Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Brownian vortex circulation due to spin orbit conversion in a circularly polarized optical tweezer DAVID RUFFNER, DAVID G. GRIER, New York University, DEPARTMENT OF PHYSICS AND CENTER FOR SOFT MATTER RESEARCH TEAM — Strong focusing of circularly polarized beams converts spin angular momentum into orbital angular momentum. We describe this process in terms of a generalized vector potential, involving the amplitude, phase, and polarization of the light. This gives a more general understanding of this force in terms of experimentally accessible parameters. In addition, this formalism provides a framework for understanding other polarization induced forces, which arise from the curl of the spin angular momentum density. Experimentally we demonstrate deterministic polarization-induced circulation with trapped clusters of 1μm polystyrene spheres, and Brownian vortex circulation for a single sphere trapped in elliptically polarized optical tweezers.

David Ruffner
New York University

Date submitted: 09 Nov 2011 Electronic form version 1.4