



LBL Nuclear Physics Forum

Thursday, March 15, 2018 @ 11:00 am

Building 88 Lounge (2nd floor)

Cookies and coffee available from 10:45am

Prof. Mark Caprio

University of Notre Dame

“Symplectic symmetry in *ab initio* nuclear structure”

A major challenge in quantitatively predicting nuclear structure *ab initio*, directly from realistic nucleon-nucleon interactions, arises due to an explosion in the dimension of the traditional configuration interaction basis as the number of nucleons and included shells increases. The need for including highly excited configurations exists, in large part, because the kinetic energy induces strong coupling across shells. However, the kinetic energy conserves symplectic, or $Sp(3,R)$, symmetry. Combining symplectic symmetry with the no-core configuration interaction (NCCI) framework provides a means of identifying and restricting the basis to include only the highly excited configurations which dominantly contribute to the nuclear wavefunction, thereby --- it is hoped --- reducing the size of the basis necessary to obtain accurate results.

This seminar will introduce a symplectic no-core configuration interaction (SpNCCI) framework for *ab initio* calculations of the nuclear problem. We will then explore the results of initial calculations of *p*-shell nuclei in this framework. We will focus on what these calculations tell us about many-body symmetries of light nuclei.

