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Tools and Techniques for Strongly Interacting Fermions A.B. BARDON, L.J. LEBLANC, M.H.T. EXTAVOUR, D.M. JERVIS, J. MCKEEVER, A. STUMMER, J.H. THYWISSEN, Department of Physics, University of Toronto — Previously in the Toronto Ultra-Cold Atoms Lab we have cooled ^{87}Rb and ^{40}K to quantum degeneracy in a chip trap. Over the past year we have expanded the capabilities of this experiment. We have added a crossed optical dipole trap, and used it to evaporatively cool ^{87}Rb to a Bose-Einstein condensate of 10^4 atoms. Unlike magnetic traps, the dipole trap allows us to freely choose our magnetic field and quantum states. Varying the magnetic field, we observed the ^{40}K Feshbach resonance between the $|F = 9/2, m_F = -9/2\rangle$ and $|F = 9/2, m_F = -7/2\rangle$ states at 202G. The hyperfine state preparation was made possible by a homemade microwave source. A second generation chip will allow better coupling of the microwaves to the atoms, as well as polarization control of rf, and higher magnetic field gradients. Using these new tools, we are making progress towards observing itinerant ferromagnetism in fermions.

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