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The neutron's negative central charge density: the inclusive-exclusive connection¹

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Models of generalized parton distributions at zero skewness are used to relate the behavior of deep inelastic scattering quark distributions, evaluated at high x , to the transverse charge density evaluated at small distances. We obtain an interpretation of the recently obtained negative central charge density of the neutron. The d quarks dominate the neutron structure function for large values of Bjorken x , where the large momentum of the struck quark has a significant impact on determining the center of momentum, and thus the “center” of the nucleon in the transverse position plane.

¹In collaboration with John R. Arrington, Physics Division, Argonne National Laboratory.