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Quantum Degenerate Gases in an All-Optical Toroidal Trap G. EDWARD MARTI, RYAN OLF, SEAN LOURETTE, DAN STAMPER-KURN, UC Berkeley, Dept. of Physics — Quantum degenerate gases confined in a toroidal potential show persistent currents, azimuthal sound waves, and other transport phenomena related to coherent, unrestricted flow around the waveguide. Sound waves and vortex states in a ring can be used to for accurate, absolute rotation sensing. We report on the status of our all-optical toroidal trap for Bose-condensed ^{87}Rb . We discuss techniques to generate angular momentum and unusual spin structures as well as future prospects with spinor gases and quantum degenerate lithium.

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