Halbleiter-Nanophotonik

SFB 787

Einladung

Es spricht: **Prof. Dr. Nikolaus Dietz**

Dept. Physics & Astronomy and Center for Nano-Optics (CeNO), Georgia State University (GSU), Atlanta, USA

Zeit: **Donnerstag, 16. Juni 2016, 10:00 Uhr**

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

Thema: **„Development of indium-rich group III-nitride heterostructures"**

Abstract:

Indium-rich ternary group III-Nitride alloys ($Ga_{1-x}In_xN$, $Al_{1-y}In_yN$, etc.) and heterostructures over a wide compositional range are essential in high-efficient spectral agile light sources, multi-junction photovoltaic solar cells as well as advanced high-speed optoelectronics. The presently encountered processing limitations for low-pressure MOCVD growth of such ternary III-N's restrict the indium incorporation and formation of such ternary heterostructures to a narrow composition range, with a rapid degradation of the materials quality for alloys with indium content above 20-25%. The exploration of potential pathways to stabilize alloys with higher indium content and to reduce the growth temperature gap between the binaries III-N's (e.g. InN, GaN, AlN, etc.) lead to the assessment of super-atmospheric pressure MOCVD (also denoted as high-pressure chemical vapor deposition, HPCVD), plasma-assisted and/or migration-enhanced MOCVD, as well as to atomic layer deposition (ALD) processes. Such advanced deposition techniques are important in order to assess common temperature processing windows for integration and stabilization of ternary $Al_{1-x}Ga_xN$ or multinary indium/boron containing III-N alloys.
This presentation will discuss the growth of ternary indium-rich III-N's by super- / low-atmospheric MOCVD and migration-enhanced plasma-assisted CVD (MEPA-MOCVD) and the influence of the precursor pulse separations on the phase purity and stability of III-N epilayer and their resulting structural and optical properties. The aim all these approaches is to narrows the growth processing windows by narrowing the growth temperatures between the III-N binaries by either thermodynamic (pressure) or kinetics (plasma) means. Results on the growth of InN, GaN, AlN and InGaN will be presented and discussed. An outlook on ongoing research for the development of GaAlN based APD's will be given.

Gäste sind herzlich willkommen!
Prof. Dr. A. Hoffmann