Seminarankündigung

Dienstag, 17. Mai 2016
16:15 Uhr

WSI, Seminarraum S 101

"Few-second-long correlation times in a quantum dot nuclear spin bath probed by frequency-comb nuclear magnetic resonance spectroscopy"

Self-assembled quantum dots in III-V semiconductors are of great interest for applications in quantum information processing due to their favourable optical properties. However, interaction with a bath of ~10^5 non-zero nuclear spins strongly limits the electron spin coherence times. Hence a comprehensive understanding of the nuclear spin bath properties is desirable in order to design a stable environment for the confined charge spin.

In this talk, I will introduce a versatile new frequency comb nuclear magnetic resonance (NMR) technique to determine the homogeneous NMR lineshapes in a weakly-invasive low-power measurement. Using the homogeneous lineshape of one isotope as a sensitive probe, we measured the elusive nuclear spin flip-flop correlation times of a second isotope. Extremely long correlation times exceeding 1s are attributed to the suppression of nuclear spin flip-flops due to inhomogeneous strain. We conclude that the charge spin coherence times in self-assembled quantum dots are not limited by *direct* nuclear-nuclear interactions up to sub-second timescales in high magnetic fields.

Dr. Andreas Waeber
Walter Schottky Institut Garching
Germany