Contribution ID: **254**                                                                 Type: **Parallel Talk**

# How many quantum gates do gauge theories require?

*Monday, 31 July 2023 13:30 (20 minutes)*

We discuss implementations of lattice gauge theories on digital quantum computers. In particular, we investigate the number of gates required to simulate the time time evolution. Using state-of-the art methods with our own augmentation, we find that the cost of simulating a single time step evolution of an elementary plaquette is prohibitive in the current era of quantum hardware. Moreover, we observe that such a cost is highly sensitive to the scheme adopted in deriving lattice gauge theories Hamiltonians, emphasizing the need for low-dimensional formulations of lattice gauge theories in the same universality class as the desired continuum theories.

## Topical area

Quantum Computing and Quantum Information

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**Session Classification:**   Quantum Computing and Quantum Information