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Measurement of Diffractive Dijet Photoproduction with Leading Proton

H1 Collaboration

Abstract

The cross section of diffractive photoproduction processes $e^+p \to eXp$ is measured, where the system X contains at least 2 jets with $E_T^{\mathrm{jet1}} > 5.5\,\mathrm{GeV}$ and $E_T^{\mathrm{jet2}} > 4\,\mathrm{GeV}$ and the diffractive proton in the kinematic region $0.010 < x_{IP} < 0.024$ and $|t| < 0.6\,\mathrm{GeV}^2$ is tagged in the Very Forward Proton Spectrometer (VFPS) of the H1 detector. The measurement is performed for untagged photoproduction with $Q^2 < 2\,\mathrm{GeV}^2$ in photon virtuality. The results are compared to next-to-leading order QCD calculations and with MC model based on leading order matrix elements with parton showers.

The measured cross sections are smaller than those obtained from the next-to-leading order calculations by a factor of about 0.67. This suppression factor has no significant dependence on the fraction x_γ of the photon four-momentum entering the hard subprocess.

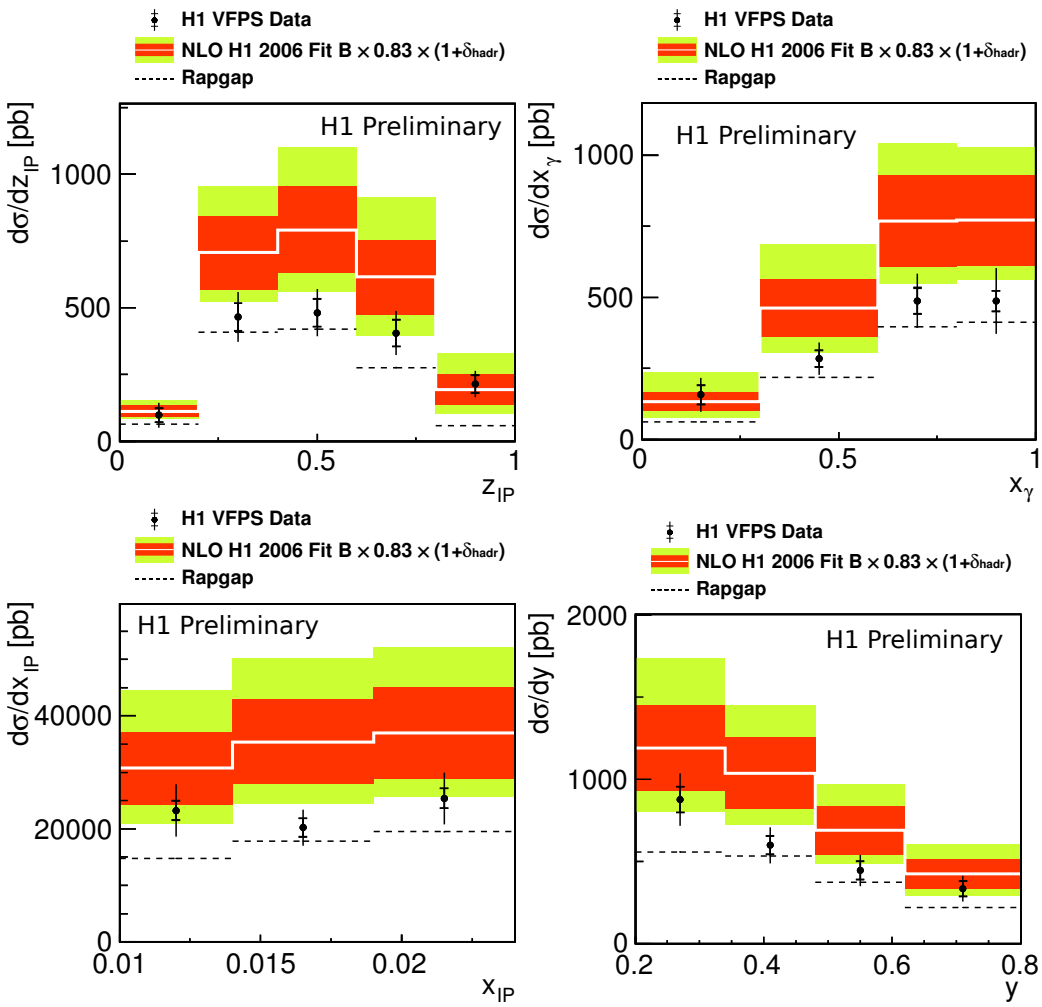

Fig. 1: The differential cross section are shown as a function of z_{IP} , x_γ, x_{IP} and y. The inner error bars represent the statistical errors. The outer error bars indicate the statistical and systematic errors added in quadrature. NLO QCD predictions based on the DPDF set H1 2006 Fit B, corrected to the level of stable hadrons, are shown as a white line. The red band indicates the DPDFs uncertainties and light green band indicates the DPDFs and scale uncertainties added in quadrature. LO QCD predictions based on the same DPDF set are shown as a dashed black line.

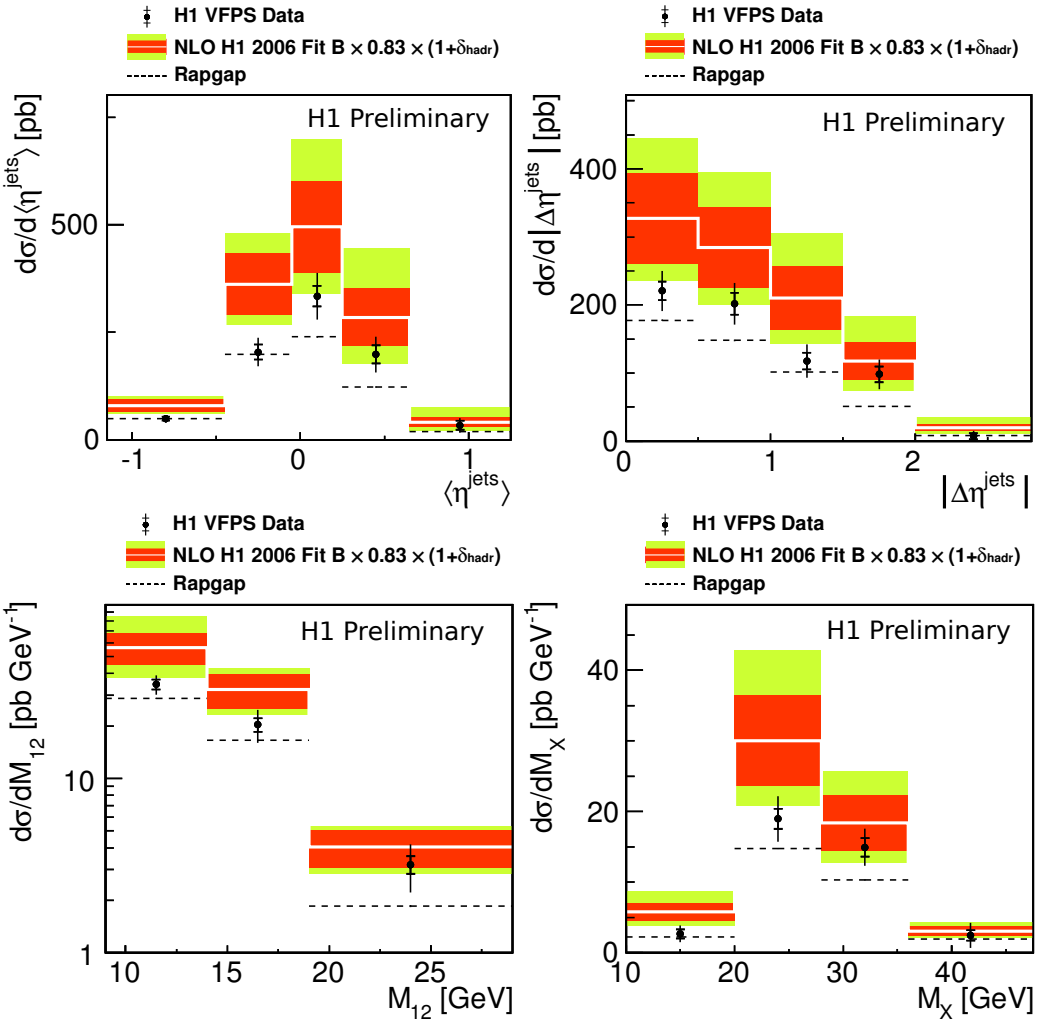

Fig. 2: The differential cross section are shown as a function of $\langle\eta^{\rm jets}\rangle$, $\Delta\eta^{\rm jets}$, M_{12} and M_X. The inner error bars represent the statistical errors. The outer error bars indicate the statistical and systematic errors added in quadrature. NLO QCD predictions based on the DPDF set H1 2006 Fit B, corrected to the level of stable hadrons, are shown as a white line. The red band indicates the DPDFs uncertainties and light green band indicates the DPDFs and scale uncertainties added in quadrature. LO QCD predictions based on the same DPDF set are shown as a dashed black line.

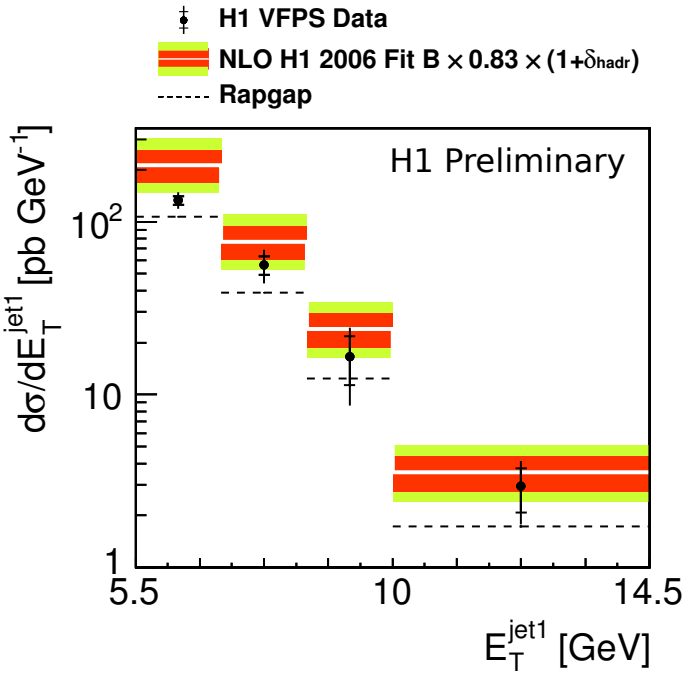

Fig. 3: The differential cross section is shown as a function of E_T^{jet1}. The inner error bars represent the statistical errors. The outer error bars indicate the statistical and systematic errors added in quadrature. NLO QCD predictions based on the DPDF set H1 2006 Fit B, corrected to the level of stable hadrons, are shown as a white line. The red band indicates the DPDFs uncertainties and light green band indicates the DPDFs and scale uncertainties added in quadrature. LO QCD predictions based on the same DPDF set are shown as a dashed black line.