学术报告

Title: **Symmetry and Topology in Non-Hermitian Systems**

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Time: **4:30pm, Saturday, June 8, 2019**

Venue: **Conference Hall 322, Science Building, Tsinghua University**

Abstract

The ideas of topology have found great success in Hermitian physical systems, but the incorporation of non-Hermitian effects may lead to even richer possibilities. Here, we present three results regarding the roles of symmetry and topology in non-Hermitian physical systems. First, we theoretically propose and experimentally demonstrate a bulk Fermi arc that develops from non-Hermitian radiative losses in an open system of photonic crystal slabs. Moreover, we discover half-integer topological charges in the polarization of far-field radiation around the bulk Fermi arc. Next, we provide a systematic classification of non-Hermitian symmetry protected topological phases in arbitrary spatial dimension, based on the Bernard-LeClair symmetry classes. We discuss the physical insights provided by such a classification, and how it can serve as an important guide for future searches of non-Hermitian topological systems. Finally, we discuss how symmetries can protect the existence of a surface of exceptional points, which are a natural generalization of Hermitian topological nodal phases.

References:

[1] "Observation of bulk Fermi arc and polarization half charge from paired exceptional points", H. Zhou*, C. Peng*, Y. Yoon, C. W. Hsu, K. A. Nelson, L. Fu, J. D. Joannopoulos, M. Soljacic, B. Zhen, Science 359, 1009-1012 (2018)

[2] "Exceptional surfaces in PT-symmetric non-Hermitian photonic systems", H. Zhou, J. Y. Lee, S. Liu, and B. Zhen, Optica 6, 190 (2019)

[3] "Periodic table for topological bands with non-Hermitian Bernard-LeClair symmetries", H. Zhou, J. Y. Lee, arXiv:1812.10490 (2018)