



ID de Contribution: 124

Type: Non spécifié

Development and characterization of novel electronics for the search of dark matter for DAMIC-M

lundi 30 novembre 2020 15:30 (30 minutes)

Despite plenty of evidence for the existence of Dark Matter (DM), no experiment has ever managed to capture it directly. In the last decades, the Weakly Interacting Massive Particle (WIMP) paradigm, the most popular among the DM models, has proven unsuccessful experimentally in a variety of detection methods in the GeV-TeV mass range. DAMIC-M (Dark Matter In CCDs at Modane) will aim to directly search for light WIMPs (<10 GeV) and hidden-sector DM, using a tower of scientific-grade Charge-Coupled Devices (CCDs) of a kg-size total target mass. In addition, by implementing the Skipper readout technique, a sub-electron energy resolution can be achieved. A critical feature of this undertaking will be the development of an acquisition system for the overall control and readout of the CCDs. I will present preliminary results from the evaluation of novel readout electronics including the front-end CCD ReadOut Chip (CROC), which will provide a pre-amplification on the output signal and improve the Signal-to-Noise Ratio, and a new Analog-to-Digital Converter board, allowing for a fast and high-resolution data acquisition.

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Classification de Session: Theme 4