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Bending the quantum Hall effect by 90 degrees: Evidence for a new kind of disordered one-dimensional superconductor M. GRAYSON, L. STEINKE, D. SCHUH, M. BICHLER, G. ABSTREITER, Walter Schottky Institut, TU-Muenchen, L. HOEPPEL, J. SMET, K. VON KLITZING, Max-Planck-Institut for Condensed Matter Physics, D. MAUDE, Grenoble High Magnetic Field Labs - CNRS/MPI — Utilizing a recently developed corner-overgrowth technique, we create a two-dimensional (2D) electron system which bends by 90 degrees at an atomically sharp corner. At certain properly oriented magnetic fields, the energetic gap in the two 2D systems confines the motion of electrons along the corner to one dimension, creating a new kind of 1D system. The conductance along this 1D corner shows power-law behavior in temperature and voltage which varies depending on the nature of the gap (integer or fractional quantum Hall effect), and for certain gaps shows a negative power-law exponent indicative of effective attractive interactions between the charges in the wire. This behavior was predicted theoretically for such systems. The 1D systems presented here represent the longest quantum wires ever fabricated, up to several millimeters in length.

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