ZEUS Status Report

HERA Coordination Meeting

Nov. 19 2001

W.Zeuner

- Detector Status
- Background Conditions
- Activities during Shutdown Nov. 19-22
- Plans for Lumi Run Nov. 22- Dec. 5
- Plans for Christmas Shutdown
- Running 2002

Detector Status

• Frontend- and readout electronic of most components is running
• Lots of activities on **Central DAQ**
  - New Event Builder is under commission

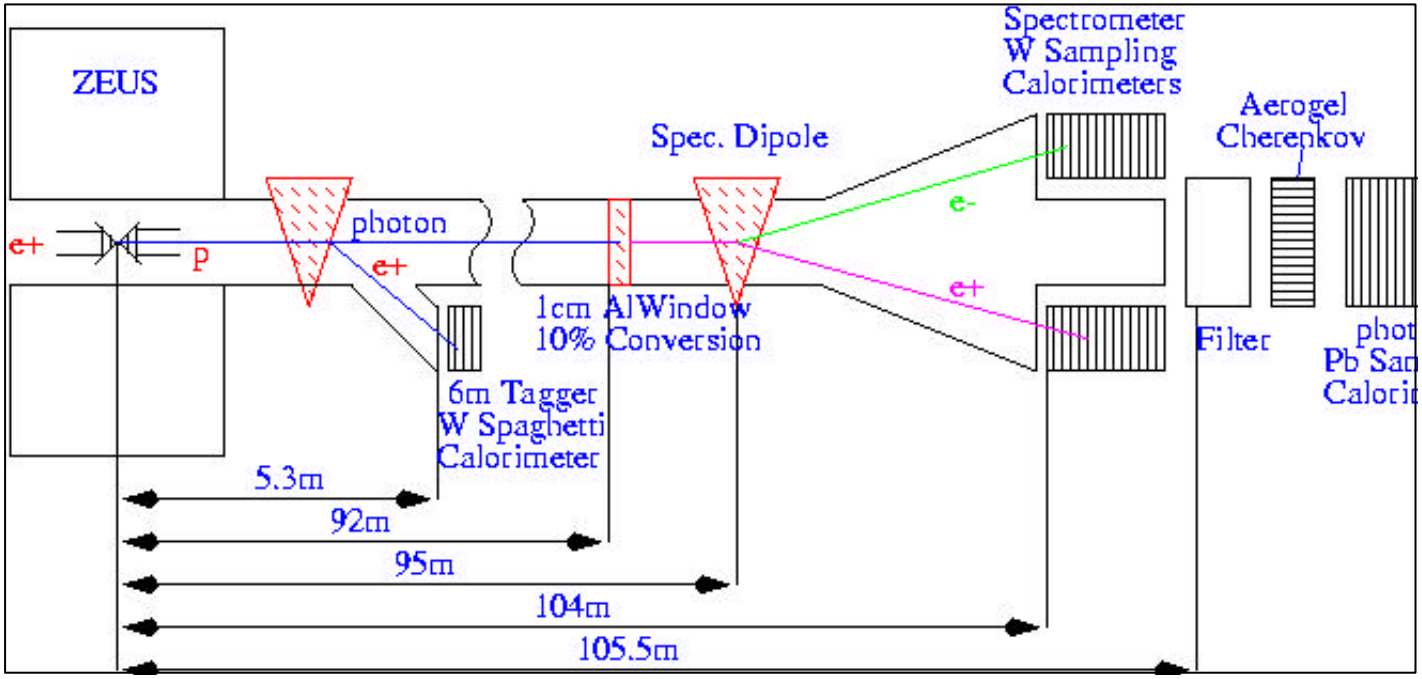
• **Calorimeter**
  - operational, a few electronics problems to be fixed in shutdown

• **Central Drift Chamber**
  - delay of proper gas mixture due to power failure on Nov. 10

• **Silicon Micro Vertex Detector**
  - Hardware ready
  - Main activities on DAQ and monitoring software
    in particular radiation monitoring

• **Straw Tube Tracker**
  - Hardware ready
  - DAQ- and integration tests ongoing,
  - HV frequently on, no background problems

- **Luminosity Monitor**



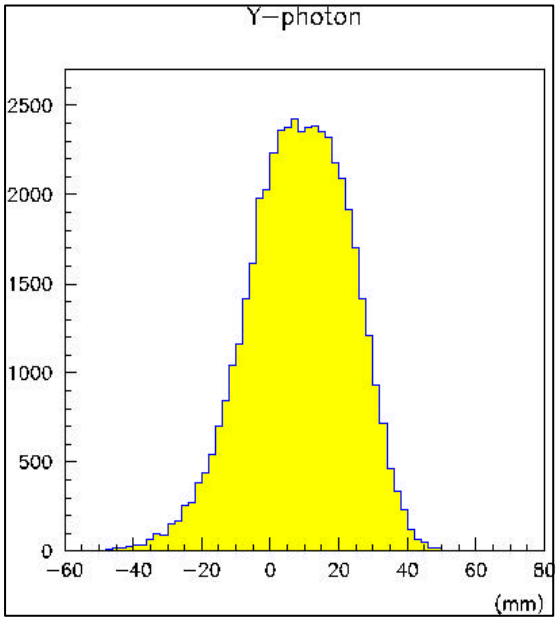
Electronics not yet final – limitations in triggering and precision
Final trigger board with full functionality currently under test

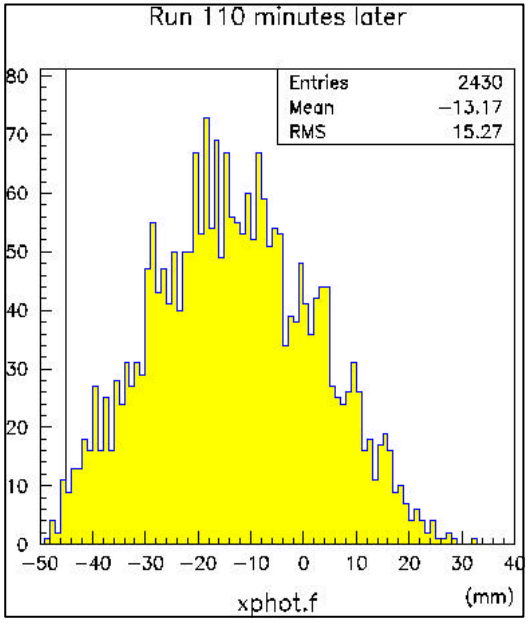
Final Electronic for the tunnel is ready and will be installed during access Nov. 19-21

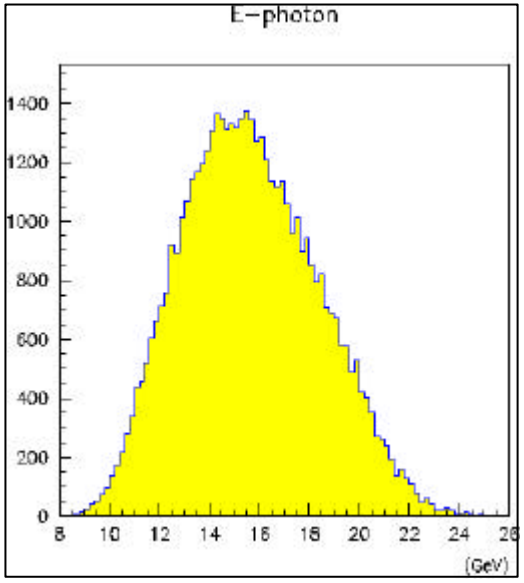
- **Photon Calorimeter** measures luminosity since Oct. 21
  Beam Gas not yet subtracted

• **Spectrometer** is under commision

• photon energy spectrum and beam profiles have been measured



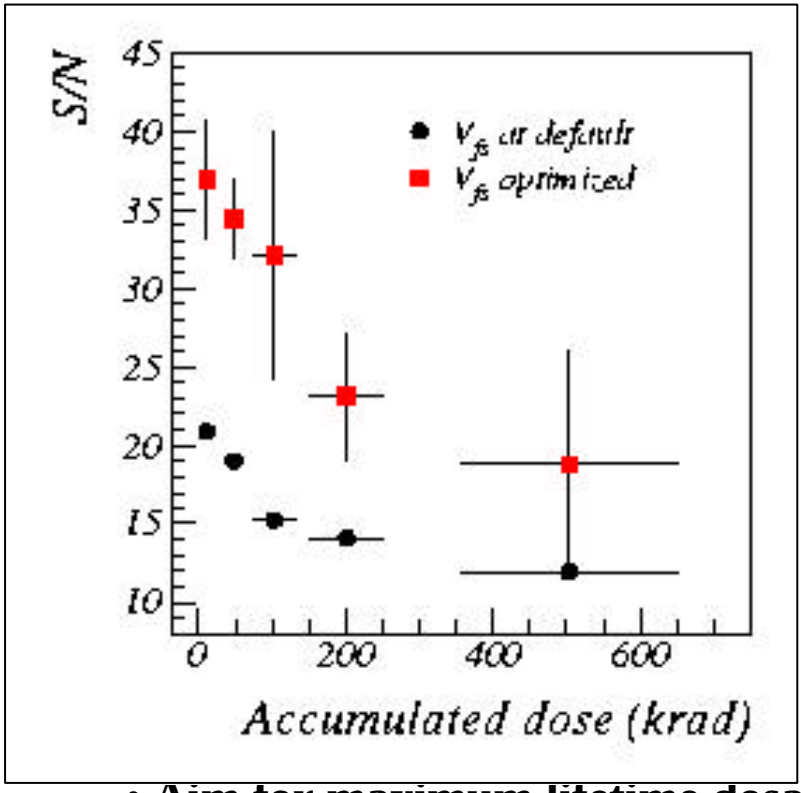


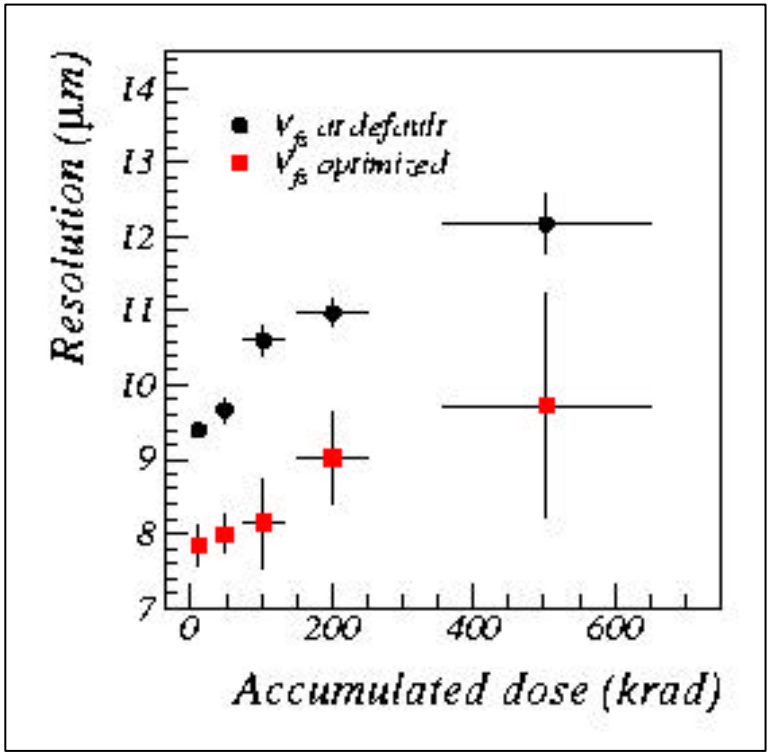


• **6m Electron Tagger** – dummy module with 4 channels is installed
Final detector will be installed during Christmas shutdown

Radiation Monitoring

- ZEUS MVD is radiation tolerant but not radiation hard.
  The Si-Detectors are mainly sensitive to high hadron fluxes.
  The readout electronic is also sensitive to synchrotron radiation
  The Helix readout chip is mounted close to the detector.





- **Aim for maximum lifetime dosage of less than 300 krad**

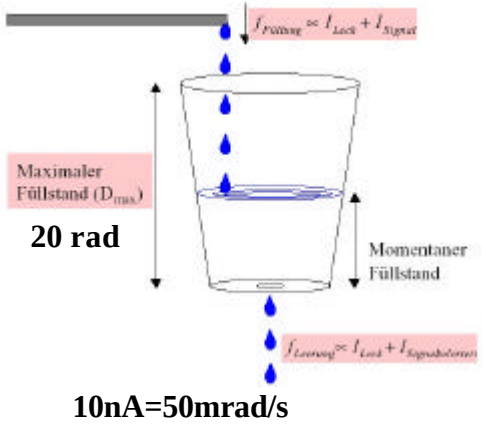
Radiation Monitoring

Three different monitors: 1. Si- Pin diodes 1x1 cm^2 - fast online measurement
2. Radfets - integrating, online read out - slower than 1.
3. TLDs - exchanged and read out every few weeks - need access

Use pin diodes for a fast monitoring system that can create a dump signal

- 16 Diodes mounted in pairs with a piece of W in between
  4 pairs of diodes in the forward region and 4 diodes in the backward region
- Measure the temperature corrected current - **1 nA ° 5mrad/s**

The principle of a leaky bucket is used to create a beam dump signal
For the moment the system tolerates a permanent current of **10nA=50mrad/s** in any diode.
If the current exceeds 10nA the bucket starts to fill. If 2 diodes have received
an integrated dose of **20 rad** the beam dump will be fired.



- **10nA ·1 HERA-Year ° 50mrad/s ·10^7 s = 500 krad**
- This is more than desired lifetime dosage and can only be accepted during machine studies

Radiation Monitoring

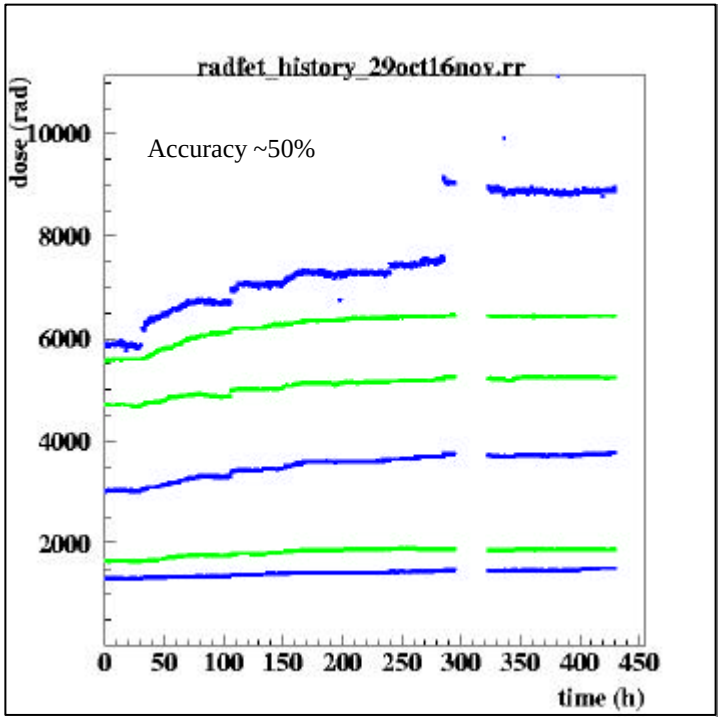
- Since setup on the beam dump would have been triggered 3 times
  Nov. 2 at 22:51, Nov. 4 at 1:20, Nov 8 at 13:12

- The integrated dosage received up to now is ~1 krad from an incident at p-injection
  and ~6 Krad from synchrotron radiation. The radfets and TLDs show similar dosages.

- It is vital for the MVD that the positron current is not increased before the sources
  of the synchrotron radiation are understood.

- High radiation background is regularly
  observed during the e^+ ramp

- The adjustment of the magnet bridges
  hopefully helps



Shutdown Nov. 19-21

South Hall

• Usual repair work at the Calorimeter electronics - frontend readout and trigger
• Exchange photomultiplier bases at the Calorimeter

• Finish repair at the Hadron Electron Separator (HES)

• HERA - Adjustment of the bridge(s)

• Work on the infrastructure of the experiment – cooling, dry air …

Tunnel (South Right)

• Install final electronics for the luminosity monitor
• Survey and adjust of proton beam pipe and calorimeter modules of the spectrometer
• Repairs and modifications on the position monitors at the filters of the calorimeter

Detector will be ready for beam operation on Nov. 21 at 22:00

Luminosity Run Nov. 22 - Dec. 5

Requests

• Background optimization for e^+ ramp and begin of collisions
• Careful background checks before increasing the e^+ current
• Priority w.r.t. beam tuning when we switch on the MVD the first few times with beam

Goals

• Test the new components with beam,
  take data to test the chain from frontend to offline reconstruction
• Test the new components of the central DAQ system and tune their performance

Christmas Shutdown

Open detector Jan 2 to Jan 11
• Change photomultiplier bases of the Calorimeter
• Install e-tagger at 6m to complete luminosity monitoring system
• Repairs as necessary

Running 2002

Priority

• High luminosity and polarisation with electrons
• Switching to electrons in April

Procedure

• As agreed, wait for approx. 1 week of smooth running with average integrated lumi per day larger than last year and spec. luminosities larger than those of HERA I.

• Start necessary preparations now to be ready for switching from April 1 onward

Polarisation

• Positron running: one spin orientation is sufficient
• Electron running: after commissioning, change spin orientation once per month

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Next long Shutdown

• Nothing planned yet
• STT predicted lifetime of reversed connected Ta-capacitors > 5 years