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QCD and Short-Range Correlations in Nuclei

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The description of the nuclear interaction in terms of partonic degrees of freedom, and the effect of the nuclear environment on bound nucleons structure functions are two of the main outstanding questions in the study of QCD in nuclear systems. Recent high-energy proton and electron scattering experiments show that short-range interactions between the nucleons form correlated, high-momentum, neutron-proton pairs, known as Short-Range Correlations (SRC). These measurements suggest that these correlations account for 20% of the nucleons in the nucleus, and 60-70% of the kinetic energy carried by nucleons in nuclei.
These short-lived SRC fluctuations present a gateway to probing cold nuclear matter at high densities where QCD effects are maximized and have wide ranging implications to the bound nucleon structure function, the EMC effect, the NuTeV anomaly and more, with recent phenology suggesting the existence of non-nucleonic degrees of freedom in their wave function.
In this talk I will overview recent experimental studies of SRC in nuclei and recent theoretical developments. I will present new (unpublished) data on SRCs at very short distances and in asymmetric, neutron rich, nuclei. Implications for various phenomena ranging from neutrino-nucleus scattering to the isospin dependence of the bound nucleon wave function will be discussed.

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