



Contribution ID: 51

Type: Oral

Results from CUORE-0 experiment, status of CUORE detector, and future perspectives for neutrinoless double beta decay at LNGS

Monday, 31 August 2015 17:15 (15 minutes)

This talk discusses a rare nuclear transition, known as neutrinoless double beta decay ($0\nu\beta\beta$), which is important for the exploration of the inverted hierarchy region of the neutrino mass pattern. The Cryogenic Underground Observatory for Rare Events (CUORE) is an experiment that aims to search for such a transition in ^{130}Te together with other rare processes. CUORE is a cryogenic detector, composed by an array of 988 Tellurium dioxide bolometer crystals, with a total mass of 741 kg. CUORE is presently under construction at Laboratori Nazionali del Gran Sasso (Italy), at a depth of about 3500 m.w.e. In order to test and demonstrate the performances of the upcoming CUORE experiment a lower scale experiment, consisting of 52 TeO_2 bolometers, 750 g each, arranged in 13 layers, constructed strictly following CUORE protocols have been built. Such an experiment, called CUORE-0, is collecting data from spring 2013. This talk presents the latest results on $0\nu\beta\beta$ coming from CUORE-0 experiment. These results show how the good performances, in terms of background and energy resolution, support the achievement of the CUORE target sensitivity. This talk will then summarize the status of CUORE Experiment and the R&D activities on bolometers, currently underway, for next-generation double-beta decay experiments.

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Session Classification: Fundamental Symmetries and Interactions