^{192}Bi ε decay (39.6 s+34.6 s) 1987Va09

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 113, 1871 (2012)	15-Jun-2012

Parent: ^{192}Bi: E=0.0; $J^\pi=(3^+)$; $T_{1/2}$=34.6 s *9*; Q(ε)=9011 *35*; %ε+%$β^+$ decay=88 *5*

Parent: ^{192}Bi: E=0.0+x; $J^\pi=(10^-)$; $T_{1/2}$=39.6 s *4*; Q(ε)=9011 *35*; %ε+%$β^+$ decay=90 *3*

Others: 1984Va11, 1984Va19, 1990Tr01, 2004An23.

The partial decay scheme and all data are from 1987Va09. Mixed sources from ^{181}Ta(^{20}Ne,9n), E(^{20}Ne)<190 MeV, mass separation (LISOL facility); measured Eγ, Iγ (Ge detectors, FWHM=2.0 keV at 1332 keV), x rays (low energy Ge detector, FWHM=580 eV at 122 keV), E(ce), Ice (Si(Li), FWHM=2.5 keV at 624 keV), γγ coin, ceγ coin, triparameter coin (γ-γ-t, ce-γ-t).

The combined decay scheme shows Iγ values for a mixed source. Separate normalizations and ε feedings could not be reliably determined. Isomer assignments made from decay curves of γ-ray peaks are indicated. The fraction of the ε decay proceeding via the low-spin isomer is assumed to be 30% 10 in 1991Va04, based on an α-decay study by several of the same authors using similarly prepared sources. This is not inconsistent with evaluator's conclusions based on I(γ+ce) imbalance (indicated in comments on relevant levels); note, however, that these intensity balances could be significantly affected by the unplaced Iγ (≈10% of total observed Iγ).

^{192}Pb Levels

E(level)	J^π†	$T_{1/2}$†	Comments
0.0	0^+	3.5 min *1*	
768.84 *23*	0^+	0.75 ns *10*	
853.64 *18*	2^+		intensity imbalance At level: 8 *5*.
1237.88 *22*	(2^+)		Intensity imbalance at level: 7.5 *22*.
1355.5 *3*	4^+		Additional information 1.
1430.2 *3*			Intensity imbalance at level: 1.7 *5*.
1544.09 *22*	$1,2^+$		Intensity imbalance at level: 5.2 *11*.
1859.8 *3*	$(5)^-$		intensity imbalance At level: 8 *5*.
1920.8 *3*	6^+		Intensity imbalance at level: 11 *5*. Presumed to result from incompleteness of decay scheme; no ε feeding expected from either isomer.
1983.3 *4*			Intensity imbalance at level: 3.0 *20*.
2303.6 *4*	8^+		Additional information 2.
2323.2 *4*	$(7)^-$		intensity imbalance At level: 9 *5*; presumed to result from incompleteness of decay scheme; No ε feeding expected from either ^{192}Tl isomer.
2507.2 *4*	$(8)^-$		Intensity imbalance at level: 9.4 *23*. negligible feeding expected from either isomer if $J^\pi=8^-$.
2514.3 *4*	$(9)^-$		Intensity imbalance at level: 12.6 *25*.
2520.3 *4*	$(8)^+$		Intensity imbalance at level: [9.3 *13* − Ti(61)]≈0; negligible ε feeding is expected if $J^\pi=8^+$.
2562.4 *4*	8^+		Intensity imbalance at level: 4.1 *3*. negligible feeding expected from either isomer if $J^\pi=8^+$.
2581.3 *5*	$(10)^+$	93 ns *11*	Intensity imbalance at level: [−0.2 *17* + Ti(61)]=9.1 *21* (if Ti(61)=9.3 *13*).
2622.4 *6*	$(2^+,3,4^+)$		Intensity imbalance at level: 5.9 *17*.
2623.1?	(10^+)		tentatively introduced by evaluator to accommodate 120γ (unplaced by 1987Va09) In accord with Adopted Levels, Gammas. However, neither this level's known deexcitation γ nor those of the neighboring 2622.4 level is reported In ε decay.
2743.9? *6*	$(11)^-$		tentatively introduced by evaluator to accommodate 120γ and 163γ (unplaced by 1987Va09) In accord with Adopted Levels, Gammas. intensity imbalance At level: 3.7 *13*.
2789.7 *4*	(9^+)		Intensity imbalance at level: 3.0 *18* (assuming placement of 929γ from this level by 1987Va09 was incorrect).
2894.0 *5*	$(7^+,8,9^-)$		Intensity imbalance at level: 4.0 *11*.

† Adopted values.

γ(^{192}Pb)

E_γ	I_γ‡	E_i(level)	J_i^π	E_f	J_f^π	Mult.#	δ	α†	Comments
61.0 *5*		2581.3	$(10)^+$	2520.3	$(8)^+$	(E2)@		61 *3*	α(L)=45.5 *20*; α(M)=12.0 *6*; α(N+..)=3.57 *16* α(N)=3.02 *13*; α(O)=0.536 *23*; α(P)=0.0190 *8* Intensity determination not possible (1987Va09). However, if J^π(2520) is 8^+, no significant ε feeding to that level is expected; I(γ+ce) balance at that level then implies Ti(61)=9.3 *13*.
67.0 *5*	2.0 *10*	2581.3	$(10)^+$	2514.3	$(9)^-$	E1@		0.269 *7*	α(L)=0.205 *5*; α(M)=0.0488 *13*; α(N+..)=0.0145 *4* α(N)=0.0121 *3*; α(O)=0.00223 *6*; α(P)=0.000155 *4*
120.8[b] *2*	0.8 *4*	2743.9?	$(11)^-$	2623.1?	(10^+)	[E1]		0.273	α(K)=0.219 *4*; α(L)=0.0420 *7*; α(M)=0.00989 *15*; α(N+..)=0.00298 *5* α(N)=0.00248 *4*; α(O)=0.000468 *7*; α(P)=3.74×10^{-5} *6* see comment on 2744 level.
x147.7 *2*	0.3 *2*								
x150.3 *2*	0.6 *3*								Eγ: matches expected Eγ for a 2894 to 2744 transition.
162.6[b] *2*	2.4 *10*	2743.9?	$(11)^-$	2581.3	$(10)^+$	E1		0.1302	α(K)=0.1052 *15*; α(L)=0.0192 *3*; α(M)=0.00450 *7*; α(N+..)=0.001363 *20* α(N)=0.001129 *17*; α(O)=0.000216 *3*; α(P)=1.82×10^{-5} *3* see comment on 2744 level.
184.0 *2*	4.3 *10*	2507.2	$(8)^-$	2323.2	$(7)^-$	M1+E2	0.89 *15*	1.18 *10*	α(K)=0.84 *11*; α(L)=0.252 *6*; α(M)=0.0624 *19*; α(N+..)=0.0190 *5* α(N)=0.0158 *5*; α(O)=0.00300 *7*; α(P)=0.000235 *13* α(K)exp=0.88 *15*; α(L)exp=0.28 *10* (1987Va09) δ: from Adopted Gammas; δ=0.83 *+25−22* from α(K)exp.
191.1 *2*	8.6 *12*	2514.3	$(9)^-$	2323.2	$(7)^-$	E2		0.502	α(K)exp=0.096 *20*; α(L)exp=0.20 *5* (1987Va09) α(K)=0.187 *3*; α(L)=0.235 *4*; α(M)=0.0615 *9*; α(N+..)=0.0185 *3* α(N)=0.01552 *23*; α(O)=0.00280 *5*; α(P)=0.0001379 *20* Mult.: from α(L)exp. α(K)exp from 1987Va09 appears to be incorrect.
210.7 *2*	1.5 *7*	2514.3	$(9)^-$	2303.6	8^+	E1+M2@	0.28 *4*	0.45 *11*	α(K)=0.33 *8*; α(L)=0.087 *22*; α(M)=0.022 *6*; α(N+..)=0.0068 *17* α(N)=0.0056 *14*; α(O)=0.0011 *3*; α(P)=0.00011 *3* Additional information 4. δ: from Adopted Gammas.
x264.2 *2*	1.6 *6*								
x331.5 *2*	0.5 *2*								Eγ: matches expected Eγ for a 2894 to 2562 transition.
382.8 *2*	8 *3*	2303.6	8^+	1920.8	6^+	E2@		0.0579	α(K)=0.0372 *6*; α(L)=0.01561 *22*; α(M)=0.00395 *6*; α(N+..)=0.001198 *17* α(N)=0.000999 *15*; α(O)=0.000186 *3*; α(P)=1.285×10^{-5} *19* Additional information 3. α(K)exp=0.026 *10* (corrected for contribution from E1 383.9γ of ^{192}Tl decay, but Ice(K) also includes ΔJ=(0) 383.9 transition in ^{192}Pb) (1987Va09)); authors favor mult=E1, inconsistent with adopted value.
383.9 *4*	<1.0	1237.88	(2^+)	853.64	2^+				
x385.6 *2*	3.2 *10*								
402.4 *2*	3.8 *16*	2323.2	$(7)^-$	1920.8	6^+	(E1)@		0.01522	α(K)=0.01253 *18*; α(L)=0.00206 *3*; α(M)=0.000479 *7*;

$^{192}_{82}Pb_{110}$-2

^{192}Bi ε decay (39.6 s+34.6 s) 1987Va09 (continued)

γ(^{192}Pb) (continued)

E_γ	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	δ	α[†]	Comments
									α(N+..)=0.0001467 *21* α(N)=0.0001208 *17*; α(O)=2.36×10^{-5} *4*; α(P)=2.27×10^{-6} *4*
463.4[&] *2*	30 *3*	2323.2	(7)$^-$	1859.8	(5)$^-$	E2		0.0354	α(K)exp=0.020 *3*; α(L)exp=0.005 *1* (1987Va09) α(K)=0.0244 *4*; α(L)=0.00825 *12*; α(M)=0.00206 *3*; α(N+..)=0.000627 *9* α(N)=0.000522 *8*; α(O)=9.82×10^{-5} *14*; α(P)=7.41×10^{-6} *11*
469.4 *3*	0.4 *3*	1237.88	(2$^+$)	768.84	0$^+$	[E2]		0.0343	α(K)=0.0238 *4*; α(L)=0.00792 *12*; α(M)=0.00198 *3*; α(N+..)=0.000602 *9* α(N)=0.000500 *7*; α(O)=9.42×10^{-5} *14*; α(P)=7.15×10^{-6} *10*
[x]471.4 *2*	1.7 *9*								
486.1 *2*	3.0 *18*	2789.7	(9$^+$)	2303.6	8$^+$	D[@]			
501.8 *2*	80 *4*	1355.5	4$^+$	853.64	2$^+$	E2		0.0291	α(L)exp=0.0068 *10* (1987Va09) α(K)=0.0206 *3*; α(L)=0.00642 *9*; α(M)=0.001596 *23*; α(N+..)=0.000486 *7* α(N)=0.000404 *6*; α(O)=7.64×10^{-5} *11*; α(P)=5.97×10^{-6} *9* Mult.: from α(L)exp and Adopted Gammas.
504.3[&] *2*	39 *3*	1859.8	(5)$^-$	1355.5	4$^+$	E1		0.00939 *14*	α(K)exp=0.011 *2* (1987Va09) α=0.00939 *14*; α(K)=0.00777 *11*; α(L)=0.001248 *18*; α(M)=0.000290 *4*; α(N+..)=8.90×10^{-5} *13* α(N)=7.32×10^{-5} *11*; α(O)=1.437×10^{-5} *21*; α(P)=1.410×10^{-6} *20*
[x]535.7 *2*	2.0 *6*								
[x]538.4 *2*	0.8 *4*								
565.4[&] *2*	36 *3*	1920.8	6$^+$	1355.5	4$^+$	E2		0.0220	α(K)exp=0.020 *2* (1987Va09) α(K)=0.01608 *23*; α(L)=0.00449 *7*; α(M)=0.001106 *16*; α(N+..)=0.000338 *5* α(N)=0.000280 *4*; α(O)=5.33×10^{-5} *8*; α(P)=4.37×10^{-6} *7*
570.8 *3*	3.9 *10*	2894.0	(7$^+$,8,9$^-$)	2323.2	(7)$^-$	[E2]		0.0215	α(K)=0.01577 *23*; α(L)=0.00436 *7*; α(M)=0.001075 *16*; α(N+..)=0.000328 *5* α(N)=0.000272 *4*; α(O)=5.18×10^{-5} *8*; α(P)=4.26×10^{-6} *6*
576.6 *2*	1.7 *5*	1430.2		853.64	2$^+$				
599.5 *2*	9.1 *12*	2520.3	(8)$^+$	1920.8	6$^+$	E2		0.0193	α(K)=0.01427 *20*; α(L)=0.00379 *6*; α(M)=0.000930 *13*; α(N+..)=0.000284 *4* α(N)=0.000236 *4*; α(O)=4.50×10^{-5} *7*; α(P)=3.77×10^{-6} *6*
[x]615.7 *2*	2.6 *10*								
641.6 *2*	4.0 *3*	2562.4	8$^+$	1920.8	6$^+$	E2		0.01658	α(K)=0.01245 *18*; α(L)=0.00313 *5*; α(M)=0.000766 *11*; α(N+..)=0.000234 *4* α(N)=0.000194 *3*; α(O)=3.72×10^{-5} *6*; α(P)=3.19×10^{-6} *5* Mult.: from Adopted Gammas.
[x]652.1 *2*	1.2 *3*								
690.7 *2*	4.0 *10*	1544.09	1,2$^+$	853.64	2$^+$				
[x]709.3 *2*	1.8 *4*								
[x]725.7 *2*	1.3 *6*								
[x]733.4 *3*	1.8 *2*								
745.4 *3*	3.0 *20*	1983.3		1237.88	(2$^+$)				

$^{192}_{82}Pb_{110}$-3

^{192}Bi ε decay (39.6 s+34.6 s) 1987Va09 (continued)

γ(^{192}Pb) (continued)

E_γ	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	α[†]	$I_{(\gamma+ce)}$	Comments
768.5[a] *4*		768.84	0^+	0.0	0^+	E0		1.7 *3*	K/L=5.2 *7* (1990Tr01). Placement based on absence of coincidences between 853.8γ and 768.5-transition ce. $I_{(\gamma+ce)}$: Σ (Ice(K)+Ice(L)+Ice(M)) (1987Va09). Mult.: from comparison of ce and γ-ray spectra in 650-850 keV region (K, L, M ce lines, but no corresponding photopeak, are observed), and coincidences with Pb K x rays.
775.0 *2*	1.2 *3*	1544.09	$1,2^+$	768.84	0^+				
[x]791.9 *2*	0.4 *2*								
853.8 *2*	100.0	853.64	2^+	0.0	0^+	E2[@]	0.00911 *13*		α(L)exp=0.0010 *2* (1987Va09) α=0.00911 *13*; α(K)=0.00714 *10*; α(L)=0.001498 *21*; α(M)=0.000360 *5*; α(N+..)=0.0001105 α(N)=9.11×10^{-5} *13*; α(O)=1.770×10^{-5} *25*; α(P)=1.649×10^{-6} *24*
[x]926.6 *3*	2.3 *10*								
[x]928.7 *3*	2.8 *10*								Placement from 2789 level appears to be incorrect; see comment on 2789 level in Adopted Gammas.
[x]1101.9 *3*	2.8 *10*								
1237.7[a] *3*	9.6 *8*	1237.88	(2^+)	0.0	0^+	[E2]	0.00443 *7*		α=0.00443 *7*; α(K)=0.00358 *5*; α(L)=0.000645 *9*; α(M)=0.0001521 *22*; α(N+..)=5.44×10^{-5} *8* α(N)=3.85×10^{-5} *6*; α(O)=7.58×10^{-6} *11*; α(P)=7.57×10^{-7} *11*; α(IPF)=7.52×10^{-6} *11* α(K)exp<0.0033 (1987Va09) Mult.: E1 or E2 allowed by α(K)exp.
1266.9 *3*	3.4 *3*	2622.4	$(2^+,3,4^+)$	1355.5	4^+				
[x]1607.9 *4*	1.6 *4*								
1768.9 *4*	3.5 *15*	2622.4	$(2^+,3,4^+)$	853.64	2^+				
[x]1795.3 *4*	4.4 *8*								

[†] Additional information 5.
[‡] For mixed source; relative intensity normalized so I(854γ)=100.
[#] From α(K)exp (and K/L), except where noted. The photon and ce intensity scales were normalized assuming α(K)(E2 theory) for 501.8γ and 853.8γ.
[@] From Adopted Levels, Gammas.
[&] Attributed to decay of high-spin ^{192}Bi (39.6 s) based on measured γ(t) (1987Va09).
[a] Attributed to decay of low-spin ^{192}Bi (34.6 s) based on measured γ(t) (1987Va09).
[b] Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.

$^{192}_{82}Pb_{110}$-4

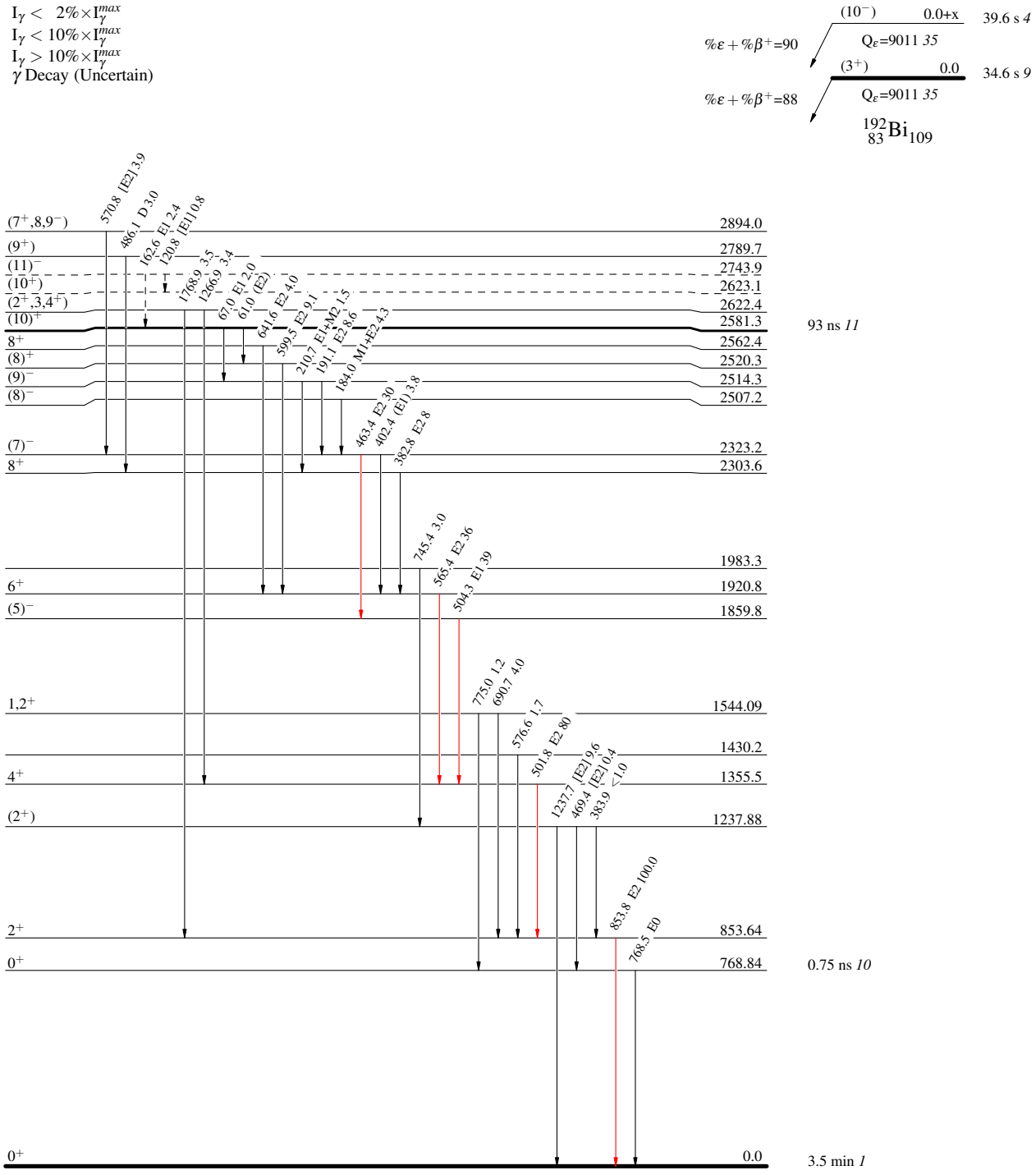
^{192}Bi ε decay (39.6 s+34.6 s) 1987Va09

Decay Scheme

Intensities: Relative Iγ from mixed source

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)



$^{192}_{82}Pb_{110}$