

Exploring the Low-Energy Spectrum of CUORE to Search for Solar Axions

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The Cryogenic Underground Observatory for Rare Events (CUORE) is the first tonne-scale experiment using cryogenic calorimeters. The detector is located underground at the Laboratori Nazionali del Gran Sasso in Italy and consists of 988 TeO₂ crystals operated in a dilution refrigerator at a base temperature of about 10 mK. Thanks to the large exposure, sharp energy resolution, segmented structure and radio-pure environment, CUORE provided the most sensitive exclusion limit of the neutrinoless double beta decay of ¹³⁰Te. The same features offer a unique opportunity to search for the interaction of dark matter candidates, such as Solar Axions, in the CUORE crystals. We are working towards demonstrating the potentiality of the CUORE detector technology in a lower energy region, from few to tens of keV, which is of interest for Solar Axion searches, and profit from the very large amount of data collected so far (2 ton yr of exposure) to search for these elusive dark matter candidates. In this contribution, we present a comprehensive study on low-energy events in the CUORE experiment, alongside the current status and future prospects in the search for Solar Axions.

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