

Jet Production at HERA with ZEUS

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Differential inclusive-jet cross sections have been measured in photoproduction for boson virtualities $Q^2 < 1 \text{ GeV}^2$ with the ZEUS detector at HERA using an integrated luminosity of 300 pb^{-1} . These cross sections have the potential to constrain the gluon density in the proton and the photon when included as input to fits to extract the proton parton distribution functions. A value of $\alpha_s(M_Z)$ has been extracted from the measurements. For the first time, differential inclusive-jet cross sections have been measured in neutral current deep inelastic ep scattering using the anti-kt and SISCone algorithms, as well as the nominal kt cluster algorithm. The measurements were made for boson virtualities $Q^2 > 125 \text{ GeV}^2$ and the jets were identified in the Breit frame. Measurements of the ratios of cross sections using different jet algorithms are also presented and values of $\alpha_s(M_Z)$ are extracted from the data. Single- and double-differential inclusive dijet cross sections in neutral current deep inelastic ep scattering have been measured using an integrated luminosity of 374 pb^{-1} . The measurement was performed at large values of the photon virtuality, Q^2 , between 125 and 20000 GeV^2 . Single- and double-differential dijet cross sections have also been measured in photoproduction for boson virtualities $Q^2 < 1 \text{ GeV}^2$ with the ZEUS detector at HERA using an integrated luminosity of 300 pb^{-1} . These cross sections have the potential to constrain the gluon density in the proton and the photon when included as input to fits to extract the proton parton distribution functions. Next-to-leading-order QCD calculations give a good description of the measurements.

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