

Isospin Dependence of the EMC Effect and Nucleon Short-Range Correlations

Thursday, 31 May 2018 14:25 (25 minutes)

The number of Short-Range Correlated (SRC) pairs in nuclei is known to linearly correlate with the strength of the European Muon Collaboration (EMC) effect. This linear correlation has led to theoretical models of the EMC effect where primarily nucleons which are members of SRC pairs are modified. As recent work has shown, the overwhelming majority of these SRC pairs are neutron-proton (np) pairs. A consequence of np pair dominance is an isospin dependence to the EMC effect. By constructing per-neutron and per-proton SRC and EMC cross-section ratios, we show that a larger fraction of protons than of neutrons are modified in asymmetric, neutron-rich nuclei. With these new normalizations, we find that the per-neutron EMC slopes and SRC ratios both saturate much sooner than the standard per-nucleon quantities, starting already with carbon; while the per-proton values continue to increase, even going from iron to lead. In addition, we extract a universal EMC modification function based on the assumption of np pair dominance.

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Session Classification: Nuclear Forces and Structure, NN Correlations, and Medium Effects

Track Classification: NFS