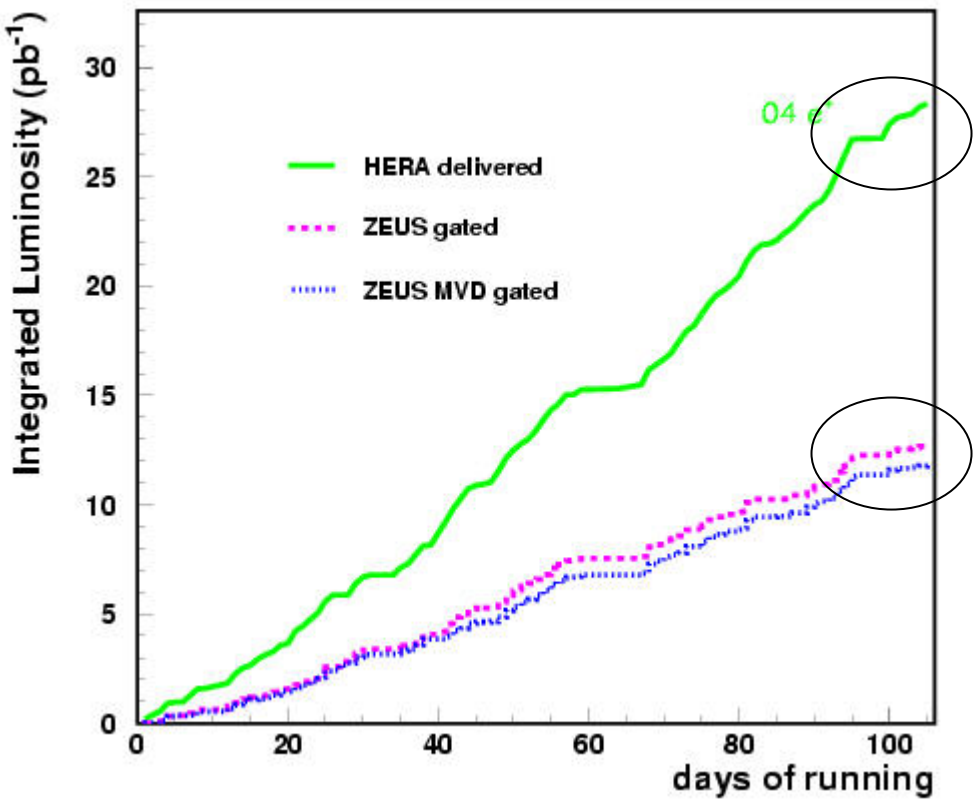
R. Yoshida

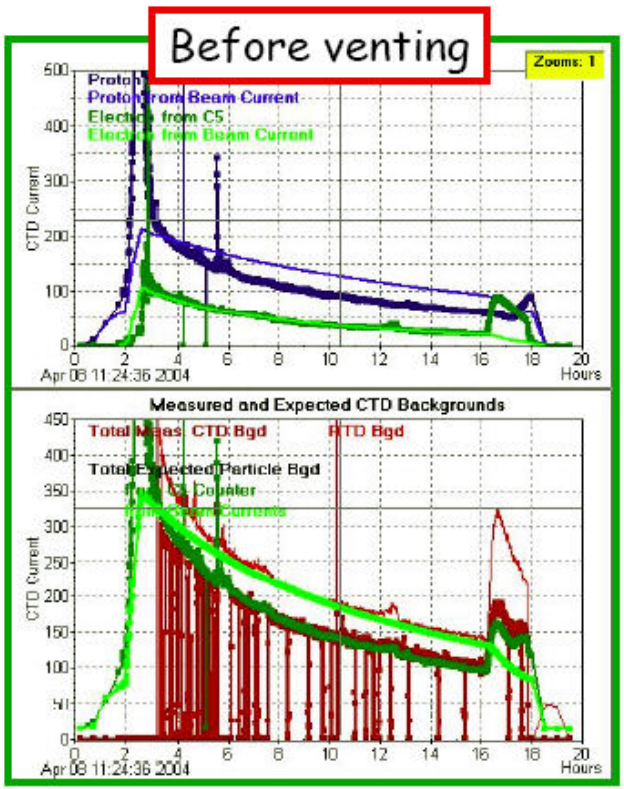
ZEUS status 23.4.04

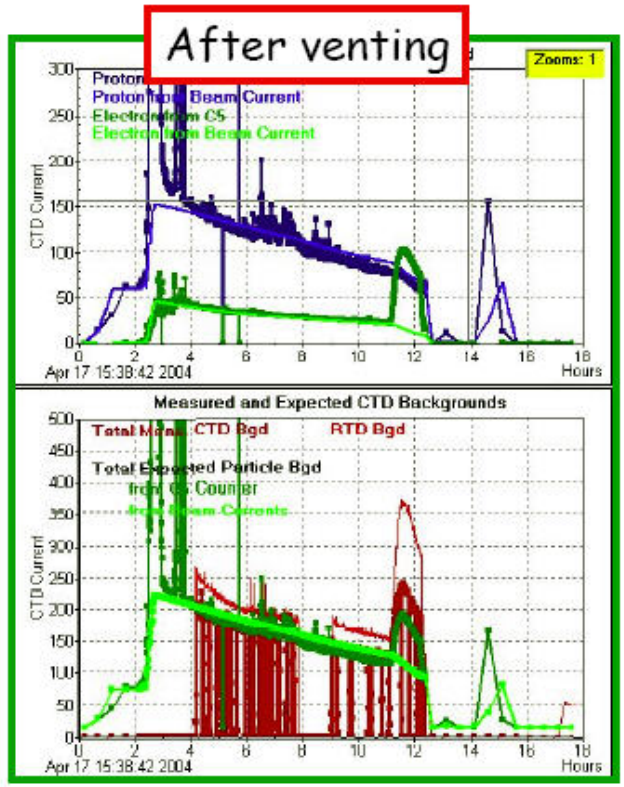


Disappointing

Low efficiency due
to too many HV trips

Spikes:





We are investigating:

- The time structure of the spikes using scintillator counters and possibly the CTD.
- Investigating relatively safe ways to make the CTD less sensitive to spikes.

Other items

- We had 2 leaks in SR from which we recovered very quickly.—Please see Roberto Carlin's presentations in the past weeks at the HERA weekly meetings.
- The detector is operating stably.
- The solenoid is operating stably.
- No major work is planned during the summer shutdown.

ZEUS request for HERA II planning

- The primary aim of the ZEUS collaboration for HERA II is physics research which is possible with high luminosity running with polarized electrons and positrons, as well as the physics with our new detectors, the MVD and the STT.
- The members of the collaboration are here for that physics, and have obtained support of various funding agencies on that premise.
- We have to ensure that we are able to carry out that research program.
- In order to do this, we have to switch to electron in summer 04.

- The situation is illustrated in the scenarios proposed by the directorate.
- The last chance to change to electrons and still have an equal share of electrons and positrons is mid-2005.
- If you consider that Hermes requires a change again back to positrons after the electron change, mid-2005 is already too late.

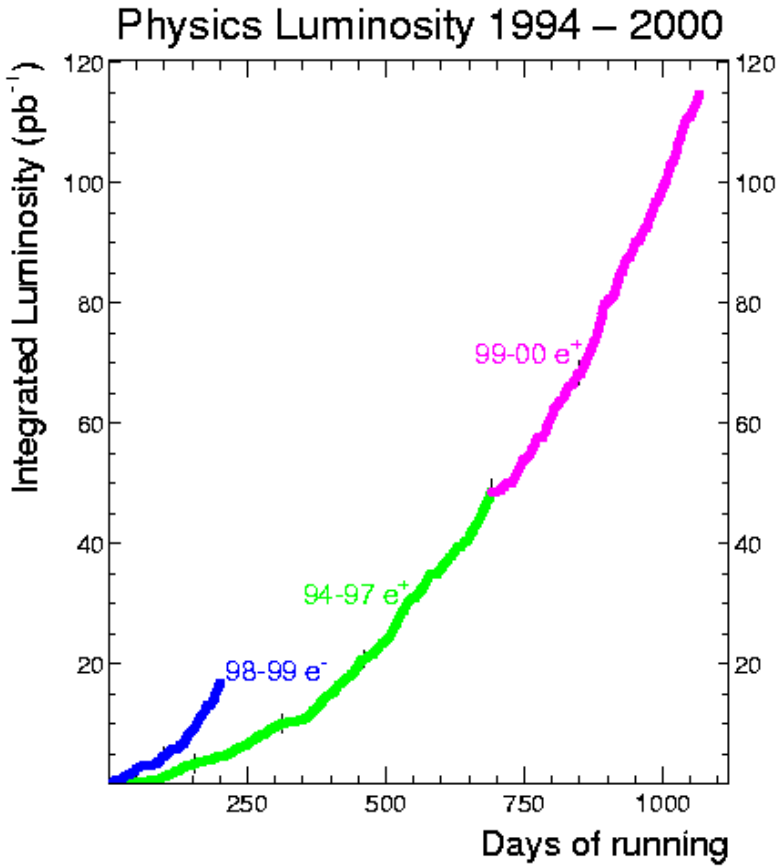
Scen.	04	04	05	05	06	06	07	e^+	e^-	sum
1	e^+ 70	e^+ 30	e^+ 170	e^- 15	e^- 150	e^+ 30	e^+ 230	e^+ 530	e^- 165	e^++e^- 695
2	e^+ 70	e^+ 30	e^+ 170	e^- 15	e^- 150	e^- 45	e^- 160	e^+ 270	e^- 370	e^++e^- 640
3	e^+ 70	e^- 10	e^- 110	e^- 30	e^- 150	e^+ 30	e^+ 230	e^+ 330	e^- 300	e^++e^- 630
4	e^+ 70	e^+ 30	e^- 90	e^- 30	e^- 150	e^+ 30	e^+ 230	e^+ 360	e^- 270	e^++e^- 630

- We switch to electrons in the Summer 04:
  - If there are problems, we still have time to investigate and fix them.
  - If there are really serious limitations with electron running we cannot fix, we have time to reconsider our research program in a rational way.
- If we only switch in Summer 05:
  - If there are problems, there is little time to remedy the situation.
  - Probably driving us into a program we cannot defend—neither with funding agencies nor with collaboration member interests.
- Yes it is only 1 year difference but we only have 3 years!

Physics benefits of switching to electrons in Summer 04

- Since we, in the end, intend to get an equal amount of e- and e+ data, the physics arguments are strategic—i.e. which results come out first, and how fast they can come out.
- Even if we struggle with electron running we are likely to get more physics results out quicker in the coming year than if we stayed with positrons.
- This is because, we have an order of magnitude less e- sample from HERA I.

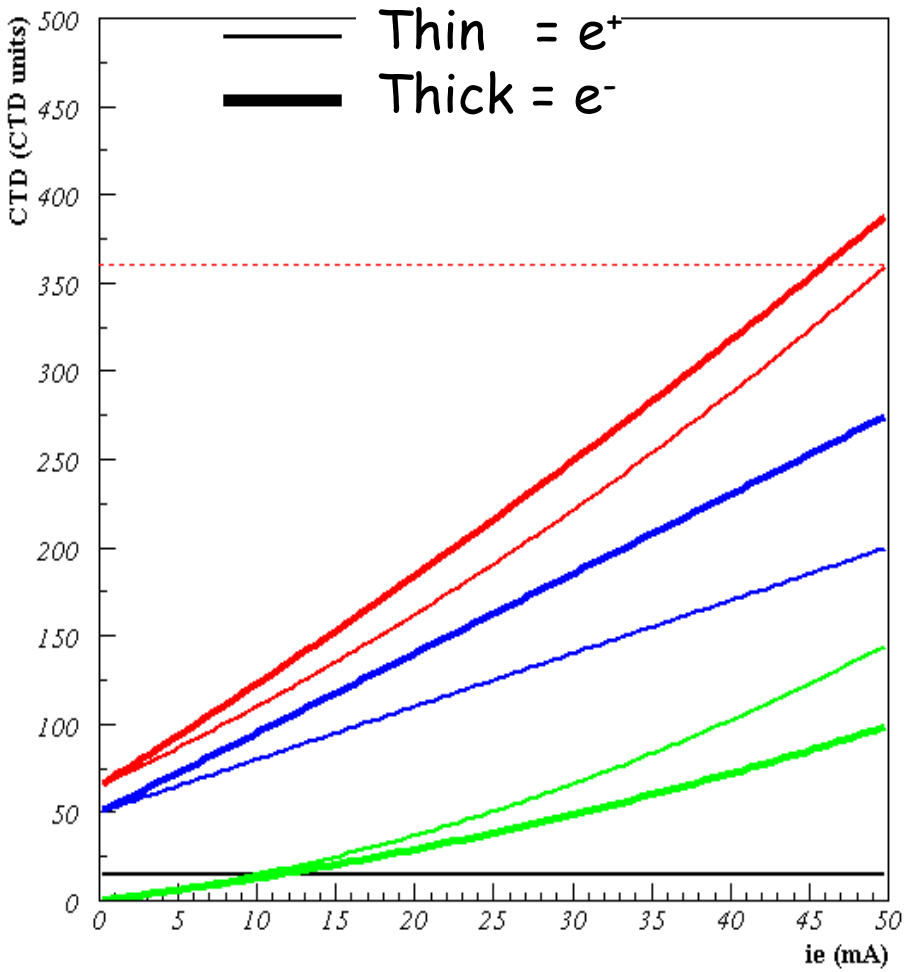
- If things go relatively well, we could double the existing sample of e-, and have a sample an order of magnitude larger by summer 05.
- Even if things do not go well, we will have a sample which is considerably larger than the existing one—and thus be able to write papers on them
  - xF3: errors will go down rapidly with increased e-
  - Search for excited neutrinos.
  - Lepton flavor violation.
  - R-parity violating squarks
  - Resonance searches (not there in e+, what about e-?)
  - Compliments searches for isolated lepton+ Pt misss in e+
  - …
- We would need a big positron sample to say something new in most areas: 2-300 pb-1 (i.e. the final envisioned sample).
- The MVD physics (heavy flavors) will yield results with relatively small samples (50-100 pb-1). Not affected.



- If we switch to electrons, will we "look bad" because we'll have less luminosity than otherwise?
- I find this argument simplistic.
  - We will not be judged solely on how much luminosity we have accumulated by the end of the year.
  - The relevant questions is: Is HERA II in shape to deliver the physics it has promised?
    - Is the rate of luminosity accumulation correct for our goals?
    - Is the machine able to deliver all of the beams that it needs to deliver in order to do the physics we promised?
- If we can say yes to those last two questions, it will be enough, both for the collaboration and for those outside.
- If we cannot say yes, we ourselves will need to reconsider what it is that we intend to do at HERA II.

Will it be so bad anyway?

Calculated with **110** mA protons



CTD total

CTD p-gas

CTD e-gas + synch.

Pedestal

Our best knowledge indicates that the experimental background will be manageable.

There are, obviously, many unknowns: these are what we have to face now.

- Yes, we're all tired and would like to not to have to face new challenges just yet.
- However, we've ran out of time.
- I believe it would be irresponsible to ourselves, and to our goals—not to mention to the people who fund us—to not to switch to electrons in the summer 04.
- The ZEUS Collaboration strongly requests that we switch to electrons in Summer 04.
- Moreover, the ZEUS Collaboration strongly requests that scenario 3 (switch 04, switch 06) be adopted as the base HERA II program.