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Construction and commissioning of the SuperNEMO detector tracker

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The SuperNEMO detector will search for neutrinoless double beta decay at the Modane Underground Laboratory with a sensitivity of $|\mathbf{m}\beta\beta| < 0.05 \div 0.1$ eV; the detector design allows complete topological reconstruction of the event enabling excellent background rejection and, eventually, the ability to determine the nature of the lepton number violating process.

To prove the experiment feasibility, we are building a demonstrator module with 7 kg of ^{82}Se , with an expected sensitivity of $|\mathbf{m}\beta\beta| < 0.2 \div 0.4$ eV after 2.5y.

The tracker, composed of 2034 drift cells operated in Geiger mode, is currently being assembled in the UK. The main challenge is the high radiopurity required to reduce the background. For this reason all components are carefully screened for radiopurity, the cell wiring is automated and every step of the tracker assembly happens in a clean environment.

We review the detector design, and present the result of the Radon emanation measurement and of the surface commissioning of the first section of the tracker (504 drift cells).

Collaboration

SuperNEMO collaboration

Primary author: Dr CASCELLA, Michele (Università del Salento e INFN di Lecce)

Presenter: Dr CASCELLA, Michele (Università del Salento e INFN di Lecce)

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