Physics AT QUEENS COLLEGE

Colloquium Notice

Maxim Vavilov

Massachusetts Institute of Technology

Theory of the Oscillatory Photoconductivity of 2D Electron Gas

One of the most exciting recent experimental discoveries in condensed matter physics has been the observation of the oscillatory magnetoresistance and the zero resistance of a 2D electron gas subject to microwave radiation. For microscopic understanding of this phenomenon we derive the quantum Boltzmann equation for the two-dimensional electron gas at large values of the filling factor. This equation describes all of the effects of the electric fields on the impurity collision integral, including Shubnikov-de Haas oscillations, smooth part of the magnetoresistance, and non-linear transport. We use this equation to analytically analyze the effect of the external microwave radiation on the electron transport. Particularly, we show that the dominant contribution to the observed oscillatory magnetoresistance originates from the non-equilibrium component of the electron distribution function rather than from the corrections to the matrix elements of electron scattering off disorder due to the microwave field.

Monday
March 8, 2004
Starts at 12:15 PM
Coffee at 12:00 PM
Physics Conference Room, SB B326