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Transport measurements and simulations of GaAs/AlGaAs "anti-Hall-bar within a Hall bar" devices ANNIKA KRIISA, Emory University, RAMESH G. MANI, Georgia State University — Hall effect measurements are often carried out in the Hall geometry, which is a thin rectangular plate with current and Hall voltage contacts at the external boundary. The motivation of this study is to further understand the impact on Hall effect when a hole is inserted inside Hall geometry. One way on conducting this investigation is to superimpose an "anti-Hall bar" inside the standard Hall bar, where the anti Hall bar is actually the hole inside the Hall device with contacts on the inside boundary of this hole. This configuration is thought to generate an ordinary Hall effect within the interior boundary such that the interior Hall voltage divided by the interior injected current equals the Hall resistance. One believes that it might also be possible to simultaneously realize multiple independent Hall effects by injecting multiple currents into the multiply connected device [1]. We have studied Hall effect in the doubly connected "anti-Hall bar within a Hall bar" geometry fabricated out of the GaAs/AlGaAs semiconductor system. Also the simulations of the distribution of the Hall current and potential profile within the specimen are conducted. To attain understanding of how the Hall effect arises in this geometry, the simulation plots are compared to the experimental results. [1] R. G. Mani and K. von Klitzing, App. Phys. Lett. 1993, 64, 1262-1264.

Annika Kriisa
Emory University

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