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# Advancing Dark Matter Detection with the PICO-500 Bubble Chamber

*Friday, 14 February 2025 19:30 (15 minutes)*

The PICO collaboration uses superheated bubble chambers in search of dark matter through direct detection. The PICO-500 experiment is the next generation PICO detector, expected to reach world-leading sensitivity for weakly interacting massive particle (WIMPs) interactions. Building upon the success of previous PICO detectors, this next-generation apparatus will consist of ∼250 liters of superheated $C_3F_8$, optimized for detecting nuclear recoils from spin-dependent interactions. The detector is currently under construction at SNOLAB in Sudbury, Ontario, where its completion is expected in 2026. During assembly, tiny particles, dust, or contaminants can enter the detector and later introduce background signals that obscure the weak signals expected from dark matter interactions. Therefore, building off of previous experience from the assembly of PICO-40L, stringent cleanliness practices and radon mitigation techniques have been employed to ensure any potential dark matter interactions can be accurately observed and analyzed. This presentation will provide an overview of the PICO-500 design, cleanliness, and quality control techniques to reduce background signals.

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