Abstract Submitted
for the DNP15 Meeting of
The American Physical Society

Many-body correlation effects on the Bjorken-x dependence of cross section ratios off nuclei for Bjorken-x greater than 1 ATHANASIOS PETRIDIS, ALLEN BARR, DREW FUSTIN, Drake University — Many-body correlations in nuclei determine the behavior of cross section ratios off heavy over light nuclei especially for Bjorken-x greater than 1, obtained at Jefferson Lab. They can be described in terms of quark-cluster formation in nuclei due to wave-function overlapping, manifesting itself when the momentum transfer is high so that the partonic degrees of freedom are resolved. In clusters (correlated nucleons) the quark and gluon momentum distributions are softer than in single nucleons and extend to x greater than 1. The cluster formation probabilities are computed using a network-defining algorithm in which the initial nucleon density is either standard Woods-Saxon or is input from lower energy data while the critical radius for nucleon merging is an adjustable parameter. The exact choice of critical radius depends on the specific nucleus. Additional rescaling of the Bjorken-x is needed for bound nucleons. The calculations show that there is a dependence of the cross section ratios on the Bjorken-x. Detailed comparison with Jefferson-Lab data shows that model parameter values are consistent for all nuclei studied. Four-body correlations are needed to explain the experimental results even in the range of Bjorken-x between 2 and 3.

Athanasios Petridis
Drake University

Date submitted: 30 Jun 2015 Electronic form version 1.4