



# Seminarankündigung

**Dienstag, 28. Juni 2011  
17:15 Uhr**

**WSI, Seminarraum S 101**

## **“Charge and spin sensing using self-assembled quantum dots”**

Self-assembled semiconductor quantum dots are known to display discrete electronic energy levels coupled by optical transitions and they are governed by spin-dependent optical selection rules. This opens a channel to control and detect a single spin in a quantum dot via lasers. Recent notable achievements include coherent control of individual spins via fast rotations as well as revelation of spin coherence through experimental signatures such as coherent population trapping and spin echo measurements. We propose and utilize resonance fluorescence as a tool for optical detection of spins and coherent generation of single photons using single and tunnel-coupled QD systems. The excitonic transitions of self-assembled quantum dots also display spectral shifts under an applied electric field due to the finite permanent dipole. This property of quantum dots is essential in many measurements to-date relying on resonant light scattering. We will discuss how this effect can be utilized in return for electric field sensing with sensitivity better than  $1 \text{ V/m}/\sqrt{\text{Hz}}$ . Other avenues of quantum metrology will also be discussed.

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