

JITCP Seminar

THE UNIVERSITY OF HONG KONG
HKU-UCAS JOINT INSTITUTE OF THEORETICAL AND COMPUTATIONAL PHYSICS
[Thursday afternoon, 4 pm, Zoom (online)]

Fractional Chern Insulators in Topological Flat Bands

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Fractional Chern insulators (FCIs) generalize the conventional fractional quantum Hall effect (FQHE) from continuum two-dimensional (2D) electron gases to lattice setups. They typically arise when a nearly flat 2D Bloch band with nonzero Chern number is partially occupied by strongly interacting particles. Band topology and interactions endow FCIs intrinsic topological orders. Since in principle FCIs can exist at zero magnetic field and be protected by a large energy gap, they provide a potentially experimentally more accessible avenue for observing and harnessing FQHE phenomena. Moreover, the interplay between FCIs and lattice-specific effects poses new theoretical challenges. In this talk, I will give a general introduction of FCIs, and present our recent results on FCIs in moire materials. We find topological flat bands in moire materials such as magic-angle twisted bilayer graphene are indeed a remarkably versatile platform for realizing FCIs and studying the intriguing interplay between topology, geometry, and interactions.

About the speaker:

Zhao Liu got his PhD degree at Institute of Physics, Chinese Academy of Sciences in 2012. He did postdoctoral research at Princeton University (2013-2015) and Free University Berlin (2015-2018). Since 2018, he is an assistant professor at Physics Department, Zhejiang University. His research interest focuses on strongly-correlated topological phases, disorder and localization, and non-equilibrium dynamics.

Online Zoom Seminar

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