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Status of the SuperNEMO Experiment and physics objectives

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The SuperNEMO experiment began physics data-taking in April 2025, becoming the only operational double beta decay detector with full topological event reconstruction, enabled by its unique tracker–calorimeter design. This topology-based approach offers powerful background rejection and is particularly well-suited for probing a broad spectrum of beyond-the-Standard-Model (BSM) scenarios. The detector, located at the Laboratoire Souterrain de Modane (LSM) in France, utilizes 6.11~kg of enriched ^{82}Se as its double beta decay source.

We present the physics goals defined by the SuperNEMO collaboration in the context of BSM physics, along with sensitivity estimates to exotic decay modes based on detailed simulations using a newly developed multi-dimensional analysis framework.

Neutrino Properties

results and developments in neutrinoless double beta decay

Neutrino Telescopes & Multi-messenger

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Neutrino Theory & Cosmology

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Data Science and Detector R&D

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