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Investigations of the Two-Dimensional Electron System Under Hydrostatic Pressure[1] KATE SCHREIBER, Purdue University, NODAR SAMKHARADZE, Delft University of Technology, GEOFFREY GARDNER, MICHAEL MANFRA, Purdue University, EDUARDO FRADKIN, University of Illinois Urbana-Champaign, GABOR CSATHY, Purdue University — 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 parameters such as effective carrier mass, carrier density, and effective g-factor. In this manner, pressure acts as a probe into the properties of 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 in order 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 highly anisotropic quantum Hall nematic phase in the second Landau level.

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