

LUCIFER: A Scintillating Bolometer Array for the Search of Neutrinoless Double Beta Decay

Wednesday, 16 March 2011 19:33 (1 minute)

In recent years important results have been obtained in the study of neutrino's properties, but the fundamental character of the particle (Dirac or Majorana) and its absolute mass are still open questions.

Neutrinoless Double Beta Decay (DBD) is a unique tool to discriminate the neutrino nature, since the observation of this rare process would imply that neutrinos are Majorana particles and would set a limit on the mass of the electron neutrino.

Bolometric detectors are particularly suitable for the search of DBD: they can provide a good versatility in the choice of material and they can achieve a good energy resolution, a high efficiency and a low background.

The last point, in particular, represents the main challenge for the next generation experiments.

A major role in this field could be played by LUCIFER (Low-background Underground Cryogenic Installation For Elusive Rates), whose goal is the study of the DBD of ^{82}Se through the achievement of a background on the order of 0.001 counts/kg/keV/year.

The LUCIFER detector will be an array of ZnSe scintillating bolometers. The simultaneous measurement of the heat and of the light emitted by an interaction will allow to discriminate between different interacting particles, providing thus a disentangled and reduced background.

In this poster the scintillating bolometers technique will be presented, as well as the features of the ZnSe crystals and the expected performances.

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Session Classification: Poster session