Contribution ID: **46** Type: **Plenary Talk**

Investigating the use of Quantum Computers for Final State Radiation(20'+10')

Thursday 25 July 2019 12:00 (30 minutes)

Particles produced in high energy collisions that are charged under one of the fundamental forces will radiate proportionally to their charge, such as photon radiation from electrons in quantum electrodynamics. At sufficiently high energies, this radiation pattern is enhanced collinear to the initiating particle, resulting in a complex, many-body quantum system. Classical Markov Chain Monte Carlo simulation approaches work well to capture many of the salient features of the shower of radiation, but cannot capture all quantum effects. We show how quantum algorithms are well-suited for describing the quantum properties of final state radiation. In particular, we develop a polynomial time quantum final state shower that accurately models the effects of intermediate spin states similar to those present in high energy electroweak showers. The algorithm is explicitly demonstrated for a simplified quantum field theory on a quantum computer. See 1904.03196 for details.

Authors: NACHMAN, Ben (Lawrence Berkeley National Lab. (US)); BAUER, Christian (Max-Planck-Institut fuer Kernphysik (MPI)); PROVASOLI, Davide; DE JONG, Wibe

Presenter: NACHMAN, Ben (Lawrence Berkeley National Lab. (US))

Session Classification: Session