Spatially Resolved Study of Backscattering in the Quantum Spin Hall State

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While electronic transport experiments have confirmed the broad theoretical model, the properties of the QSH edge states have not yet been investigated on a local scale. Using Scanning Gate Microscopy to perturb the QSH edge states on a sub-micron scale, we identify well-localized scattering sites which likely limit the expected non-dissipative transport in the helical edge channels. In the micron-sized regions between the scattering sites, the edge states appear to propagate unperturbed as expected for an ideal QSH system and are found to be robust against weak induced potential fluctuations.

REFERENCE: