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Measurement of D* photoproduction at three different centre-of-mass energies at HERA

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The cross sections for the photoproduction of D^* mesons have been measured with the ZEUS detector at HERA at three different ep centre-of-mass energies, \sqrt{s} , of 318, 251 and 225\,GeV. For each data set, D^* mesons were required to have a transverse momentum, $p_T^{D^*}$, and pseudorapidity, η^{D^*} , in the ranges, $1.9 < p_T^{D^*} < 20$ \,GeV and $|\eta^{D^*}| < 1.6$, respectively. The events were required to have a virtuality of the incoming photon, Q^2 , of less than 1 GeV² and three different photon-proton centre-of-mass energies, corresponding to the same value of y, the fraction of the incoming electron momentum carried by the photon. The dependence on \sqrt{s} was studied by normalising to the high-statistics measurement at $\sqrt{s} = 318$ GeV. This led to the cancellation of a number of systematic effects both in data and in theory. Predictions from next-to-leading-order QCD describe well the energy dependence in data.

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