Institut für Physik

Montanuniversität Leoben

A-8700 LEOBEN, Franz Josef Straße 18, Austria
Tel: +43 3842 402-4601, Fax:+43 3842 402-4602
e-mail: physics@unileoben.ac.at

S E M I N A R
aus
Halbleiterphysik und Nanotechnologie

Di, 21.6.2016, 14:30 Uhr, Hörsaal für Physik

"Interfaces and Defects in 2D Materials: Graphene and $MoSe_2$"

Prof. Dr. Matthias Batzill

Department of Physics, University of South Florida, Tampa, FL 33620, USA

Semiconductor materials with covalent bonding in a single molecular plane, such as graphene or $MoSe_2$, can be 'stacked' without lattice matching constraints. In principle, this allows combination of materials with diverse properties at the ultimate length limit of single atomic layers. In this presentation we investigate two approaches for making such hetero-materials: (i) mechanical transfer of graphene to MoS_2 and (ii) growth by molecular beam epitaxy of $MoSe_2$ on MoS_2. We use these materials to investigate fundamental properties that arise from these interfaces and synthesis procedures. In the case of graphene/MoS_2 we study the electronic structure variation in graphene due to orbital hybridization between the two materials. In the case of $MoSe_2$/MoS_2 we identify line-defects that form during the growth process. We show that these line defects have the properties of one-dimensional metals. I will discuss that electrons confined in one dimension behave fundamentally different than electrons in regular metals and give rise to exotic phenomena such as separation of spin and charge.