H1prelim-03-071

Photoproduction of D^* Mesons at HERA

H1 Collaboration

Abstract

A measurement is presented of cross sections for D^* Meson photoproduction at HERA. The measurement uses data taken with the H1 detector during the years 1999 to 2000. The cross sections are determined in the kinematical region $171 < W < 256$ GeV, $Q^2 < 0.01$ GeV^2, $P_t(D^*) > 2.5$ GeV, and $|eta(D^*)| < 1.5$, where W is the γp center of mass energy. Photoproduction is assured through the detection of the scattered electron at small angles. In addition to total cross sections, the data are presented as a function of $P_t(D^*)$, $\eta(D^*)$ and W and are compared with predictions from Monte Carlo programs in leading order and QCD calculations in fixed order (NLO).

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visible range	
Q^2	< 0.01 GeV^2
$W_{\gamma p}$	$171 < W_{\gamma p} < 256$ GeV^2
$p_t(D^*)$	> 2.5 GeV
$\eta(D^*)$	$-1.5 < \eta < 1.5$

Table 1: Kinematic range of the measurement.

The kinematic range of the measurement is defined in table 1. The total measured cross section for $ep \to eD^*X$ in this range is (H1 99-00 preliminary):

$$\sigma_{vis}(ep \to e'D^*X) = 4.74 \pm 0.32 \pm 0.64 \,\text{nb}.$$

This can be compared with the result from NLO QCD (fixed order, massive scheme):

$$\sigma_{vis}(ep \to e'D^*X) = 2.46^{+1.09}_{-0.60} \,\text{nb}.$$

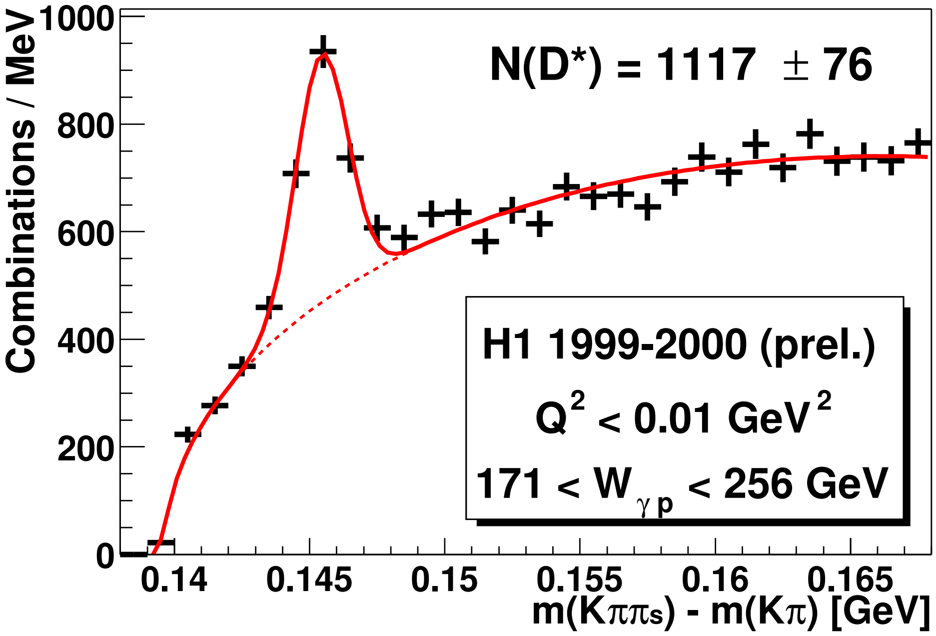

Figure 1: D^{*} signal in the form of the reconstructed mass difference $M(D^{*}) - M(D^{0})$.

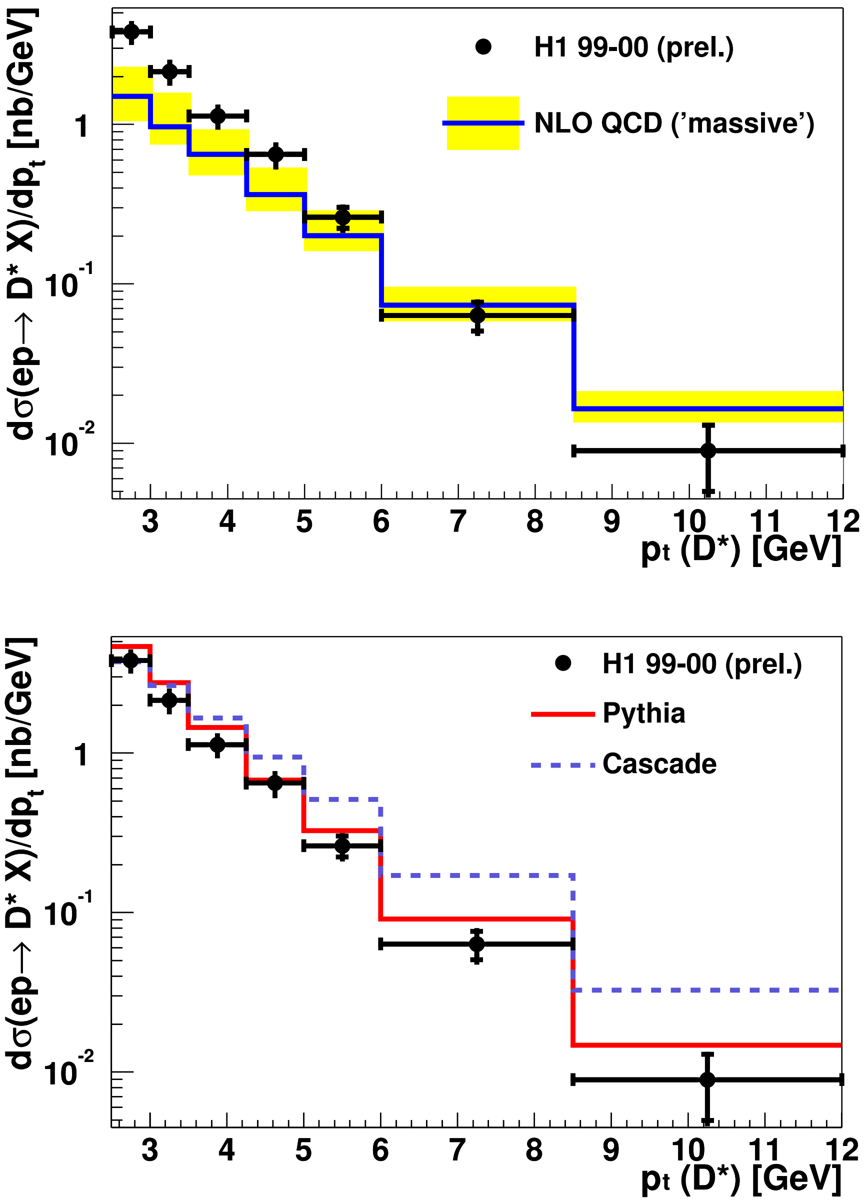

Figure 2: D^* photoproduction cross section as a function of the D^* transverse momentum, compared with (a) fixed order NLO calculations and (b) LO Monte Carlo predictions.

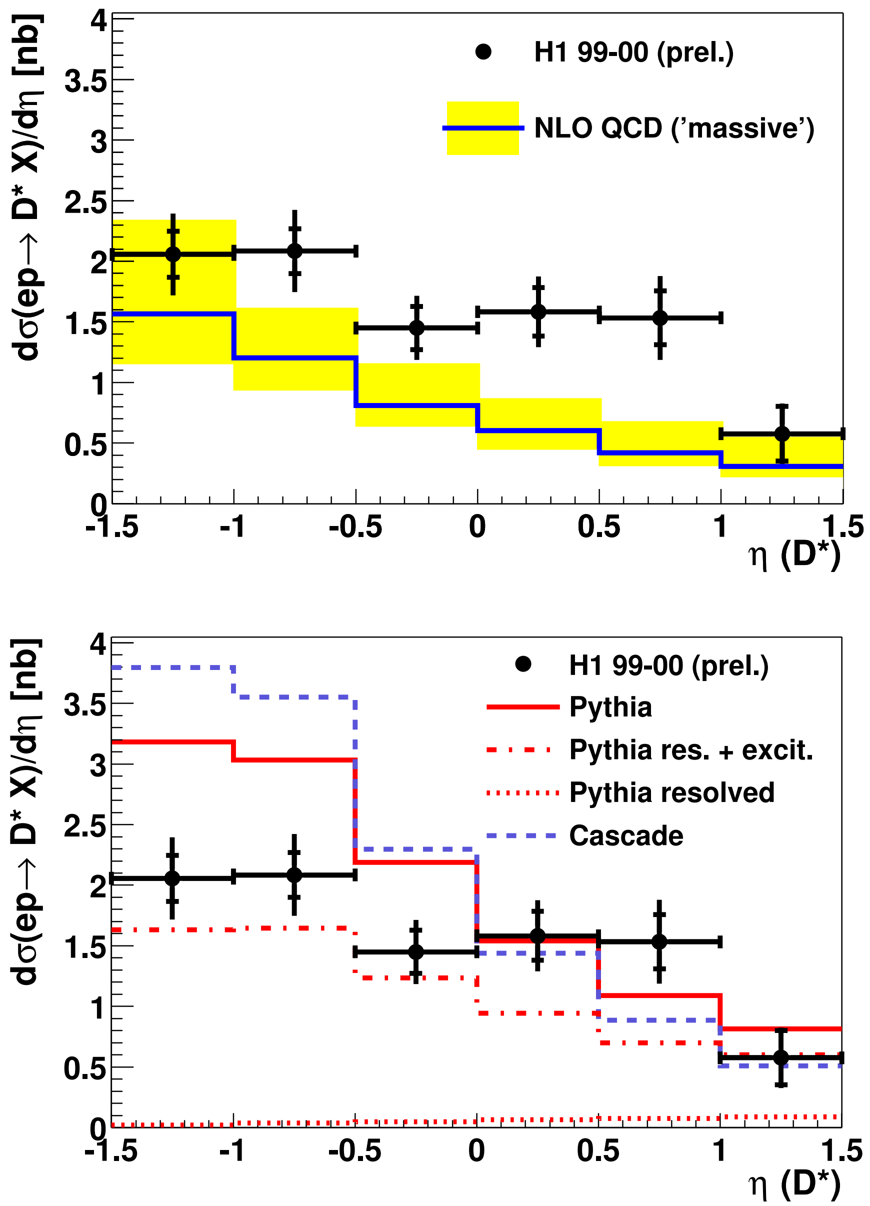

Figure 3: D^* photoproduction cross section as a function of the D^* pseudorapidity, compared with (a) fixed order NLO calculations and (b) LO Monte Carlo predictions.

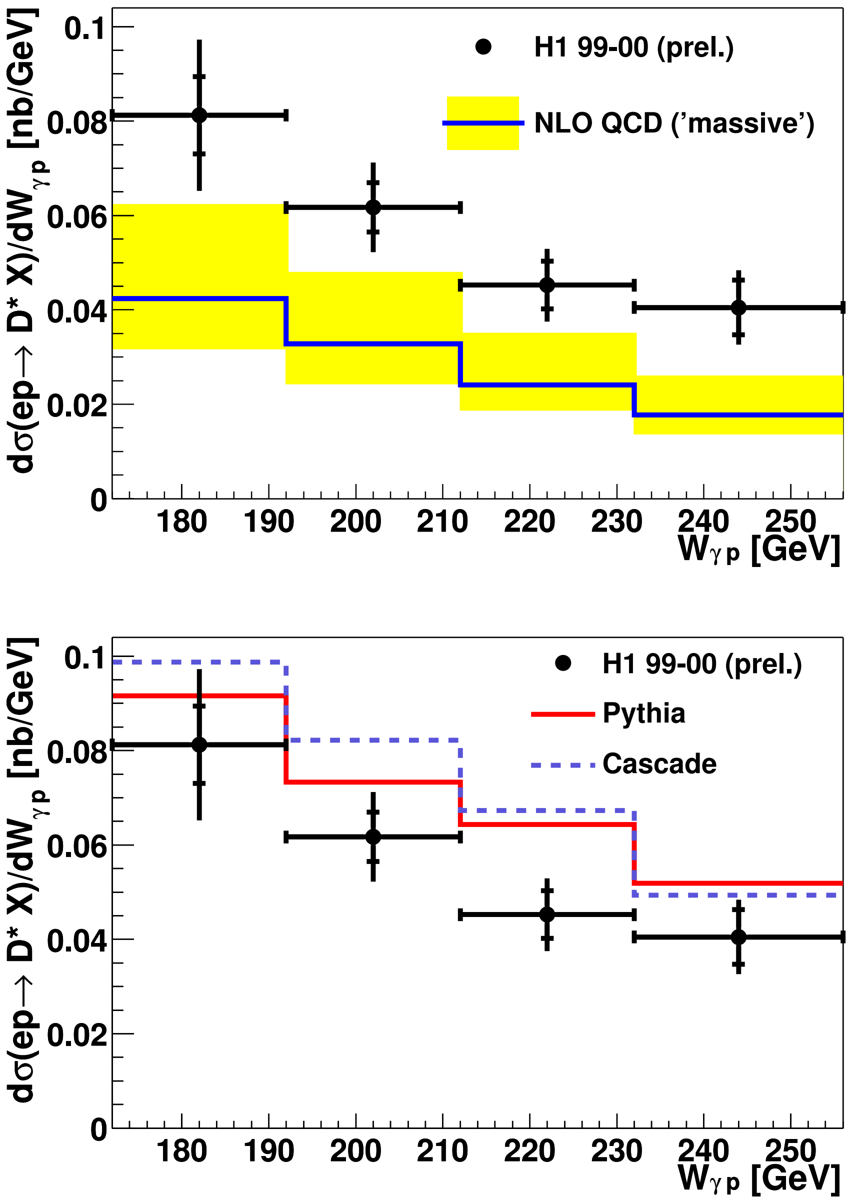

Figure 4: D^* photoproduction cross section as a function of the γp centre of mass energy, compared with (a) fixed order NLO calculations and (b) LO Monte Carlo predictions.