

SONDERSEMINAR

- am:** Mittwoch, 14. Juli 2010
- Uhrzeit:** 10:00 a.m.
- spricht:** Dr. Matthew Rakher
Center for Nanoscale Science
and Technology
National Institute of Standards & Technology
NIST
USA
- Thema:** Quantum Optics with Semiconductor Quantum Dots
- Ort:** Lehrstuhl Prof. T.W. Hänsch
Schellingstr. 4/IIIrd floor, Seminarraum H 311
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gez. Prof. T.W. Hänsch

Abstract

Semiconductor quantum dots (QDs) have recently developed into an interesting platform for conducting experiments at the intersection of quantum optics and condensed matter physics. Combined with nanofabrication techniques to create ultra-small optical cavities, QDs can be used to create bright single photon sources and to explore the coupling between a single emitter and a single cavity mode in the regime of cavity quantum electrodynamics (QED). In this talk, I will present experiments demonstrating several cavity QED effects with QDs such as the Purcell Effect and vacuum Rabi splitting using advances at the forefront of this field including active positioning and electrically-gated structures that take full advantage of the QD's semiconductor structure.

Furthermore, I will present a recent experiment in which the telecommunications-band, single photon emission of a QD is successfully transduced to visible wavelengths using frequency upconversion. For the first time, the single-photon quantum nature of the upconverted field is explicitly measured to be preserved.