

Abstract Submitted
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Exchange of Spin and Orbital Angular Momentum Between an Ultracold Bose Gas and Optical Angular Momentum Beams KEVIN C. WRIGHT, ANDREW B. KOWALIK, University of Rochester, Department of Physics, L. SUZANNE LESLIE, University of Rochester, Institute of Optics, MICHAEL V. PACK, NICHOLAS P. BIGELOW, University of Rochester, Department of Physics — Atoms and photons possess both spin and orbital angular momentum degrees of freedom, which can be coupled under appropriate experimental conditions. Using Laguerre Gaussian laser beams of differing intrinsic angular momentum and polarization, we have investigated various aspects of how the spin and orbital angular momentum of the photons couple to either a nondegenerate or degenerate (BEC) bose gas. In particular, we have focused on exploring the conditions under which it is possible to coherently transfer orbital angular momentum to an ultracold cloud of ^{87}Rb via a two-photon stimulated Raman transition between magnetic sublevels.

Kevin C. Wright
University of Rochester, Department of Physics

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