.2		343.96	$(9/2)^+$
[x]1264.0 *10*	2.4 *1*				
[x]1298.7 *12*	2.2 *7*				
[x]1310.5 *11*	1.6 *5*				
1318.6 *11*	1.8 *6*	1446.5		128	$13/2^{(+)}$
[x]1336.5 *9*	1.7 *3*				
[x]1339.2[c] *10*	2.6 *5*				
1339.2[c] *13*	2.6	1390.8?		51.59	$(5/2^-)$
[x]1345.6[c] *10*	2.9 *7*				
[x]1368.7 *10*	2.3 *7*				
[x]1416.1 *10*	1.7 *6*				
1443.5 *9*	3.2 *6*	2459.7		1016.2	$(11/2^-)$
1459.0 *20*	≈3	2475.2		1016.2	$(11/2^-)$
1472.4 *10*	1.5 *5*	1816.4		343.96	$(9/2)^+$
1488.1 *8*	3.4 *6*	2440.2		952.1	$(9/2^-)$
1507.6 *10*	3.8 *7*	1843.9		336.32	$(5/2^-)$
[x]1546.5 *10*	1.7 *6*				
1555.8[‡c] *15*	1.7 *2*	2185.4?		632.3	$(9/2^-)$
[x]1574.5 *10*	2.4 *6*				
1586.4 *11*	2.9 *6*	2456.9		870.7	$(13/2)^+$
[x]1606.9 *10*	2.2 *7*				
1613.6 *10*	7.0 *14*	2484.4		870.7	$(13/2)^+$
1616.1 *8*	4.2 *4*	2486.8		870.7	$(13/2)^+$
1619.0 *10*	4.9 *5*	2489.6		870.7	$(13/2)^+$
[x]1630.3 *10*	2.1 *6*				
[x]1644.2 *10*	2.0 *6*				
[x]1701.0 *10*	2.1 *6*				
[x]1748.5 *10*	2.0 *6*				
[x]1764.1[c] *16*	2.2 *9*				
1764.1[‡c] *15*	2.1	1815.8?		51.59	$(5/2^-)$
[x]1831.4 *10*	1.7 *6*				
1844.0 *10*	5.1 *5*	2476.3		632.3	$(9/2^-)$
[x]1851.8 *10*	1.7 *6*				
[x]1878.5 *10*	1.9 *6*				
1979.6 *14*	2.4 *7*	2543.1		563.5	$(7/2^-)$
2034.5[a] *20*	2.2[a] *11*	2412.4		377.9	$(7/2^-)$
2034.5[a] *20*	2.2[a] *11*	2427.5		393.03	$(11/2)^+$
2045.4[a] *10*	1.4[a] *2*	2423.3		377.9	$(7/2^-)$
2045.4[a] *10*	1.4[a] *2*	2438.4		393.03	$(11/2)^+$
2065.1 *14*	2.1 *4*	2443.0		377.9	$(7/2^-)$
2070.4[a] *10*	7.4[a] *4*	2414.4		343.96	$(9/2)^+$
2070.4[a] *10*	7.4[a] *4*	2463.4		393.03	$(11/2)^+$
2075.2 *14*	3.5 *7*	2468.2		393.03	$(11/2)^+$
[x]2081.5 *15*	2.8 *7*				
2086.9[a] *10*	6.3[a] *7*	2430.9		343.96	$(9/2)^+$
2086.9[a] *10*	6.3[a] *7*	2479.9		393.03	$(11/2)^+$
2091.5 *11*	4.4 *5*	2435.5		343.96	$(9/2)^+$
2099.1[a] *10*	3.4[a] *4*	2443.1		343.96	$(9/2)^+$
2099.1[a] *10*	3.4[a] *4*	2477.0		377.9	$(7/2^-)$
2105.2[a] *10*	4.2[a] *10*	2441.5		336.32	$(5/2^-)$
2105.2[a] *10*	4.2[a] *10*	2483.1		377.9	$(7/2^-)$
2112.8 *15*	3.0 *6*	2456.9		343.96	$(9/2)^+$
2141.0[a] *20*	1.9[a] *5*	2484.4		343.96	$(9/2)^+$
2141.0[a] *20*	1.9[a] *5*	2534.0		393.03	$(11/2)^+$
2192.9 *15*	2.2 *5*	2536.9		343.96	$(9/2)^+$
[x]2272.6 *20*	1.7 *4*				
2328.9 *12*	6.7 *7*	2456.9		128	$13/2^{(+)}$
2358.7 *14*	3.4 *6*	2486.8		128	$13/2^{(+)}$

$\gamma(^{191}Hg)$ (continued)

E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π
2361.5 *10*	10.6 *11*	2489.6		128	$13/2^{(+)}$
x2363.4 *15*	2.0 *6*				
x2391.2 *14*	2.7 *5*				

† From 1988WoZZ, in combination with 1976GoZE.
‡ Uncertain placement from a tentative level, not adopted.
# From ce data (1976GoZE), except where otherwise noted. α(K)exp values were calculated using Iγ from 1988WoZZ, Ice from 1976GoZE, and normalized to α(K)(215.95γ)=0.1407 (E2, theory).
@ Deduced from subshell α(exp) values using the BriccMixing code.
& Additional information 2.
a Multiply placed with undivided intensity.
b Multiply placed with intensity suitably divided.
c Placement of transition in the level scheme is uncertain.
x γ ray not placed in level scheme.

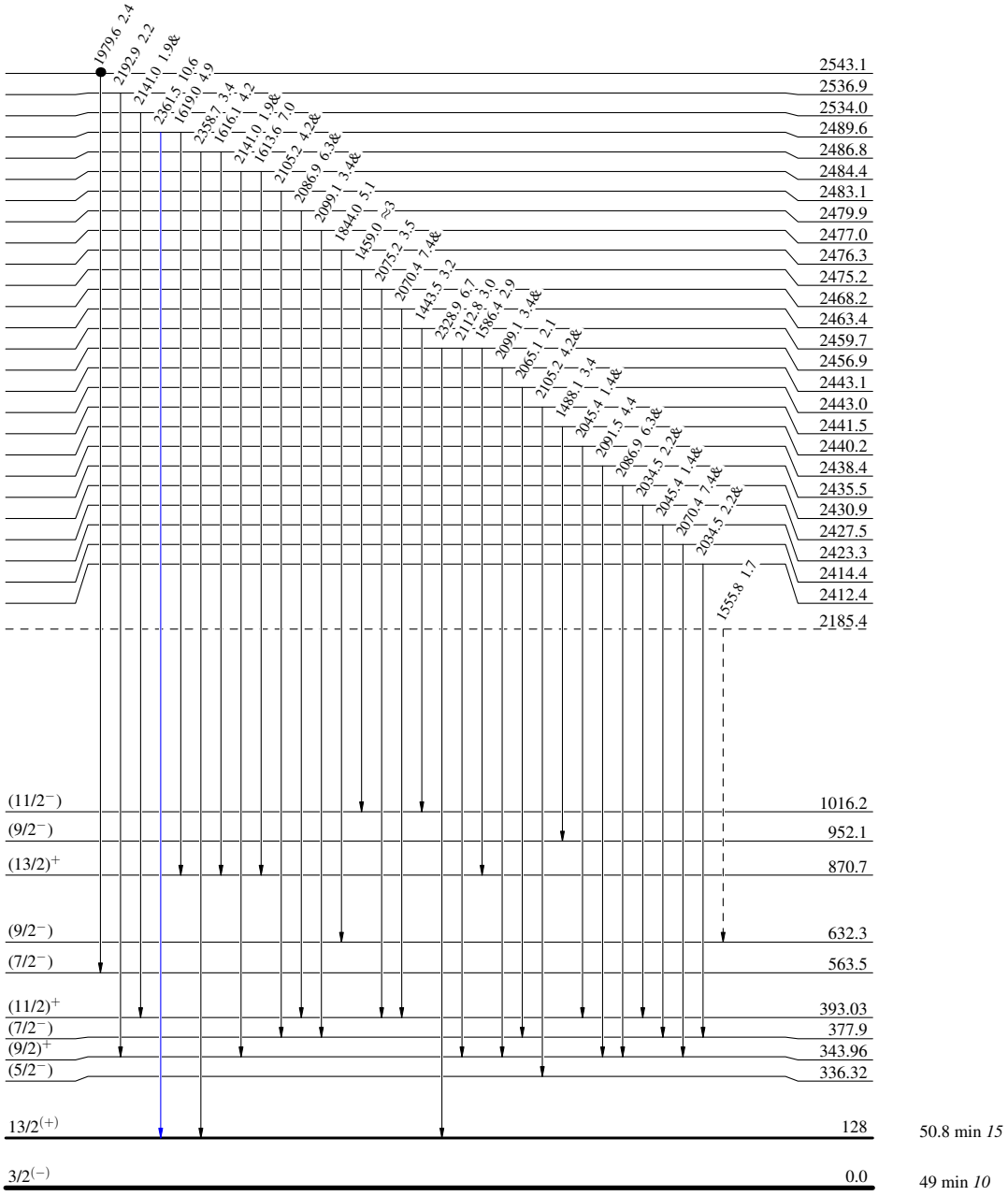
^{191}Tl ε decay (5.22 min) 1988WoZZ,1976GoZE

Decay Scheme

Intensities: Relative $I_{(\gamma+ce)}$
& Multiply placed: undivided intensity given

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

$9/2^{(-)}$ 297 5.22 min *16*
$\%\varepsilon + \%\beta^+ = 100$ $Q_\varepsilon = 4309$ *23*
$^{191}_{81}Tl_{110}$



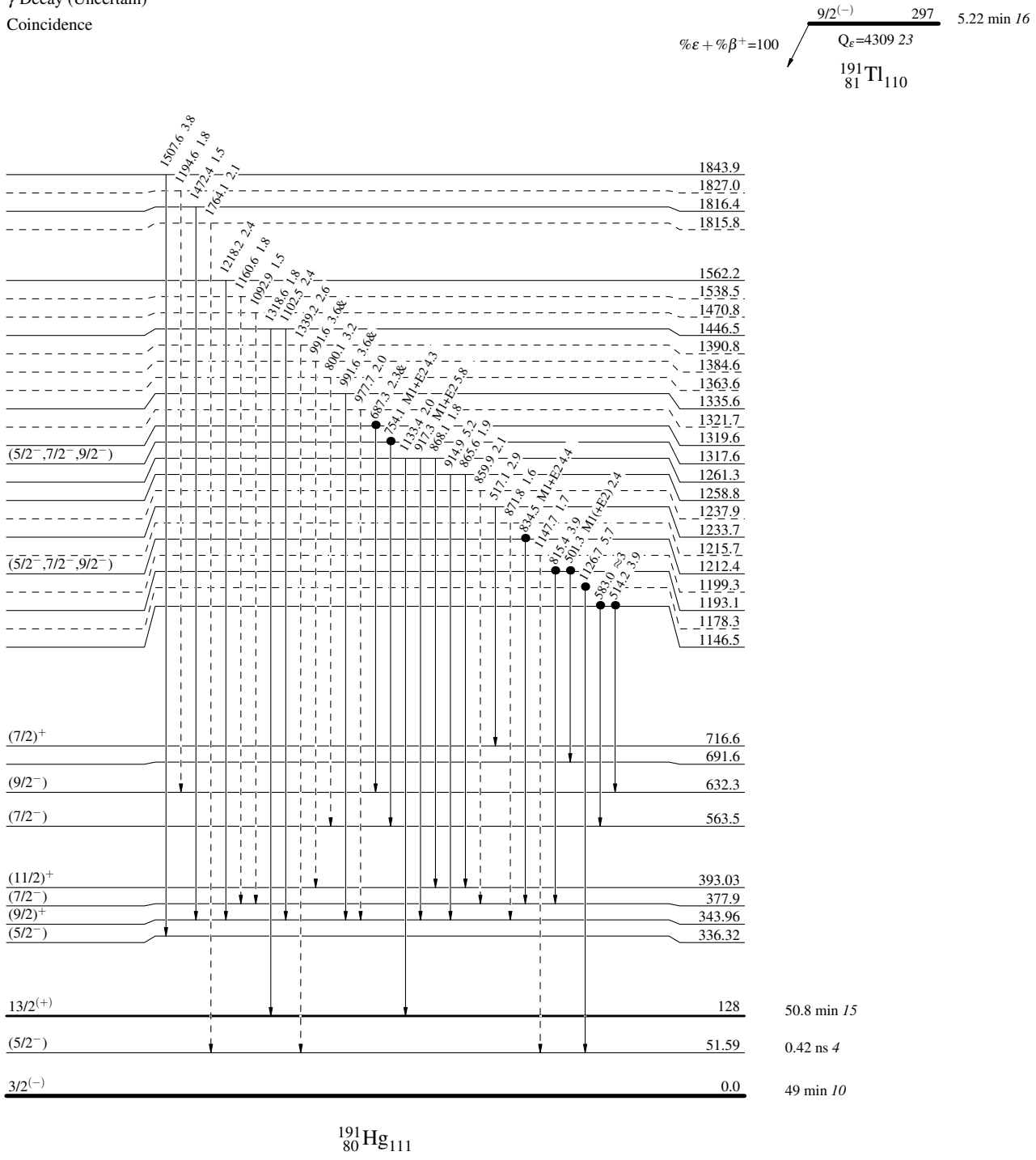
$^{191}_{80}Hg_{111}$

^{191}Tl ε decay (5.22 min) 1988WoZZ,1976GoZE

Decay Scheme (continued)

Intensities: Relative $I_{(\gamma+ce)}$
& Multiply placed: undivided intensity given

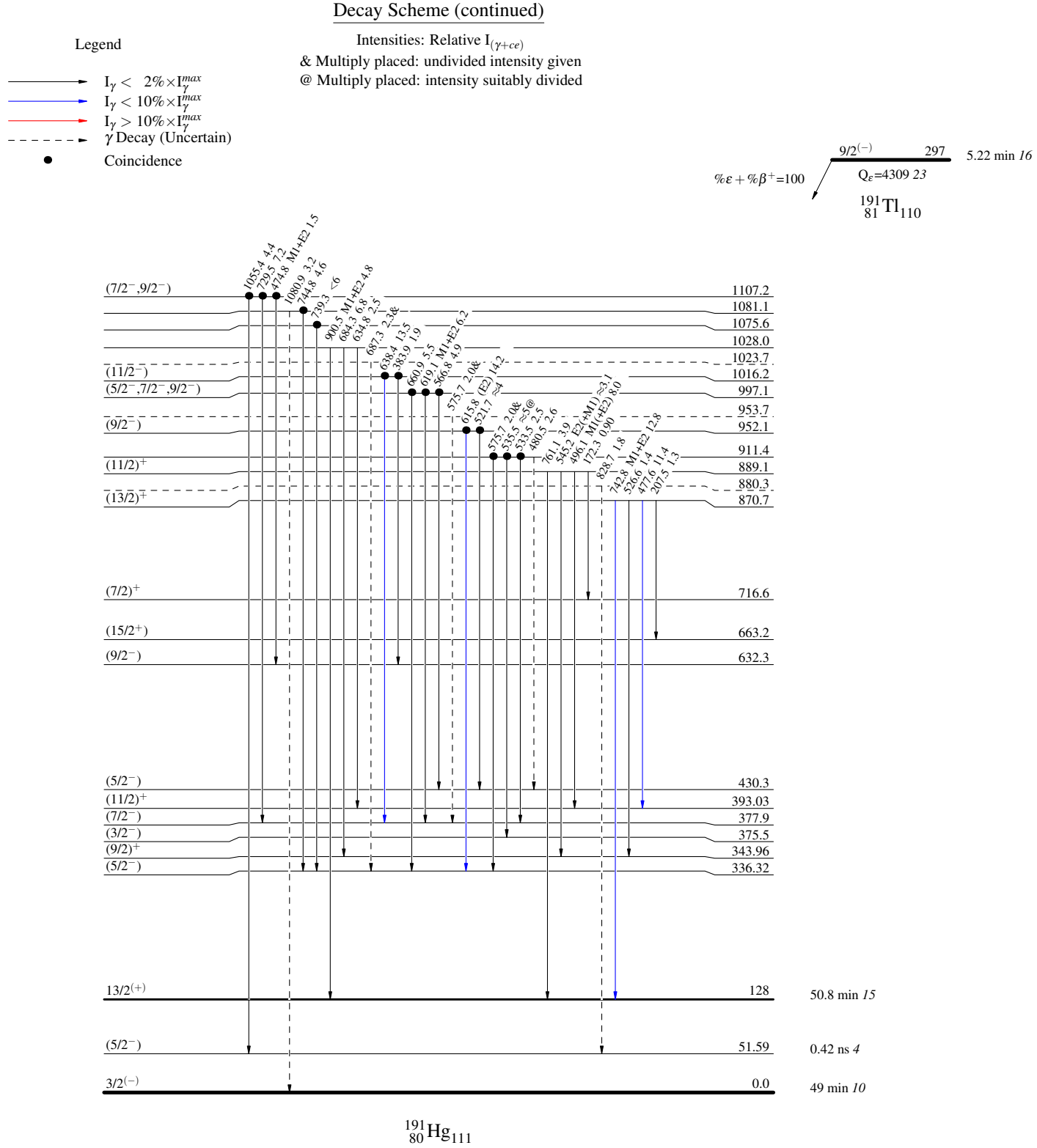
Legend
- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)
- Coincidence



^{191}Tl ε decay (5.22 min) 1988WoZZ,1976GoZE

Decay Scheme (continued)

Intensities: Relative $I_{(\gamma+ce)}$
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided



^{191}Tl ε decay (5.22 min) 1988WoZZ,1976GoZE

Decay Scheme (continued)

Intensities: Relative $I_{(\gamma+ce)}$
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

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)