Investigating Parton Energy Loss and Antishadowing in Nuclei at Fermilab E-906/SeaQuest

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SEAQUEST COLLABORATION — Fermilab E-906/SeaQuest is a fixed target experiment using Fermilab’s Main Injector optimized to detect muon pairs produced in 120 GeV proton collisions. Primarily, SeaQuest will measure the Drell-Yan di-muon cross sections for proton-proton and proton-deuterium collisions for extracting $\bar{d}$ to $\bar{u}$ asymmetry in the nucleon. This data will also be used to understand partonic energy loss in cold nuclear matter, which will aid in understanding partonic energy loss in hot nuclear matter experiments at the LHC and RHIC. Since parton energy loss is inversely proportional to the beam energy, SeaQuest will be much more sensitive to energy loss effects than Fermilab E-866/NuSea, which placed upper limits on such parton energy loss at 800 GeV. SeaQuest will also further our understanding of nuclear anti-shadowing and extend the Drell-Yan measurements into the EMC effect region. SeaQuest will have significantly better precision and extension over a higher range in Bjorken-x, where competing asymmetry models diverge strongly from each other.

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