

SuperNEMO - a new generation of underground experiments for double beta-decay investigations

The SuperNEMO experiment is dedicated to the search for neutrinoless double beta-decay which would imply, if observed, violation of the lepton number conservation, could give unique information on the neutrino mass hierarchy, and state if neutrinos are Majorana particles, confirming thus the existence of physics beyond the Standard Model. The SuperNEMO experiment builds upon the design and experience from the NEMO-3 experiment. It is based on the tracking and calorimetry techniques, which allow the reconstruction of the final state topology, including timing and kinematics of the double beta-decay transition events, offering a powerful tool for background rejection. Upgrades to the detector technologies, improved radiopurity of construction materials, and a significant increase in source mass will allow SuperNEMO to improve half-life sensitivities by two orders of magnitude. The experiment will use about 100 kg of enriched ^{82}Se source with the total exposure of $500\text{kg}\cdot\text{yr}$ to probe the half-life sensitivity $T_{0\nu} = 1 \times 10^{26}$ years with the corresponding sensitivity on the effective neutrino mass of 40 – 100 meV. An overview of the progress in the construction of the SuperNEMO demonstrator module and the improvements foreseen compared to the NEMO-3 experiment will be presented.

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