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First Results from the XENON1T Dark Matter Experiment at LNGS

Abstract

We report the first dark matter search results from XENON1T, a ~ 2000 kg dual-phase xenon time projection chamber in operation at the Laboratori Nazionali del Gran Sasso in Italy, the first ton-scale detector of this kind.

The blinded search used 34.2 live days of data acquired between November 2016 and January 2017. Inside the (1042 ± 12) kg fiducial mass and in the $[5, 40]$ keV_{nr} energy range of interest for WIMP dark matter searches, the electronic recoil background was $(1.93 \pm 0.25) \times 10^{-4}$ events/(kg \times day \times keV_{ee}), the lowest ever achieved in a dark matter detector.

A profile likelihood analysis shows that the data is consistent with the background-only hypothesis. We derive the most stringent exclusion limits on the spin-independent WIMP-nucleon interaction cross section for WIMP masses above $10 \text{ GeV}/c^2$, with a minimum of $7.7 \times 10^{-47} \text{ cm}^2$ for $35\text{-GeV}/c^2$ WIMPs at 90% confidence level.

May 30, 2017 - 2:30 pm
LNGS - "E. Fermi" auditorium