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Thick, silicon CCDs to search for dark matter within the DAMIC-M Experiment

The DAMIC (Dark Matter in CCDs) Experiment employs the active silicon of low-noise charge-coupled devices (CCDs) as a target to search for a variety of dark matter candidates with masses below 10 GeV. An array of seven 675-μm thick CCDs with a target mass of ˜40 grams has been collecting data at SNOLAB since early 2017 and the next stage of the experiment, DAMIC-M, will be an array of CCDs with a total mass of 1 kg to be located in France at the Laboratoire Souterrain de Modane. The collaboration has engaged in an extensive campaign of characterization efforts to understand the response of these CCDs to low-energy nuclear recoils and their unique capabilities, including the use of high spatial resolution for both the rejection and study of backgrounds. This talk will address the general features of DAMIC CCDs and include some results of early characterization efforts of the improved DAMIC-M devices which feature skipper-style readout capable of single-electron resolution. Potential alternative applications of CCDs in rare-event searches will be also be discussed.

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