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The XENON project: status and prospects

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Astronomical and cosmological observations indicate that a large amount of the energy content of the Universe is made of dark matter. Particle candidates under the generic name of Weakly Interacting Massive Particles (WIMPs) arise naturally in many theories beyond the Standard Model of particle physics, such as supersymmetry, universal extra dimensions, or little Higgs models.
The search for these particles continues with a variety of experimental approaches. In direct detection experiments, one attempts to observe the nuclear recoils (NRs) produced by WIMP scattering off nucleons. The recoil spectrum falls exponentially with energy and extends to a few tens of keV only.
In recent years, liquid xenon (LXe) particle detectors have achieved a large increase in target mass and a simultaneous reduction in backgrounds and are now among the leading technologies in the search for dark matter WIMPs.
The XENON project used a stage approach, with detectors of increasing mass and sensitivity.
The current detector, XENON100, in operation at LNGS is the most sensitive experiment for Dark Matter search in the world; with an active mass of 66 kg we obtained an exclusion limit of 2 x 10-45 cm2 at 50 GeV.
The future project, XENON1T, with a x10 fiducial mass and a 100 times lower background, will be sensitive to WIMPs with cross section 2 x 10-47 cm2.
In the talk I'll present the recent measurement of XENON100, the current operation of the detector and the status of the construction of XENON1T together with its aimed background reduction and sensitivity reach.

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