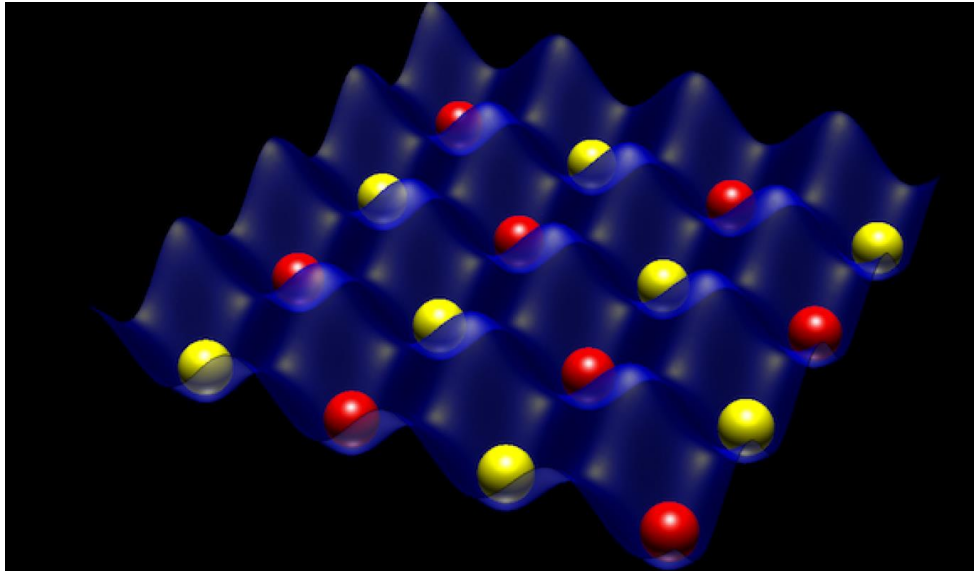


PHYSICS COLLOQUIUM



Patrick Kelly Fresno State

Exploring the Quantum Many-Body Problem with Cold Atomic Gases

Abstract

One of the greatest challenges facing the physics community in the 21st century is the accurate calculation of the dynamical properties of strongly correlated quantum many-body systems. Classical many-body physics is already extremely challenging, and the counter-intuitive behavior of quantum systems presents additional problems. Cold atomic gases provide one promising avenue to approach these problems. Of particular interest are collective excitations in cold atoms, such as the Goldstone and Higgs modes. Our work employs the accuracy of quantum Monte Carlo and the speed of the random phase approximation, to calculate the dynamical correlation functions of cold atomic gases modeled with the Fermi-Hubbard Hamiltonian. These functions are rich in detail and help us uncover hidden processes going on inside quantum many-body systems.

**3:00 p.m. - 4:30 pm, Friday, April 29th,
In-Person: McLane 162**