USC Viterbi
School of Engineering
Ming Hsieh Department of Electrical and Computer Engineering

Seminar

Generating quantum correlations between light and Microwaves with a chip-scale device

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Date: Thursday, March 28, 2024
Time: 2:00pm – 3:30pm
Location: EEB 248

https://usc.zoom.us/j/95349807608?pwd=UlZIYjVkV2tsQXVFa1pPNm9wS3VUdz09
Meeting ID: 953 4980 7608
Passcode: 547048

Abstract: Experimental capabilities in modern quantum science and engineering allow the control of quantum states in a variety of solid-state systems such as superconducting circuits, atomic-scale defect centers, and chip-scale optical and acoustic structures. Controlling interactions between physically different qubits across such platforms is a frontier in the quest to build quantum hardware at scale and to probe the coherence limits of solid-state devices. I will present recent progress on constructing a quantum interconnect between superconducting qubits and optical photons. By integrating specially engineered optical, mechanical, and superconducting microwave components in a chip-scale transducer, we made a photon pair source and used it to generate single optical and microwave photons in entangled pairs. Such devices can be used to connect superconducting qubits in distant cryogenic nodes using room-temperature fiber-optic communication channels. I will discuss open challenges with such transducers and a few near-term routes to address them. I will conclude with results from a different set of experiments where we used nanomechanical devices to control the electronic structure and coherence limits of a spin qubit in an atomic-scale defect center.

Biography: Srujan Meesala is an IQIM Postdoctoral Scholar at Caltech in Oskar Painter's research group. He received his PhD from Harvard where he worked in Marko Loncar's research group.