Polarimeter Group Status Report

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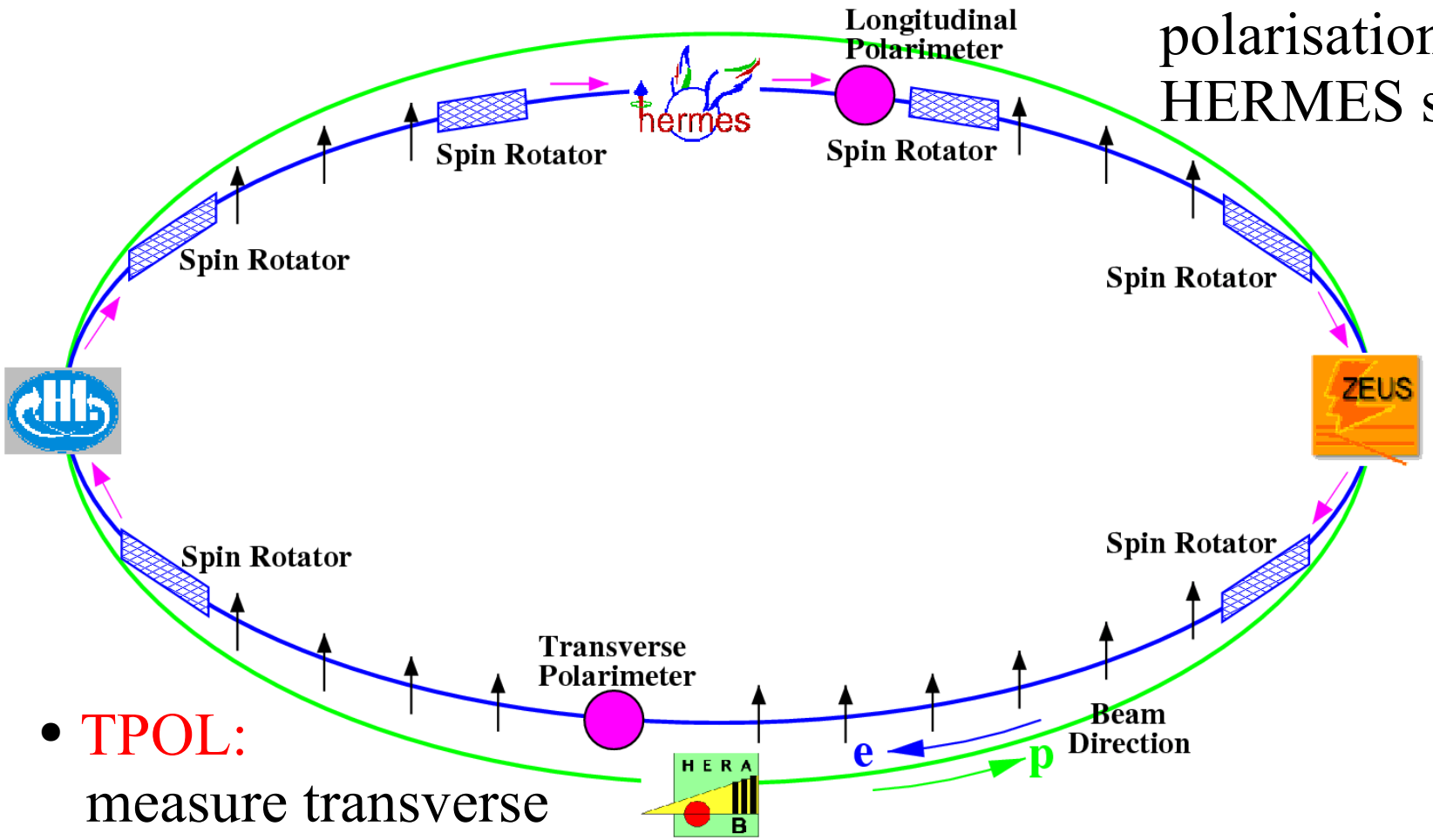
Technical Plenary
H1 Collaboration Meeting
21/9/05

- LPOL, TPOL, Cavity LPOL Status
- LPOL/TPOL ratio problems
- Fibre calorimeter installation

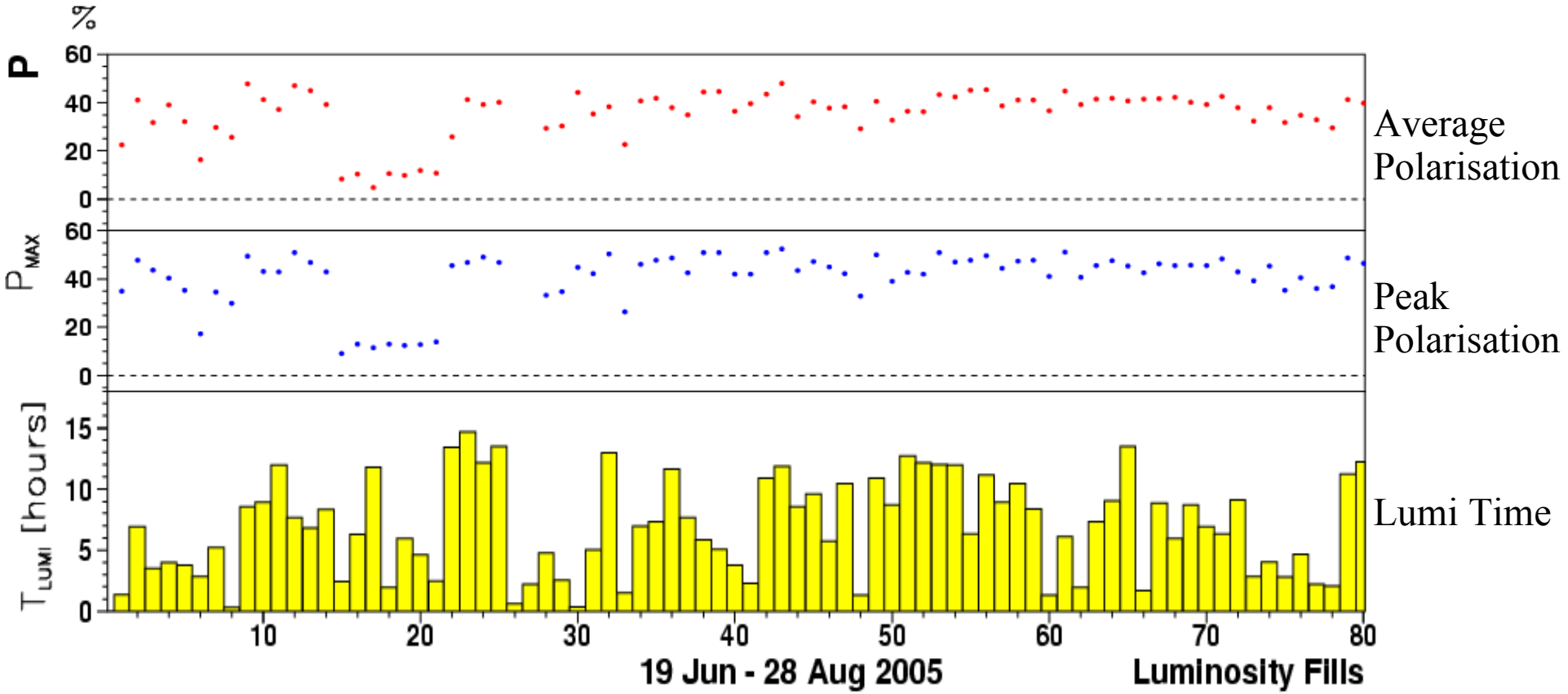
Reminder

- LPOL + LPOL Cavity: measure longitudinal polarisation between HERMES spin rotators



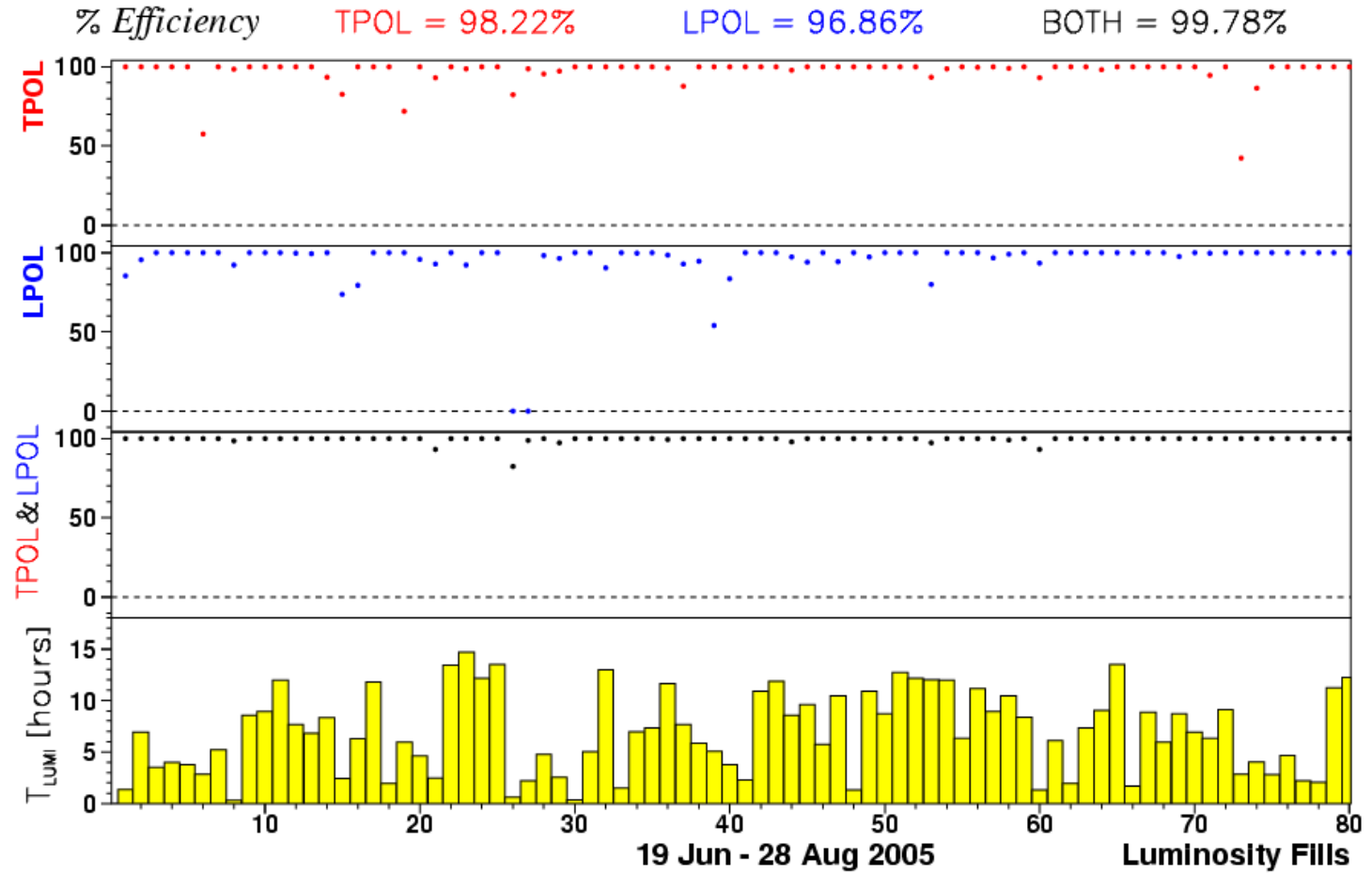
- TPOL: measure transverse polarisation far from spin rotators

Delivered Polarisation



- Generally good polarisation from HERA:
  - 1/7 – 11/7: low pol. due to change in HERA tune (mirror→normal)
  - Afterwards good polarisation delivered (~40%)
  - Helicity flip on 7th Sept – polarisation still not optimal

Polarimeter Performance

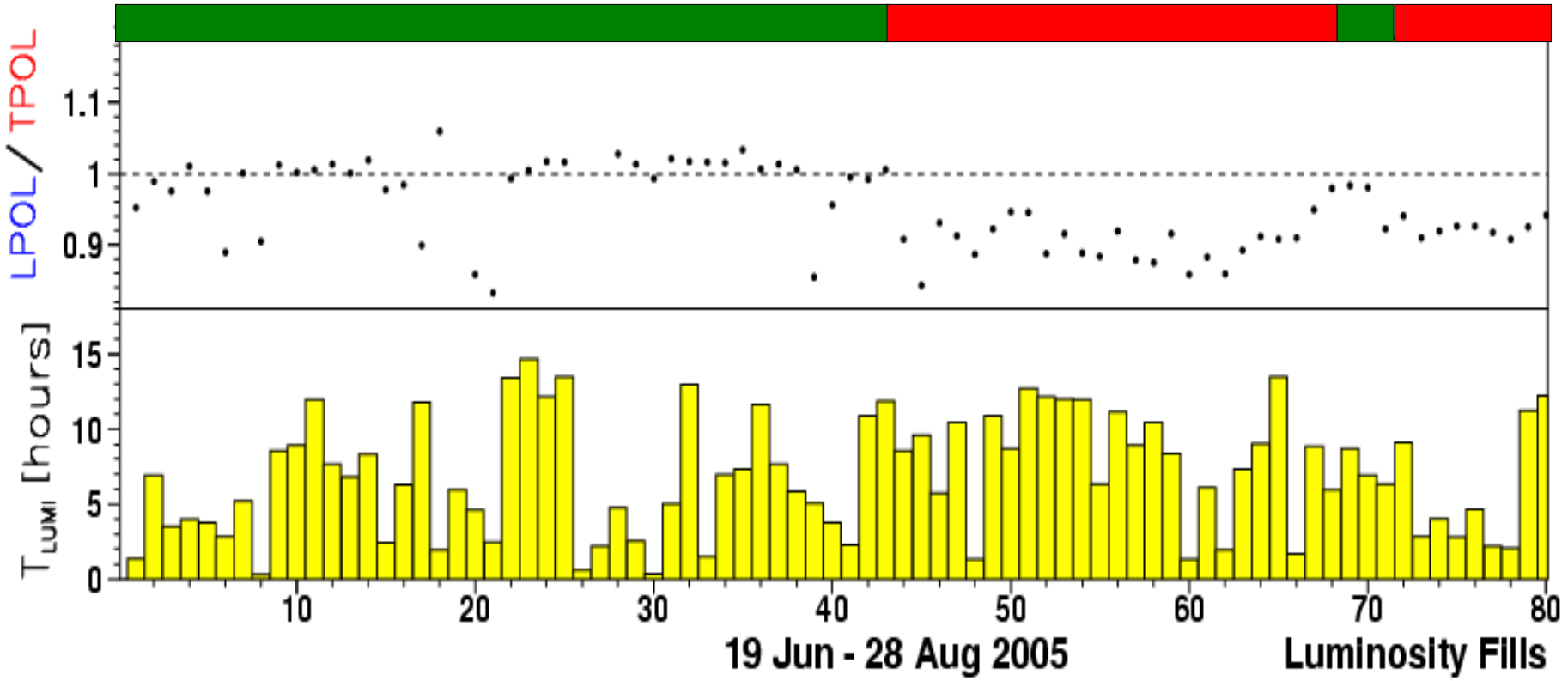


- No significant hardware problems since last collaboration meeting, overall smooth operation
- LPOL: time for systematic studies, cavity and calo studies
- TPOL: time for cooling problems, change of laser tube

Combined efficiency = 99.8% => polarimeters working efficiently

The Bad News: LPOL/TPOL Ratio

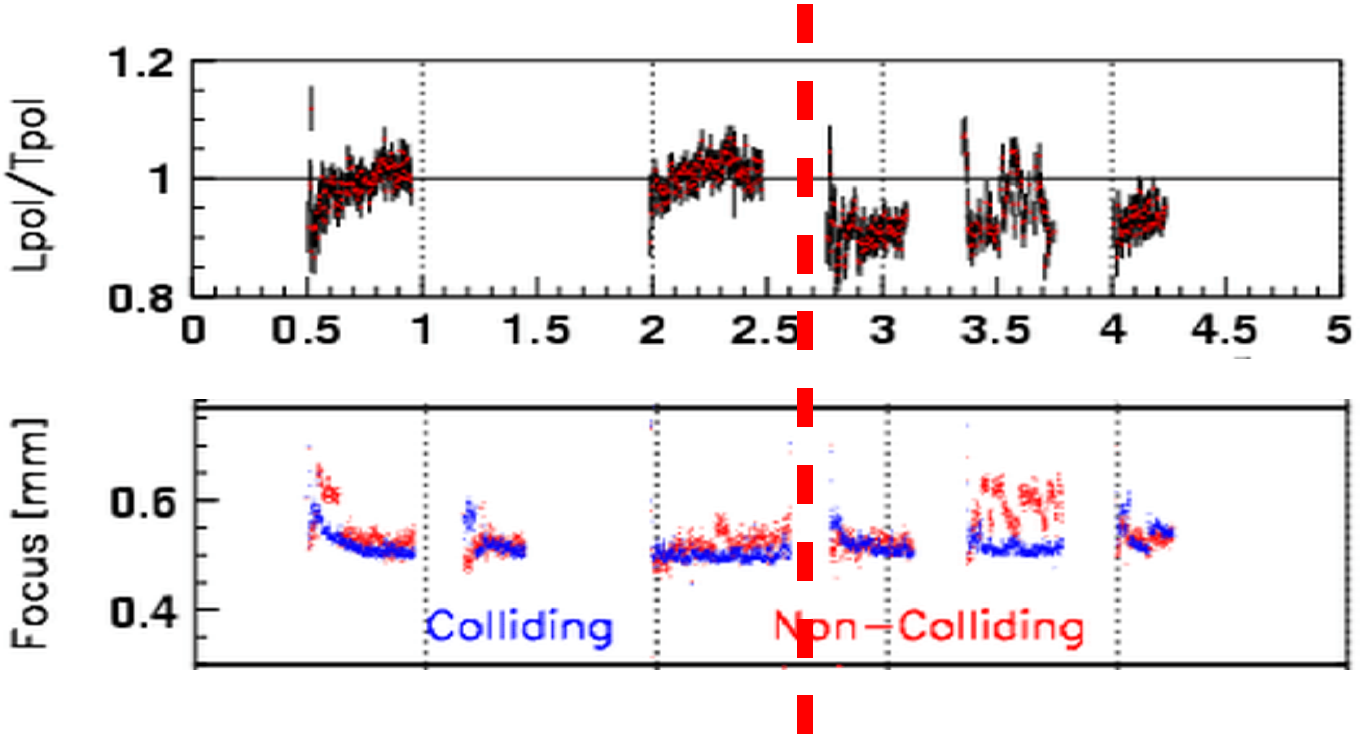
- 2nd August: observe 'jump' in LPOL/TPOL ratio (~1.0 → ~0.9)
- Apart from brief period on 21/8, ratio remains at ~0.9



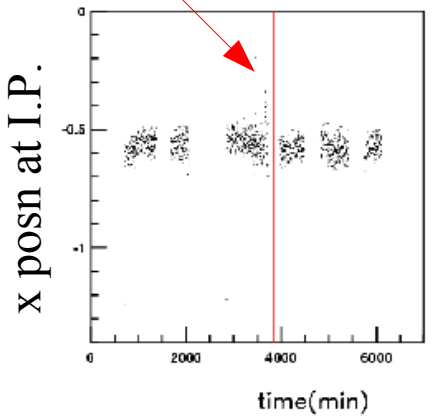
- Many checks by both LPOL and TPOL groups haven't shown any obvious problems

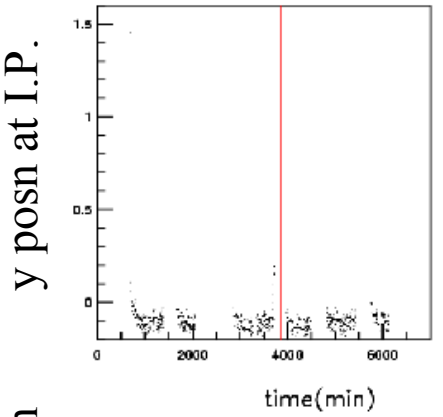
LPOL/TPOL ratio: TPOL

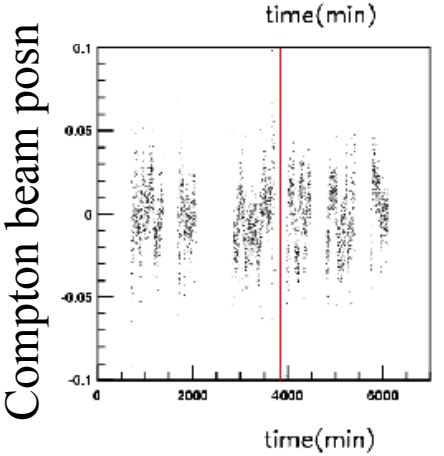
- Stable operation and calibration of TPOL
- No indication of abnormal beam parameters
- No indication of hardware or software problems



Change in LPOL/TPOL

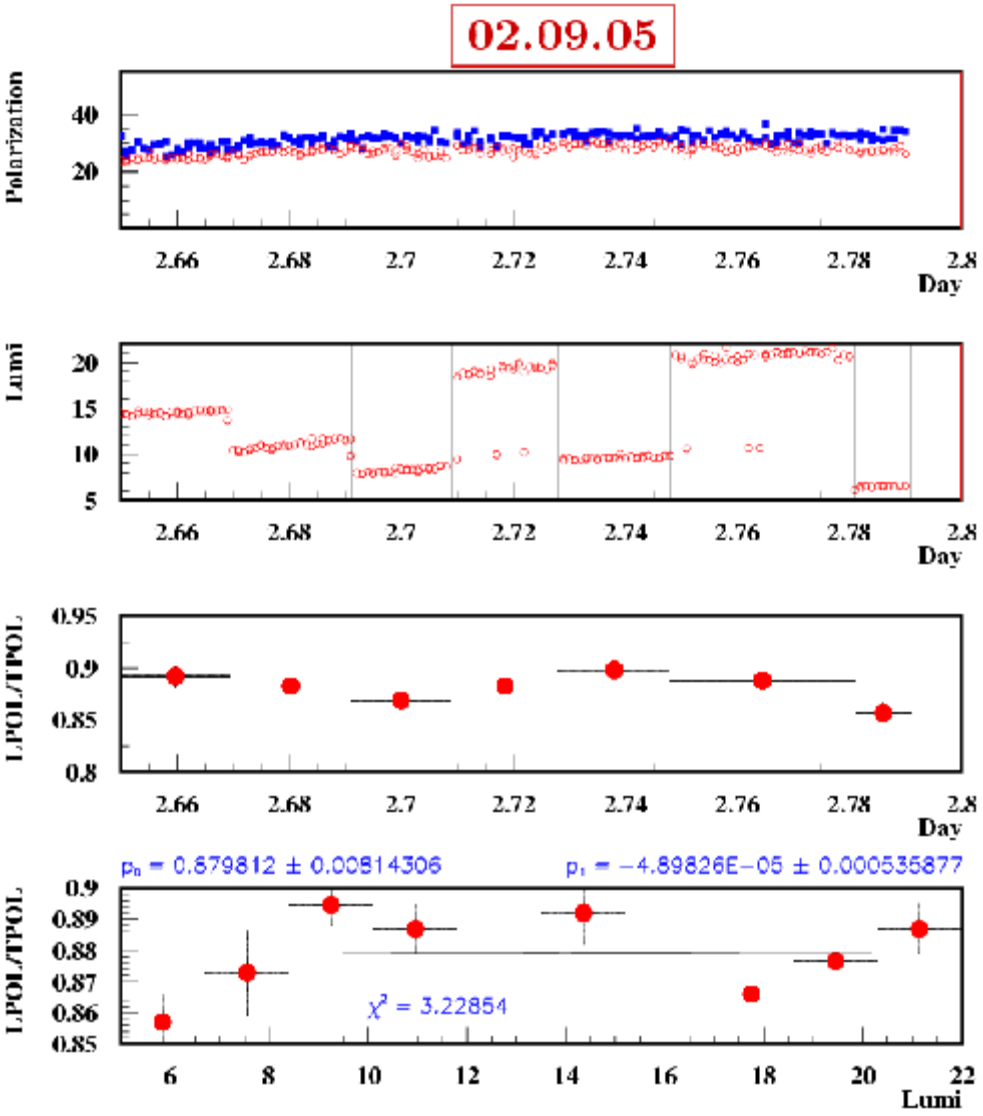






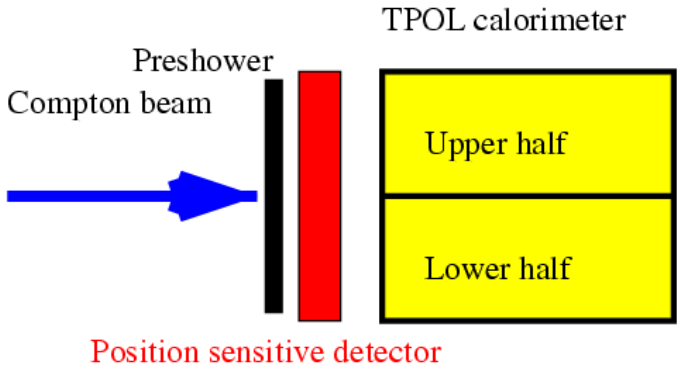
LPOL/TPOL Ratio: LPOL

- Many checks made to verify the LPOL performance:
  - Optics: understood and fixed reason for low luminosity
  - Checked alignment, re-surveyed calo in tunnel
  - Checked performance of calo → no problem found
- Radiation damage to sandwich calo observed
  - Repaired, reinstalled 14/9

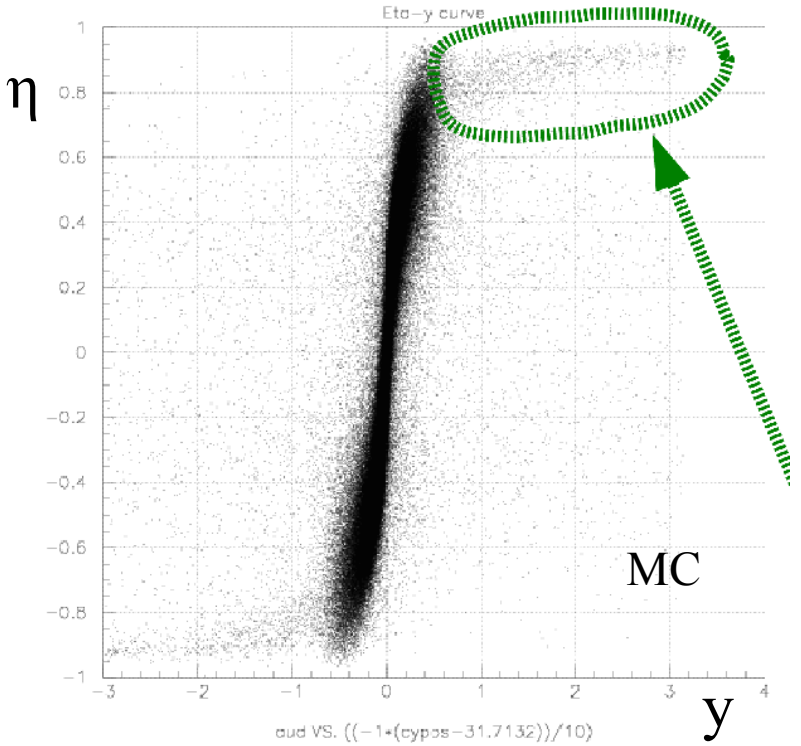


- No 'smoking gun' to explain jump in LPOL/TPOL ratio

TPOL Position Scans

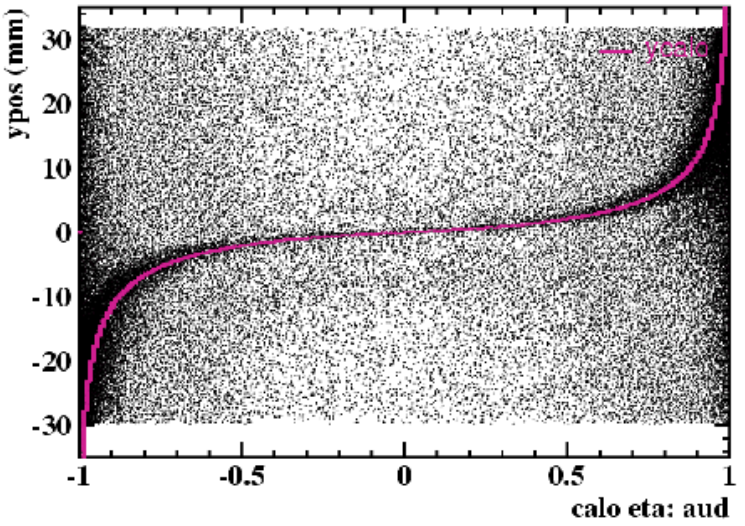


$$\eta = \frac{E_{up} - E_{down}}{E_{up} + E_{down}}$$



- New systematic studies made:
- Preliminary total TPOL sys error = 3.25% (cf. previous quoted 3.5%)
- Main errors: fitting range of η-y (2%), calo miscallibration (2%)
- MC Studies show possible to get events at high y

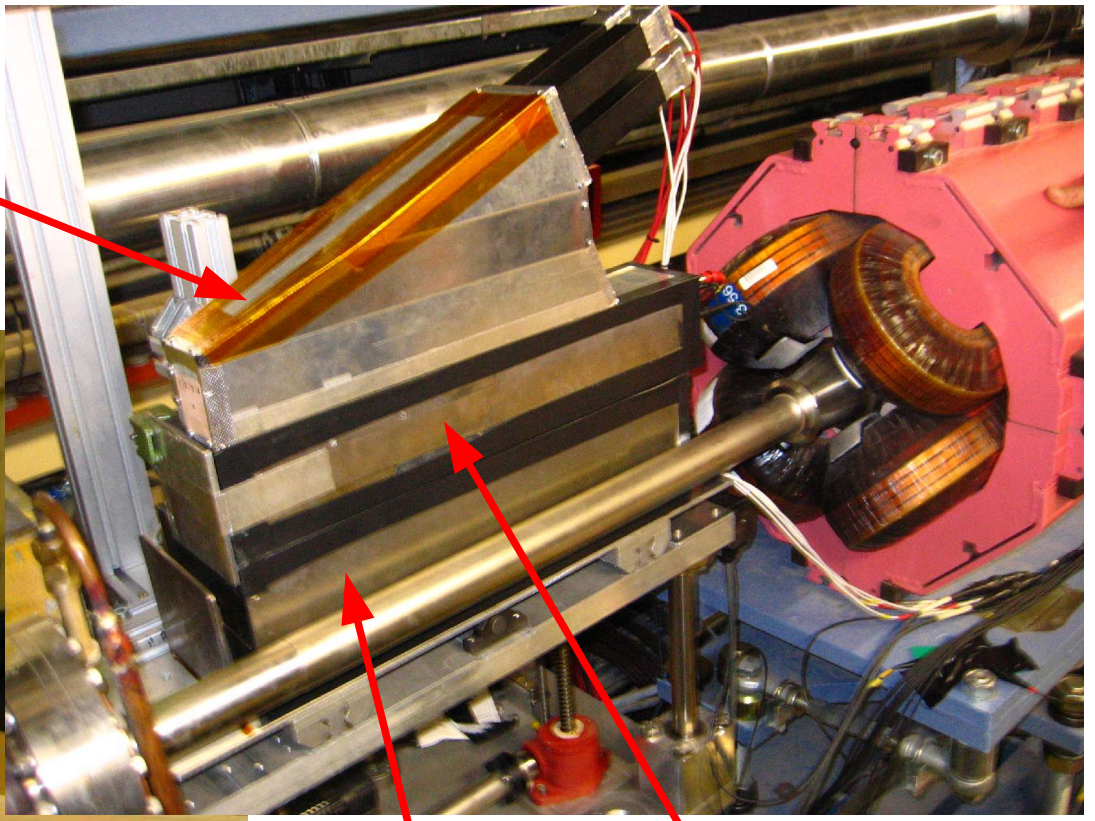
  → new table scan data out to higher y values, hope to decrease fit sys error

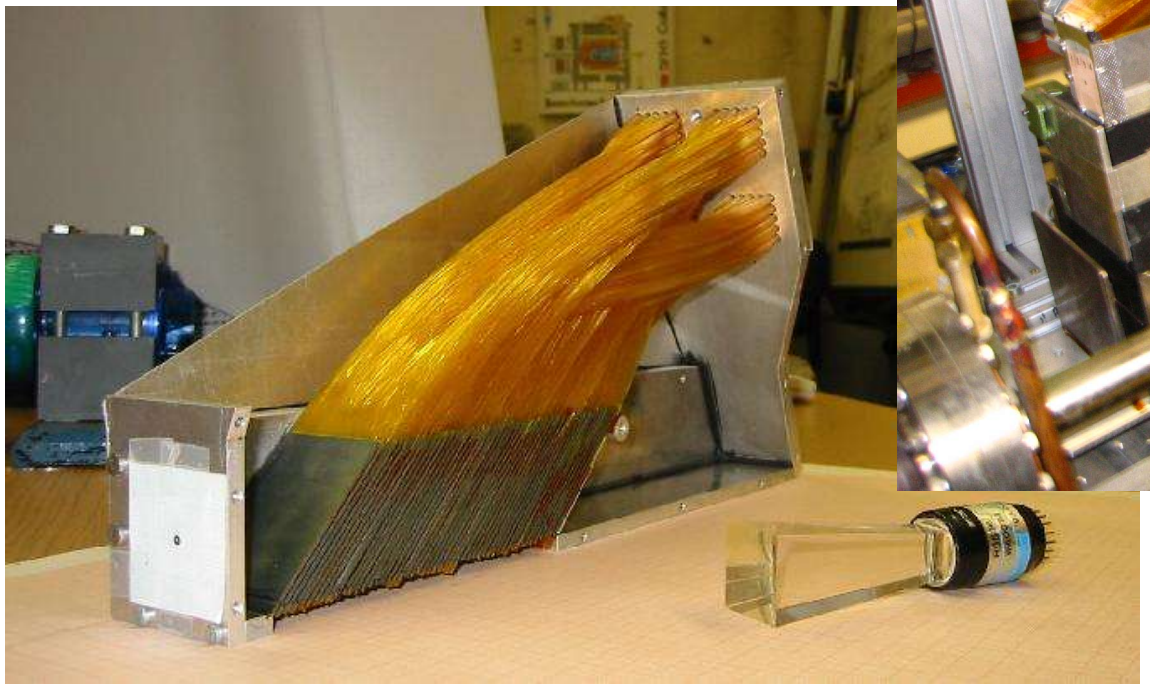


LPOL Cavity

- Improved locking during beam conditions
  - Monitoring diode changed
- New Fibre Calo installed
- Problems solved with driver card in tunnel
  - Change sum channel offset, noise reduced
- DAQ PC Crash
  - PC replaced, re-installing DAQ software
- Unsuccessful attempt to measure Comptons (30/6)
  - problems with steering bump near cavity I.P.?
- Plan cavity tests/commissioning for extended time, multiple fills before shut down

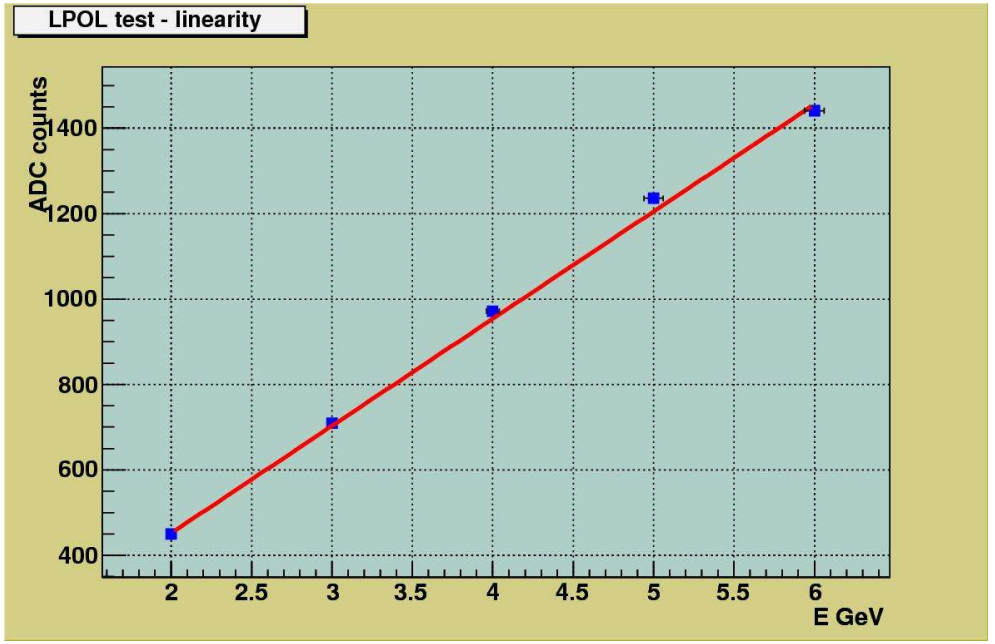
Fibre Calorimeter

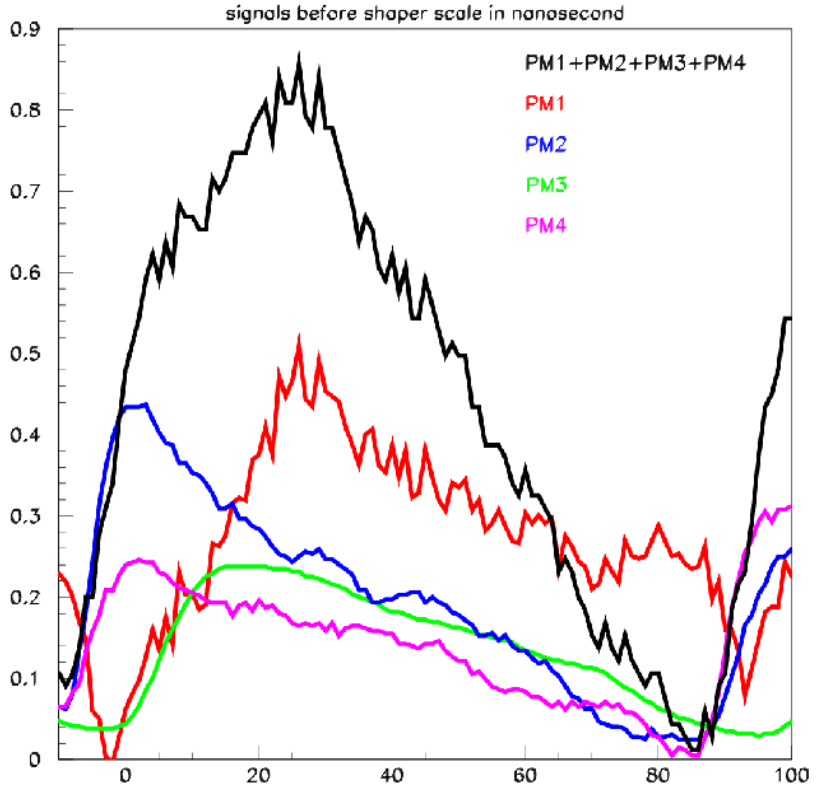




- Construction completed at end of June (P. Smirnov)
- Measurements in DESY test beam
- Installation (OR 107m) during July 6th maintenance day

Fibre Calorimeter





- Measurements in DESY test beam (P. Smirnov, Y. Soloviev)
- Linear response, but test beam lower than 12 GeV compton edge

- First measurements in HERA beam (Beckingham, Baudrand)
- Still need another data taking run to optimise timing
- Measure brems spectra, then comptons

Conclusions

- Smooth running of both LPOL and TPOL with no major hardware problems
  - LPOL&TPOL Efficiency = 99.8%
- However, LPOL/TPOL ratio jumped down to ~90%
- Extensive studies from both LPOL and TPOL groups:
  - No obvious problems or solution found
  - Studies still ongoing
- Fibre calo installed in HERA tunnel
  - First Spectra taken
- Plan for more extended cavity tests/commissioning before shutdown