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CUORE: the first bolometric experiment at the ton scale for the search for neutrino-less double beta decay

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The Cryogenic Underground Observatory for Rare Events (CUORE) is the most massive bolometric experiment searching for neutrino-less double beta ($0\nu\beta\beta$) decay. The detector consists of an array of 988 TeO_2 crystals (742 kg active mass) arranged in a compact cylindrical structure of 19 towers. The construction of the experiment and, in particular, the installation of the towers in the cryostat was completed under clean room conditions in August 2016, and data taking began in spring 2017. In this talk, we will describe the CUORE experiment, including the cryostat, the front-end electronics, the data acquisition system and the data processing chain, and present the detector performance during the first year of running. We will emphasize the effort made in improving the energy resolution in the ^{130}Te $0\nu\beta\beta$ decay of region of interest and the suppression of backgrounds. We also describe the work to lower the energy threshold that will give CUORE the sensitivity to search for other rare events such as dark matter.

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