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Results from the CUORE experiment

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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 the current best 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, the latest evaluation of the CUORE background budget, and we finally present the most precise measurement of the 130Te 2νββ half-life to date.

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