

## Towards hybrid algorithms with circuit model quantum computing on a neutral atom quantum computer

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One of the daunting challenges in developing a computer with quantum advantage is the need to scale to a very large number of qubits while maintaining the fidelity and isolation of pristine, few qubit demonstrations. Neutral atoms are one of the most promising approaches for meeting this challenge, in part due to the combination of excellent isolation from the environment and the capability to turn on strong two-qubit interactions by excitation to Rydberg states.

I will provide a snapshot of neutral atom quantum computing anno 2021, describe recent results implementing quantum gates in a large 2D array of atomic qubits, as well as efforts towards connecting multiple arrays, and present work in progress involving running VQE and QAOA on multi-qubit circuits.