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First Light from the MIGDAL experiment: Results from Commissioning Data Using Fast Neutrons

Thursday, 9 November 2023 15:00 (15 minutes)

A number of experiments searching for dark matter have invoked the Migdal effect to improve their mass sensitivity to Weakly Interacting Massive particles by over an order of magnitude without this application of the effect having ever been experimentally validated. In light of this, the Migdal in Galactic Dark mAtter expLoration (MIGDAL) experiment aims to make the first direct and unambiguous observation of the Migdal effect from fast neutron scattering.

This experiment uses an Optical Time Projection Chamber equipped with a stack of two glass-GEMs operating in 50-Torr CF4 gas, with light and charge readout provided by a CMOS camera, a photomultiplier tube, and a 120 Indium-Tin-Oxide strip anode. The signals from these enable precise three-dimensional reconstruction of ionization tracks that form the characteristic Migdal V-shape topology, namely a nuclear and electron recoil sharing an interaction vertex.

In this talk, I will present preliminary results from the experiment's commissioning using the D-D generator at the Rutherford Appleton Laboratory's Neutron Irradiation Laboratory for Electronics (NILE).

Early Career

No

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