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Charmed Meson Production Deep Inelastic Scattering at HERA and Extraction of F2(ccbar)

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Inclusive production of D*mesons in deep inelastic scattering at HERA is studied. The data were taken with the H1 detector in the years 2004 to 2007 and correspond to an integrated luminosity of ~350 pb^-1. D* mesons are reconstructed in their decays D-> *D0 + pi_slow -> K + pi + pi_slow. The visible range for the measurements covers the pseudorapidity interval |eta(D)|* <1.5, transverse momenta pT(D*)>1.5 GeV, and inelasticity in the scattering process 0.02 < y < 0.7.
The cross sections are measured for low photon virtualities, 5<Q^2<100 GeV, and, for the first time with the H1 experiment, for high photon virtualities Q^2 > 100 GeV^2. Single and double differential cross sections are measured and compared to predictions from the next-to-leading order calculation HVQDIS and the leading order Monte Carlo programs RAPGAP and CASCADE.

The charm contribution to the proton structure, F2(ccbar), is determined for the kinematic region 7 GeV^2 < Q^2 < 440 GeV^2 and 10^-4 < x_bj < 3 * 10^-2 by extrapolating the visible D* meson cross section measured by the H1 collaboration to the full phase space using the NLO QCD calculation HVQDIS, based on DGLAP evolution, and CASCADE, a LO Monte-Carlo program including parton showers based on CCFM evolution.

The production of D+/- and D0 mesons has been measured with the ZEUS detector at HERA using an integrated luminosity of 133.6 pb^-1. The measurements cover the kinematic range 5 < Q2 < 1000 GeV2, 0.02 < y < 0.7, 1.5 < pT(D) < 15 GeV and |eta(D)|<1.6. Combinatorial background to the D meson signals is reduced by using the ZEUS microvertex detector to reconstruct displaced secondary vertices. Production cross sections are compared with the predictions of next-to-leading-order QCD which is found to describe the data well. Measurements are extrapolated to the full kinematic phase space in order to obtain the open-charm contribution, F2(ccbar), to the proton structure function, F2.

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