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Decoupling via the Similarity Renormalization Group for Nucleon-Nucleon Forces[1] E.D. JURGENSON, R.J. FURNSTAHL, Ohio State Univ., S.K. BOGNER, Michigan State Univ. — The Similarity Renormalization Group (SRG) provides a compelling new method for decoupling low-energy nuclear physics from high-energy details. While observables are unchanged by the SRG's unitary transformations, the dependence of matrix elements on high-momentum contributions is modified by the running transformation. The SRG has the effect of partially diagonalizing the potential to a width of order the evolution parameter lambda. Because of this diagonalization, one expects a simple decoupling of the low-energy observables for these high-energy degrees of freedom. In a previous work,[2] evidence for decoupling in phase shifts and the deuteron was shown for the Argonne V18 potential. Here we extend the demonstration of decoupling to other NN potentials and up to A=6 nuclei to verify its universal nature and to show quantitatively that the residual coupling is perturbative above the energy corresponding to the SRG evolution parameter.

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[2]S.K. Bogner, R.J. Furnstahl, R.J. Perry and A. Schwenk, Phys. Lett. B 649 (2007) 488.

Richard Furnstahl
Ohio State University

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