RUB

PHYSIKALISCHES KOLLOQUIUM

SOMMERSEMESTER 2023

Montag, 03.07.2023, 12 Uhr c.t.

COMPLEX QUANTUM PHASES IN FLAT-BAND VAN-DER-WAALS SYSTEMS: MAKING, CONTROLLING AND MEASURING BY QUANTUM TRANSPORT

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The exchange interaction can lead to correlated states in low dimensional systems such as the graphene family. Regions of large density of states are especially prone to correlation effects. In this talk I will give an introduction into the making of flat-band-systems by Morié or electrostatic engineering. I will also discuss how to probe such states by low temperature charge transport. Finally I will discuss two of our recent experiments. First, the recently identified exchange driven quantum anomalous Hall (QAH) nu=2 state that exhibits quantized charge Hall conductance close to zero magnetic field as well as spin, valley and spin-valley anomalous quantum Hall effects and outof-plane ferroelectricity in suspended bilayer graphene. And second our recent measurements in h-BN encapsulated Bernal bilayer graphene where we realized flat



electronic bands at an electric-field tunable van-Hove-singularity and placed the Fermi level in them via electrostatic gating. In such device structures we have found indications of exotic states consistent with for example a Chern insulator finite density in the valence band.

Die Einführung erfolgt durch Michael Scherer

Die Fakultät lädt alle Interessierten herzlich ein. Die Veranstaltung findet im Hörsaal HNB und hybrid via Zoom (Link online oder per QR-Code) statt.





Physik und Astronomie from matter to materials