

Lake Louise Winter Institute 2020



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The dawn of PICO-40L

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The PICO collaboration uses bubble chambers filled with superheated C₃F₈ as a target for dark matter detection. PICO-60, with a threshold of 2.45 keV, set the most stringent direct-detection constraint to date on the weakly interacting massive particle (WIMP)-proton spin-dependent cross section at $3.2 \times 10^{-41} \text{cm}^2$ for a 25 GeV WIMP [Phys. Rev. D100 022001 (2019)]. Its successor PICO-40L employs a “right-side-up” configuration of the detector, thereby eliminating the need for the previously used buffer liquid and enhancing its background rejection capability. PICO-40L also serves as a prototype for another next generation ton-scale chamber PICO-500 which will further explore the WIMP-nucleon parameter space. The commissioning of PICO-40L is nearly complete. Its upcoming run is expected to considerably improve on the previous limit.

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