

Adopted Levels, Gammas

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia		NDS 143, 1 (2017)	31-Mar-2017

$Q(\beta^-) = -8258.26$; $S(n) = 8326.18$; $S(p) = 2080.30$; $Q(\alpha) = 7094.4$ [2017Wa10](#)

[2013Se03](#), [2014Se07](#): beam of ¹⁹³Po produced at the CERN ISOLDE facility by impinging 1.4 GeV protons on a 50 g/cm² thick, UC_x target. Reaction products diffused out and transferred to the RILIS. Deduced nuclear charge radius from the measured isotope shifts; magnetic dipole and electric quadrupole moments from measured hyperfine structure. Systematic uncertainties in $\delta\langle r^2 \rangle$ arising from electronic factor and mass-shift calculations are not included. Their magnitude is similar to the quoted experimental uncertainty.

[2015AnZZ](#): Measured ¹⁹³Po production cross section, 5 μ I, from ⁵⁶Fe+¹⁴¹Pr fusion-evaporation reaction at E=50 MeV.

¹⁹³Po Levels

Identification: ¹⁸⁵Re(¹⁹F,xn) excitation functions ([1967Si09](#)); ¹⁸²W(²⁰Ne,xn) excitation functions ([1977De32](#)); ^{nat}Ce(⁵⁶Fe,xn) and ¹⁴¹Pr(⁵⁶Fe,p3n) excitation function ([1981Le23](#)).

The level scheme is from [1999He32](#).

Cross Reference (XREF) Flags

- A** ¹⁹⁷Rn α decay (55 ms)
- B** ¹⁹⁷Rn α decay (24 ms)
- C** ¹⁶⁰Dy(³⁶Ar,3n γ)

E(level) [†]	J ^π [‡]	T _{1/2}	XREF	Comments
0.0	(3/2 ⁻) [#]	399 ms 34	A	$\% \alpha \leq 100$ $\mu = -0.389.37$ (2014Se07) $Q = -1.31.30$ (2014Se07) $\delta\nu(^{193}\text{Po}, ^{196}\text{Po}) = -0.59 \text{ GHz } 15$; $\delta\langle r^2 \rangle(^{193}\text{Po}, ^{210}\text{Po}) = -0.576 \text{ fm}^2 13$ (2013Se03). The uncertainties are statistical only. $\langle \beta_2^2 \rangle^{1/2} = 0.21$ (2013Se03 , 2014Se07). μ, Q : hyperfine structure studies using in-source resonance ionization spectroscopy at CERN-ISOLDE facility (2014Se07). Total (statistical and systematic) uncertainties are given. $\% \alpha$: Only α decay observed. T _{1/2} : weighted average of 450 ms 150 (1977De32), 360 ms 50 (1981Le23), 450 ms 40 (1993Wa04), 180 ms +150-60 (1995Mo14), 290 ms +110-60 (1996En02).
100 @ 6	(13/2 ⁺) [#]	245 ms 11	BC	$\% \alpha \leq 100$ $\mu = -0.742.65$ (2014Se07) $Q = +1.08.50$ (2014Se07) Additional information 1. $\delta\nu(^{193}\text{Po}, ^{196}\text{Po}) = -1.11 \text{ GHz } 15$; $\delta\langle r^2 \rangle(^{193}\text{Po}, ^{210}\text{Po}) = -0.532 \text{ fm}^2 13$ (2013Se03). The uncertainties are statistical only. $\langle \beta_2^2 \rangle^{1/2} = 0.22$ (2013Se03 , 2014Se07). E(level): From NUBASE2016 – (2017Au03). Other: 95 keV 7 in 2013Sa43 . J ^π : spin consistent with optical hyperfine spectrum shown in Fig. 6 of 2014Se07 . μ, Q : hyperfine structure studies using in-source resonance ionization spectroscopy at CERN-ISOLDE facility (2014Se07). Total (statistical and systematic) uncertainties are given. $\% \alpha$: Only α decay observed. T _{1/2} : weighted average of 420 ms 100 (1977De32), 260 ms 20 (1981Le23), 240

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) ^{193}Po Levels (continued)

<u>E(level)[†]</u>	<u>J^π[‡]</u>	<u>XREF</u>	<u>Comments</u>
ms 10 (1993Wa04), 150 ms +110–40 (1995Mo14), 370 ms +160–90 (1996En02). Other: 70 ms +330–30 (2005Uu02).			
351.4@ 5	(17/2 ⁺)	C	
375.0& 5	(15/2 ⁺)	C	
712.3@ 7	(21/2 ⁺)	C	
744.3& 8	(19/2 ⁺)	C	
1176.0@ 9	(25/2 ⁺)	C	
1229.7& 10	(23/2 ⁺)	C	

[†] Level energies from a least-squares fit to adopted γ -ray energies, keeping energy of (13/2⁺) level fixed at 100 keV.

[‡] From $^{160}\text{Dy}(^{36}\text{Ar},2\text{n}\gamma)$ unless otherwise noted. The assignments are based on band structures.

From systematics and from shell model two isomers are expected in a N=109 nucleus: high spin 1i_{13/2}, and low spin 3p_{3/2} (^{189}Hg).

@ Band(A): Band based on (13/2⁺).

& Band(B): Band based on (15/2⁺).

 $\gamma(^{193}\text{Po})$

<u>E_i(level)</u>	<u>J^π_i</u>	<u>E_γ[†]</u>	<u>I_γ[†]</u>	<u>E_f</u>	<u>J^π_f</u>
351.4	(17/2 ⁺)	251.4 5	100	100	(13/2 ⁺)
375.0	(15/2 ⁺)	274.9 [‡] 5	100	100	(13/2 ⁺)
712.3	(21/2 ⁺)	360.9 5	100	351.4	(17/2 ⁺)
744.3	(19/2 ⁺)	369 [‡] 1	100 28	375.0	(15/2 ⁺)
		393 [‡] 1	83 22	351.4	(17/2 ⁺)
1176.0	(25/2 ⁺)	463.7 5	100	712.3	(21/2 ⁺)
1229.7	(23/2 ⁺)	485 [‡] 1		744.3	(19/2 ⁺)
		518 [‡] 1		712.3	(21/2 ⁺)

[†] From [1999He32](#).

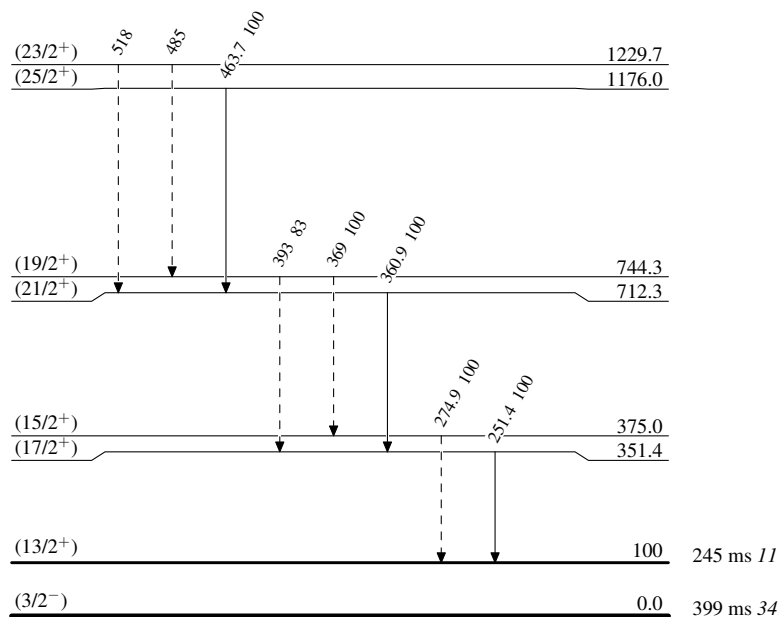
[‡] Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

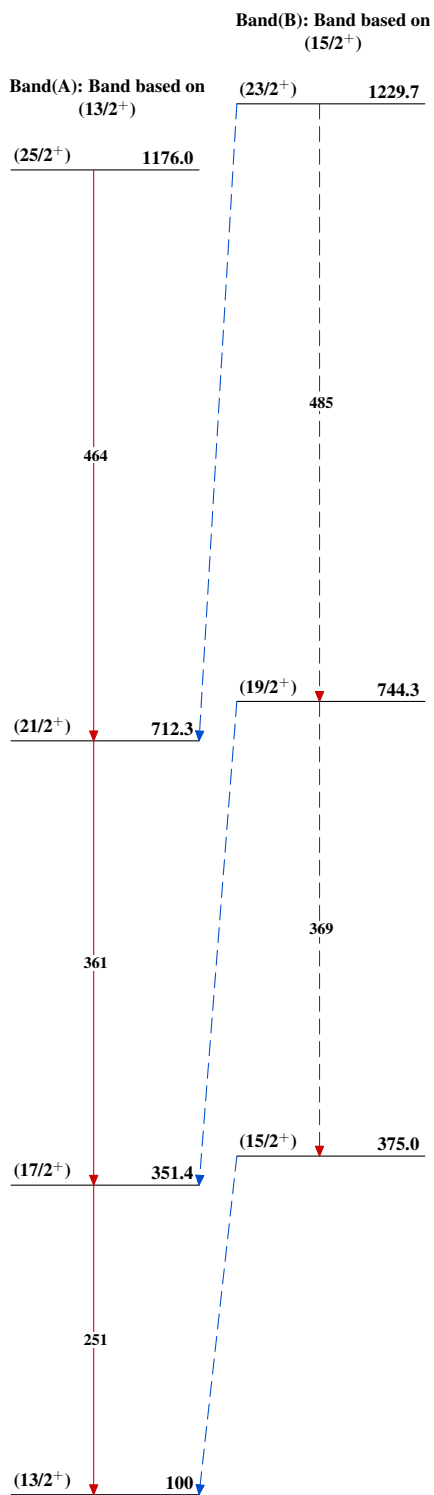
Legend

Level Scheme

Intensities: Relative photon branching from each level

 -----► γ Decay (Uncertain)

 $^{193}_{84}\text{Po}_{109}$

Adopted Levels, Gammas


 $^{193}_{84}\text{Po}_{109}$