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DAMIC: a direct dark matter search with CCDs

Chair: Stefano Ragazzi

Abstract

Millimeter-thick charge-coupled devices (CCDs) are outstanding particle detectors. Although initially developed for near-infrared astronomy, the low pixel read-out noise also makes them the most sensitive detectors to signals from ionizing radiation. By virtue of their very low energy threshold (<100 eV of ionization energy), the relatively small mass of their nuclear target (Silicon) and their unique capabilities for background characterization, CCDs are poised to become the leading technology in the search for the faint signals from WIMPs with masses <10 GeV/c/c. I will present the DAMIC100 experiment, a direct dark matter search consisting of 100 g of CCDs hosted in the low-radioactivity environment of the SNOLAB underground laboratory. I will also discuss the technical challenges of next-generation CCD dark matter experiments, including the pursuit of a single-electron threshold detector and increasing the size of the target to the kg-scale and beyond.

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LNGS - "E. Segrè" room