

# The Physics Program of the PADME Experiment

*Wednesday 5 February 2020 10:00 (30 minutes)*

Massive photon-like particles are predicted in many extensions of the Standard Model as possible portals toward a hidden sector where Dark Matter is secluded [1]. They are vector bosons mediating the interaction between ordinary and dark matter and can be produced in different processes through a dim mixing to the photon.

The PADME experiment searches for a signal of a Dark Photon  $A'$  in the  $e+e-\rightarrow\gamma A'$  reaction in a positron-on-target experiment. For this purpose, it is analyzed the missing mass spectrum of final states with a single photon, produced in the annihilation of the positron beam of the DAΦNE Beam-Test Facility, at Laboratori Nazionali di Frascati of INFN, on the electrons of a diamond target. In about one year of data taking, a sensitivity on the interaction strength ( $\epsilon$  parameter) down to 0.001 is achievable in the mass region  $M(A') < 23.7$  MeV.

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), proto-phobic X bosons, Dark Higgs ... In the talk, the scientific program of the experiment, and its current status will be illustrated.

## References

[1] B. Holdom, Phys. Lett B 166, 196 (1986).

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