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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 that has been able to reach the 1-ton scale. The detector consists of an array of 988 TeO₂ crystals arranged in a cylindrical compact structure of 19 towers. The construction of the experiment and, in particular, the installation of all towers in the cryostat was completed in August 2016 and data taking started in spring 2017. In this talk we present the neutrinoless double beta decay results of CUORE from examining a total TeO₂ exposure of 86.3 kg yr, characterized by an effective 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 decay half-life of ¹³⁰Te > 1.3 · 10²⁵ 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 in the evaluation of the background budget.

Primary author: CAMINATA, Alessio (INFN)

Presenter: CAMINATA, Alessio (INFN)

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