

The Beam Dump eXperiment

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The Beam Dump eXperiment is an electron-beam thick-target experiment aimed to investigate the existence of Light Dark Matter particles in the MeV-GeV mass range. The experiment has been conditionally approved and is expected to run in a dedicated underground facility located about 20 m downstream of the JLab-Hall A beam-dump. The detector consists of two main components: a CsI(Tl) electromagnetic calorimeter (ECal) and a veto system used to suppress the background. The expected signature of the DM interaction in the Ecal is a \sim GeV electromagnetic shower paired with a null activity in the surrounding active veto counters. A complete small-scale prototype of the final detector has been constructed in order to validate the proposed technology and demonstrate the capability to reject the cosmogenic background. Beam-related background was estimated by means of Monte Carlo (MC) simulations. In order to benchmark our simulation tools with on site data, we recently measured, with JLab support, the muon background produced by the 10.6 GeV e -beam on the Hall-A dump at the location of the proposed BDX facility with present shielding configuration. A hodoscope made by a BDX ECal CsI(Tl) crystal sandwiched between a set of segmented plastic scintillators was used to measure the muon rate. This talk will present an overview of the BDX experiment with a particular focus on the results of the recent muon-flux measurements and the comparison with the corresponding simulations.

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