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Direct Dark Matter Search with CRESST III –Status & Perspectives

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Detecting Dark Matter (DM) particle is one of the most exciting experimental challenges of modern astroparticle physics. Many cosmological observations at different scales agree on the existence of DM ascribing 25% of the Universe's composition to it. In this context a variety of experiments have been performed in order to investigate the different possible DM candidates arising from theory.
The CRESST III experiment, located at the Gran Sasso underground laboratory in Italy, is designed to detect Dark Matter interactions in $CaWO_4$ scintillating crystals, probing the low mass region of the parameter space for spin-independent DM-nucleus scattering below $\sim$ 10 GeV/c^2 with a sensitivity never reached before.

In CRESST-III an array of 10 scintillating $CaWO_4$ crystals of $\sim$ 25 g each are read out simultaneously as cryogenic calorimeters and scintillating detectors. The scintillation light is measured with a second cryogenic calorimeter made of Silicon-On-Sapphire. Both cryogenic calorimeters of CRESST-III detectors are operated at temperatures below 10 mK and are equipped with Transition Edge Sensor (TES) thermometers for read-out. The double channel read-out is foreseen for interacting particle identification used for background suppression. The TES sensors of the $CaWO_4$ crystals are designed to provide thresholds of the order of 50-100 eV. Furthermore, the CRESST-III detectors modules are also equipped with a fully scintillating housing and instrumented holders to veto the possible background originated from surrounding surfaces.

Phase 1 of the CRESST-III experiment started data-taking in August 2016. In this contribution the current status and future perspectives of the CRESST-III experiment will be presented.

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Abstract Title

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