Abstract Submitted
for the DNP16 Meeting of
The American Physical Society

Exploration of Similarity Renormalization Group Generators in 1-Dimensional Potentials MATTHIAS HEINZ, Ohio State Univ - Columbus — The Similarity Renormalization Group (SRG) is used in nuclear theory to decouple high- and low-momentum components of potentials to improve convergence and thus reduce the computational requirements of many-body calculations [Phys. Rev. C 75, 061001 (2007)]. The SRG is a series of unitary transformations defined by a differential equation for the Hamiltonian. The user input into the SRG evolution is a matrix called the generator, which determines to what form the Hamiltonian is transformed. As it is currently used, the SRG evolves Hamiltonian into a band diagonal form. However, due to many-body forces induced by the evolution, the SRG introduces errors when used to renormalize many-body potentials. This makes it unfit for calculations with nuclei larger than a certain size. A recent paper suggests that alternate generators may induce smaller many-body forces [Phys. Rev. C 90, 034302 (2014)]. Smaller many-body force induction would allow SRG use to be extended to larger nuclei. I use 1-dimensional systems of two, three, and four bosons to further study the SRG evolution and how alternate generators affect many-body forces induced.

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Date submitted: 25 Jul 2016 Electronic form version 1.4