

Physics Division Colloquium

16 October 2020

Dean Lee, Facility for Rare Isotope Beams, Michigan State University

New Tools for the Quantum Many-Body Problem

I discuss three new methods for the quantum many-body problem. The first is the pinhole trace algorithm for first principles calculations of nuclear thermodynamics. I present lattice Monte Carlo results for the phase diagram of symmetric nuclear matter. The second is the eigenvector continuation method for extrapolation and interpolation of quantum wave functions. I will show how it can be used as a fast emulator for quantum many-body calculations and a resummation method for divergent perturbative expansions. The third is the rodeo algorithm for quantum computing. This method is able to construct general eigenvectors of quantum Hamiltonians as well as the energy spectrum, transition matrix elements, and linear response functions.

To meet with the speaker (remotely), please contact the host [Kévin Fosse](#).