

# The PICO-40L Direct Detection Experiment

*Monday, 8 July 2024 15:40 (20 minutes)*

Constraining the spin-dependent WIMP-nucleon cross-section using Earth-based direct detection experiments is a critical component of the ongoing effort to discover the nature of dark matter. PICO-40L is a bubble chamber detector with a target material of superheated  $C^{13}F^{18}$ , located at the SNO-LAB underground research facility outside Sudbury, Canada. In bubble chambers, since energy depositions from particle interactions are required to be sufficiently localized in order to nucleate a bubble, PICO-40L is effectively blind to electron recoil interactions, which is a major class of background in other direct detection technologies. PICO-40L is the first dark-matter-sensitive PICO experiment to employ the “Right Side Up” geometry, putting the detector compression and expansion system below the target fluid, which is expected to suppress backgrounds seen in previous PICO detectors. With its abundance of non-zero-spin fluorine nucleons in the detector target, it has the capacity to set world-leading exclusion limits in the spin-dependent dark matter interaction parameter space. PICO-40L is fully assembled and operational, and is currently being commissioned. An overview of the detector, the analysis strategy, as well as the results from the early commissioning runs, will be presented in this talk.

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