Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Microwave Transmission Measurements in Gated GaAs/AlGaAs Quantum Wells KRISTJAN STONE, IVAN KNEZ, RUI-RUI DU, Rice University, MICHAEL MANFRA, Purdue University, LOREN PFEIFFER, KEN WEST, Princeton University — Microwave transmission measurements across a 2D electron system have been previously demonstrated in quantum Hall effect and electronic solids regime [1]. We have developed a co-planar waveguide (CPW) system for experiments in microwave-induced resistance oscillations and zero resistance states. Microwaves from a tunable source (2 - 40 GHz) were fed into our system and coupled to a CPW meander line at 300mK to measure cyclotron resonance peaks from a carbon-doped (100) GaAs/$Al_xGa_{1-x}As$ quantum well 2D hole system. Our samples are Hall bars with mobility μ= 0.7-1 $\times 10^6$ cm^2/Vs and carrier density ranging from 2.02 - 2.26$\times 10^{11} cm^{-2}$. Each sample has been gated with AuPd using a Si_3N_4 dielectric. A differential power measurement $\Delta P = P_{out}\text{-}P_{out}^{gate}$ is taken with the signal from the power sensor triggered from a modulated gate to remove the background microwave signal, yielding a cyclotron resonance peak from the transmission signal. We are able to fit our cyclotron transmission signal using the Drude model and determine the hole mass and the cyclotron scattering time. Experimental data as well as a brief discussion will be presented. The work at Rice was funded by NSF DMR-0706634. [1] L. W. Engel et al, Phys. Rev. Lett. 71, 2638 (1993).

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Date submitted: 20 Nov 2009 Electronic form version 1.4