Abstract Submitted
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Benchmarking Non-Abelian Lattice Gauge Theories with NISQ Algorithms[1] ANDREW SHAW, University of Maryland, College Park — Non-Abelian gauge theories are at the heart of the Standard Model of Particle Physics, and can be treated numerically with a lattice regularization scheme. Computing the real-time dynamics of lattice gauge theories remains computationally intractable, as the only known classical algorithms are NP-complex. The discovery of polynomial quantum simulation algorithms [Lloyd, 1995], represents a promising alternative, provided scalable quantum computing platforms can be engineered. (1+1)-dimensional SU(2) fermionic gauge theory (SU2FGT) can be efficiently mapped to a quantum platform with limited qubit-connectivity, and represents the perfect testbed for benchmarking classically intractable computations on *noisy intermediate-scale quantum* (NISQ) hardware. In this work, the real-time dynamics of (1+1)-SU2FGT is simulated on IBM's 5-qubit quantum platform family. To amplify the range of accessible real-time dynamics, a set of newly-developed hybrid quantum algorithms are applied to subsidize coherence-limited quantum hardware with classical resources.

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