Abstract Submitted
for the APR21 Meeting of
The American Physical Society

Theoretical and Phenomenological Understanding of Quark-hadron Duality[1] HUMA HAIDER, MARY HALL RENO, The University of Iowa — Quark-hadron duality connects the resonance and deep inelastic scattering (DIS) region in the intermediate energy regime of electron-proton (ep) scattering. Resonances include the $\Delta(1232)$ and other heavier nucleon resonances peaking at higher hadron invariant mass W ($\sim 1.4 - 2.0$ GeV), a kinematic region which needs study to better understand the transition between a hadronic resonance description and a perturbative QCD description of ep inelastic scattering. We present results for the structure function $F_2(x, Q^2)$ and $F_1(x, Q^2)$ for electron-proton inelastic scattering including nonperturbative and higher order perturbative QCD effects. With theoretically motivated extrapolations to low momentum transfers, we compare our results with parametrized structure functions and JLAB data for inclusive ep scattering. A better understanding of quark-hadron duality in ep scattering will have implications for neutrino-nucleon/nucleus scattering, important for the neutrino experiments like NOνA, MINERνA and DUNE which have significant numbers of events in this less explored transition region.

[1]Work supported in part by the US DOE.

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Date submitted: 11 Jan 2021 Electronic form version 1.4