

^{221}Pa α decay (5.9 μs) [1995AnZY](#),[1989Mi17](#),[1983Hi12](#)

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	B. Singh, A. Chakraborty, S. Bhattacharya		NDS 147, 382 (2018)	1-Dec-2017

Parent: ^{221}Pa : $E=0.0$; $J^\pi=9/2^-$; $T_{1/2}=5.9 \mu\text{s}$ 17; $Q(\alpha)=9250$ 50; $\% \alpha$ decay=100.0

^{221}Pa - $J^\pi, T_{1/2}$: From ^{221}Pa Adopted Levels.

^{221}Pa - $Q(\alpha)$: From [2017Wa10](#).

^{221}Pa - $\% \alpha$ decay: $\% \alpha=100$ for ^{221}Pa decay.

[1989Mi17](#): ^{221}Pa was populated using $^{209}\text{Bi}(^{16}\text{O},4n)$ with $E(^{16}\text{O})=87-102$ MeV from SF Cyclotron at INS. The reaction products were separated from beam by gas filled recoil separator (GARIS); surface barrier detectors were used at the focal plane for particle identification. Time distribution between the arrival of the reaction products at the Si-detectors and their subsequent α -particle decays were measured. The TAC-range was 40 μs . Measured E_α and $T_{1/2}$.

[1983Hi12](#): ^{221}Pa was populated using $^{186}\text{W}(^{40}\text{Ar},4n)$ with $E(^{40}\text{Ar})=189$ MeV at UNILAC, GSI using velocity filter SHIP facility and surface barrier detector. Measured E_α and $T_{1/2}$.

 ^{217}Ac Levels

E(level)	J^π	$T_{1/2}$	Comments
0.0	$9/2^-$	69 ns 4	$J^\pi, T_{1/2}$: from Adopted Levels. E(level): it is assumed that 9075α feeds the g.s. of ^{217}Ac , although, this α could also be from an isomer.

 α radiations

E_α	E(level)	I_α^\ddagger	HF †	Comments
9075 30	0.0	100	1.1 4	E_α : from 1995AnZY . Earlier measurements: 1989Mi17 and 1983Hi12 measured the sum peak of ^{221}Pa and ^{217}Ac α 's at 18.73 MeV and 18.78 MeV, respectively. 1989Mi17 could determine the E_α value of 9.08 MeV 30 from time-sorted spectra with 3.44 μs time interval.

† Using $r_0(^{217}\text{Ac})=1.547$ 12, from interpolation of $r_0(^{216}\text{Ra})=1.566$ 9 ([1998Ak04](#)) and $r_0(^{218}\text{Th})=1.529$ 15; the latter deduced by evaluators assuming 100% α decay from ^{222}U g.s. to ^{218}Th g.s. ([2015Kh09](#)) and HF=1.

‡ Absolute intensity per 100 decays.