

Adopted Levels, Gammas

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh, M. S. Basunia, Murray Martin et al. ,		NDS 160, 405 (2019)	30-Oct-2019

$Q(\beta^-)=259\ 12$; $S(n)=5598\ 7$; $S(p)=7662\ 18$; $Q(\alpha)=6114.75\ 9$ [2017Wa10](#)
 $S(2n)=9568.2\ 20$; $S(2p)=13700\ 200$ (syst) ([2017Wa10](#)).

Additional information 1.

Nuclide assignment: ^{218}Po activity of 3 min first identified from decay of Ra by E. Rutherford and H.T. Barnes, Phil. Mag. 7, 202 (1904). See [2013Fr04](#) for a brief description of discovery of this isotope.

Theory references: consult NSR database (www.nndc.bnl.gov/nsr/) for 56 primary references for calculations of half-lives of radioactive decay modes, and 10 for nuclear structure.

 ^{218}Po LevelsCross Reference (XREF) Flags

- A** ^{218}Bi β^- decay (33 s)
B ^{222}Rn α decay (3.8222 d)

E(level) [†]	J^π [‡]	$T_{1/2}$	XREF	Comments
0.0	0^+	3.097 min 12	AB	$\% \alpha = 99.980\ 2$; $\% \beta^- = 0.020\ 2$ Evaluated rms charge radius = 5.6558 fm 173 (2013An02). Evaluated charge radius relative to ^{208}Po : $\delta\langle r^2 \rangle(^{218}\text{Po}, ^{208}\text{Po}) = +1.092\ \text{fm}^2\ 15$ (2013An02). $\% \beta^-$: unweighted average from 1958Wa16 ($\% \beta^- = 0.0185$) and 1952Hi60 ($\% \beta^- = 0.022\ 3$). Earlier measurements: 1943Ka04 , 1944Ka01 , 1949Wa05 . $\% \beta^-$ was deduced from intensity of ^{218}At α group observed to grow into fresh ^{218}Po sample. $T_{1/2}$: from α decay; weighted average of 1982Va09 (3.11 min 2) and 1986Po17 (3.093 min 12). Other: 3.05 min (1931Cu01 evaluation). RMS nuclear charge radius relative to that of ^{210}Po : $\delta\langle r^2 \rangle(^{218}\text{Po}, ^{210}\text{Po}) = +0.958\ \text{fm}^2\ 10(\text{stat})\ 7(\text{syst})$ (2011Co01 , 2012Co24). RMS nuclear charge radius relative to that of ^{210}Po : $\delta\langle r^2 \rangle(^{218}\text{Po}, ^{210}\text{Po}) = +0.948\ \text{fm}^2\ 10(\text{stat})\ 7(\text{syst})$ (2015Fi07).
509.70 10	2^+		AB	J^π : γ to g.s.; α decay from 0^+ ^{222}Rn ; $\alpha\gamma(\theta)$ measurement of 1989Po03 rules out $J=1,3$.
676? 4			B	E(level): from Ea of a weak α branch in ^{222}Rn α decay.
935.20 15	(4^+)		A	
1320.90 18	(6^+)		A	
1583.90 20	(8^+)		A	
1757.9 3			A	
1858.70 20			A	
1871.0 3			A	
2002.2 6			A	
2047.5 6			A	
2286.8 4			A	

[†] From a least-squares fit to E_γ data, by evaluators except where noted.

[‡] From systematics of even-even nuclides in this mass region, unless otherwise stated.

Adopted Levels, Gammas (continued)

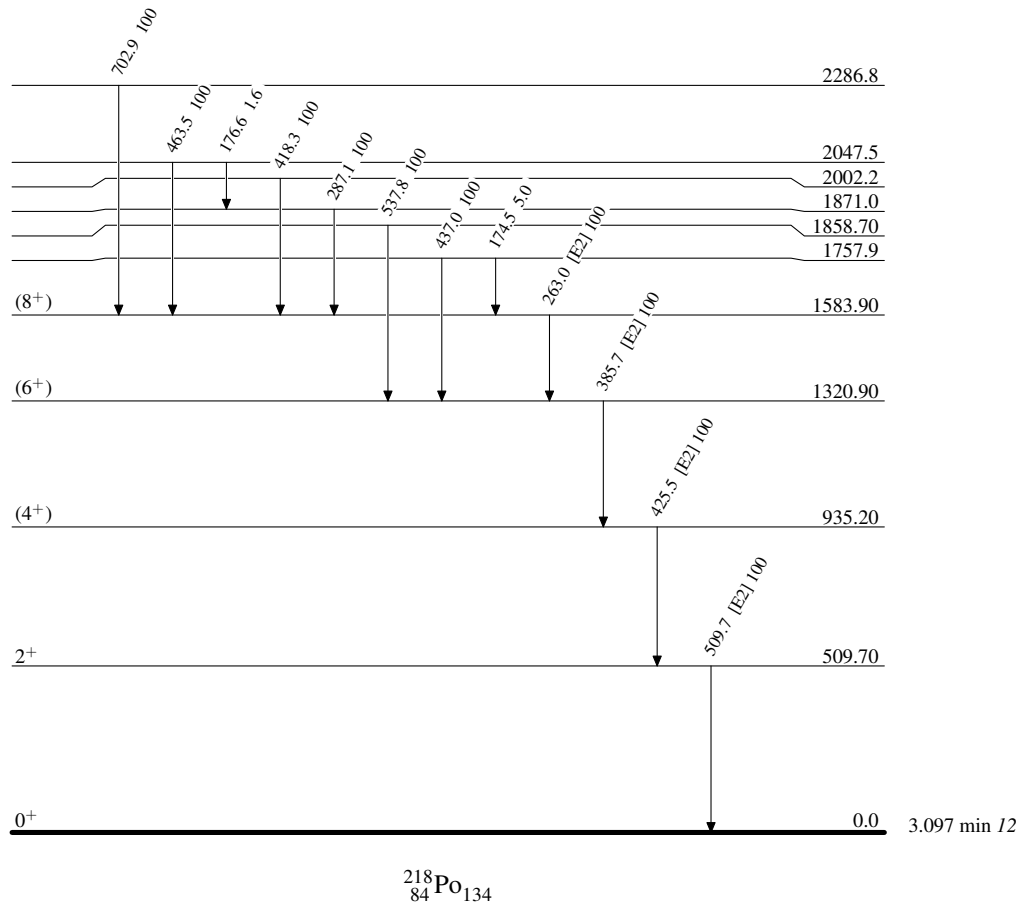
$\gamma(^{218}\text{Po})$							
$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\dagger	E_f	J_f^π	Mult.	α^\ddagger
509.70	2 ⁺	509.7 1	100	0.0	0 ⁺	[E2]	0.0307
935.20	(4 ⁺)	425.5 1	100	509.70	2 ⁺	[E2]	0.0478
1320.90	(6 ⁺)	385.7 1	100	935.20	(4 ⁺)	[E2]	0.0619
1583.90	(8 ⁺)	263.0 1	100	1320.90	(6 ⁺)	[E2]	0.189
1757.9		174.5 9	5.0 25	1583.90	(8 ⁺)		
		437.0 2	100 50	1320.90	(6 ⁺)		
1858.70		537.8 1	100	1320.90	(6 ⁺)		
1871.0		287.1 2	100	1583.90	(8 ⁺)		
2002.2		418.3 5	100	1583.90	(8 ⁺)		
2047.5		176.6 9	1.6 16	1871.0			
		463.5 6	100 33	1583.90	(8 ⁺)		
2286.8		702.9 3	100	1583.90	(8 ⁺)		

[†] From ^{218}Bi β^- decay.

[‡] 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.

Adopted Levels, GammasLevel Scheme

Intensities: Relative photon branching from each level

 $^{218}_{84}\text{Po}_{134}$