# Hybrid CV-DV Quantum Processors

(a)
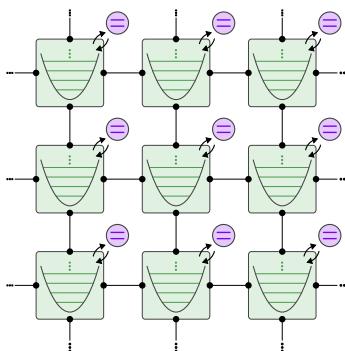
Superconducting

☷ Microwave resonator

⊖ Superconducting qubit

↻ Dispersive interaction

Trapped ion
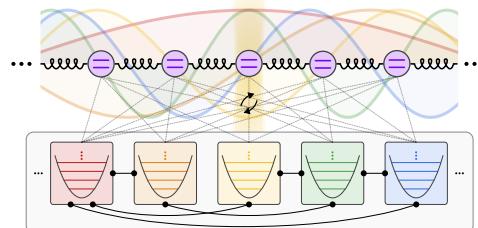
☷ Collective motional modes

⊖ Ion qubit

↻ Sideband interaction

Neutral atom
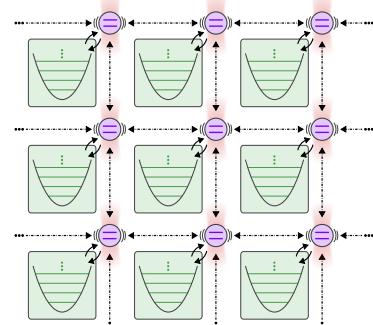
☷ Atomic motional modes

⊖ Neutral atom qubit

↻ Sideband interaction

☷ Oscillator   ⊖ Qubit   ↻ Oscillator-qubit   ●—● Oscillator-oscillator (beamsplitter)   ◄····► Qubit-qubit

Computational components   *Native interactions*

(b)

AMM 1: Qubit centric
Long-range connectivity through auxiliary bosonic modes

AMM 2: Oscillator centric
Boson sampling and simulation of interacting boson models

AMM 3: Hybrid oscillator-qubit
Hybrid algorithms and simulation of physical models w/ spins and bosons

Hybrid oscillator-qubit hardware layer