

CoSSURF 2022 - Dark matter

Dark Matter search with the CRESST-III experiment

Stefano Di Lorenzo on behalf of the CRESST collaboration

Abstract

The CRESST (Cryogenic Rare Event Search with Superconducting Thermometers) experiment, installed at the Laboratori Nazionali del Gran Sasso (LNGS), is suited for direct detection of dark matter particles via elastic scattering off nuclei. CRESST uses an array of crystals operated as cryogenic calorimeters, each equipped with a cryogenic light detector. An interaction in the crystal produces a phonon and light signal: the phonon signal allows a precise energy measurement, the light signal is used to discriminate the expected dark matter signal (nuclear recoil) from the dominant background (electron/gamma and alpha). In early 2018, CRESST completed an initial data taking campaign reaching a nuclear recoil threshold of 30.1 eV on CaWO_4 crystals. This unprecedented low threshold allows to probe dark matter particle masses down to $160 \text{ MeV}/c^2$. Currently the sensitivity is limited by the presence of events of unknown origin that rise from a few hundreds of eV down to threshold. Dedicated measurements with different target materials are currently on going at LNGS to investigate the nature of this low energy excess. Most recent results are presented. The current stage and the perspectives for the next phase of the experiment will be also discussed.