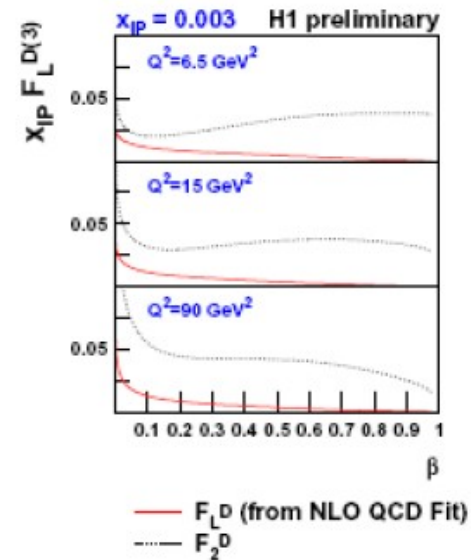
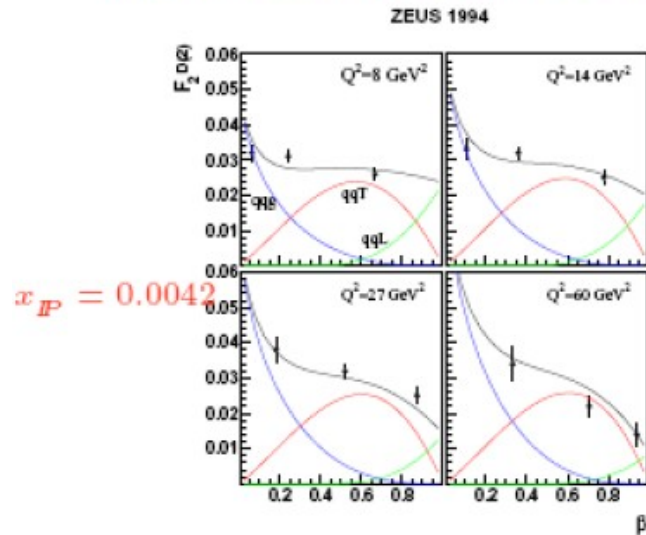


Motivation for Diffractive F_L^D Measurement

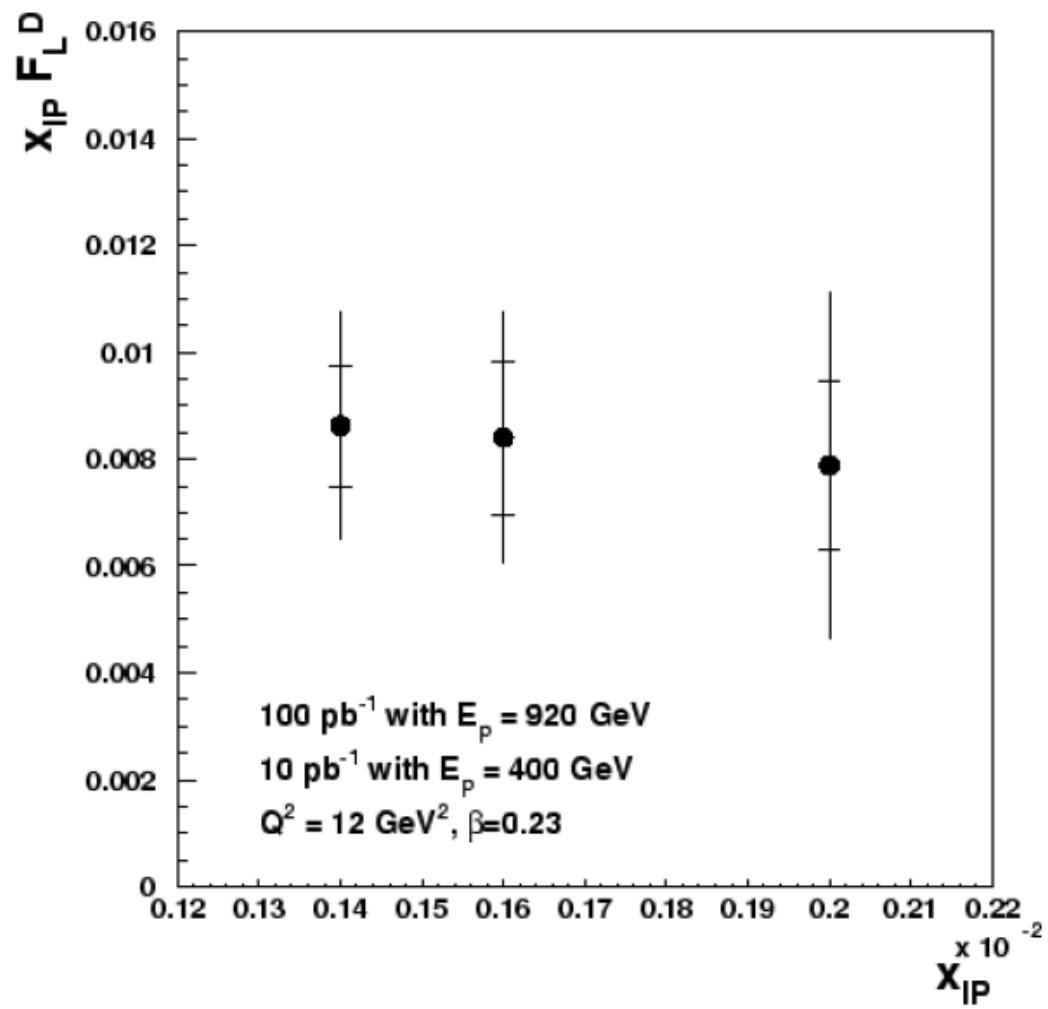
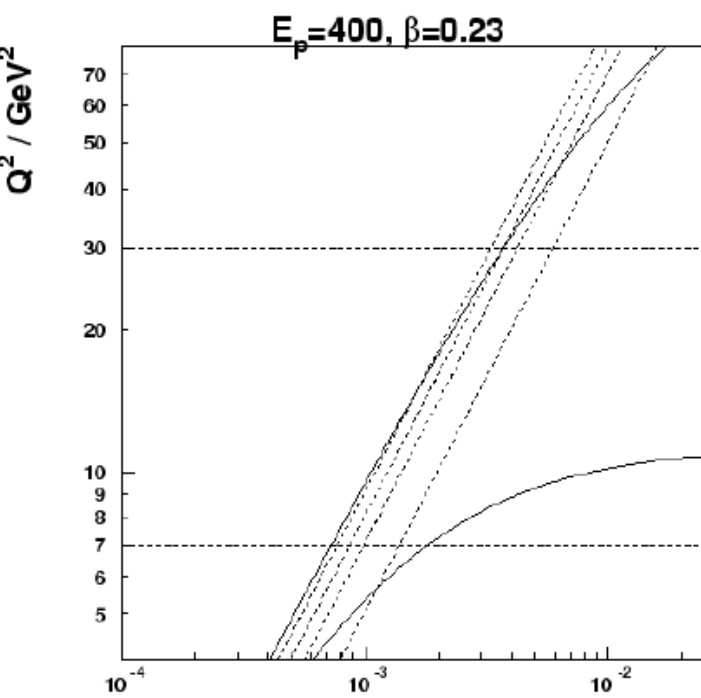
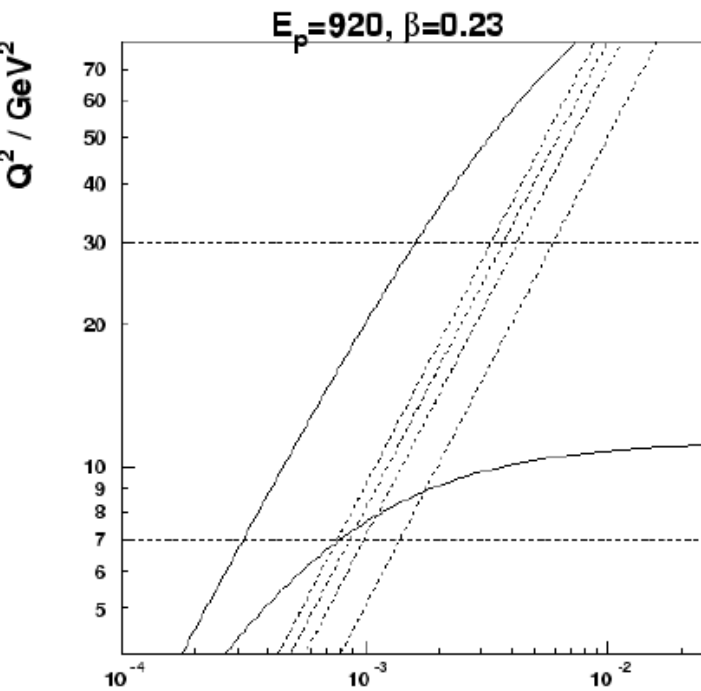
Inclusive diffraction cannot be fully understood without separating out F_L^D contribution:



pQCD calculable Higher Twist σ_L dominant
 at high β ? (BEKW, Saturation)
 pQCD predictions exist
 (including vector mesons, exclusive dijets)

Leading Twist F_L^D tests gluon from QCD fits at
 low x where jets / charm unavailable and novel
 QCD effects (satn, non-DGLAP) most likely

Simulated Measurement (2005)



Encouraging result \rightarrow 3-4 σ measurement in 3 x_{IP} bins at fixed β and Q^2

FLD extraction

- reduced cross-section: $\sigma_r^D = F_2^D - \frac{y^2}{Y_+} F_L^D$
 - two different binning schemes should lead to the same reduced cross-section
 - measurement in x_{IP}, Q^2, x bins
 - measurement in x_{IP}, Q^2, y bins
- $$x_{IP} \sigma_r^D(Q^2, x_{IP}, \beta) = \frac{d^3 \sigma}{dx_{IP} dQ^2 dx} \frac{Q^4 x x_{IP}}{2 \pi \alpha^2 Y_+}$$
- $$x_{IP} \sigma_r^D(Q^2, x_{IP}, \beta) = \frac{d^3 \sigma}{dx_{IP} dQ^2 dy} \frac{Q^4 x x_{IP}}{2 \pi \alpha^2 Y_+} * \text{Jacobian}$$
- Jacobian $\begin{vmatrix} \frac{\delta x_{IP}}{\delta x_{IP}} & \frac{\delta x_{IP}}{\delta Q^2} & \frac{\delta x_{IP}}{\delta x} \\ \frac{\delta Q^2}{\delta x_{IP}} & \frac{\delta Q^2}{\delta Q^2} & \frac{\delta Q^2}{\delta x} \\ \frac{\delta y}{\delta x_{IP}} & \frac{\delta y}{\delta Q^2} & \frac{\delta y}{\delta x} \end{vmatrix} = -\frac{y}{x}$

Kinematics

- FLD turn-over at high y (low x)
- FLD measurement most interesting at high beta

- $x_{pom} < 0.01$
- $12 < Q^2 < 90$

- $y < 0.9$ (460)
- $Y < 0.75$ (575)
- $Y < 0.5$ (920)

FLD measurement

- FLD measurement = FL measurement + diffractive selection
 - Cross-check with FL analysis before the diffractive selection
 - Cross-check with F2D before the FLD extraction
 - Cross-check using two different binning schemes
- So far analysis follows recent 'medium Q2' FL publication
 - $Q^2 > 12 \text{ GeV}^2$
 - CJC track region only (BST to follow later)
- Data
 - 920 GeV
 - 460 GeV: 8 pb⁻¹
 - 575 GeV: 5 pb⁻¹
- Results after summer