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Towards ultra-cold Bose-Fermi mixtures in a micro-magnetic trap
S. AUBIN, M. EXTAVOUR, S. MYRSKOG, L. LEBLANC, A. STUMMER, J. H. THYWISSEN, Dept. of Physics, University of Toronto — We present progress on producing quantum degenerate fermionic potassium (^{40}K) and bosonic rubidium (^{87}Rb) gases in a micro-magnetic chip trap. The two atomic species are cooled and trapped simultaneously in a vapor loaded magneto-optical trap (MOT). The cold two-species atomic cloud is transported in a quadrupole magnetic trap to the surface of a chip, where it is loaded into a micro-magnetic trap. In optimizing the loading process, we developed an optical probe with high signal-to-noise for mapping out the minima of the micro-magnetic field by creating a 1D MOT at the surface of the chip. We have seen evidence of RF evaporation and are working towards quantum degeneracy. This approach to degeneracy requires only a single chamber, because the rapid evaporative cooling due to the tight confinement of the chip trap relaxes the stringent vacuum requirements of a traditional magnetic trap. In describing our experimental approach, we address the experimental challenges related to microtrapping fermions and future studies of cold Fermi gases. Work supported by NSERC, CFI, PRO, and OIT.

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