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Dark sector studies with the PADME experiment

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The search for dark matter signals is nowadays an important asset of many particle physics experiments at accelerators.
This approach to the dark matter study, the most abundant constituent of the universe, has contributed in setting more stringent limits on the characteristics of dark matter.
The Positron Annihilation into Dark Matter Experiment (PADME) [1] searches for a signal of a dark photon A'[2] in the $e^+e^- \rightarrow A'\gamma$ 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 DA\PhiNE Beam-Test Facility, at Laboratori Nazionali di Frascati of INFN, on the electrons of a thin diamond target.
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 the first physics results will be illustrated. In particular, the detector performance evaluated studying the cross-section of the SM process $e^+e^- \rightarrow \gamma\gamma$ at $\sqrt{s}$=21 MeV will be shown.

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