Contribution ID : **582** Type : **Plenary/section talk**

The CUORE Experiment : Neutrinoless Double Beta Decay Results

Tuesday, 23 October 2018 18:40 (15)

The Cryogenic Underground Observatory for Rare Events (CUORE) is the first bolometric experiment searching for neutrinoless double beta decay (0νββ) that has been able to reach the one-ton scale. The detector consists of an array of 988 TeO2 crystals arranged in a compact cylindrical structure of 19 towers. The construction of the experiment was completed in August 2016 with the installation of all towers in the cryostat. Following a cooldown, diagnostic, and optimization campaign, routine data-taking began in spring 2017. In this talk, we present the 0νββ results of CUORE from examining a total TeO2 exposure of 86.3 kg·yr, characterized by an average energy resolution of 7.7 keV FWHM and a background in the region of interest of 0.014 counts/(keV·kg·yr). In this physics run, CUORE placed a lower limit on the 130Te 0νββ half-life of > 1.3 × 10ˆ25 yr (90% C.L.). We then discuss the additional improvements in the detector performance achieved in 2018 and the latest update on the study of other rare processes in Tellurium and the evaluation of the background budget.

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Session Classification : Particle Physics: Neutrino Physics

Track Classification : Particle physics: neutrino physics