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Commissioning of the CUORE cryostat: the first experimental setup for bolometric detectors at the 1 tonne scale

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The Cryogenic Underground Observatory for Rare Events (CUORE) is a 1-ton scale bolometric experiment. The CUORE detector is an array of 988 TeO₂ crystals arranged in a cylindrical compact and granular structure of 19 towers. This will be by far the largest bolometric mass ever operated. These detectors will need a base temperature around 10 mK in order to meet the performance specifications. To cool the CUORE detector a large cryogenic-free cryostat with five pulse tubes and one specifically designed high-power dilution refrigerator has been designed. The cryostat (4K refrigerator with Pulse Tubes) and Dilution Unit were first tested independently and then merged together. We report here the detailed description of the cryostat for the CUORE experiment together with the results of the validation tests done in 2014.

Summary

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