



## Sonderforschungsbereich 1277

Emergent Relativistic Effects in Condensed Matter -  
From Fundamental Aspects to Electronic Functionality



### SFB – Colloquium

Speaker: **Prof. Dr. Ming-Hao Liu**

National Cheng Kung University, Taiwan

Date: Tuesday, 07 February 2023, 14:15, H34

Topic: Electronic transport in twisted van der Waals 2D materials



#### Abstract:

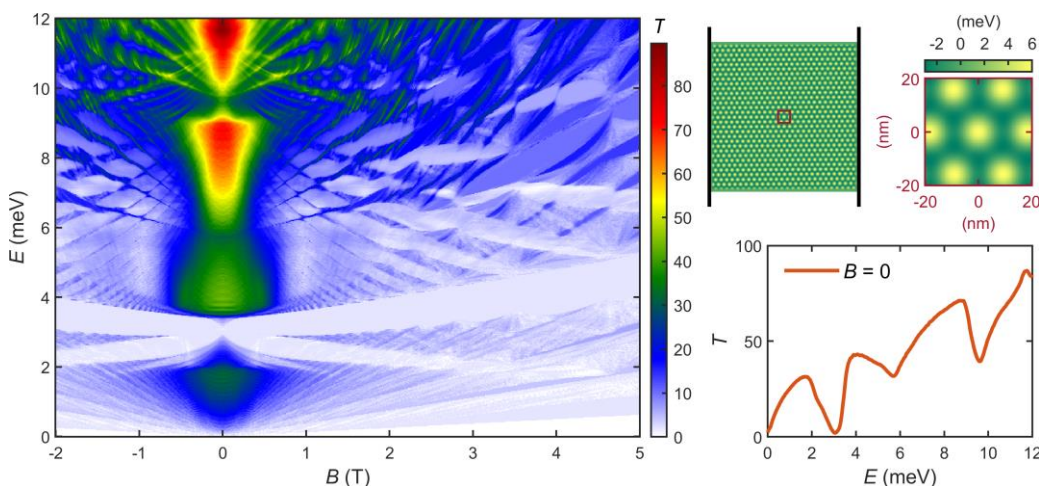
The discovery of monolayer graphene in 2004 using mechanical exfoliation led to the era of 2D materials. Subsequent nanotechnological developments making use of the weak van der Waals interaction, particularly the so-called tear-and-twist technique, eventually led to the recently emerging field of twistronics, where different types of superlattices are formed by stacking atomic layers of 2D materials on top of each other, whether twisted or untwisted, homogeneous or heterogeneous. In this talk, recent transport experiments and simulations for graphene systems are briefly reviewed, including various combinations of graphene (Gr) and hexagonal boron nitride (hBN): Gr/hBN [1], hBN/Gr/hBN [2], Gr/Gr [3], and Gr/hBN/hBN. When time allows, recent work on twisted MoS<sub>2</sub> systems based solely on our theoretical calculations will also be shown, pointing the experimentalists to new challenges.

[1] R. Kraft et al., Phys. Rev. Lett. **125**, 217701 (2020).

[2] L. Wang et al., Nano Lett. **19**, 2371 (2019).

[3] A. Mreńca-Kolasińska et al., 2D Mater. **9**, 025013 (2022).

Host: Prof. Dr. Klaus Richter



*Transmission spectrum of a two-terminal MoS<sub>2</sub> monolayer in the presence of a superlattice model potential arising from the moire pattern of bilayer MoS<sub>2</sub> twisted by about 1 degree.*