

The “Beam Dump eXperiment” at Jefferson Laboratory

A. Celentano,

for the BDX collaboration

MeV-GeV dark matter (DM) is theoretically well motivated but remarkably unexplored. The “Beam Dump eXperiment” (BDX) at Jefferson Laboratory aims to search for low-mass dark matter, through the scattering on a segmented plastic scintillator detector placed downstream of the beam-dump at one of the high intensity JLab experimental Halls, receiving up to 10^{22} electrons-on-target (EOT) in a one-year period.

For these experimental conditions, BDX is sensitive to the DM-nucleon elastic scattering at the level of a thousand counts per year, and is only limited by cosmogenic backgrounds. The experiment is also sensitive to DM-electron elastic and inelastic scattering, at the level of 10 counts/year. The foreseen signal for this channel is an high-energy (> 100 MeV) electromagnetic shower, with almost no background.

The experiment, currently being designed, has been presented in form of a Letter of Intent to the laboratory, receiving positive feedback. This encouraged the preparation of a full proposal, to be submitted to the next year PAC.

In the talk, after briefly discussing the motivations for low-mass dark matter existence, I will describe the experimental setup, and show the foreseen experimental sensitivity for the two aforementioned channels, obtained through MonteCarlo simulations.