

Joint Quantum Seminar

Wednesday, November 7th, 4:00 pm
Jefferson 250

Prof. Rob Schoelkopf

Yale University

“The Prospects for Scalable Quantum Computing with Superconducting Circuits”

Dramatic progress has been made in the last decade and a half towards realizing solid-state systems for quantum information processing with superconducting quantum circuits. Artificial atoms (or qubits) based on Josephson junctions have improved their coherence times more than a million-fold, have been entangled, and used to perform simple quantum algorithms. The next challenge for the field is demonstrating quantum error correction that actually improves the lifetimes, a necessary step for building more complex systems. At Yale we have been pursuing a hardware-efficient approach for error correction, that relies on encoding information in a superconducting cavity, the so-called “cat codes.” With this approach, we have applied real-time measurements and feedback to achieve the first extension of the lifetime of a quantum bit through error correction. For scaling, an attractive approach is the modular architecture, in which small quantum processors are networked together using microwave signals on superconducting transmission lines. I will present the first implementation of a teleported C-NOT gate, which is a key building block for the modular approach.

Student Presentation by Mian Zhang will begin at 4:00

Guest Presentation will begin at 4:30 PM

Refreshments will be provided

