



Contribution ID: 26    Type: 5th week (Formal developments and other frontiers in lattice QCD)

## Quantum Simulations of the Schwinger Model: from vacuum to dense matter

*Wednesday, November 13, 2024 2:00 PM (1 hour)*

Quantum electrodynamics in 1+1 dimensions (the Schwinger model) exhibits a number of features similar to quantum chromodynamics in 3+1D, including confinement and a fermion condensate, making it the perfect sandbox during the NISQ era. In this talk, I will present new scalable algorithms that use the symmetries and hierarchy of length scales in the Schwinger model (and generally applicable to other confining theories) for simulating the real-time dynamics of hadrons on a quantum computer, and their realization on a 56-site lattice (112 qubits) using IBM's quantum computers. I will also comment on the discretization effects seen when studying heavy-hadrons propagating through a dense medium, such as energy loss and the destruction of entanglement.

**Primary author:** ILLA, Marc (University of Washington)

**Co-authors:** N. CIAVARELLA, Anthony (LBNL); J. SAVAGE, Martin (University of Washington); C. FARRELL, Roland (University of Washington)

**Presenter:** ILLA, Marc (University of Washington)

**Session Classification:** Seminar (5th week)