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Parity Violation in Deep Inelastic Scattering with the SoLID Spectrometer at Jlab

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We discuss the measurements of parity-violating asymmetries in DIS region (PVDIS) using SoLID spectrometer at JLab Hall A in the 12 GeV era. Measurements with polarized electron beam on unpolarized deuteron and proton targets have been approved with an A rating. The deuteron measurement aims to measure weak mixing angle $\sin^2(\theta_W)$ with precision of ± 0.0006 as well as access a fundamental coupling constant C_{2q} with high precision, which is ideally suited for the Standard Model test while with potential to probe charge symmetry violation and resolve the quark-quark correlations in the DIS region. The proton experiment provides a clean measurement of d/u ratio in the high-x region free of nuclear corrections. To achieve the goals, the SoLID spectrometer, based on a solenoid magnet, was designed to handle high luminosity with large acceptance. In this talk, we will go through the details of the approved measurements and also mention new ideas with PVDIS using a polarized ^3He target to access new γZ interference polarized structure functions and an unpolarized ^{48}Ca target to study the EMC effect.

Presenter: ZHAO, Yuxiang (Stony Brook University)

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