



Preblessing of Run II Diffractive Results

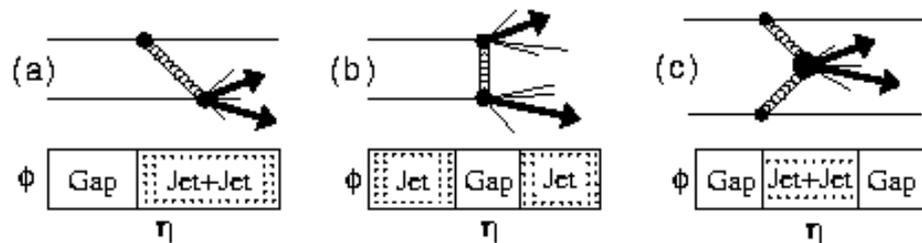
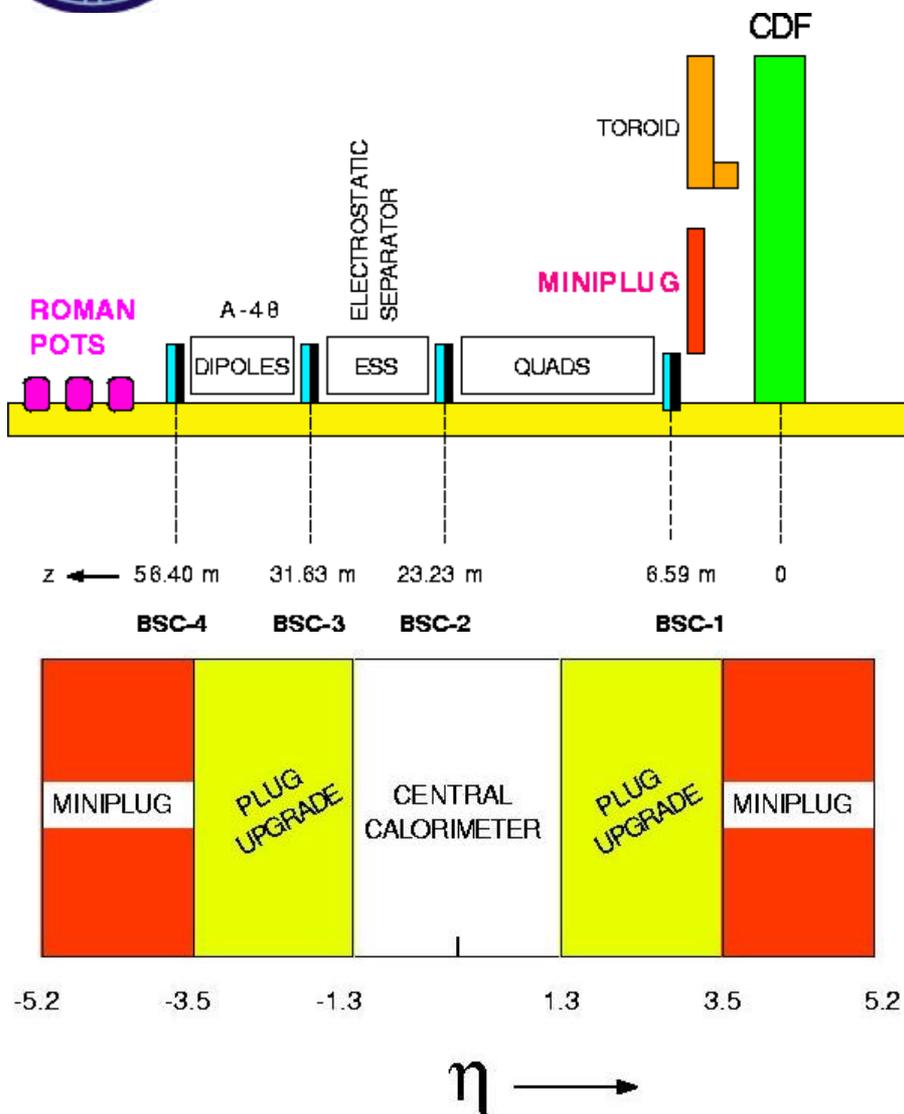
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C. Mesropian, K. Terashi

(QCD Meeting - Feb. 21, 2003)

- ✓ **Introduction**
- ✓ **Data sample**
- ✓ **Event selection**
- ✓ **Diffractive Structure
Function**
- ✓ **DPE**



Forward Physics

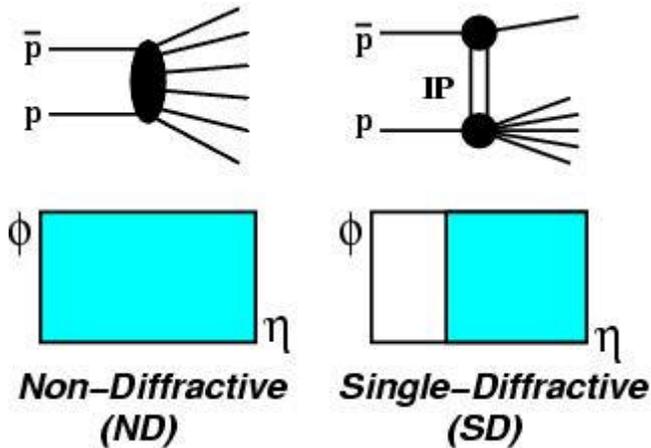


- Hard Single Diffraction
- Double Pomeron Exchange
- ...

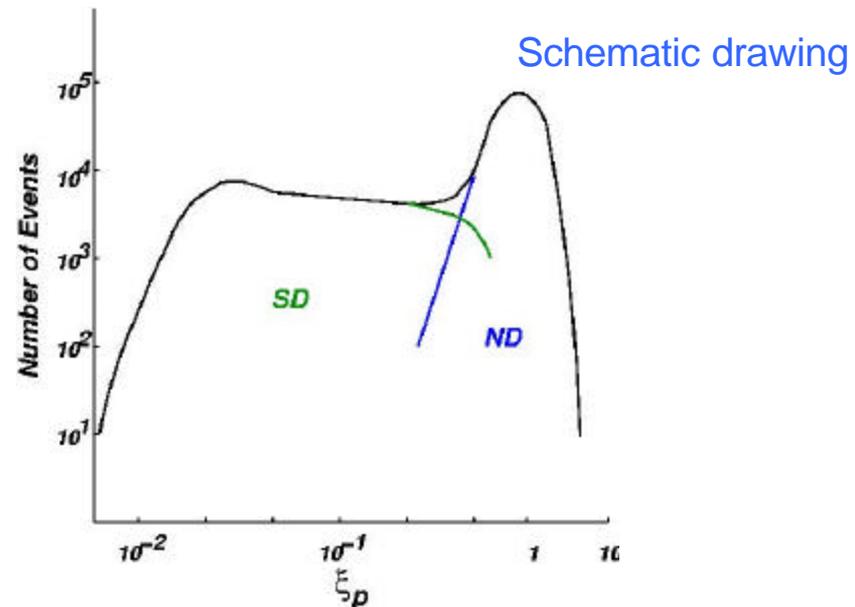


Diffractive Dijets

- Compare diffractive events to ND
- Measure diffractive structure function
- Calculate $R_{SD/ND}$
- DSF different in ep (Hera) and pp
- Test of QCD factorization

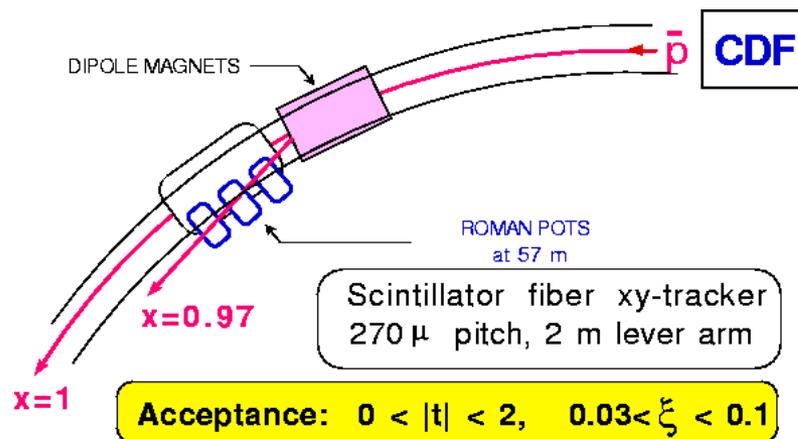
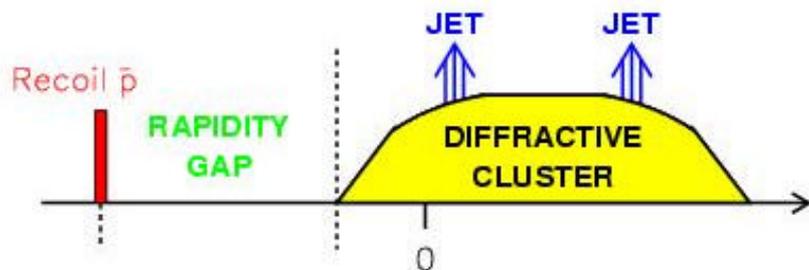


Measure ξ (momentum loss fraction)





Strategy



- Events triggered on a leading antiproton
- Use RP + jet triggers
- Lower ξ /higher Q^2 than Run 1
- Use MP/BSC to measure event energy/gap



Event Selection

- Use dedicated diffractive triggers
 - RP+J5 (diffractive sample)
 - J5 (control sample)
- Data sample $\sim 9 \text{ pb}^{-1}$ (PHYSICS_1_03_v1)

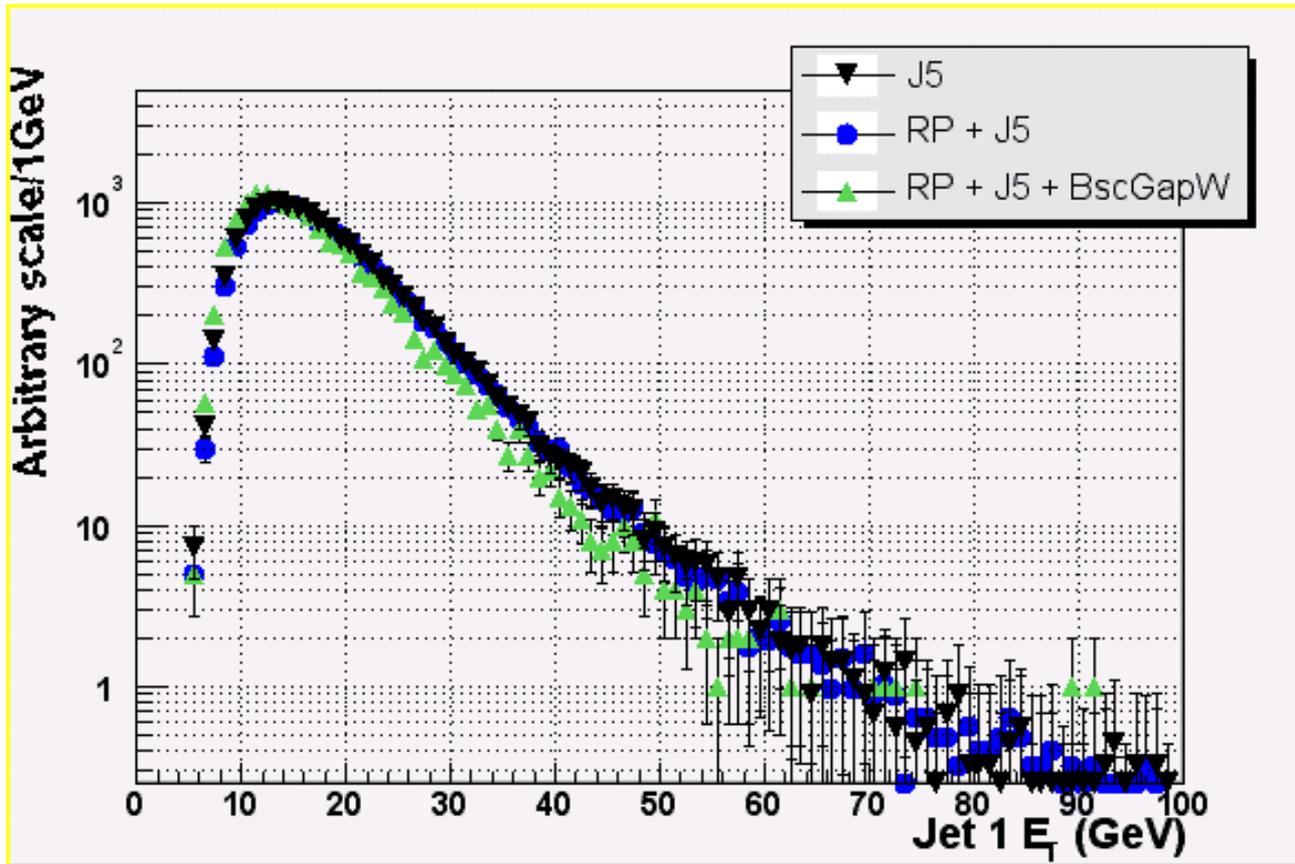


Event Selection II

1. Triggered events	352,359
2. MET Significance < 6	352,359
3. Two jets ($E_T > 5$, $ h < 2.5$)	175,292
4. RP Track	168,153
5. BSC-1 West Gap	14,603
6. All BSC West Gap	13,443
7. All BSC East Gap	1,126

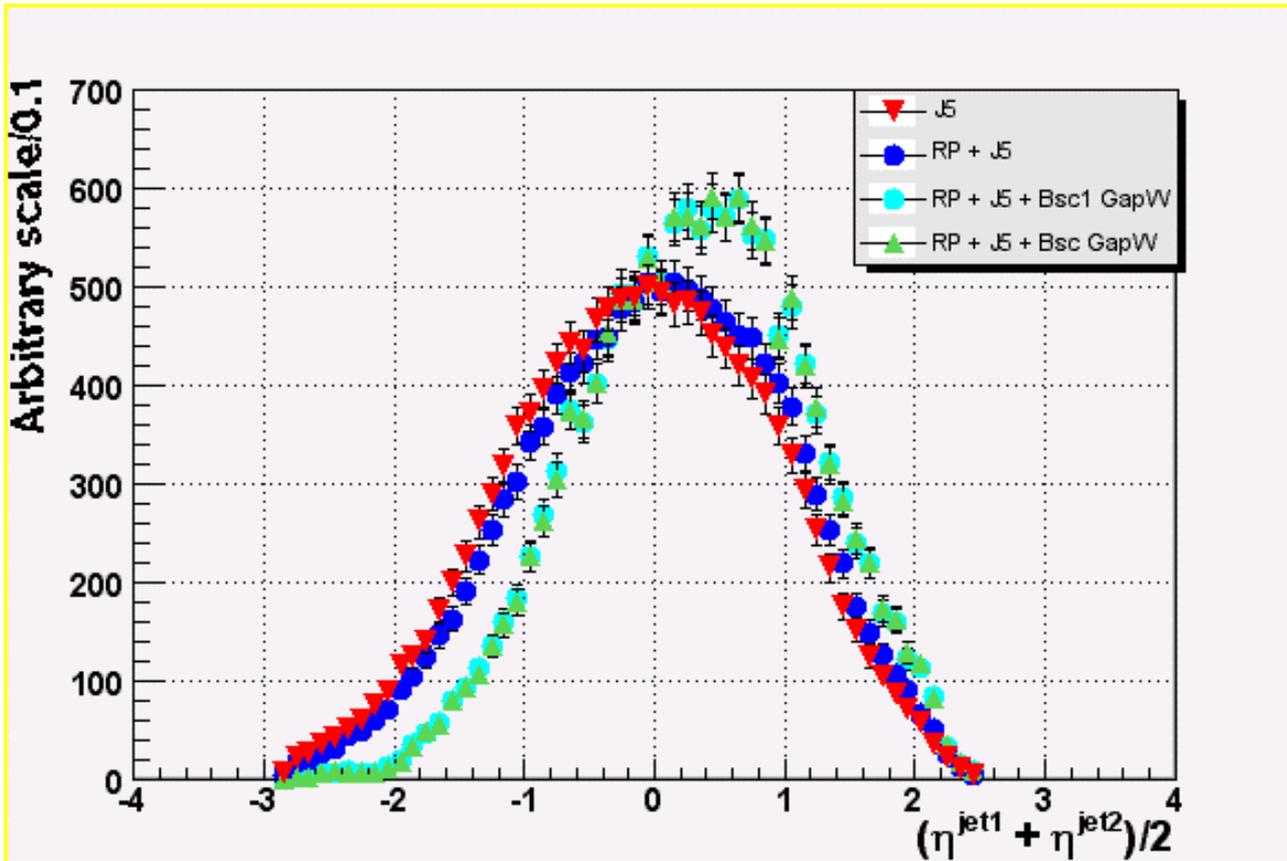


Higher Jet E_T than Run I





Rapidity ($\text{jet}_1, \text{jet}_2$)

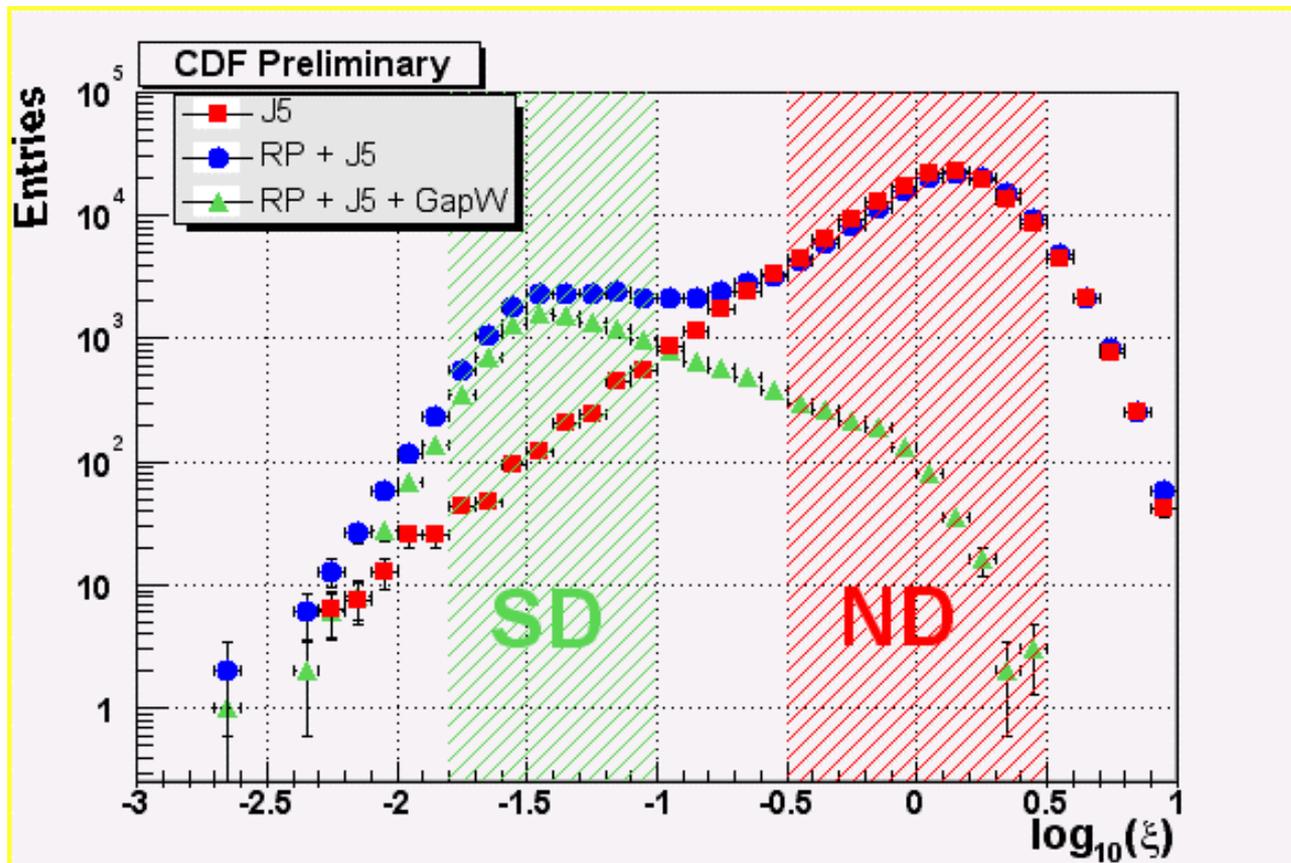


⇒ **Gap selects purer diffractive sample**



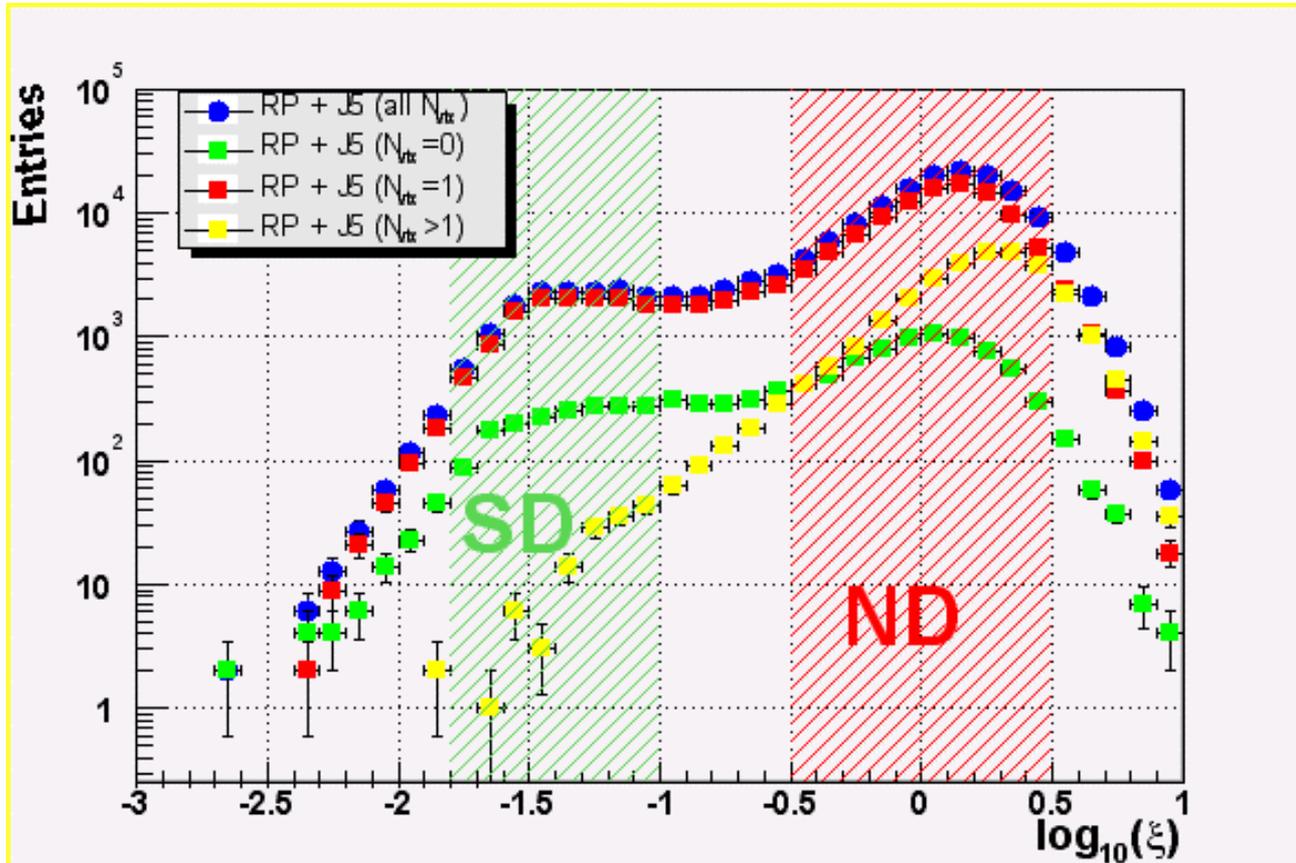
x Distribution

- $x = SE_T e^{-h/\bar{\sigma}s}$
- Discriminate on x (SD/ND)





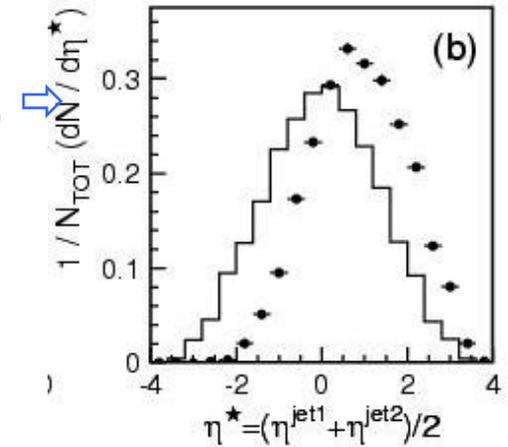
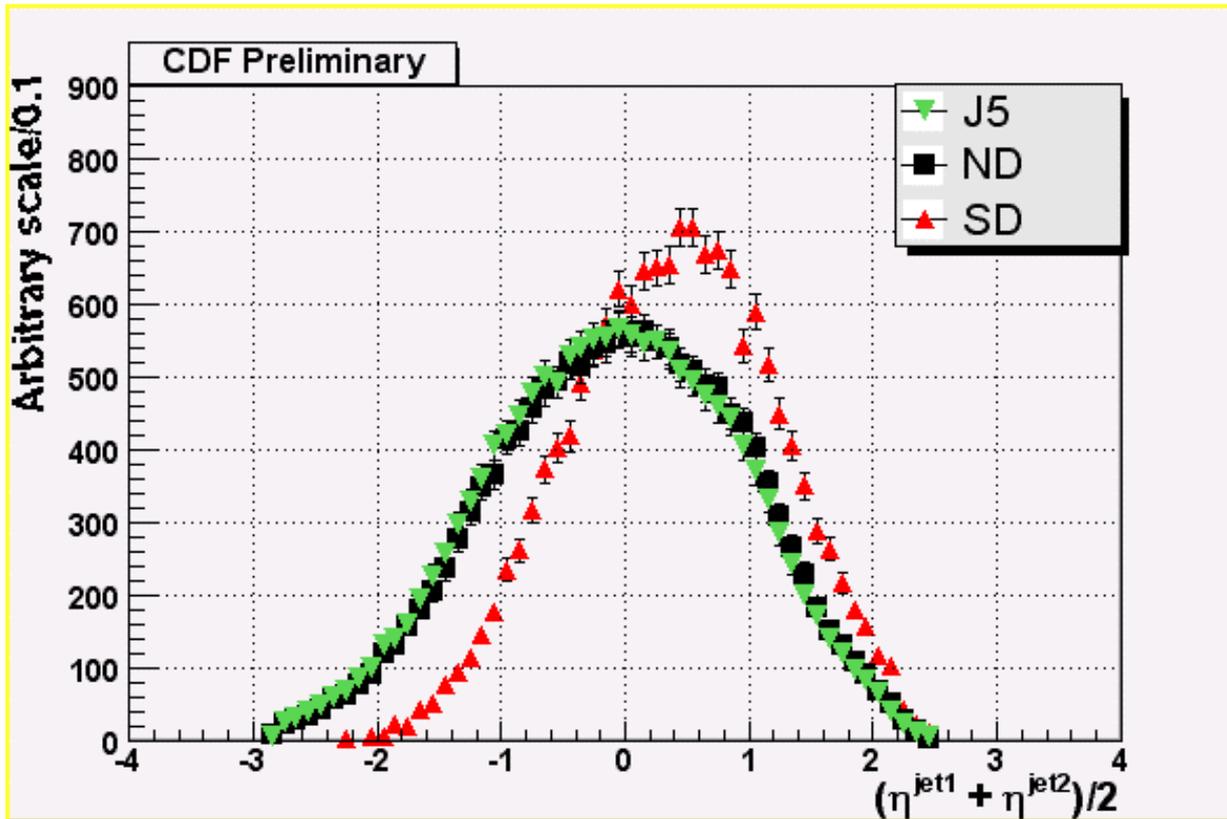
No Vertex Cut





Rapidity

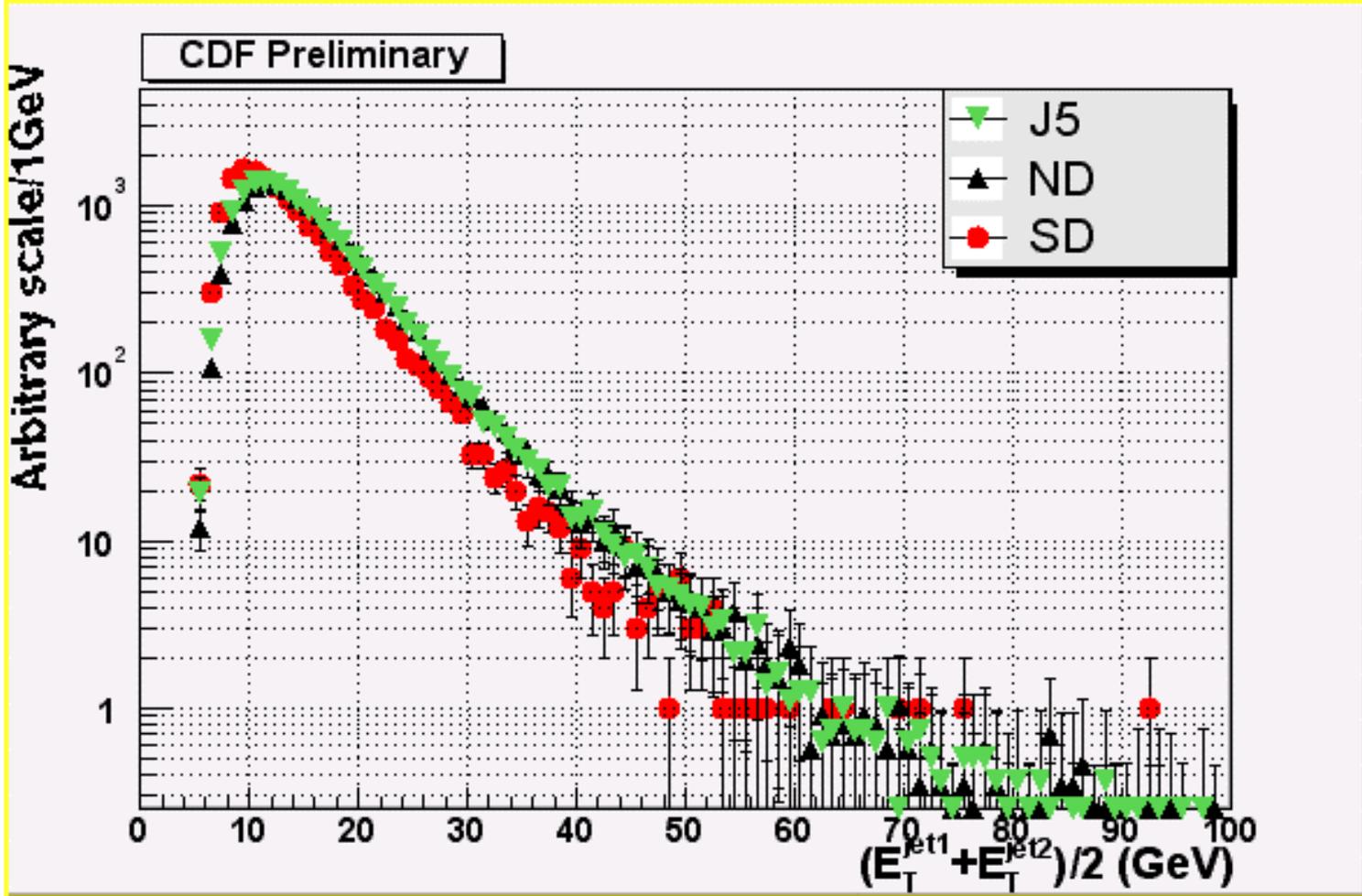
Run I PRL



⇒ **Diffraction dijets are boosted away from the recoil antiproton**

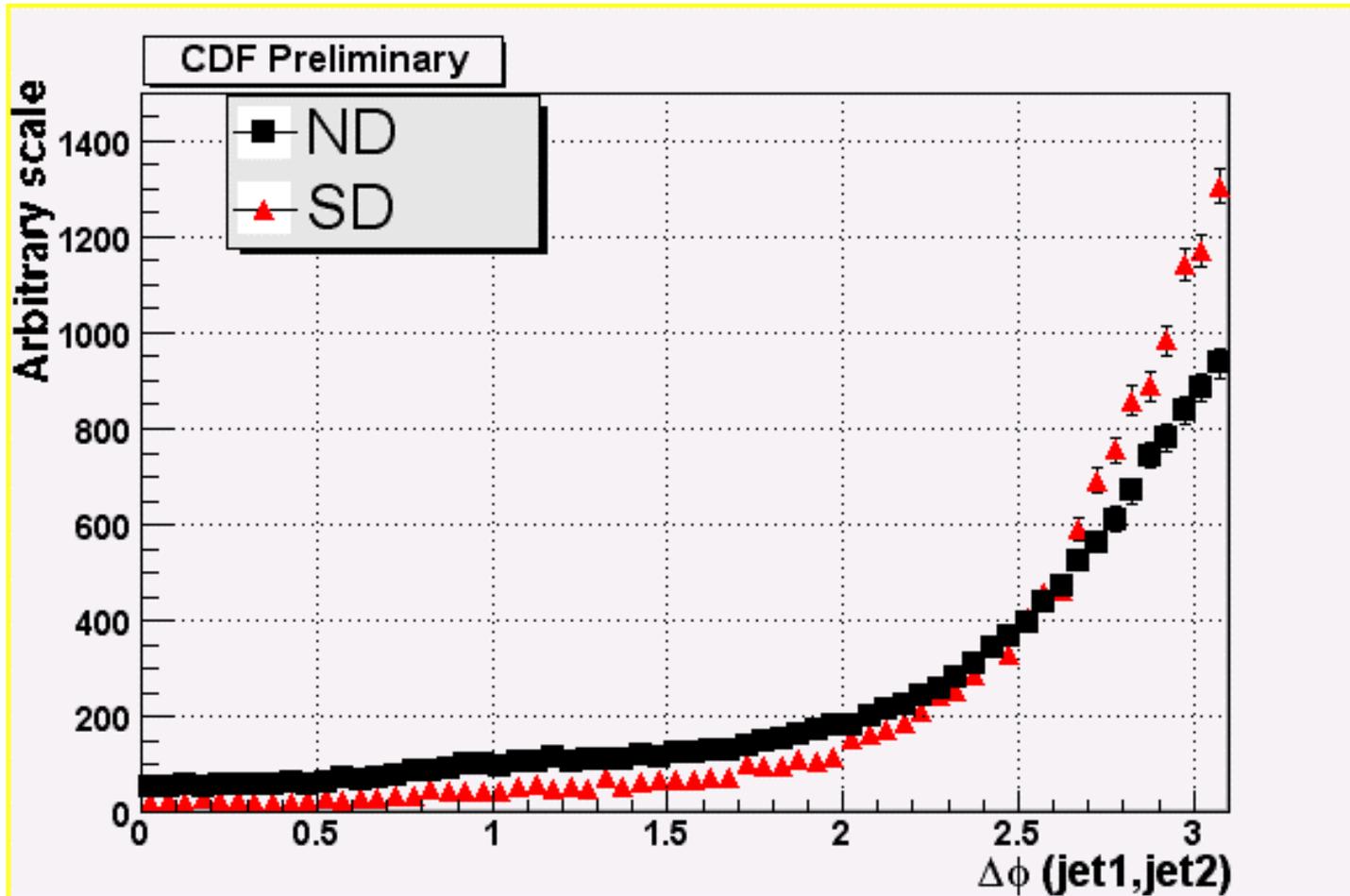


Mean Dijet Jet Energy





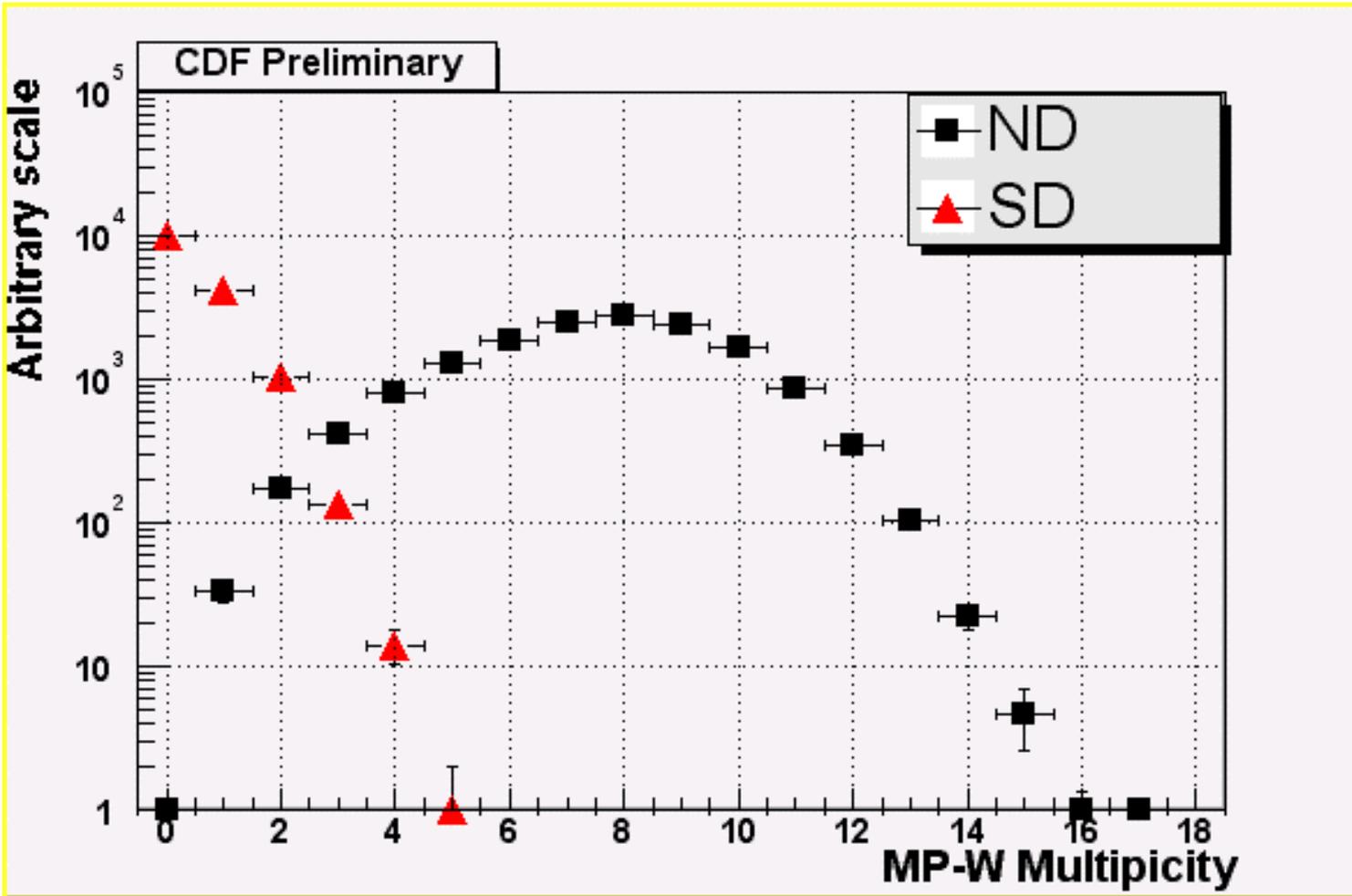
Df (jet₁-jet₂)



⇒ **Diffractive dijets are more back to back**

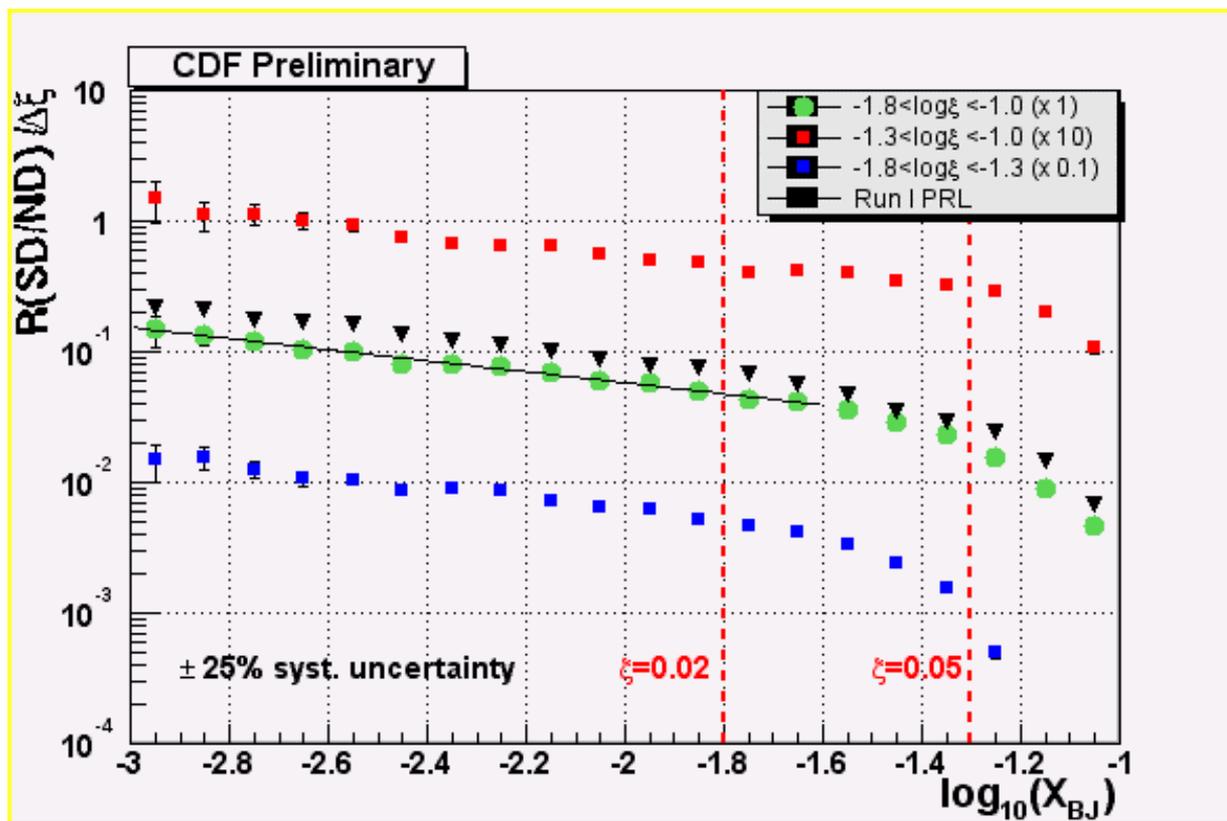


MP Multiplicity





Diffractive Structure Function



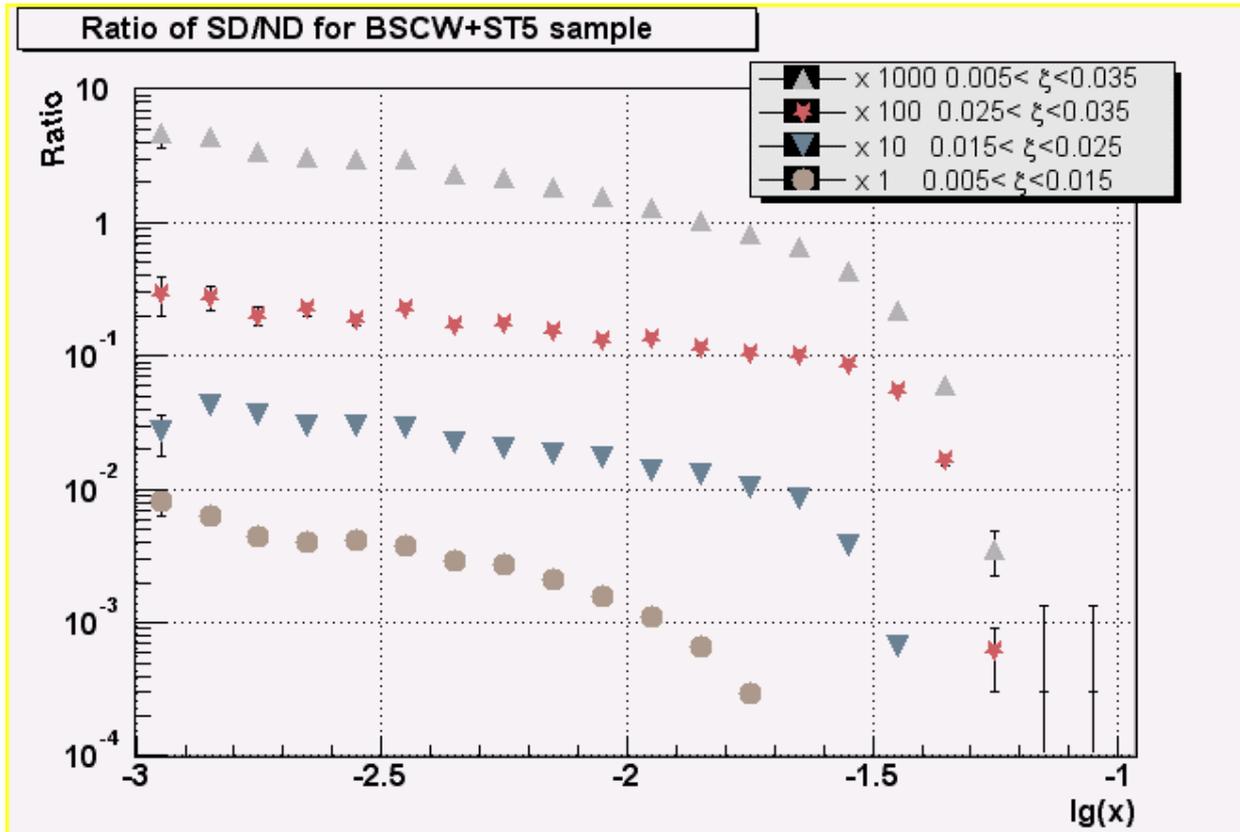
- $x = S_{1,2,3} E_T e^{-h/\xi}$
- Ratio SD/ND
- $E_T(\text{jet}_{1,2,(3)}) > 5 \text{ GeV}$
- $|h(\text{jet}_{1,2,(3)})| < 2.5$

Run I PRL (b=0.45)

Fit to $dR/dx = R_0 x^{-b}$
 $\Rightarrow b = 0.42 (0.02)$



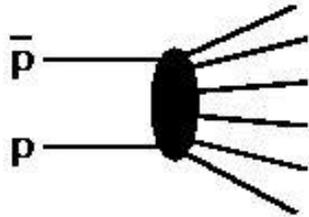
Gap W + J5



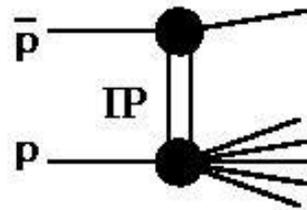
⇒ lower x region than RP+J5



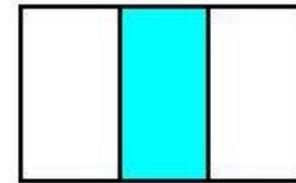
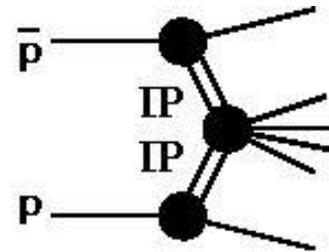
Double Pomeron Exchange



ND



SD η

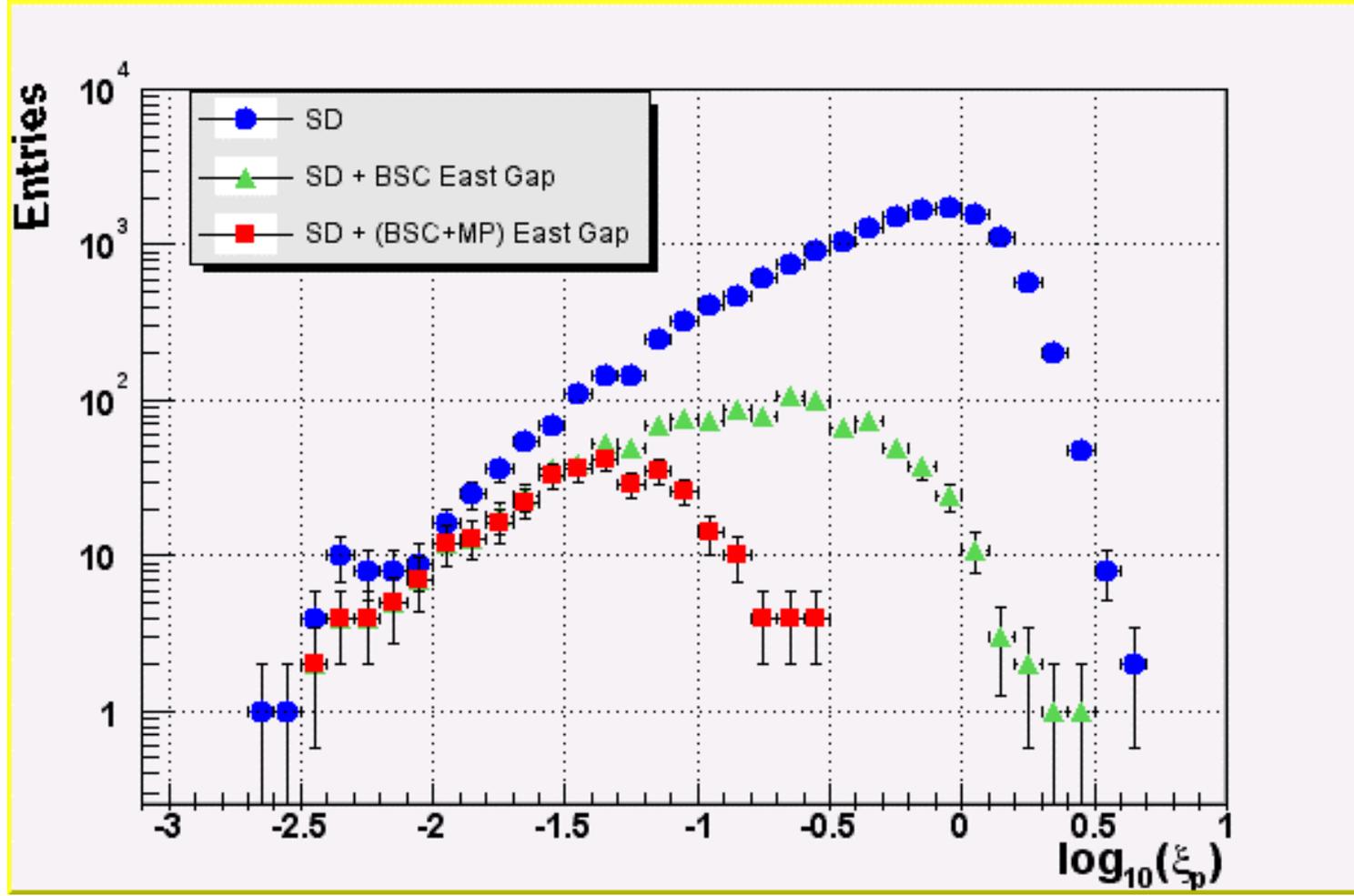


DPE

Dijet production diagrams and event topologies

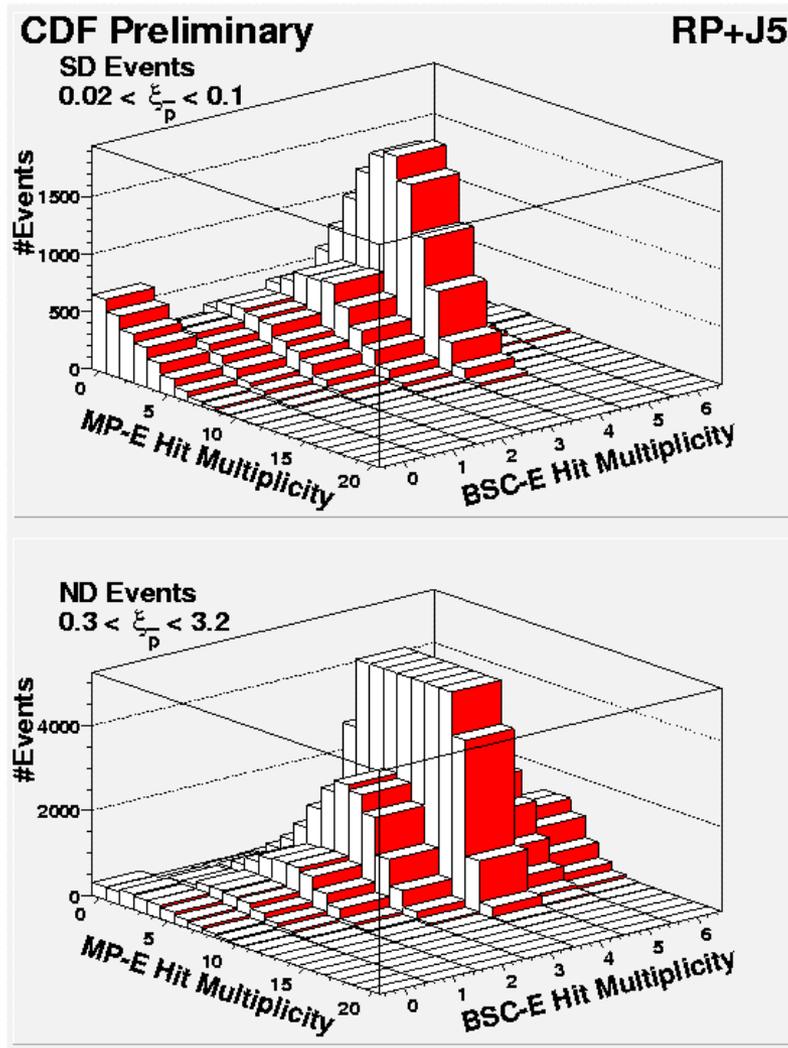


Proton Momentum Loss





East Multiplicity: BSC vs MP



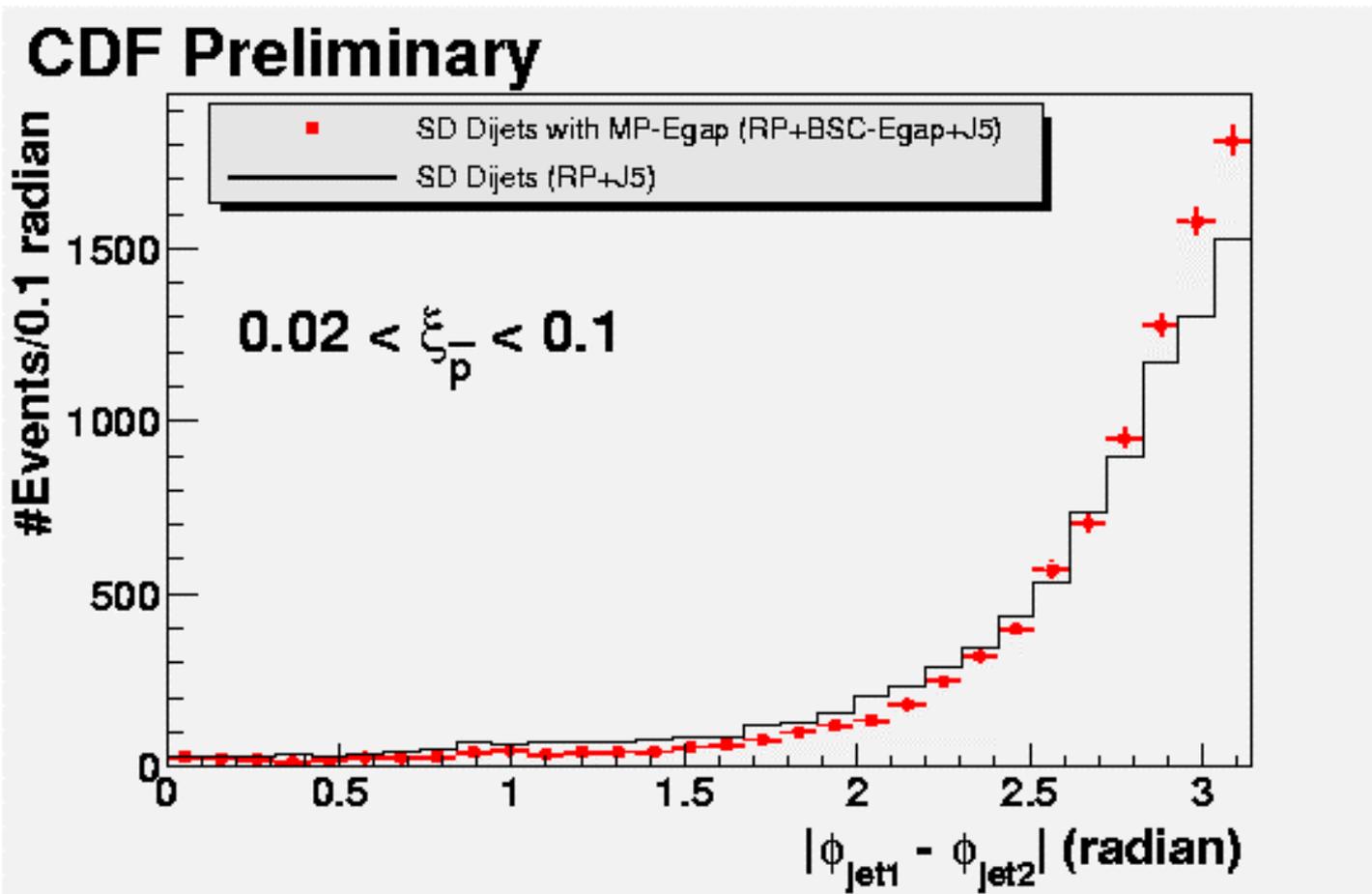


DPE Enhanced Sample

- Study a dedicated DPE trigger (RP+J5+GapE)
- ~300 k events
- $E_T(\text{jet}_{1,2}) > 5 \text{ GeV}$
- $|\eta(\text{jet}_{1,2(,3)})| < 2.5$
- (0,0) bin \Rightarrow ~ 15,000 events (in Run I: 100 evts)

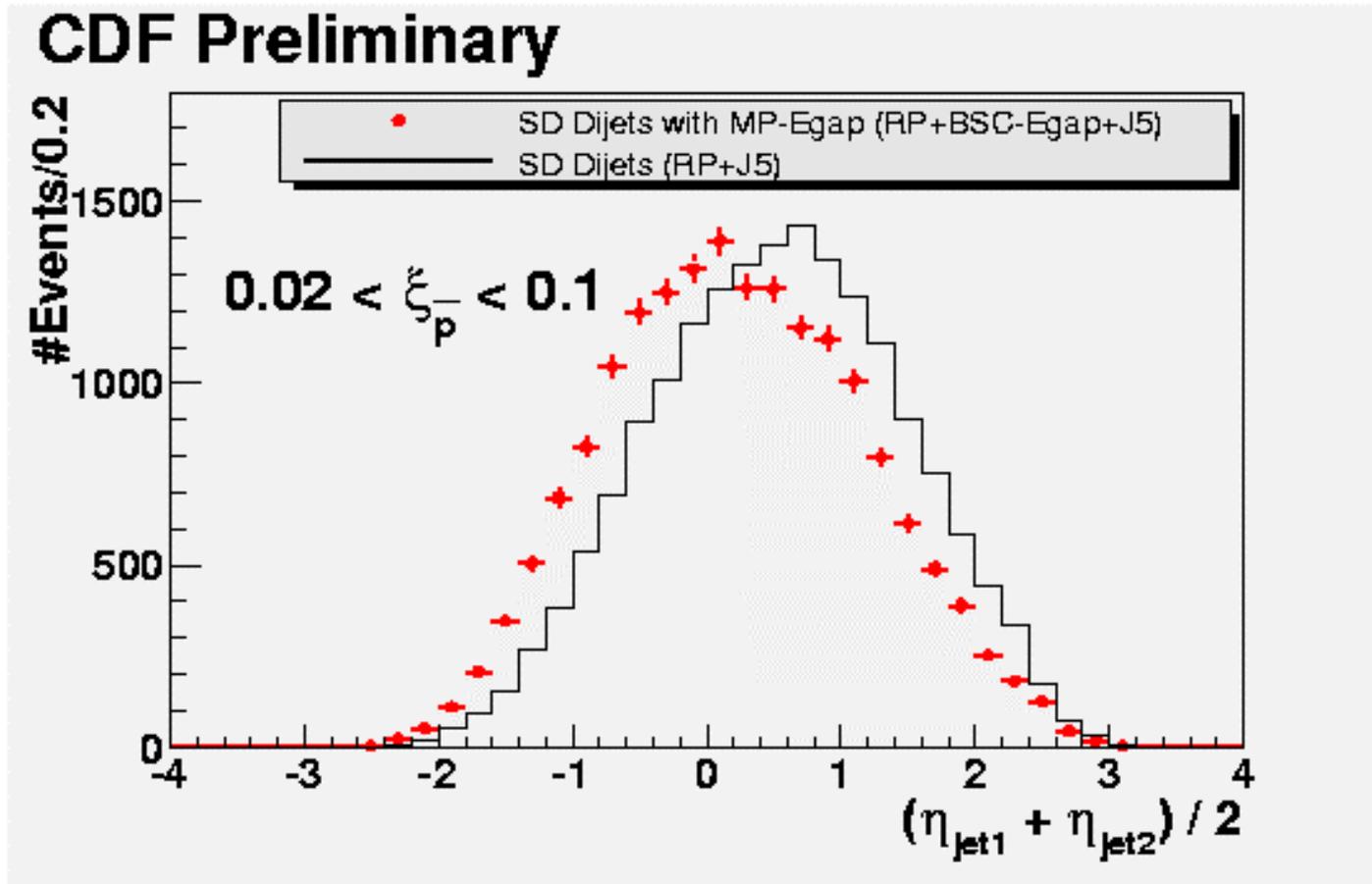


Df (jet₁-jet₂)





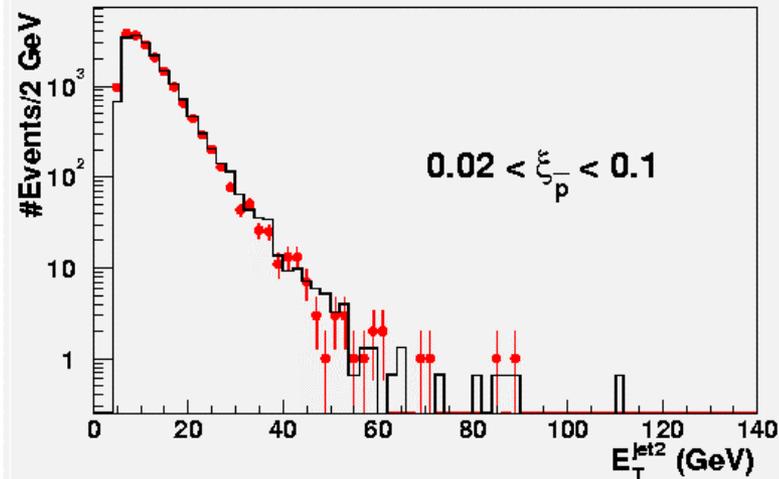
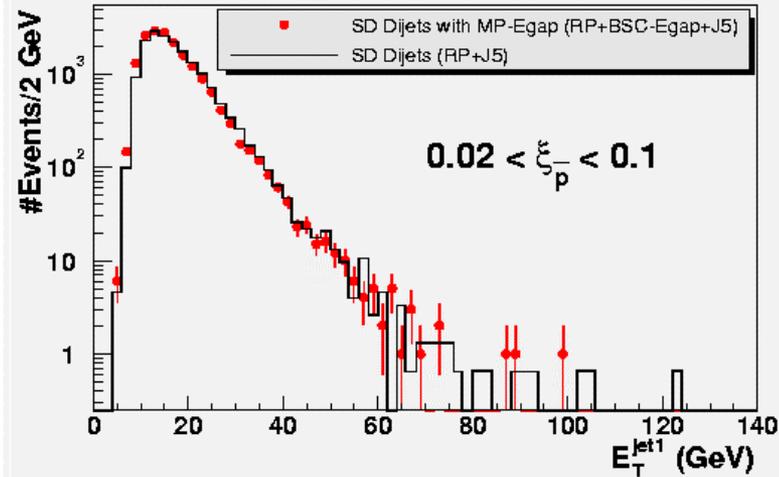
Rapidity





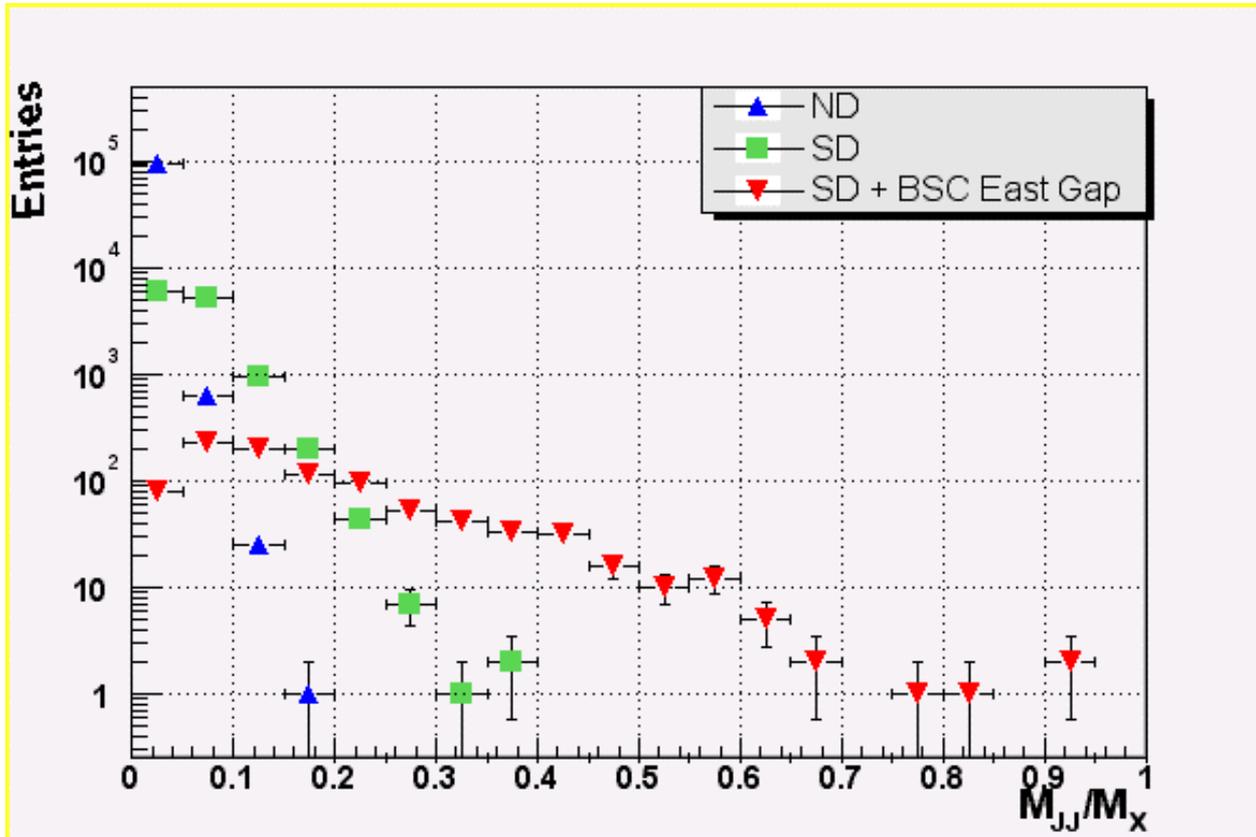
Jet Transverse Energy

CDF Preliminary





Dijet Mass Fraction



⇒ an interesting subject...



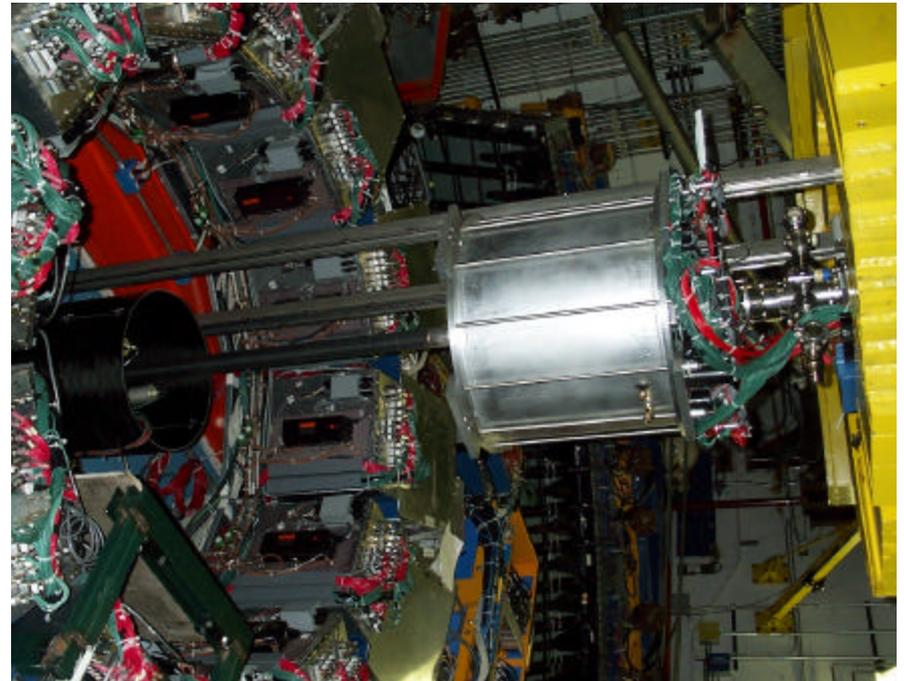
Conclusions

- **Measurement of diffractive structure function**
- **Extend to higher q^2 and lower x**
- **Good agreement with Run I results**
- **DPE kinematic distributions**



MiniPlugs in CDF-II

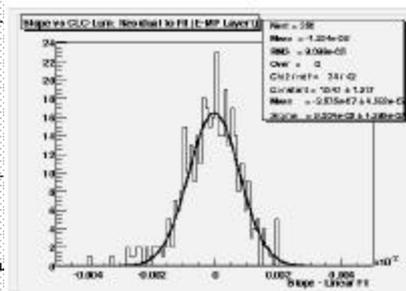
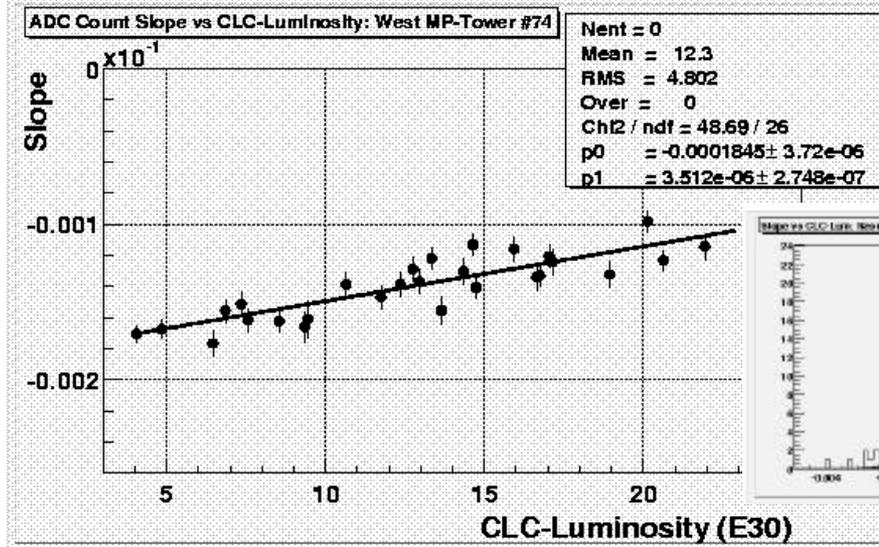
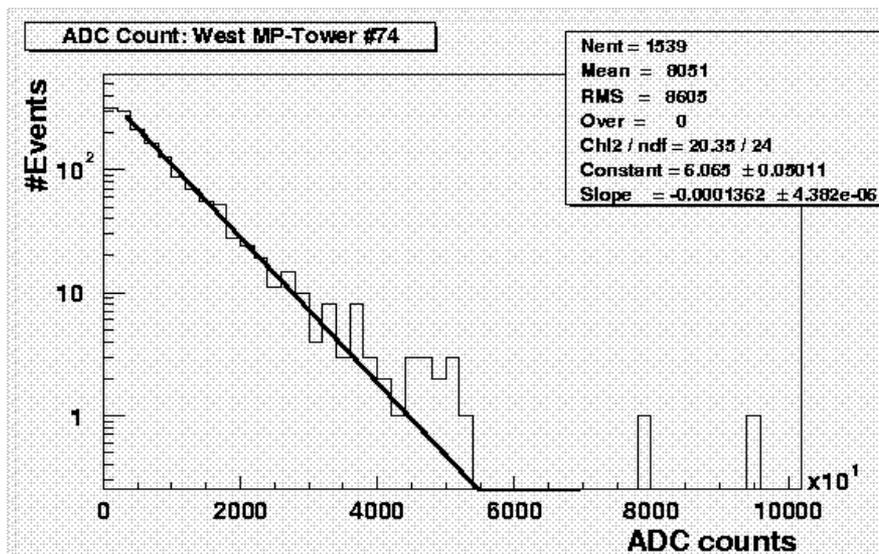
- Extend coverage to $3.6 < |\eta| < 5.1$
- Measure charged and neutrals
- Measure energy and position of both EM and hadron showers
- Forward jets at large rapidity





MP Calibration

- Use slope from ADC distribution
- Tower-to-tower relative calibration with data/MC
- Energy scale from MC
- MC/MBR



- ✓ Pile-up at high luminosity
- ✓ (Slope-Fit)/Fit ~7% for each h ring
- ✓ Time dependence (LED)