

Spin, Isospin and the short range nucleon –nucleon interaction

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The nuclear force that binds nucleons together is predominantly scalar, i.e., spin and isospin independent. This force includes tensor, spin-isospin and other components, but these parts are much weaker than the main scalar part. Since the scalar force is attractive at typical distances between nucleons in nuclei and becomes repulsive at shorter distances, it must vanish in between, and there the tensor force become important. The tensor force prefer the spins of the nucleons to be aligned (deuteron like configurations). Study of Short Range Correlation (SRC) nucleon pairs is a powerful way to investigate the short range tensor force and the illusive repulsive nucleon-nucleon core. Recent exclusive studies of SRC demonstrated that the nucleon-nucleon interaction in short distances is not sensitive to nuclear structure and exhibits a universal scaling. The fact that the nucleon-nucleon interaction is insensitive to the nuclear size enables usage of light nuclei for which experimental results can be compared to theoretical predictions. Data from a recent exclusive measurement on ^4He and from the data mining project, performed in Hall A and Hall B (CLAS), respectively, both in Jefferson Laboratory, VA, USA.

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