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Casting light on the Dark Sector with BDX at Jefferson Lab

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The Beam Dump eXperiment (BDX) is an electron-beam thick-target experiment aimed to investigate the existence of Light Dark Matter (LDM) particles in the MeV-GeV mass range at Jefferson Lab. The experiment has been approved by JLab PAC46 and is expected to run in a dedicated underground facility located about 20 m downstream of the Hall A beam-dump. It will make use of a 10.6 GeV e- beam collecting up to 10^{22} electrons on target. The detector consists of two main components: a CsI(Tl) electromagnetic calorimeter (Ecal) and a veto system used to reject 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. In addition to the veto system, a specific shielding configuration installed between the dump and the detector will be used to suppress the high-energy component of the beam-related background. A proof of concept measurement has recently started at JLAB in the present unshielded configuration. It is using a 2.2 GeV e- beam and is expected to run parasitically for 1 year. The compact detector used, called BDX-MINI, is made by a PbWO₄ electromagnetic calorimeter, surrounded by a layer of tungsten shielding and two hermetic plastic scintillator veto systems. It was lowered in a well, dug downstream HALL A at the location of the proposed BDX facility, and positioned 8 m underground at the beam height. This talk will present an overview of the BDX experiment and a focus on the description of the current measurement and its preliminary results. This early stage experiment represents the first dedicated new-generation beam-dump experiment whose physics reach should almost cover a parameter region measured by summing up old not-optimized experiments.