

## PHYSIKALISCHES KOLLOQUIUM

### Sommersemester 2023

Das Kolloquium findet (soweit nicht anders angegeben) **jeweils montags um 17:15 Uhr in Präsenz im Röntgen-Hörsaal des Physikalischen Instituts, Hubland Campus Süd, Universität Würzburg** statt.

**22.05.2023**

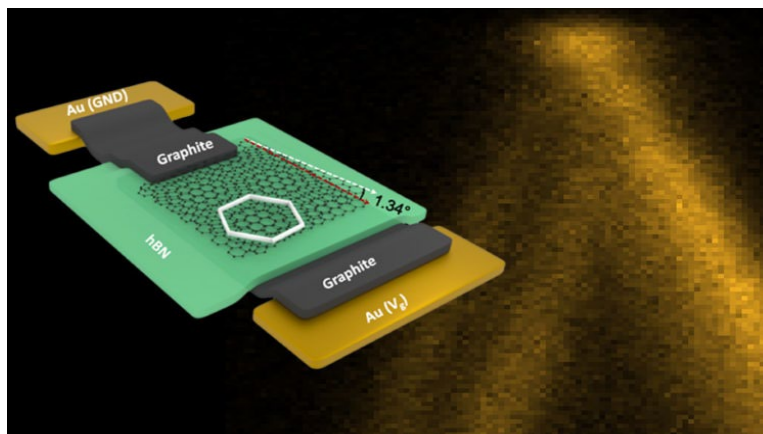
Prof. Dr. Felix Baumberger  
Universite de Genève, Faculte des sciences

#### **Moiré bands in 2D materials**

##### **Abstract**

Van der Waals bilayers stacked with a small twist-angle between the layers form lateral moiré superlattices. This profoundly affects the transport and optical properties of the materials, as exemplified by the recent discoveries of superconductivity in magic angle bilayer graphene [1] and of correlated insulating phases at integer and fractional filling in twisted transition metal dichalcogenides [2]. It is generally believed that these remarkable manifestations of many-body physics arise from flat minibands forming in the moiré superlattice.

Recent advances in sample fabrication and photoemission instrumentation now allow for direct electronic structure measurements of moiré systems fabricated with the top-down methods developed for transport and optical studies. In this talk, I will address the specific challenges of device fabrication for electron spectroscopy and discuss nano-ARPES results on twisted bilayer graphene and transition metal dichalcogenide moirés [3,4].



## References

- [1] Y. Cao et al., *Unconventional superconductivity in magic-angle graphene superlattices*, Nature **556**, 80 (2018).
- [2] K. F. Mak and J. Shan, *Semiconductor moiré materials*, Nature Nanotechnology **17**, 686 (2022).
- [3] S. Lisi et al., *Observation of flat bands in twisted bilayer graphene*, Nature Physics **17**, 189 (2021)
- [4] G. Gatti et al., *Observation of flat G moiré bands in twisted bilayer WSe<sub>2</sub>*, arXiv:2211.01192 (2022)

Für die Dozentinnen bzw. Dozenten der Fakultät

PD. Dr. Meyer, Prof. Dr. Klemmt, Dr. Fromm, Dr. Feichtner und Hr. Kögel