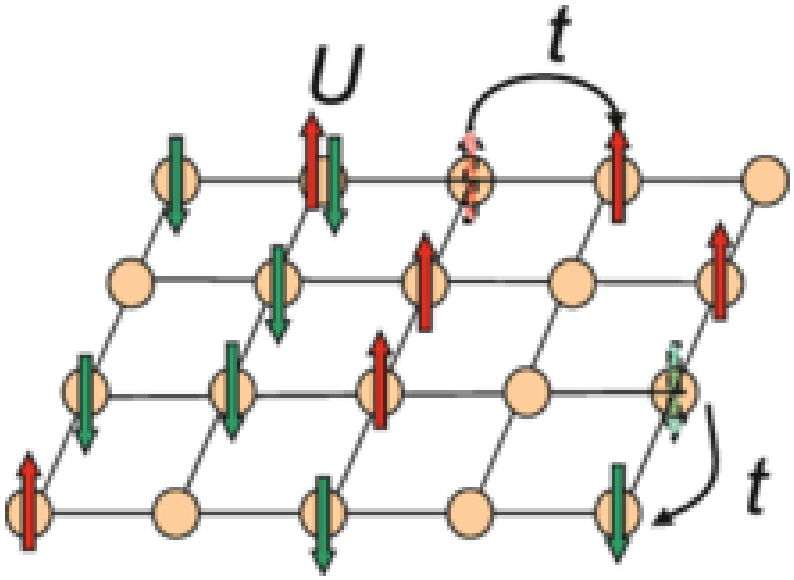
# PHYSICS COLLOQUIUM




**Harrison Mausolff**
**California State University, Fresno**

## The Hartree-Fock Approximation to the 2D Hubbard Model

**Abstract**

Condensed matter and atomic physics is principally concerned with solving the Schrödinger equation for many body systems. Different modeling methods have been developed to simplify the problem of many body systems such as the Jellium or Hubbard Model. These models often require mean-field approximations to allow for meaningful solutions. In this thesis, I will develop the 2D Hubbard Model using second quantization. I will then analyze the 2D Hubbard model using various Hartree-Fock approximations. I will end with a comparison between quantum Monte Carlo and unrestricted Hartree-Fock methods for future research.

3:00 p.m. – 4:30 pm, Friday, March 21st,
In-Person: McLane 162