APR20-2020-000736

Abstract for an Invited Paper for the APR20 Meeting of the American Physical Society

CUORE, CUPID, and Understanding the Nature of the Neutrino Mass

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Understanding the nature of the neutrino mass is one of the most elusive-and one of the most important-questions in the current quest for beyond-standard-model physics. Experiments that can establish a Majorana component of the neutrino mass will provide key insights into physical processes with the potential to explain a number of phenomena, including the origin of the observed matter-antimatter asymmetry in the universe. The Cryogenic Underground Observatory for Rare Events (CUORE) is a ton-scale crystal calorimeter at Laboratori Nazionali del Gran Sasso designed to search for lepton-number-symmetry violation through the observation of neutrinoless double-beta decay in Te-130. Now in its third year of operation, CUORE has accumulated a total exposure of over 650 kg-yr of physics-sensitive data. New results from CUORE establish a lower limit of 3.2e25 yr (90% C.I.) for the half-life of neutrinoless double-beta decay in Te-130, using the first 372.5 kg-yr of analyzed exposure. In addition to implementing significant improvements to the operational and analysis procedures, the most recent results from CUORE set the stage for the future CUORE Upgrade with Particle IDentification (CUPID), which incorporates light detectors for enhanced particle discrimination and background reduction. In this talk, we discuss the most recent results from the CUORE experiment, and provide an overview of the upcoming plans and current status of CUPID.