世纪物理情·系列讲座

Classification and construction of crystalline topologicalsuperconductors and insulators in interacting fermion systems

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【 时间 】
2024/ 06 / 19（周三）
下午 4:00

【 地点 】
清华大学高等研究院
科学馆104报告厅

【摘要】

The construction and class cation of crystalline symmetry protected topological (SPT) phases in interacting bosonic and fermionic systems have been intensively studied in the past few years. Crystalline SPT phases are not only of conceptual importance, but also provide us great opportunities towards experimental realization since space group symmetries naturally exist for any realistic material. In this talk，I will discuss how to construct and classify crystalline topological superconductors (TSC) and topological insulators (TI) in interacting fermion systems. I will also discuss the relationship between internal symmetry protected SPT phases and crystalline symmetry protected SPT Phases.

【报告人简介】

Prof Gu is an internationally recognized leading expert on topological phases of quantum matter. In recent years, he and his collaborator had established a new paradigm for topological phases based on the concept of long-range entanglement. They further used classify topological phases of quantum matter in strongly correlated electron systems and developed new mathematical framework such as super tensor category theory and group super-cohomology theory. In particular, he and his collaborator proposed a new class of topological phases protected by global symmetry - the so-called symmetry protected topological phase (SPT), which made significant contribution to 2016 physical Nobel Prize. Prof Gu and his collaborator further pointed that long-rang entanglement can be locally encoded in a special class of wave functions, the tensor network states (TNS). They also developed an accurate and efficient way to simulate TNS. This new method has the potential to resolve a large class of long standing hardcore problems

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