Contribution ID: **23**   Type: **not specified**

Reconstructing the Kinematics of Deep Inelastic Scattering with Deep Learning

Tuesday 23 November 2021 14:40 (20 minutes)

In this talk I present a method to reconstruct the kinematics of neutral-current deep inelastic scattering (DIS) using a deep neural network (DNN). Unlike traditional methods, it exploits the full kinematic information of both the scattered electron and the hadronic-final state, and it accounts for QED radiation by identifying events with radiated photons and event-level momentum imbalance. The method is studied with simulated events at HERA and the future Electron-Ion Collider (EIC). We will show that the DNN method outperforms all the traditional methods over the full phase space, improving resolution and reducing bias. The DNN-base reconstruction has the potential to extend the kinematic reach of future experiments at the EIC, and thus their discovery potential in polarized and nuclear DIS.

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Session Classification: Computing: Machine learning