

Abstract Submitted  
for the MAR12 Meeting of  
The American Physical Society

**Spin waves in the second Landau level: Probing the spin-polarization enigma**<sup>1</sup> URSULA WURSTBAUER, TREVOR DAVID RHONE, ARON PINCZUK, Columbia University, KEN W. WEST, LOREN N. PFEIFFER, Princeton University — The physics in the second Landau level (SLL) is governed by competing phases resulting in striking phenomena. We use resonant inelastic light scattering experiments to explore collective excitation modes with the focus on low lying spin excitation modes in the SLL. The intensity of the small momentum spin-wave at the bare Zeeman energy ( $E_Z$ ) collapses for filling factors away from integer filling factor  $\nu < 3$  and are dominated by a continuum of modes. We find that at the fractional filling factors  $14/5$ ,  $8/3$ ,  $5/2$ ,  $7/3$ ,  $11/5$  the continuum coexists with a weak but distinct signal at  $E_Z$ , a long wavelength spin-wave that suggests a degree of spin polarization. In addition, at  $5/2$  an intriguing well developed sharp mode is observable below  $E_Z$ , which is unique for the even-denominator filling factor. Modes at energies larger than  $E_Z$  merge additionally at odd-denominator states in ILS spectra, most pronounced for  $7/3$ , in a manner that is similar to that of the  $1/3$  state. This observation could be evidence that the CF framework could be applicable to these states.

<sup>1</sup>Supported by NSF and AvH

Ursula Wurstbauer  
Columbia University

Date submitted: 10 Nov 2011

Electronic form version 1.4