Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Phase Diagram for Magnon Condensate in YIG FUXIANG LI, WAYNE SASLOW, VALERY POKROVSKY, Texas A&M Univ — Recently, magnons, which are quasiparticles describing the collective motion of spins, were found to undergo Bose-Einstein condensation (BEC) at room temperature in films of Yttrium Iron Garnet (YIG). Unlike other quasiparticle BEC systems, this system has a spectrum with two degenerate minima, which makes it possible for the system to have two condensates in momentum space. Recent Brillouin Light scattering studies for a microwave-pumped YIG film of thickness $d = 5$ μm and field $H = 1$ kOe find a low-contrast interference pattern at the characteristic wavevector Q of the magnon energy minimum. In this report, we show that this modulation pattern can be quantitatively explained as due to unequal but coherent Bose-Einstein condensation of magnons into the two energy minima. Our theory predicts a transition from a high-contrast symmetric phase to a low-contrast non-symmetric phase on varying the d and H, and a new type of collective oscillations.

Fuxiang Li
Texas A&M Univ

Date submitted: 12 Nov 2013 Electronic form version 1.4