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High resolution low background Calorimeter for SuperNEMO

The SuperNEMO double beta decay project is a modular tracker-calorimeter based experiment that will reach about 10^{26} years for neutrinoless double beta decay corresponding to 50-100meV in terms of Majorana neutrino mass. It will scrutinize a hundred of kilograms of ^{82}Se double beta decay isotope.

The first module is under construction and will be installed early 2015 in the LSM (Laboratoire Souterrain de Modane) underground laboratory. The calorimeter is based on Optical Modules made of large volume plastic scintillators (10L) coupled with large area photomultipliers (Hamamatsu R5912-Mod and R6594). They are assembled in walls that surround the isotope foil and the tracking volume.

One of the main goals is to reach an energy resolution as low as $(8\% \text{ (FWHM)})/\sqrt{E(\text{MeV})}$ for the most sensitive parts of the calorimeter with a 4π coverage in terms of gamma tagging for background suppression. The other cornerstone of the success of the calorimeter is to reach the radiopurity requirements for its construction materials and detecting parts.

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Track Classification: Neutrinoless Double Beta Decay