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Unlocking the keV frontier: low-energy physics with the CUORE experiment

Wednesday 27 August 2025 18:00 (2 hours)

The CUORE experiment, originally conceived to search for neutrinoless double-beta decay, has proven itself a versatile platform for exploring the broad landscape of rare-event physics. In this talk, we present a comprehensive study of CUORE's sensitivity to keV-scale energy physics - including dark matter interactions and rare nuclear decays. By applying specialized data selection and noise rejection techniques to over 2 tonne·yr TeO_2 exposure, we demonstrate effective event reconstruction using energy thresholds as low as 3 keV. We quantify the detector performance across the 988-calorimeter array, exploring how cryogenic conditions, vibrational isolation, and sensor properties influence sensitivity at low energies. These findings validate the use of CUORE-like cryogenic calorimeters as broad-range rare event detectors, spanning from the keV to the MeV scale.

Collaboration you are representing

CUORE

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