

Abstract Submitted  
for the MAR07 Meeting of  
The American Physical Society

**Short-range disorder induced RIQHE in the lowest Landau level**

WANLI LI, D. R. LUHMAN, D. C. TSUI, Princeton University, L. N. PFEIFFER, K. W. WEST, Bell Labs — We have studied the magneto-transport of two dimensional electron systems with various amount of short-range alloy disorder. Our samples are  $\text{Al}_x\text{Ga}_{1-x}\text{As}-\text{Al}_{0.32}\text{Ga}_{0.68}\text{As}$  heterostructures with the Al concentration  $x$  ranging from 0 to 0.85%, and the electron mobility varies from  $1.2 \times 10^7 \text{cm}^2/\text{V.s}$  down to  $8.9 \times 10^5 \text{cm}^2/\text{V.s}$  within this  $x$  range. We have two major observations in the high magnetic field regime. First, we have found that the amplitude of the fractional quantum Hall gaps is independent on  $x$ . Second, and more surprisingly, we have observed a  $\nu=1$  reentrant integer quantum Hall effect (RIQHE) between the Landau level filling factor  $\nu=2/3$  and  $\nu=3/5$  in the sample with  $x=0.85\%$ . Between the quantum Hall Plateaus of  $\nu=2/3$  and  $\nu=3/5$ , the Hall resistance is observed to be quantized to  $h/e^2$  while the longitudinal resistance reaches a deep minimum.

Wanli Li  
Princeton University

Date submitted: 20 Nov 2006

Electronic form version 1.4