

Abstract Submitted  
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**An experimental study on  $\Gamma(2)$  modular symmetry in the quantum Hall system with a small spin-splitting** C.F. HUANG, CMS/ITRI, Y.H. CHANG, Dept. of Physics, NTU, H.H. CHENG, Z.P. YANG, Center for Condensed Matter Sciences, NTU, H.D. YEH, CMS/ITRI, C.H. HSU, C.-T. LIANG, Dept. of Physics, NTU, D.R. HANG, Dept. of Materials Science and Optoelectronic Engr., Natl. Sun Yat-sen Univ., H.H. LIN, Dept. of Elec. Engr., NTU — Magnetic-field-induced phase transitions are investigated by performing transport measurements on the two-dimensional (2D) electron system in an AlGaAs/GaAs heterostructure at low temperatures. [1] Both the semicircle law and universal two-parameter scaling are observed as the spin-splitting becomes resolved with increasing the magnetic field  $B$  perpendicular to such a 2D system. The critical resistivities, however, are not of the expected universal values, and the modular symmetry is reduced from  $\Gamma_0(2)$  to  $\Gamma(2)$ . On the other hand,  $\Gamma_0(2)$  symmetry survives at lower  $B$  where the spin-splitting is unresolved. Therefore, the reduction of the modular symmetry can be due to the resolved small spin-splitting as predicted by Dolan [2]. Such a small splitting not only reduces the modular symmetry, but also breaks the scaling on the longitudinal conductivity  $\sigma_{xx}$  at higher temperatures. It is found that the scaling on the Hall conductivity  $\sigma_{xy}$  is more robust than that on  $\sigma_{xx}$  under a small spin gap. References [1] C. F. Huang, Y. H. Chang, H. H. Cheng, Z. P. Yang, H. D. Yeh, C. H. Hsu, C.-T. Liang, H. H. Lin, D. R. Hang, and H. H. Lin, J. Phys.:Condens. Matt. 19, 026205 (2007). [2] B. P. Dolan, Phys. Rev. B 62, 10278 (2000).

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