

²¹⁷At α decay 1997Ch19,1997Ch53,1967Dz02

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	M. S. Basunia	NDS 181, 475 (2022)	1-Jan-2022

Parent: ²¹⁷At: E=0.0; J ^{π} =9/2⁻; T_{1/2}=32.6 ms 3; Q(α)=7201.4 12; % α decay=99.993 3

²¹⁷At-J ^{π} ,T_{1/2}: From 2018Ko01 (A=217 evaluation).

²¹⁷At-Q(α): From 2021Wa16.

Others: 1969LeZW ($\alpha\gamma$,semi), 1964Va20 ($\alpha\gamma$,scin), 1962Wa28, 1960Vo05, 1955St04.

1997Ch19: Source: Separated ²²⁵Ac from ²²⁹Th; Detector: Si(Au) α -detector, HPGe γ -detector; Measured: E α , I α , E γ , I γ , α - γ coin.

1997Ch53: Source: Separated ²²⁵Ac from ²²⁹Th; Detector: Si(Au)- α -detector, Measured: E α .

²¹³Bi Levels

E(level) [†]	J ^{π} [‡]	T _{1/2}	Comments
0.0	9/2 ⁻	45.59 min 6	T _{1/2} : From Adopted Levels.
257.88 5	7/2 ⁻		
593.13 3	(5/2,7/2,9/2) ⁻		
758.90 10	(5/2 ⁻ ,13/2 ⁻)		
1050			E(level): From 1997Ch53.

[†] From E γ , except where otherwise noted. The 465-keV level in ²¹³Bi, reported earlier in 1967Dz02 feeding through 6609-keV α from ²¹⁷At, was not confirmed by 1997Ch53, instead the 6609 α has been assigned to ²²¹Ra (1997Ch53).

[‡] From Adopted Levels.

α radiations

E α [†]	E(level)	I α ^{‡@}	HF [#]	Comments
6037	1050	<0.002	>5.4	E α : From 1997Ch53. In 1968Le07 and 1967Dz02, the 6037 α is shown from ²²¹ Fr.
6322.0 16	758.90	0.005 1	37 8	
6484.7 16	593.13	0.021 2	40 4	E α : Others: 6483 5 (adjusted value in 1991Ry01), 6484.7 15 (1996GrZT). I α : Weighted average of 0.02 1 (1969LeZW), 0.021 2 (1997Ch19), and 0.020 3 (1996GrZT). I γ intensity balance yields 0.018 1.
6813.8 16	257.88	0.038 3	394 32	E α : Others: 6812 5 (adjusted value in 1991Ry01) and 6813.8 15 (1996GrZT). I α : Weighted average of 0.036 3 (1997Ch19), 0.040 3 (1996GrZT), and 0.06 2 (1969LeZW).
7066.9 16	0.0	99.9 1	1.19 1	E α : Others: 7066.9 15 (adjusted value in 1991Ry01), 7062 5 (1977Vy02), 7071 2 (1982Bo04), 7066.9 15 (1996GrZT), 7064 5 (1960Vo05). I α : From 1969LeZW. Others: I α =99.9 (1997Ch19), 99.9 (1996GrZT).

[†] From 1997Ch19. α 's 6849-, 6772-, 6541-, and 6422-keV reported in 1967Dz02 were not confirmed in 1997Ch19,1997Ch53, and 1969LeZW. These α 's are assumed to be due to contaminants and they are not listed here.

[‡] From 1997Ch19, except otherwise noted. In 1997Ch19, I α per 100 ²¹⁷At decays is reported, assuming the absence of γ -feeding from higher-lying unknown levels.

[#] r₀(²¹³Bi)=1.5509 7, average of r₀(²¹²Pb)=1.5412 3 and r₀(²¹⁴Po)=1.5606 7 (2020Si16).

[@] For absolute intensity per 100 decays, multiply by 0.99993 3.

^{217}At α decay 1997Ch19,1997Ch53,1967Dz02 (continued) $\gamma(^{213}\text{Bi})$

I γ normalization: from 2018Ko01 (A=217 evaluation) based on 1997Ch19.

E_γ^\dagger	I_γ^\ddagger	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult.	δ	$\alpha^\#$	Comments
^x 165.8	<0.0002								E_γ : Reported both in 1997Ch19 and 1964Va20. $\alpha(\text{K})=0.45$ 4; $\alpha(\text{L})=0.093$ 3; $\alpha(\text{M})=0.0223$ 5 $\alpha(\text{N})=0.00569$ 13; $\alpha(\text{O})=0.00114$ 3; $\alpha(\text{P})=0.000128$ 6 E_γ : Weighted average of 257.88 4 (1997Ch19), 258.5 2 (1981Di14), and 257.87 4 (1996GrZT). I_γ : Others: 0.0297 20 (1996GrZT), 0.04 1 (1969ArZV), and also 0.056 20 by scaling $I_\gamma(258.5)=0.239$ 20 (relative) (1981Di14) with $I_\gamma(218)=49$ (relative) (1981Di14) and and $I_\gamma(218)=11.38\%$ of ^{221}Fr α decay (11.57% 15 (1986He06) and 11.2% 2 (1997Ch19)). Mult.: M1+E2 from $\alpha(\text{K})_{\text{exp}}=0.45$ 4 (1997Ch19). M1 from $(\alpha)(\text{K} \times \text{ray})/(\alpha)(\gamma)$ coincidence (1969LeZW). δ : Deduced from $\alpha(\text{K})_{\text{exp}}=0.45$ 4 (1997Ch19) using BriceMixing code.
257.89 6	0.0287 7	257.88	7/2 ⁻	0.0	9/2 ⁻	M1+E2	0.59 13	0.57 5	
335.26 5	0.0062 3	593.13	(5/2,7/2,9/2) ⁻	257.88	7/2 ⁻				E_γ : Weighted average of 335.33 10 (1997Ch19) and 335.24 5 (1996GrZT). Others: 334 (1969LeZW). I_γ : Other: 0.0048 9 (1996GrZT).
^x 501.0	<0.0002								E_γ : From 1996GrZT. Others: 593.1 2 (1997Ch19), 593.1 (1981Di14). I_γ : Other: 0.0128 9 (1996GrZT), also 0.018 6 by scaling $I_\gamma(593.1)=0.0507$ 25 (relative) (1981Di14) with $I_\gamma(218)=49$ (relative) (1981Di14) and and $I_\gamma(218)=11.38\%$ of ^{221}Fr α decay (11.57% 15 (1986He06) and 11.2% 2 (1997Ch19)).
593.13 3	0.0115 5	593.13	(5/2,7/2,9/2) ⁻	0.0	9/2 ⁻				
758.9 1	0.0049 4	758.90	(5/2 ⁻ ,13/2 ⁻)	0.0	9/2 ⁻				

[†] From 1997Ch19. γ 's 140-, 375-, and 455-keV, reported in 1964Va20, are not placed in the level scheme. These γ rays were not confirmed by 1997Ch19 and 1969LeZW. Also the reported 218 γ in 1969LeZW was not confirmed by 1997Ch19 and appears to be associated with ^{217}At . Aforementioned γ could arise due to summing effect or remnant of random coincidence peaks (1997Ch19). These γ are not listed in the dataset.

[‡] From 1997Ch19, absolute photon intensity per 100 ^{217}At decays.

Continued on next page (footnotes at end of table)

^{217}At α decay **1997Ch19,1997Ch53,1967Dz02** (continued)

$\gamma(^{213}\text{Bi})$ (continued)

[Additional information 1.](#)

@ Absolute intensity per 100 decays.

^x γ ray not placed in level scheme.

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Decay Scheme

Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$

 $I_\gamma < 10\% \times I_\gamma^{max}$

 $I_\gamma > 10\% \times I_\gamma^{max}$

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