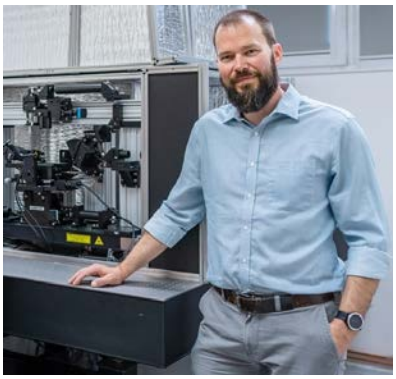
TECHNISCHE UNIVERSITÄT
IN DER KULTURHAUPTSTADT EUROPAS
CHEMNITZ

Institut für Physik
Physikalisches Kolloquium



Donnerstag, 14.12.2023, 15:30 Uhr

Ort: Reichenhainer Str. 90;
Zentrales Hörsaal- und Seminargebäude, Raum C10.013

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(Nano)spectroscopic signatures of intricate relations between 2D layers and their substrate

Standard spectroscopic investigation of two-dimensional materials and their van der Waals (vdW) heterostructures mostly relies either on diffraction-limited microRaman or photoluminescence (PL). However, these methods do not properly capture local variations caused by, for example, nanometre-sized heterogeneities emanating from contamination trapped between the layers or complicated strain and charge-doping patterns formed by strong out-of-plane interactions.

Tip-enhanced spectroscopy techniques tap into information on the local lattice deformation and also on the interaction between the individual layers composing the heterostructure. What may appear as peak splitting in micro-Raman or PL spectra of transition metal dichalcogenides (TMDC) on metal substrates or of vdW heterobilayers, can, actually, often originate from mixing up signals from various regions within the laser spot, including new or discretely shifted peaks. In other cases, nevertheless, peak splitting can indicate lifting the degeneracy of the phonon, due to, e.g., uniaxial deformation. Spectroscopic fingerprints, both on micro- and nanoscale, of variously interacting vdW layers will be discussed, including TMDCs on metals [1-3] and TMDC heterobilayers [4-6].

References:
[1] Velicky et al. J. Phys. Chem. Lett. 11, 6112 (2020)
[2] Velicky et al. Adv. Mater. Interfaces 7, 2001324 (2020)
[3] Rodriguez et al. Phys. Rev. B 105, 195413 (2022)
[4] Rodriguez et al. 2D Mater. 8, 025028 (2021)
[5] Rodriguez et al. J. Phys. Chem. Lett. 13, 5854 (2022)
[6] Rodriguez et al., ACS Nano 17, 7787 (2023)

Alle Zuhörer sind ab 15:15 Uhr zum Kaffee vor dem Hörsaal eingeladen.

Informationen zum Vortrag erteilt:
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