



Charm production in DIS at HERA

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Charm production has been measured with the ZEUS detector in deep inelastic ep scattering at HERA. The measurement is based on the full reconstruction of the decay chain $D \rightarrow D^0 p \pi$, $D^0 \rightarrow K^+ p \pi^-$ and exploits the full HERA II statistics. Differential cross sections have been measured. The kinematic range is $1.5 \text{ GeV} < p_T(D) < 10 \text{ GeV}$, $|\eta(D)| < 1.5$, $5 < Q^2 < 1000 \text{ GeV}^2$ and $0.02 < y < 0.7$. The observed cross sections is extrapolated to the full $p_T(D)$ and $\eta(D^*)$ range in order to determine the open-charm contribution, $F_2^{\text{cc}}(x, Q^2)$ to the proton structure function, F_2 .

Charm production in deep inelastic scattering has been measured with the ZEUS detector using the full HERA II data set. The charm content in events with a jet has been extracted using the decay length significance and invariant mass of secondary vertices. Differential cross sections as a function of Q^2 , Bjorken x , $ET(\text{jet})$ and $\eta(\text{jet})$ were measured and compared to theoretical predictions. The open charm contribution to the proton structure function F_2 was extracted from double differential cross sections.

The production of D^* , D^+ , D^0 , D_s and Λ_c charm hadrons and their antiparticles in ep scattering at HERA was studied with the ZEUS detector using the full HERA II data set. The measurement has been performed in the photoproduction regime. The fractions of c quarks hadronising as a particular charm hadron, $f(c \rightarrow D, \Lambda_c)$, were derived in the visible kinematic range. The obtained fractions can be compared to previous results from HERA and to measurements from e^+e^- experiments.

The inclusive photoproduction of D^* mesons and of D^* -tagged dijets is investigated with the H1 detector at the ep collider HERA. The kinematic region covers small photon virtualities $Q^2 < 2 \text{ GeV}^2$ and photon-proton centre-of-mass energies of $100 < W_{\gamma p} < 285 \text{ GeV}$. Inclusive D^* meson differential cross sections are measured for central rapidities $|\eta(D^*)| < 1.5$ and transverse momenta $p_T(D^*) > 1.8 \text{ GeV}$. The heavy quark production process is further investigated in events with at least two jets with transverse momentum $p_T(\text{jet}) > 3.5 \text{ GeV}$ each, one containing the D^* meson. Differential cross sections for D^* -tagged dijet production and for correlations between the jets are measured in the range $|\eta(D^*)| < 1.5$ and $p_T(D^*) > 2.1 \text{ GeV}$. The results are compared with predictions from Monte Carlo simulations and next-to-leading order perturbative QCD calculations.

Inclusive production of D mesons in deep-inelastic ep scattering at HERA is studied in the range $5 < Q^2 < 100 \text{ GeV}^2$ of the photon virtuality and $0.02 < y < 0.7$ of the inelasticity of the scattering process. The observed phase space for the D meson is

$p_T(D) > 1.25 \text{ GeV}$ and $|\eta(D)| < 1.8$. The data sample corresponds to an integrated luminosity of 348 pb^{-1} collected with the H1 detector. Single and double differential cross sections are measured and the charm contribution F_2^{cc} to the proton structure function F_2 is determined. The results are compared to perturbative QCD predictions at next-to-leading order implementing different schemes for the charm mass treatment and with Monte Carlo models based on leading order matrix elements with parton showers.

Primary author: Dr GEISER, Achim (DESY)

Presenter: Dr GEISER, Achim (DESY)

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