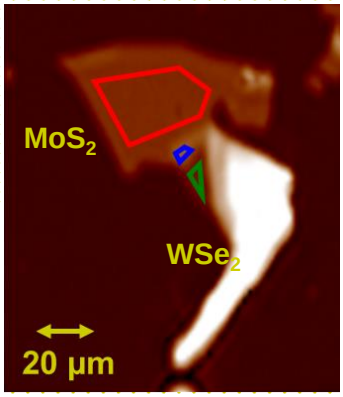
Hetero-Structure MoS_2/WSe_2 INVESTIGATED BY IMAGING ELLIPSOMETRY

SAMPLE AND SETUP:

2D-materials often show superior properties compared to their bulk or few-layer materials. The stacking of different mono layered materials do even promise more interesting combinations. MoS_2 and WSe_2 show strong excitonic dominated behaviour. In theory, the stacking shows the opportunity of intra-layer excitons.
Imaging ellipsometry with the **nanofilm_EP4** offers highest lateral ellipsometric resolution down to 1 µm. It combines the sensitivity for thickness and refractive indices measurements of ellipsometry with the benefits of magnification and lateral resolution from optical microscopy. Spectroscopic dispersions can be obtained by varying the wavelength.

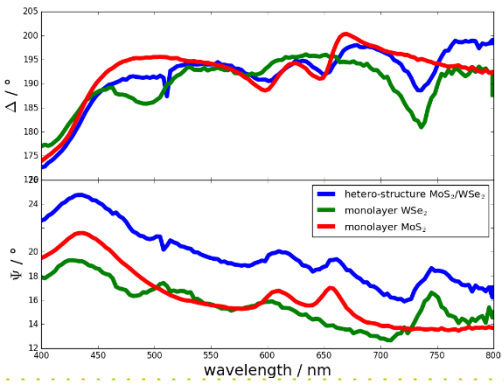
MEASUREMENT:



The mechanically exfoliated flakes of MoS_2 and WSe_2 are stacked, that their mono layered regions overlap. The unique feature knife-edge illumination of the **nanofilm_EP4** is used to avoid disturbing backside reflections from the thin, transparent glass substrate. The Ψ map on the left (λ = 450 nm) shows differentiated contrast for both monolayer regions and the hetero-structure. The overlapping area is 2 µm x 6 µm sized. The 20x objective offers high lateral ellipsometric resolution within a field of view of 150 µm x 150 µm. The wavelength is varied from 400 nm to 800 nm. All regions inside the field of view are measured simultaneously.

RESULTS:

- Spectroscopic Δ, Ψ values/maps for MoS_2, WSe_2 and the overlapping hetero-structure within one single measurement
- Refractive indices for each regions independently



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