Abstract Submitted
for the HAW14 Meeting of
The American Physical Society

$A = 10$ nuclei and ^{12}C with SRG evolved chiral three-nucleon interactions[1] PIETER MARIS, JAMES VARY, Iowa State University, ANGELO CALCI, JOACHIM LANGHAMMER, SVEN BINDER, ROBERT ROTH, Technische Universität Darmstadt — We investigate selected static and transition properties of $A = 10$ nuclei and ^{12}C using *ab initio* No-Core Shell Model (NCSM) methods with chiral two- and SRG-evolved three-nucleon interactions. We examine the dependences of observables on the SRG evolution scale and on the model-space parameters. We obtain nearly converged low-lying excitation spectra for ^{12}C. We compare results of the full NCSM with the Importance Truncated NCSM in large model spaces for benchmarking purposes in ^{12}C. The agreement of some observables with experiment is improved significantly by the inclusion of 3N interactions, e.g., the B(M1) from the first $(J^\pi, T) = (1^+, 1)$ state to the ground state of ^{12}C. However, in some cases the agreement deteriorates, e.g., for the excitation energy of the first $(1^+, 0)$ state, leaving room for improved next-generation chiral Hamiltonians. On the other hand, the excitation energies of ^{10}C, ^{10}B,and ^{10}Be are not as well converged as those of ^{12}C. In particular the lowest two $(1^+, 0)$ states of ^{10}B are sensitive to both the basis truncation parameters and the 3N interaction.

[1]Supported by the US DOE grants DESC0008485 (SciDAC/NUCLEI), and DE-FG02-87ER40371, US NSF grant 0904782; by the DFG contract SFB 634, by the Helmholtz Int. Center for FAIR within the LOEWE program of the State of Hesse, and the BMBF contract 06DA7047I.

Pieter Maris
Iowa State University

Date submitted: 01 Jul 2014 Electronic form version 1.4