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Probing a Wigner Crystal via Composite Fermion Commensurability Oscillations in an Adjacent Layer HAO DENG, INSUN JO, YANG LIU, MANSOUR SHAYEGAN, LOREN N. PFEIFFER, KEN W. WEST, KIRK W. BALDWIN, Department of Electrical Engineering, Princeton University, Princeton, New Jersey 08544 — At high magnetic fields and low temperatures, two-dimensional electrons form a composite fermion (CF) Fermi sea with a well-defined Fermi wave vector when the Landau level fillings factor (ν) is near 1/2. In contrast, when $\nu \ll 1$, the Wigner crystal (WC) is the favored ground state. We report measurements of the magneto-resistance in a bilayer electron system with unequal layer densities at high magnetic fields. One layer has a very low density and is in the WC regime ($\nu \ll 1$), while the other (probe) layer is near $\nu = 1/2$ and hosts a CF sea. As the magnetic field is swept away from $\nu = 1/2$ of the CF layer, the CFs feel the periodic electric potential of the WC in the other layer and exhibit magneto-resistance maxima whenever their cyclotron orbit encircles certain integer number of the WC lattice points. Via measuring the temperature dependence of strength of these commensurability features, we probe the melting of the WC.

Hao Deng
Department of Electrical Engineering, Princeton University, Princeton, New Jersey 08544

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