Contribution ID: **121**   Type: **Plenary talk in the main Conference**

Dark matter search via positron's interactions

Wednesday, 1 November 2023 09:30 (30 minutes)

Dark matter exploration is become a central or side topic of many experiments at particle accelerators. Even if this approach, up-to-now, has not produced evidences, it helped in setting stringent limits on the characteristics of dark matter.

In this panorama is inserted the Positron Annihilation into Dark Matter Experiment (PADME) ongoing at the Laboratori Nazionali di Frascati of INFN. PADME was conceived to search a Dark Photon signal [2] by studying the missing-mass spectrum of single photon final states resulting from positron annihilations with the electrons of a fixed target. Actually, the PADME approach allows to look for any new particle produced in e^+e^- collisions through a virtual off-shell photon such as long lived Axion-Like-Particles (ALPs), protophobic X bosons, Dark Higgs …

After the detector commissioning and the beam-line optimization, the PADME collaboration had different periods of data acquisition and and some results have been already published [3].

In the second half of 2022 a special data taking was conducted with the scope to confirm/disprove the particle nature of the X17 anomaly observed in the ATOMKI nuclear physics experiments studying de-excitation via e^+e^- emission of several light nuclei [4].

About 10^{10} positrons have been stopped on the target for each of the 47 beam energy values in the range 262 - 298 MeV. This precise energy scan was intended to study the reaction $e^+e^- \rightarrow X17 \rightarrow e^+e^-$.

The talk will give an overview of the scientific program of the experiment and of the data analyses ongoing.

[1] P. Agrawal et al., Eur. Phys. J. C 81 (2021) 11, 1015.
[2] P. Albicocco et al., JINST 17 (2022) 08, P08032.
[3] F. Bossi et al., Phys. Rev. D 107 (2023) 1, 012008.
[4] L. Darmé et al., Phys. Rev. D 106 (2022) 11, 115036.

Primary author: GIANOTTI, Paola (LNF)

Presenter: GIANOTTI, Paola (LNF)

Session Classification: Conference talks