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Hall Potential Distribution in Anti-Hall bar Geometry[1] VINICIO TARQUINI, TALBOT KNIGHTON, ZHE WU, JIAN HUANG, Wayne State University, LOREN PFEIFFER, KEN WEST, Princeton — A high quality system has been fabricated in an Anti-Hall bar geometry, by opening a 1.4 x 2.0 mm rectangular window using wet etching in the middle of a 2.4 x 3.0 mm two-dimensional high-mobility ($\mu = 2.6\times10^6$ cm^2/(V·s)) hole system confined in a 20 nm wide (100) GaAs quantum well. Topologically this system is equivalent to a normal Hall bar even though there is an extra set of edges in the center. This configuration allows us to probe the Hall potential distribution in relation to the formation of edge channels. The Quantum Hall measurements at 30 mK show a standard behavior of the outer edges. At each Hall plateau the inner edge becomes an equipotential and the Hall voltage between the inner and outer edges exhibits a drastic asymmetry for the upper and lower arms of the sample. At various integer fillings, depending on the chirality, the voltage drop across one of the arms measures 0 while the drop across the other one is equal to the Hall voltage. This behavior will be explained in terms of the dynamical process of forming the edge channels which also will account for the more irregular behavior of the Hall potential in more disordered systems.

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