Physikalisches Kolloquium
22.12.08
16:15 Uhr
Hörsaal H2

Prof. Dr. Guido Burkard (Universität Konstanz)

“**Spin qubits in semiconductor and graphene quantum dots”**

Abstract:
The first part of this talk will consist in a general overview on various forms of spin qubits in solid-state nanostructures and their potential for universal quantumcomputation. Then, I will argue that graphene represents a promising material for spin qubits. Graphene is a two-dimensional crystal consisting of a single atomic layer of carbon that features a low concentration of nuclear spins and relatively weak spin-orbit coupling, both of which are known to cause spin decoherence and relaxation in typical semiconductor spin qubits. I will discuss the challenges posed by Klein tunneling and the valley degeneracy in graphene and some theoretical solutions for electron spin qubits localized in graphene quantum dots.