

¹⁹⁵Po α decay (4.64 s) 2010Co13,1993Wa04,1967Si09

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

Parent: ¹⁹⁵Po: E=0.0; J ^{π} =3/2⁽⁻⁾; T_{1/2}=4.64 s 9; Q(α)=6749.7 28; % α decay=94 4

¹⁹⁵Po-J ^{π} : From favored α decay (HF=1.72 9) to the 3/2⁽⁻⁾ g.s. of ¹⁹¹Pb.

¹⁹⁵Po-T_{1/2}: From 1993Wa04. Others: 4.5 s 5 (1967Si09), 3.9 s +32-12 (2005Uu02).

¹⁹⁵Po-% α decay: From 2010Co13, based on the assumption that the ¹⁹⁵Po ϵ decay only populates the J ^{π} =(1/2⁺) state in ¹⁹⁵Bi.

Others: 2002Va13, 2005Uu02, 1982LeZN, 1967Tr06.

2010Co13: Source produced by bombarding UCx target (50 g/cm²) with the proton pulsed beam. Nuclei produced in the spallation reaction diffused, effused to the high-temperature RILIS ion source cavity. Polonium atoms were irradiated with three different laser beams and extracted from the ion source cavity, accelerated by dc electrical fields to an energy of 50 keV and mass separated in the ISOLDE separator. In Run I, a single Si detector in Run II, two Si detectors (FWHM = 25 keV, 20 keV and 30 keV, respectively for 5500 α), an HPGe detector (FWHM=4.3 keV at E γ =1300 keV). Measured E α , I α , E γ , $\alpha\gamma$, $\gamma\alpha$, $\gamma\gamma$ coin, half-life of ¹⁹⁵Po, deduced excited levels, spin-parity. Also studied ¹⁹¹Bi ϵ decay.

1993Wa04: Source was produced <240-MeV Ne on ¹⁸²W reaction. The mass-separated beam was implanted in aluminized mylar tape. Silicon surface-barrier detectors and silicon PIPS-type (Passivated Implanted Planar Silicon) detectors with energy resolution between 11-20 keV for the 5486 α of ²⁴¹Am. Measured E α , I α , half-life of ¹⁹⁵Po.

1967Si09: Source was produced from the ¹⁸⁵Re(¹⁹F,X) reaction. Measured E α , ¹⁹⁵Po half-life.

¹⁹¹Pb Levels

E(level) [†]	J ^{π}	T _{1/2}	Comments
0.0	3/2 ⁽⁻⁾	1.33 min 8	J ^{π} ,T _{1/2} : From Adopted Levels.
214.7 5	(5/2 ⁻)		J ^{π} : 5/2 ⁻ or 7/2 ⁻ , from population in the ¹⁹⁵ Po α Decay (4.64 s) J ^{π} =3/2 ⁽⁻⁾ and ¹⁹¹ Bi ϵ Decay (12.4 s) J ^{π} =(9/2 ⁻), along with the HF of α decay. Based on the systematics of the low-excitation energy levels in the neighboring odd-A Pb isotopes, J ^{π} =5/2 ⁻ is proposed by authors of 2010Co13.
597.3 5	3/2 ⁽⁻⁾		J ^{π} : Based on E0 component of 597.2 γ to 3/2 ⁽⁻⁾ .
641.7 11	(3/2 ⁻)		J ^{π} : Proposed by authors of 2010Co13 based on the hindrance factor of 5985 α from the 3/2 ⁽⁻⁾ state of ¹⁹⁵ Po.

[†] From E γ .

α radiations

E α	E(level)	I α [‡] #	HF [†]	Comments
5985 10	641.7	0.036 3	12.2 12	E α : From 2010Co13.
6027 5	597.3	0.34 3	2.02 21	E α : From 2010Co13. Other: 6030 keV 20 (2002Va13). I α : Other: >0.17 (2002Va13).
6399 10	214.7	0.054 12	4.8 \times 10 ² 11	E α : From 2010Co13.
6611 4	0.0	99.56 2	1.72 9	E α : Weighted average of 6606 keV 5 (1993Wa04) and 6606 keV 10 (2002Va13), 6617 keV 6 (2005Uu02), 6624 keV 8 (1967Si09), and 6608 keV 5 (1967Tr06). Other: 6610 keV (1982LeZN - Fig. 1). I α : Other: 99.8 35 (2002Va13).

[†] Using r₀(¹⁹¹Pb)=1.512 3, obtained from the r₀ of neighboring even-even isotopes, r₀(¹⁹⁰Pb)=1.5113 39 and r₀(¹⁹²Pb)=1.5126 28 (2020Si16).

[‡] From 2010Co13.

For absolute intensity per 100 decays, multiply by 0.94 4.

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γ(¹⁹¹Pb)

<u>E_γ[†]</u>	<u>I_γ[†]</u>	<u>E_i(level)</u>	<u>J_i^π</u>	<u>E_f</u>	<u>J_f^π</u>	<u>Mult.</u>	<u>α[‡]</u>	<u>Comments</u>
214.8 5		214.7	(5/2 ⁻)	0.0	3/2 ⁽⁻⁾			
383 1	9 2	597.3	3/2 ⁽⁻⁾	214.7	(5/2 ⁻)			
427 1	7 2	641.7	(3/2 ⁻)	214.7	(5/2 ⁻)			
597.2 5	100	597.3	3/2 ⁽⁻⁾	0.0	3/2 ⁽⁻⁾	E0+M1+E2	0.6 3	E _γ : Other: 597 1 (2002Va13). Placement from coincidences with the 6030α transition (2002Va13). Mult.: From measured total conversion coefficient (2002Va13). Theoretical values are: α(M1)=0.0676 10, α(E1)=0.0067 1, α(E2)=0.0194 3. The difference from the experimental value is attributed to the large E0 component (2010Co13). α: Measured value reported in 2010Co13.

[†] From 2010Co13.

[‡] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multiplicities, and mixing ratios, unless otherwise specified.

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