Abstract Submitted
for the DNP07 Meeting of
The American Physical Society

**Operator Evolution via the Similarity Renormalization Group**[1]

E.R. ANDERSON, Ohio State Univ., S.K. BOGNER, Michigan State Univ., R.J. FURNSTAHL, R.J. PERRY, Ohio State Univ. — The Similarity Renormalization Group (SRG) uses unitary transformations to suppress off-diagonal matrix elements, forcing the Hamiltonian towards a band-diagonal form. An SRG transformation applied to nucleon-nucleon interactions leads to greatly improved convergence properties while preserving observables, and provides a method to consistently evolve many-body potentials and other operators.[2] Here the nature of operator evolution is explored, taking as an example the operator for the bare momentum distribution. The equivalence of a direct evolution via SRG equations and a construction from evolved eigenstates is shown. The flow of the operator and its matrix elements in the deuteron is exhibited and analyzed on the basis of the SRG flow equations for the operator. Conjectures[3] on the factorization of the unitary operator $U(\mathbf{k}, \mathbf{q})$ into $K_\lambda(\mathbf{k})Q(\mathbf{q})$ for $k < \lambda$ and $q \gg \lambda$ are explored pictorially and analytically.

[1]Supported in part by the NSF under Grants Nos. PHY-0354916 and PHY-0653312.
[2]S.K. Bogner, R.J. Furnstahl, and R.J. Perry, Phys. Rev. C 75 (2007) 061001.
[3]S.K. Bogner *et al.*, Phys. Lett. B 649 (2007) 488.

Richard Furnstahl
Ohio State University

Date submitted: 02 Jul 2007 Electronic form version 1.4