^{210}**Pb** β^- **decay**   **1981He15,1990Sc08,1990Hi03**

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia	NDS 121, 561 (2014)	31-Mar-2014

Parent: ^{210}Pb: E=0.0; J^π=0$^+$; T$_{1/2}$=22.20 y 22; Q(β^-)=63.5 5; %β^- decay=100.0

1981He15: Measured γ-ray energies using HPGe detector.
1990Sc08: Measured γ-ray and X-ray emission probabilities using two Ge(Li) and one Si(Li) detectors.
1990Hi03: Measured the emission rate of 46.5 keV γ ray using $2\pi\alpha$ spectrometer and HPGe detector (thin beryllium window).

^{210}Bi Levels

E(level)	$J^{\pi\dagger}$	T$_{1/2}$†
0.0	1$^-$	5.012 d 5
46.539 1	0$^-$	<3 ns

† From Adopted Levels.

β^- radiations

E(decay)	E(level)	I$\beta^{-\dagger}$	Log ft	Comments
(17.0 5)	46.539	84 3	5.4 1	av Eβ= 4.16 13 Eβ=17 2 (1955Le29); Eβ=17.0 5 (1967Ha03). Others: 1952Ba02, 1952In01, 1953Hu46, 1953Ja02, 1958To10, 1991SaZR, 1993Am10, 1994Ha63, 1996Gr01, 1996Go47. Iβ=85 5 (1956St99).
(63.5 5)	0.0	16 3	7.9 1	av Eβ= 16.16 13 Eβ=61 (1957To16); Eβ=61.0 13 (1963Ro31). Iβ=15 5 (1956St99). Others: 1957To16, 1963Ro31, 1991SaZR, 1993Am10, 1994Ha63, 1996Gr01, 1996Go47.

† Absolute intensity per 100 decays.

γ(^{210}Bi)

Iγ normalization: from absolute photon intensity measurements of 1990Sc08 and 1990Hi03.
Absolute L x ray intensities measured with a high-purity germanium detector (1990Sc08).
Others: 1987Me17, 1971Fi04, 1971Ge11, 1969Fr07, 1958Cu91, 1958To10, 1957Fi06, 1954Da23, 1935St05. See 1967Ha03 for measurements of L-Auger electrons with a magnetic spectrometer.

^{210}Bi L x ray

energy (keV)		Intensities experimental (1990Sc08)	deduced by evaluator#(2003Br13)
9.42	L$_1$ x ray	0.55 3	0.48 5
10.80	L$_\alpha$ x ray	9.48 17	9.45 50
11.68	L$_\eta$ x ray	0.075 4	0.083 5
12.6	Lβ_4 x ray+Lβ_6 x ray	2.55 7	2.33 30
13.0	Lβ_1 x ray+Lβ_2 x ray+Lβ_{15} x ray	6.59 33	5.66 27 (Lβ_1 x ray+Lβ_2 x ray)
13.3	Lβ_3 x ray+Lβ_5 x ray	1.54 9	2.79 40
13.6	Lβ_{10} x ray	0.23 1	
15.2	Lγ_1 x ray	0.682 27	0.75 5
15.6	Lγ_2 x ray	1.38 4	0.75 12
16.2	Lγ_4 x ray	0.30 2	

using theoretical conversion coefficients for a pure M1 46.5γ.

E_γ	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α[†]	Comments
46.539 *1*	4.25 *4*	46.539	0^-	0.0	1^-	M1	17.86	α(L)=13.64 *19*; α(M)=3.21 *5*

α(N)=0.822 *12*; α(O)=0.1678 *24*; α(P)=0.0200 *3*

E_γ: high-precisionGe(Li) measurement of 1981He15, relative to 53.161 keV *2* from ^{133}Ba and 40.58347 keV *17* from ^{99}Mo (value quoted by 1980Lu11). Other values: 46.545 keV *15*,Ge(Li) (1974HeYW); 46.503 keV *15*, ce measurement with a magnetic spectrometer (1957Fr29); 46.52 keV *2*, cryst (1952Ew17). Others: 2000He14.

I_γ: weighted average of 4.26 *7* (1990Hi03) and 4.24 *5* (1990Sc08), both measurements used high-purity germanium detectors for photons, and ion chambers for α particles. Other values: 4.18 *9*, high-purity germanium detector (1983De11); 4.05 *8*, scin (1958Kr71); 3.8 *6* (1954Da23); 4.5 *4* (1957Fi06). Others: 1996Ta22, 1996Hu07, 1995Qu03, 1991Ga09, 1969Fr07, 1958To10, 1953Ba80, 1951Bu37, 1950Cr01, 1935St05.

Mult.: from conversion coefficients and sub-shell ratios. ce(L1):ce(L2):ce(L3) exp=100:10.6 *2*:0.93 *5* (1959Se59); ce(L1):ce(L2):ce(L3) exp=100:10.3 *2*:0.87 *3* (1969Ge01); ce(M1):ce(M2):ce(M3):ce(M4):ce(N1):ce(O1) exp=100:10.9:≈1:≈0.1:23:5.5 (1957Fr29); α(L)exp=15.6 *8* (1958Kr71); α(L)exp=14.3 *15*, semi (1971Ge11) using ω(L)=0.38 *2* (1957Fi06); α(L)exp=13.3 *20* (1957Fi06). Others: 1966Ve01, 1958To10, 1957Fr29, 1953Wu28, 1953Ba80, 1950Cr01.

[†] Additional information 1.
[‡] Absolute intensity per 100 decays.

^{210}Pb β^- decay   1981He15,1990Sc08,1990Hi03

Decay Scheme

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

0^+ 0.0   22.20 y *22*

Q_{β^-}=63.5 *5*   %β^-=100

$^{210}_{82}$Pb$_{128}$

$I\beta^-$	Log *ft*			
84	5.4	0^-	46.539	<3 ns
16	7.9	1^-	0.0	5.012 d *5*

46.539 M1 80.2

$^{210}_{83}$Bi$_{127}$