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Spin-Polarization of $\nu = 3/2$ Composite Fermions[1] INSUN JO, DOBROMIR KAMBUROV, M.A. MUEED, YANG LIU, MANSOUR SHAYEGAN, LOREN PFEIFFER, KEN WEST, KIRK BALDWIN, JERRY LEE, Department of Electrical Engineering, Princeton University, Princeton, New Jersey 08544, USA
— We report the observation of ballistic transport commensurability minima in the magnetoresistance of $\nu = 3/2$ composite fermions (CFs) in high-quality two-dimensional electron systems confined to wide GaAs quantum wells and subjected to a unidirectional periodic potential modulation. The positions of the minima are consisted with the magnetic commensurability condition implying the commensurability features originate from a periodic magnetic field. Their distance away from $\nu = 3/2$ yields the size and shape of the CF Fermi contour. At a fixed electron density of n $\approx$ 1.8 x 10^{11} cm^{-2}, as the quantum well width increases from 30 to 60 nm, the CFs become fully spin-polarized. The application of an additional parallel magnetic field ($B_{||}$) leads to a significant distortion of the CF Fermi contour. The distortion is much more severe compared to the $\nu = 1/2$ CF case at comparable $B_{||}$. Furthermore, the applied $B_{||}$ spin-polarizes the $\nu = 3/2$ CFs as evinced from the size of the CF Fermi contour.

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