

**Colloquium
Dahlem Center for Complex Quantum Systems**

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Coherence and Interactions in an Open Quantum Dot

Location: Hörsaal A (1.3.14)

Time: Tuesday, July 12, 2011, 14:00 c.t.

Abstract:

Mesoscopic quantum systems are typically divided into closed and open systems. In closed systems electrons are localized and Coulomb blockade dominates transport. In open systems transport is strongly affected by the coherent interference of electron trajectories, but Coulomb blockade is expected to be absent, with the Coulomb interaction instead giving rise to electron-electron scattering that causes dephasing. We have investigated the transport properties of a large (3 square micron) quantum dot in the open regime and have extracted the electron dephasing time from weak localization measurements. We observe a power law dependence on temperature down to the lowest temperature, with no apparent saturation. At the lowest temperatures, we find that phase coherence causes a type of Coulomb blockade, called Mesoscopic Coulomb blockade, to persist in this open system.