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Measurement and QCD analysis of inclusive jet production in deep inelastic scattering at HERA

A new measurement of inclusive jet cross sections in neutral current deep inelastic scattering using the ZEUS detector at the HERA collider is presented. The data were taken at HERA in the years 2004 to 2007 at a centre-of-mass energy of 318 GeV and correspond to an integrated luminosity of 347 pb⁻¹. Massless jets, reconstructed using the kT-algorithm in the Breit reference frame, have been measured as a function of the squared momentum transfer, Q^2 , and the transverse momentum of the jets in the Breit frame, $p_{T,Breit}$. The measured jet cross sections are compared to previous measurements as well as perturbative QCD predictions. The measurement has been used in a next-to-next-to-leading-order QCD analysis to perform a simultaneous determination of parton distribution functions of the proton and the strong coupling constant $\alpha_s(M_Z^2)$. A significantly improved accuracy is observed compared to similar measurements of the strong coupling constant.

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