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The CUORE detector and results

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The Cryogenic Underground Observatory for Rare Events (CUORE) is a bolometric experiment searching for neutrinoless double beta decay ($0\nu\beta\beta$) of ^{130}Te . The detector consists of an array of 988 TeO_2 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 $0\nu\beta\beta$ results of CUORE from examining a total TeO_2 exposure of 86.3 kg yr, characterised 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 ^{130}Te $0\nu\beta\beta$ half-life of $> 1.3 \times 10^{25}$ 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 accurate and precise measurement of the ^{130}Te $2\nu\beta\beta$ half-life to date.

Less than 5 years of experience since completion of Ph.D

N

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