

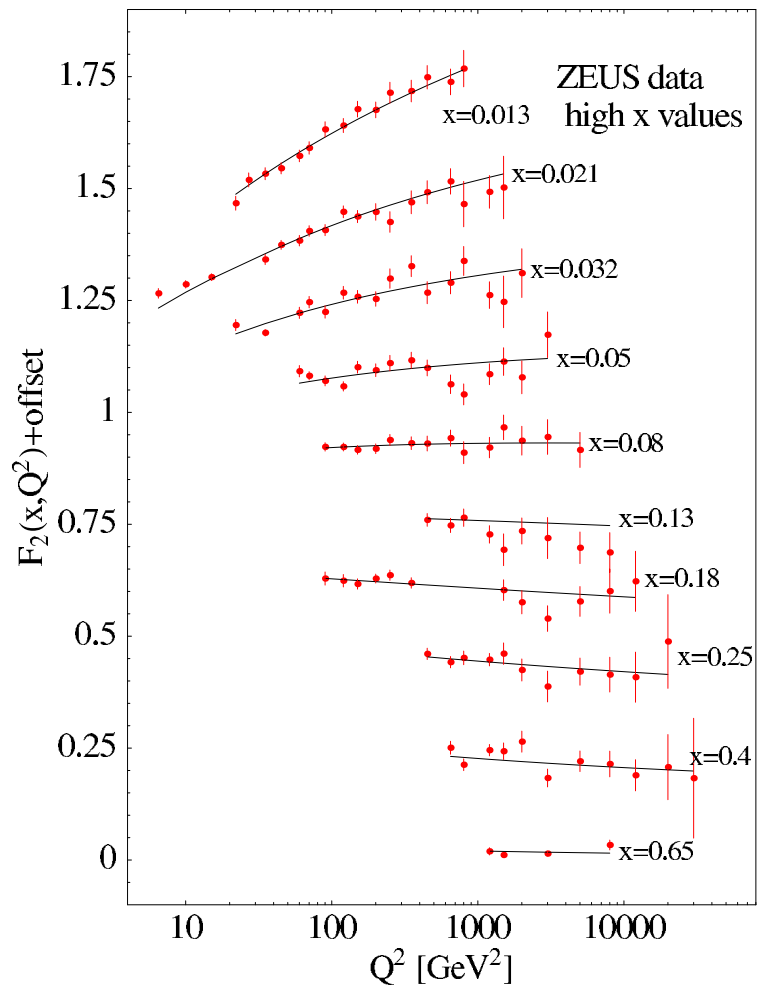
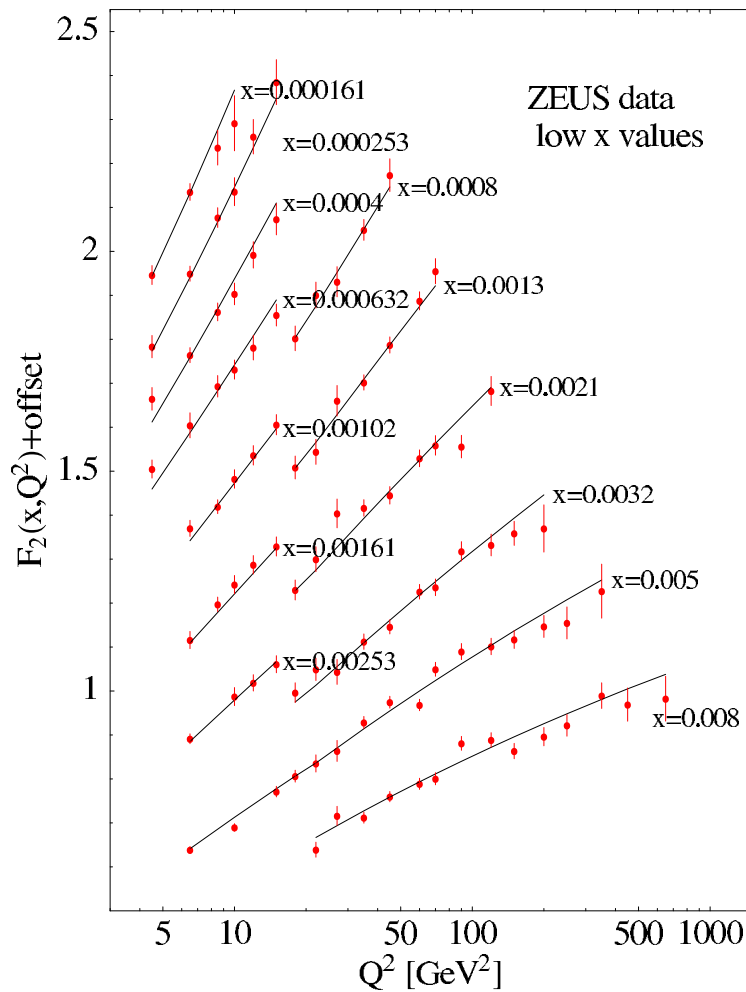
Comparison to Data

Data sets with published correlated systematic errors—

data set	N_e	χ_e^2/N_e
BCDMS p	339	1.114
BCDMS d	251	1.114
H1a	104	0.948
H1b	126	1.024
ZEUS	229	1.147
NMC F2p	201	1.517
NMC F2d/p	123	0.909
DØ jet	90	0.766
CDF jet	33	1.472

There is good qualitative agreement between theory and data,
but detailed studies are necessary to assess the uncertainties.

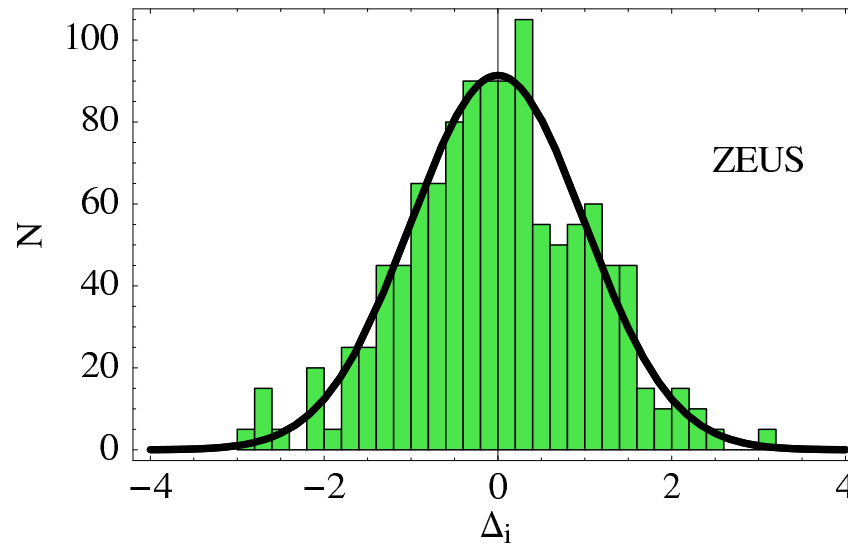
Consider ZEUS F_2 measurements as an example ...



CTEQ6M model and ZEUS data in separate x bins. The data points include the optimal shifts for systematic errors. The error bars are statistical errors only.

ZEUS collaboration: S. Chekanov *et al*, Eur Phys J, **C21** (2001) 443.

The “pull” distribution



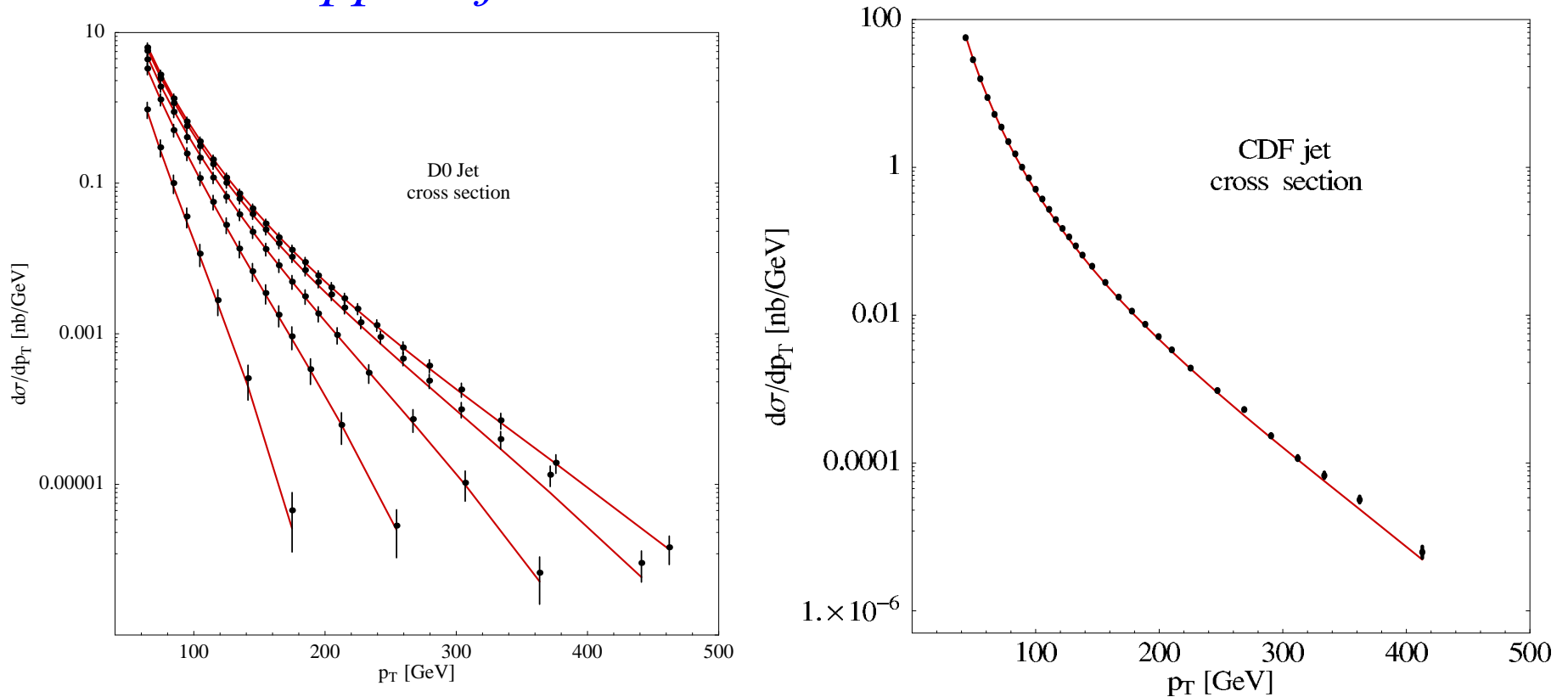
Histogram of residuals for the ZEUS data

$$\Delta_i = (D_i^{\text{shifted}} - T_i) / \alpha_i \quad \text{where} \quad D_i^{\text{shifted}} = D_i - \sum_{k=1}^K \hat{r}_k \beta_{ki}.$$

The curve is a Gaussian of width 1.

The optimal systematic shifts \hat{r}_k are all of order 1, consistent with expectations.

Tevatron $p\bar{p} \rightarrow jet$ inclusive cross section



The CTEQ6M fit to the inclusive jet data.

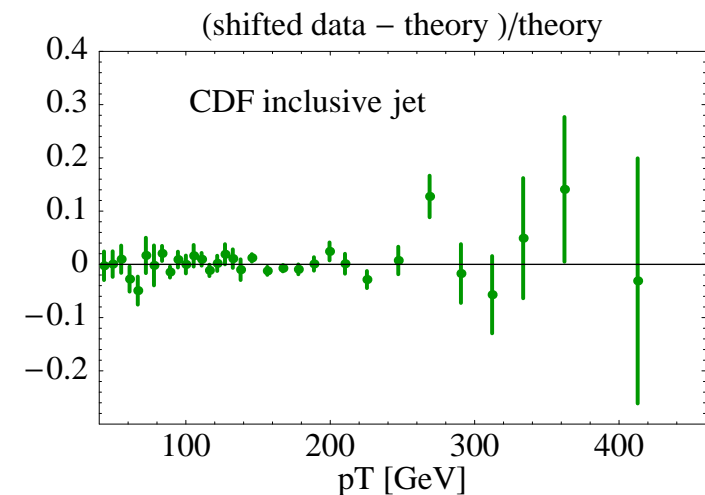
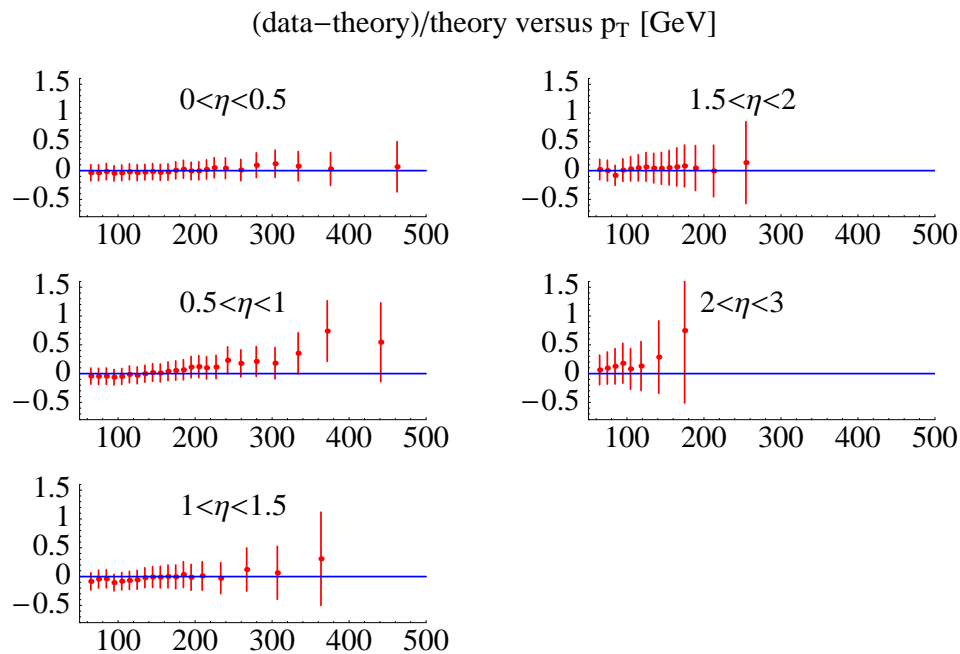
- (a) DØ data for 5 rapidity bins (0.0 0.5 1.0 1.5 2.0 3.0);
- (b) CDF data for central rapidity ($0.1 < |\eta| < 0.7$).

DØ Collaboration: B. Abbott *et al* ; CDF Collaboration: T. Affolder *et al*.

Closer comparison (data - theory / theory) between CTEQ6M and the jet cross section

DØ jet cross section

CDF jet cross section



The Tevatron inclusive jet cross section implies a hard gluon distribution, i.e., $g(x, Q)$ is large at large x .
(Recall CTEQ4HJ and CTEQ5HJ.)

