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S E M I N A R
on
Semiconductor Physics and Nanotechnology

Mo, 17.11.2025, 15:00 Uhr,

Seminar in
person in the Physics lecture hall *or* via Zoom

"Not-so-perfect 2D materials in vertical heterostructures and scalable devices"

Prof. Georg S. Duesberg

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2D heterostructures are engineered materials that offer custom-tailored properties not found in nature. Despite significant progress in producing high-quality, small-scale van der Waals heterostructures through manual stacking by mechanical exfoliation and assembly, major challenges for scalability and reproducibility remain. To move beyond lab-scale experiments, there is a clear need for synthesis methods that are scalable, uniform, and reproducible.

This talk explores vertical heterostructures produced via scalable synthesis techniques such as chemical vapor deposition (CVD). Direct synthesis provides a promising route to exploiting the potential of these materials for next-generation electronics, optoelectronics, and sensing technologies.

Here, we present the growth and assembly of heterostructures and devices using highly controllable, industrial-scale methods. The grown 2D materials typically deviate from perfect crystallinity, exhibiting domain sizes ranging from a few nanometers to several micrometers. The chemical and morphological properties of the heterostacks were characterized using a range of complementary techniques, including energy-dispersive X-ray (EDX) spectroscopy, Raman spectroscopy, (angle-resolved) X-ray photoelectron spectroscopy (XPS), and time-of-flight secondary ion mass spectrometry (ToF-SIMS). In particular, the latter techniques elucidate the role of impurities in 2D materials. Finally, the electrical performance of devices based on these not-so-perfect 2D materials will be discussed.

Zoom – Link:
https://zoom.us/j/96375934537?pwd=RTlKTWhSdzRHU211YTY1bGFxTUtpZz09
Meeting-ID: 963 7593 4537
Kenncode: =r=4YQ