

Abstract Submitted  
for the MAR08 Meeting of  
The American Physical Society

**Equilibrium phases of a dipolar spinor Bose gas** MUKUND VENGALATTORE, S. R. LESLIE, J. GUZMAN, C. SMALLWOOD, D. M. STAMPER-KURN, University of California, Berkeley — We investigate the effect of magnetic dipole interactions in determining the properties of  $F = 1$  spinor Bose gases of  $^{87}\text{Rb}$ . Due to the competition between the local ferromagnetic interaction and the long-range, anisotropic dipole interaction, we observe the spontaneous formation of modulated spin domains that exhibit crystalline order. The formation of this modulated spin texture is accompanied by the creation of spin vortices in this dipolar superfluid. We observe this modulated phase both as an equilibrium phenomenon by cooling an incoherent thermal spinor gas, and as a result of a dynamical instability in a pure transversely magnetized spinor condensate. We clarify the crucial role played by dipolar interactions in the creation of the crystalline phase in the spinor condensate and study the finite temperature phase diagram of this dipolar quantum fluid.

Mukund Vengalattore  
University of California, Berkeley

Date submitted: 27 Nov 2007

Electronic form version 1.4