“Superconducting Circuits for Quantum Information Processing”

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Abstract:

Superconducting circuits based on Josephson junctions are one of the leading candidates for the quantum bits, or qubits, of a scalable quantum information processor. There have been significant advances in the performance of superconducting qubits over the past decade and there is currently rapid progress in the development of systems with up to tens of qubits. In order to scale to yet larger systems, qubit coherence will need to be improved further and new techniques will need to be developed to implement more of the qubit control and readout in the low-temperature environment. We are investigating an alternate qubit design, the asymmetric transmon, that allows for a reasonable range of flux-tunability of the qubit frequency with a greatly reduced sensitivity to magnetic flux noise, which is one of the limiting sources of decoherence for superconducting qubits. In addition, we are working on an approach for integrating superconducting classical digital circuitry with superconducting qubits for control and measurement.

Biography:

Britton Plourde is a Professor of Physics at Syracuse University where he runs a low-temperature research lab for studying microfabricated superconducting circuits. Prof. Plourde received his Ph.D. from the University of Illinois at Urbana-Champaign in 2000, then worked on superconducting qubits as a postdoctoral researcher at the University of California, Berkeley.