

DOUBLE BETA DECAY WITH NEMO-3 AND SUPERNEMO

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Neutrinoless double beta decay ($0\nu\beta\beta$) is the only practical way to understand the neutrino nature (i.e. whether it is a Dirac or a Majorana particle) and to observe full lepton number violation required by most beyond the standard model scenarios.

The goal of the SuperNEMO experiment is to search for $0\nu\beta\beta$ decay. Its technology is based on a successful design approach of the NEMO-3 experiment which was running at the Modane Underground Laboratory in the Frejus Tunnel under the French-Italian Alps in 2003 – 2011. The unique features of this approach are the ability to study almost any $\beta\beta$ isotope and reconstruction of the event topology which produces a “smoking gun” evidence for the process and may allow the underlying physics mechanism to be disentangled.

The latest updates on the final NEMO-3 results obtained with 7 different $\beta\beta$ isotopes are presented. The physics reach of the SuperNEMO project is discussed and the status of the integration and commissioning of its first module, the Demonstrator, as well as its physics sensitivity are presented.

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