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Search for Light Dark Matter with DAMIC-M

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DAMIC-M (Dark Matter in CCDs at Modane) is a near-future experiment that aims at searching for low-mass dark matter particles through their interactions with silicon atoms in the bulk of charge-coupled devices (CCDs). Pioneer in this technique was the DAMIC experiment at SNOLAB. Its successor, DAMIC-M, will have a detector mass 25 times larger and will employ a novel CCD technology (skipper amplifiers) to achieve sub-electron readout noise. Strengthened by these characteristics, DAMIC-M will reach unmatched sensitivity to the dark matter candidates of the so-called hidden sector. A challenging requirement is to control the radiogenic background down to the level of a fraction of events per keV per kg-day of target exposure. To meet this condition, Geant4 simulations are being exploited to optimize the detector design, drive the material selection and handling, and test background rejection techniques. Furthermore, precise measurements are being carried out with skipper CCDs to characterize the spectrum of Compton scattered electrons, which represent a dominant source of environmental background at low energy.

This talk gives an overview of the project, including the estimated background, and the strategies implemented for its mitigation and characterization.

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