

Contributed Talk

Scintillating Bolometers for Rare Events Searches: The LUCIFER Experiment.

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The main goal of LUCIFER is the study of the neutrino-less double beta decay of ^{82}Se , a rare process that, if detected, could demonstrate the Majorana nature of neutrino and set the absolute mass of this particle. Dealing with rare decays, one of the most critical issues of the experiment is the background reduction. This requirement will be satisfied by LUCIFER thanks to the use of scintillating bolometers: the simultaneous read-out of heat and light emitted by the interactions will allow to reject most of the spurious events, providing a background of 10^{-3} counts/keV/kg/y at the transition energy of ^{82}Se (2997 keV). The detector will be made by tens of ~ 0.5 kg ZnSe crystals and light detectors operated as bolometers at 10 mK. We recently measured the scintillation and radio-purity properties of a single detector module, and we improved the energy resolution and background rejection with new analysis algorithms. We measured the light emitted by nuclear recoils and investigated the discrimination capability at low energy in view of Dark Matter searches with ZnSe bolometers. In this presentation we summarize the results obtained with this prototype and also discuss the feasibility of dark matter searches with the LUCIFER detector.