

## Tagged EMC - Exploring the correlations between the EMC effect and nucleon-nucleon short-range correlations

Shalev Gilad and Barak Schmookler

*Massachusetts Institute of Technology*

A linear correlation is observed between the slope of the EMC universal curve for  $0.3 < x_B < 0.7$  in deep-inelastic (DIS) lepton scattering,  $d[F_2(A)/F_2(d)]/dx_B$ , and  $a_2(A/d)$ , the per-nucleon inclusive electron scattering cross-sections ratio of nucleus  $A$  to deuterium for  $1.4 < x_B < 2$ . The value of  $a_2(A/d)$  is associated with the number of short-range correlated nucleon pairs in nuclei. This correlation is surprising because of the vastly different energy and distance scales of EMC and short-range nucleon-nucleon correlations (SRC).

A possible explanation of this correlation is that the modification of  $F_2(A)$ , the nucleon structure-function in the nuclear medium, depends on the virtuality of nucleons and is pronounced for short-range correlated nucleons that are highly virtual.

We are studying this hypothesis by studying EMC events “tagged” by high-momentum protons recoiling backward to  $q$ . Such protons have been shown to be spectators from scattering off their short-range correlated partners.

The data were collected using the CLAS6 detector in Hall B of JLab and have not been previously analyzed. They consist of DIS off several nuclei and are being analyzed now as part of the “data mining” project. We shall present results of inclusive DIS  $A(e, e')X/d(e, e')X$  (“normal” EMC) and semi-exclusive DIS  $A(e, e'p_{recoil})X/d(e, e'p_{recoil})X$  (“tagged” EMC). We shall discuss these results with respect to our hypothesis that the EMC effect, to a large extent, is related to DIS from highly virtual, short-range correlated nucleons.