

Title: Non-Hermitian Electromagnetics and Its Applications

Abstract: Over the past decade, non-Hermitian physics and its unique singularities—exceptional points (EPs)— have redefined wave engineering, facilitating breakthroughs in signal generation, routing, and sensing. My talk starts with reviewing non-Hermitian physics and parity-time (PT) symmetry, demonstrating how the formal similarity between Schrödinger's and Maxwell's equations enable electromagnetic systems with unconventional functionalities like unidirectional propagation and chiral dynamics. I will showcase our recent advancements in the RF and microwave domains, such as EP-based wireless sensors with unprecedented sensitivity, super-directive antennas, misalignment-tolerant wireless power transfer, and entropy-boosted electromagnetic fingerprints for cryptography and security. I will also introduce the self-dual absorber-emitter singularity in PT systems and their potential in tailoring laser thresholds and developing ultrasensitive optical and RF sensors.