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XENON

- Rayonnement Cosmique et Matière Noire - XENON -

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[https://lpnheweb3.in2p3.fr/IMG/distant/jpg/spipphpactioec5e.jpg]

Project XENON is a program of direct detection of dark matter that uses liquid xenon. It aims at detecting the tiny amount of charge and light that is emitted after the interaction of a dark matter particle with a xenon nuclei. The goal consists in reaching the sensitivity to the very small cross sections predicted by the cosmological observations and the theory. The current detector, XENON1T, has been installed underground at the *Laboratori Nazionali del Gran Sasso* (LNGS) in Italy.

XENON1T, with its 3.6 tons of xenon, of which 2 tons are in the active part of the detector, allowed to lower down the sensitivity to levels never explored so far, becoming the most sensitive detector in the world for the dark matter hunting. This success has been made possible thanks to the care on efficiently reducing most of the sources of background that could mimic a dark matter signal, including the ones that may be produced by the detector itself. The detector is currently collecting new data, that will allow to reach a better sensitivity very soon.

The next phase of the XENON project foresees an upgrade of the current detector with the aim of increasing the sensitivity of the experiment by a factor 10. The new detector is named XENONnT. Such a better performance will be made possible thanks to an increase of the size of the target and a stronger reduction of the background. The amount of xenon to be handled will be of about 8 tons. The main technical contribution of XENON-France (LAL, LPNHE and Subatech) consists in the construction of a novel liquid xenon storage and recovery system, with a capacity of 10 tons that will allow to recover the xenon from XENONnT with a speed of about 1 ton per hour. This system will be the biggest xenon storage ever build, a true safe, essential for the success of the experiment.

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Le site du projet XENON

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