NES21-2021-000011

Abstract for an Invited Paper
for the NES21 Meeting of
the American Physical Society

Quantum Engineering of Superconducting Qubits

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Superconducting qubits are coherent artificial atoms assembled from electrical circuit elements and microwave optical components. Their lithographic scalability, compatibility with microwave control, and operability at nanosecond time scales all converge to make the superconducting qubit a highly attractive candidate for the constituent logical elements of a quantum information processor. Over the past decade, spectacular improvements in the manufacturing and control of these devices have moved the superconducting qubit modality from the realm of scientific curiosity to the threshold of technical reality. In this talk, we present the progress, challenges, and opportunities ahead in the engineering larger scale processors.