

Study and development of new detectors for the search of light dark matter with CRYOSEL

jeudi 27 avril 2023 10:30 (30 minutes)

The EDELWEISS collaboration performs light Dark Matter (DM) particle searches with high-purity germanium bolometers collecting both charge and phonon signals. As is the case for most cryogenic dark matter experiments, the sensitivity of EDW's detectors is limited by unknown low-energy backgrounds. But recent results (PhysRevD.106.062004) obtained thanks to detectors equipped with NbSi Transition Edge Sensor (TES) operated underground at the Laboratoire Souterrain de Modane (LSM) have shown the high relevance of this technology for better understanding and constraining of these backgrounds. In this context, the EDELWEISS collaboration, as part of its SubGeV program, is working on a new design of germanium bolometers using NbSi TES : CRYOSEL. These innovative TES phonon sensors called Superconducting Single Electron Device (SSED) will be sensitive to the athermal phonons induced by the amplification of a single charge drifting in the strong electric field generated in the detector and hence, will be able to discriminate against our main low-energy background, which is not affected by this amplification.

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