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A scintillator based charged particle veto system for the PADME experiment

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The PADME experiment will search for the e+e− → γA'process in a positron-on-target experiment, assuming a decay of the A'into invisible particles of the hidden sector. The 550 MeV positron beam of the DAΦNE Beam-Test Facility, at Laboratori Nazionali di Frascati of INFN, will be used. The suppression of the background due to bremsstrahlung emission from the beam positrons requires high efficient charged particle detectors with optimized geometry. A fine-grained plastic scintillator veto composed of three stations in vacuum is foreseen. Two stations are placed inside a dipole magnet with 0.6 T magnetic field and will also provide momentum measurement at the percent level. Different prototypes for the design of the detector elements, the photo-sensor, and the front-end electronics were studied with single electron beam at the DAΦNE Beam-Test Facility to choose the optimal technologies and construction solutions. PADME is currently under construction and it is planned to take data in 2018. The design of the charged particle vetoes and the test beam performance of the prototypes will be reviewed.

Has accepted

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