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Charm and beauty production at HERA (H1)

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Measurements of open charm production are presented in diffractive deep inelastic scattering ($5 < Q^2 < 100 \text{ GeV}^2$), based on 287 pb⁻¹ of H1 HERA-II data recorded at the center of mass energy $\sqrt{s}=319 \text{ GeV}$. The event topology is given by $ep \rightarrow eXY$, where the system X, containing at least one $D^*(2010)$ meson, is separated from a leading low-mass proton dissociative system Y by a large rapidity gap. The kinematics of D^* candidates are fully reconstructed in the $D^* \rightarrow K\pi\pi$ decay channel. The measured cross sections are compared at the level of stable hadrons with next-to-leading order QCD predictions obtained in the massive scheme, where the charm quark is produced via the boson-gluon fusion. The calculations rely on the collinear factorization theorem and are based on diffractive parton densities previously obtained by H1 from fits of the inclusive diffractive cross sections. The measured data are further used to estimate the ratio of diffractive to inclusive open charm production in deep inelastic scattering.

Measurements of open beauty and charm production cross sections in deep inelastic ep scattering at HERA from the H1 and ZEUS Collaborations are combined. Reduced cross sections for beauty and charm production are obtained in the kinematic range of photon virtuality $2.5 < Q^2 < 2000 \text{ GeV}^2$ and Bjorken scaling variable $3 \times 10^{-5} < x < 5 \times 10^{-2}$. The combination method accounts for the correlations of the systematic uncertainties among the different data sets. The combined data are compared to perturbative QCD predictions.

Experimental Collaboration

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