Kater Murch (Department of Physics, Washington University in St. Louis, US)

Title: Exceptional points and parity time symmetry in quantum microwave circuits

Abstract: This talk will present experimental studies that explore the consequences of non-Hermitian evolution in superconducting quantum circuits. I will present our realization of effective non-Hermitian Hamiltonians and Liouvillian superoperators for superconducting qubits, and the resulting dynamics that occur when periodic driving is included in the dynamics. The interplay of periodic drive and energy dissipation of quantum systems further enriches the quantum dynamics and leads to nonequilibrium steady states. Furthermore, we realize the evolution of a Parity-Time symmetry dimer in narrowband microwave parametric amplifiers. The non-Hermitian nature of the equations of motion of the cavity modes gives insight into the functionality of a Josephson parametric amplifier and sets the stage for harnessing the physics of exceptional points in large arrays of such parametric devices.

References:

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