

School of Physics

Ph.D Defense Session

Title:

Transport properties of double layer Dirac materials

Candidate:

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Venue:

Farmanieh Seminar Room

Time:

14:30 pm, January 15, 2015

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Abstract:

In this thesis, we investigate the electronic and transport properties of two-dimensional electronic systems with a special focus on the double layer systems. The layer degree of freedom acts as a pseudospin and provide more tunability of physical quantities such as electrically tunable band dispersion and band gap, which are of much interest both fundamentally and technologically. Also the interlayer electron-electron interaction can lead to change in the ground-state and transport properties of the layers. In this thesis, we first investigate the RKKY interaction in spin-polarized graphene and MoS₂ and then we extend our work to the bilayer graphene. Considering decoupled layered systems, we explored the quantum capacitance of the double layer system. The other effect we have explored in the decoupled layers, is the magnetoresistance in a slightly tilted magnetic field. Finally we investigate the magneto-optical activity of a thin film of topological insulator under an in-plane magnetic field.

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