Contribution ID: **376** Type: **Posters**

Reconstructing DIS Kinematics at the EIC Using Deep Learning

Wednesday 4 May 2022 18:50 (20 minutes)

In a recent paper, we have studied the use of deep learning techniques to reconstruct the kinematics of DIS. In particular, we have used simulated data from the ZEUS experiment at the HERA accelerator facility, and trained deep neural networks to reconstruct the kinematic variables Q^2 and x. Our approach is based on the information used in the classical construction methods, the measurements of the scattered lepton, and the hadronic final state in the detector, but is enhanced through correlations and patterns revealed with the simulated data sets. Our studies suggest that deep learning techniques to reconstruct DIS kinematics can serve as a rigorous method to combine and outperform the classical reconstruction methods. In our presentation, we will discuss how our technique can be used for physics and detector studies for the upcoming Electron-Ion Collider. We will show results from detailed full detector simulations of the EIC Comprehensive Chromodynamics Experiment (ECCE), a proposal for an EIC detector that is based on a 1.5T solenoid.

Submitted on behalf of a Collaboration?

No

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Session Classification: WG6: Future Experiments

Track Classification: WG6: Future Experiments