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PICO: dark matter searches using bubble chambers

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The PICO-60 C_3F_8 dark matter detector is a bubble chamber located at SNOLAB, 2 km underground in Sudbury, Ontario, Canada using 52 kg of octafluoropropane (C_3F_8) as the target fluid. This experiment reached exposures of 1404 kg-day at a 2.45-keV thermodynamic threshold and 1167 kg-day at 3.29-keV. The physics program of PICO bubble chambers will be presented in this talk, including the most stringent direct-detection constraints to date on the WIMP-proton spin-dependent cross-section and leading limits on the couplings for photon-mediated interactions. Leading limits for dark matter masses between $2.7 \text{ GeV}/c^2$ and $24 \text{ GeV}/c^2$ will be presented for anapole moment, electric dipole moment, magnetic dipole moment, and millicharge. These couplings to the electromagnetic current through higher multipole interactions were studied using non-relativistic contact operators in an effective field theory framework.

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