Abstract Submitted
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Anisotropic gapped excitation modes in the SLL from Light Scattering[1] ARON PINCZUK, Columbia University, URSULA WURSTBAUER, TU München, ANTONIO L. LEVY, Columbia University, JOHN WATSON, GEOFF C. GARDNER, MICHAEL J. MANFRA, Purdue University, KEN WEST, LOREN PFEIFFER, Princeton University — The fascinating interaction physics in the SLL supports the emergence of exotic quantum phases and unconventional FQHE states as e.g. anisotropic, possibly nematic, FQHE states at $\nu = 5/2$ [1] and $\nu = 7/3$ [2]. We explore the fascinating physics of these states by studying low-lying collective excitation spectrum from resonant inelastic light scattering (RILS) experiments. Here, we focus on the filling factor range $5/2 > \nu > 2$. We observe clear signatures from gapped modes that weaken with increasing temperature for several filling factors that are known from transport to be incompressible FQHE states like $\nu = 2+2/5$, $2+3/8$ and $2+1/3$. These modes exhibit a clear dependence on filling factor, unambiguously uncovering incompressible quantum states. The lowest mode exhibits a remarkably strong polarization dependence that can be interpreted as fingerprint for the lack of rotational symmetry of the ground state. This interpretation of the observed RILS mode would support nematic FQHE states in the SLL.

[1] Y. Liu et al., Phys. Rev. B 88, 035307 (2013).
[2] J. Xia et al., Nature Phys. 7, 845-848 (2011).

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