

The Laboratorio Subterráneo de Canfranc and its scientific activity

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ABSTRACT

In 1985, the Nuclear and Astroparticle Physics research group of the University of Zaragoza, lead by Prof. Angel Morales, set off the Canfranc Underground Laboratory in the Central Pyrenees (Spain), close to a dismissed railway tunnel.

More recently, the construction of a road tunnel between Spain and France, parallel to the railway one, provided a unique opportunity. A. Morales, strong of the success of two decades of research and of his determination, convinced the Spanish authorities of building a new, larger laboratory, with fully international standards. The new facility, now called Lab 2400, is at depth of 850 m under Mount Tobazo, with an area of 1260 m² corresponding to a volume of 9800 m³. It has been completed and handed over to the Consortium managing the laboratory on 30 June 2010. Additional underground infrastructures include two galleries 70 m long at the two sides of the train tunnel, called Labs 780 (170 m², 290 m³). The "old" underground infrastructures are being integrated in the LSC according to a Memorandum of Understanding with the Saragossa University, called Lab 2.500 (100 m², 440 m³). The total underground space is 1530 m² and 10 530 m³.

Underground services to the users include an ISO7/ISO6 clean room, a mechanical workshop and a battery of (presently 3, up to 9 planned) hyperpure Ge detectors, for components assay and other applications. The stability of the caverns is constantly monitored by a network of optical sensors with a sensitivity of a few micrometers.

The underground facilities are complemented by a new building on the surface, completed on 25 January 2011, lodging headquarters, administration, safety and quality assurance service, 16 offices for scientific users, 7 offices for LSC personnel, four specialised laboratories, mechanical workshop, storage room, meeting rooms, a small library, a conference room with 98 seats, exhibitions room and two apartments

Seven experiments have already been approved, with the advice of an International Scientific Committee, (ANAIS, ROSEBUD and ArDM on dark matter, BiPo, NEXT and SuperK-GD on neutrinos and GEODYN on geodynamics) and more are under discussion (CUNA on nuclear astrophysics). The scientific users are 214 from 15 Countries. An open call for more experimental proposals, to be hosted in still available underground space, is ongoing.

The status of the facilities, the science and status of the experiments will be reviewed, including a perspective of the future programmes.

Short bibliography:

- 1) A. Bettini, Nucl. Instrum. Meth. A626, S1-S5 (2011).
- 2) A. Bettini, *The World underground scientific facilities: A Compendium*, arXiv: 0712.1051 [hep-ex].