^{210}Po α decay 1964EiZZ,1973Go39

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	F. G. Kondev	NDS 201,346 (2025)	21-Jan-2025

Parent: ^{210}Po: E=0.0; $J^\pi=0^+$; $T_{1/2}$=138.3763 d *25*; Q(α)=5407.53 *7*; %α decay=100

^{210}Po-$T_{1/2}$: Weighted average of 138.3749 d *6*, 138.3832 d *11* and 138.3726 d *6* in 1964EiZZ [calorimetry], supersedes 138.4005 d *58* (1954Ei20). Others: 138.37 d *3* (1953Cu46) and 138.40 d *21* (2015Zh41, 700 d long measurement) [α counting].

^{210}Po-Q(α): From 2021Wa16.

1964EiZZ: Resistance-bridge type calorimeter. Three series of measurements 1954-1958 (47 observations), 1963-1964 (78 observations) and 1964 (19 observations) were carried out.

1973Go39: magnetic spectrograph at BIPM; chemically purified ^{210}Po source; absolute Eα measurement.

Others: 1933Ro03, 1934Le01, 1951Gr15, 1951St75, 1952Ba20, 1952De08, 1952Ri14, 1952Ru08, 1953Co64, 1953Cu46, 1954Br07, 1955Ha09, 1955Ro30, 1956As46, 1956Sh24, 1957Ag15, 1957Ov09, 1957Ov10, 1958Ba45, 1958Wh09, 1960Br20, 1960Fe04, 1961Be13, 1961Ry05, 1962Br22, 1963Ru04, 1964Wa19, 1973Go39, 1974Br22, 1975Fi09, 1975Ra10, 1975Ra11, 1977Sc07, 1978Ov03, 1991Ry01, 1999Oh02, 2015Zh41, 2018Sh12, 2023Av04.

^{206}Pb Levels

E(level)†	J^π†	$T_{1/2}$†
0.0	0^+	stable
803.043 *25*	2^+	8.17 ps *8*
1166.4 *3*	0^+	0.75 ns *4*

† From Adopted Levels.

α radiations

Eα	E(level)	Iα‡	HF†	Comments
4441.1 *5*	1166.4	$<6\times10^{-7}$	>5.9	Eα: From Q(α) and E(level). Iα: From non-observation of ce in 1978Ov03.
4516.58 *10*	803.043	0.001233 *21*	1.232 *21*	Eα: From Q(α) and E(level). Measured: 4525 keV *5* (1960Fe04). Iα: From Iγ(803.04γ) and α(tot). Directly measured Iα(4516.58α)/Iα(5304.33α)=1.070×10^{-5} *21* (1958Ba45) and 8.83×10^{-6} *47* (1999Oh02).
5304.33 *7*	0.0	100	1.000	Eα: From the evaluation of 1991Ry01, based on 1973Go39 results. Others: 5298 keV *6* (1933Ro03), 5298.8 keV *21* (1934Le01), 5300.6 keV *26* (1954Br07), 5304.3 keV *29* (1953Co64), 5297.8 keV *15* (1957Ag15), 5305.4 keV *10* (1958Wh09), 5308.6 keV *30* (1960Br20), 5302.5 keV *15* (1961Be13), and 5304.9 keV *6* (1961Ry05).

† $r_0(^{206}Hg)$=1.40879 *4* is calculated from HF(5304.33α)=1.0.

‡ Absolute intensity per 100 decays.

$\gamma(^{206}Pb)$

X rays are produced primarily by shake-off of electrons during the passage of α particles through the atom. The measured I(K x ray)/Iα values are 2.28×10^{-6} *20* (1999Oh02), 1.65×10^{-6} *17* (1975Ra10), 1.97×10^{-6} *13* (1975Fl09), 1.5×10^{-6} *5* (1951Gr15), 2.0×10^{-6} *4* (1952Ba20), 1.6×10^{-6} *5* (1952Ri14), 1.5×10^{-6} *3* (1957Ov10), and 2.0×10^{-6} *5* (1974Br22); For I(L x ray)/Iα see 1952Ri14, 1952Ru08, 1974Br22, 1975Fi09, 1975Ra11, and 1977Sc07. For I(M x ray)/Iα see 1963Ru04.

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^{210}Po α decay 1964EiZZ,1973Go39 (continued)

$\gamma(^{206}Pb)$ (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	α[#]	Comments
803.04 *3*	0.001220 *22*	803.043	2^+	0.0	0^+	E2	0.01032 *14*	α(K)=0.00804 *12*; α(L)=0.001745 *25*; α(M)=0.000420 *6*; α(N+..)=0.0001290 *18* α(N)=0.0001065 *15*; α(O)=2.06×10^{-5} *3*; α(P)=1.89×10^{-6} *3* I_γ: Weighted average of 0.00121 *6* (1955Ha09), 0.0012 *1* (1955Ro30), 0.00121 *8* (1956As46), 0.00122 *9* (1957Ov09), 0.00132 *8* (1957Ov09), 0.00115 *9* (2018Sh12) and 0.00122 *3* (2023Av04). Others: 0.00180 *14* (1951Gr15), 0.0016 *2* (1952Ri14), and 0.0012 *2* (1956Sh24). Indirect measurements: 0.001059 *21* and 0.000874 *47* from Iα(4516.58α) and α(tot) in 1958Ba45 and 1999Oh02, respectively. Mult.: α(K)exp=0.0081 *14* (1999Oh02).

† From adopted gammas.
‡ Absolute intensity per 100 decays.
# Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with "Frozen Orbitals" approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

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Decay Scheme

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