Martin Salvage – Colloquium – 4/12/2018
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Title: Quantum Chromodynamics in the Exascale Era with the Emergence of Quantum Computing

Abstract:
A century of coherent experimental and theoretical investigations uncovered the laws of nature that underly nuclear physics — Quantum Chromodynamics (QCD) and the electroweak interactions.
While analytic techniques of quantum field theory have played a key role in understanding the dynamics of matter in high energy processes, they become inapplicable to low-energy nuclear structure and reactions, and dense systems.
Expected increases in computational resources into the exascale era will enable Lattice QCD calculations to determine a range of important strong interaction processes directly from QCD.
However, important finite density systems, non equilibrium systems, and inelastic processes are expected to remain a challenge for conventional computation.
In this presentation, I will discuss the state-of-the-art Lattice QCD calculations, progress that is expected in the near future, and the potential of quantum computing to address Grand Challenge problems in nuclear physics.