Spatially resolved breakdown in reentrant quantum Hall states
OLEKSANDR ROSSOKHATY, JOSHUA FOLK, University of British Columbia,
YUVAL BAUM, ADY STERN, Weizmann Institute of Science, JOHN WATSON,
GEOFFREY GARDNER, MICHAEL MANFRA, Purdue University — Electrons in
a two dimensional electron gas in the fractional quantum Hall regime may rearrange
into a quasi-crystalline structure that gives rise to a reentrant Integer Quantum
Hall (RIQH) effect in transport. As bias current increases, longitudinal and Hall
resistivities measured for these states show multiple sharp breakdown transitions, a
signature that is unique to RIQH states and has previously been ascribed to pinning-
depinning transitions or to the development of bias-induced anisotropy. We present
an alternate interpretation of the characteristic features of RIQH breakdown at high
bias, based on spatially-resolved measurements that indicate a phase boundary be-
tween broken-down and unbroken regions propagating chirally from source and drain
contacts as a function of bias current. As the phase boundary passes various con-
tacts, its spreading generates multi-stage breakdown signatures like those reported
elsewhere. Confirming numerical simulations, the chiral sense of the spreading is
set not by the chirality of the edge state itself, but instead depends on electron- or
hole-like character of the RIQH state.

Oleksandr Rossokhaty
University of British Columbia

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