

SONDERKOLLOQUIUM

zur Ausschreibung – W2-Proessur für theoretische Quanten-
Vielteilchenphysik

9. April 2025 um 9:00 Uhr

BCTP, Wegelerstraße 10, Seminarraum I (2.019)

Dr. Valentin Crepel

Center for Computational Quantum Physics -- Flatiron Institute (New York, USA)

Towards anyon control in moiré quantum simulators

Recent experimental breakthroughs on hetero-structures composed of twisted atomically thin semiconducting layers have demonstrated (i) the existence of phases analog to fractional quantum Hall states in the absence of magnetic fields, and (ii) a high degree of tunability and versatility in sample design, including non-uniform gating or metallization-induced superconductivity. In this talk, I will review these achievements and argue why, together, they promote moiré systems as unique platforms to realize, manipulate and control anyons. These long sought-after quasiparticles possess, amongst other properties, fractional statistics and can be harnessed to perform fault-tolerant quantum computation. For this, I will use concrete models that integrate the aforementioned experimental building blocks and can yield, if realized, localized anyonic quasi-particles never isolated before or novel itinerant anyonic phases that could not exist in quantum Hall systems.

Join Zoom Meeting

<https://uni-bonn.zoom-x.de/j/64252761213?pwd=U69G2w5W1mexudZUYl628jDZdXluNP.1>

Meeting-ID: 642 5276 1213

Kenncode: 189923