H1 after one year at HERA II

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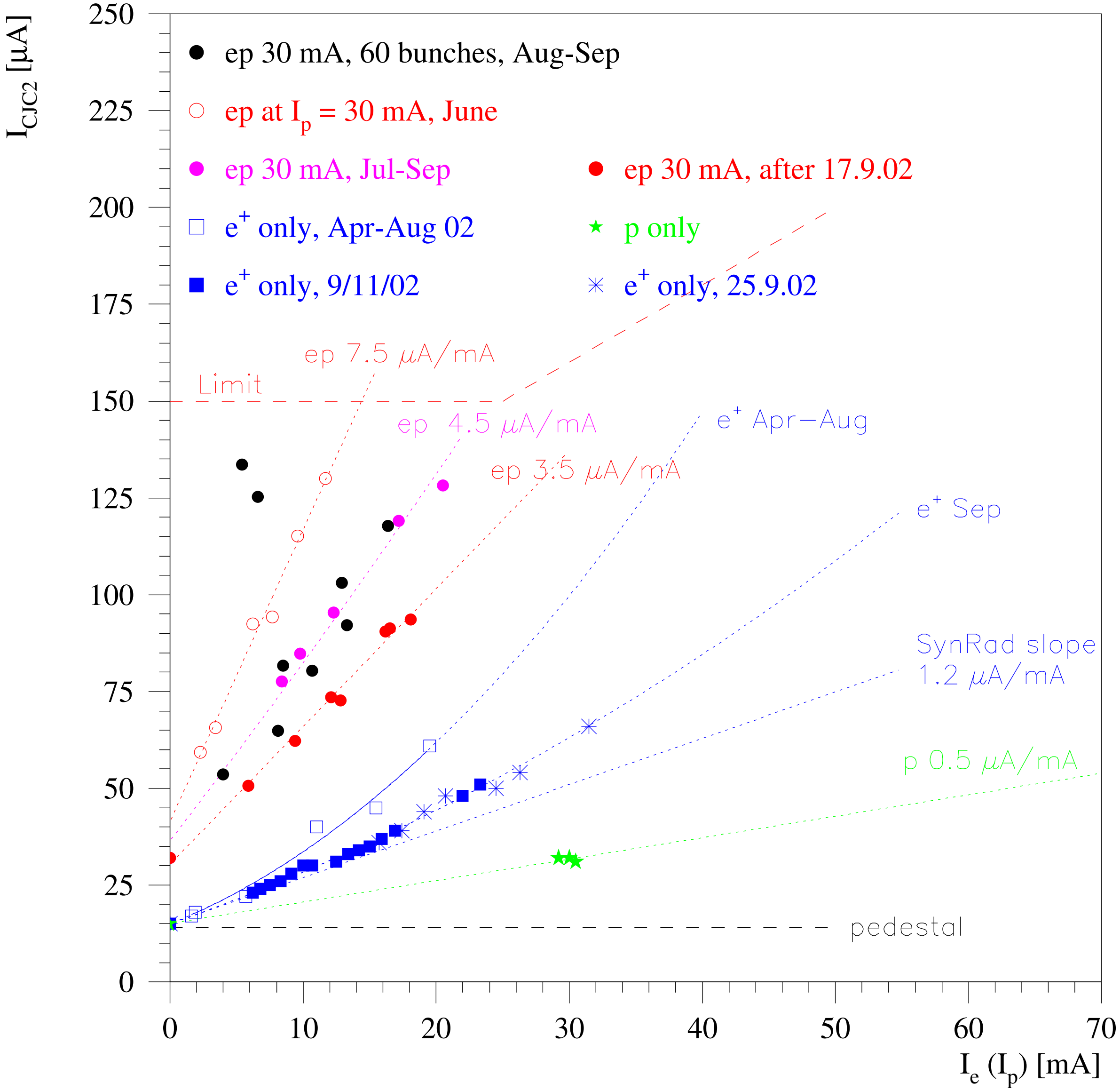
HERA coordination meeting, 26.9.2002

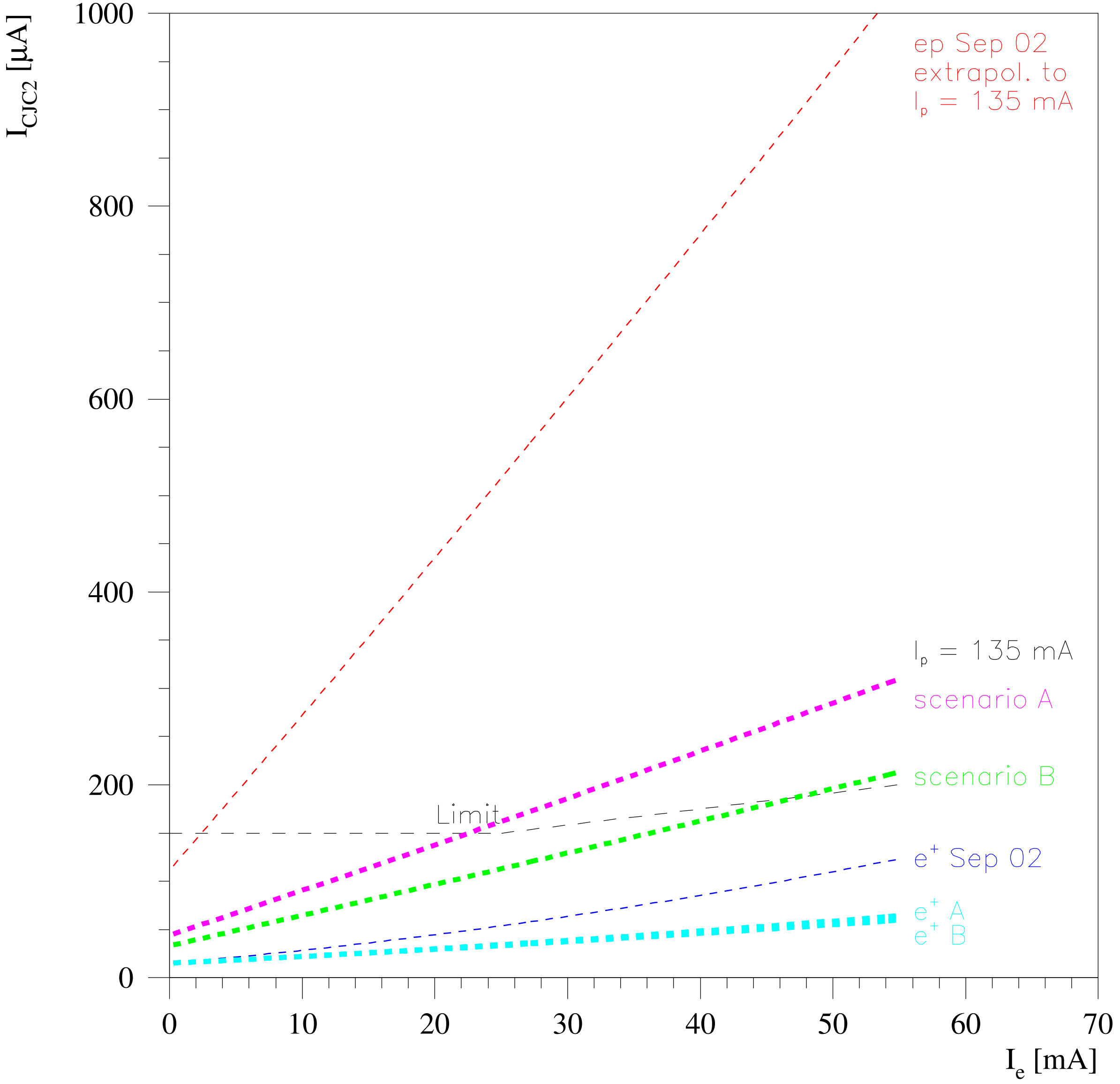
- Background studies
- Recent running
- Physics goals
- Shutdown plans

Chamber current vs beam current



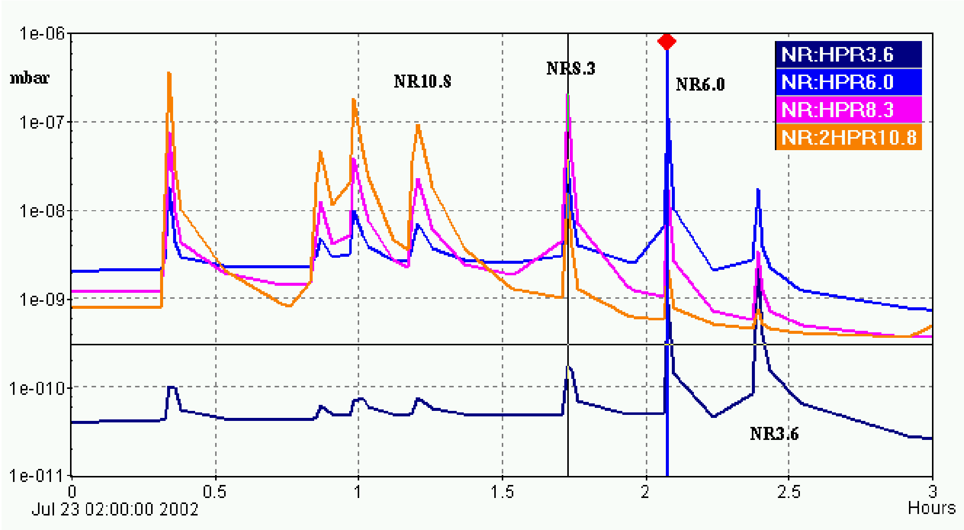
- Ageing limit 150–200 μA.
- *ep*: p-gas dominates. Limit now $I_e \cdot I_p < 1000\,\text{mA}^2$. So far $I_e \cdot I_p < 460\,\text{mA}^2$. Similar limits from Radiation monitor.
- *ep*: improvement after vacuum conditioning, GO/GG warm-up.
- e^+: SynRad and e-gas similar at 55 mA in Sep.
- *p*: fine at 30 mA, increase above 50 mA.

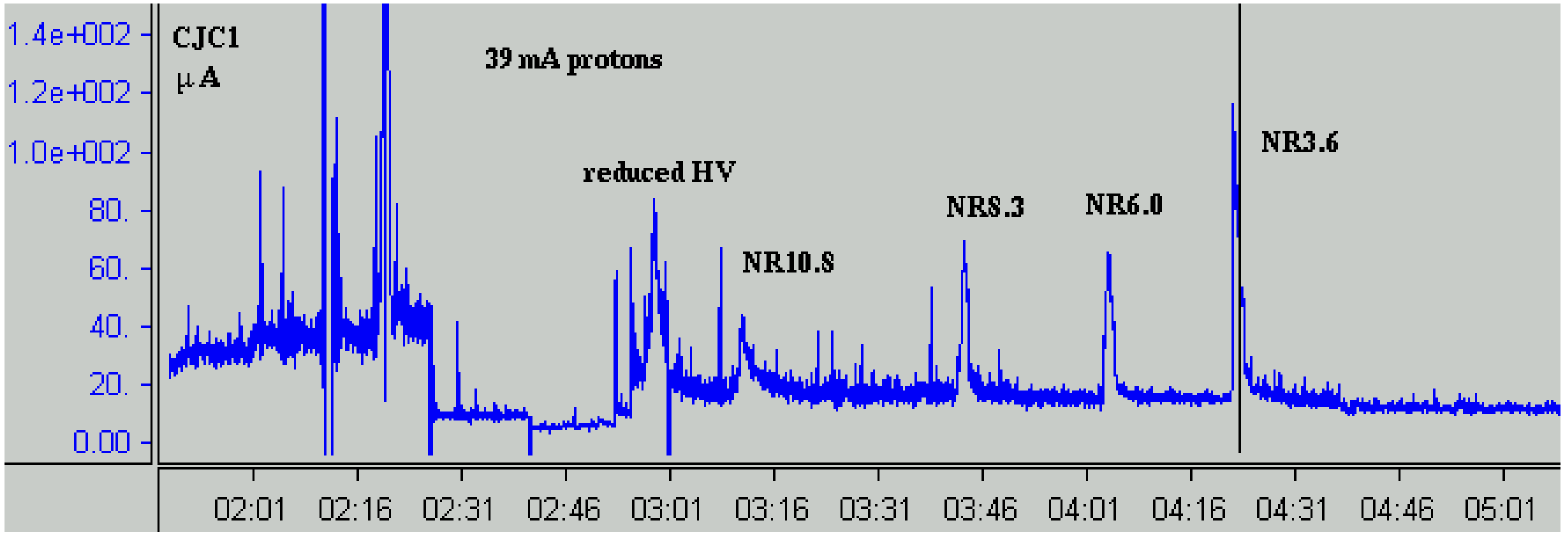
Extraction to $I_p = 135\,\text{mA}$



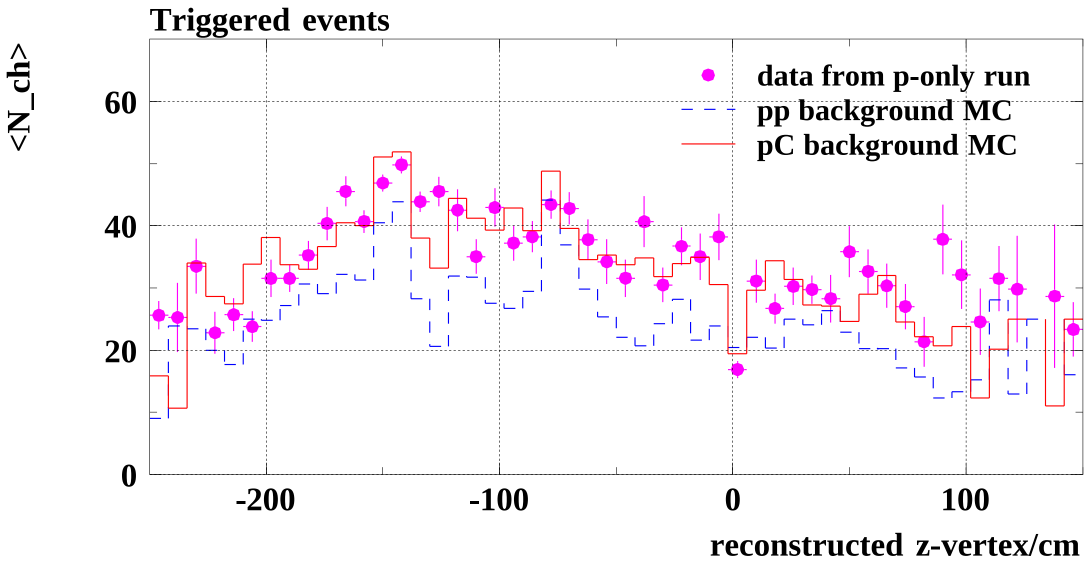
- Conditions from mid-Sep '02 extrapolated to $I_p = 135\,\text{mA}$.
- A: improve vacuum by factor 3.3, reduce SynRad by 1.8 (coating ABS4).
- B: improve vacuum by factor 5.3, reduce SynRad by 1.8
- e^+-only contribution Sep '02
- e^+-only contribution in A and B.

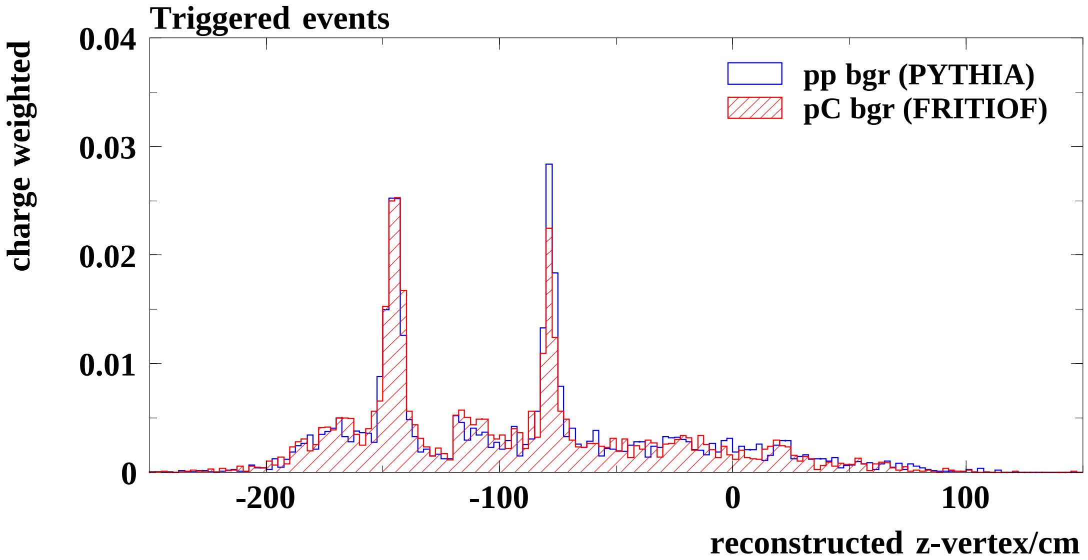
CJC current vs pressure



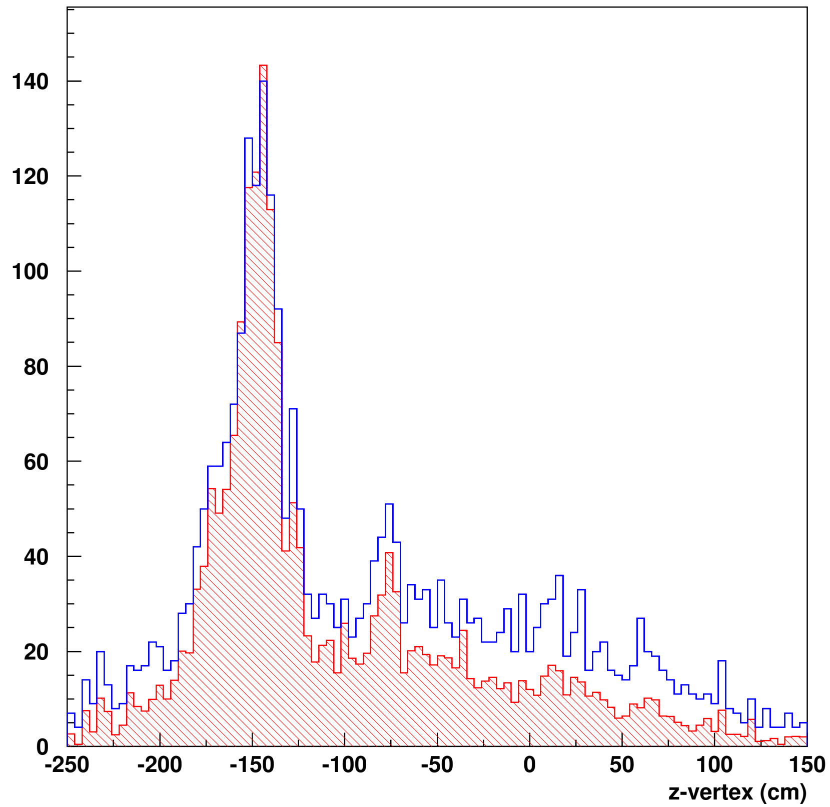


p-gas simulation vs data



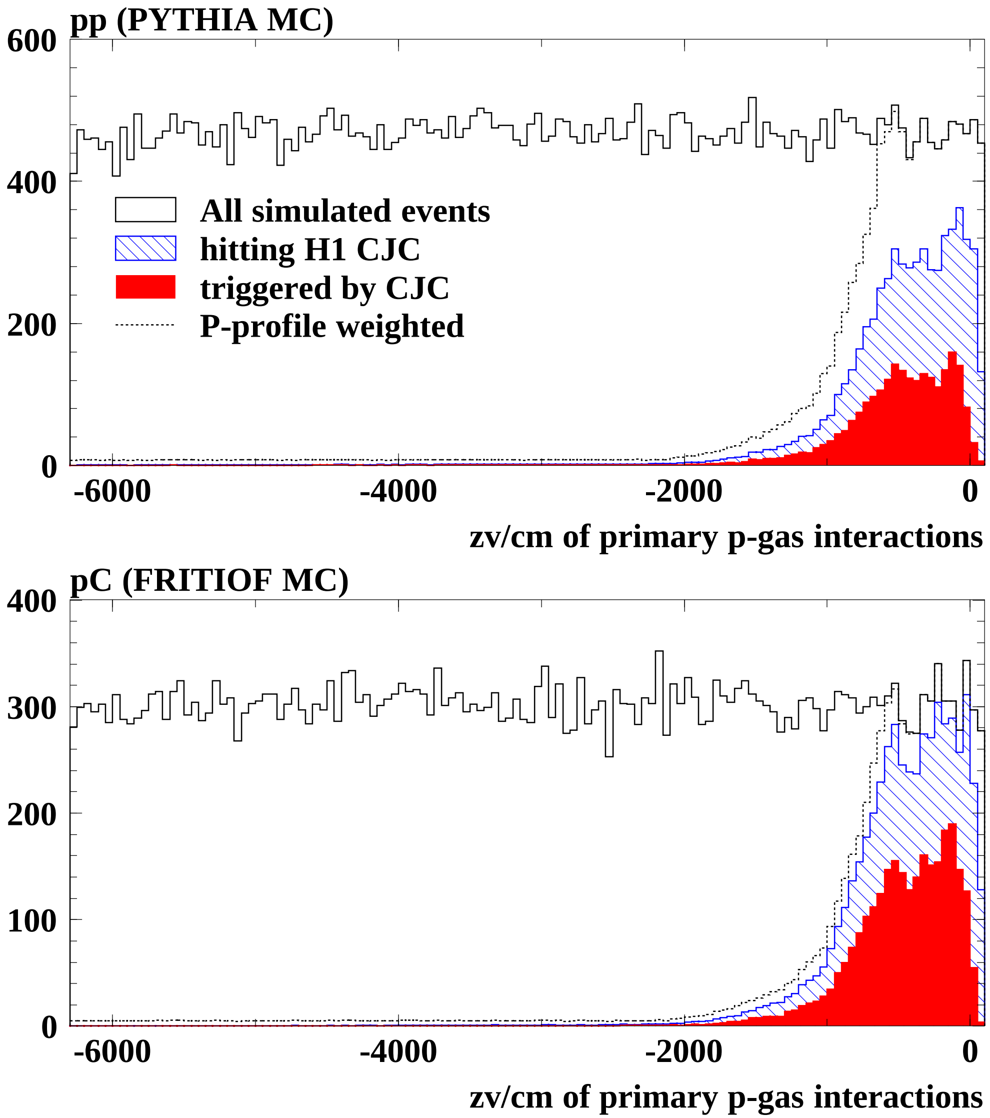


Data



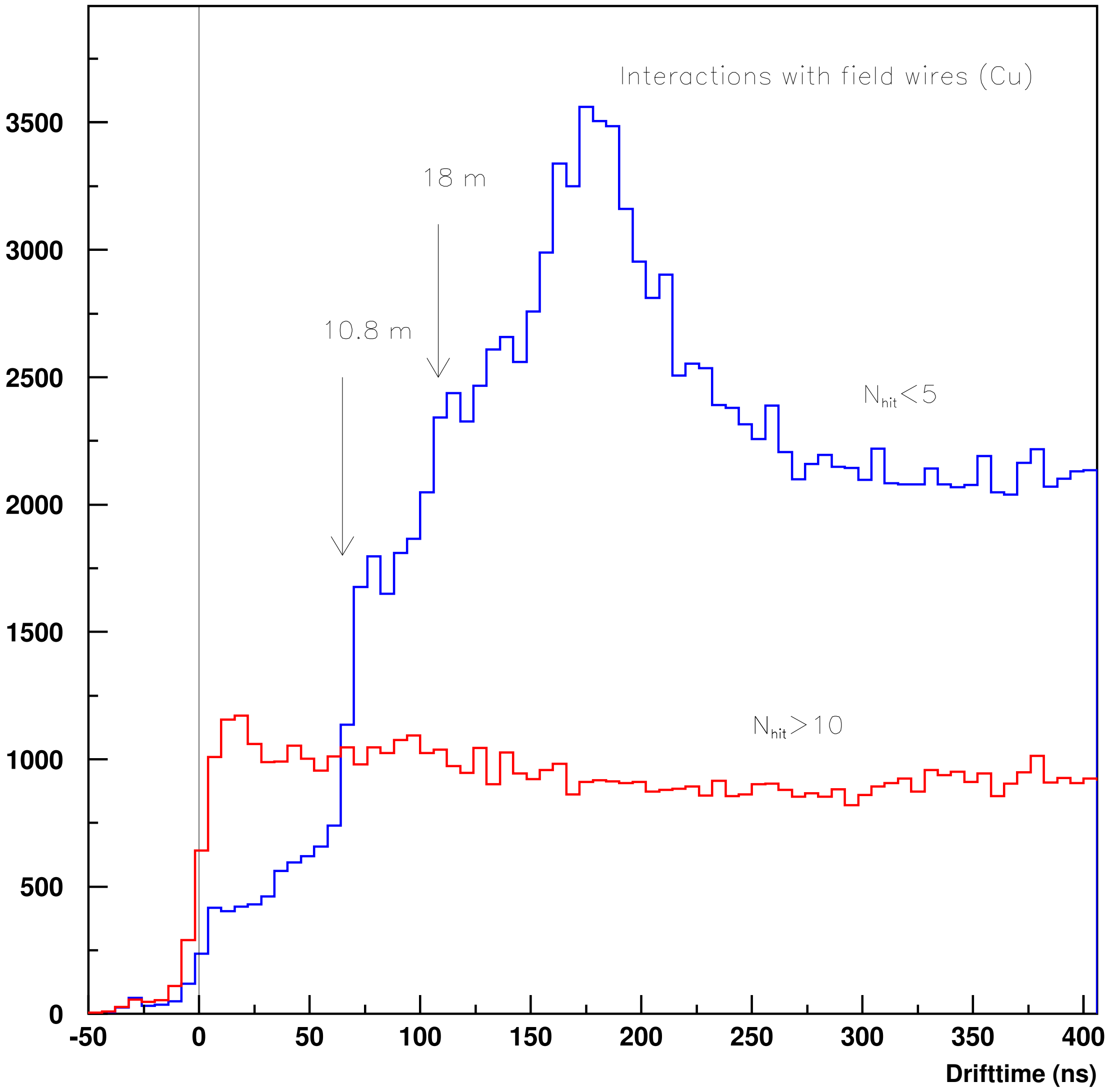
Charge weighted

p-gas simulation: sources



- Input: flat pressure profile up to 64 m.
- Measured pressure profile introduces cut-off beyond 11 m.
- pp: 56% hit CJC.
  pC: 79% hit CJC.
- pp: 23% fire track trigger.
  pC: 41% fire track trigger.

Synchrotron radiation sources

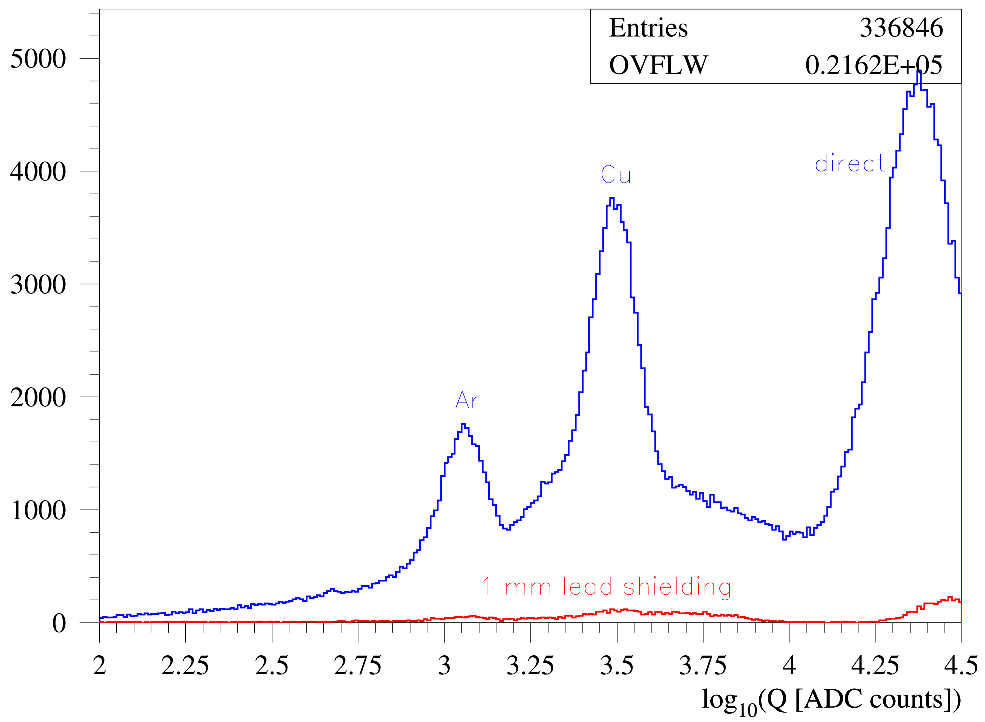


CJC drift time distribution

- Isolated e^+ bunch
- Tracks are prompt: e^+-gas interactions.
- Delayed synchrotron radiation from 10.8 and 18 m ABS4 and GN face

Synchrotron radiation in the CJC

Simulation



Run 318307 e+ only at 27.5 GeV

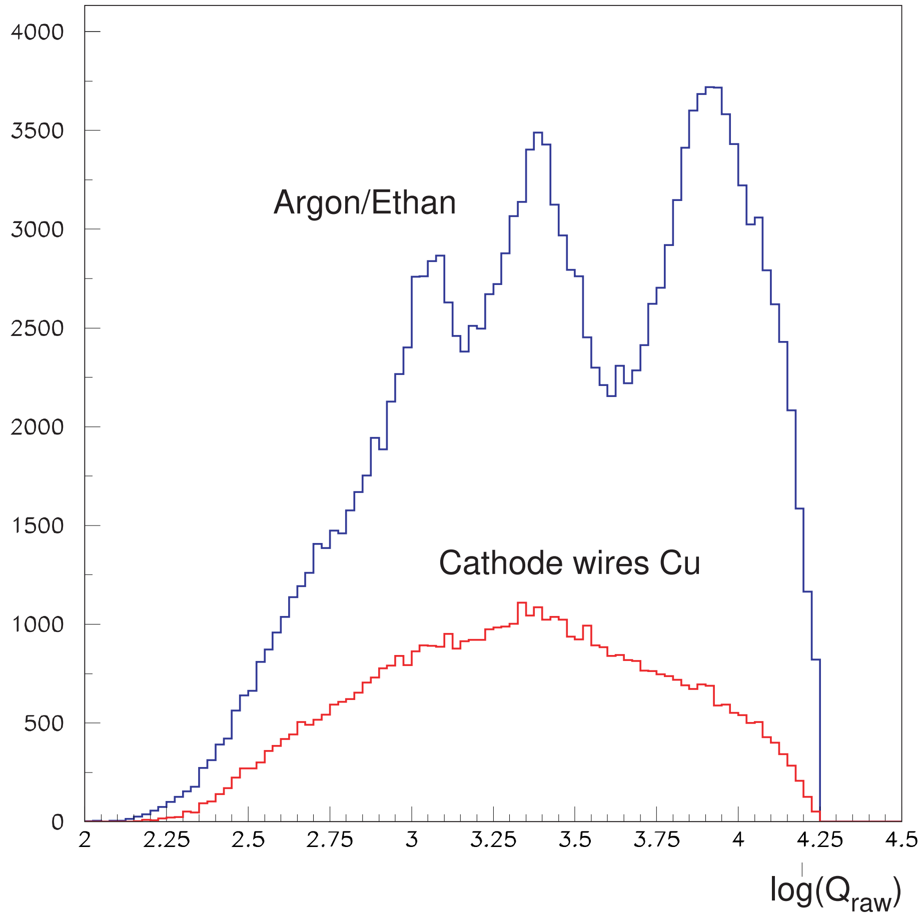
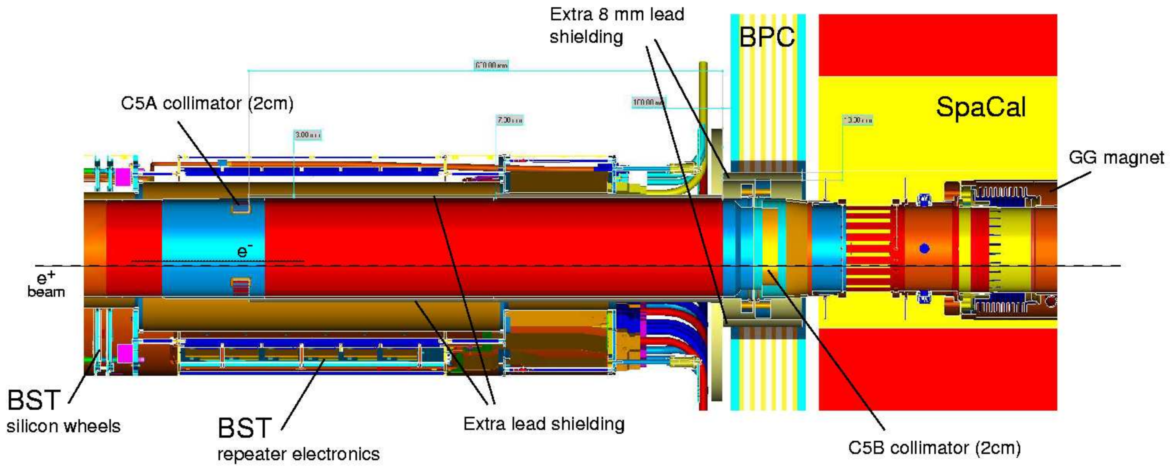


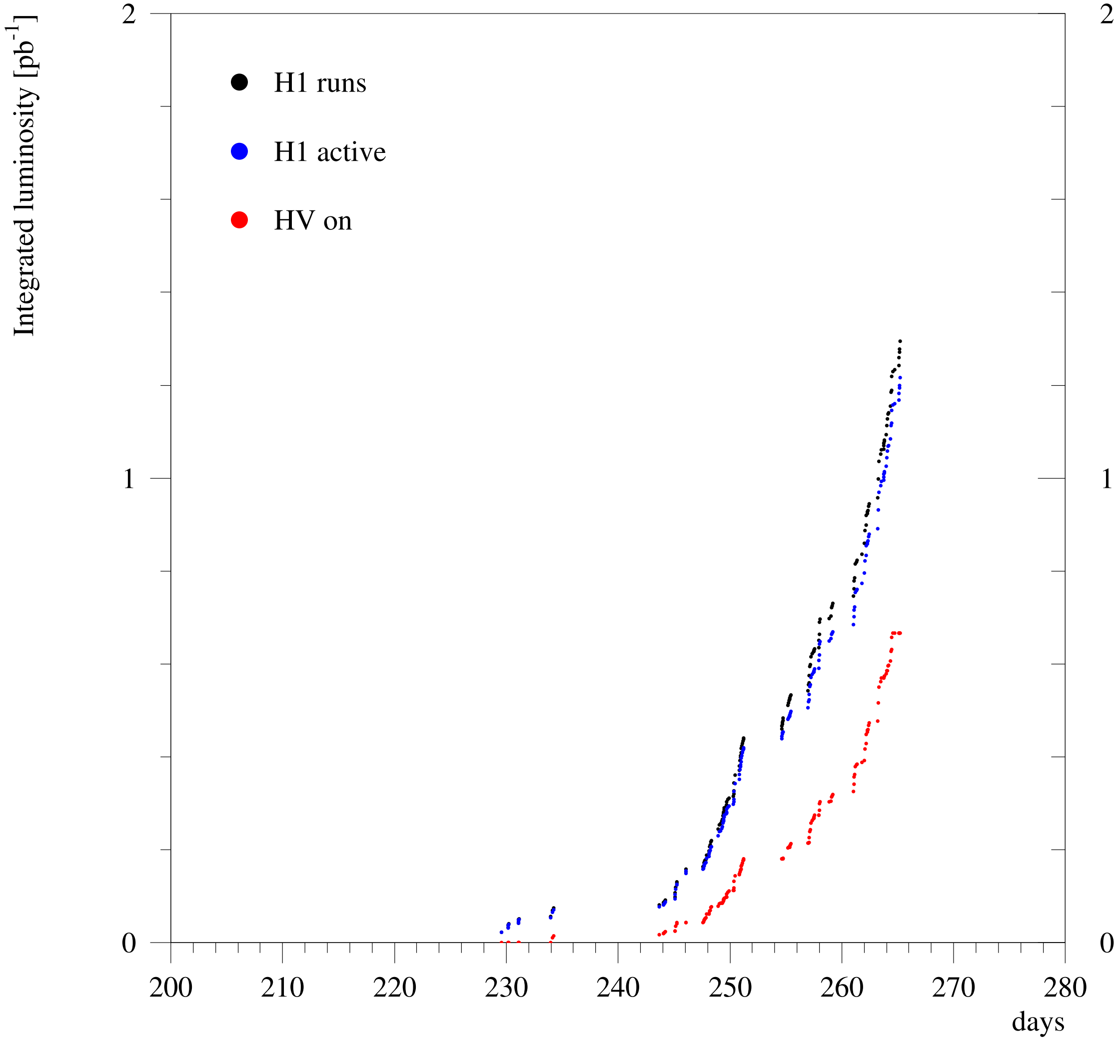
Photo-electrons from Ar and Cu fluorescence and direct synchrotron radiation seen.

Remedies



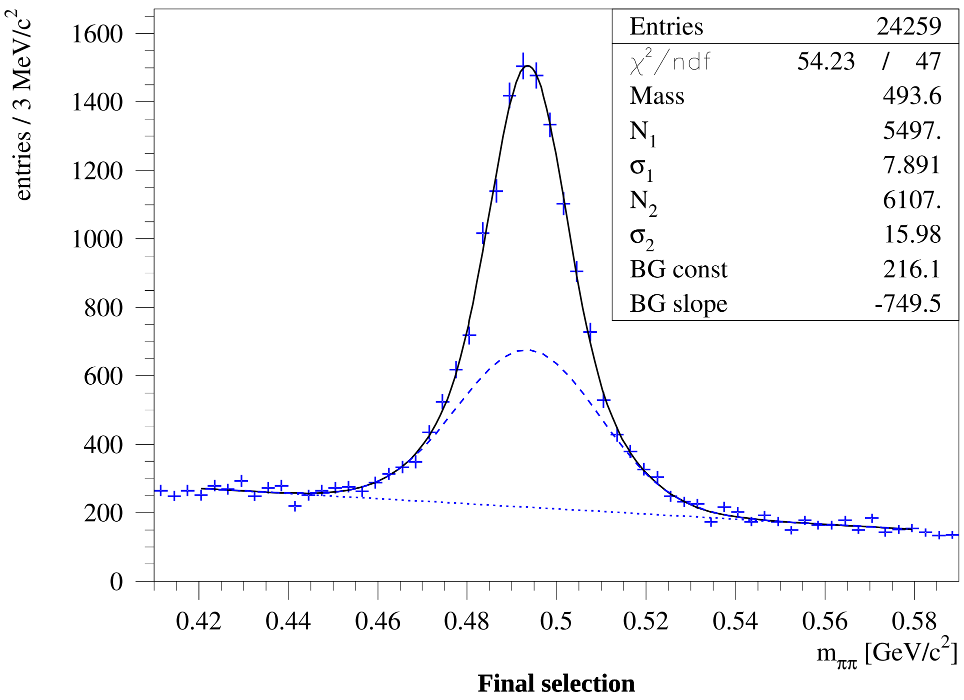
- Coat ABS4: factor 1.8 less backscattered SynRad.
- Add 1 mm lead shielding around the backward beam pipe between C5A and C5B:
  $\gtrsim$20% less SynRad in BST, CJC.
  $\approx 12\%$ more p background.
- Reduce thickness of C5B from 20 to 5 mm:
  $\approx 11\%$ less p background.
- Improve vacuum between IP and NR 11 m.

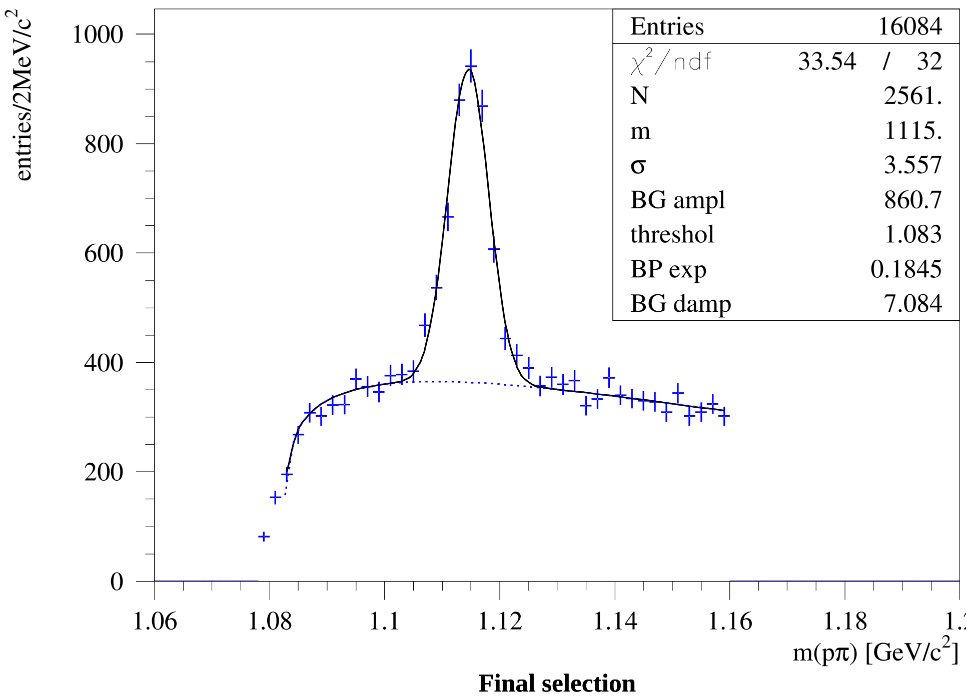
Recent running



- Over the last 3 extended weekends H1 has collected about 1.2 pb^{-1} with physics triggers
- 0.66 pb^{-1} with CJC HV on.

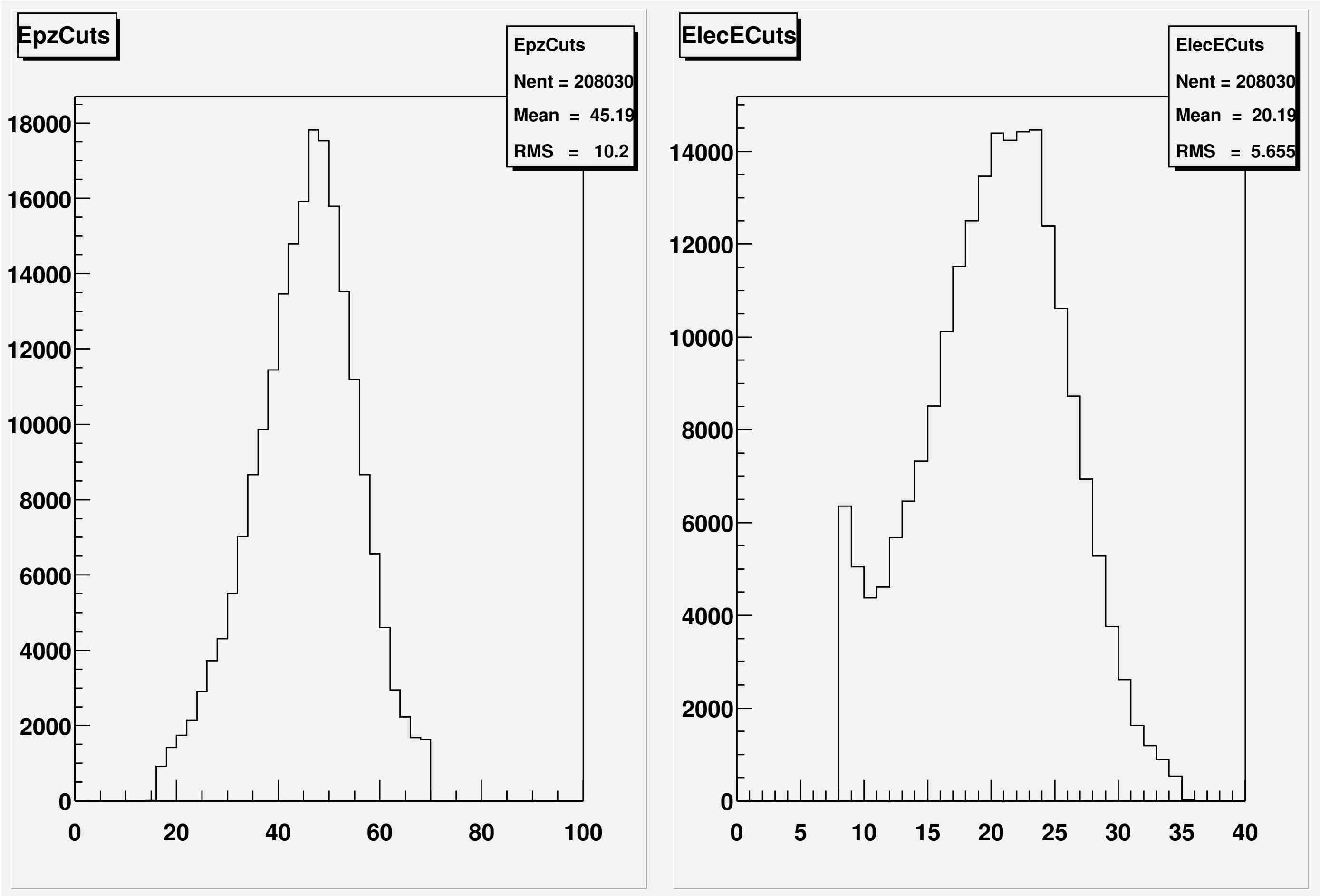
CJC V^0s





Mass and width as expected.

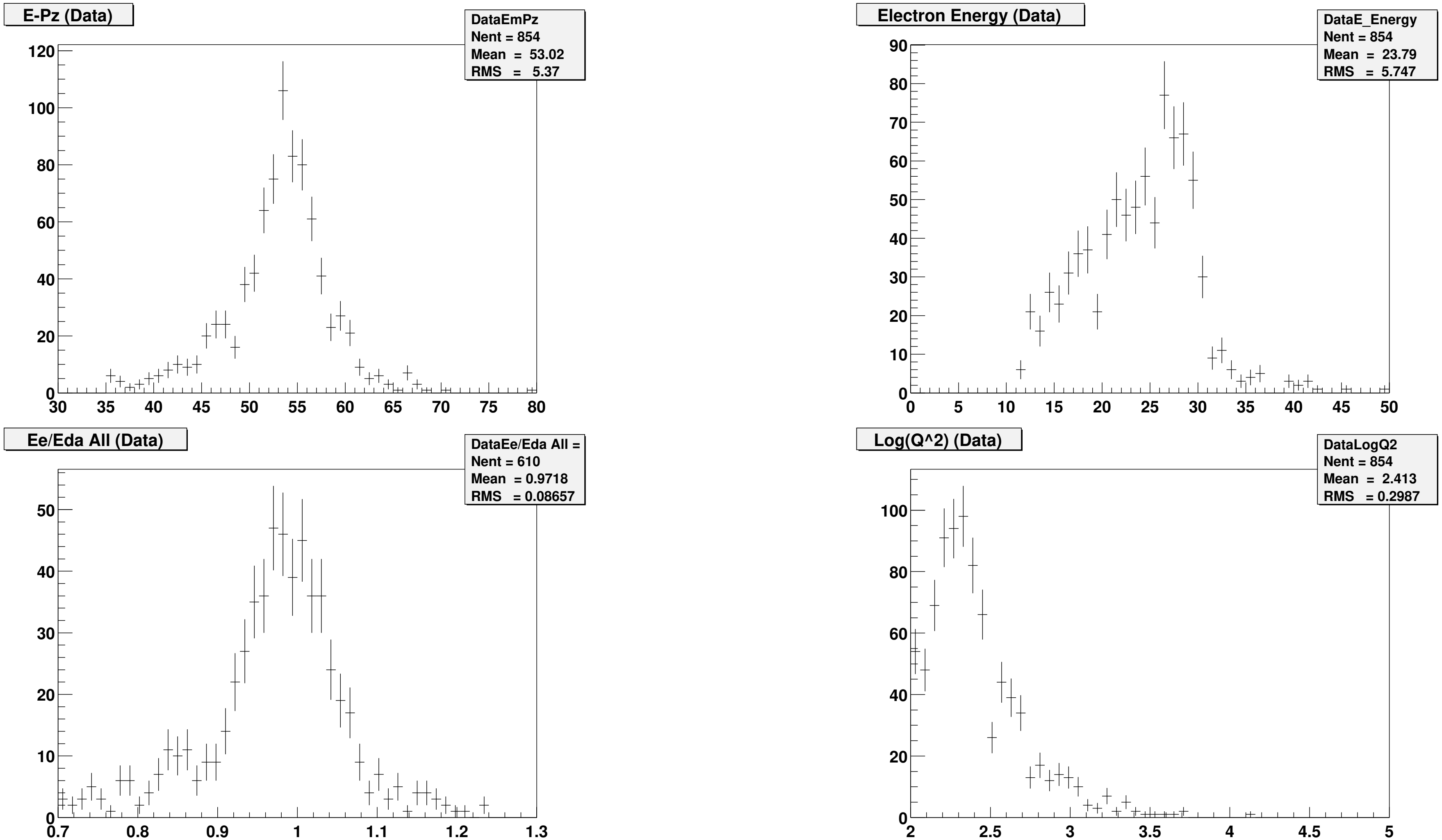
Spacal kinematic peak



$\sum E - p_z [GeV]$ $E_e [GeV]$

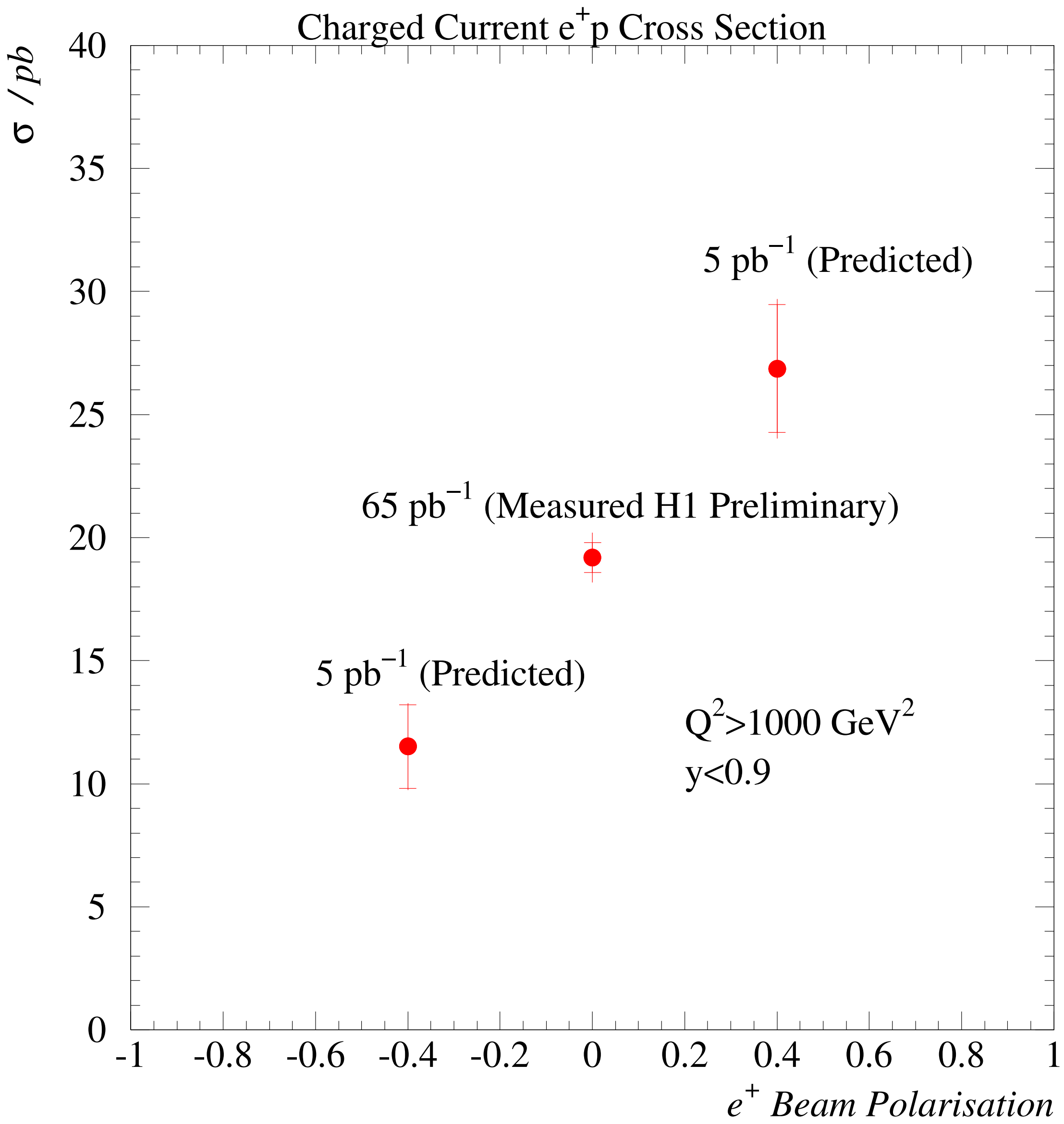
- Electron finder
- $y_{JB} < 0.03$
- $150^o < \Theta_e < 175.5^o$
- Spacal energy calibration in progres.

NC DIS in the Liquid Argon Calorimeter



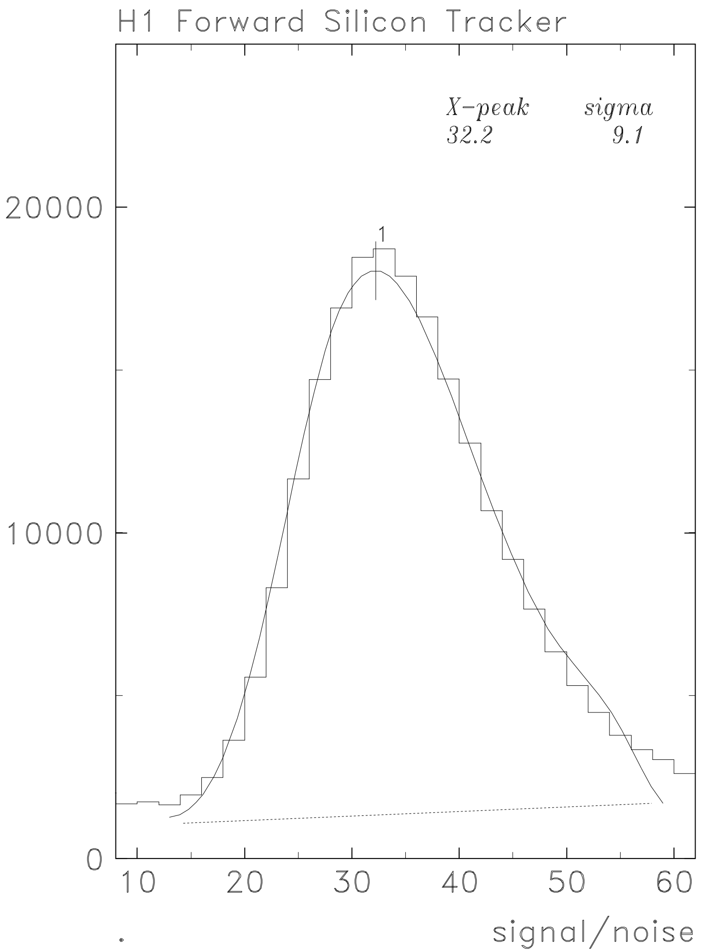
LAr has started taking physics data.

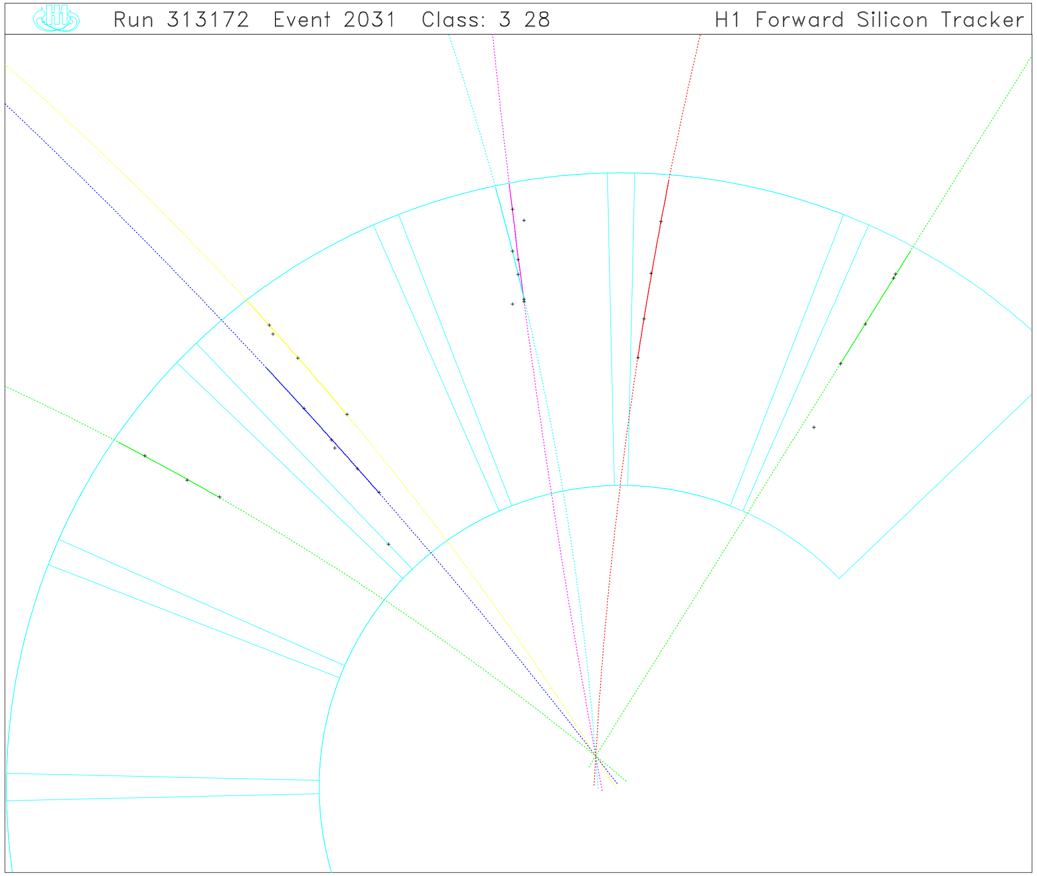
Charged current cross section vs polarisation



- Assume $\mathcal{P} = \pm 0.4$ and $2 \times 5\,\mathrm{pb}^{-1}$.
- Would give the first measurement of the polarization dependence of charged current interactions.

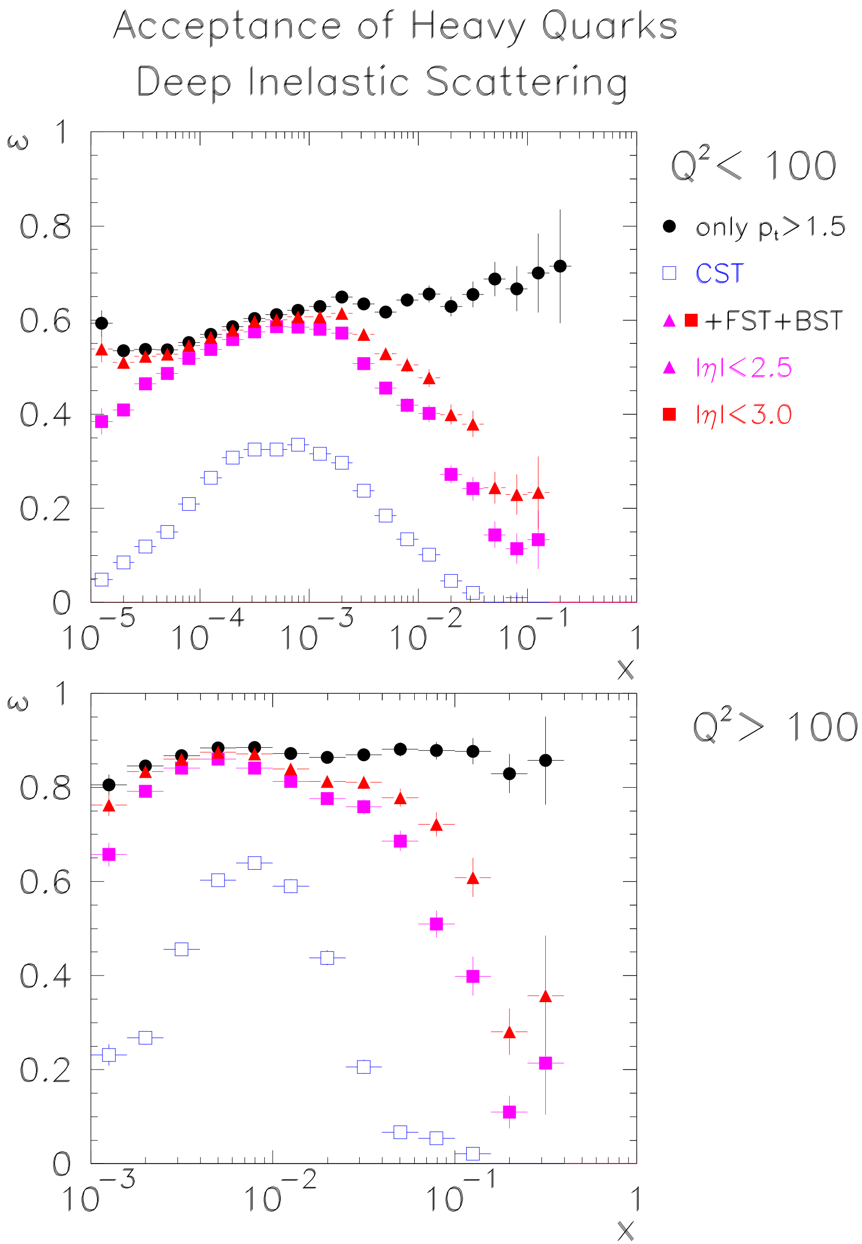
Forward silicon tracker





FST fully operational.

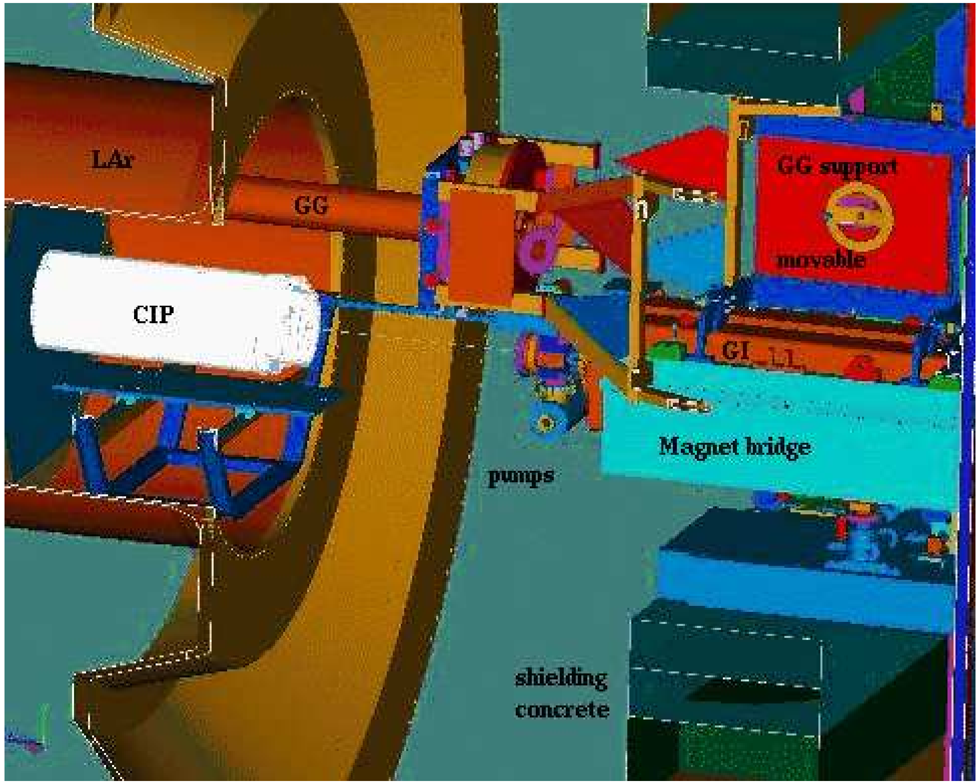
Forward charm



- Use the FST together with the upgraded Forward Tracker.
- Charm acceptance extended from 1.5 to 2.5 in η.
- Charm acceptance extended from few 10^{-3} to $5 \cdot 10^{-2}$ in x.
- Visible cross section is about 35 pb

H1 Shutdown activities

H1 stays in beam position.



Access to the CIP with raised GG magnet.

- Improve/modify SynRad shielding.
- Exchange CIP frontend electronics: critical path 16 weeks.
- Exchange radiation damaged BST electronics.
- Replace old BST r-sensors with ϕ sensors as in FST.
- Improve water cooling for silicon trackers.
- Improve gas distribution for the BPC.
- Install the Very Forward Proton Spectrometer with a Cold Bypass at HERA NL 220 m.