Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Spin Susceptibility of an Anisotropic 2D Electron System in an AlAs Quantum Well T. GOKMEN, M. PADMANABHAN, E. P. DE POORTERE, E. TUTUC, M. SHAYEGAN, Department of Electrical Engineering, Princeton University, Princeton, NJ 08544 — We report measurements of the spin susceptibility in dilute 2D electrons confined to a 150A wide AlAs quantum well. In the absence of in-plane strain, the electrons in this well occupy two degenerate in-plane valleys with an anisotropic mass. We lift this degeneracy by applying symmetry breaking strain in the plane, thus obtaining a 2D electron system in a single, anisotropic, in-plane valley. In this system we observe an enhancement of the spin susceptibility over the band value that increases as the density is decreased. Yet, the spin susceptibility is suppressed compared to the results of quantum Monte Carlo calculations. We attribute the suppression to the finite layer thickness of electrons and the anisotropic in-plane Fermi contour. Our measurements also show that the effective mass remains nearly constant and close to its value in bulk AlAs down to the lowest densities ($r_s = 10$), in contrast to Si-MOSFET data.

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Date submitted: 17 Nov 2006 Electronic form version 1.4