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Searching for Dark Matter with the DAMIC at SNOLAB Experiment

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The DAMIC experiment at SNOLAB uses thick, fully-depleted, scientific grade charge-coupled devices (CCDs) to search for the interactions between proposed dark matter particles in the galactic halo and the ordinary silicon atoms in the detector. DAMIC CCDs operate with an extremely low instrument noise and dark current, making them particularly sensitive to ionization signals expected from low-mass dark matter particles. This talk will focus on results from the 11 kg day exposure with traditional CCDs, including the strictest limits on the WIMP-nucleon scattering cross section for a silicon target. We will discuss the recent upgrade of the SNOLAB apparatus with two (~9 g each) skipper CCDs that allow for a sub-electron readout noise and therefore a lower detector threshold. We are actively acquiring data at SNOLAB with these upgraded CCDs to directly probe the previously observed excess. Furthermore, we will discuss the recent progress at DAMIC-M and the future of CCDs as a dark matter search device with the Oscura experiment, which will aim to build a large array of CCDs with a total exposure of 30 kg-yr. This research and development effort is now in the design phase with a goal to start construction in late 2024.

Collaboration name

DAMIC

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