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**The XENON1T Demonstrator: Impact of the recirculation of the gas above the liquid xenon on the purity** HUGO CONTRERAS, Columbia University, XENON COLLABORATION — XENON1T is the third detector in the XENON project for direct detection of Dark Matter. Its construction started at the end of 2013, and will achieve a sensitivity in the spin-independent cross section to  $2 \cdot 10^{-47} \text{ cm}^2$  for a  $50 \text{ GeV}/c^2$  WIMP. XENON1T is a dual phase liquid xenon TPC detector with a fiducial mass of 1.1 ton and a length of 1m. To address the most important technical challenges involved in the scaling of this kind of detectors a facility was built in the Nevis Laboratories at Columbia University, the XENON1T Demonstrator, a dual-phase TPC with a 1-meter drift length. One of the main research topics in this facility has been the improvement of the purification process in XENON1T. The new approach includes the direct recirculation of the gas xenon layer on top of the active liquid xenon, to improve both the purification time and the maximum purity achievable in XENON1T. In this talk we will summarize the results obtained with this improved recirculation system in the XENON1T Demonstrator.

Hugo Contreras  
Columbia University

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