Condensed Matter Theory Center Seminar
Tuesday, November 11 at 11:00 AM
2205 Physics Building

Speaker: Konstantin Matveev (Argonne National Laboratory)

Title: Conductance of uniform quantum wires

Abstract: At low temperatures the conductance of a single channel quantum wire takes the quantized value e^2/h, a universal combination of the electron charge and Planck's constant. This result is well understood in the model of noninteracting electrons. I will discuss corrections to the conductance of long uniform quantum wires caused by interactions between electrons. Properties of such one-dimensional systems are commonly described in terms of the Luttinger liquid theory. In this approximation, the excitations of the system are noninteracting bosons decoupled from the electric current flowing through the wire, and the conductance remains quantized. I will show that relaxation processes not captured by the Luttinger liquid theory lead to equilibration of the excitations with the current and give rise to a temperature-dependent correction to the conductance. The latter is determined by the velocity of the excitations and the relaxation rate.

Host: Jay D. Sau

http://www.physics.umd.edu/cmtc/seminars.html
