Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Electronic Transport Studies in Thin GaAs/AlGaAs Quantum Wells D.R. LUHMAN, D.C. TSUI, Princeton University, L.N. PFEIFFER, K.W. WEST, Bell Labs, Lucent Technologies — The results of experimental transport studies involving a series of thin GaAs/AlGaAs quantum wells with varying well widths will be reported. The mobility, μ, of thin GaAs/AlGaAs quantum wells is typically limited by electron scattering from the interfacial roughness of the quantum well. The total scattering rate due to all scattering mechanisms is determined from the mobility through $\tau^{-1} = e/\mu m^*$ where m^* is the effective electron mass. Our series of samples consists of well widths of $L = 7.9, 9.9, 12.9, 16.0$ and 33.0 nm. For constant electron density ($n_e \sim 5.5 \times 10^{10}$ cm^{-2}) we find that interfacial roughness is the dominant scattering mechanism for $L \leq 16.0$ nm and successfully fit the data using a finite quantum well model[1] with adjustable interfacial roughness parameters. We will also present the magnetotransport properties of this series of samples. [1]J.M. Li et al. Semicond. Sci. and Tech. 20, 1207 (2005).

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Date submitted: 17 Nov 2006 Electronic form version 1.4