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Probing Hadron Structure with High Energy Proton Beams

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The history of probing hadronic structure with proton beams is long and rich. Results from just one experiment that used an 800 GeV proton beam, FNAL E866/NuSea, have provided new insight into the composition of the nucleon sea, the partonic structure at high Bjorken- x , an upper limit on parton energy loss in cold nuclear matter, and more. Two similar experiments have been proposed at lower energies. FNAL E906 has been approved to run using the 120 GeV beam from the Fermilab Main Injector. The lower beam energy will yield more Drell-Yan events and extend the kinematical coverage to higher x values. A Letter of Intent has been submitted to J-PARC to perform the measurement using the 50 GeV proton beam. This will overlap with the E906 measurement and extend to even higher x values. The lower beam energy will also aid in the measurement of energy loss in cold nuclear matter. If a polarized proton beam were available at J-PARC in the future, then a polarized Drell-Yan measurement would be possible. I will highlight the results from FNAL E866/NuSea and discuss future plans for both E906 at FNAL and the LOI at J-PARC.