

Abstract Submitted
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Probing insulator-quantum Hall transitions near the onset of Landau quantization in GaAs/AlGaAs heterostructures¹ KUANG YAO CHEN, National Taiwan University, Y.H. CHANG, C.-T. LIANG, National Taiwan University, N. AOKI, Y. OCHIAI, Chiba University, CHUN FENG HUANG, NML/CMS ITRI, LI-HUNG LIN, National Chiayi University, K.A. CHENG, Lung-Hwa University of Science and Technology, H.H. CHENG, H.H. LIN, National Taiwan University, JAU-YANG WU, SHENG-DI LIN, National Chiao Tung University — Magneto-transport measurements are performed on the two-dimensional GaAs electron systems (2DESs) to study the low-field insulator (I) and quantum Hall (QH) effect. With increasing the perpendicular magnetic field B , the 2DESs undergo direct I-QH transitions to enter QH liquids from the low-field insulators near the onset of Landau quantization. The mobility obtained from Shubnikov-de Haas oscillations, however, indicates that such transitions do not occur as Landau bands become well-separated. We note that Landau quantization is significant even when the Landau-level spacing is smaller than the broadening, and it is insufficient to consider the crossover from weak localization to such a quantization in direct I-QH transitions. Our study supports the importance of the two-body interaction to direct I-QH transitions.

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