

# Condensed Matter Physics Seminar Series

## Integer and Fractional Chern insulators in moiré MoTe<sub>2</sub>

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The fractional Chern insulator (FCI), a lattice analogue of the renowned fractional quantum Hall state, was theorized to exist without external magnetic field. FCI provides a pathway towards novel topologically ordered quantum phases that are useful for decoherence-free quantum computation. Two-dimensional (2D) moiré materials, featuring strong correlation, non-trivial band topology and unparalleled tunability, stands as an ideal platform for realizing FCI. In this talk, I will first present our innovative optoelectronic detection method, which is capable of detecting the chemical potential in arbitrary 2D materials. Employing this new technique, we successfully demonstrated definitive evidence of an FCI and integer Chern insulator in MoTe<sub>2</sub>-based moiré materials.

Yihang Zeng received a bachelor's degree from Peking University in China in 2015. He then joined Columbia University for his Ph.D. studies. Under the guidance of Professor Cory Dean, he studied graphene-based systems in the quantum Hall regime, through electrical transport measurements. After obtaining his Ph.D. in 2021, he became a postdoctoral researcher in the joint group of Kin Fai Mak and Jie Shan at Cornell University as. His research there centers on investigating moiré materials using optical sensing techniques.



**Friday, December 8th at 4:00PM**

**Zoom: <https://ucla.zoom.us/j/92576210045> and 4-330 PAB**