Contribution ID: **246** Type: **Poster**

Simulating Supersymmetric Quantum Mechanics Using Variational Quantum Algorithms

Tuesday 4 November 2025 18:00 (1h 30m)

The sign problem is a major obstacle for lattice studies of spontaneous supersymmetry breaking (SSB). Quantum computing provides a promising alternative approach. In particular, properties of supersymmetry relate SSB to the ground-state energy, which can be probed using hybrid quantum-classical algorithms such as the variational quantum eigensolver (VQE). I will present VQE analyses for supersymmetric quantum mechanics with various superpotentials. A key new feature is an adaptive ansatz construction algorithm that reduces the number of variational parameters within our ansätze. This lowers the resource burden on both the classical optimizer and the noisy quantum processor, thereby improving the feasibility of these calculations in the NISQ era.

Parallel Session (for talks only)

Quantum computing and quantum information

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Session Classification: Poster session