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

Ming Hsieh Institute **Seminar Series**

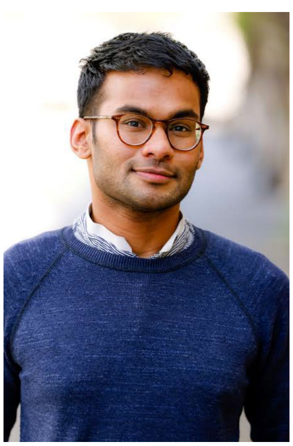
Quantum Science & Technology

A chip-scale source of entangled microwave and optical photons

Srujan Meesala
IQIM Postdoctoral Scholar
Caltech

Date: Friday, November 17, 2023
Time: 10:30am – 11:45am
In-person: EEB 132

Abstract: Classical supercomputers and the internet are based on optically connected microwave frequency processors. An analogous architecture for large-scale quantum computers and networks would involve entanglement distribution between superconducting microwave processor modules using optical communication links. Connecting quantum particles in these two vastly different platforms while preserving quantum coherence is an outstanding technical challenge. I will present a recent experimental advance where we used a chip-scale transducer to prepare entangled states of single optical and microwave photons. We achieved this through a low-noise parametric down-conversion process in a device with carefully engineered optical, acoustic and superconducting components. This device can enable a room-temperature optical interconnect between superconducting qubits cooled in separate cryogenic nodes in the near term. I will discuss open challenges and opportunities with such devices en route to the long-term vision of a distributed quantum computer.



Biography: I am an Institute for Quantum Information and Matter (IQIM) Postdoctoral Scholar at Caltech in Oskar Painter's group. Previously, I received my PhD from Harvard where I worked in Marko Loncar's group. I perform experimental research on a variety of solid-state quantum platforms including superconducting circuits, defect center spins, and nanoscale optical and acoustic devices. I am interested in connecting such platforms to address open questions on building large-scale quantum systems for computation, communication and sensing.

Hosted by: Quntao Zhang, Wade Hsu, Mengjie Yu, Jonathan Habif & Eli Levenson-Falk