


RESEARCH
XENON1T IS THE MOST SENSITIVE DETECTOR FOR THE DIRECT SEARCH FOR DARK MATTER

The highest sensitivity ever achieved in the direct search for dark matter: this is the record set by XENON1T, the data acquisition experiment at the Gran Sasso National Laboratories (LNGS) of

INFN, the largest underground laboratories in the world dedicated to astroparticle physics.

The results, obtained with a short run of 30 days and presented on May 18th to the scientific community, make XENON1T the most sensitive experiment in the world for searching for so-called WIMPs (Weakly Interacting Massive Particles), which are among the candidates to constitute dark matter particles.

Many astrophysical observations have strengthened the hypothesis of the existence of dark matter, leading to a global effort to try to directly observe its interactions with ordinary matter particles, thanks to very high sensitivity detectors. These interactions, nevertheless, are so rare and weak to have so far impeded their direct detection, prompting scientists to build increasingly large and sensitive detectors. The recent results of XENON1T show that the detector has the lowest level of radioactivity ever achieved, by many orders of magnitude less than that of the materials surrounding it on Earth. With a total mass of approximately 3,200 kg, the detector is also the largest of its kind ever built. The combination of the significant increase in mass with a lower background contamination of the possible dark matter interaction signal provides an excellent chance of discovery in the years to come.

The XENON scientific collaboration consists of 135 researchers from USA, Germany, Italy, Switzerland, Portugal, France, Netherlands, Israel, Sweden and the United Arab Emirates. ■