

Latest Results from the XENONnT Dark Matter Experiment

The XENONnT project is located in the Gran Sasso laboratory in Italy. Its main goal is the direct detection of dark matter, particularly Weakly Interacting Massive Particles (WIMPs). It uses a dual-phase liquid xenon time projection chamber (TPC) to identify particle interactions. When a particle interacts with the target mass, light (S1 signal) and charge (S2 signal) are produced. The experiment is protected by natural shielding, situated under 3600 meters of rock, and has an active system to reduce background noise. The dense liquid xenon also provides effective self-shielding, allowing the definition of a central fiducial volume with minimal background noise.

Recently, XENONnT achieved a major breakthrough by observing solar neutrinos from 8B via coherent elastic neutrino-nucleus scattering (CEvNS). This is a significant milestone, as it marks the first direct detection of nuclear recoils caused by solar neutrinos using a dark matter detector. The detection was made with a statistical significance of 2.73σ , confirming the observation. This CEvNS measurement presents a new opportunity for neutrino studies and paves the way for future analyses that may lead to further exciting discoveries. XENONnT continues to collect and analyze more data, raising the potential for new advances in rare interaction searches.

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