

Beam Tests of an Entrance Detector for the Muon EDM Experiment

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In the Muon EDM experiment in preparation at the Paul Scherrer Institute (PSI), an entrance detector is needed to trigger the storage mechanism if a muon with the right phase space is injected. A first detector prototype consists of a very thin (100 μm) plastic scintillator to trigger the arrival of a muon, and a long rectangular channel to ensure that the muon follows the desired trajectory for storage. Both the rectangular channel, which consists of four tiles of plastic scintillators, and the thin scintillator are coupled to silicon photomultipliers. We present results of a dedicated beamtime at PSI in December 2022 to study this detector. By equipping the detector with auxiliary scintillators, we measured the efficiency of the thin scintillator and its timing properties with 28 MeV/c muons. Additionally, optical crosstalk in the rectangular channel was studied for two different channel configurations and the possible paths on which muons traverse the detector were identified.

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