Chez Pierre

Presents ...

Monday, April 14, 2025
12:00 pm -1:00 pm
Duboc Room – 4-331

Chez Pierre Seminar

Shizeng Lin, Los Alamos National Laboratory

"Enhanced Kohn-Luttinger Superconductivity in Ideal Bands".

Kohn and Luttinger predicted that superconductivity can emerge from purely repulsive interactions. Motivated by the experimental observation of superconductivity in rhombohedral graphene, we investigate Kohn-Luttinger superconductivity in the presence of Berry curvature. Specifically, we consider a model incorporating both a dispersive band and an ideal band geometry. Our results reveal an exponential enhancement of Tc in the resulting topological superconductor. Moreover, we find that Tc exhibits oscillations as a function of the Berry flux enclosed by the Fermi surface. Interestingly, an ideal band geometry—previously identified as optimal for fractional Chern insulators—also enhances superconductivity. This suggests that systems hosting fractional Chern insulators can potentially support superconductivity as well. We will discuss the implications of our findings for the observed superconductivity in rhombohedral graphene, as well as the possibility of superconductivity in transition metal dichalcogenides moiré superlattices, where fractional Chern insulators have been experimentally realized.

Reference: A. Jahin and S.-Z. Lin, *Enhanced Kohn-Luttinger Topological Superconductivity in Bands with Nontrivial Geometry*, arXiv:2411.09664.