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First observation of single photons in a CRESST detector and new Dark Matter exclusion limits

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The CRESST-III (Cryogenic Rare Event Search with Superconducting Thermometers) experiments main goal is the direct detection of dark matter particles via their scattering off target nuclei in cryogenic detectors. The detectors are equipped with transition edge sensors (TES), operated at around 15 mK. These sensors reach sensitivities down to very low energy depositions (≤ 100 eV), allowing for the search of dark matter particles with sub-GeV masses. This contribution presents the analysis and results of an Al_2O_3 detector with a mass of 0.6 g. This detector could be calibrated via the detection of single luminescence photons in the eV-range, which were observed in CRESST for the first time. The low threshold of this detector (≤ 10 eV) allows for the calculation of a dark matter exclusion limit of masses below $100 \text{ MeV}/c^2$.

Submitted on behalf of a Collaboration?

Yes

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