Measurement of Light Anti-quark Asymmetry in $p+p(d) \rightarrow \mu^+ + \mu^-$

Drell-Yan Process in Fermilab E-906/SeaQuest Experiment

CHIRANJIB DUTTA, University of Michigan, Ann Arbor, E906/SEAQUEST COLLABORATION — The Fermilab E-906/SeaQuest experiment will measure the anti-quark structure of the nucleon which eventually will give unique insight into the origin of the sea quarks. The predecessor E866/NuSea experiment showed a clear asymmetry of the ratio $\frac{d}{u}$ for Bjorken $x < 0.2$ while it approaches unity for $x > 0.25$, indicating clear deviations from the phenomenological models. The E-906/SeaQuest experiment will measure the Drell-Yan cross section in $p$-$p$ and $p$-$d$ scattering and will determine the $\frac{d}{u}$ asymmetry over $0.04 < x < 0.45$, thus extending the available E-866 measurements to a higher $x$ region. The experiment will use the 120 GeV/c proton beam extracted from the Fermilab Main Injector on liquid hydrogen and deuterium targets. A lower beam energy compared to E-866 will produce a factor of almost 50 times more Drell-Yan events in E-906 and hence, a significant improvement in the statistical uncertainty will be achieved. The experiment will start taking data in 2011 and the physics motivation as well as the current status, primarily the design and status of the cryogenic targets will be presented. The expected results from E906/SeaQuest experiment will also be addressed.

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