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The one-ton scale detector of 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 ($0\nu\beta\beta$) that has been able to reach the one-ton scale. The detector, located at the Laboratori Nazionali del Gran Sasso in Italy, consists of an array of 988 TeO_2 crystals operated as cryogenic bolometers at 10 mK. The construction of the experiment was completed in August 2016 with the installation of the detector. CUORE is currently in stable operation and has accumulated data corresponding to a TeO_2 exposure approaching 500 kg·yr, placing the most stringent limit on $0\nu\beta\beta$ half-life of ^{130}Te.
In this talk, we present the design of the CUORE experiment, with a particular focus on the bolometric technique. We also describe the signal-to-noise optimization methods applied in standard operations and during noise reduction campaign. We finally present the detector performance, giving a brief overview of the achieved CUORE physics results.

Funding information

Primary author: Dr MARINI, Laura (University of California, Berkeley)

Co-author: D'ADDABBO, Antonio (Istituto Nazionale di Fisica Nucleare)

Presenter: Dr MARINI, Laura (University of California, Berkeley)

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