SPEAKER

Ravitej Uppu

Ravi Uppu joined as an Assistant Professor in the Department of Physics & Astronomy at the University of Iowa in January 2021. His research group (QLiC! Lab) focuses on developing deterministic emitter-photon interfaces that serve as the building blocks for implementing photonic quantum technologies such as quantum repeater networks and simulators. To this end, the group studies fundamental light-matter interactions and develops nanophotonic routes for controlling them using nanofabrication as well as adaptive wavefront control methods. Before joining the University of Iowa, Ravi did his research across three countries and worked with a diverse set of students and enjoys learning about different cultures and experiencing cuisines. He was an Assistant Professor at the Niels Bohr Institute (NBI) in Copenhagen in the Center for Hybrid Quantum Networks (Hy-Q) and a postdoc at NBI as well as at the University of Twente in The Netherlands in the Complex Photonic Systems (COPS) group, where he worked on quantum light scattering and deterministic multiphoton sources towards scaling up boson sampling. Ravi earned his PhD from Tata Institute of Fundamental Research in India on statistical optics of random lasers and a Bachelors of Science in Physics from the Chennai Mathematical Institute. Ravi received a seed grant from the UI P3 Initiative, Jumpstarting Tomorrow, towards building an interdisciplinary team of researchers and students across Engineering, Maths, Chemistry, and Physics that could tackle the systems challenge in scaling up of a photonic quantum simulator.

CCEM Seminar

June 6, 2023

10:30 AM to 11:30 AM

Steering photons on a chip

Abstract: Photons are essential for transmitting and transducing quantum information because of the ease with which we can generate, manipulate, and detect them. Among the variety of physical systems that were explored to generate coherent photonic qubits, none could achieve the steep performance metrics necessary for quantum advantage demonstrations. A central reason behind the shortcoming is inefficiency arising from photon loss in generation as well as manipulation schemes. I will discuss our ongoing research on steering light and light-matter interactions and illustrate how a detailed understanding and tailoring of fundamental electronic properties of single quantum emitters in combination with precision control of the nanophotonic light-matter interactions can overcome these shortcomings. I will contextualize the improvements that we achieved and discuss a way forward towards realizing a versatile platform for photonic quantum technologies, with building blocks such as single- and entangled-photon sources as well as deterministic spin-photon interfaces.

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