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The MIGDAL experiment: towards the first observation of the Migdal effect

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The Migdal effect predicts the emission of an atomic electron when the respective nucleus is perturbed. The experimental confirmation of this prediction would imply that current direct detection experiments are sensitive to dark matter (DM) particles with mass well below the thresholds typically assumed. In particular, it would have a great impact on the search for sub-GeV DM particles.

The objective of the Migdal In Galactic Dark mAtter expLoration (MIGDAL) experiment is to carry out the first observation of the Migdal effect. To that purpose, MIGDAL will use a neutron beam to induce the Migdal effect in gas atoms contained in a tracking chamber, and will search for events with a recoiling nucleus and a ionization electron originating from a common vertex.

This talk will present an overview of MIGDAL. I will first describe and motivate the design of the experiment. Then I will explain the expected signal, and discuss the respective backgrounds obtained from dedicated Monte Carlo studies.

Primary author: LOPEZ ASAMAR, Elias

Presenter: LOPEZ ASAMAR, Elias

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