



Contribution ID: 8

Type: **Invited Talk**

Hadron scattering amplitudes from high-performance computing

The strong nuclear force is the residual interaction between hadrons, which are bound states of quarks and gluons. These fundamental particles interact via Quantum Chromodynamics (QCD), a strongly-coupled non-abelian gauge theory, which must be simulated on a discrete space-time lattice using high-performance computing resources. Such simulations are necessarily performed in ‘imaginary’ time, so that Monte Carlo importance sampling may be applied. While certain properties like energies and matrix elements are independent of the time signature, determining real-time scattering amplitudes from imaginary-time simulations is a challenge. Nonetheless, I will discuss recent results and future prospects for hadron scattering amplitudes from lattice QCD simulations.

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