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Exploration of similarity renormalization group generators in 1-dimensional potentials MATTHIAS HEINZ, The Ohio State University — 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. It includes a matrix called the generator that defines how the transformation will change the Hamiltonian. The commonly used SRG generators evolve the Hamiltonian into a band-diagonal shape. Evolving potentials using SRG induces many-body forces. If these forces are truncated at the N-body level, this systematically introduces errors from omitted (N+1)-body forces when modeling many-body systems. While established generators are fairly successful, alternative generators may converge faster, be faster to calculate, or lead to smaller many-body forces. In particular, recent findings suggest that a block diagonal generator may induce smaller many-body forces [Phys. Rev. C 90, 034302 (2014)]. We use 1-dimensional systems of two, three, and four bosons [Nuclear Physics A 818 (2009) 152-173] as a theoretical laboratory for studying how these alternative generators perform, and to observe how they induce many-body forces.

Matthias Heinz
The Ohio State University

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