

Kinematic Reconstruction for inclusive scattering at EIC-ATHENA

As the electron-proton (nucleus) inclusive scattering cross section is a function of the center-of-mass energy and of two kinematic variables (x , y , Q^2), an accurate reconstruction of these event kinematics is vital at the future Electron-Ion Collider (EIC). Various methods for reconstructing the event kinematics have been developed for electron-proton collisions. For neutral-current processes, the kinematics can be reconstructed using either the scattered electron, the final-state hadronic system, or a combination of both. For charged-current scattering, reconstruction relies on the hadronic system. The accuracy of a given reconstruction method depends non-trivially on the kinematic regime under study, detector acceptance and resolution effects, and the size of radiative processes. We present detailed simulation studies of various kinematic reconstruction techniques conducted using the proposed ATHENA detector. These studies demonstrate the ability of the ATHENA detector to accurately reconstruct the inclusive kinematics over the entire EIC phase space.

Submitted on behalf of a Collaboration?

Yes

Authors: SCHMOOKLER, Barak (Stony Brook University); NEWMAN, Paul Richard (University of Birmingham (GB)); XU, Qinghua (Shandong University); MAPLE, Stephen (University of Birmingham)

Presenter: MAPLE, Stephen (University of Birmingham)

Session Classification: WG6: Future Experiments

Track Classification: WG6: Future Experiments