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Latest Results from the PICO-2L Dark Matter Detector, and the identification and mitigation of particulate-induced backgrounds[1] DANIEL BAXTER, Northwestern University, PICO COLLABORATION — The PICO Collaboration has taken a key step toward a background-free bubble chamber for WIMP dark matter detection. An unexpected background of unknown origin limited WIMP searches in the PICO-2L and PICO-60 detectors at SNOLAB in 2013 and 2014. Recent efforts targeting particulate contamination in the active volume of PICO-2L have reduced this background by at least one order of magnitude, to a rate below the known neutron background in the detector. The resulting data set the most stringent limit to date from a direct detection experiment on spin-dependent WIMP-proton interactions. I will present a comparison of the background-limited Run-1 of PICO-2L with the new results from Run-2, identifying particulate as the primary source of the previously unexplained background. I will describe the engineering and operational controls now being implemented to eliminate this background in the PICO-60 detector, with the goal of a background-free run using our large detector within the next year.

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