Beam Dump Experiments with Photon and Electron Beams\textsuperscript{1} ELTON SMITH, Jefferson Lab, BDX COLLABORATION — Programs are underway to search for light dark matter (DM) with masses between 1 and 1000 MeV produced by photon and electron interactions in a beam dump. We summarize various strategies being pursued. Details are given on the Beam-Dump eXperiment (BDX) at Jefferson Lab, which will use a \( \sim 1 \) m\(^3\) segmented CsI(Tl) scintillator detector placed downstream of Hall A and accumulate \( 10^{22} \) electrons-on-target (EOT) in 285 days. The dark matter signal is an electromagnetic shower of few hundreds of MeV, together with a reduced activity in the surrounding active veto counters. This experiment would be sensitive to elastic DM-electron and to inelastic DM scattering at the level of 10 counts per year, reaching the limit of the neutrino irreducible background. The proposed experiment will be sensitive to large regions of DM parameter space, exceeding the discovery potential of existing and planned experiments in the MeV-GeV DM mass range by up to two orders of magnitude.

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