The HERA Polarimeters: Status report

report to the HERA coordination meeting
Monday, 19.11.2001
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POL2000: the four experiments and HERA operate and maintain together the two polarimeters (TPOL and LPOL) for the HERAII run

transverse polarimeter:

installed next to HERA−B
operation in single photon mode
active detector elements:
- calorimeter (since many years)
- position sensitive detector (new)

longitudinal polarimeter:

installed next to HERMES
operation in the multi photon mode
active detector elements:
- calorimeter
- 2. calorimeter with position sensitive detector (new)

Status of the transverse polarimeter

- calorimeter: simple 4−channel sampling calorimeter
  - re−calibrated in CERN testbeam in summer 2001
  - installed in beam September/ October 2001
  - seen first Compton spectra, performance normal
  - for final calibration need higher statistics

- position sensitive detector:
  - 2−plane SI strip detector (CMS chips)
  - detector tested in conjunction with calorimeter in summer 2001 CERN test
  - performance mostly as expected
  - installation of one plane (y) of detector ongoing

- Calibration system:
  - calorimeter: calibration with LED pulse functioning and used
  - installed additional single fiber detector to monitor the calibration of the y−sensor: ongoing
  - calibration scheme sucessfully tested in CERN test beam summer 2001

whats new:
installed preamp in tunnel to boost calo signals: lower noise
new readout system: on the fly pedestal calculations: more stable operation

problems:
delivery problems with CMS chip slowed down production of x−plane
technical problems with readout of x−plane means that ½ of x−plane does not work: will not install x−plane
(no serious problem, only used for operational purposes anyway)

Ready to deliver polarisation numbers, though absolute calibration has still to be established;
can expect some operational problems at the beginning

Longitudinal Polarimeter: Status

- longitudinal polarimeter essentially unchanged from 2000 run
  - commissioned
  - some service work done
  - is available for data

- new sampling calorimeter installed in addition to default one:
  - tested and calibrated in DESY and CERN test beams
  - installed as 2rd calorimeter
  - ready to be used
  - installed in conjunction with fiber position sensitive detector to facilitate the operation
  - potential for smaller systematic errors

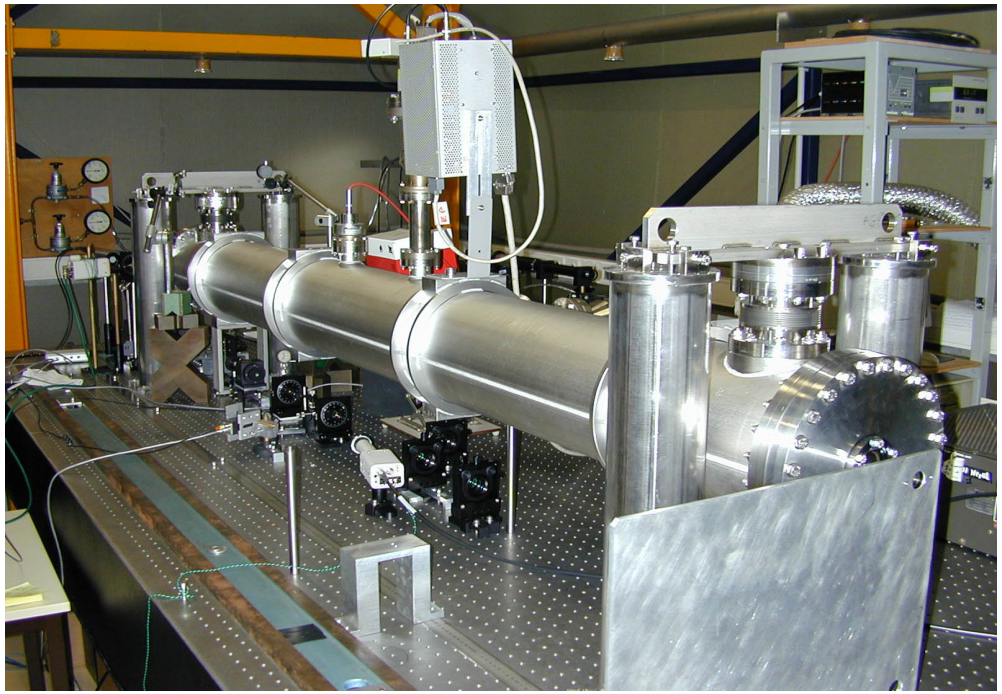
LPOL: ready to deliver polarisation numbers to HERA and the experiments

LPOL upgrade

- the plan:
  - replace the current LPOL laser by a significantly more powerful optical cavity
  - makes fast and precise single bunch measurements of the polarisation possible

- The status
  - cavity: test cavity has been installed in Orsay and is operating.
  - very stable operation, can stay in resonance for long times, little sensitivity to vibrations and the environment

test cavity:
- shorter than the final one
- simpler mechanics
- no "beam pipe"
- realistic mirror support
- realistic optical system and feedback
- measured quality in the cavity: 5000−7000 (wanted: >20000)
- probable cause: dirty mirrors



Plans for LPOL upgrade

- installation of mechanical support, preparation of the area: ongoing
- infrastructure installation: probably during switchover positron − electron
- final installation of the cavity:
  - original plan: April seems very unlikely (problem with manufacterer of mechanics of cavity)
  - will use the access days for staged installation
  - final installation time: depends on the HERA schedule and the next longer access period
  - we hope for a complete installation at the end of 2002

Requests

- TPOL will need the regular maintenance days (probably) for servicing
- We would like to start a discussion on some dedicated pol MD:
  - the new TPOL system should be largely self calibrating
  - it would be very nice and useful if we could cross check this with a rise time calibration
  - this would require some running of HERA with a flat machine
  - we do not yet know how much time we would need (in the past about a few days, but we hope that we can do this faster)
  - we will study −− once the installation is done and the setup works −− how much time is needed and might return to HERA and the experiments with a request for some flat machine running

Summary

TPOL: expected to be ready to deliver a polarization after this shutdown

LPOL: ready to deliver a polarization measurement any time

LPOL upgrade: very nice progress, some problems: hope for complete installation to be ready in one year