Contribution ID: **7** Type: **talk**

Fermion bag approach to Hamiltonian lattice field theories

Monday, 26 June 2017 10:25 (25 minutes)

Hamiltonian lattice field theories provide an alternate approach to study traditional Lagrangian lattice field theories in the strongly interacting regime. These formulations are more commonly used in condensed matter physics and may be more natural in theories at finite densities. They can be formulated both in discrete and continuous time. In the continuous time formulation they can help in reducing the fermion doubling problem. Some new sign problems are also solvable within this approach. In the discrete time formulation they are very similar to traditional Lagrangian lattice field theories but with unconventional actions. Unfortunately, traditional Monte Carlo methods for Hamiltonian lattice field theories seem to scale rather poorly with system size. Here we show that by using ideas of fermion bags we can design algorithms that help speed up these calculations and allow us to go to large lattices for the first time. Using this approach we compute critical exponents of the 2+1d Gross-Neveu model with Nf=1, which was impossible so far in Lagrangian lattice field theory.

Primary authors: Ms HUFFMAN, Emilie (Duke University); CHANDRASEKHARAN, Shailesh (Duke University)

Presenter: CHANDRASEKHARAN, Shailesh (Duke University)