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Low Temperature Scanning Hall Probe Microscopy of 2D Electron Nanostructures ZHUOQUAN YUAN, YANHUA DAI, RUIRUI DU, Rice University, L.N. PFEIFFER, K.W. WEST, Bell Labs, Alcatel-Lucent — Current distribution can provide key information on microscopic properties of 2D electron systems (2DES) in the regime of quantum transport. However, imaging coherent electron flow is proven to be experimentally challenging. We developed a method to image current distribution by using low temperature (0.3K), high spatial resolution ($< 1\mu m$) scanning Hall probe. We imaged the local magnetic field component perpendicular to the 2DES in GaAs/AlGaAs samples, and then used Fast Fourier Transform (FFT) technique to recover the current distribution from the data of magnetic field. As an example, we will present the data and a brief discussion of imaging geometrical resonance in anti-dot lattices patterned on a very high mobility 2DES. The research at Rice was supported by NSF DMR-0706634.

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