Measurement of Antiquark Flavor Asymmetry in the Proton by the Drell-Yan Experiment SeaQuest at Fermilab

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The amount of u-bar and that of d-bar in the proton were assumed to be the same based on the flavor symmetry. However, the NMC experiment at CERN found, by deep inelastic muon scattering, that d-bar is dominant in the proton. The previous Drell-Yan experiment at Fermilab (E866) measured the ratio of d-bar to u-bar, namely flavor asymmetry, and showed that d-bar/u-bar is as asymmetric as 1.7 at Bjorken x ~ 0.2. The E866 experiment also indicated that d-bar/u-bar rapidly decreased at Bjorken x ~ 0.3 although the uncertainty was large. This behavior is not explained by any theories at present. The SeaQuest experiment (E906) at Fermilab aims to clarify the flavor asymmetry in that region. The ratio of d-bar to u-bar is derived from the cross section ratio of proton-deuteron to proton-proton Drell-Yan process. We use the 120-GeV proton beam extracted from Fermilab Main Injector and two targets such as liquid hydrogen and deuterium. We analyzed the data taken in 2015 and obtained the preliminary result. We found that the d-bar/u-bar doesn't decrease at Bjorken x ~ 0.3.

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