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Confinement of fractional quantum Hall states in the first excited Landau level MICHAEL MANFRA, ROBERT WILLETT, LOREN PFEIFFER, KENNETH WEST, Bell Laboratories — The quasiparticles of certain exotic quantum Hall states in the first excited Landau level including ν=5/2 and ν=12/5 are believed to obey non-Abelian statistics. Manipulation of such quasiparticles is crucial to recent proposals of topologically protected quantum computation. Most schemes to determine the statistics of the quantum Hall quasiparticles rely on the manipulation of the correlated state in confined geometries. As a preliminary step in this direction, we report on the magnetic field and temperature dependences of transport through quantum point contacts (qpc's) in the regime where the first excited Landau level is partially occupied in the confined region. Our high density (n$\sim$4x10^{11}cm^{-2}) and high mobility GaAs samples are of sufficient quality such that well-defined quantum Hall states are resolved at ν=8/3, 5/2, and 7/3 in the bulk at low temperature. In particular, we have studied the impact of confining geometry design and the size of the qpc opening on the stability of higher order fractional states in the qpc.

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