

LUCIFER: Scintillating bolometers for the search of Neutrinoless Double Beta Decay

The nature of neutrino mass is one of the frontier problems of particle physics.

Neutrinoless Double Beta Decay (0 ν DBD) is a powerful tool to measure the neutrino mass and to test possible extensions of the Standard Model.

Bolometers are excellent detectors to search for this rare decay, thanks to their good energy resolution and to the low background conditions in which they can operate. The current challenge consists in the reduction of the background, represented by environmental gamma's and alpha's, in view of a zero background experiment.

We present the LUCIFER R&D, funded by an European grant, in which the background can be reduced by two orders of magnitude with respect to the present generation experiments. The technique is based on the simultaneous bolometric measurement of the heat and of the scintillation light produced by a particle, that allows to discriminate between beta and alpha particles. The gamma background is reduced by choosing 0 ν DBD candidate isotopes with transition energy above the environmental gamma's spectrum.

The prospect of this R&D will be discussed, together with a comparison with the leading experiments of the field.

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