DNP07-2007-000468

Abstract for an Invited Paper
for the DNP07 Meeting of
the American Physical Society

**Correlations in Nuclei: Recent Progress on an Old Problem**[1]

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The two preeminent features of the nucleon-nucleon ($NN$) interaction are its short-range repulsion and intermediate- to long-range tensor character. These induce strong spatial-spin-isospin $NN$ correlations, which leave their imprint on the structure of ground- and excited-state wave functions. In the present talk I will review how these features influence a variety of nuclear properties—from energy spectra of low-lying states to two-nucleon density distributions to nuclear response functions—as well as the experimental evidence in support of their presence. In particular, I will show [R. Schiavilla, R.B. Wiringa, S.C. Pieper, and J.Carlson, Phys. Rev. Lett. **98**, 132501 (2007)] how tensor correlations impact the momentum distribution of $np$ pairs in the ground state of nuclei and make it orders of magnitude larger than that of $pp$ pairs for values of the relative momentum in the range (300–600) MeV/c and vanishing total momentum. This order-of-magnitude difference is seen in all nuclei considered, and has a universal character originating from the tensor components present in any realistic $NN$ interaction. It should be easily observable in two-nucleon knock-out processes. Indeed, a preliminary analysis of $(e, e'np)$ and $(e, e'pp)$ reactions in $^{12}$C finds [R. Subedi *et al.*, in preparation] that the $pp$ cross section is suppressed relative to the $np$ by a factor $\simeq 10$ in kinematics close to back-to-back emission of the two nucleons.

[1]This work is supported by the U.S. Department of Energy, Office of Nuclear Physics, under contract DE-AC05-06OR23177.