Abstract Submitted
for the DNP16 Meeting of
The American Physical Society

Accelerating Convergence by Change of Basis for No-Core Configuration Interaction Calculations[1] ABRAHAM R. FLORES, Michigan State University, MARK A. CAPRIO, CHRYSOVALANTIS CONSTANTINOU, University of Notre Dame — *Ab initio* no-core configuration interaction (NCCI) calculations attempt to describe the structure of nuclei using realistic internucleon interactions. However, we can only describe these many-body systems within the limits of our computational power. As the number of nucleons increases, the calculations require more memory and processing power to reach convergence. Being able to accelerate convergence is crucial in extending the reach of NCCI calculations. Convergence can be obtained through a change of basis, for which we need to compute the overlaps of the radial functions for the new basis with those for the old basis. A large number of overlaps must be computed in order to accurately transform the many-body problem. Using alternative bases also requires the calculation of the one-body matrix elements for operators such as r^2 and p^2 in the new basis. We report a computer code that uses cubic spline interpolation to compute radial overlaps and radial integrals. This code facilitates using new bases to accelerate the convergence of NCCI calculations.

[1]Supported by the US NSF under grant NSF-PHY05-52843 the US DOE under grant DE-FG02-95ER-40934.

Abraham R. Flores
Michigan State University

Date submitted: 25 Jul 2016 Electronic form version 1.4