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日時: 2月4日(火) 15:00-16:00

場所: 本館1階 H111講義室

“Transport through helical edge states in 2D topological insulators”

Abstract

Two dimensional topological insulators have spin-filtered helical edge states which are a realization of a helical Luttinger liquid and which exhibit the quantum spin Hall effect. The nearly quantized conductance in the experiment is a consequence of the time-reversal symmetry. However, Kramer's theorem only applies to states with the same energy so that inelastic processes could lead to backscattering corrections. We investigated such inelastic processes in terms of phonons and electron-electron interactions in combination with a Rashba impurity on the edge and calculated the backscattering conductance as a function of temperature and bias voltage. Further, I will consider a system where the helical edge is coupled to a quantum dot spin in the presence of a small Zeeman field. Such a system could be used to detect the direction of the spins in the helical edge or to tune the polarization of the dot spin by varying the bias voltage in the helical edge.

Host by Prof. Shuichi MURAKAMI (2747)