

PHY5037 Quantum Transport in Low Dimensional Systems

Course Code	PHY5037	Semester	
Course Title	<i>Quantum Transport in Low Dimensional Systems</i>		
Credits	3	Type	Elective

Course Structure

Boltzmann transport equation. Transport in large and small systems. Electrochemical potential, Fermi energy and band bending. Two dimensional electron gas, heterostructures and MOSFET. Ballistic transport. 1D transport, cyclotron motion and focussing. Two dimensional systems in magnetic field: Landau levels and quantum Hall effects. Quantum dots and antidots: Coulomb blockade, quantum capacitance, Aharonov - Bohm effect. Effect of Coulomb interactions in 2D and 1D systems: fractional quantum Hall effect, Luttinger liquid and Wigner crystallization.

Suggested Books

1. John H. Davis, Physics of low dimensional semiconductors, An Introduction, Cambridge (1997)
2. M.J.Kelly, Low Dimensional Semiconductors, Clarendon Press (1995)