I. Motivation

Virtual sea quark pairs inside a proton are held together by gluons, and contribute to its spin. The sea comprises Up and Down quarks and their antiquarks; however, it was predicted that Strange quarks and antiquarks also contribute to the spin of a proton. Our group will use Semi-Inclusive Deep-Inelastic Scattering (SIDIS) of polarized electrons on a polarized proton to study the particle jets with special interest on Kaons, since they are the only produced particles comprising the strange quark. This will be achieved by using a new Ring Imaging Cherenkov (RICH) detector for particle separation.

II. Background

For SIDIS the photon strikes quark flavors of the proton and emits pions and kaons and they are detected in coincidence with the scattered electrons. \( e + P \rightarrow e' + K^+ + X \)

The distribution and fragmentation functions of strange quarks depend on the kinematics of SIDIS process.

III. Method: SIDIS

Previous experiments at SLAC (Stanford), DESY (German), and CERN in Switzerland studied the Strange quark-antiquark contribution to the nucleon spin, but their results lacked precision. RICH detector will increase the precision by using Semi-Inclusive Deep-Inelastic Scattering.

IV. RICH Detector and GUI

A GUI of MA-PMTs was built using maven based software Netbeans which reads data from the JLab Database. By clicking on a PMT, you can generate its gain and graphs.

V. Expected Results

• Momentum range: 3-8 GeV/c
• High luminosity, >10^{35} cm^{-2} s^{-1}
• Precise detection of kaon particles

VI. Outlook

RICH detector construction is almost done at Jlab. In February, CLAS12 will be taking real Physics Data, and I am looking forward to analyze it and select Kaons using RICH.

VII. Acknowledgements

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