

Modane Underground Laboratory

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ABSTRACT

The Modane Underground Laboratory (LSM) is located in the Fréjus roadway tunnel at the border between France and Italy. It is operated by CNRS and CEA.

The laboratory is below the Fréjus Mountain under 1700 of rock corresponding to 4 800 meter water equivalent. The muons flux is reduced by a factor 2 000 000 and the neutrons flux by a factor 1 000. The volume of the LSM is 3500 m³ and its surface is 400 m². More than 100 physicists are using this facility.

The laboratory has been created in 1981 to host the τ_p experiment looking for the proton decay. Today, the laboratory is a multi-science platform. For particle physics, astroparticle and nuclear physics, the laboratory hosts the following international experiments: NEMO 3 (Double beta decay search), EDELWEISS (Dark matter search), TGV II (double EC) and SHIN (search of Super heavy nuclei in Nature).

Several prototypes of detectors are also installed like the BiPo detector for SuperNEMO project (double beta decay) and the TPC sphere (supernovae neutrino).

Fourteen gamma spectrometers (high purity Ge diodes) are also hosted for the selection of the low radioactivity materials, for environmental researches (oceanography, retro-observation, glaciology...) and for applications (wine datation, eperitises). The LSM team participates also to the development of very low background gamma spectrometers, neutrons and radon detectors.

There are also activities to the study of the origin of the failures in the microelectronics circuits. Soon, some biologists will use also the site to study the development of the bacteria in very low radioactivity conditions. A safety gallery parallel to the roadway tunnel is presently under construction. It is an opportunity for the LSM to dig a new cavity (40 000 m³) at moderate cost. This new laboratory could be in operation in 2014 and could host some of the projects of the European astroparticle roadmap like SuperNEMO (DBD) and EURECA (DM). The final decision for the funding of this extension is expected in the next weeks.