



Einladung

Es spricht: **Prof. Donat As**

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Zeit: **Mittwoch, 28. Januar 2015, 10:15 Uhr**

Ort: **Technische Universität Berlin
Institut für Festkörperphysik
Hardenbergstraße 36, 10623 Berlin
Raum EW 561**

Thema: **„Cubic GaN quantum dots in cubic AlN – single photon emission and lasing in microdisk cavities“**

Abstract:

The absence of internal polarization fields in cubic group III-nitrides is the significant advantage compared to their hexagonal counterparts, especially considering low dimensional structures like quantum dots (QDs).

In this work, cubic GaN (c-GaN) QDs embedded in cubic AlN (c-AlN) confinement layers are fabricated by plasma assisted molecular beam epitaxy on 3C-SiC/Si (001) substrates. An analysis of the QD size and density distributions as a function of the GaN coverage reveals the strain driven Stranski-Krastanov process as the main QD formation mechanism. Single isolated QDs and first insights into the structural properties of overgrown QDs are obtained by transmission electron microscopy experiments. To integrate the QDs in microresonators a structuring technique, mainly based on dry chemical etching steps, is developed to fabricate freestanding c-AlN photonic structures on the 3C-SiC substrates. Microdisks are produced and investigated by micro photoluminescence (μ -PL) experiments. Whispering gallery modes are observed and analyzed by theoretical mode spectra calculations. Micro-PL studies at various excitation powers are performed to analyze the lasing emission of c-AlN microdisks.

The high QD quality enables the measurement of single c-GaN QD emission lines with narrow linewidths down to 500 μ eV. Short radiative lifetimes in the order of \sim 300 ps are obtained almost independent of the QD emission energy. Photon correlation experiments show single photon emission of c-GaN QDs with a $g^{(2)}(0)$ of 0.25 at liquid helium temperature.

Gäste sind herzlich willkommen!

Prof. Dr. M. Kneissl