



Sonderforschungsbereich 631
Festkörperbasierte Quanteninformationsverarbeitung



SEMINARANKÜNDIGUNG

Dienstag, 27. November 2007

17:15 Uhr

WSI, Seminarraum S 101

“ Optical spin manipulation in quantum dots ”

The physical properties of electrons confined to nanoscale semiconductor systems are of great interest, not only for application in devices for (quantum) information processing, but also to study the rich physics of electrons in a solid state environment.

Here we present the effect of a single electron charging in a self-assembled quantum dot on the optical absorption and emission spectra [1]. We show that the spin of this single confined electron can be initialized with a high degree of fidelity by optical means [2]. We present a two laser measurement schema to optically control the spin state of the confined electron and to gain access to transition rates and energies of the system. Finally we discuss a new method for optically detected microwave absorption in the GHz frequency range to study single electron spin resonance effects in the quantum dot. This experiment reveals the rich physics of an electron interacting with the nuclei that form the confining semiconductor structure.

- [1] Warburton *et al.*; Nature **405**, 926 (2000),
A. Hoegele *et al.*, PRL **93**, 217401 (2004),
[2] Atatüre *et al.*, Science **312**, 551 (2006)

- K. Karrai *et al.*, Nature **427**, 135 (2004)
A. Hoegele *et al.*, APL **86**, 221905 (2005)

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