



## Einladung

Es spricht:

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Zeit:

**Donnerstag, 28. Januar 2016, 14:15 Uhr**

Ort:

**Otto-von-Guericke-Universität Magdeburg  
Fakultät für Naturwissenschaften  
Institut für Experimentelle Physik  
Universitätsplatz 2, Gebäude 15 / Raum 054**

Thema:

**"Advanced optical signatures of single, wurzite  
GaN quantum dots"**

We review a selection of advanced optical properties of single GaN quantum dots (QDs) embedded in AlN. The entire presentation will be split into three parts, focusing either on the low-, the mid-, or the high-excitation regime and the associated optical signatures.

In the low-excitation regime we first evidence the influence of charge fluctuations and optical phonons on the mostly excitonic emission lines of single QDs. Based on a statistical analysis of hundreds of QDs, it is not only possible to extract the average, defect-induced electric field, but even a particular scaling behavior for the exciton-phonon coupling strength and the closely related longitudinal-optical (LO) phonon energy. Both scaling behaviors provide access to a commonly obscured parameter, the exciton-LO-phonon interaction volume.

Rising the optical excitation of individual GaN QDs towards the mid-excitation regime extends the already rich optical signature by distinct, biexcitonic traces. As a highlight, we will demonstrate a two-photon source based on the biexciton cascade, which maintains its promising photon statistics up to a temperature of 50 K. Further in-detail studies of this biexciton cascade even lead to the description of hybrid-quasiparticles, with prominent consequences for a wide range of quantum light sources.

Entering the high-excitation regime upon saturation of any biexcitonic emission, one starts to observe an entire zoo of multiexcitonic transitions related to individual GaN QDs. Here, we will exemplify how the conjunction of excitation power dependent and time-resolved micro-photoluminescence can finally lead to a clear assignment of all these transitions.

All presented observations can be regarded as general phenomena and evidence the state-of-the-art of single QD spectroscopy based on strongly polar material systems as the nitrides.

Gäste sind herzlich willkommen!

Prof. Dr. Jürgen Christen