



# EINLADUNG zum IFP-SEMINAR

## 2D material photonics and (opto-)electronics

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Host: Silke Bühler-Paschen  
Termin: Mittwoch, 28. November 2018, 16:00 Uhr  
Ort: Institut für Festkörperphysik, TU Wien  
Wiedner Hauptstraße 8-10, 1040 Wien  
Seminarraum DC rot 07 (roter Bereich, 7. OG)

### Abstract:

The materials that have enabled the information technology revolution over the past decades will soon reach their physical limits. Novel nanomaterials and technologies have therefore become a major focus of current solid-state research, with two-dimensional (2D) atomic crystals being one of the most promising candidates. Graphene, a 2D structure of carbon atoms with unorthodox electronic properties, is the most prominent representative of the 2D material family. More recently, transition metal dichalcogenides (TMDs) have come into the focus of interest, as these offer properties that complement those of graphene.

In this talk I will review some of our recent activities in the field of 2D material photonics and (opto-)electronics, in particular: (i) Electrically-driven light emission from higher-order correlated excitonic states in high-quality encapsulated  $\text{WSe}_2$  monolayers. (ii) Optical second harmonic generation in strained 2D semiconductors, which allows extraction of the full strain tensor with a spatial resolution below the optical diffraction limit. (iii) Large-area  $\text{MoS}_2$  growth by chemical vapor deposition, together with the development of large-scale integrated circuits. (iv) Graphene integration into silicon photonic chips for ultra-high data rate optical communications. It is envisioned that the excellent material quality, combined with the advantages of 2D materials, such as flexibility, high mechanical stability and the possibility for hybrid integration with other technologies, could lead to novel electronic and optoelectronic applications.