

Title: Non-Hermitian Eigenvalue Topology

Speaker: Casey Wojcik

Abstract: Non-Hermitian Hamiltonians are widely used in photonics to describe systems with gain and loss. There has been much recent work on understanding how topological band theory generalizes to these non-Hermitian systems. In particular, the winding of the complex eigenvalues of a non-Hermitian Hamiltonian leads to topological features which have no direct analog in Hermitian systems. In this talk I will discuss some of our recent work on this non-Hermitian eigenvalue topology, including a theoretical homotopy characterization which highlights the interplay between eigenvalue and eigenvector topology as well as connections to the braid group, and a direct experimental demonstration of eigenvalue topology in a photonic synthetic dimension system.

References:

"Homotopy characterization of non-Hermitian Hamiltonians." 15 May 2020,  
<https://link.aps.org/doi/10.1103/PhysRevB.101.205417>.

"Observation of arbitrary topological windings of a non-Hermitian band." 29 Nov 2020,  
<https://arxiv.org/abs/2011.14275>.