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Unusual temperature dependence of quantum Hall stripes in ultra-high quality AlGaAs/GaAs two-dimensional electron gases MICHAEL MANFRA, QI QIAN, JAMES NAKAMURA, SAEED FALLAHI, GEOFFREY GARDNER, Purdue University — We report a temperature dependence study of anisotropic electron transport in high (N = 2, 3) Landau levels in an ultra-high quality AlGaAs/GaAs two-dimensional electron system. At half filling, the magnetoresistance along the easy direction drops to zero at low temperature and remains zero as temperature is decreased further, while along the hard direction it reaches a peak at intermediate temperature and then decreases as temperature is lowered all the way down to the base temperature of our dilution refrigerator (10mK). At low temperature, time-dependent fluctuations in longitudinal resistance become substantial and hysteresis is observed in magnetic field sweeps through ν =9/2, 13/2 and 15/2. The temperature dependence of the anisotropic resistance at each half filling suggests that we are possibly observing a nascent phase transition from quantum Hall stripes to a Wigner solid at the lowest temperatures.

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