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Spin polarized multi-terminal transport in helical edge states

SUMATHI RAO, Harish-chandra Research Institute, SOURIN DAS, Delhi University — We propose a three-terminal spin polarized scanning tunneling microscope setup for probing the helical nature of the edge states that appear in the quantum spin Hall system. We show that the three-terminal tunneling conductance depends on the magnetic anisotropy, i.e., the angle between the magnetization of the tip and the local orientation of the electron spin on the edge. We show that chiral injection of an electron into the helical Luttinger liquid is associated with fractionalization of the spin and charge of the injected electron. Finally, we show that the magnetic anisotropy of the probe also leads to Fabry-Perot like two-terminal resonances in charge transport.

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