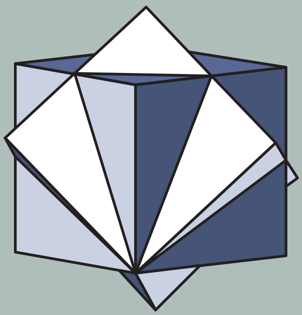
GEORG-AUGUST-UNIVERSITÄT
GÖTTINGEN



# 30th DGKK Workshop Göttingen

10th – 11th December 2015

Organized by IV. Physikalisches Institut, Georg-August-Universität Göttingen

with support from

AIXTRON

VBS VacuumBarrierSystems

DOCK/
CHEMICALS
SEMICONDUCTORS DECISION

## Session Overview

### Thursday, 10th December

| | | |
|---|---|---|
| 12:00 - 13:00 | **Registration and Welcome Snack** | |
| 13:00 - 14:00 | **Session 1** HS 2<br>Invited | |
| 14:00 - 16:00 | **Session 2A** HS 3<br>Quantum dots and laser structures | **Session 2B** HS 4<br>III/V on Silicon |
| 16:00 - 16:30 | **Coffee Break** sponsored by VBS VacuumBarrierSystems | |
| 16:30 - 18:30 | **Session 3A** HS 3<br>Structures for electronic devices | **Session 3B** HS 4<br>Semipolar and bulk III-Nitrides |
| | **Workshop Dinner** sponsored by AIXTRON | |

### Friday, 11th December

| | | |
|---|---|---|
| 9:15 - 10:00 | **Session 4** HS 2<br>Invited | |
| 10:00 - 11:00 | **Session 5A** HS 3<br>Nanowires I | **Session 5B** HS 4<br>Impurities |
| 11:00 - 11:30 | **Coffee Break** sponsored by DOCK/ CHEMICALS SEMICONDUCTORS DECISION | |
| 11:30 - 13:30 | **Session 6A** HS 3<br>Nanowires II | **Session 6B** HS 4<br>Growth and in-situ monitoring |
| | **Closing and Light Lunch** | |

# Scientific Program

## Session 1: Invited
## Thursday, 13:00 - 14:00 (HS 2)

| | | |
|---|---|---|
| 13:00 | A. Rizzi | Welcome |
| 13:15 | U. Steegmüller | LEDs and Laser Diodes: Today’s and Future Trends in Lighting |

## Session 2A: Quantum dots and laser structures
## Thursday, 14:00 - 16:00 (HS 3)

| | | |
|---|---|---|
| 14:00 | D. Quandt | Submonolayers with antimony and 1.3 µm low-density quantum dots |
| 14:20 | C. Clausen | InGaAs-quantum dots in the telecom wavelength range combined with a VCSEL as excitation source |
| 14:40 | S. Hepp | Far-field and quality factor optimized photonic crystal cavities for high collection efficiencies in quantum optical applications |
| 15:00 | A. Kaganskiy | Advanced Cathodoluminescence Lithography for the Deterministic Nanofabrication of Quantum Light Sources |
| 15:20 | R. Bek | AlGaInP disk laser design for enhanced pump efficiency |
| 15:40 | S. Seifert | Revised refractive index and absorption of InGaAsP lattice-matched to InP in transparent and absorption IR-region |

## Session 2B: III/V on Silicon
## Thursday, 14:00 - 16:00 (HS 4)

| | | |
|---|---|---|
| 14:00 | K. Werner | Sub monolayer CVD of TBP on Si (001) |
| 14:20 | C. Koppka | Reduction of rotational twin formation in GaP epilayers on Si(111) for improved III-V nanowire growth |
| 14:40 | O. Supplie | Single-domain GaP heteroepitaxy on Arsenic-modified Si(100) |
| 15:00 | A. Paszuk | Silicon p-n junctions prepared by group-V in-diffusion in CVD ambient |
| 15:20 | L. Grieger | Quantitative domain orientation analysis of GaN/Er2O3 grown on vicinal Si(001) |
| 15:40 | S. Brückner | In situ study of Ge (100) step and domain formation in MOVPE under influence of III-V residuals |

## Session 3A: Structures for electronic devices
## Thursday, 16:30 - 18:30 (HS 3)

| | | |
|---|---|---|
| 16:30 | A. Wille | Electro-optic Modulator based on 2DEG-containing AlN/ GaN superlattice structures |
| 16:50 | T. Wernicke | Exploring the limits of n- and p-type doping of AlxGa1-xN with high aluminum mole fractions x > 80% |
| 17:10 | J. Hennig | Enhancement-mode operation of AlInN/AlN/GaN HEMTs by magnesium doped GaN capping layers |
| 17:30 | B.-J. Godejohann | AlN/GaN HEMTs for High Frequency Power Electronics |
| 17:50 | S. Breuer | Carbon Doping using Pentane for GaN-on-Si HEMTs with High Vertical Breakdown Voltage |
| 18:10 | S. Fleischmann | AlGaN layers grown by HVPE |

## Session 3B: Semipolar and bulk III-Nitrides
## Thursday, 16:30 - 18:30 (HS 4)

| | | |
|---|---|---|
| 16:30 | B. Weinert | Entwicklung von 2”-FS-GaN-Substraten für den Telekommunikationssektor im Rahmen des BMBF-Projektes “TeleGaN” |
| 16:50 | F. Scholz | Planar semipolar (11-22) green InGaN/GaN LEDs grown on Patterned Sapphire Substrates |
| 17:10 | P. Horenburg | Strain dependence of indium incorporation in m-oriented GaInN/GaN multi quantum well structures |
| 17:30 | M. Caliebe | Influence of trench period and depth on MOVPE grown (11-22) GaN on patterned r-plane sapphire substrates |
| 17:50 | M. Bickermann | Bulk AlN Substrates for Deep-UV Optoelectronic Applications |
| 18:10 | E. Gridneva | Hydride Vapor Phase-Epitaxy of iron-doped GaN layers with diameters up to 100 mm |

## Session 4: Invited
## Friday, 9:15 - 10:00 (HS 2)

| | | |
|---|---|---|
| 9:15 | D. Car | Rationally Designed Single-Crystalline Nanowire Networks |

## Session 5A: Nanowires I
## Friday, 10:00 - 11:00 (HS 3)

| | | |
|---|---|---|
| 10:00 | T. Rieger | The route towards complex nanowire geometries |
| 10:20 | T. Wierzkowski | Growth Evolution of Lateral InAs Nanowires on Si (110) |
| 10:40 | A. Nägelein | Electrical characterization and modelling of p-GaAs nanowires by MT-STM |

## Session 5B: Impurities
## Friday, 10:00 - 11:00 (HS 4)

| | | |
|---|---|---|
| 10:00 | S. Bauer | Optical Characterization of GaN:Fe |
| 10:20 | M. Feifel | Impact of the III-V MOVPE Environment on the Minority Carrier Lifetime in Silicon |
| 10:40 | D. Lackner | Employing Power Dependent Relative Photoluminescence for MOVPE Process Control |

## Session 6A: Nanowires II
## Friday, 11:30 - 13:30 (HS 3)

| | | |
|---|---|---|
| 11:30 | M. Steidl | Growth kinetics of GaP-nanowires employing TBP and TMGa |
| 11:50 | H. Potts | Growth of twin-free InAs1-xSbx nanowires using MBE |
| 12:10 | O. Rettig | GaN-Nanowires for Sensor Applications |
| 12:30 | C. Tessarek | Self-catalyzed and Si-induced growth of vertically aligned InN nanorods by MOVPE |
| 12:50 | C. Blumberg | Morphology control of self-catalyzed GaN-microrods on silicon grown by MOVPE |
| 13:10 | H. Zhou | Density reduction of large hexagonal pyramidal structures in MOVPE selective area growth of 3D GaN column arrays |

## Session 6B: Growth and in-situ monitoring
## Friday, 11:30 - 13:30 (HS 4)

| | | |
|---|---|---|
| 11:30 | M. Heuken | Blue LED manufacturing optimization based on a MOCVD growth parameter sensitivity study |
| 11:50 | T. Wurm | InGaN QW growth on c-plane off-cut substrates |
| 12:10 | C. Berger | Analysis of in-situ reflectance measurements during growth of nitride-based Bragg reflectors |
| 12:30 | F. Brunner | Advanced in-situ control for GaN-based electronic devices |
| 12:50 | A. Tonkikh | Molecular Beam Epitaxy of Large Scale Hexagonal-BN on Sapphire(0001) |
| 13:10 | B. Jenichen | Structure of Fe3Si/Al/Fe3Si metal thin film stacks |

## Session 7: Closing
## Friday, 13:40 - 13:50 (HS 4)