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Semi-Inclusive Physics Prospects at EPIC

Thursday, 30 March 2023 15:20 (20 minutes)

Measurements in semi-inclusive deep inelastic scattering provide a wide range of insights into nucleon structure and hadronization. Spin asymmetries and cross sections in single-hadron and dihadron production are sensitive to various combinations of transverse momentum-dependent (TMD) distribution and fragmentation functions, depending on the polarizations of the initial electron and target nucleon. For example, the transverse-spin asymmetry A_{UT} accesses the Sivers, transversity, pretzelosity, and Kotzinian-Mulders TMD distributions, as well as the Collins fragmentation function, while the double-spin asymmetry A_{LL} probes the sea-quark helicity. Insight from semi-inclusive dihadrons includes dihadron fragmentation functions, gluon saturation, and the twist-3 distribution $h_L(x)$. TMD fragmentation functions are accessible via the production of a final state with a known polarization, in particular, lambdas. These functions probe spin-orbit correlations in fragmentation analogously to those in TMD PDFs. This presentation will summarize the possibilities and impact of these measurements at the forthcoming EPIC experiment at the Electron-Ion Collider.

Submitted on behalf of a Collaboration?

Yes

Participate in poster competition?

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