SFB 608

Einladung zum Kolloquium

Ort: Universität zu Köln
II. Physikalisches Institut
Seminarraum 201

Zeit: 18. November 2009, 14:30 Uhr s.t.

Sprecher: **Prof. Dr. Alexander Mirlin**
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Thema: From graphene to topological insulators

“In this talk, I will discuss novel materials- graphene and topological insulators- where the charge carriers have a character of 2D Dirac fermions. A non-trivial topological nature of the corresponding theories leads to remarkable physical consequences. In graphene, the charge carriers turn out to be topologically protected from Anderson localization, as long as the intervalley scattering can be neglected.
A similar phenomenon takes place for surface modes of a 3D topological insulator. Furthermore, we show that, in the latter system, the Coulomb interaction leads to emergence of a quantum critical state. Remarkably, the interaction-induced critical state emerges on the surface of a three-dimensional topological insulator without any adjustable parameters. This ``self-organized quantum criticality'' is a novel concept in the field of interacting disordered systems. Finally, we predict a quantum spin-Hall transition between the normal and topological insulator phases in 2D that occurs via a similar (or identical) quantum critical point.”

gez. Rosch