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Hadronic final states at HERA

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The photoproduction of isolated photons, both inclusive and together with a jet, has been measured with the ZEUS detector at HERA using an integrated luminosity of 374 pb⁻¹. A variety of kinematic variables that are sensitive to different aspects of the event dynamics are studied. Cross sections are given in terms of the collinearity of the photon and the jet, the fraction of the proton energy involved in the interaction, and the pseudorapidity difference between the photon and the jet. These and other variables are also studied for different ranges of x_{γ}^{meas} , the fraction of the photon energy involved in the interaction, in order to enhance the direct and resolved photon components of the process. Differential cross sections are also presented for inclusive isolated-photon production as functions of the transverse energy and pseudorapidity of the photon. Higher-order theoretical calculations are compared to the results. Measurements of normalised cross sections for the production of photons and neutrons at very small angles with respect to the proton beam direction in deep inelastic scattering are presented as a function of the Feynman variable x_F and of the centre-of-mass energy of the virtual photon-proton system, W . The data are taken with the H1 detector and correspond to an integrated luminosity of 131 pb⁻¹. The measurement is restricted to photons and neutrons in the pseudorapidity range $\eta > 7.9$. To test the Feynman scaling hypothesis the W dependence of the x_F dependent cross sections is investigated. Predictions of deep inelastic scattering models and of models for hadronic interactions of high energy cosmic rays are compared to the measured cross sections.

Summary

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