Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

**Landau quantization, Localization, and Insulator-quantum Hall Transition at Low Fields** TSAI-YU HUANG, C.-T. LIANG, Department of Physics, National Taiwan University, Taipei 106, Taiwan, GIL-HO KIM, Department of Electronic and Electrical Engineering, Sungkyunkwan University, Suwon 440-746, Korea, C.F. HUANG, National Measurement Laboratory, Center for Measurement Standards, Industrial Technology Research Institute, Hsinchu 300, Taiwan, CHAO-PING HUANG, Department of Physics, National Taiwan University, Taipei 106, Taiwan, D.A. RITCHIE, Cavendish Laboratory, Madingley Road, Cambridge CB3 0HE, United Kingdom — We have performed a magnetotransport study on a two-dimensional gated GaAs electron system containing self-assembled InAs quantum dots. In our system Shubnikov-de Haas (SdH) oscillations are induced by Landau quantization in the low- field insulator, and the system undergoes a direct insulator- quantum Hall ($\nu = 4$) transition as the magnetic field is increased. The low-field Landau quantization, in fact, is governed by the SdH theory and can modulate the density of states without causing the formation of a quantum Hall liquid in our system. While the expected property $\rho_{xy} \sim \rho_{xx}$ may not be valid at direct insulator-quantum Hall transitions, we find that such transitions do occur as the product $\mu B \sim 1$ and hence well-separated Landau bands exist in the energy spectrum.

Tsai-Yu Huang
Department of Physics, National Taiwan University, Taipei 106, Taiwan

Date submitted: 01 Dec 2004 Electronic form version 1.4