Abstract Submitted
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High Pressure Studies of the Second Landau Level Region of a Two-Dimensional Electron System[1] KATHERINE SCHREIBER, Purdue University Dept. of Physics, NODAR SAMKHARADZE, Delft University of Technology, GEOFFREY GARDNER, Purdue University Birck Nanotechnology Center, EDUARDO FRADKIN, University of Illinois Urbana-Champaign Dept. of Physics, MICHAEL MANFRA, GABOR CSATHY, Purdue University Dept. of Physics — Hydrostatic pressure has become a prevalent tool in condensed matter systems because the application of pressure to crystalline structures results in the shrinking of the lattice constant. This allows one to tune the Bloch wavefunction of the electrons and therefore all band parameters such as effective carrier mass, carrier density, and effective g-factor. In this manner, pressure acts as a probe into various strongly interacting electronic states. Motivated in particular by the capability to discern the spin polarization of quantum Hall states, we apply hydrostatic pressure up to 10 kbar to a two dimensional electron system (2DES) in a high-mobility GaAs/AlGaAs quantum well. This 2DES is subjected to milliKelvin temperatures and strong magnetic fields to observe the effect of pressure on fractional quantum Hall states, especially those in higher Landau levels, a regime not previously studied under pressure. We report our findings, focusing on the observation of a pressure-driven transition from a fractional quantum Hall state to the quantum Hall nematic phase in the second Landau level.

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