Quantum Computing and Spin Qubit Platforms

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I will provide an overview of quantum computing with focus on spin qubits in semiconducting nanostructures such as quantum dots and nanowires for electron and hole spins from a theorist’s point of view. Despite enormous experimental efforts in many labs worldwide over the last twenty years, progress to integrate many qubits has been slow due to many challenges posed by material issues and the related coherence of spin qubits. Nevertheless, the field has evolved steadily, in theory and experiment, and there is a strong believe in the community that the ultimate goal of building a powerful quantum computer most likely will be reached with spin qubits in semiconducting quantum dots which have the advantage of being inherently small and fast: In principle, it is possible to fit a billion spin qubits on a square centimeter chip and have them function at a clock speed of GHz. I will mention recent developments and challenges for implementing surface code structures, in particular for Si or Ge hole-spin qubits in combination with superconducting striplines.

Einführung: Prof. Dr. A. Wieck

Die Fakultät lädt alle Interessierten herzlich ein.

Ab 11.45 Uhr Kaffee/Tee im Hörsaal