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Results from the MIGDAL experiment

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Many dark matter experiments are exploiting the Migdal effect, a rare atomic process, to improve sensitivity to low-mass WIMP-like dark matter candidates. However, this process is yet to be directly observed in nuclear scattering. The MIGDAL experiment aims to make the first unambiguous measurement of the Migdal effect in nuclear scattering. A low-pressure optical Time Projection Chamber is used to image in 3-dimensions the characteristic of a Migdal event: an electron and a nuclear recoil track sharing a common vertex. Nuclear recoils are induced using fast neutrons from a DD source, which scatter in the gaseous volume of the detector. The experiment is operated with 50 Torr of CF₄ using two glass GEMs for charge amplification. Both scintillation light and ionisation charge are read-out, and these measurements are combined for full-track reconstruction. In this talk we will present the analysis of the first search from the MIGDAL experiment at the Neutron Irradiation Laboratory for Electronics (NILE) at the Rutherford Appleton Laboratory in the UK.

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Session Classification: Migdal search