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Nonequilibrium Transport Through a Gate-Controlled Barrier on the Quantum Spin Hall Edge[1] RONI ILAN, University of California, Berkeley, JEROME CAYSSOL, Max-Planck-Institut für Physik Komplexer Systeme, Dresden, Germany and LOMA (UMR-5798), CNRS and University Bordeaux, Talence, France, JENS BARDARSON, JOEL MOORE, University of California, Berkeley and the Materials Sciences Division, Lawrence Berkeley National Laboratory, Berkeley, CA — The quantum spin Hall insulator is characterized by the presence of gapless helical edge states where the spin of the charge carriers is locked to their direction of motion. In order to probe the properties of the edge modes, we propose a design of a tunable quantum impurity realized by a local gate under an external magnetic field. Using the integrability of the impurity model, the conductance is computed for arbitrary interactions, temperatures and voltages, including the effect of Fermi liquid leads. The result can be used to infer the strength of interactions from transport experiments.

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