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The CUORE Fast Cooling System

The Cryogenic Underground Observatory for Rare Events (CUORE) is a ton-scale Neutrino-less Double Beta Decay experiment that uses 998 TeO₂ crystal bolometers that need to be operated at a baseline temperature of around 10 mK. The large volume and masses involved require a dedicated precooling system that allows the apparatus to reach a threshold temperature after which the Dilution Unit, a mK-scale refrigerator, can start the final cool-down. CUORE Fast Cooling System (FCS) has been developed, constructed and recently used for the CUORE precooling stage. It mainly consists of a cryostat with heat exchangers that use 3 Gifford-McMahon refrigerators, a He blower, a filtering module and several sensors that allow to monitor and control the system during this very delicate cooldown procedure. The present work will describe the FCS and will summarize the FCS performances during the first full CUORE detector cooldown.

Experimental Collaboration

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