

Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Evidence of Dirac Monopoles in a Spin-1 Bose-Einstein Condensate MICHAEL RAY, Amherst College, EMMI RUOKOKOSKI, Aalto University, SAUGAT KANDEL, Amherst College, MIKKO MÖTTÖNEN, Aalto University, DAVID HALL, Amherst College — Isolated magnetic poles (monopoles) have not yet been observed, although there are good theoretical reasons for thinking that they may exist — and profound implications if they do. The first successful theoretical description of a magnetic monopole consistent with quantum mechanics was formulated by Dirac [1], but may be applied more generally to quantum-mechanical systems in the presence of gauge potentials. We describe the successful experimental creation of Dirac monopoles in a *synthetic* magnetic field in the context of a dilute-gas Bose-Einstein condensate. The existence of a monopole is inferred from direct observations of a vortex line that terminates inside the condensate, which evidence is supported by excellent agreement between experiment and numerical simulations.
[1] P.A.M. Dirac, Proc. R. Soc. Lond. A **133**, 60 (1932).

Michael Ray
Amherst College

Date submitted: 15 Nov 2013

Electronic form version 1.4