

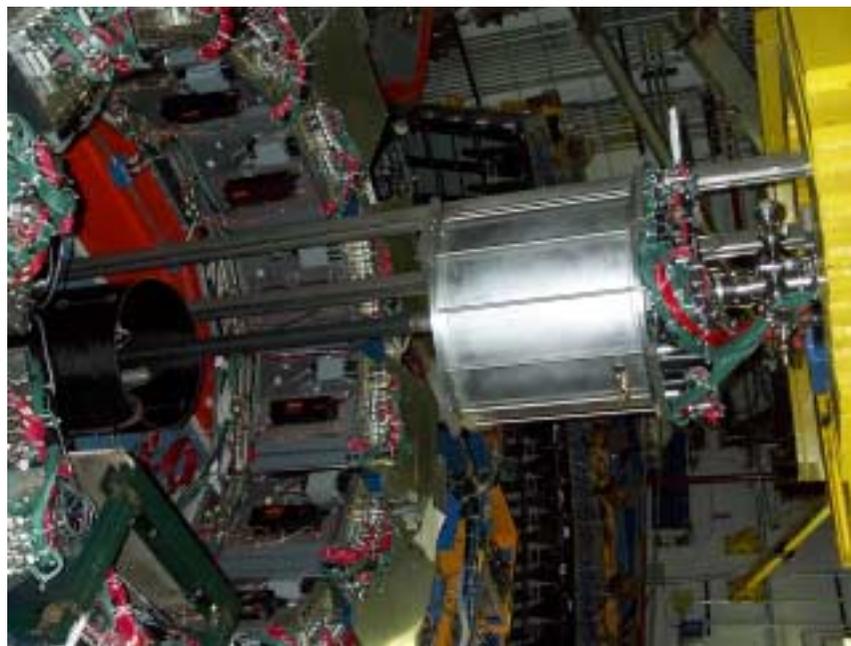


Towards Run II Forward Physics

M. Gallinaro, K. Goulianos, K. Terashi

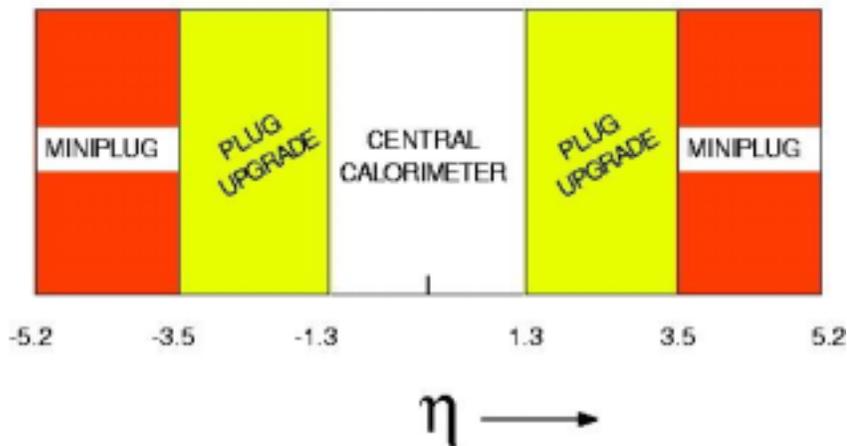
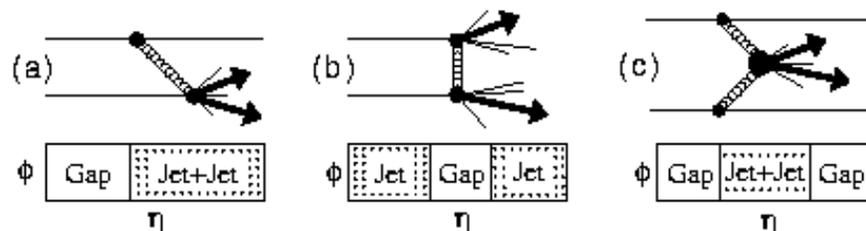
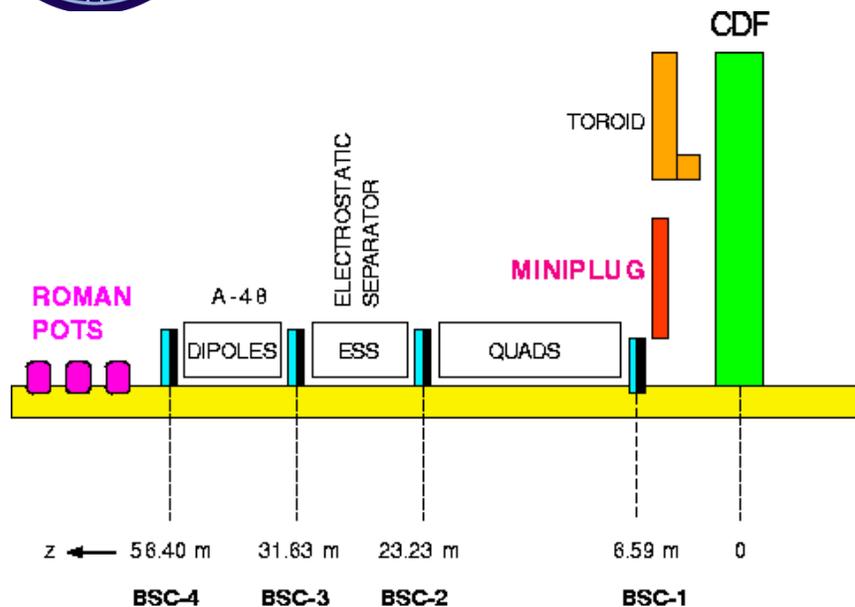
(QCD Meeting - Dec. 13, 2002)

- ✓ Forward Physics
- ✓ Detectors
- ✓ MP calibration
- ✓ Run II Data





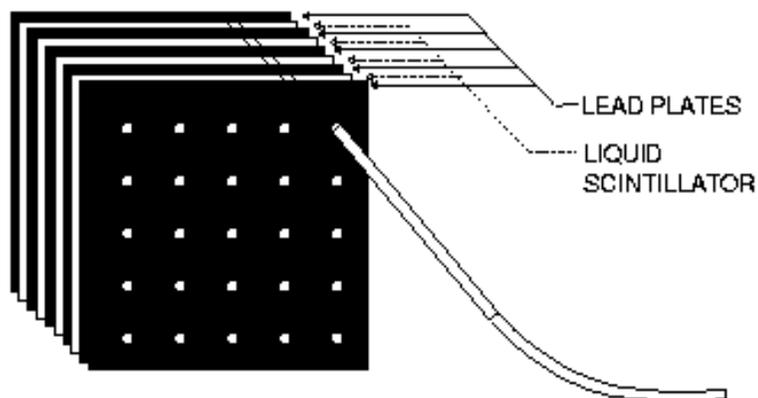
Forward Physics



- Hard Single Diffraction
- Double Diffraction
- Double Pomeron Exchange
- Forward Jets (jet-gap-jet)
- ...



MiniPlug Conceptual Design



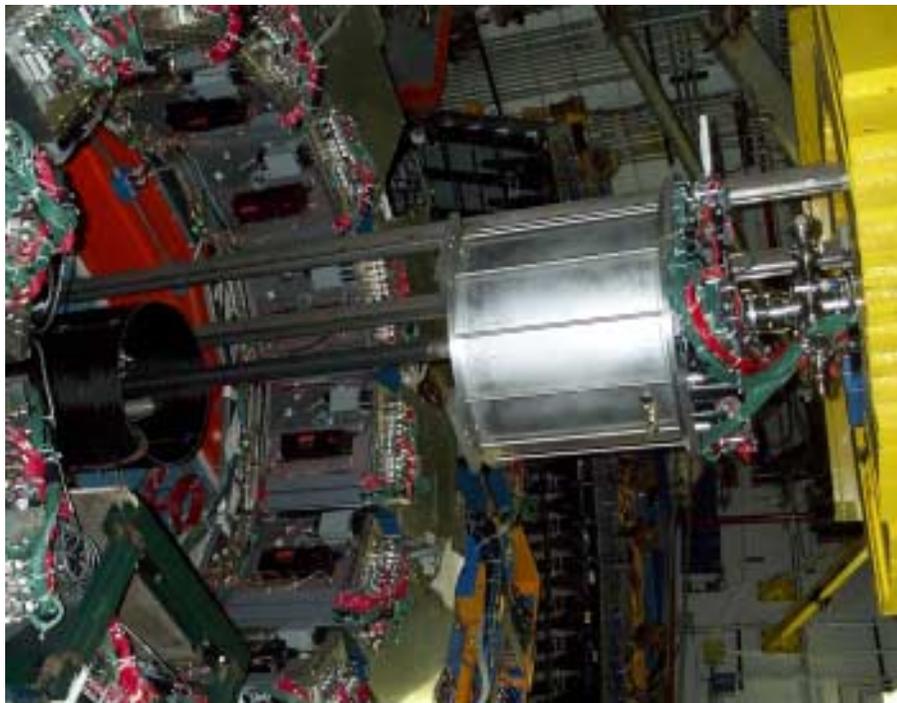
WLS - FIBER
(to multi-channel phototube)

- Pb plates in liquid scintillator
- WLS fibers to MAPMT
- Towerless geometry
(no dead regions)
- "Tower" size not fixed



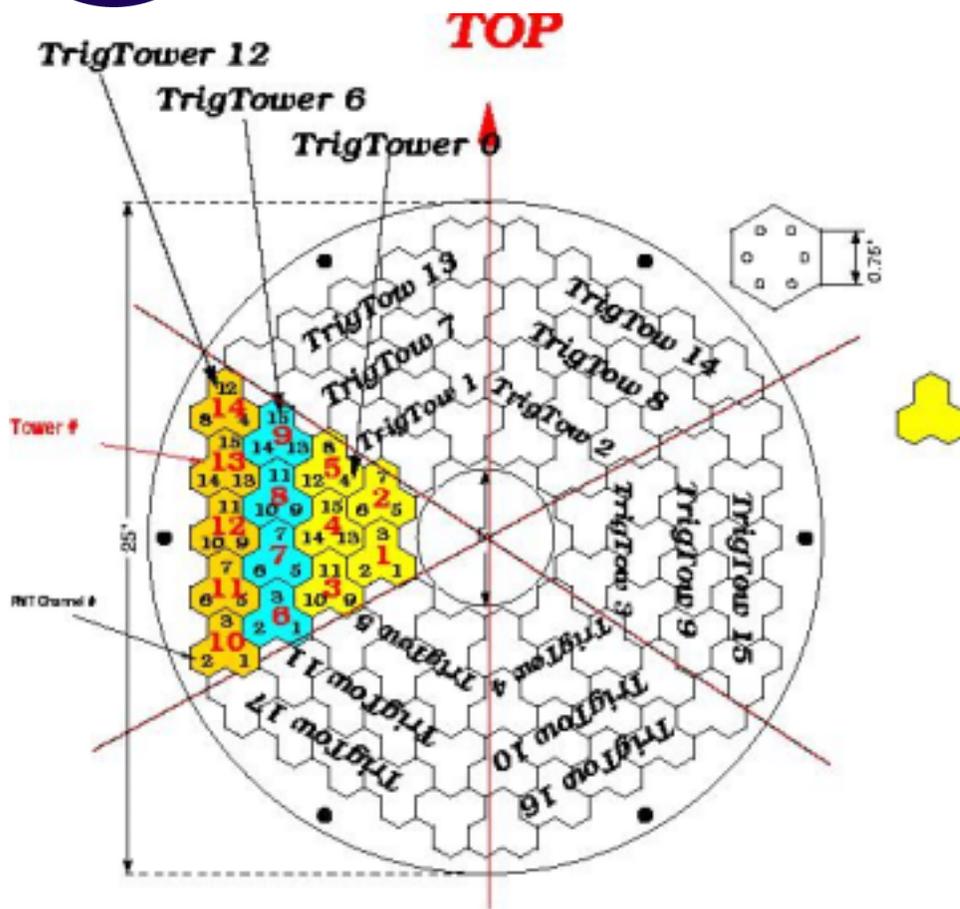
MiniPlugs in CDF-II

- 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





MiniPlug Design



East MP (viewed from IP)

- 6 WLS fibers = hexagon
⇒ 1 MAPMT pixel
- 1 clear fiber to LED
- 252 hexagons viewed by 18
16-channel MAPMT
- 3 MAPMT outputs added
⇒ 84 calorimeter "towers"
(to reduce electronics' cost)
- 4 η rings: $3.6 < |\eta| < 5.1$
- 18 + 18 "trigger-towers"

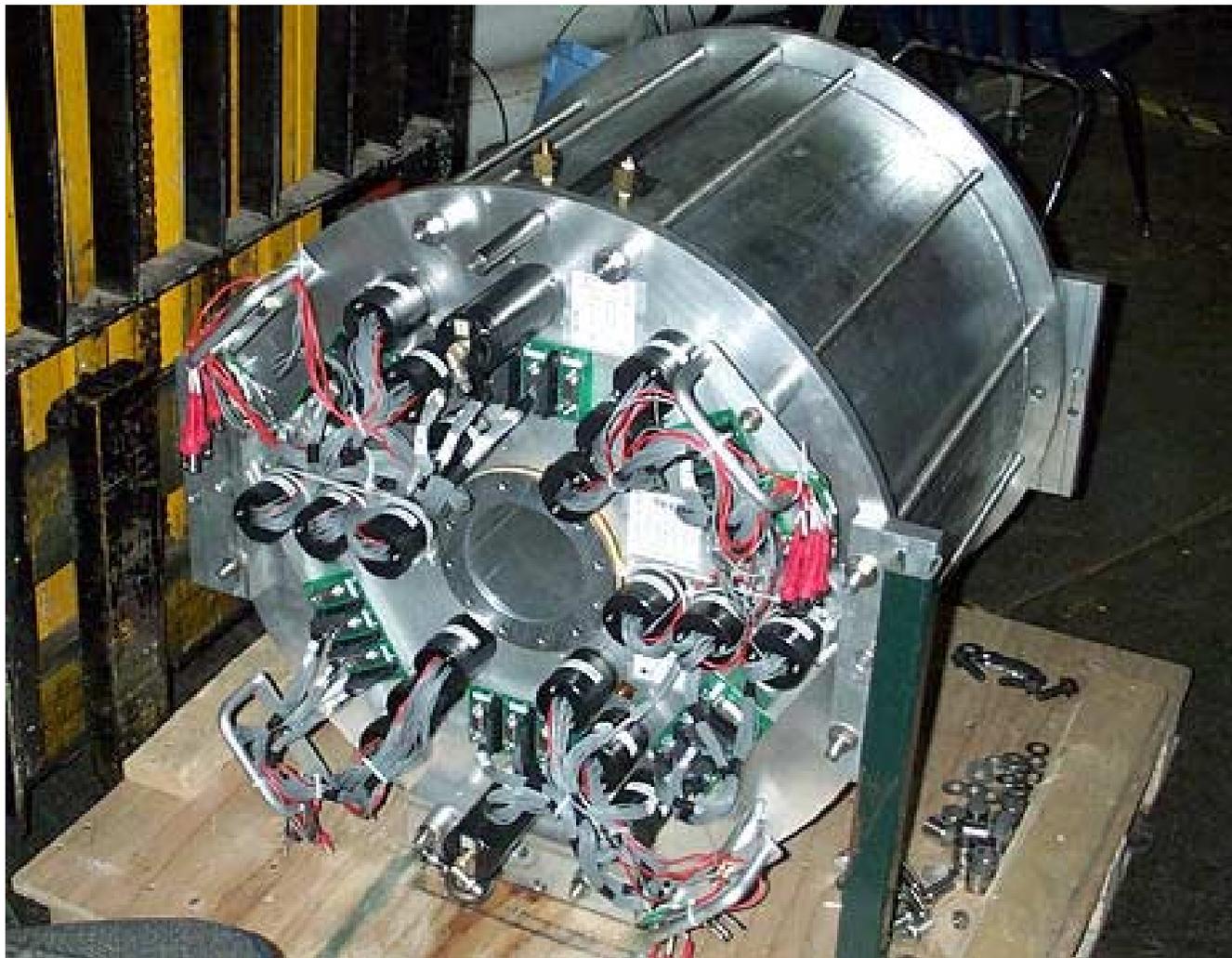


MiniPlug Assembly





MiniPlug Assembled

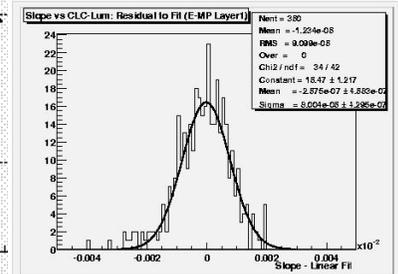
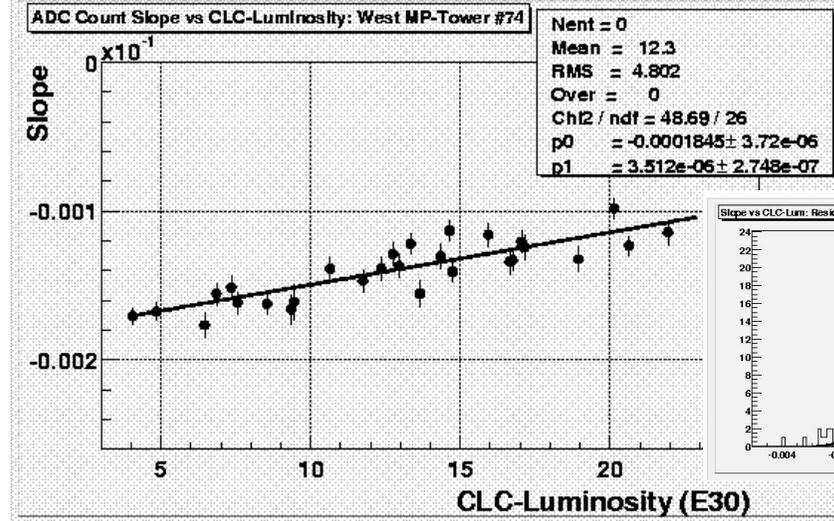
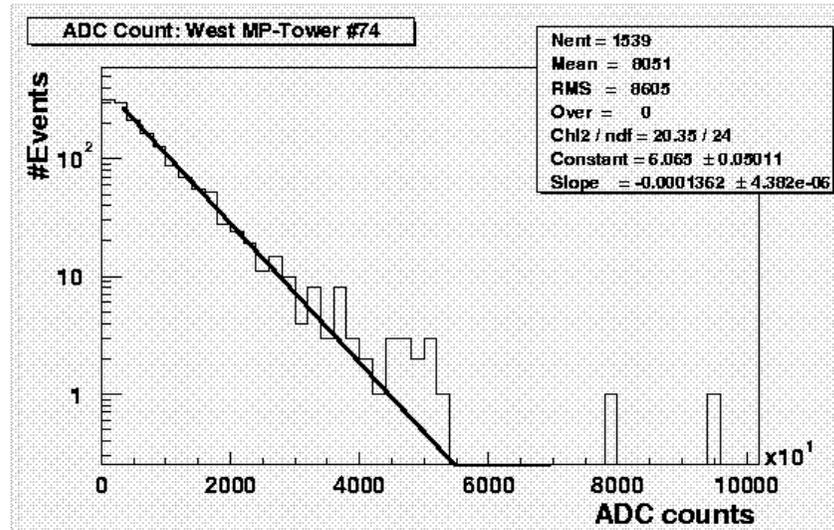




MP Calibration

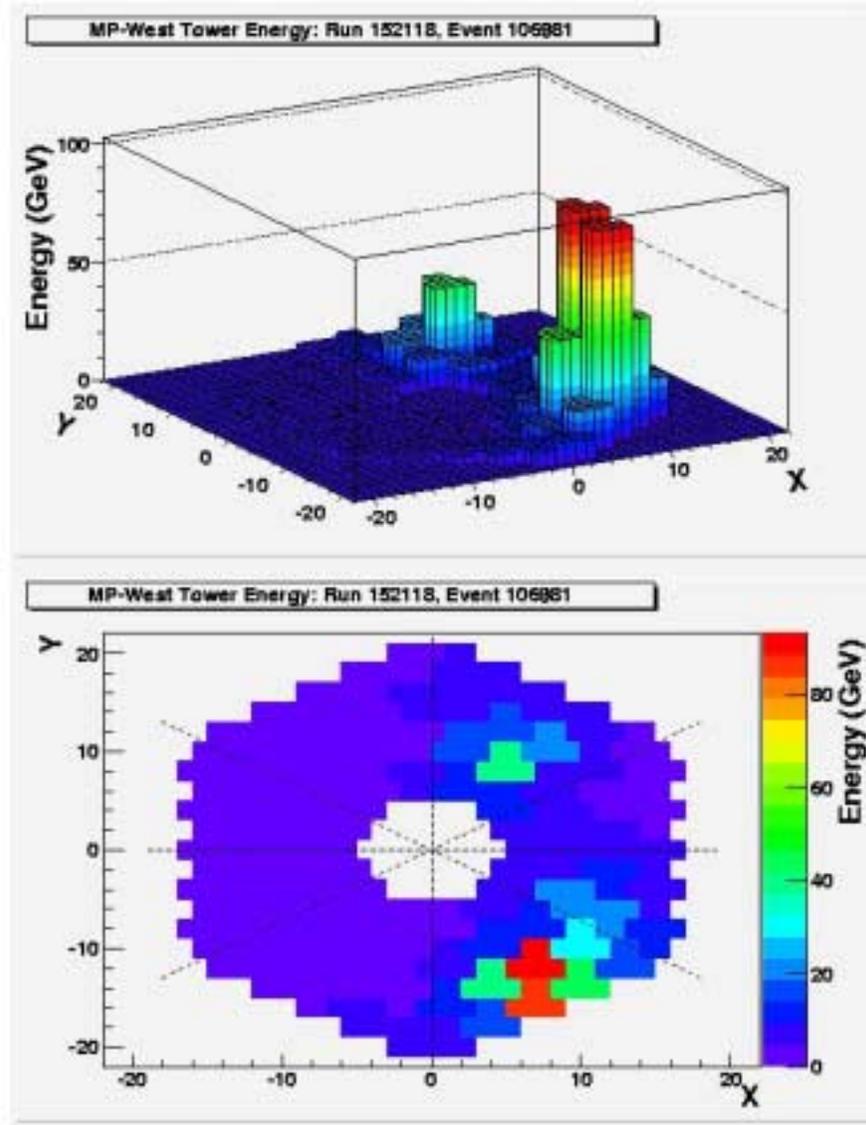
- Use slope from ADC distribution
- Tower-to-tower relative calibration with data/MC
- Energy scale from MC

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



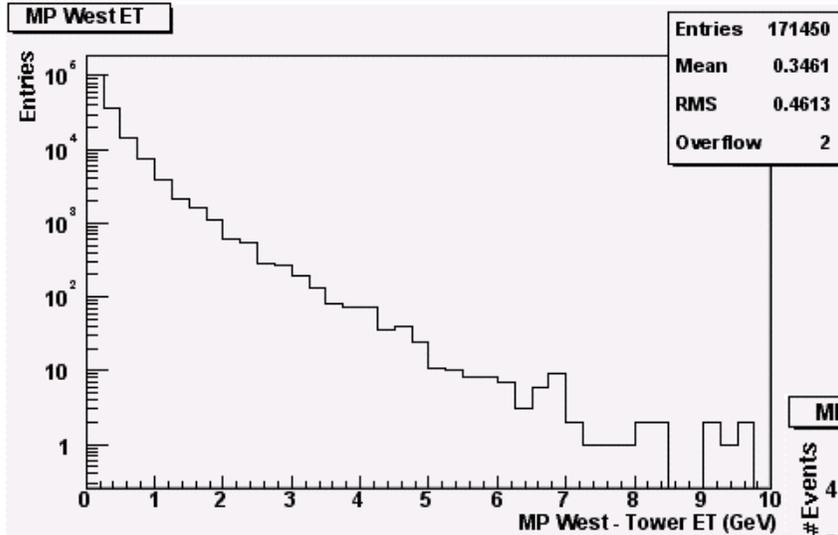


Event display

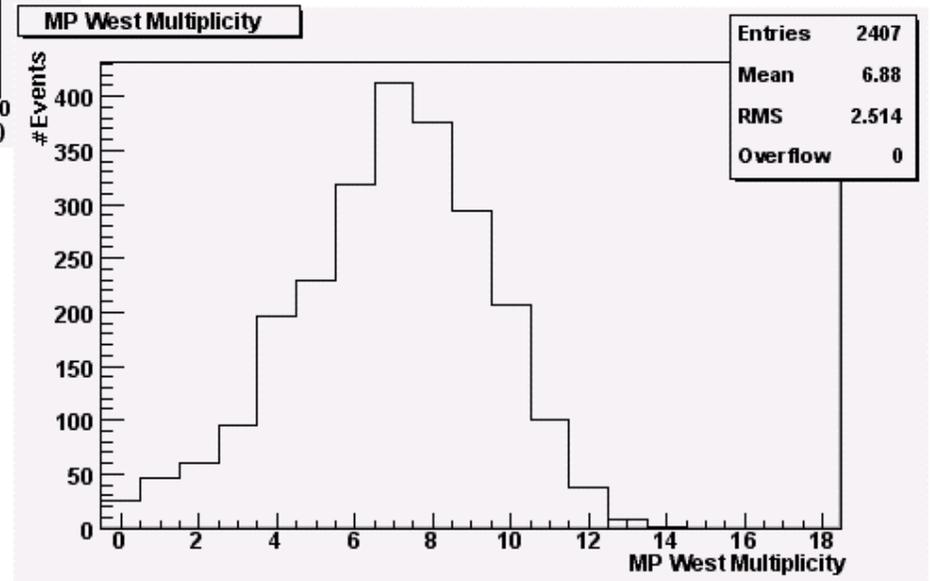




MP Data



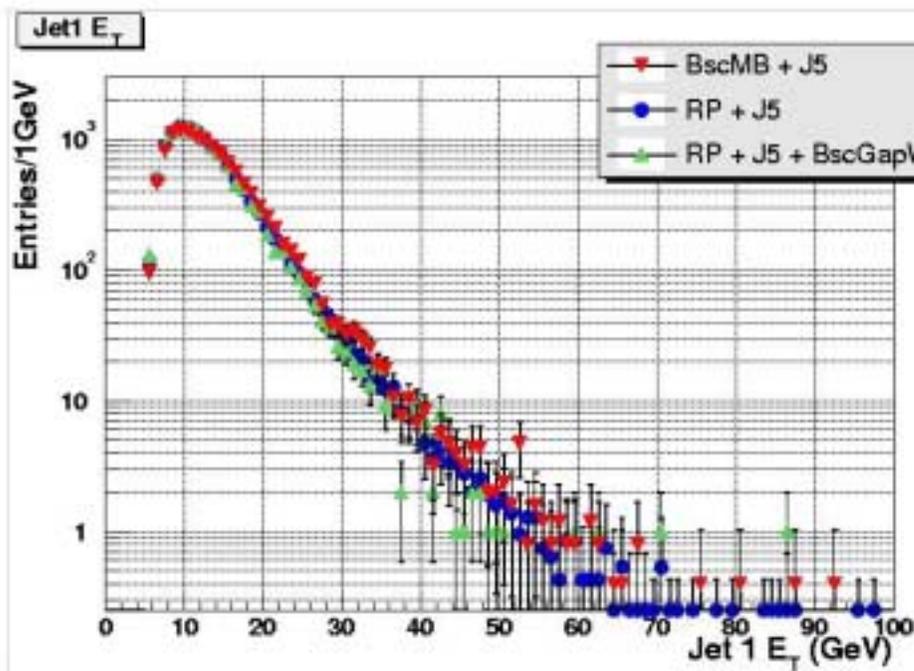
← Tower E_T distribution



Particle multiplicity $\sim 7 \Rightarrow$



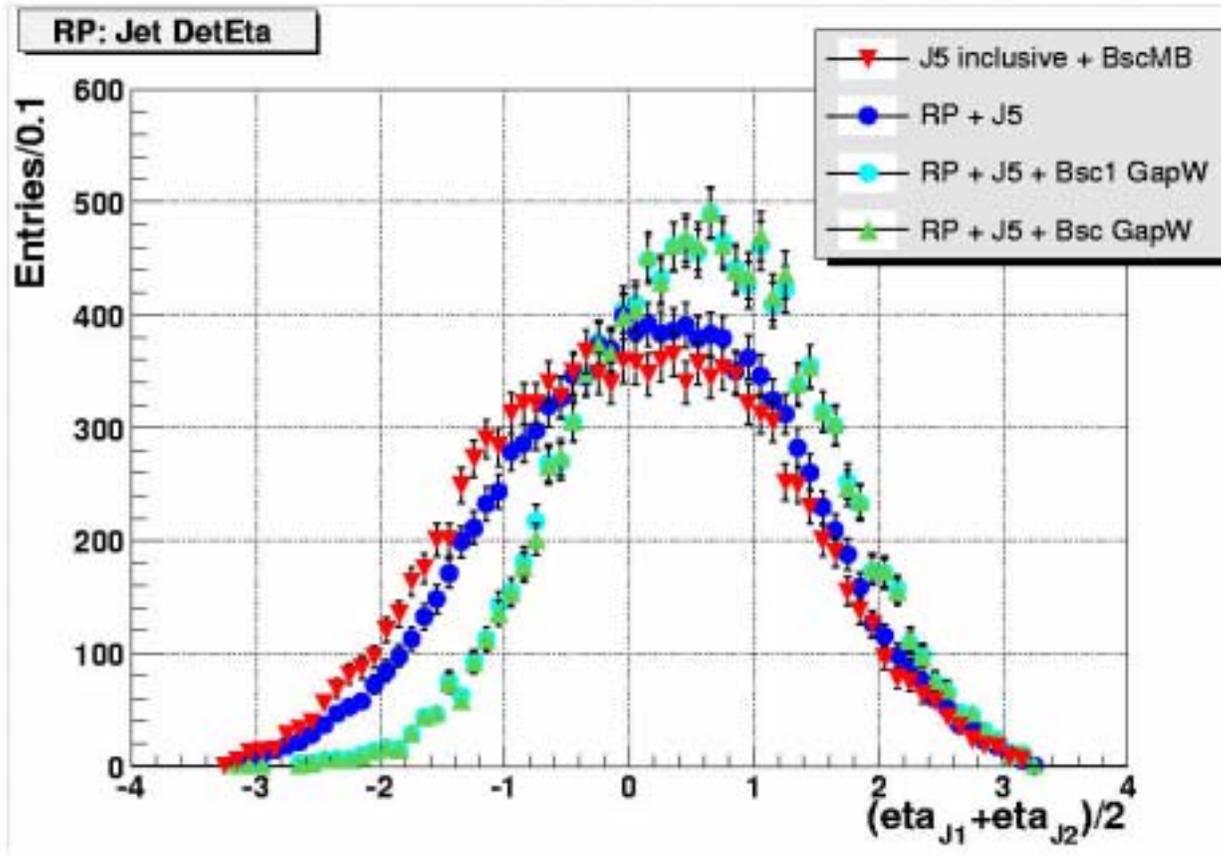
Run II Data



- Diffractive triggers
 - Data sample $\sim 8 \text{ pb}^{-1}$
 - RP coincidence + Jets
-
- ✓ Higher Jet E_T than Run I
 - ✓ Good agreement



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

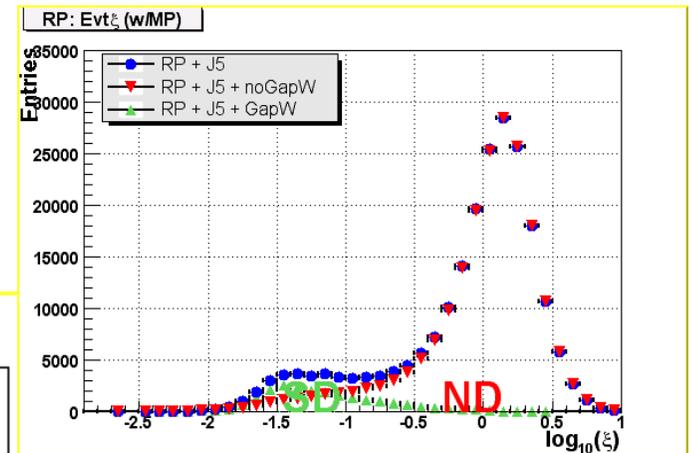
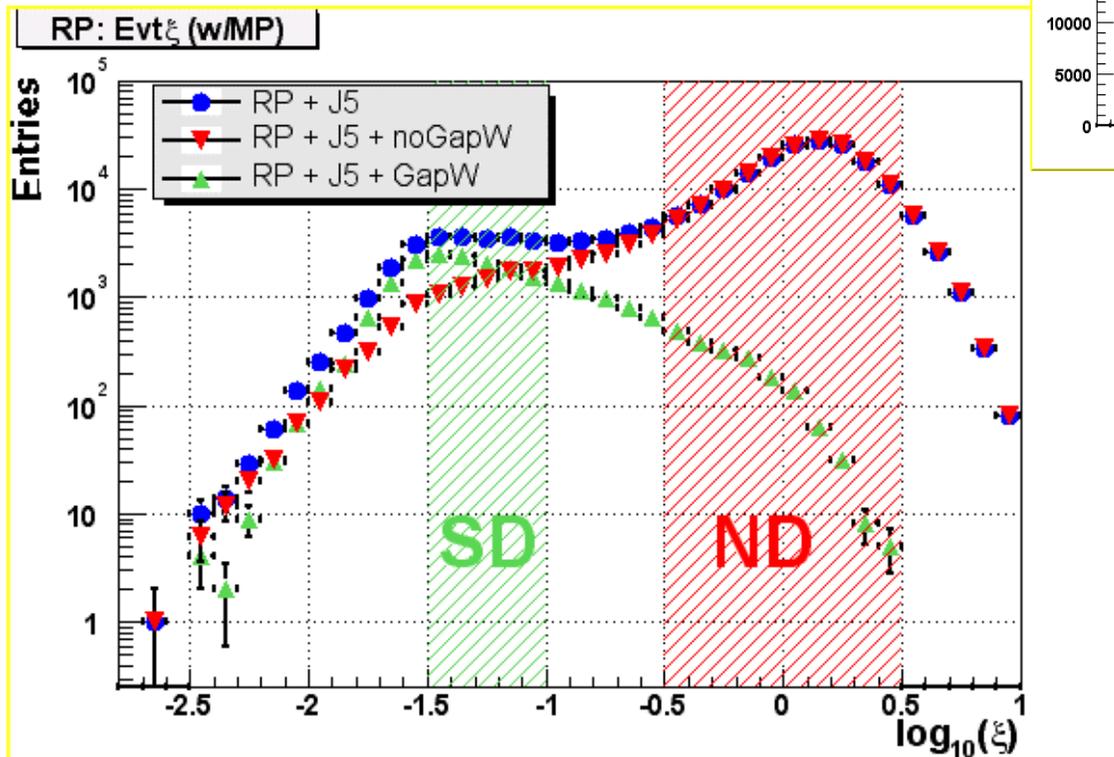


⇒ Gap selects purer diffractive sample



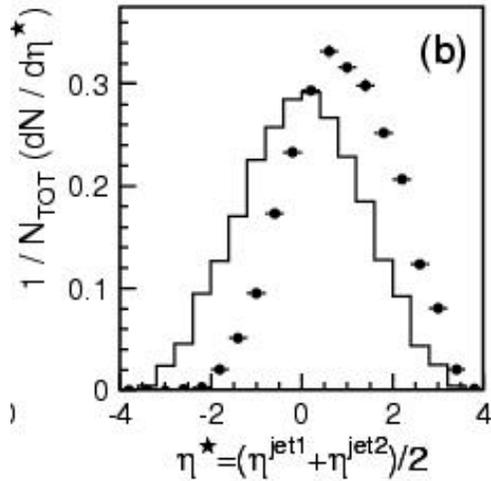
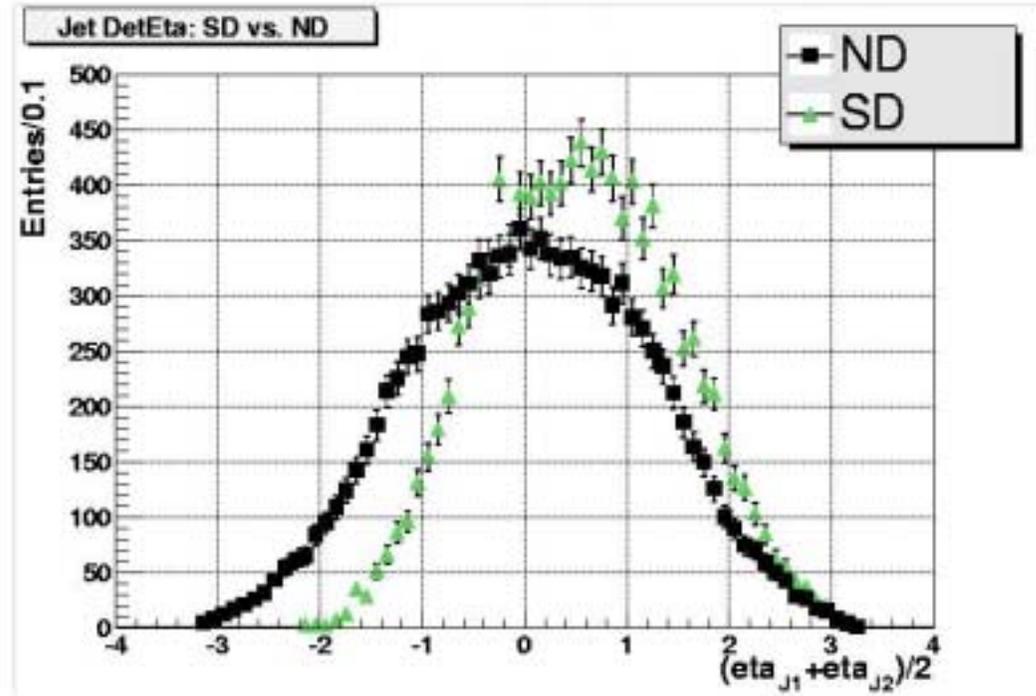
ξ Distribution

- $\xi = \Sigma E_T e^{-\eta} / \sqrt{s}$
- Discriminate on ξ (SD/ND)





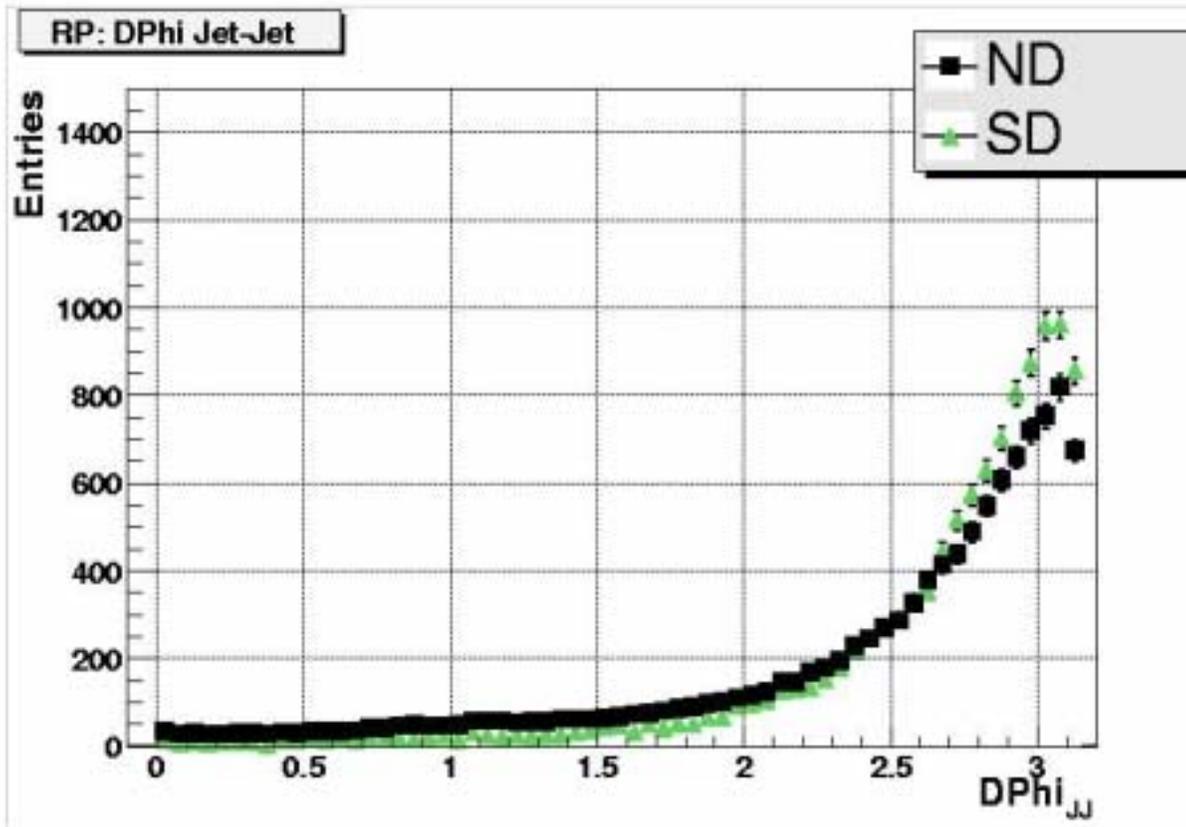
Rapidity



← Run I PRL



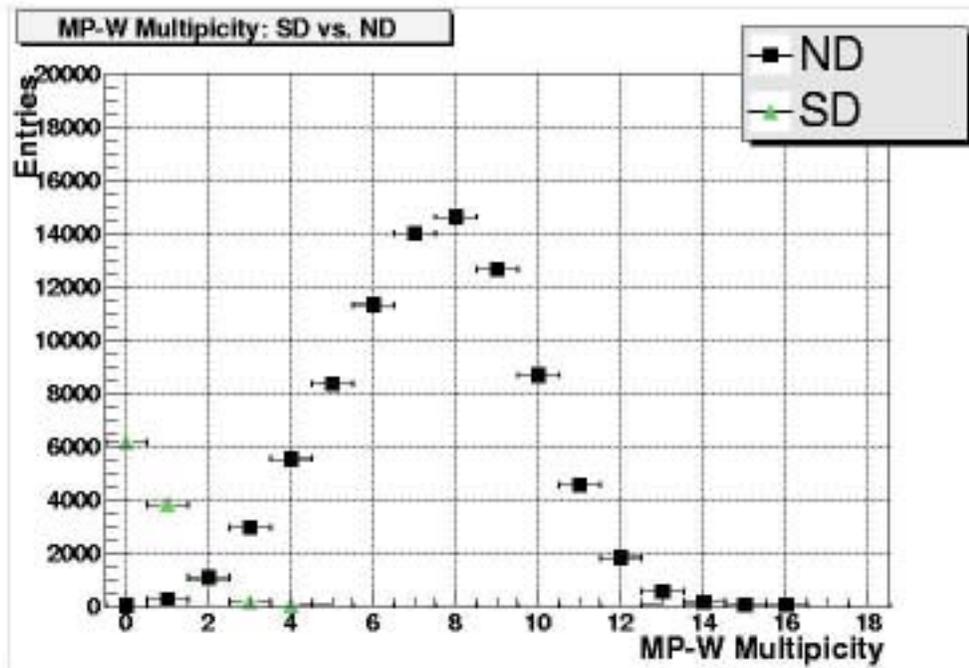
$\Delta\phi$ (jet₁-jet₂)



- SD and ND



MP Multiplicity

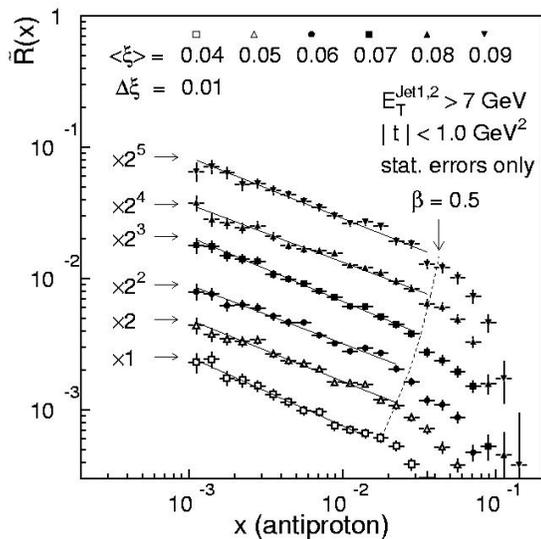


- SD and ND

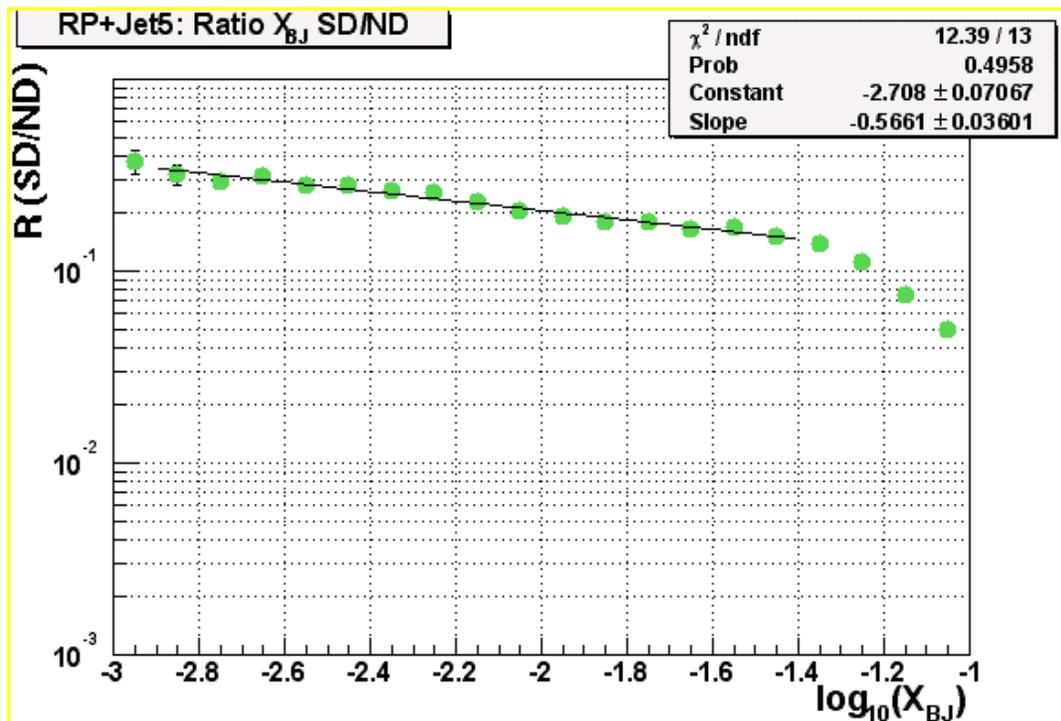


Structure Function

- SD/ND
- 3 leading jets
- $E_T(\text{jet}_{1,2,3}) > 5 \text{ GeV}$



← Run I PRL





Conclusions

- Forward detectors are fully integrated in CDF DAQ
- Forward detectors are **performing well**
- Data look **promising**
- Other samples under study
- Updated diffractive triggers soon