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Photon-mediated dark-matter-nucleus interactions in the PICO-60 C3F8 bubble chamber

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The PICO-60 C3F8 dark matter detector was a bubble chamber consisting of a fused silica inner vessel filled with 52 kg of C₃F₈ in a superheated state operating at 2.45-keV and 3.29-keV thermodynamic thresholds, reaching exposures of 1404-kg-day and 1167-kg-day, respectively. This bubble chamber was operated two km deep underground at SNOLAB, in Sudbury, Ontario in Canada. These two searches established the most stringent direct-detection constraints to date on the WIMP-proton spin-dependent cross-section at $2.5 \times 10^{-41} \text{ cm}^2$ for a 25 GeV/c² WIMP. In this poster, the latest results from the PICO-60 detector will be presented, establishing coupling limits for photon-mediated dark matter-nucleus interactions using non-relativistic contact operators in an effective field theory framework.

Summary

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