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P4.073 Development of an optical simulation for the SuperNEMO calorimeter

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The SuperNEMO double beta decay project is a modular tracker calorimeter based experiment. The aim of this project is to reach a sensitivity of the order of 10^{26} years concerning the neutrinoless double beta decay half-life, corresponding to a Majorana neutrino mass of 50-100 meV. The main calorimeter is based on 520 Optical Modules made of large volume plastic scintillators (10L) coupled with a large area photomultipliers (Hamamatsu R5912-MOD and R6594). The design of the calorimeter is optimized for the double beta decay detection and allows gamma tagging for background rejection. In large volumes of scintillators, the visible energy and signal shapes depend on the particles, electrons or photons, due to their different interaction point inside the scintillator. The aim of the optical simulation, developed for SuperNEMO, is to modelize the Optical Module response on the energy and time performances, regarding the particle type.

This poster will describe the SuperNEMO Optical Module design, the optical simulation characteristics and the achieved results.