



ZEUS Backgrounds

Dave Bailey

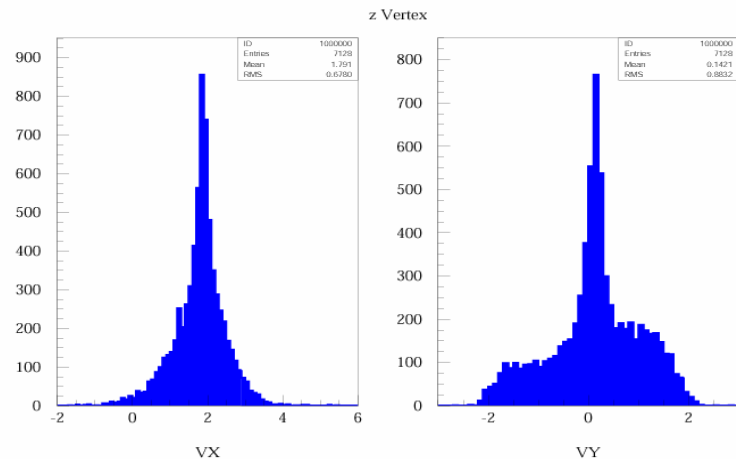
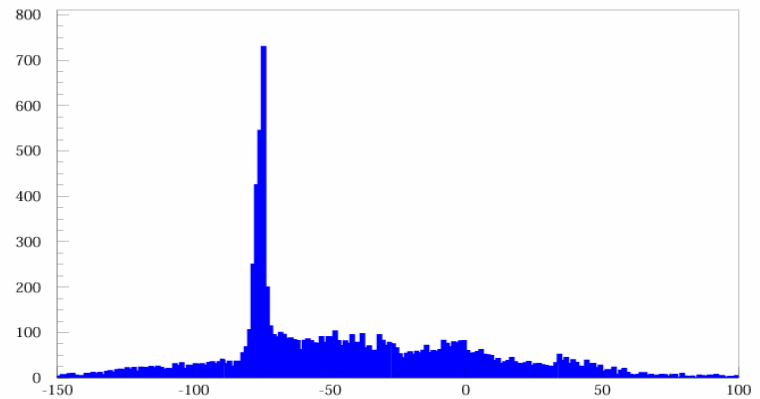


Status Summary

- Data from Lumi run on 24/07/2002
 - Vertex position
 - Beam position
 - Chamber currents
- Effects of vacuum on currents
- First look at isolated e^+ bunch data
- Results from beam scan at IP
- Effects of lead shielding

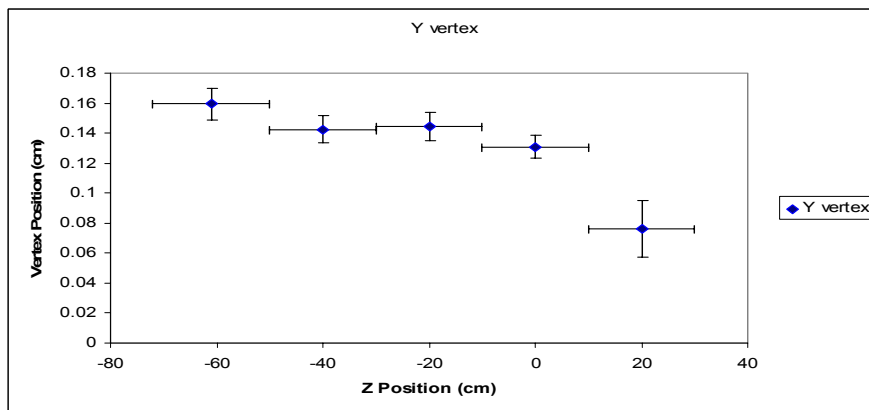
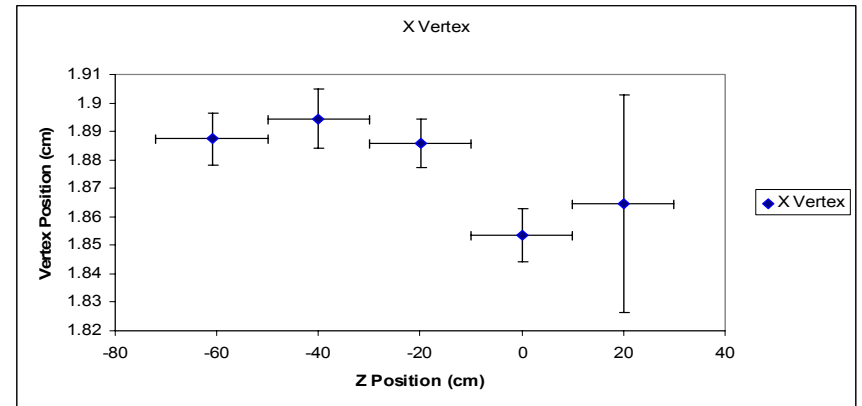
Lumi Run

- Data taken with tight physics trigger
 - Clear feature at -75cm due to scattering from C5A mask
- Attempt to measure beam position in x-y



Lumi Run

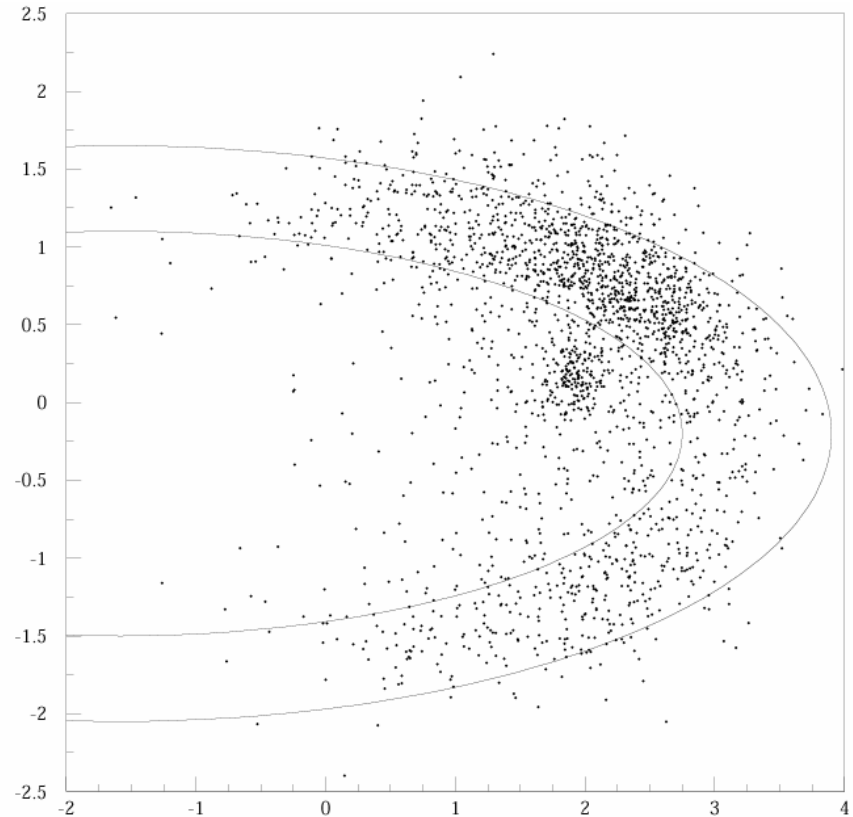
- Fit gaussian to peak of x and y vertex distribution
 - Ignore bias due to tails/scattering
 - Limit to region away from masks



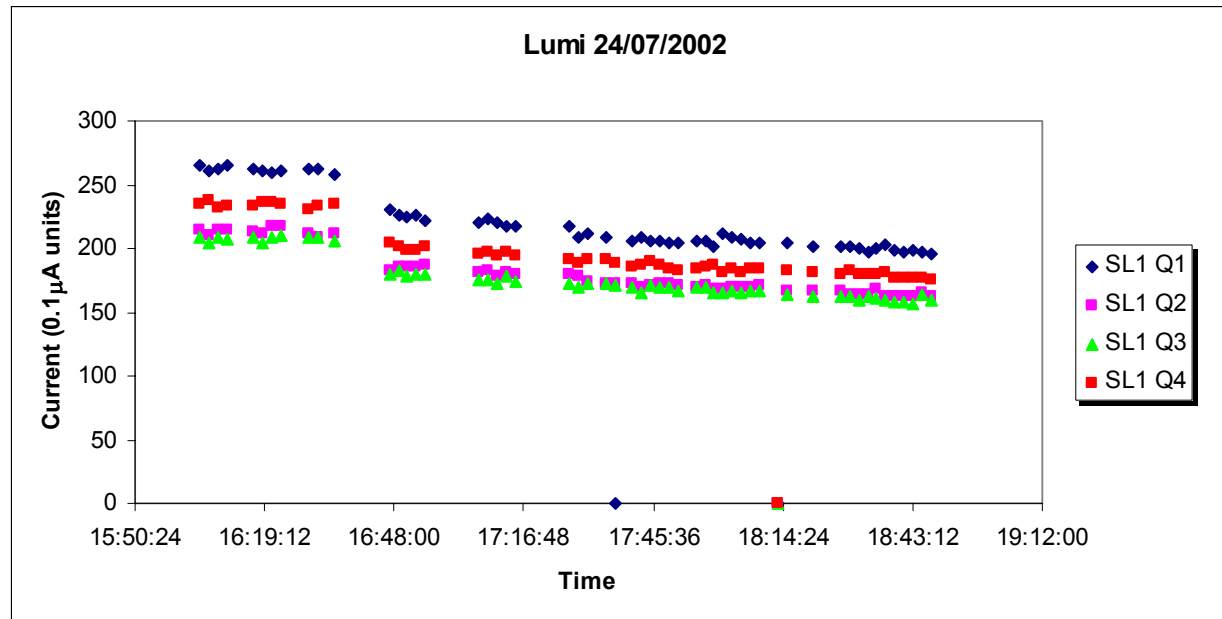
- X position looks OK
- Y position is $\sim 2\text{mm}$ too high

Lumi Run

- Vertex positions at C5A mask
 - Good quality vertices selected (>4 tracks)
 - Mask centre at -1.6cm (x) and -0.2cm (y)
 - X position consistent with 10mm shift of whole experiment
 - Y shift?

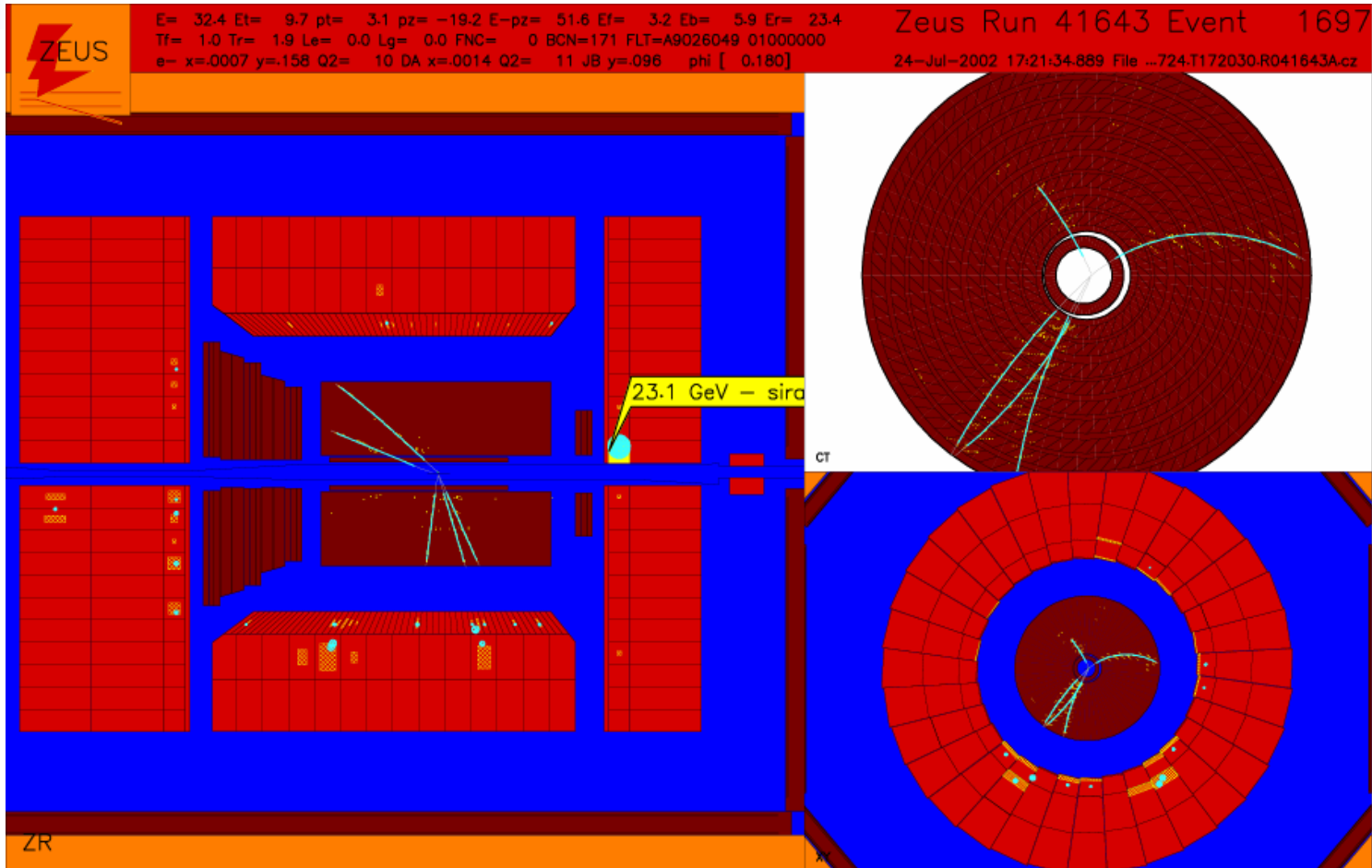


Lumi Run

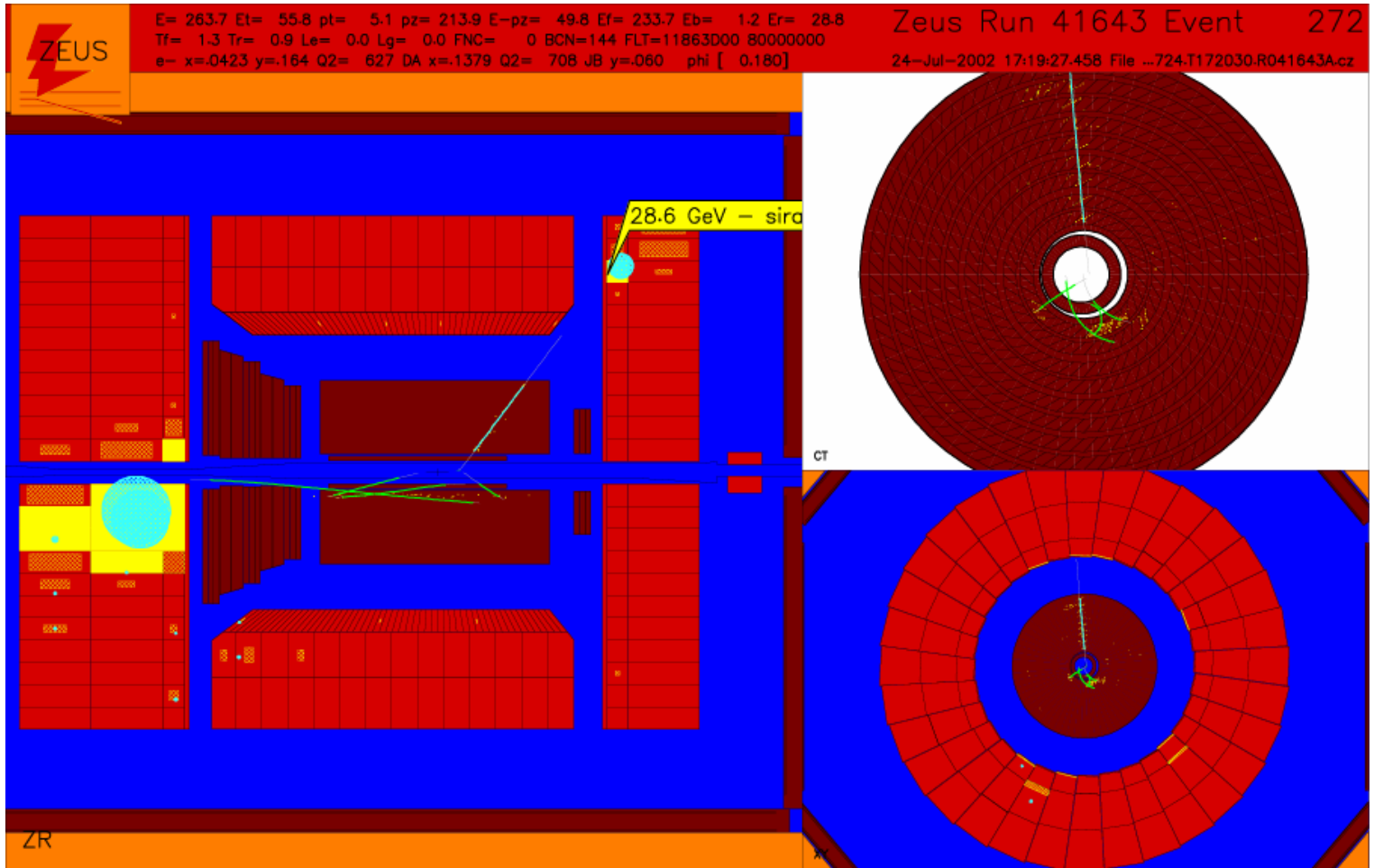


- Central Tracker chamber currents very high for this fill
 - $I_p \sim 30\text{mA}$
 - $I_e \sim 3.5\text{mA}$

Physics!

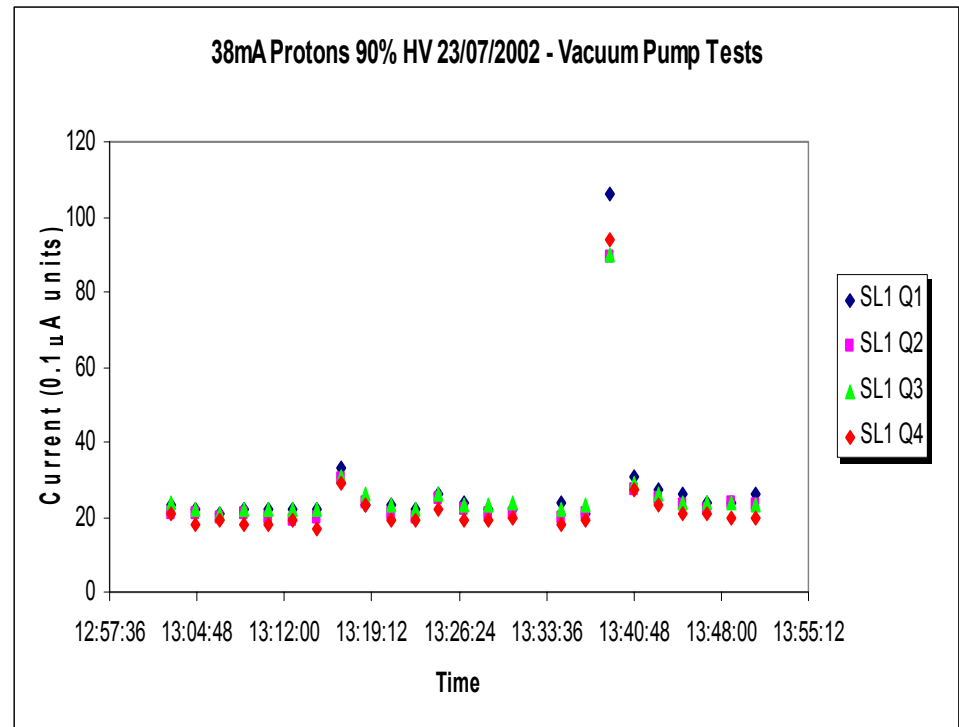


More Physics!



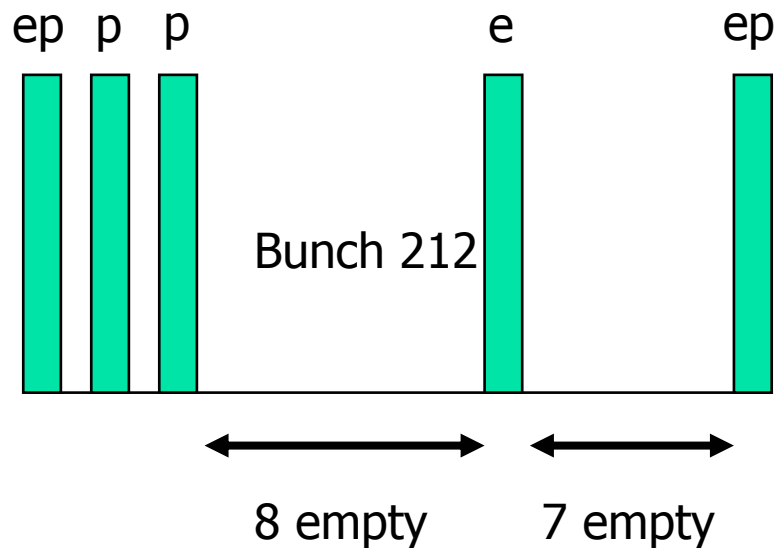
Effect of vacuum on currents

- Effects seen from all three pumps (10m, 8m and 6m)
 - Largest effect at 6m, but change in pressure also greatest here
 - Relative change at 6m is greatest however
 - Not completely independent as pressure changes are correlated between pumps



Isolated e^+ bunch

- Idea to use isolated bunch as part of standard running to try to investigate delayed sync. radiation component
 - Isolated bunch separated by $>$ max chamber drift time from neighbours
 - Trigger only on bunch 212



Isolated bunch

ZEUS UK - CTD group

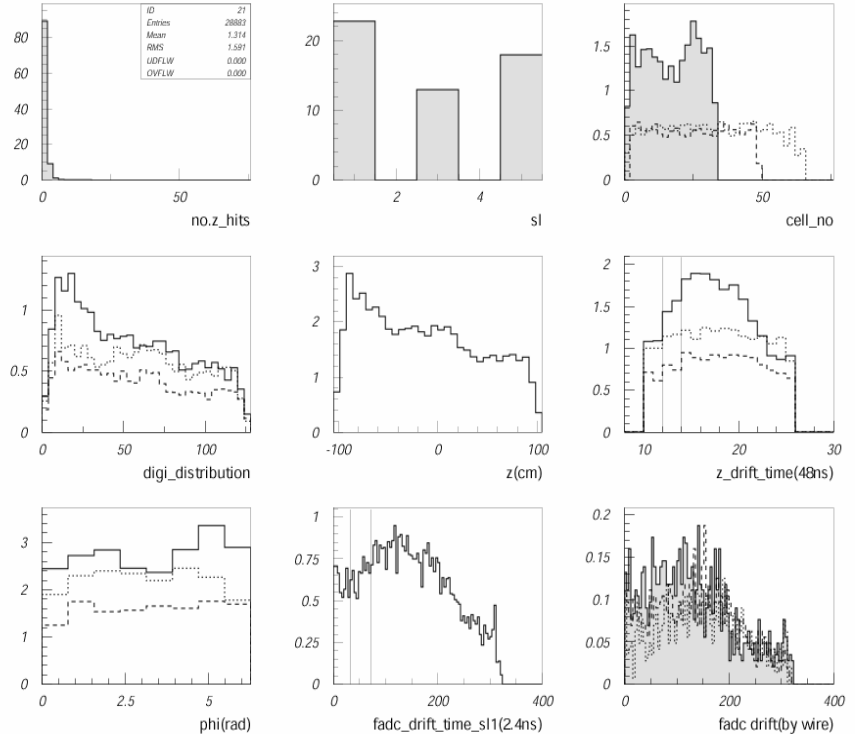
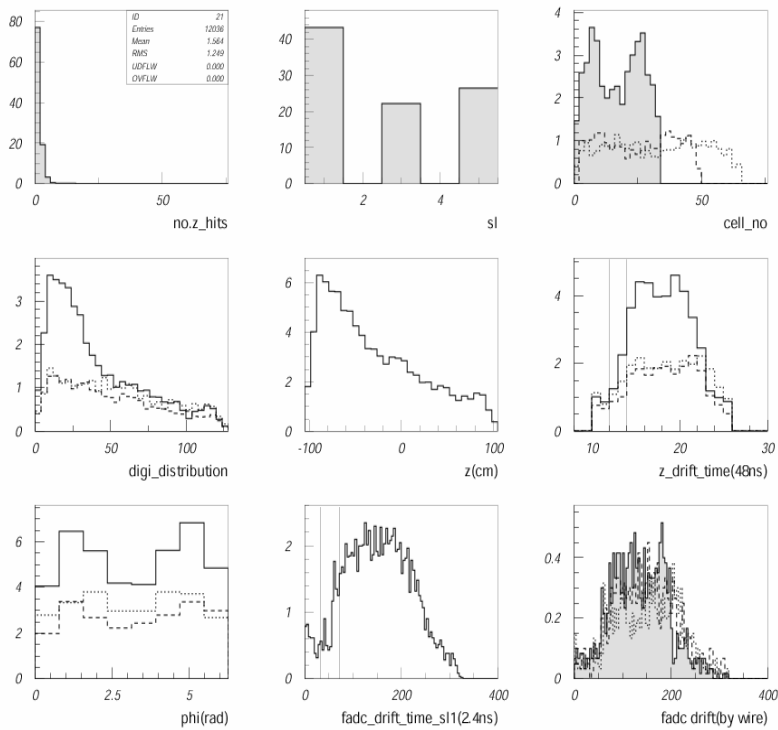
Run:41318t:random(MVD:nominal)

Background Studies

ZEUS UK - CTD group

Run:41645b:random(ep):b212

Background Studies

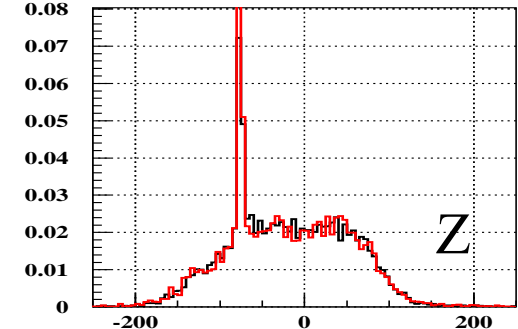
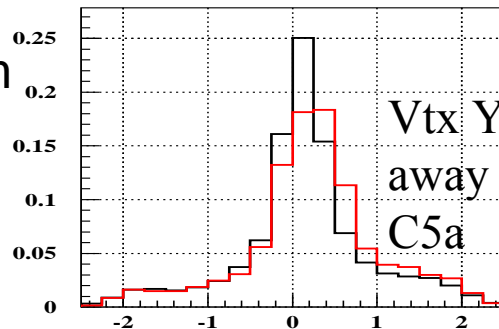
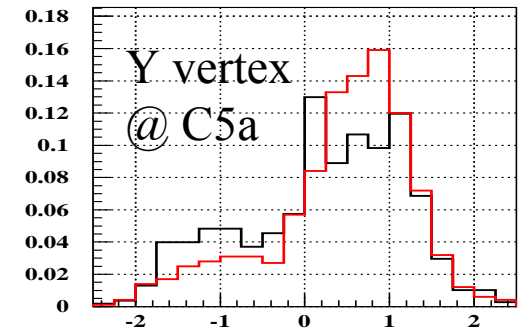
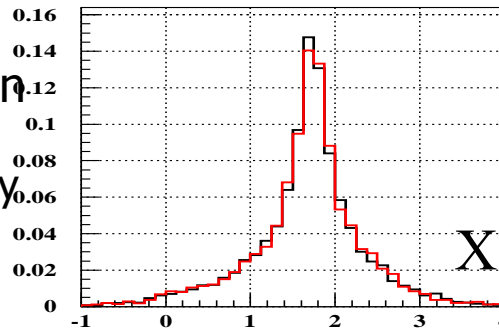


■ Differences not understood at present

Dave Bailey

Beam scan at IP: shift in vertex position

- ZEUS beam is 1.5mm too high at IP
- Vertical shift only possible in upward direction
 - Lowering beam center only by 0.5mm: limited by magnet current (we didn't take data)
 - Upper direction by 1.87mm shown in Red
- Shift visible in Y distribution
- C5a collimator shadow has changed the shape: more asymmetric in Y

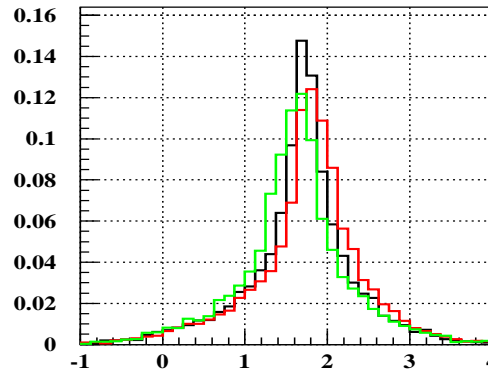


Vertex outside -75 cm

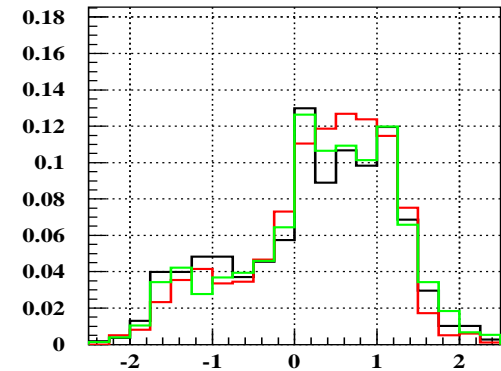
Beam movement changes C5a asymmetry
 – need to move down to nominal position

Beam shift in X

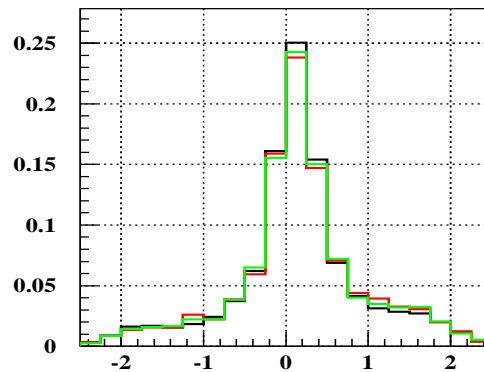
- Nominal: black
Shift in positive X: red
Shift in negative X: green
- Little effect on the “Y asymmetry”
 - maybe a bit when we move to positive X (closer to the collimator edge)



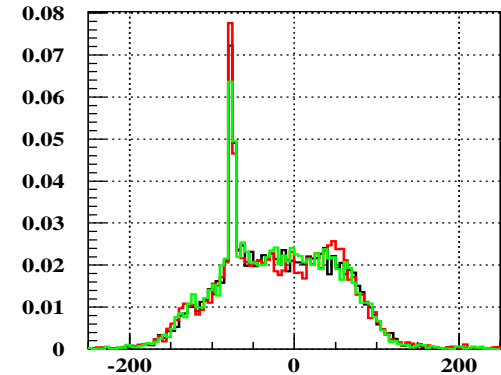
Vertex X distribution



Vertex around -75cm

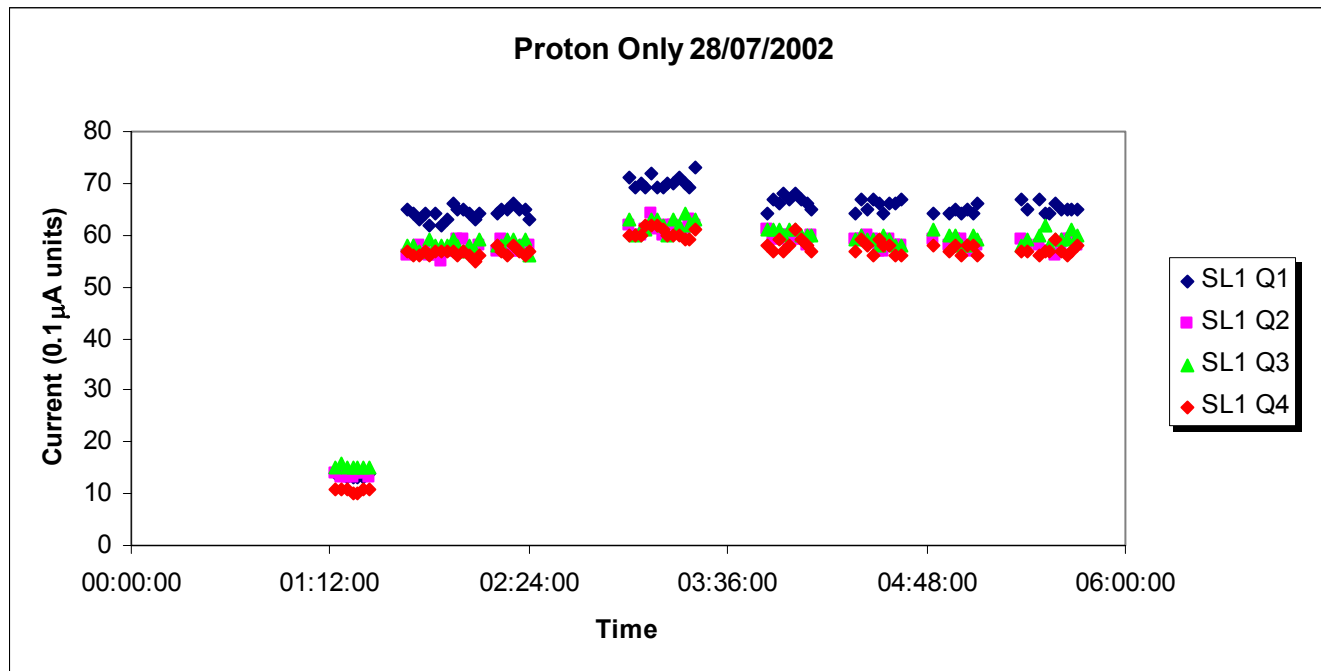


Vertex outside -75 cm

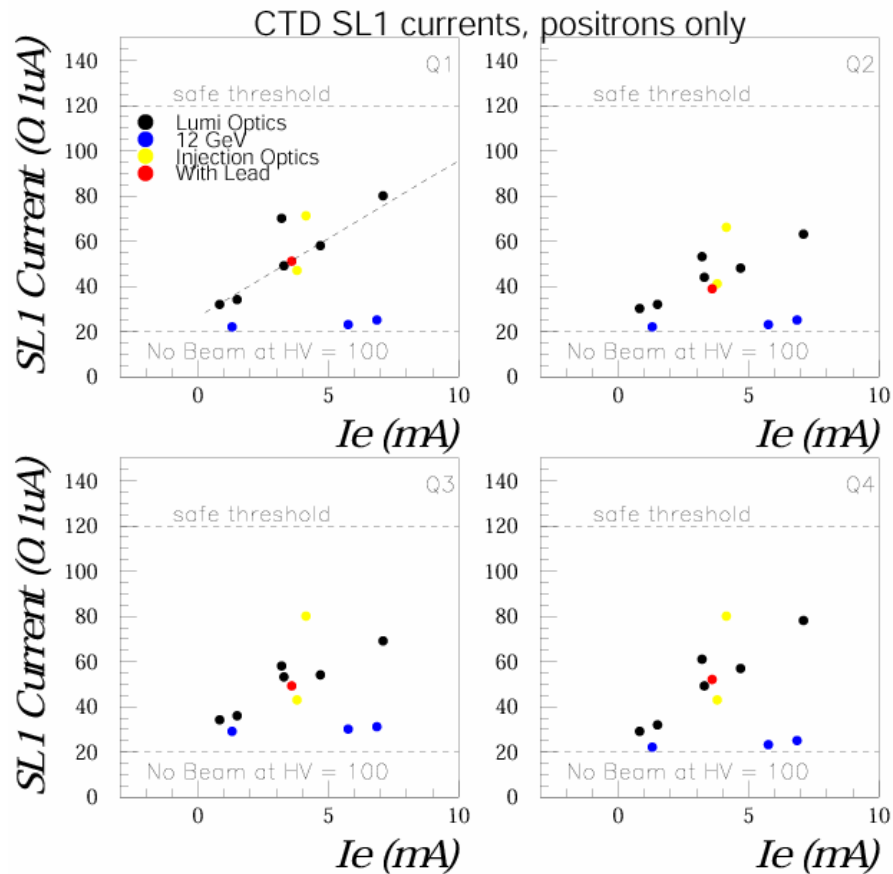


Vertex Z distribution

Beam scan – chamber currents



Effect of Shielding





Proposals for Running

- Proton related
 - Investigate vertex position
 - Shift down in vertical direction $\sim 2\text{mm}$
- Positron related
 - Understand effect of lead
 - Request another widely space e^+ only fill
 - Is it possible to make measurements at different e^+ energies?
 - Repeat isolated bunch study in next fills
 - Downstream beam steering
 - Long positron fill to attempt to separate prompt and delayed components