

Scintillating bolometric technique for the neutrino-less double beta decay search: the LUCIFER experiment

CUPID is a proposed future ton-scale bolometric neutrinoless double beta decay ($0\nu\text{DBD}$) experiment to probe the Majorana nature of neutrinos and discover Lepton Number Violation in the so-called inverted hierarchy region of the neutrino mass. In order to achieve this sensitivity improvement with respect to the current bolometric experiments, the source mass must be increased and the backgrounds in the region of interest dramatically reduced. The background suppression can be achieved detecting the different light yield emitted by α and β/γ events in a scintillating bolometer. The increase in the number of $0\nu\text{DBD}$ emitters demand for crystals grown with enriched material. LUCIFER, the first demonstrator of CUPID, aims at running the first array of enriched scintillating Zn^{82}Se bolometers (total mass of about 9 kg of ^{82}Se) with a background level as low as 10^{-3} counts/(keV kg y) in the energy region of interest. We show the results of the first measurement performed on Zn^{82}Se enriched bolometers operated deep underground in the Hall C of Laboratori Nazionali del Gran Sasso.

Author: Dr CASALI, Nicola (INFN)

Presenter: Dr CASALI, Nicola (INFN)

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