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Dijet Production in Diffractive Deep-Inelastic Scattering using Proton Spectrometers at HERA

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The cross section of diffractive deep-inelastic scattering ep ⟶ eXp is measured, where the system X contains at least two jets and the leading final state proton is detected in the H1 Forward Proton Spectrometer. The measurement is performed for fractional proton longitudinal momentum loss x_IP < 0.1 and covers the range 0.1 < |t| < 0.7 GeVˆ2 in squared four-momentum transfer at the proton vertex and 4 < Qˆ2 < 110 GeVˆ2 in photon virtuality. The differential cross sections extrapolated to |t| < 1 GeVˆ2 are in agreement with next-to- leading order QCD predictions based on diffractive parton distribution functions extracted from measurements of inclusive and dijet cross sections in diffractive deep-inelastic scattering. The data are also compared with leading order Monte Carlo models.

The production of dijets in diffractive deep inelastic scattering, ep -> e gamma*p -> e p jet1 jet2 X, has been measured with the H1 detector at HERA using Very Forward Proton Spectrometer to measure the scattered proton momentum. The data correspond to an integrated luminosity of 95 pbˆ-1. This process is sensitive to the partonic structure of the diffractive exchange between the proton and the virtual photon. The scattered proton is measured using the VFPS with an acceptance of about 90% in the range 0.009 < x_pom < 0.025, where x_pom is the energy fraction lost by the proton in the interaction. The dijet cross section has been measured for virtualities of the exchanged boson, 5 < Qˆ2 < 80 GeVˆ2 and photon-proton centre-of-mass energies, 100 < W < 250 GeV and |t| < 1 GeVˆ2. The jets were identified using the inclusive k_T algorithm in the gamma* p frame. The two highest transverse energy jets identified in each event were required to satisfy E*{T, jet} > 5.5 and 4 GeV, respectively in the pseudorapidity range -2.0 < eta{jet} < 2. The cross sections are compared to the predictions from leading-logarithm parton-shower RapGap Monte Carlo and next-to-leading-order QCD calculations based on recent diffractive parton densities extracted from inclusive diffractive deep inelastic scattering data.

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