Symposium Physics of van der Waals 2D heterostructures (SYWH)

jointly organized by
the Low Temperature Division (TT),
the Thin Films Division (DS),
the Semiconductor Physics Division (HL),
the Magnetismn Division (MA), and
the Surface Science Division (O)

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Van der Waals heterostructures based on 2D layered materials provide an exciting platform to engineer and control electronic, transport, optical and magnetic properties. Novel phenomena, which arise from twisting, straining, gating, or doping of the heterostructures are a subject of intensive investigations in Germany and worldwide. Emergence of strong correlations, stemming from band flattening in twisted bilayer graphene is a spectacular example of how radically the electronic structure can change by misaligning the weakly bonded layers. In addition to twisted graphene bilayers, which exhibit superconductivity at the magic angle, researchers find remarkable effects in twisting transition metal dichalcogenides. Novel topological phases have been observed in engineered 2D nanostructures and van der Waals heterostructures harbor fascinating many-body excitations which give distinct optical responses. Finally, it has been shown that ultrafast laser field application allows for a striking control over the carrier dynamics in the 2D realm, allowing to push the carriers across the valleys in the momentum space. The aim of this symposium is to present an overview of those recent developments by leading experts in this forefront area of condensed matter physics.

Overview of Invited Talks and Sessions

(Lecture hall HSZ 02)

Invited Talks

SYWH 1.1	Wed	15:00–15:30	HSZ 02	**Engineering 2D materials with a twist** — •Cory Dean
SYWH 1.2	Wed	15:30–16:00	HSZ 02	**Flat Bands and Correlated Electronic States in Two Dimensional Atomic Crystals** — •Eva Y. Andrei
SYWH 1.3	Wed	16:00–16:30	HSZ 02	**Lightwave electronics and valleytronics in van der Waals layered materials** — •Rupert Huber
SYWH 1.4	Wed	16:30–17:00	HSZ 02	**Interaction and Topological Effects in Atomically Thin Two-dimensional Materials** — •Steven G. Louie
SYWH 1.5	Wed	17:00–17:30	HSZ 02	**Excitons in 2D Semiconductors and Heterostructures** — •Alexander Högele

Sessions

SYWH 1.1–1.5	Wed	15:00–17:30	HSZ 02	**Physics of van der Waals 2D heterostructures**