Physics AT QUEENS COLLEGE

Colloquium Notice

Srivatsan Chakram

Rutgers University

Quantum information and simulations with multimode superconducting systems

Quantum information science promises to revolutionize technologies in computing, communication, and sensing. There has been dramatic progress on superconducting quantum systems, which are poised to implement medium-scale quantum simulations and algorithms for quantum chemistry, and quantum optimization. However, superconducting processors are still limited in terms of coherence and connectivity, and expensive in terms of hardware and control resources. Current qubit error rates require large numbers of physical qubits (10k - 1 million) for implementing quantum error correction. Can we significantly reduce the number of physical qubits and the hardware overhead required for fault-tolerant quantum computing? We discuss the prospects of addressing these challenges through new hardware-efficient architectures for quantum computing, that combine superconducting circuits with ultra-low-loss multimode microwave resonators. We will discuss new multimode control schemes, and applications of multimode cQED systems for bosonic quantum error correction and realizing analog quantum simulators that leverage the single-site (cavity mode) and single-particle (microwave photon) control offered by the toolbox of quantum optics.

Monday
October 3, 2022
Starts at 12:15 PM
Coffee at 12:00 PM
Physics Conference Room, SB B326
This talk is accessible via **Zoom** or use
meeting ID 829 2687 2594 and **passcode 866995** to join