^{210}At α decay (8.1 h) 1981Va29,1975Ja09,1969Go23

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	F. G. Kondev	NDS 109, 1527 (2008)	31-Jan-2008

Parent: ^{210}At: E=0.0; $J^{\pi}=(5)^+$; $T_{1/2}$=8.1 h *4*; Q(α)=5631.2 *10*; %α decay=0.175 *20*

1981Va29,1969Go23: Sources produced by spallation of Th target by 660-MeV protons, followed by chemical separation; detectors: α-particle spectrograph; measured: Eα, Iα.

1975Ja09: Source produced via the ^{209}Bi(α,3n) reaction with Eα=39 MeV followed by chemical separation; detectors: 6 mm diameter Au-Si surface barrier detector (FWHM=16 keV at 5.3 me);Ge(Li) detector; measured: α-γ coin., α singles, Eα, Iα, Eγ, Iγ.

^{206}Bi Levels

E(level)[†]	J^{π}[‡]	$T_{1/2}$[‡]	Comments
0.0	6^+	6.243 d *3*	
59.908 *18*	4^+	7.7 μs *2*	
70.75 *3*	$(3)^+$		
82.802 *22*	$(5)^+$		
140.0 *10*	7^+		
166.1 *9*	5^+		
282 *4*	$(4^+,5^+)$		E(level): From Eα=5242 keV *3* and Q(α)=5631.2 keV *10*.
352.69 *3*	$(3,4)^+$		

[†] From a least-squares fit to Eγ.
[‡] From Adopted Levels.

α radiations

%α is from Iα(^{210}Po)/Iα(^{210}At) in 1969Go23.

Eα[†]	E(level)	Iα[‡@]	HF[#]	Comments
5131[&] *2*				Eα: unobserved in 1981Va29 and 1975Ja09.
5175 *4*	352.69	0.21 *6*	67 *21*	Eα: From 1981Va29.
5242 *3*	282	0.9 *1*	39 *7*	Eα: From 1981Va29.
5361.1 *10*	166.1	27.8 *20*	5.2 *8*	
5386 *1*	140.0	4.6 *3*	43 *7*	
5442.0 *15*	82.802	28.4 *15*	13.9 *20*	
5456 *2*	70.75	0.40 *6*	1.14×10^3 *23*	Eα: From 1981Va29.
5465.5 *15*	59.908	7.2 *3*	72 *10*	
5524.0 *15*	0.0	30.5 *9*	34 *5*	

[†] From 1969Go23, unless otherwise specified.
[‡] From 1981Va29.
[#] r_0=1.432 *10*, unweighted averages of 1.4571 *33* (^{210}Rn), 1.4343 *34* (^{212}Rn), 1.4296 *8* (^{208}Po) and 1.40882 *10* (^{210}Po) from 1998Ak04.
[@] For absolute intensity per 100 decays, multiply by 0.00175 *20*.
[&] Existence of this branch is questionable.

^{210}At α decay (8.1 h) 1981Va29,1975Ja09,1969Go23 (continued)

γ(^{206}Bi)

Iγ normalization: from Ti(140γ)=Iα(5386α), using α(140γ,M1)=3.9 and %α=0.175 *20*.

E_γ [†]	I_γ [@&]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[‡]	α[a]	Comments
(10.836[#] *22*)		70.75	$(3)^+$	59.908	4^+	M1(+E2)	<0.003	319	α(M)=242 *4*; α(N+..)=76.2 *12* α(N)=62.1 *10*; α(O)=12.67 *20*; α(P)=1.506 *23*
(59.908[#] *18*)		59.908	4^+	0.0	6^+	E2		72.4	α(L)=53.8 *8*; α(M)=14.25 *20*; α(N+..)=4.33 *6* α(N)=3.62 *5*; α(O)=0.663 *10*; α(P)=0.0500 *7*
82.802[‡] *22*	766	82.802	$(5)^+$	0.0	6^+	M1(+E2)	<0.041	3.32	α(L)=2.53 *4*; α(M)=0.597 *9*; α(N+..)=0.188 *3* α(N)=0.1527 *22*; α(O)=0.0312 *5*; α(P)=0.00370 *6*
106 *1*	272 *54*	166.1	5^+	59.908	4^+	(M1)		8.6 *3*	α(K)=7.01 *22*; α(L)=1.24 *4*; α(M)=0.291 *9*; α(N+..)=0.091 *3* α(N)=0.0744 *24*; α(O)=0.0152 *5*; α(P)=0.00181 *6* Mult.: consistent with Iα(5361α)=Ti(106γ+167γ) from intensity balance measured in αγ coincidence (1975Ja09).
140 *1*	100	140.0	7^+	0.0	6^+	M1		3.90 *10*	α(K)=3.17 *8*; α(L)=0.556 *14*; α(M)=0.131 *4*; α(N+..)=0.0411 *11* α(N)=0.0334 *9*; α(O)=0.00683 *17*; α(P)=0.000813 *21*
167 *2*	174 *35*	166.1	5^+	0.0	6^+	(M1)		2.37 *9*	α(K)=1.93 *8*; α(L)=0.336 *13*; α(M)=0.079 *3*; α(N+..)=0.0249 *10* α(N)=0.0202 *8*; α(O)=0.00413 *16*; α(P)=0.000492 *19*
(281.923[#] *23*)		352.69	$(3,4)^+$	70.75	$(3)^+$	M1(+E2)	<0.161	0.545 *10*	α(K)=0.444 *8*; α(L)=0.0773 *12*; α(M)=0.0182 *3*; α(N+..)=0.00571 *9* α(N)=0.00465 *7*; α(O)=0.000949 *14*; α(P)=0.0001127 *18*
(292.80[#] *3*)		352.69	$(3,4)^+$	59.908	4^+	M1		0.496	α(K)=0.404 *6*; α(L)=0.0699 *10*; α(M)=0.01642 *23*; α(N+..)=0.00516 *8* α(N)=0.00420 *6*; α(O)=0.000858 *12*; α(P)=0.0001022 *15*

[†] From αγ coincidence (1975Ja09), unless otherwise specified.
[‡] From adopted gammas.
[#] Unobserved in ^{210}At α-decay, but inferred from adopted gammas.
[@] Relative to Iγ(140γ)=100 in 1975Ja09.
[&] For absolute intensity per 100 decays, multiply by 1.65×10^{-5} *22*.
[a] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

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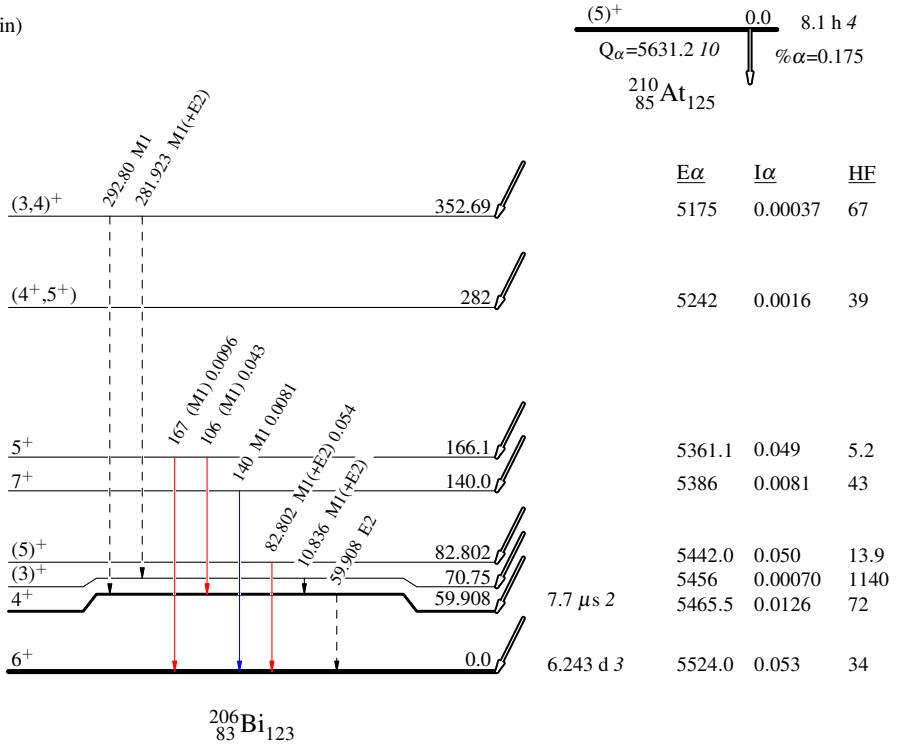
Decay Scheme

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

Legend
- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)



	Eα	Iα	HF
	5175	0.00037	67
	5242	0.0016	39
	5361.1	0.049	5.2
	5386	0.0081	43
	5442.0	0.050	13.9
	5456	0.00070	1140
	5465.5	0.0126	72
	5524.0	0.053	34