

Background mitigation with PICO-500

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Modern bubble chambers offer a unique opportunity to probe the dark matter parameter space through the use of superheated C_{3F_8} as the target material. PICO-500 is the next generation of bubble chamber detector made by the PICO collaboration. It will be located at the underground research facility SNOLAB in Sudbury, Canada. Backed by the operational experience of previous detectors, PICO-500 will be an improvement over previous detectors on many fronts including size and design. Bubble nucleation requires highly localized energy deposition, making PICO-500 insensitive to electron at the operated energy threshold. This leaves the focus on background rates to alpha and neutron particles. Background rates were among the limiting factors of previous detectors. New mitigation techniques are going to be used in the assembly of PICO-500, most notably for radon mitigation. The high radon concentration in the underground lab makes it a difficult task to limit the exposure time to this background. During the assembly of the detector, nylon bags flushed with nitrogen will be used to limit the deposition of radon on the surfaces of the bubble chambers active region. In this talk, an overview of the detector design, its improvement from previous, background mitigation techniques and expected background rates following mitigation will be presented.

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