

^{198}Bi ε decay (11.6 min) [1987Va09](#),[1973Pa04](#),[1996Zh23](#)

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Huang Xiaolong and Kang Mengxiao		NDS 133, 221 (2016)	1-Dec-2015

Parent: ^{198}Bi : $E=0+x$; $J^\pi=(7^+)$; $T_{1/2}=11.6$ min 3; $Q(\varepsilon)=6681.32$; $\% \varepsilon + \% \beta^+$ decay=100.0

Other: [1970Ha14](#).

Sources produced by α 's on Tl ([1970Ha14](#)), protons on U ([1972Kr08](#)), protons on Pb ([1973Pa04](#)), and $^{187}\text{Re}(^{16}\text{O},5n)$ ($E=85, 105$ MeV) with mass separated isotopes.

[1996Zh23](#): measured $E\gamma$, $I\gamma$, $\gamma\gamma$ -coin with BGO(Ac)HPGe detectors and intrinsic Ge planar detector.

[1987Va09](#): measured $E\gamma$, $I\gamma$, $E(x\text{-ray})$, $I(x\text{-ray})$, $\gamma\gamma$ coin, γce coin, $\gamma\gamma(t)$, $\gamma\text{ce}(t)$.

[1973Pa04](#): measured $E\gamma$, $I\gamma$, $E(\text{ce})$, $I(\text{ce})$, $\gamma\gamma$ coin, $\gamma(t)$.

[1970Ha14](#): measured $E\gamma$, $I\gamma$, $I(\text{ce})$.

Others: [1984Va11](#), [1984Va19](#).

Partial decay scheme; absolute transition intensities undetermined. Higher levels are expected from $Q(\varepsilon)$ value, γ decay to 2141 level is implied by (K x-ray)(318 γ)(t) coin.

 ^{198}Pb Levels

E(level) [†]	J^π [@]	$T_{1/2}$ [#]	Comments
0.0	0^+	2.40 h 10	
1063.5 10	2^+		
1392.1 10	(0^+)		
1625.9 13	4^+		
1734.7 10	(0^+)		
1823.5 13	$(5)^-$	50.4 ns 5	configuration: $\nu(i_{13/2})^{-1}\nu(p_{3/2})^{-1}$ (1996Zh23).
1980.5 [‡] 15	(4^+)		
2141.3 16	$(7)^-$	4.19 μs 10	
2231.3 16	$(9)^-$		For discussion of the possibility that 90.0 γ transition from 9^- 2231 level feeds the 7^- 2141 level directly, or via an intermediate level, see 2231 level notes in (HI,xny).
2257.5 [‡] 16	(6^-)		
2342.5 [‡] 16			
2345.5 [‡] 16			
2369.5 [‡] 16	(6^-)		
2611.5 [‡] 16			
2695.5 [‡] 16			
2703.5 [‡] 16			

[†] From decay scheme and $E\gamma$'s by using least-squares fit to $E\gamma$ values. $\Delta E=1$ keV assumed in the fit.

[‡] From [1996Zh23](#).

[#] From Adopted Levels.

[@] From γ -ray multiplicities.

 $\gamma(^{198}\text{Pb})$

$I\gamma$ normalization: Undetermined.

$\gamma\gamma$ coin: [1970Ha14](#), [1972Kr08](#), [1973Pa04](#).

$\gamma\gamma(t)$ coin: [1972Al44](#), [1972Kr08](#), [1973Pa04](#).

$\alpha(K)\text{exp}$: Semi spectrometer $\text{ce}(K)/I\gamma$ ([1970Ha14](#)); other $\alpha(K)\text{exp}$ from $I\gamma$. $\text{ce}(K)$ ([1972Kr08](#)) are normalized to $\alpha(K)(1063.5\gamma)=0.00473$ (E2 theory).

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^{198}Bi ε decay (11.6 min) [1987Va09](#),[1973Pa04](#),[1996Zh23](#) (continued) $\gamma(^{198}\text{Pb})$ (continued)

E_γ #	I_γ @	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. &	$\delta^{\pm\&}$	$\alpha^\dagger$	Comments
90.0 2	8 3	2231.3	(9) ⁻	2141.3	(7) ⁻	E2		9.98 17	$\alpha(\text{K})=0.460$ 8; $\alpha(\text{L})=7.09$ 13; $\alpha(\text{M})=1.87$ 4 $\alpha(\text{N})=0.472$ 9; $\alpha(\text{O})=0.0840$ 15; $\alpha(\text{P})=0.00321$ 6 Mult.: From Adopted Gammas.
^x 138.1	2.3					M1(+E2)	0.8 +9-6	2.9 8	$\alpha(\text{K})=2.0$ 10; $\alpha(\text{L})=0.70$ 16; $\alpha(\text{M})=0.18$ 5 $\alpha(\text{N})=0.045$ 12; $\alpha(\text{O})=0.0084$ 20; $\alpha(\text{P})=0.00060$ 6 $\alpha(\text{K})_{\text{exp}}=2.1$ 10 (1973Pa04).
^x 157.5 197.6 2	<0.9 80	1823.5	(5) ⁻	1625.9	4 ⁺	E1		0.0803	$\alpha(\text{K})=0.0652$ 10; $\alpha(\text{L})=0.01157$ 17; $\alpha(\text{M})=0.00271$ 4 $\alpha(\text{N})=0.000681$ 10; $\alpha(\text{O})=0.0001310$ 19; $\alpha(\text{P})=1.144\times 10^{-5}$ 17 $\alpha(\text{K})_{\text{exp}}<0.1$, $\alpha(\text{L})_{\text{exp}}<0.02$ (1970Ha14), $\alpha(\text{K})_{\text{exp}}=0.069$ 14, $\alpha(\text{L})_{\text{exp}}=0.009$ 2 (1972Kr08).
^x 247.6 317.85	2.2 37.5	2141.3	(7) ⁻	1823.5	(5) ⁻	E2		0.0975	$\alpha(\text{K})=0.0568$ 8; $\alpha(\text{L})=0.0305$ 5; $\alpha(\text{M})=0.00780$ 11 $\alpha(\text{N})=0.00197$ 3; $\alpha(\text{O})=0.000364$ 5; $\alpha(\text{P})=2.29\times 10^{-5}$ 4 $\alpha(\text{K})_{\text{exp}}=0.064$ 7, $\text{K/L}=2.1$ 2 (1970Ha14), $\alpha(\text{K})_{\text{exp}}=0.062$ 14 (1972Kr08).
434 ^b ^x 434.3	11.4 ^b 7.3	2257.5	(6) ⁻	1823.5	(5) ⁻	M1(+E2)	0.21 +64-21	0.15 5	$\alpha(\text{K})=0.12$ 4; $\alpha(\text{L})=0.021$ 5; $\alpha(\text{M})=0.0050$ 10 $\alpha(\text{N})=0.00127$ 25; $\alpha(\text{O})=0.00025$ 6; $\alpha(\text{P})=2.7\times 10^{-5}$ 7 $\alpha(\text{K})_{\text{exp}}=0.13$ 4, $\text{K/L}=3.2$ 3 (1970Ha14).
519 ^b 522 ^b 546 ^b ^x 546.5	1.1 ^b 3.6 ^b 3.4 ^b 2.7	2342.5 2345.5 2369.5	(6) ⁻	1823.5	(5) ⁻	M1		0.0854	$\alpha(\text{K})=0.0700$ 10; $\alpha(\text{L})=0.01176$ 17; $\alpha(\text{M})=0.00275$ 4 $\alpha(\text{N})=0.000698$ 10; $\alpha(\text{O})=0.0001393$ 20; $\alpha(\text{P})=1.493\times 10^{-5}$ 21 $\alpha(\text{K})_{\text{exp}}=0.08$ 2, $\text{K/L}=7$ 2 (1970Ha14).
562.4	79	1625.9	4 ⁺	1063.5	2 ⁺	E2		0.0223	$\alpha(\text{K})=0.01626$ 23; $\alpha(\text{L})=0.00456$ 7; $\alpha(\text{M})=0.001123$ 16 $\alpha(\text{N})=0.000284$ 4; $\alpha(\text{O})=5.41\times 10^{-5}$ 8; $\alpha(\text{P})=4.43\times 10^{-6}$ 7 $\alpha(\text{K})_{\text{exp}}=0.0156$ 12, $\text{K/L}=3.3$ 2 (1970Ha14), $\alpha(\text{K})_{\text{exp}}=0.018$ 4 (1972Kr08).
760 ^b 788 ^b 872 ^b 880 ^b 917 ^b ^x 917.3	4.8 ^b 5.7 ^b 2.6 ^b 2.2 ^b 4.4 ^b 5.5	1823.5 2611.5 2695.5 2703.5 1980.5	(5) ⁻ (5) ⁻ (5) ⁻ (5) ⁻ (4 ⁺)	1063.5	2 ⁺				

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^{198}Bi ε decay (11.6 min) [1987Va09,1973Pa04,1996Zh23](#) (continued) $\gamma(^{198}\text{Pb})$ (continued)

E_γ [#]	I_γ [@]	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. ^{&}	α [†]	Comments
1063.45	100	1063.5	2 ⁺	0.0	0 ⁺	E2	0.00591	$\alpha(\text{K})=0.00473$ 7; $\alpha(\text{L})=0.000898$ 13; $\alpha(\text{M})=0.000213$ 3 $\alpha(\text{N})=5.40 \times 10^{-5}$ 8; $\alpha(\text{O})=1.058 \times 10^{-5}$ 15; $\alpha(\text{P})=1.032 \times 10^{-6}$ 15 $\alpha(\text{K})_{\text{exp}}=0.0049$ 4 (1970Ha14).
1392.1 ^a		1392.1	(0 ⁺)	0.0	0 ⁺	(E0) ^a		I_γ : <40 estimated from measured ce spectrum.
1734.7 ^a		1734.7	(0 ⁺)	0.0	0 ⁺	(E0) ^a		I_γ : <15 estimated from measured ce spectrum. $\alpha(\text{K})_{\text{exp}}/\alpha(\text{L})_{\text{exp}}=5.41$ 93 (1990Tr01).

[†] [Additional information 1](#).[‡] If No value given it was assumed $\delta=1.00$ for E2/M1, $\delta=1.00$ for E3/M2 and $\delta=0.10$ for the other multipolarities.[#] From [1973Pa04](#), except as noted.[@] Relative I_γ . Values normalized to $I_\gamma(1063.45\gamma)=100$ are from [1973Pa04](#), except as noted.[&] Deduced from $\alpha(\text{K})_{\text{exp}}$, K/L, L-subshell ratios, except as noted.^a From ce measurements ([1987Va09,1984Va11,1984Va19](#)).^b From [1996Zh23](#).^x γ ray not placed in level scheme.

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Legend

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

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

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

● Coincidence

Decay Scheme

Intensities: Relative I_γ

$^{198}_{83}\text{Bi}_{115}$ (7⁺) 0+x 11.6 min 3

$Q_\epsilon = 6681.32$

$\% \epsilon + \% \beta^+ = 100.0$

