

Status of the H1 Very Forward Spectrometer

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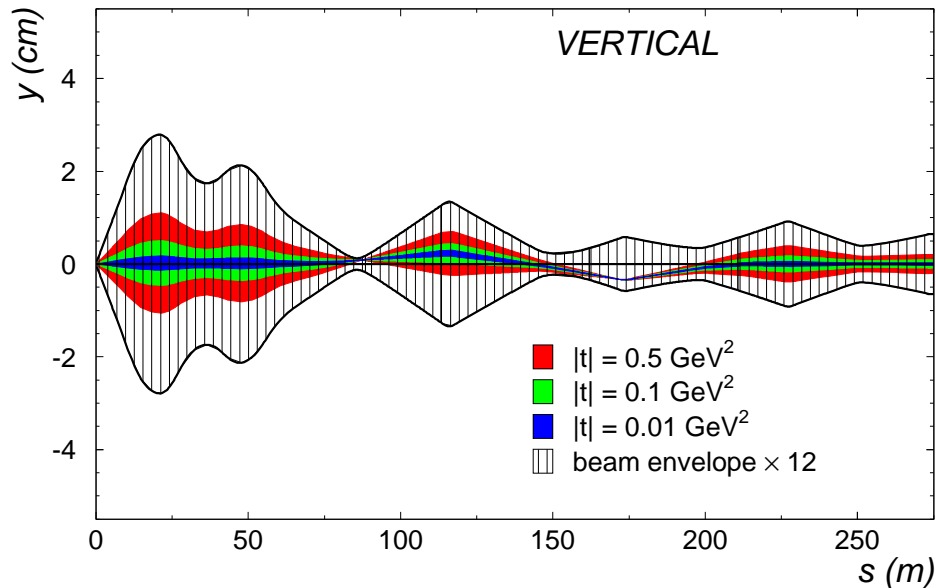
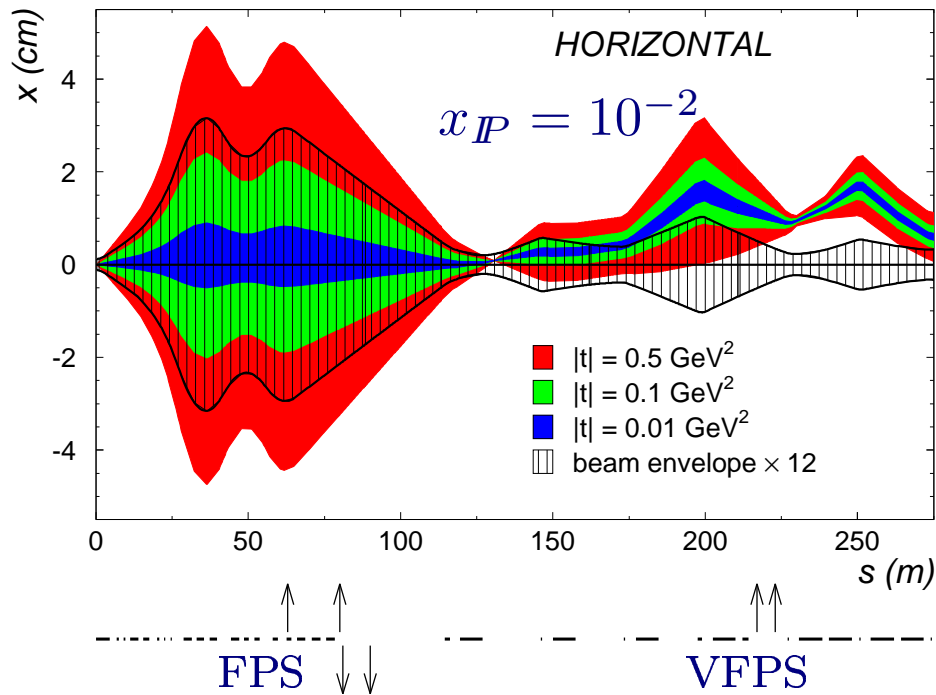
On behalf of the



Overview

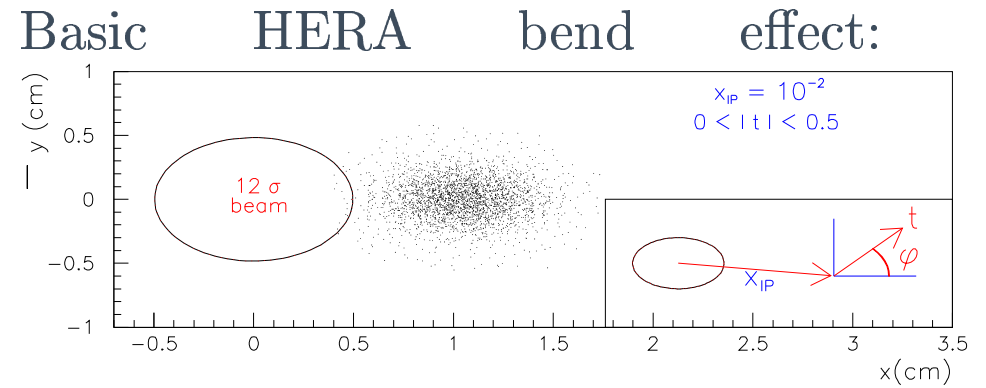
- Beam optics at 220 m
- VFPS detectors
- Collected Lumi by VFPS
- First look at diffractive channels with tagged proton:
 - Inclusive diffraction in DIS
 - Dijets in DIS
 - Dijets in photoproduction

The H1 Very Forward Proton Spectrometer



Goal: Tag and measure the scattered proton at HERA II with large acceptance at low x_P and down to t_{min}

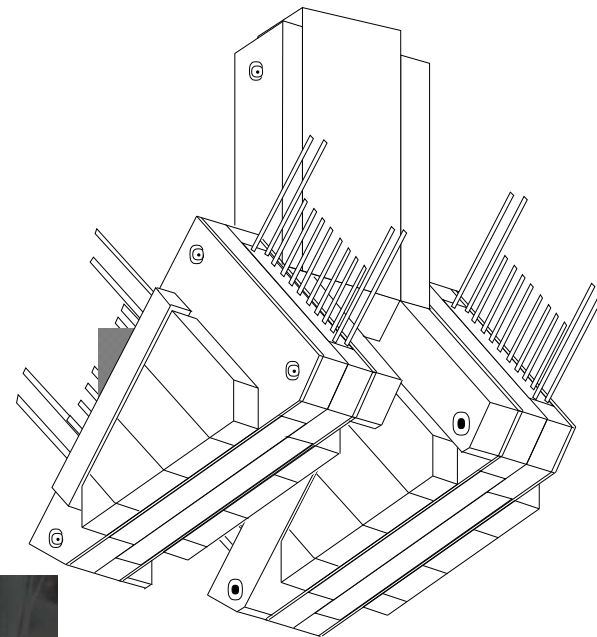
\Rightarrow Best location is 220 m in the horizontal plane



VFPS Detectors

Detectors:

- Same design as Vertical H1-FPS
- 2 detectors: 218 m and 222 m
- 4 Trigger Tiles / plane, 4 planes
- Fibers for spatial reconstruction
 - Resolution = 100μ

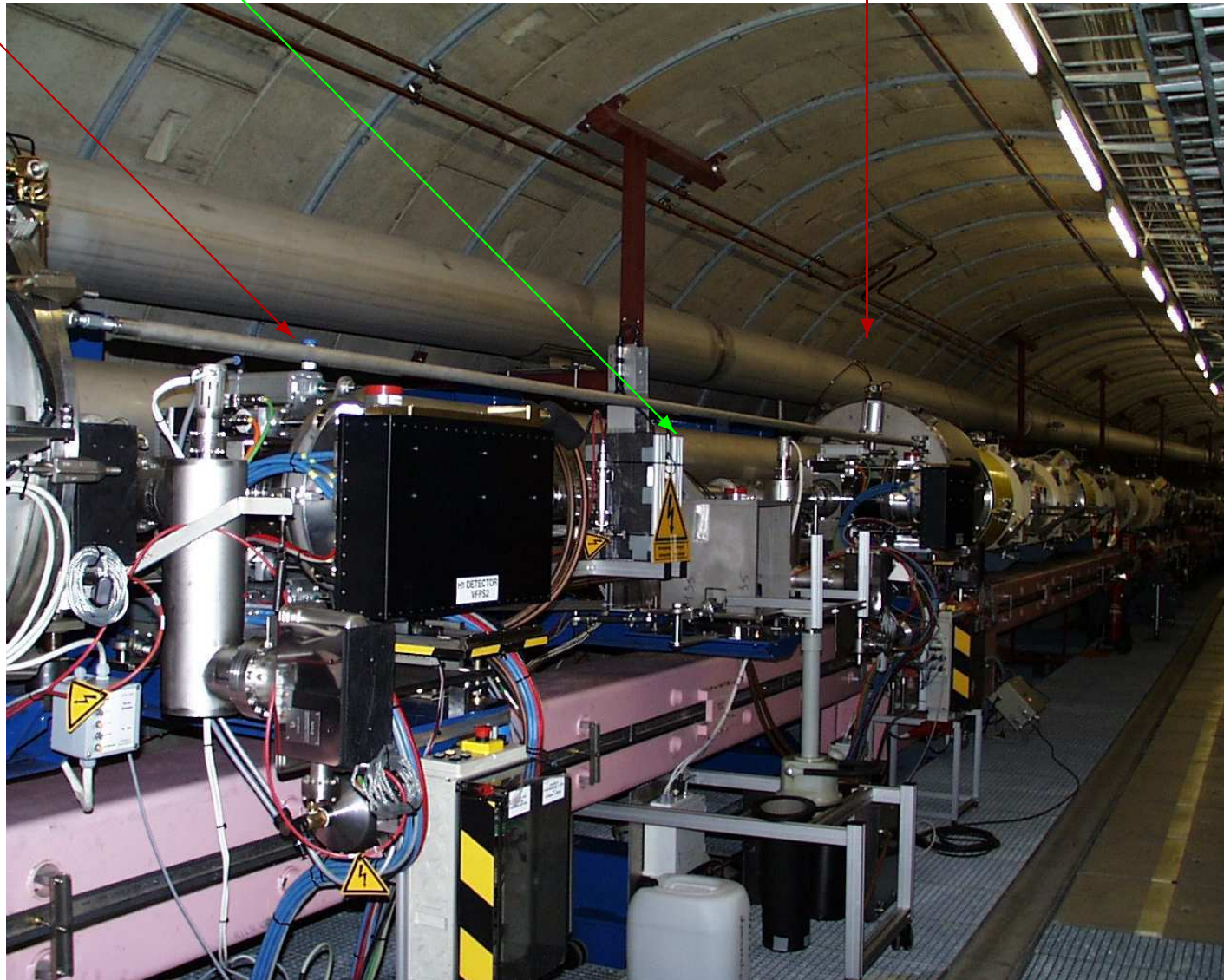


VFPS Installation

VFPS-2

Beam Position Monitor

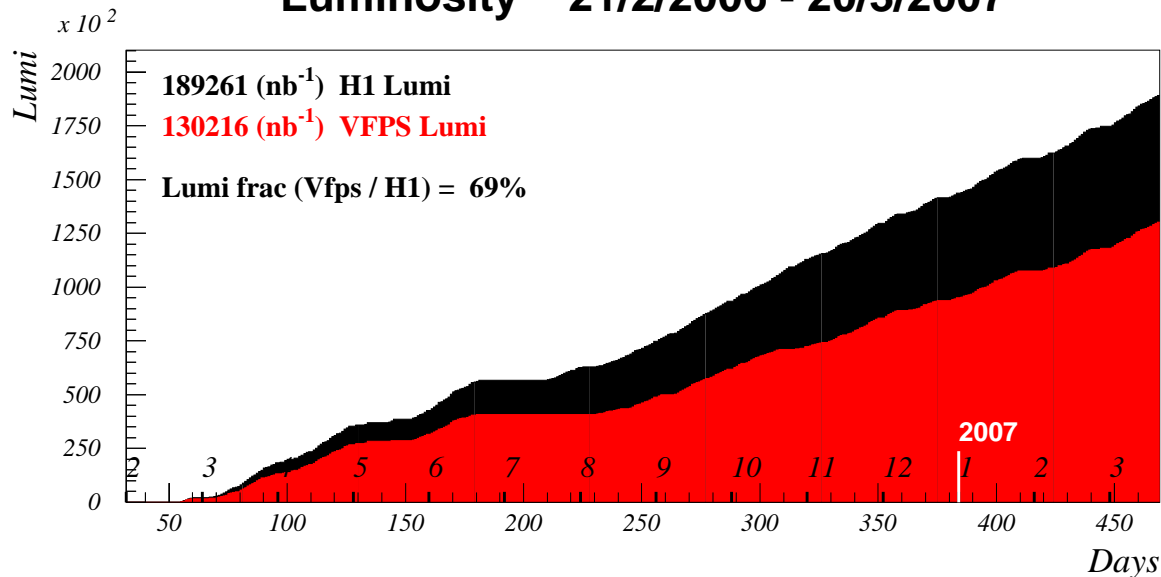
VFPS-1



Protons
from H1

VFPS Collected Luminosity

Luminosity 21/2/2006 - 20/3/2007

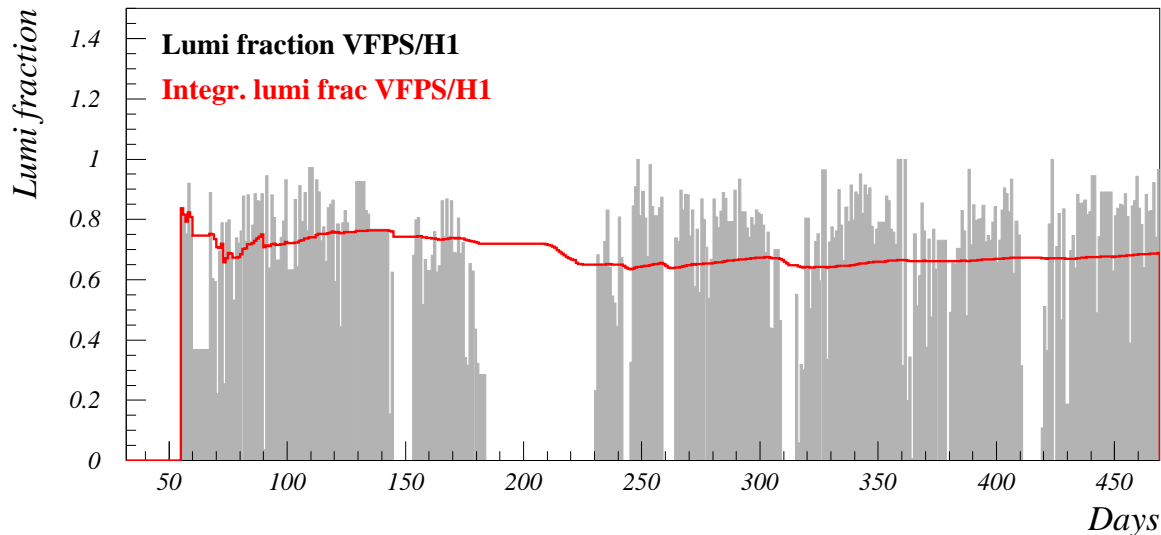


Period 2006-07:

Total H1 Lumi: 190 pb^{-1}

VFPS Lumi: 130 pb^{-1}

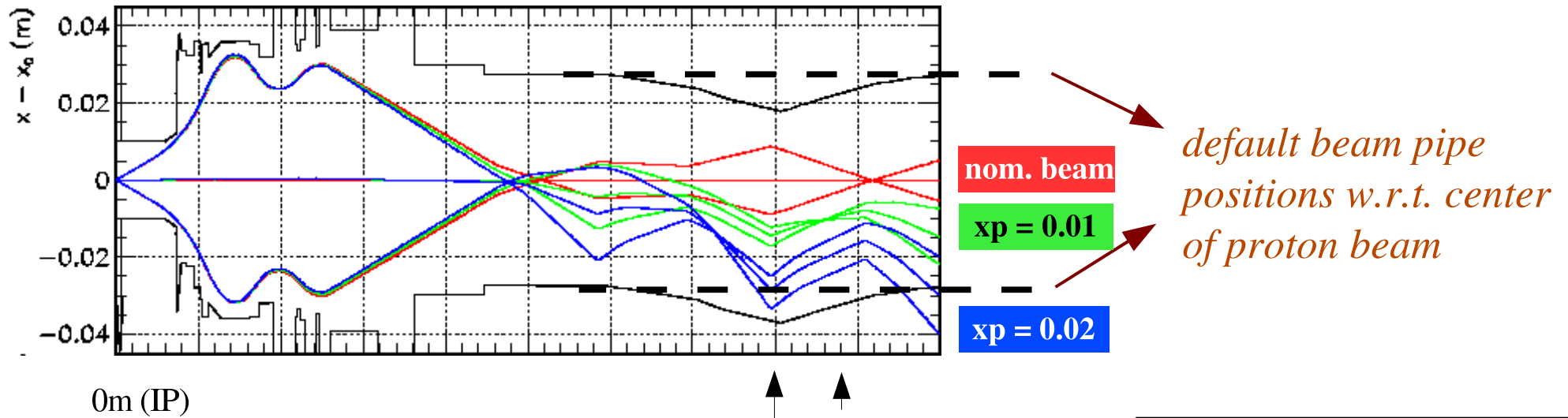
(i.e. VFPS close to beam)



⇒ efficiency of 69 %

Acceptance Study: Beam steering

Main Limitation for high x_{IP} comes from beam pipe aperture at 200 m from H1:

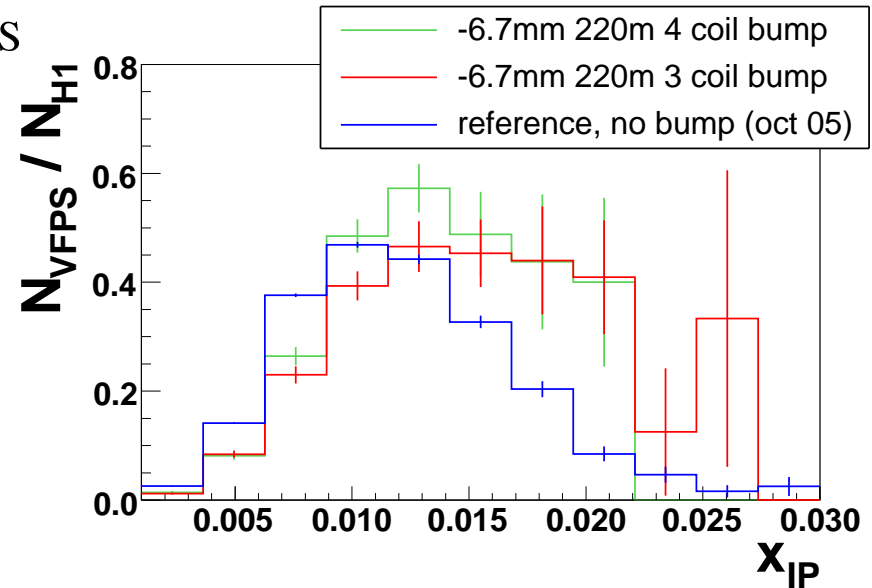


Solution:

Move beam outwards HERA at 200 m to increase high x_{IP} acceptance

→ applied since autumn 2006

effect seen on the fraction of tagged events



Inclusive Diffraction: Selection

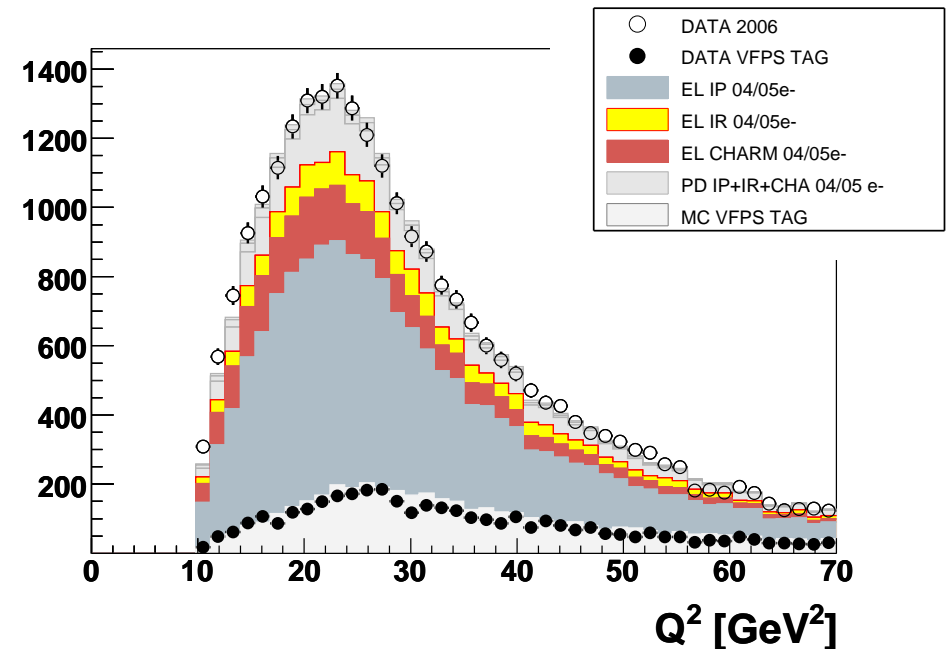
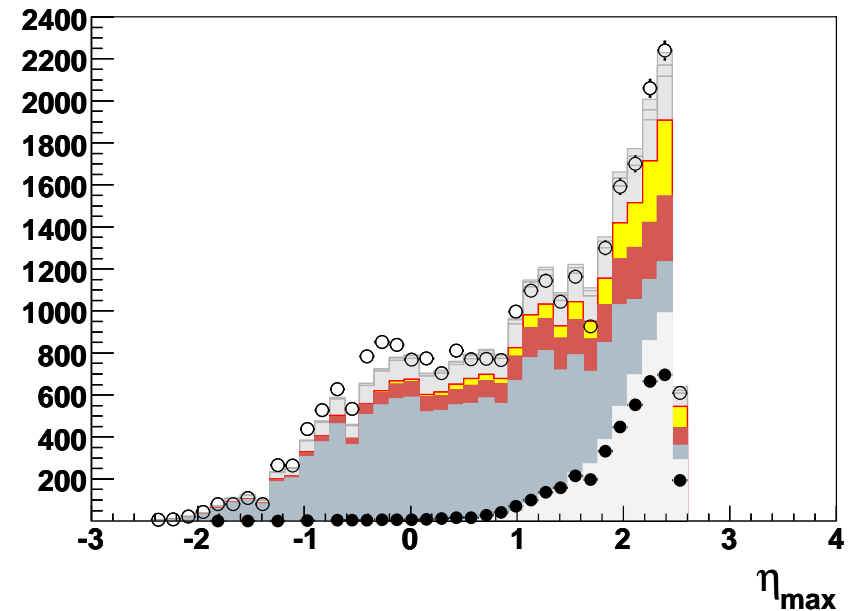
H1 Selection

- $|Z_{vertex}| < 40$ cm
- $E_{electron} > 10$ GeV
- $Q^2 > 10$ GeV²
- $E_X > 3$ GeV
- Rapidity Gap:
 - $\eta_{max} < 2.5$
 - Empty Fwd Detectors

VFPS Selection

- Trigger in both VFPS
- about 880000 events in DIS
(215000 with $Q^2 > 10$ GeV²)
with activity in VFPS

on plots: only 24 pb⁻¹ of data shown!
(with -6mm beam bump)

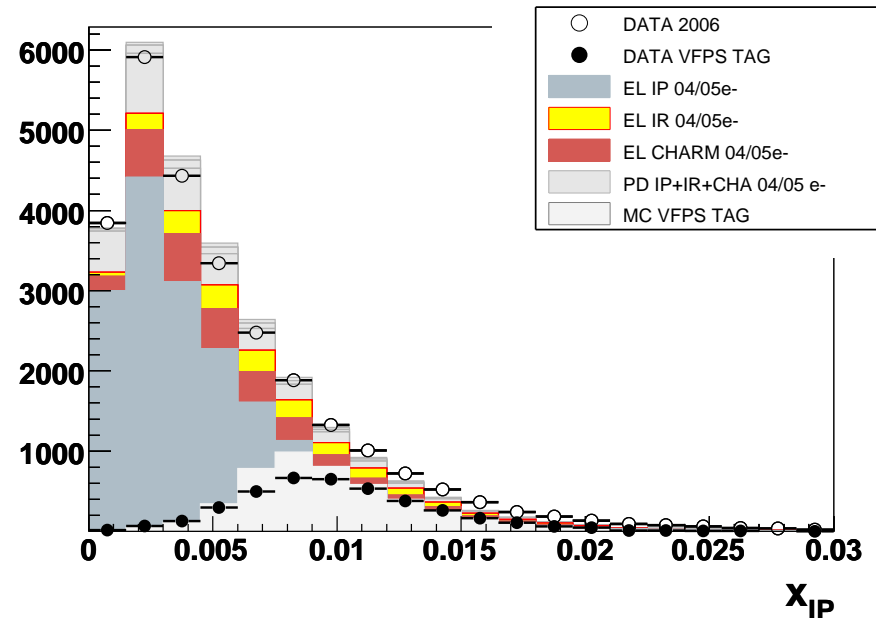
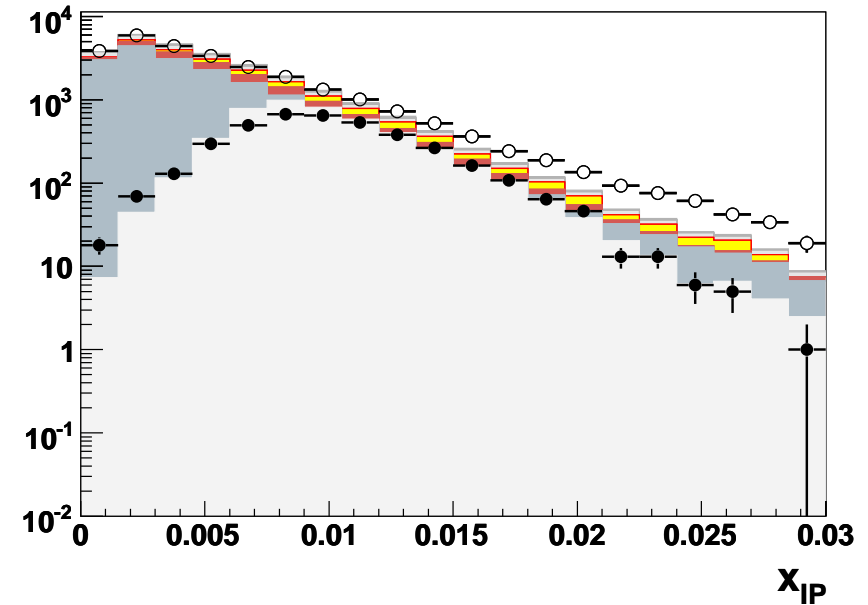
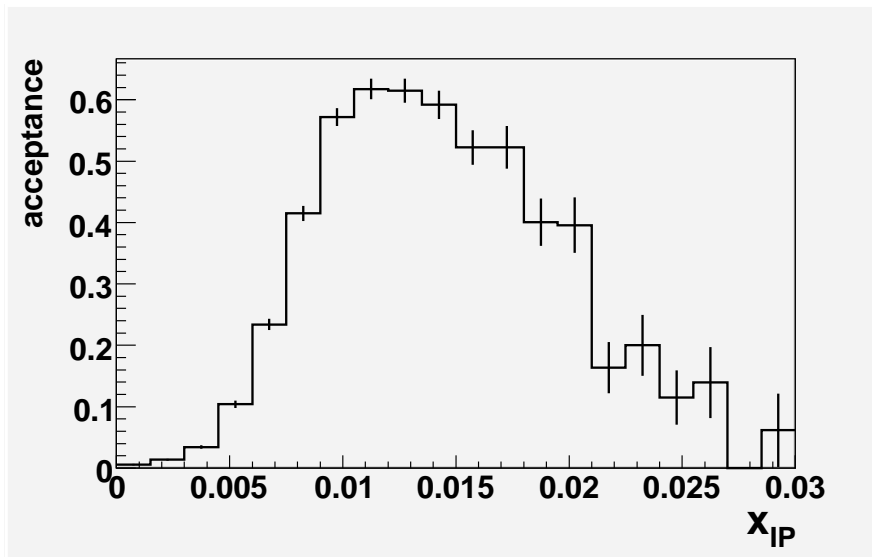


Inclusive Diffraction: x_{IP}

VFPS acceptance in x_{IP}

- taking the ratio of VFPS tagged events over all events with RapGap
- corrected for 17% p-diss
- use the x_{IP} reconstructed from central H1
- Not corrected for smearing

→ VFPS events in correct x_{IP} region, up to 60%



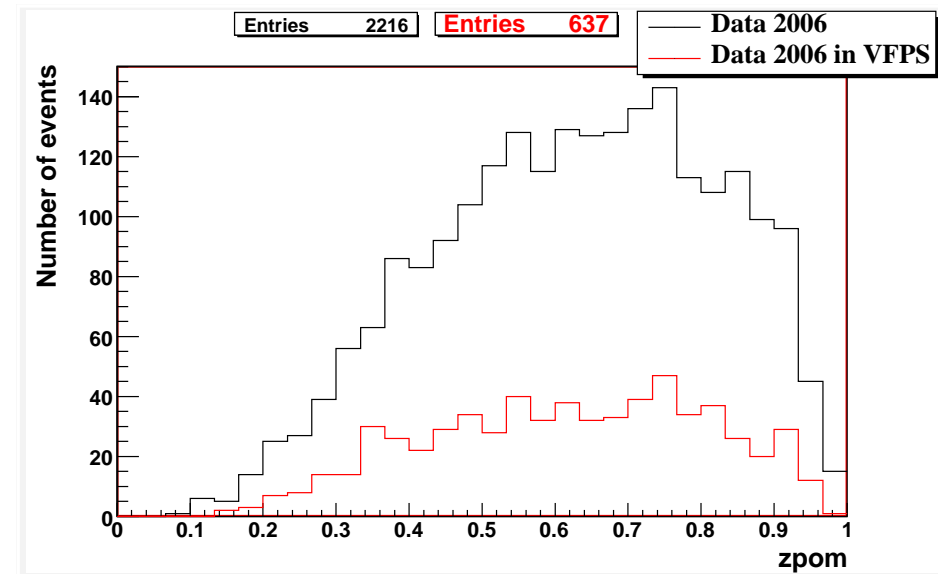
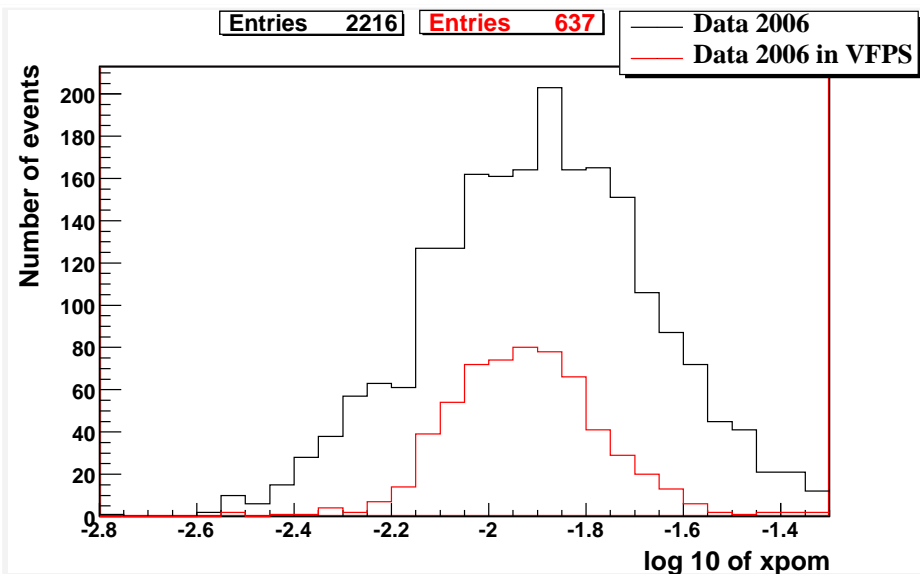
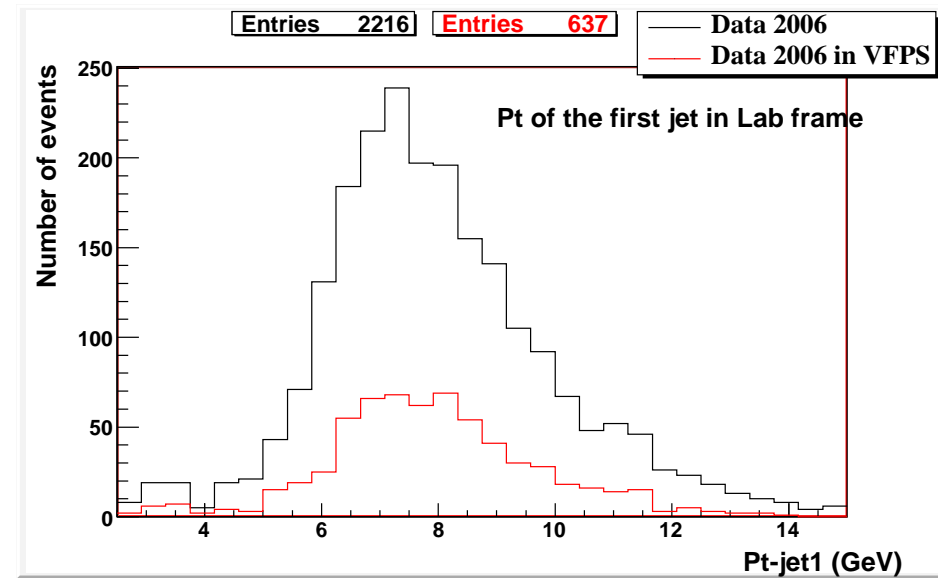
Diffractive di-jets in DIS

cuts:

- DIS cuts & at least 2 jets (Kt)
- $\eta_{max} < 2.5$
- $p_{T,1}^* > 5.5\text{GeV}$ & $p_{T,2}^* > 4\text{GeV}$
- $\eta_{j1,j2} \in [-1, 2]$

data: full 2006: $42.6e^- + 54.7e^+ \text{ pb}^{-1}$

637 di-jets in DIS tagged in VFPS



Very good acceptance for Dijets

Diffractive di-jets in photoproduction

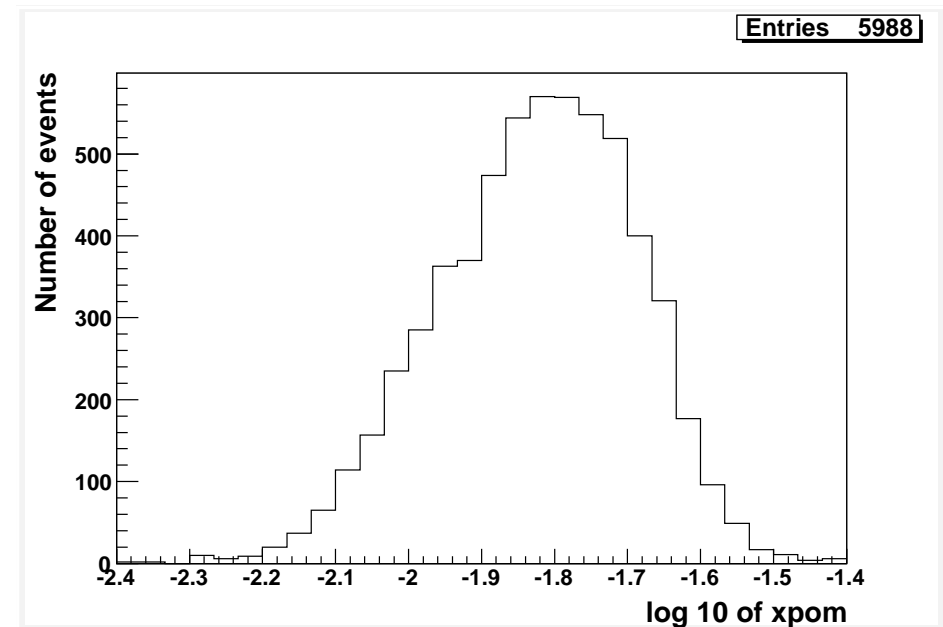
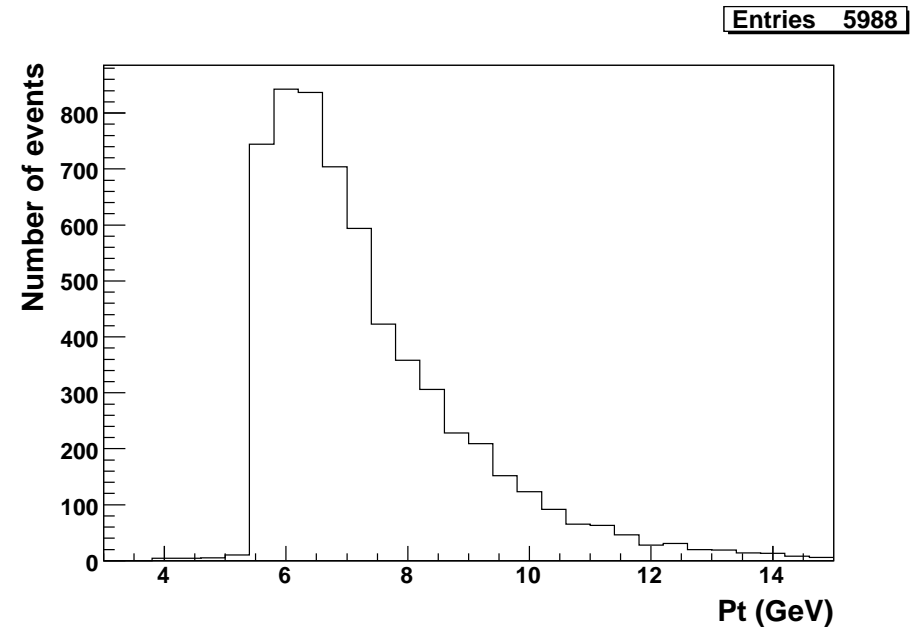
cuts:

- At least 2 jets (kT)
- $\eta_{max} < 2.5$
- $p_{T,1}^* > 5.5 GeV$ &
 $p_{T,2}^* > 4 GeV$
- $\eta_{j1,j2} \in [-1, 2]$
- VFPS tag

data: special trigger

Lumi= 23.7 pb^{-1} over 2006+07

\Rightarrow 6000 diffractive dijets in photoproduction with p tagged in VFPS



Conclusions

- VFPS has collected 130 pb^{-1} of data
- high acceptance - close to expected
- further details of beam optic still to be understood
- high statistics for inclusive diffraction (F_2^D)
- Dijet in DIS and photoproduction very promising
- p momentum reconstruction still in progress