

Engineering and Probing Topological Phases

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报告人简介

Dr. Peng obtained his PhD degree from Freie Universität Berlin in 2017. He became a Sherman Fairchild postdoctoral fellow in theoretical physics at Caltech after graduation. He has worked on various topological systems, ranging from topological insulators and superconductors, under equilibrium and nonequilibrium conditions. He has extensive experiences on signatures of Majorana bound states in topological superconductors. He is also one of the pioneers in the field of higher-order topological insulators.



报告摘要

In this talk, he would like to provide an overview of his research over the past few years. His main research focus is on topological phases under either equilibrium or nonequilibrium conditions. This divides his talk into two (but nonorthogonal) parts.

On the equilibrium, or static, side, he first focus on topological superconductors by showing how to probe Majoranas with STM/transport and Josephson junctions. He will then consider general topological phases by introducing the higher-order topological systems, which host corner/hinge modes in 2D/3D. Moreover, he will propose a practical platform for engineering 1D chiral Majorana hinge modes in 3D.

On the nonequilibrium side, he would like to demonstrate that the time-dependence introduces new degrees of freedom and can be used to create synthetic dimensions and multiple types of boundary modes. Moreover, he will demonstrate that by engineering the driving protocol, Floquet higher-order topological phases can also be created.

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