

Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Pinning mode of integer quantum Hall Wigner crystal of skyrmions HAN ZHU, Princeton Physics; NHMFL, G. SAMBANDAMURTHY, Y.P. CHEN, P.-H. JIANG, NHMFL/FSU; Princeton EE, L.W. ENGEL, NHMFL/FSU, D.C. TSUI, Princeton EE, L.N. PFEIFFER, K.W. WEST, Bell Labs — Just away from integer Landau level (LL) filling factors ν , the dilute quasiparticles/holes at the partially filled LL form an integer-quantum-Hall Wigner crystal, which exhibits microwave pinning mode resonances [1]. Due to electron-electron interaction, it was predicted that the elementary excitation around $\nu = 1$ is not a single spin flip, but a larger-scale spin texture, known as a skyrmion [2]. We have compared the pinning mode resonances [1] of integer quantum Hall Wigner crystals formed in the partly filled LL just away from $\nu = 1$ and $\nu = 2$, in the presence of an in-plane magnetic field. As an in-plane field is applied, the peak frequencies of the resonances near $\nu = 1$ increase, while the peak frequencies below $\nu = 2$ show negligible dependence on in-plane field. We interpret this observation as due to a skyrmion crystal phase around $\nu = 1$ and a single-hole Wigner crystal phase below $\nu = 2$. The in-plane field increases the Zeeman gap and causes shrinking of the skyrmion size toward single spin flips. [1] Yong P. Chen et al., Phys. Rev. Lett. 91, 016801 (2003). [2] S. L. Sondhi et al., Phys. Rev. B 47, 16 419 (1993); L. Brey et al., Phys. Rev. Lett. 75, 2562 (1995).

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Date submitted: 16 Dec 2008

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