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Electrical manipulation and measurement of spin properties of quantum spin Hall edge states TEEMU OJANEN[1], JUKKA VAYRYNEN, Low Temperature Laboratory, Aalto University, Finland — The existence of the quantum spin Hall state has been confirmed in a series of experiments performed in HgTe quantum wells but a quantitative observation of the helical edge structure is still lacking. We study an electrical manipulation and measurement of helicity properties of the edge states by employing the Rashba spin-orbit interaction (SOI). Specifically, we show that a spatially uniform Rashba SOI, controllable by the gate voltage, can be utilized in tuning the spin orientation of the edge modes (J. I. Väyrynen and T. Ojanen, arXiv:1010.1353). We introduce a point-contact geometry where helicity of the edge modes can be accessed by two- terminal conductance measurements.

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