

Determining the effect of electron-electron interactions on transport coefficients is one of the central problems of solid state physics. While in many situations interactions are expected to affect the value of the conductivity, there are some special situations where transport coefficients appear to be "protected" (e.g., by symmetry or conservation laws) against interaction corrections. One important example is the Quantum Hall Effect, which concerns 2D electron systems subject to a transverse magnetic field. Evidence shows that at low temperatures the transverse conductivity is quantized in integer (or sometimes fractional) multiples of e^2/h , irrespective of disorder or interactions. In this talk I will consider a specific model of interacting electrons on the hexagonal lattice subject to a transverse dipolar magnetic field: the Haldane model with generalized Hubbard interactions. I will report rigorous results on the quantization of the transverse conductivity at weak enough interactions, in the whole "topological" phase diagram, including at the transition between the normal and Hall insulating phases. Based on joint works with V. Mastropietro, M. Porta, S. Fabbri, I. Jauslin, R. Reuvers.
