Contribution ID: **199** Type: **Parallel talk**

Machine learning-assisted measurement of multi-differential lepton-jet correlations in deep-inelastic scattering with the H1 detector

Wednesday 29 March 2023 10:50 (20 minutes)

The lepton-jet momentum imbalance in deep inelastic scattering events offers a useful set of observables for unifying collinear and transverse-momentum-dependent frameworks for describing high energy Quantum Chromodynamics (QCD) interactions. The imbalance in the laboratory frame was measured recently [1] using positron-proton collisions from HERA Run II. With a new machine learning method, the measurement was performed simultaneously and unbinned in eight dimensions, however the results were projected onto four key observables. This paper extends over those results by showing the multi-differential nature of the unfolded result. In particular, the lepton-jet correlation observables are measured differentially in kinematic properties of the scattering process, the momentum transfer $Q^2 > 150$ GeV^2 and inelasticity $0.2 < y < 0.7$. The jets are restricted to have transverse momentum $p_T > 10$ GeV and pseudorapidity $-1 < \eta < 2.5$. The results are compared with parton shower Monte Carlo predictions as well as with calculations from perturbative QCD and from a Transverse Momentum Dependent (TMD) factorization framework. The measurement in bins of Q^2 probes the scale evolution of the azimuthal decorrelation.

[1] PRL 128 (2022) 123003

Submitted on behalf of a Collaboration?

Yes

Participate in poster competition?

Primary authors: SCHMITT, Stefan (Deutsches Elektronen-Synchrotron (DE)); XU, Yao (Berkeley University)

Presenter: XU, Yao (Berkeley University)

Session Classification: WG4

Track Classification: WG4: QCD with Heavy Flavours and Hadronic Final States