



## Walther-Meißner-Seminar

**Walther-Meißner-Institut, Seminar Room 143 (limited seats) & virtual via Zoom**

**Date:** **Special date: Monday, 14 December 2020, 10:00 h**

**Speaker:** **Fabian Kronowetter**

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**Title:** **Temporal Coherence of the Excitonic Emission in TMDC Heterostructures**

**Abstract:**

Single layer transition metal dichalcogenides (TMDCs) are direct band gap semiconductors exhibiting strong light-matter and Coulomb interactions. TMDC heterostructures, which are fabricated by vertically stacking TMDC monolayers, can host so-called interlayer excitons, where electrons and holes are spatially separated. The unique combination of strong binding energies and large lifetimes makes interlayer excitons in TMDC heterostructures a promising platform for studying correlated phases. We investigate the temporal coherence properties of light emitted by radiative recombination of interlayer excitons in atomically thin MoSe<sub>2</sub>/WSe<sub>2</sub> heterostructures. The underlying linewidth broadening mechanisms are found to be strongly governed by Lorentzian statistics. The temporal coherence length of interlayer excitons at cryogenic temperatures is on the order of 50  $\mu\text{m}$ , corresponding to a coherence time of about 170 fs. Here, we gain insight into the fundamental excitonic properties in TMDC-based heterostructures, which is a prerequisite for correlated many-body phenomena and a first step towards the realization of a degenerate exciton Bose gas.