

A new cryogenic detector for low mass dark matter search with CRESST-III

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The CRESST-II (Cryogenic Rare Event Search with Superconducting Thermometers) experiment, which second phase has successfully finished in summer 2015, aims at the direct detection of dark matter particles. CRESST uses CaWO_4 crystals operated as cryogenic detectors. Compared to previous runs the intrinsic radiopurity of CaWO_4 crystals, the capability to reject recoil events from alpha-surface contamination and the energy threshold were significantly improved. The acquired data provides competitive limits on the spin-independent WIMP-nucleon cross section and probes a new region of parameter space for WIMP masses below $2 \sqrt{\text{GeV}/c^2}$. This potential for low-mass WIMP search can be further exploited by a new detector design planned for CRESST-III. We describe the experimental strategy for the near future and give a detailed technical description of the new cryogenic detector technology.

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