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Strain-Induced Anisotropic Fermi Contour of 2D Holes and Composite Fermions[1] INSUN JO, K. A. V. ROSALES, M. A. MUEED, Dept. of Electrical Engineering, Princeton University, Princeton, NJ 08544, USA, M. PADMANABHAN, Physical Sciences Department, Rhode Island College, Providence, RI 02908, USA , L. N. PFEIFFER, K. W. WEST, K. W. BALDWIN, Dept. of Electrical Engineering, Princeton University, Princeton, NJ 08544, USA, R. WINKLER, Dept. of Physics, Northern Illinois University, Dekalb, IL 60115, USA , M. SHAYEGAN, Dept. of Electrical Engineering, Princeton University, Princeton, NJ 08544, USA — We present experimental and theoretical results demonstrating strain-induced Fermi contour anisotropy of two-dimensional (2D) holes and composite fermions (CFs) confined to a (001) GaAs quantum well. We apply a tunable uniaxial strain to a thinned (001) GaAs wafer, glued to a piezoelectric actuator. When the 2D holes are subjected to an in-plane uniaxial strain, their band structure and Fermi contour become anisotropic by about 30% even for a minute amount of strain, on the order of 10^{-4}. Via measurements of commensurability oscillations, we determine the Fermi contour anisotropy for holes near zero magnetic field, and for CFs at high magnetic fields, as a function of uniaxial strain. The measured Fermi contour anisotropy of holes is consistent with the calculation results. The observed CF Fermi contour anisotropy also shows a strong dependence on the applied strain, which we compare quantitatively to that of the low-field holes.

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