## Joint Annual Meeting of the Swiss and Austrian Physical Society 2023



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## [802] Scaling-up demonstrations on superconducting qubits

Thursday 7 September 2023 14:15 (30 minutes)

Quantum computers are making significant progress in their performance as measured by their scale, speed, and quality. For instance, in 2022 IBM Quantum announced a 433-qubit quantum processor and a factor of 10 increase in circuit execution speed. Furthermore, coherence times and gate fidelities have also improved as exemplified by T1 times on devices with 127 qubits which typically range from 0.2 ms to 0.3 ms. This increase in device size enables demonstrations of quantum algorithms at a larger scale than what was possible before. In this presentation we will discuss a few recent experiments featuring a large number of qubits. For instance, we will look at Trotter simulations with 127 qubits as well as depth-two quantum approximate optimization on non-planar graphs with 40 nodes. We will explore some of the quantum circuit transpilation methods and error mitigation tools that enable these demonstrations. Increasing the size of such experiments is important for the future of the quantum computing ecosystem. Crucially, this also enables the study of heuristic quantum algorithms designed for noisy hardware.

## **Theoretical Work**

Presenter: EGGER, Daniel Session Classification: Quantum Computing

Track Classification: Quantum Computing (by NCCR SPIN)