# Physikalisches Kolloquium — Physics Colloquium

**Einladung** — **Invitation**

# Monday, 15 April 2024

**BE AWARE - ROOM CHANGE - Lecture Hall O25/H2, at 16:15**
**Coffee and cookies will be served in front of the lecture hall from 16:00**

## Exciton dynamics in strained 2D semiconductors


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https://www.uni-muenster.de/Physik.PI/Bratschitsch/group/michaelis.html



2D semiconductors have opened up a vast and exciting field that connects fundamental physical phenomena with quantum information applications. Monolayers of transition metal dichalcogenides (TMDs) are highly flexible, exhibit considerable light emission and ultrafast non-equilibrium dynamics. Their optical and electronic properties are governed by a rich landscape of tightly bound excitons, including regular bright excitons, as well as optically inaccessible dark exciton states. Along with the ability to stack layers of different 2D crystals into hetero-structures and the emergence of quantum light emitters in various 2D materials such as $WSe_2$ and hBN they are promising candidates for novel (quantum) optoelectronic devices.

Recently, strain engineering of monolayer TMDs has been introduced to tune their optical properties, such as the exciton transition energy or the exciton-phonon coupling. In addition, strain has been also proposed to control the transport of excitons, which as neutral particles cannot be manipulated by external electric fields. In my presentation, I will give an introduction into the physics of 2D materials and provide an overview of how strain impacts the optical properties and excitons of 2D semiconductors. In particular, I will explain the counter-intuitive effect of inhomogeneous strain on the transport dynamics of excitons.


Host: Prof. Dr. Johannes Hecker Denschlag, Institute of Quantum Matter

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