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Inclusive Measurement of Diffractive Deep Inelastic Scattering at HERA

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Measurements of the cross section for the diffractive process $ep \rightarrow eXY$ are presented, where Y is a proton or a low mass proton excitation carrying a fraction $1 - x_{IP} > 0.95$ of the incident proton longitudinal momentum and the squared four-momentum transfer at the proton vertex satisfying $M_Y < 1.6 \text{ GeV}$ and $|t| < 1.0 \text{ GeV}^2$. Using data taken by the H1 experiment, the cross section is measured for photon virtualities in the range $3 \leq Q^2 \leq 1600 \text{ GeV}^2$, triple differentially in x_{IP} , Q^2 and $\beta = x/x_{IP}$, where x is the Bjorken scaling variable. These measurements are made after selecting diffractive events by demanding that a large rapidity interval separates the final state hadronic systems X and Y . New measurements covering data taking periods 1999-2000 and 2004-2007 are combined with previously published results in order to provide a single set of diffractive cross sections using the large rapidity gap selection method from the H1 experiment. Comparisons of measurements with predictions from the diffractive parton density and dipole models are shown. Finally, the proton vertex factorisation hypothesis, which is an important aspect in the modelling of diffractive structure, is discussed.

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