

Abstract Submitted
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Full Bloch Bose-Einstein condensates AZURE HANSEN, JUSTIN T. SCHULTZ, NICHOLAS P. BIGELOW, University of Rochester — We create and characterize a spin texture in a spinor Bose-Einstein condensate (BEC) that, in analogy to the full Poincare laser beams of singular optics [1], covers the Bloch sphere. The time evolution of the full Bloch BEC spin texture allows us to access information about the Gouy phase in matter waves. This phase anomaly is an important and interesting topic in optics and has not yet been directly measured in atom optics. Using this system, we explore parallels between angular momenta in light and in atoms. To engineer the complex wavefunction of a BEC, we use a coherent Raman spin imprinting technique. This transfers phase, amplitude, and polarization properties from a set of laser beams onto the phase, amplitude, and spin of the BEC.

[1] A.M. Beckley, T.G. Brown, and M.A. Alonso, “Full Poincare beams.” *Optics Express* 18, 10777 (2010).

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