

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation		NDS 114, 2023 (2013)	23-Sep-2013

$Q(\beta^-)=715.7$; $S(n)=4141.8$ 27; $S(p)=6629$ 11; $Q(\alpha)=7526.3$ 8 [2012Wa38](#)
 $S(2n)=10030$ 4, $S(2p)=11916$ 7 ([2012Wa38](#)).

^{215}Po evaluated by J.K. Tuli, B. Singh, Sudeb Bhattacharya, S. Dasgupta, J.Y. Lee.

 ^{215}Po LevelsCross Reference (XREF) Flags

- A ^{215}Bi β^- decay (7.6 min)
 B ^{215}Bi β^- decay (36.9 s)
 C ^{219}Rn α decay (3.96 s)

E(level) [†]	J ^π	T _{1/2}	XREF	Comments
0.0 [‡]	9/2 ⁺	1.781 ms 5	ABC	$\% \alpha = 99.99977$ 2; $\% \beta^- = 2.3 \times 10^{-4}$ 2 (1950Av61) RMS charge radius $\langle r^2 \rangle^{1/2} = 5.627$ fm 20; deduced from interpolation of evaluated rms charge radii of ^{208}Po to ^{216}Po (2013An02), with slope $k_x = 0.37$ in formula 9 of 2004An14 . T _{1/2} : weighted average of 1.778 ms 5 (1961Vo06), and 1.784 ms 6 (1971Er02). Other value: 1.83 ms 4 (1942Wa04). J ^π : favored α decay (HF=1.4) to ^{211}Pb (J ^π =9/2 ⁺). $\% \beta^-$: from observation of ≈ 8 MeV α from ^{215}At decay (1950Av61). Other values: $\approx 5 \times 10^{-4}$ (1944Ka01 , 1944Ka02); $\approx 4 \times 10^{-4}$ (1955Ad09).
271.228 [‡] 10	7/2 ⁺	195 ps 15	A C	T _{1/2} : (α)(ce)(t) coin (1974Bo11). Other value: < 250 ps (1969Be67). J ^π : 271.2 γ M1+E2 to 9/2 ⁺ ; 130.6 γ M1+E2 from 5/2 ⁺ .
293.56 [#] 4	(11/2) ⁺		ABC	J ^π : 293 γ M1 to 9/2 ⁺ .
401.812 [‡] 10	5/2 ⁺	66 ps 7	A C	J ^π : favored α decay (HF=3.4) from ^{219}Rn (J ^π =5/2 ⁺); 401.8 γ E2 to 9/2 ⁺ . T _{1/2} : from T _{1/2} (402 level)/T _{1/2} (271 level)=0.336 23 (Doppler shift measurement in ^{219}Rn α decay) and using T _{1/2} (271 level)=195 ps 15 (1974Bo11).
517.63 [#] 6	7/2 ⁺ , 9/2 ⁺		A C	J ^π : 517.6 γ M1(+E2) to 9/2 ⁺ ; 224.0 γ to (11/2) ⁺ . J ^π =7/2 ⁺ member of possible configuration= $\pi h_{9/2}^2 \otimes \nu g_{9/2}^4 \otimes \nu i_{11/2}$.
608.30 [‡] 20	(11/2 ⁺ , 13/2 ⁺)		A C	J ^π : 608.3 γ to 9/2 ⁺ ; no gamma rays to 7/2 ⁺ or 5/2 ⁺ . Possible J ^π =13/2 ⁺ member of configuration= $\pi h_{9/2}^2 \otimes \nu g_{9/2}^5$.
676.64 7			A C	
708.1 5			C	
712.66 [?] & 21	(15/2 ⁺) [@]		B	
732.7 4			C	
835.32 22			A C	
877.2 6			C	
891.1 3			C	
930.1 11			C	
1021.07 [?] & 23	(19/2 ⁺) [@]		B	
1073.7 4	(5/2 ⁺)		C	J ^π : large α hindrance factor (HF=31 from 5/2 ⁺ ^{219}Rn parent). Level belongs to possible ground state configuration= $\pi h_{9/2}^2 \otimes \nu g_{9/2}^5$.
1077.6 15			A	
1094.2 10			C	
1176.2 20			A	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) ^{215}Po Levels (continued)

E(level) [†]	J ^π	XREF	Comments
1247.37?& 25	(23/2 ⁺)@	B	
1294.53 11		A	
1398.8 3		A	
1503.3?& 5	(23/2 ⁻)@	B	
1682.1?& 6	(25/2 ⁻)@	B	
2001.3?& 5	(-)	B	J ^π : log ft=5.2 from (25:29/2) ⁽⁻⁾ parent.
2159.5 6	(-)	B	J ^π : log ft=5.4 from (25:29/2) ⁽⁻⁾ parent.

[†] From least-squares fit to E γ data.

[‡] Configuration= $\pi h_{9/2}^2 \otimes \nu g_{9/2}^5$.

Configuration= $\pi h_{9/2}^2 \otimes \nu g_{9/2}^4 \otimes \nu i_{11/2}$.

@ From 2003Ku26 based on assumed ordering of the cascade in ^{215}Po (36.9 s) β^- decay.

& The orderings of the 158-319-179 and 498-256-226-308-419 γ cascades are not established, the ones given here is just one of the possibilities, thus the positions of the intermediate levels may be different.

Adopted Levels, Gammas (continued)

$\gamma(^{215}\text{Po})$									
$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [‡]	$\delta^\ddagger$	$\alpha^\&$	Comments
271.228	7/2 ⁺	271.23 1	100	0.0	9/2 ⁺	M1+E2	3.6 +7-5	0.207 12	B(M1)(W.u.)=0.00032 7; B(E2)(W.u.)=20.0 16
293.56	(11/2) ⁺	293.56 4	100	0.0	9/2 ⁺	M1		0.536	
401.812	5/2 ⁺	130.60 3	2 1	271.228	7/2 ⁺	M1+E2	0.62 +5-4	4.40 11	B(M1)(W.u.)=0.0018 10; B(E2)(W.u.)=15 8
		401.81 1	100 3	0.0	9/2 ⁺	E2		0.0555	B(E2)(W.u.)=9.2 12
517.63	7/2 ⁺ ,9/2 ⁺	224.0 ^a 7	3.2 5	293.56	(11/2) ⁺				
		517.63 6	100 5	0.0	9/2 ⁺	M1(+E2)		0.1162	α : for M1.
608.30	(11/2 ⁺ ,13/2 ⁺)	608.3 2	100	0.0	9/2 ⁺				
676.64		383.1 6	2.5 4	293.56	(11/2) ⁺				I_γ : 33 implied in β^- decay is in severe disagreement.
		405.4 6	1.4 3	271.228	7/2 ⁺				
		676.64 7	100 13	0.0	9/2 ⁺				
708.1		436.9 6	93 7	271.228	7/2 ⁺				
		708.1 8	100 30	0.0	9/2 ⁺				
712.66?	(15/2 ⁺)	419.1 [#] 2	100	293.56	(11/2) ⁺	(E2) [#]		0.0497	
732.7		330.8 4	100 11	401.812	5/2 ⁺				
		461.6 8	17 3	271.228	7/2 ⁺				
		732.8 10	7 4	0.0	9/2 ⁺				
835.32		542.7 [@] 25	30 [@] 10	293.56	(11/2) ⁺				γ not reported in ^{219}Rn α decay.
		564.1 3	90 10	271.228	7/2 ⁺				
		835.3 3	100 10	0.0	9/2 ⁺				
877.2		877.2 6	100	0.0	9/2 ⁺				
891.1		373.5 6	33 4	517.63	7/2 ⁺ ,9/2 ⁺				
		489.3 5	83 11	401.812	5/2 ⁺				
		619.9 6	43 14	271.228	7/2 ⁺				
		891.1 4	100 29	0.0	9/2 ⁺				
930.1		321.8 10	100	608.30	(11/2 ⁺ ,13/2 ⁺)				
1021.07?	(19/2 ⁺)	308.4 [#] 1	100	712.66?	(15/2 ⁺)	(E2) [#]		0.1161	
1073.7	(5/2 ⁺)	556.1 10	17 10	517.63	7/2 ⁺ ,9/2 ⁺				
		671.9 6	67 34	401.812	5/2 ⁺				
		802.5 6	100 33	271.228	7/2 ⁺				
		1073.7 6	100 33	0.0	9/2 ⁺				
1077.6		784 [@] 2	83 [@] 17	293.56	(11/2) ⁺				
		806.5 [@] 22	100 [@] 17	271.228	7/2 ⁺				
1094.2		576.6 10	100	517.63	7/2 ⁺ ,9/2 ⁺				
1176.2		905 [@] 2	100 [@]	271.228	7/2 ⁺				
1247.37?	(23/2 ⁺)	226.3 [#] 1	100	1021.07?	(19/2 ⁺)	(E2) [#]		0.308	
1294.53		776.9 [@] 1	100 [@] 17	517.63	7/2 ⁺ ,9/2 ⁺				
		1023.1 [@] 12	75 [@] 8	271.228	7/2 ⁺				
		1294.5 [@] 3	75 [@] 8	0.0	9/2 ⁺				
1398.8		1104.5 [@] 5	100 [@] 5	293.56	(11/2) ⁺				

Adopted Levels, Gammas (continued)

$\gamma(^{215}\text{Po})$ (continued)

<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>	<u>Mult.[‡]</u>	<u>α^{&}</u>
1398.8		1127.7@ 7	32@ 5	271.228	7/2 ⁺		
		1399.2@ 4	55@ 5	0.0	9/2 ⁺		
1503.3?	(23/2 ⁻)	255.9# 4	100	1247.37?	(23/2 ⁺)	(E1)#	0.0454
1682.1?	(25/2 ⁻)	178.7# 4	100	1503.3?	(23/2 ⁻)	[M1]#	2.13 4
2001.3?	(⁻)	319.1# 3	26 3	1682.1?	(25/2 ⁻)	[M1]#	0.427
		498.0# 1	100 6	1503.3?	(23/2 ⁻)	[E2]#	0.0324
2159.5	(⁻)	158.2# 2	100	2001.3?	(⁻)	[E2]#	1.115

[†] From ²¹⁹Rn α decay, unless otherwise stated.

[‡] From ce data in ²¹⁹Rn α decay, unless otherwise stated.

From ²¹⁵Bi β^- decay (36.9 s) decay; but ordering of the 158-319-179 and 256-226-308-419 cascades is not established. The ordering given here is just one of the possibilities.

@ From ²¹⁵Bi β^- decay (7.6 min).

& 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.

^a 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)

