Contribution ID: **108** Type: **not specified**

Extracting Sivers Asymmetry in Drell-Yan at E1039 experiment using a likelihood method

Tuesday, 9 July 2024 09:00 (15 minutes)

The intrinsic spins of the valence and sea quarks inside the nucleon contribute only a fraction of the total spin of the nucleon. The orbital angular momentum of these quarks may also contribute. A non-vanishing Sivers function, which will produce a Transverse Single Spin Asymmetry in Drell-Yan production, is conclusive evidence of non-zero or- bital angular momentum. The E1039 (SpinQuest) experiment at Fermi-lab studies Drell- Yan production of di-muon pairs by scattering a 120 GeV proton beam off polarized NH_3/ND_3 fixed targets. In this scenario the Sivers asymmetry appears as a sinusoidal modulation in the azimuthal angular distribution of the virtual photons, observed in the lab frame. However, the measured distributions for any quantity in the detector might not represent the true distributions due to effects induced by the detector such as smear- ing, acceptance, inefficiencies, etc. Correcting for smearing is called the unfolding. Many techniques including Bayesian iterative method, SVD, etc have already been established to address the smearing problem for a binned data set. Temporal variations in the po- larization of the target require an un-binned method to address the smearing. In this talk we will present a framework, which employs the minimization of the negative log likelihood, developed to address smearing in un-binned data.
This work was supported in part by US DOE grant DE-FG02-94ER40847.

Primary authors: Mr NAWARATHNE, Dinupa (New Mexico State University); KALU ARACHCHIGE, Harsha Sirilal (New Mexico State University); Prof. PATE, S (New Mexico State University); Prof. PAPAVASSILIOU, V (New Mexico State University)

Presenter: KALU ARACHCHIGE, Harsha Sirilal (New Mexico State University)

Session Classification: SpinQuest