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Angular Distributions of Drell-Yan Dimuons at Fermilab Experiment 906/SeaQuest

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The Lam-Tung relation, a perturbative QCD, “Callan-Gross-like” correlation of the azimuthal and polar angles of leptonic products relative to the initial hadronic plane in multiple frames, defines a standard component of any analysis using Drell-Yan as a nucleon probe. In at least three experiments involving Drell-Yan between various species of pions and nuclei at CERN and Fermilab, the existence of what appears to be (at leading-order) a double-spin flip in a single photon process manifests itself as a cosine modulation in dilepton azimuthal distributions. This modulation suggests significant non-perturbative effects, including the Boer-Mulders distribution, a nonzero correlation between the motion and spin of transversely polarized (anti)quarks within their encompassing unpolarized nucleon. Fermilab Experiment 866/NuSea saw a Lam-Tung violation in proton-induced Drell-Yan characterized by a smaller cosine dilepton azimuthal modulation relative to previous experiments conducted with pions and heavier nuclear targets with lower energy beams from the SPS at CERN. SeaQuest is investigating the difference with greater precision and at a higher x range than any previous Drell-Yan experiment. Studies of the angular distributions of dimuons in SeaQuest will be presented.

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