

Abstract Submitted
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Competing quantum Hall phases in the second Landau level in low density limit¹ WEI PAN, Sandia National Labs, A. SERAFIN, J.S. XIA, L. YIN, N.S. SULLIVAN, University of Florida and NHMFL, K.W. BALDWIN, K.W. WEST, L.N. PFEIFFER, D.C. TSUI, Princeton University — We present here the results from two high quality, low density GaAs quantum wells. In sample A of electron density $n = 5.0 \times 10^{10} \text{ cm}^{-2}$, anisotropic electronic transport behavior was observed at $\nu = 7/2$ in the second Landau level. We believe that the anisotropy is due to the large Landau level mixing effect in this sample. In sample B of density $4.1 \times 10^{10} \text{ cm}^{-2}$, strong $8/3$, $5/2$, and $7/3$ fractional quantum Hall states were observed. Furthermore, our energy gap data obtained in various samples of different densities suggest that the $5/2$ state may be spin unpolarized in the low density limit. The results from both samples show that the strong electron-electron interactions and a large Landau level mixing effect play an important role in the competing ground states in the second Landau level. Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

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Wei Pan
Sandia National Labs

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