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## Inclusive-jet photoproduction with Pythia for Electron-Ion Collider

Inclusive-jet photoproduction at HERA has shown to be a favorable ground for verifying perturbative QCD with the obtained jet cross-section. Monte-carlo event generator PYTHIA8 is used to compare the data of ZEUS collaboration aiming for high precision measurements of  $\alpha_s$  at HERA. Inclusive-jet photoproduction in the reaction  $e^+ + p \rightarrow e^+ + jet + X$  with beam energies  $E_p = 920$  GeV,  $E_e = 27.5$  GeV and centre-of-mass energy  $\sqrt{s} = 318$  GeV is analyzed using different parton distribution function (PDFs) and jet reconstruction algorithm such as,  $k_T$ , anti- $k_T$  and SIScone. A better fit for parton content of photon is required for precision phenomenology at Electron-Ion collider, the successor of HERA that will be colliding spin polarized electrons and ions at energy scales from 29-141 GeV. The framework developed from the validated results is used in making prediction for differential cross-section at EIC with different centre-of-mass energies (44.7, 63.2, and 141.4 GeV) at low and high photon virtualities. This study further aims to explore the multi-parton interaction from hadronic fluctuation of the exchanged photon.

### Field of contribution

Phenomenology

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