



Sonderforschungsbereich 631
Festkörperbasierte Quanteninformationsverarbeitung



Seminar Announcement

Tuesday, 27th January 2004

5.15 p.m.

WSI, Seminarraum S 101

„Single-shot read-out of a single electron spin”

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The ability to perform single-shot measurement of individual quantum particles has led to profound insights in quantum mechanics and is an essential ingredient for quantum information processing. The polarization of a photon, the internal state of a trapped ion or atom, and the position of an electron have been measured in a single-shot mode with high fidelity. We here demonstrate single-shot measurement of the spin of a single electron subject to a magnetic field and trapped in a nanoscale semiconductor structure, known as a quantum dot - the measurement distinguishes spin-up from spin-down electrons. The estimated measurement fidelity is 65 %. We apply the measurement technique to determine the energy relaxation time, T_1 , of the electron spin, obtaining $T_1 \sim 0.5$ ms at 10 Tesla. Electron spin resonance experiments are now underway.
