Abstract Submitted
for the DAMOP15 Meeting of
The American Physical Society

Magnon Interferometry in a ^{87}Rb Spinor Condensate G. EDWARD MARTI, JILA, CU Boulder; UC Berkeley, Dept. of Physics, ANDREW MACRAE, RYAN OLF, SEAN LOURETTE, FANG FANG, DAN STAMPER-KURN, UC Berkeley, Dept. of Physics — Low temperature properties of a many-body system are typically governed by the lowest energy excitations. In many magnetic system, these low energy excitations are magnons, a Goldstone boson created by spontaneous symmetry breaking of the order parameter. We report on performing interferometry with coherent magnon waves to measure the magnon dispersion relation and gap in a spin-1 ferromagnetic rubidium spinor condensate. We find a magnon mass slightly heavier than predicted by mean-field calculations of condensate with contact interactions. We also observe a nonzero gap, consistent with magnetic dipole-dipole interactions.

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Date submitted: 02 Feb 2015 Electronic form version 1.4