

Proton and Nuclear Collinear Parton Densities at the Electron Ion Collider using simulated ATHENA Data

Thursday 5 May 2022 12:10 (20 minutes)

The potential of the future Electron Ion Collider to constrain proton and nuclear collinear parton densities is explored using data simulated in the context of the proposed ATHENA detector. For the proton, projections relative to a ‘DIS-only’ approach are obtained in the HERAPDF2.0 framework. Substantial improvements in precision are observed at large x for valence quark, sea quark and gluon densities. Projections relative to the MSHT20 global fits, which also include proton-proton data from the LHC and elsewhere, show smaller improvements, though the impact at large x remains substantial for the up-valence density in particular. For the nuclear case, the baseline is taken to be the EPPS16 PDFs. The simulated ATHENA data result in substantial improvements throughout the accessible EIC kinematic range for all quark flavours and also for the gluon density. The impact is particularly noteworthy at small x , where only very limited collider data (from the LHC) has previously been included. The sensitivity of the simulated low x data to log $1/x$ resummation effects is also evaluated.

Submitted on behalf of a Collaboration?

Yes

Authors: SCHMOOKLER, Barak (Stony Brook University); WICHMANN, Katarzyna (Deutsches Elektronen-Synchrotron (DE)); NEWMAN, Paul Richard (University of Birmingham (GB)); GIULI, Francesco (Brandeis University (US)); HARLAND-LANG, Lucian (University of Oxford); ARMESTO PEREZ, Nestor (Universidade de Santiago de Compostela (ES)); THORNE, Robert Samuel (University College London (UK)); CRIDGE, Thomas (University College London)

Presenter: NEWMAN, Paul Richard (University of Birmingham (GB))

Session Classification: Joint WG1+WG6 session

Track Classification: Joint WG1+WG6 session