世纪物理情·系列讲座

The power of symmetry through defects in quantum matter

【摘要】

Global symmetry is a key factor in determining the universality class of the long-distance, low-energy physics for quantum many-body systems. In recent years, it has been appreciated that unlocking the full power of symmetry requires the study of topological defects. In the first part of the talk, we will discuss how symmetry and the associated notion of anomaly explain the subtle interplay between lattice effects and continuum field theory in quantum spin systems. Using the example of a spin-1/2 chain, we will show how the continuum limit of a lattice model is properly described in terms of a field theory with topological defects. In the second part, we will describe how measuring “disorder parameter”, the expectation value of a defect operator, provides new probes into various quantum phases of matter, such as defect quantum dimensions in gapped phases, and universal logarithmic corrections at quantum critical points.

【报告人简介】

Meng Cheng is an Assistant Professor of Physics at Yale University. He received his undergraduate degree from Nanjing University (China). In 2013, he obtained his Ph.D degree from the University of Maryland, College Park, where he studied topological superconductivity and its applications in quantum information processing. He then moved to a postdoctoral researcher position in Microsoft Research, Station Q in Santa Barbara, during which he investigated the interplay of global symmetry and topological quantum order. He joint the Department of Physics at Yale University in 2016.

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