



WESTFÄLISCHE  
WILHELMS-UNIVERSITÄT  
MÜNSTER



FACHBEREICH  
PHYSIK

# › Allgemeines Physikalisches Kolloquium

› Donnerstag, 26.01.2017 um 16 Uhr c.t.

*Jun.-Prof. 'in Dr. Doris Reiter*

Institut für Festkörpertheorie, WWU Münster  
&

*Jun.-Prof. Dr. Carsten Schuck*

Physikalisches Institut, WWU Münster



## Ultrafast Optics in Nano-structured Solids & Integrated Quantum Photonics on Silicon Chips

Nowadays it is possible to fabricate solid-state structures, which have the size of a few nanometers, i.e. they are about a million times smaller than structures we experience in our everyday life. On these extreme scales, the physics is governed by the rules of quantum mechanics and fascinating effects arise. In our talks we will present several examples of physics at the nanoscale.

In the first part, Doris Reiter will present various aspects on the optical control of semiconductor quantum dots. Due to the nano-confinement, the energy in these dots is quantized. Electron-hole-pairs, so called excitons, can be excited and manipulated by laser pulses. Because the quantum dots are embedded in a crystal matrix, they are subject to interaction with the lattice vibrations, i.e., with phonons. It is shown that phonons play a crucial role for different quantum state preparation schemes.

In the second part, Carsten Schuck will present how quantum information processing can be realized with single-photons in nanophotonic waveguides. All fundamental building blocks of a quantum information processor can be realized on silicon chips by using advanced nanofabrication technology: single photon sources allow for preparing quantum states, which are then manipulated with nanophotonic circuit components before readout with superconducting single-photon detectors. It is shown how all these elements can be embedded into a scalable network of photonic integrated circuits that will eventually allow for implementing optical quantum computers.

**After the colloquium you are invited for drinks & snacks!**

Kolloquiums-Kaffee  
ab 16 Uhr vor dem Hörsaal

Wilhelm-Klemm-Straße 10  
Institutsgruppe 1 Hörsaal HS 2

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