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3D Nucleon Structure with SoLID

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For the SoLID Collaboration

SoLID (Solenoidal Large Intensity Device) is a large acceptance, high luminosity device proposed for fully exploiting the potential of the Jefferson Lab (JLab) 12 GeV energy upgrade. The scientific program of SoLID includes one parity-violating deep inelastic scattering (PVDIS) experiment, three semi-inclusive deep inelastic scattering experiments, and one J/ψ production experiment, with several run group experiments. One of the major tasks of SoLID is to deepen our knowledge about the internal structure of the nucleon, which, in terms of its partonic constituents, can be described by a five-dimensional quantum phase-space distribution, the so-called Wigner distribution. Integrating the Wigner distribution over its intrinsic transverse coordinates leads to the transverse-momentum-dependent (TMD) parton distribution function. TMD depicts a three-dimensional imaging of the nucleon and plays an important role in understanding the origin of its spin. This three-dimensional distribution is experimentally accessible via the Drell-Yan process and Semi-Inclusive Deep Inelastic (SIDIS) process. In this talk, an overview of the SoLID program and projections of the 3D imaging of the nucleon will be presented.

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Submitted on behalf of a Collaboration?

Yes

Author: Dr PENG, Chao (Argonne National Laboratory)

Presenter: Dr PENG, Chao (Argonne National Laboratory)

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