Abstract Submitted
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Observation of Chiral Heat Transport in the Quantum Hall Regime[1] G. GRANGER, D.A. NICHOLS, J.P. EISENSTEIN, Caltech, J.L. RENO, Sandia, L.N. PFEIFFER, K.W. WEST, Bell Labs — The nature and properties of heat transport at the edge of a quantum Hall state are investigated using three adjacent quantum point contacts (QPCs) separated by 20 micrometers fabricated along the edge of a GaAs/AlGaAs two-dimensional electron gas (2DEG). With the bulk of the device at filling factor ν=1, a thermovoltage signal appears across a detector QPC only on one side of the heater QPC depending on the direction of the magnetic field. This behavior indicates that heat transport is chiral at this filling factor. Raising the temperature decreases the thermovoltage, as the electrons carrying the heat find more ways to cool off at higher temperatures. When the distance between the heater and the detector is doubled, the thermovoltage is reduced, meaning that the electrons cool significantly over distances on the order of tens of micrometers. These findings are qualitatively insensitive to the exact magnetic field over the field range corresponding to the ν=1 minimum.

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