Contribution ID: **39** Type: **not specified**

The PADME experiment at LNF

The long standing problem of reconciling the cosmological evidence of the existence of dark matter with the lack of any clear experimental observation of it, has recently revived the idea that the new particles are not directly connected with the Standard Model gauge fields, but only through mediator fields or "portals", connecting our world with new "secluded"or "hidden"sectors.
One of the simplest models just adds an additional U(1) symmetry, with its corresponding vector boson A'. All SM particles will be neutral under this symmetry, while the new field will couple to the charged particles of the SM with an effective charge ϵe.
Additional interest arises from the observation that A' in the mass range 1 MeV/c^2 to 100 MeV/c^2 and coupling $\epsilon \sim 10^{-3}$, would justify the discrepancy
between theory and observation for the muon anomalous magnetic moment, (g − 2)μ.
This possibility has been recently disproved in the hypothesis that the A' decays to SM particles only, on the contrary if A' decays to dark sector particles, almost all of the available experimental constraints can be evaded and the dark photon is still a valuable explanation for the muon (g-2) anomaly.
At the end of 2015 INFN has formally approved a new experiment, PADME, to search for invisible decays of the A' at the DAFNE Linac in Frascati. The experiment is designed to detect dark photon produced in positron on fixed target annihilation ($e^+e^- \to \gamma A'$) decaying to dark matter by measuring the final state missing mass. The collaboration aims to complete the design and construction of the experiment by the end of 2017 and to collect $\sim 10^{13}$ positron on target by the end of 2018, thus allowing to reach the $\epsilon \sim 10^{-3}$ sensitivity up to a dark photon mass of ~ 26 MeV/c^2

Summary

Primary author: FIORE, Salvatore (INFN Sezione di Roma (IT))

Co-authors: RAGGI, Mauro (LNF INFN); VALENTE, Paolo (Universita e INFN, Roma I (IT)); KOZHUHAROV, Venelin (University of Sofia (BG))

Presenter: FIORE, Salvatore (INFN Sezione di Roma (IT))