H1prelim-03-075

Elastic Photoproduction of J/ψ Mesons

H1 Collaboration

Abstract

The elastic J/ψ cross section is measured in the kinematic region $Q^2 < 1\ \mathrm{GeV}^2$, $40\ \mathrm{GeV} < \mathrm{W}_{\gamma\mathrm{p}} < 150\ \mathrm{GeV}$ and $|t| < 1.2\ \mathrm{GeV}^2$ using the decay channel $J/\psi \to \mu^+\mu^-$. The analysis is based on an integrated luminosity of $\mathcal{L} = 54.8\ \mathrm{pb}^{-1}$. Single and double differential cross sections are measured as a function of $\mathrm{W}_{\gamma\mathrm{p}}$ and $|t|$ and are compared to calculations in perturbative QCD.

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References

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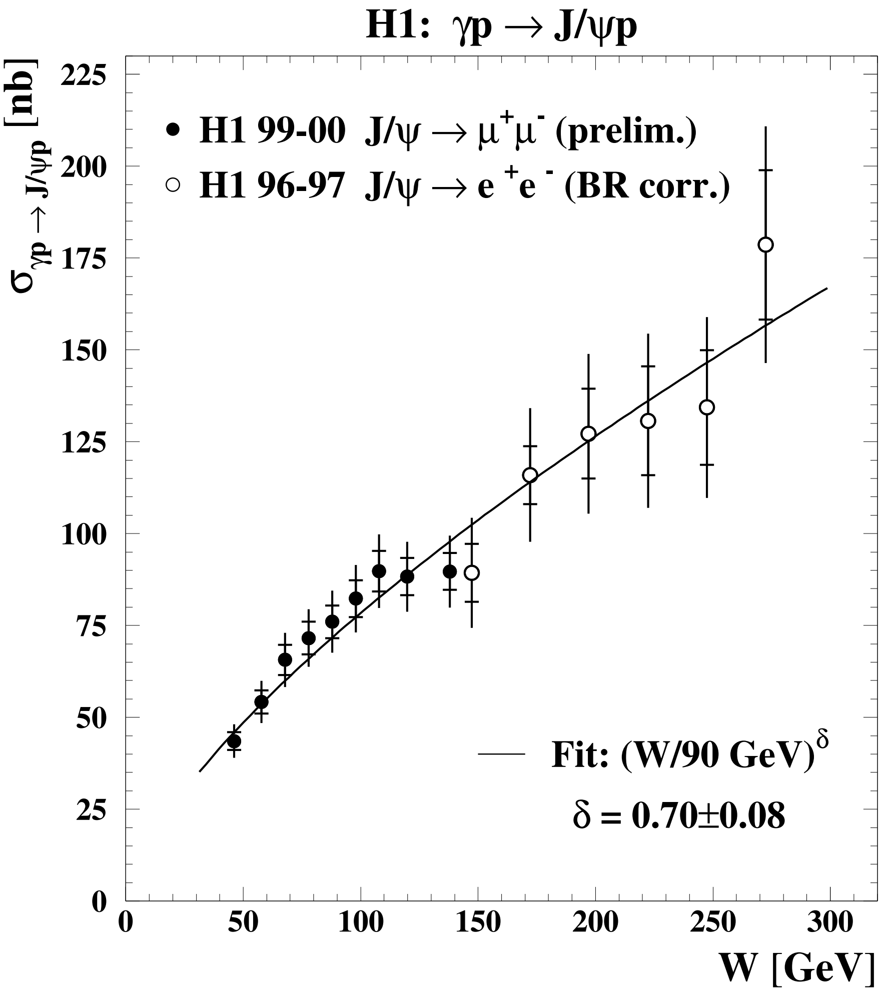

Figure 1: The elastic cross section $\sigma_{\gamma p}$ as a function of $W_{\gamma p}$. The inner (outer) bars give the statistical (total) error. The data from the process $J/\psi \rightarrow e^+e^-$ are those from [1], corrected due to a wrong branching ratio, which had been used. The fit is applied to both data sets, allowing different normalisation factors.

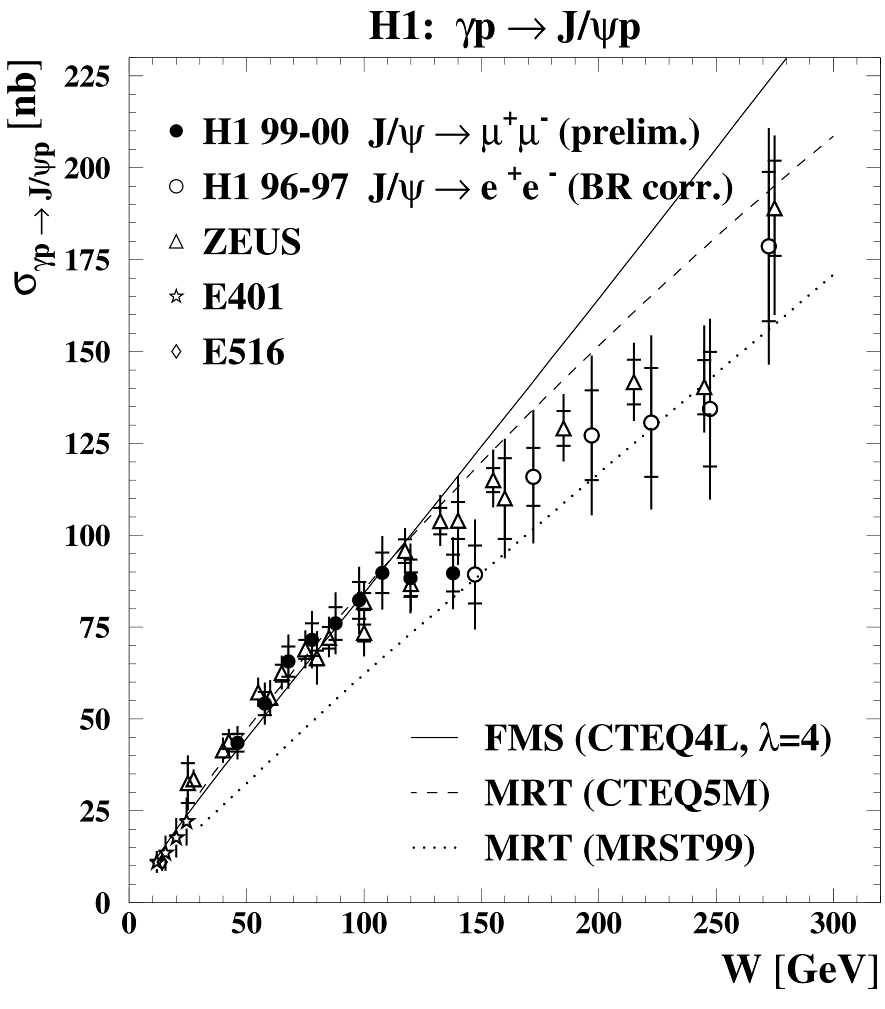

Figure 2: The elastic cross section $\sigma_{\gamma p}$ as a function of $W_{\gamma p}$. The inner (outer) bars give the statistical (total) error. The experimental data [2–4] are compared to some QCD models [5–8].

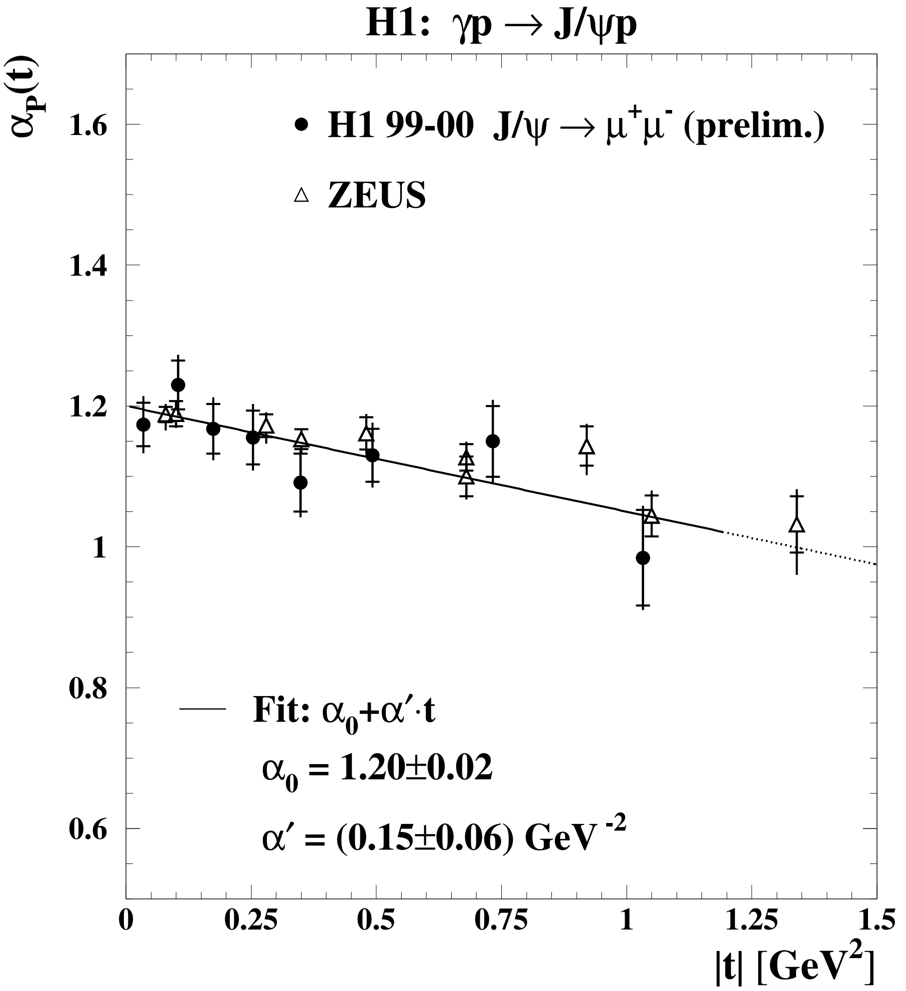

Figure 3: The effective pomeron trajectory $\alpha_{\mathbb{P}}$ as a function of $|t|$. The inner (outer) bars give the statistical (total) error. A straight line is fitted to the H1 data, which shows shrinkage as a three sigma effect. The ZEUS data are from [4].

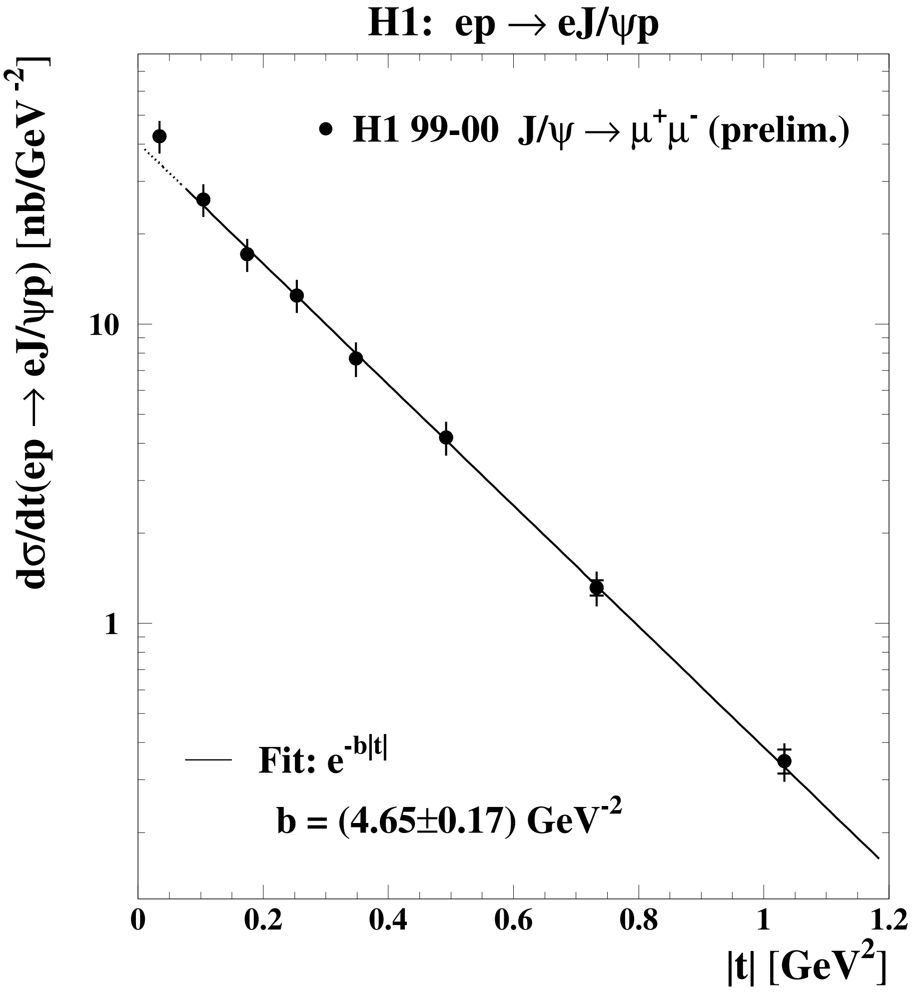

Figure 4: The differential cross section $d\sigma/dt$ as a function of $|t|$. The inner (outer) bars give the statistical (total) error. A fit of the form $d\sigma/dt \propto e^{bt}$ is shown as solid line in the applied fit range (0.07 GeV^2 - 1.2 GeV^2) and as dotted line outside.

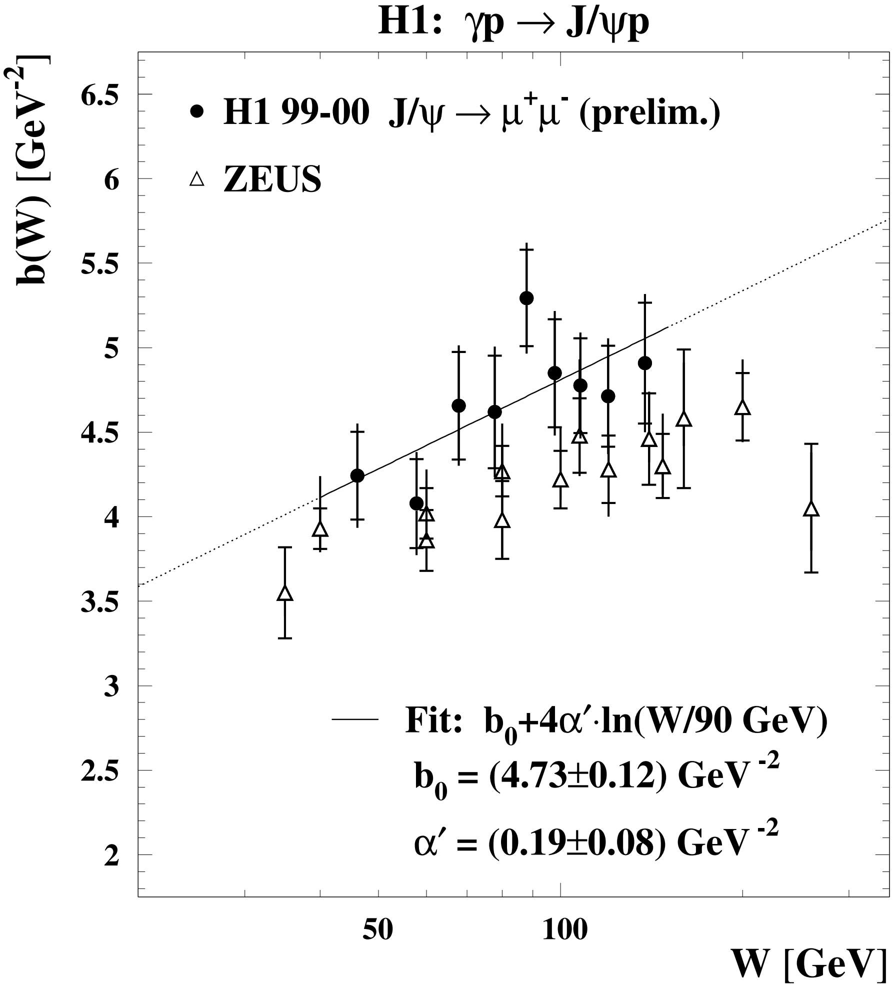

Figure 5: The slope parameter b derived from a fit to the differential crossection $d\sigma/dt \propto e^{bt}$ as a function of $\mathrm{W}_{\gamma\mathrm{p}}$. The inner (outer) bars give the statistical (total) error. A fit to the H1 data is shown as solid line in the applied fit range ($40\ \mathrm{GeV}$ - $150\ \mathrm{GeV}$) and as dotted line outside. The ZEUS data are from [4].