LNGS SEMINARS

Matteo Biassoni
Milano Bicocca University & INFN

New results from CUORE – a sensitive new probe of lepton number violation in the ^{130}Te system

Abstract

CUORE (Cryogenic Underground Observatory for Rare Events) is a ton-scale experiment whose main goal is the search for neutrino-less double beta decay in ^{130}Te with a segmented array of TeO_2 thermal detectors operated at cryogenic temperatures. Its projected sensitivity to the Majorana effective mass touches the inverted ordering region for a light Majorana neutrino exchange model.
After a construction and commissioning phase (that, given the scale and complexity of the setup and the peculiarity of its working conditions is an outstanding achievement by itself), the CUORE detector is finally operational and has been taking science data since the first months of 2017.
With the first ~2 months worth of science data, we report the presently sector-leading limit on the ^{130}Te decay rate in the neutrino-less channel. A detailed description of the detector, performance, analysis technique and physical implications of the result will be given, as well as an outlook on the potential of the detector in the search for rare events.

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