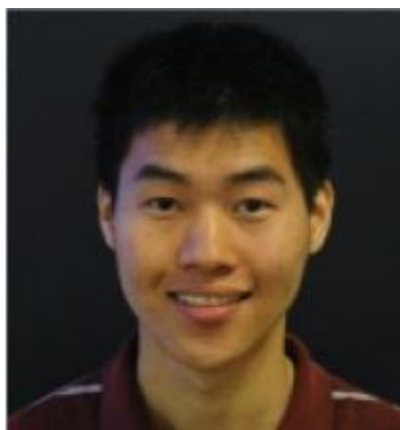


# Condensed Matter Physics Seminar Series

## Integer and Fractional Quantum Spin Hall Effects in Twisted Moiré Materials

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Spin-reserved quantum spin Hall effects are robust two-dimensional topological phases characterized by spin Chern numbers. Similar to Chern insulators, quantum spin Hall effects allow for multiple pairs of edge states, electron fractionalization, and time-reversal symmetry breaking. In this talk, I will discuss our recent observations of both integer and fractional quantum spin Hall effects in two moiré materials: twisted WSe<sub>2</sub> and twisted MoTe<sub>2</sub>. In weakly interacting twisted WSe<sub>2</sub>, only integer quantum spin Hall effects are observed at even integer moiré lattice fillings. In strongly interacting twisted MoTe<sub>2</sub>, both integer quantum spin Hall effects at even fillings and a fractional quantum spin Hall effect at an odd filling factor of 3 are observed.

Kaifei Kang is a Postdoc in the Kin Fai Mak and Jie Shan group at Cornell University, where his research focuses on investigating topological, correlated, ferroelectric, and superconducting phenomena in 2D material heterostructures. Kaifei earned his PhD in the same group in 2022.



Friday, April 5th, 2024 at 4:00PM

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