

Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Disorder and Strong Correlations in Two-Dimensional Electron Liquids in SrTiO₃ PATRICK MARSHALL, HONGGYU KIM, SUSANNE STEM-MER, Univ of California - Santa Barbara — We report on angle-dependent measurements of the resistances and Hall coefficients of two-dimensional electron liquids in MBE-grown SmTiO₃/SrTiO₃/SmTiO₃ quantum wells on DyScO₃ (001) substrates, which were found to possess highly anisotropic planar defects. The defects lead to strong in-plane anisotropy in the transport properties, allowing for a systematic investigation of the interplay between disorder and the strong correlations that give rise to a number of unusual phenomena in this system. Disorder was found to increase the residuals in the resistance and Hall angle by up to a factor of 11, while the Hall scattering amplitude was unaffected. The Hall angles exhibited strong T² temperature dependences along all directions, while the longitudinal resistances displayed very different direction-dependent behavior with temperature. This is indicative of carrier-lifetime separation between the longitudinal and Hall scattering rates. Remarkably, the degree of the carrier-lifetime separation was completely insensitive to disorder.

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Date submitted: 10 Nov 2016

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