Quantum Degenerate Rubidium in an All-Optical Toroidal Trap

G. EDWARD MARTI, RYAN OLF, GABRIEL DUNN, DAN STAMPER-KURN, UC Berkeley, Dept. of Physics — Quantum degenerate gases confined in a toroidal potential show persistent currents and other transport phenomena relating to coherent, unrestricted flow around the waveguide. Vortex states are particularly interesting in such traps because multiply-charged states are topologically stable, unlike in a simply connected condensate. Much as a SQUID attains high magnetic field sensitivity, atomic configurations containing vortices may allow for accurate, absolute rotation sensing. We report on the status of our all-optical toroidal trap for Bose-condensed rubidium-87. We will discuss techniques to generate angular momentum in the condensate as well as future prospects with spinor gases and quantum degenerate lithium.