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## Study of the X17 anomaly with the PADME experiment

The study of Internal Pair Creation in the de-excitation of some  $^8\text{Be}$  and  $^4\text{He}$  states [1,2] spotted an anomaly in the opening angle of the outgoing  $e^+e^-$  pair. This effect seems not due to any nuclear physics effect and thus has been interpreted by some authors [3] as the creation and decay of an intermediate particle of mass approximately 17 MeV, which has been named X17. The existence of such state, if confirmed, will then represent a real breakthrough in the search of physics beyond the Standard Model.

The Positron Annihilation into Dark Matter Experiment (PADME) ongoing at the Laboratori Nazionali di Frascati of INFN, is searching for dark sector particles by studying positron annihilations on the electrons of a fixed target. The PADME physics program aims at exploring the existence of dark photons, Axion-Like-Particles (ALPs), proto-phobic X bosons, Dark Higgs [4].

Thanks to the possibility to change the positron beam energy, PADME has the unique opportunity to rule out or to confirm the existence of the X17. In fact, the new particle may be produced resonantly via the annihilation process  $e^+ e^- \rightarrow X$  and then identified via its decay via  $e^+ e^-$  [5,6].

The talk will present an overview of the PADME setup and of the dedicated data taking at  $\sim 280$  MeV beam energy performed in Autumn 2022 to produce the X17 at resonance.

### References

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