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Effects of many-body correlations on the Bjorken-x dependence of DIS cross section ratios off nuclei ATHANASIOS PETRIDIS, ALLEN BARR, DREW FUSTIN, Drake University — Many-body correlations in nuclei determine the behavior of Deep-Inelastic-Scattering (DIS) cross section ratios off heavy over light nuclei especially for Bjorken-x > 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 $x > 1$. 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 and it is anti-correlated to the rescaling of the Bjorken-x needed for bound nucleons. The calculations show that there is a strong dependence of the cross section ratios on the Bjorken-x in agreement with the data and that four-body correlations are needed to explain the experimental results even in the range $2 <$ Bjorken-x < 3. The dependence on the specific exponents of parton distributions in high-order clusters is weak.

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