



Seminarankündigung

**Dienstag, 19. Juni 2012
17:15 Uhr**

WSI, Seminarraum S 101

“Electron-spin-based-quantum computing: Where are we?”

The spin, is predicted to be a good candidate for quantum bits. Advances in semiconductor quantum dot technology have enabled us to detect and coherently manipulate the single electron spin, e.g. However, for quantum computation the one-qubit operation is not sufficient. In addition an entangling two-qubit operation is necessary.

In this talk I will provide an overview about the progress of spin based quantum computation with quantum dots. After a brief description of various spin qubit designs and recent results in this field, I will introduce our work. Here, we show that an entangling two-qubit operation can be achieved by using a double quantum dot with a split micro-magnet design. With our approach we are able to create a sequence of various quantum operations, including specific single spin rotations and a two-qubit exchange operation in the inhomogeneous magnetic field produced by the micro-magnets. The results are highly important to achieve the universal set of quantum operations necessary for quantum computation.

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