



## Weekly Seminar

### Fractional Chern Insulators in moiré flatbands

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*Temple University*



**Time: 3:00 pm, Feb. 28, 2024(Wednesday)**

**时间: 2024年2月28日 (周三) 下午3:00**

**Venue: Room w563, Physics building, Peking University**

**地点: 北京大学物理楼, 西563会议室**

#### Abstract

Moiré material has been of intense interest for the range of correlated electron phenomena they exhibit and for the high degree of experimental tunability. Recently, fractional Chern insulators (FCI) have been experimentally observed in a couple of moiré materials, including twisted TMD and moiré graphene systems. This talk presents an exact geometric criterion for the stability of FCI in general flatbands and discuss its implications to moiré systems. The common wisdom to find FCI is to engineer material to approach the limit with uniform Berry curvature. Here we will disprove such common lore by showing a new theory (ideal band) that emphasizes the importance of quantum metric. Ideal band is proved to allow exact FCI ground states for arbitrary amount of Berry curvature fluctuation and is useful for future material engineering in searching for fractionalized phases in moiré and other platforms.

#### About the speaker

Jie Wang obtained his bachelor's degree from University of Sciences and Technology of China in 2013, and PhD degree from Princeton University in 2019. He did postdoc research at Flatiron institute from 2019/09 to 2022/09, and at Harvard University from 2022/09 to 2023/12. Starting from 2024/01, he is an assistant professor at Temple University. His research interest includes topological, geometric aspects of strongly interacting quantum material, including fractional quantum Hall system, moiré flatbands, cavity systems and others.