



# Seminarankündigung

**Dienstag, 4. April 2017  
16:15 Uhr**

**ZNN, Seminarraum EG 0.001**

## **“Electronic interactions and non-invasive manipulations of two-dimensional materials”**

Coulomb and electron-phonon interactions largely shape the electronic and optical properties of 2d materials. They affect band gaps and excitons in 2d semiconductors like MoS<sub>2</sub> and lead to a competition of different metallic, insulating and superconducting phases in nominally metallic 2d materials like NbSe<sub>2</sub> or TaS<sub>2</sub>. We discuss which of these effects can be manipulated by external screening and hybridization. First, we consider 2d semiconducting monolayers in a dielectric environment and reveal a two-faced nature of interaction effects leading to a complex interplay of band gap changes and exciton binding effects. We show how this interplay leads to the prospect of trapping and guiding of excitations by means of tailor-made dielectric substrates. Afterwards, we analyze how correlated electronic states in materials like NbSe<sub>2</sub> or TaS<sub>2</sub> change upon going from bulk to monolayers. We show that superconducting states in these materials are surprisingly robust against variations in external screening but that they are very sensitive to hybridization effects with neighboring layers and substrates. We introduce the concept of pseudodoping which appears to be ubiquitous in metallic 2d systems.

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