Contribution ID: **24** Type: **Invited Speaker**

Benchmarking Quantinuum's Second-Generation Quantum Processor

Thursday, 28 September 2023 10:00 (30 minutes)

One of the main challenges facing large-scale quantum computing is scaling systems to more qubits while maintaining high fidelity operations. In this talk, I will describe our efforts at Quantinuum in scaling trapped-ion quantum computers based on the quantum charge-coupled device architecture. We recently released our second-generation machine, which has a race-track shaped ion trap. The new system incorporates several technologies crucial to future scalability, including electrode broadcasting, multi-layer RF routing, and magneto-optical trap loading, while maintaining, and in some cases exceeding, the gate fidelities of our first-generation system. We initially released the system with 32 qubits, but future upgrades will allow for more. I will describe the thorough set of benchmarking experiments we performed to characterize the system, as well as present a selection of recent results of quantum circuits that have been run on the system.

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