KÖLNER Theoretisch-Physikalisches KOLLOQUIUM

Universität zu Köln

Time: Friday, November 19, 2010, **16.00 h (!) Probevorlesung**
16.45 h Vortrag

Speaker: B. Rosenow (Universität Leipzig)

Spectroscopy of Majorana fermions in non-linear transport

Much effort has been devoted recently to the search for experimental demonstrations of Majorana fermions and the exotic quantum statistics that can be encoded by them. In this talk I will mainly focus on Majorana fermions in the non-abelian quantum Hall state at filling fraction nu=5/2. To detect them, there have been several proposals for transport experiments in the linear regime, which however are not robust with respect to disorder in realistic samples. I will discuss signatures of Majorana states in non-linear transport through a Coulomb blockaded antidot of nu=5/2 quantum Hall fluid surrounded by an integer quantum Hall state. In contrast with linear Coulomb blockade (CB), current-voltage characteristics in the non-linear regime of the CB hold information of the many-particle excitation spectrum of the system. A peak in the differential conductance dI/dV will appear whenever a proper resonance condition between the source-drain voltage and the excitations of the dot is met. The "diamond structure" that characterizes the CB out of the linear response regime could serve to identify the nature of the nu=5/2 state.