Results from the direct search for dark matter with the XENON1T experiment

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XENON1T in the Gran Sasso deep-underground laboratory is the largest experiment for the direct search for dark matter. It utilizes 3.2 tonnes of ultra-pure liquid xenon in a dual-phase time projection chamber (TPC) to search for Weakly Interacting Massive Particles (WIMPs) scattering off nuclei. The main experimental challenge is the reduction of environmental radioactivity (which mimics WIMP interactions in the detector) to an unprecedented low level. This is achieved by exploiting the good self-shielding properties of liquid xenon and by a combination of strict quality control during the construction of the detector and dedicated xenon purification techniques. Further background reduction is achieved by making use of the differential energy loss which allows to discriminate between between signal-like nuclear recoils and background-like electronic recoils.

In the talk the experimental setup and the latest dark matter search results are presented. The detector has been operated in stable conditions for more than one year which enabled us to accumulate 1 tonne x year of exposure. We found no significant excess of events over the background expectation and can place the world's most stringent limit for the WIMP-nucleus cross section for WIMP masses above 6 GeV with a minimum of $4.1 \times 10^{(-47)}$ cm^2 at 30 GeV.