Einladung zum

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QUBITS IN NANOSTRUCTURES

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We use quantum dot structures in various solid state systems to realize controllable two-level quantum systems. We focus on spin states, either one electron doublet states (i.e. spin-up or spin-down) or two-electron singlet and triplet states. Using time-varying magnetic and electric fields we are able to manipulate the spin states, create quantum superpositions and measure individual spins.

The material systems include GaAs/AlGaAs semiconductor heterostructures, semiconducting nanowires and carbon nanotubes. These materials have their own advantages that can be employed to engineer a spin-friendly environment. These include fabrication and electrical-control issues as well as the strength of the hyperfine interaction (i.e. presence or absence of nuclear spins) and the spin-orbit interaction.

We are also investigating the feasibility of transferring local spin-qubit states into flying-qubit photon states for which we develop nanoscale quantum-LED's. Two-electron entanglement is studied by using superconducting materials as electronic leads.

Montag, 19. November 2007, 17:30 Uhr
(ab 17:00 Uhr Kaffee)
Technische Universität Wien, Freihaus,
Hörsaal 6 (Turm A, grüner Bereich, 2. Stock)
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