



Seminarankündigung

**Dienstag, 7. Februar 2017
16:15 Uhr**

WSI, Seminarraum S 101

“Nuclear spin dynamics, thermodynamics, and structural analysis in quantum dots using nuclear magnetic resonance (NMR)”

Semiconductor quantum dots in group III-V materials are promising for quantum information technologies: the spin of the electron trapped in a dot can act as a basic quantum logic gate, while optical excitation and recombination provides a route for devices scaling. On the other hand, in all III-V materials electron spin is strongly coupled to the nuclear magnetic moments – this is both a challenge for achieving long electron spin qubit coherence and an interesting object for the studies of mesoscopic many-body spin phenomena.

In this talk, I will show how optically detected nuclear magnetic resonance (NMR) can be used to study and manipulate nuclear spins of individual quantum dots. I will review the results on coherent spin dynamics and discuss recent studies of the thermodynamics of the nuclear spins: Techniques for spin thermometry of the nanoscale spin ensembles will be presented, and the origin of quasi-equilibrium nuclear spin state induced by optical cooling will be discussed. Furthermore, recent progress in non-invasive structural analysis of individual quantum dots using NMR will be reported.

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