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Direct dark matter search with the CRESST-III experiment

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Detecting dark matter particles is one of the most exciting experimental challenges in modern astroparticle physics. Despite many naturally motivated theoretical models for light dark matter, a large part of the parameter space for spin-independent scattering off nuclei remains untested for dark matter particles with masses below few GeV/c^{2}. The CRESST-III experiment (Cryogenic Rare Events Search with Superconducting Thermometers), located at the underground facility Laboratori Nazionali del Gran Sasso in Italy, uses detectors designed to probe the dark matter low-mass region of the parameter space with a sensitivity never achieved before.

The CRESST-III experiment employs scintillating CaWO_{4} crystals as target material for dark matter interaction. Each detector consists of one ˜25 g CaWO_{4} crystal coupled with a smaller crystal made of Silicon-On-Sapphire for the detection of the scintillating light. Both crystals are equipped with Transition Edge Sensors (TES) and operated as cryogenic calorimeters down to temperatures of ˜10 mK. The double read-out of scintillating light and total energy deposition allows an event-by-event particle identification, which is used for background suppression.

CRESST-III, whose Phase 1 started data taking in August 2016, extends further the reach of a direct search to the sub-GeV/c^{2} mass region.

In this contribution the achievements of the CRESST-III will be discussed focusing on the latest results and the perspectives of future stages of the experiment.

Primary author: Dr MANCUSO, Michele (Max-Planck-Institut für Physik)

Presenter: Dr MANCUSO, Michele (Max-Planck-Institut für Physik)

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