

**PHYSICAL COLLOQUIUM**  
**INVITATION**

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Monday, 29.10.2018, 4.15 p.m., W2 1-148

speaks

**Dr. Ursula Wurstbauer,**

**Walter Schottky Institute and Physics Department,**

**Technical University of Munich, Germany**

**Nanosystems Initiative Munich (NIM), Germany**

about

**“Light matter interaction in tunable 2D materials  
and their heterostructures”.**

Atomically thin two-dimensional layered materials receive great interest because of their unique properties. Particularly, monolayers of semiconducting transition metal dichalcogenides (SC-TMDs), such as MoS<sub>2</sub>, excel due to their strong light-matter interaction that is dominated by exciton phenomena [1-3]. Key to the integration of SC-TMD monolayers into circuitries is the possibility to tune and engineer their properties on demand and on-chip e.g. by defects, dielectric environment or doping [4-7].

We apply inelastic light scattering together with emission, absorption and transport measurements to study the manifold coupling mechanism in van der Waal hetero- and hybrid structures. We introduce the influence of the dielectric environment, the charge carrier density as well as defects on the optical properties of these atomically thin materials and discuss consequences for their integration into optoelectronic circuits [8]. Moreover, optical properties of direct and indirect interlayer excitons in artificial van der Waals solids are addressed.

We acknowledge the financial support by the Deutsche Forschungsgemeinschaft (DFG) via excellence cluster Nanosystems Initiative Munich (NIM) as well as DFG project WU 637/4-1.

### References

- [1] U. Wurstbauer, et al. J. Phys. D: Appl. Phys. 50, 173001 (2017).
- [2] S. Funke, et al., J. Phys.: Condens. Matter 28, 385301 (2016). [3]  
B. Miller, et al., Nano Lett. 17(9), 5229–5237 (2017).
- [4] S. Diefenbach, et al., J. Phys. Chem. C, 122 (17), 9663–9670 (2018).
- [5] J. Klein, et al., 2D Materials 5, 011007 (2018).
- [6] J. Wierzbowski, et al., Nature Scientific Reports 7, 12383 (2017).
- [7] B. Miller, et al., Appl. Phys. Lett. 106, 122103 (2015).
- [8] E. Parzinger, et al., Nature 2D material 1, 40 (2017).

All interested persons are cordially invited. Sgd.

Prof. Dr. Christoph Lienau