BDX-DRIFT

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- Name, location and approximate number of collaborators of the experiment

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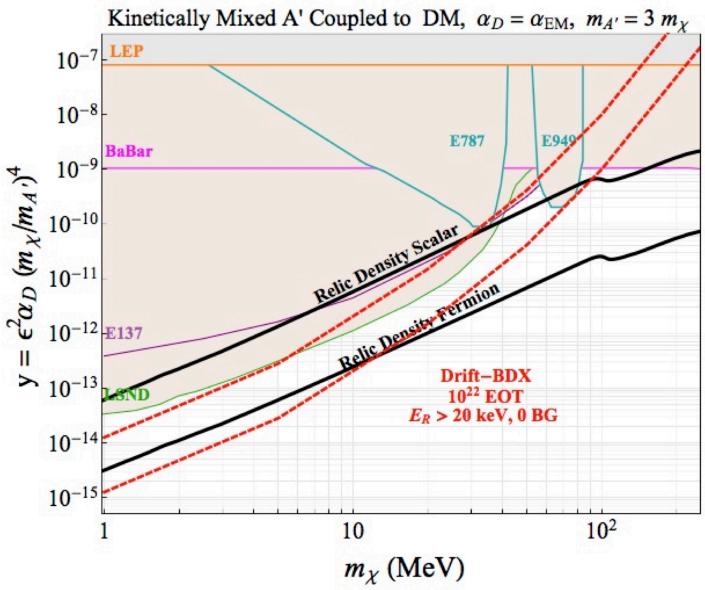
At present there are two of us working on the BDX-DRIFT idea however I have joined the Beam Dump eXperiment) BDX collaboration.

- Primary physics goals

The primary goal is an unambiguous detector of dark sector dark matter in the MeV – GeV region. However, as described below, the experiment is sensitive to any massive dark matter created in the beam dump in this mass range capable of creating nuclear recoils.

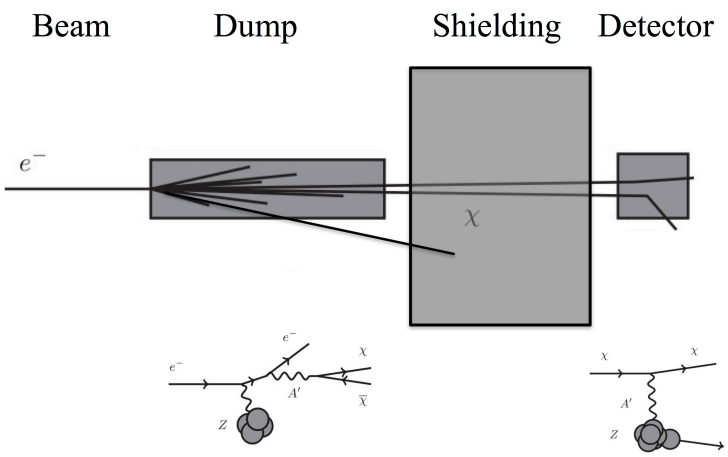
- Summary of current and expected physics results, if possible a plot(s) of the expected sensitivity



The top red, dashed line shows the sensitivity of a 1 m long detector while the lower line is for a 10 m long detector.

- Summary of the experimental approach and setup

A summary of the experimental approach is shown below.



The experiment seeks to detect low energy nuclear recoils created by light dark matter particles in an electron beam dump utilizing a low pressure TPC. The low pressure TPC has been utilized for over 15 years to search for halo dark matter as part of the Directional Recoil Identification From Tracks (DRIFT) experiment. Besides having proven background rejection capabilities the experiment has the ability to detect the direction of the recoils. Because of the low momentum transfer the recoils would naturally recoil perpendicular to the beam direction. Thus the BDX-DRIFT detector would have a strong signature for positive identification of dark matter created recoils.

- Status of the experiment (proposal / approved experiment / under construction / taking data /...)

The BDX collaboration has obtained conditional approval from JLab and we are working towards full approval. I have submitted a proposal to the NSF to fund development of the BDX-DRIFT experiment.

Last summer a small scale BDX-DRIFT experiment was run at SLAC. Results from the experiment are as follows,

1) Backgrounds were low as expected.
2) Neutron backgrounds from a gap in the shielding were detected.
3) GEANT simulations of those backgrounds agreed with experiment.
4) The directional capabilities of the experiment were verified.

- If applicable, estimated timescale and resources for R&D and construction

If the NSF proposal is funded we will construct BDX-DRIFT detectors and then verify their performance utilizing the SLAC beam.