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Overview of the TMD/SIDIS program at Jefferson Lab

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The study of the single-hadron semi-inclusive deep inelastic scattering process (SIDIS) is a rapidly developing and expanding area of inquiry in hadronic physics, owing to the prospect of realizing a precision three-dimensional imaging of the quark structure of the nucleon in momentum space. Measurements of the azimuthal angular distributions of hadrons produced at large values of $z = E_h/E$ and “small” transverse momentum $p_T \sim \Lambda_{\text{QCD}}$ in deep inelastic lepton-nucleon scattering provides access to novel features of nucleon structure that are inaccessible in traditional inclusive DIS, including the effects of initial-state quark transverse momentum, transverse polarization of the parent nucleon and the struck quark, and “flavor tagging” due to the varying sensitivity of different hadron species to different quark flavors. The Continuous Electron Beam Accelerator Facility (CEBAF) at Jefferson Lab has recently completed an upgrade to a maximum beam energy of 11 GeV at which it passes for electron scattering experiments. The energy upgrade of CEBAF, combined with its already unrivaled intensity, duty cycle and polarization, facilitates a three-dimensional nucleon imaging program of unprecedented precision in the valence region. In this talk, I will present a brief overview of the planned CEBAF SIDIS program in experimental Halls A, B and C.

Primary author: PUCKETT, Andrew (University of Connecticut)

Presenter: PUCKETT, Andrew (University of Connecticut)

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