

Abstract Submitted
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Excitation spectra of unconventional FQHE states in the SLL from Light Scattering Experiments¹ URSULA WURSTBAUER, Walter Schottky Institut TU München, ANTONIO LEVY, ARON PINCZUK, Columbia University, JOHN WATSON, GEOFF GARDNER, MICHAEL MANFRA, Purdue University, KEN WEST, LOREN PFEIFFER, Princeton University — The fascinating interaction physics in the second Landau level (SLL) supports the emergence of exotic quantum phases and unconventional possibly FQHE states such as e.g. at $\nu = 5/2$ and $2+1/3$ and the weaker state at $\nu = 2+3/8$ and $2+2/5$. We observe clear signatures for gapped collective excitations in inelastic light scattering experiments just for these ‘magic’ filling factors and only for low temperatures substantiating access to the physics of the incompressible quantum fluids [1]. The lowest excitation feature in the spectrum at $2+1/3$ occurs at around $70 \mu\text{eV}$. The analysis of spectral lineshapes suggests magnetoroton features that are characteristic of 2D neutral excitations in a perpendicular magnetic field. The striking polarization dependence observable in light scattering experiments in the SLL are consistent with nematic FQHE states. [1] U. Wurstbauer *et al.*, arXiv:1507.04939v2 (2015).

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