



Einladung

Es spricht: **Prof. Dr. Arnab Bhattacharya**
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Zeit: **Donnerstag, 28. Mai 2015, 14:15 Uhr**

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

Thema: **„Transition-metal dichalcogenides:
promising substrates for GaN Epitaxy?“**

Abstract:

A fundamental challenge in the growth of III-nitride semiconductors has been the lack of a lattice-matched substrate, with most materials being grown on non-lattice matched substrates such as sapphire and silicon. While recipes for growth on sapphire have been developed and perfected, there has always been interest to find materials that may serve as potential lattice-matched substrates for nitride epitaxy. Layered materials such as graphene and transition-metal dichalcogenides (TMDCs) have been a subject of great recent interest due to their own unique electrical and optical properties. What has perhaps not been noticed is their relatively close in-plane lattice match with materials of the III-nitride family. The TMDCs can thus provide near-lattice-matched substrates for nitride epitaxy and enable new materials combinations for optoelectronics. Further, the weak out-of-plane interactions and absence of dangling bonds on their surface may help in controlling stress between the epilayer and substrate. However, this is an emerging area with little experimental study. There are challenges in the synthesis of large-area TMDC films and in their stability at the typical MOVPE growth conditions. I will discuss our investigations on the MOVPE growth of GaN on a range of TMDC materials, and show WS₂ and MoS₂ in particular as promising substrates for nitride growth. While most experiments are on exfoliated flakes, we also have a proof-of-concept demonstration of large-area growth of GaN on CVD MoS₂ films. The combination of III-nitrides with the transition metal dichalcogenides such as WS₂ may permit the realization of new heterostructure designs for novel devices.

Gäste sind herzlich willkommen!
Prof. Dr. M. Kneissl