Massachusetts Institute of Technology
Department of Physics

Condensed Matter Theory Seminar

"Non-Hermitian symmetry-protected topological phases"

Simon Lieu, Imperial College-London

Abstract: Topological band theory was developed to predict and explain robust features in the electronic structure of insulators and superconductors. Are these ideas applicable to photonic bands or Bogoliubov spectra in cold atoms? In this talk, I will discuss the topology of "non-Hermitian Hamiltonians." The formalism can be used to make robust statements concerning edge modes in a dissipative, quenched, or generically out-of-equilibrium environment. While non-Hermitian Hamiltonians have been experimentally realized in classical optics with gain/loss, quenched bosonic condensates offer a new platform to observe topological edge instabilities. The non-Hermitian formalism is thus relevant for both open, classical systems and closed, quantum systems. From a mathematical point of view, non-Hermiticity of the Hamiltonian results in a richer set of topological symmetry classes. I highlight the importance of the "Bernard-LeClair" classes which generalize the Altland-Zirnbauer (AZ) classes in the absence of Hermiticity. These classes represent a new direction in symmetry-protected topological phases which go beyond the AZ and crystalline symmetries.

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2:30pm
Monday, October 29, 2018
Duboc Room (4-331)

Host: Liang Fu