

Electro-Optics and Photonics Seminar

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Few-photon quantum optics with cavities, emitters and waveguides

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Abstract

Quantum optics studies how light interacts with matter at the quantum level. The field has witnessed tremendous activity in the past two to three decades due to promising applications in quantum computation and quantum information processing. In this talk, I will discuss how architectures based on emitters, optical cavities and waveguides are used to observe and utilize quantum optical effects. I will focus on three examples of my work: (1) two-photon interference in coupled cavity arrays, (2) mechanical effects of single photons in hybrid atom-cavity optomechanics and (3) entanglement generation and control in waveguide quantum electrodynamics.

Brief Biography

Dr. Imran Mirza is currently an Assistant Professor at the Macklin Quantum Information Sciences, Department of Physics at Miami University. Before joining Miami, he was a postdoctoral fellow at the University of Michigan, Ann Arbor. He holds a physics Ph.D. from the University of Oregon.

Dr. Mirza's research interest lies in the area of theoretical quantum optics and many-body physics with primary applications in quantum information processing and quantum computation. At Miami, his research focuses on developing theoretical models to describe how light interacts with matter at a very small (atomic/quantum) scale in realistic situations where the system is allowed to interact with their surroundings (environment). In particular, his group studies how some of the key aspects of light-matter interactions can be utilized to build novel quantum technologies and to understand the underlying fundamental physics.