

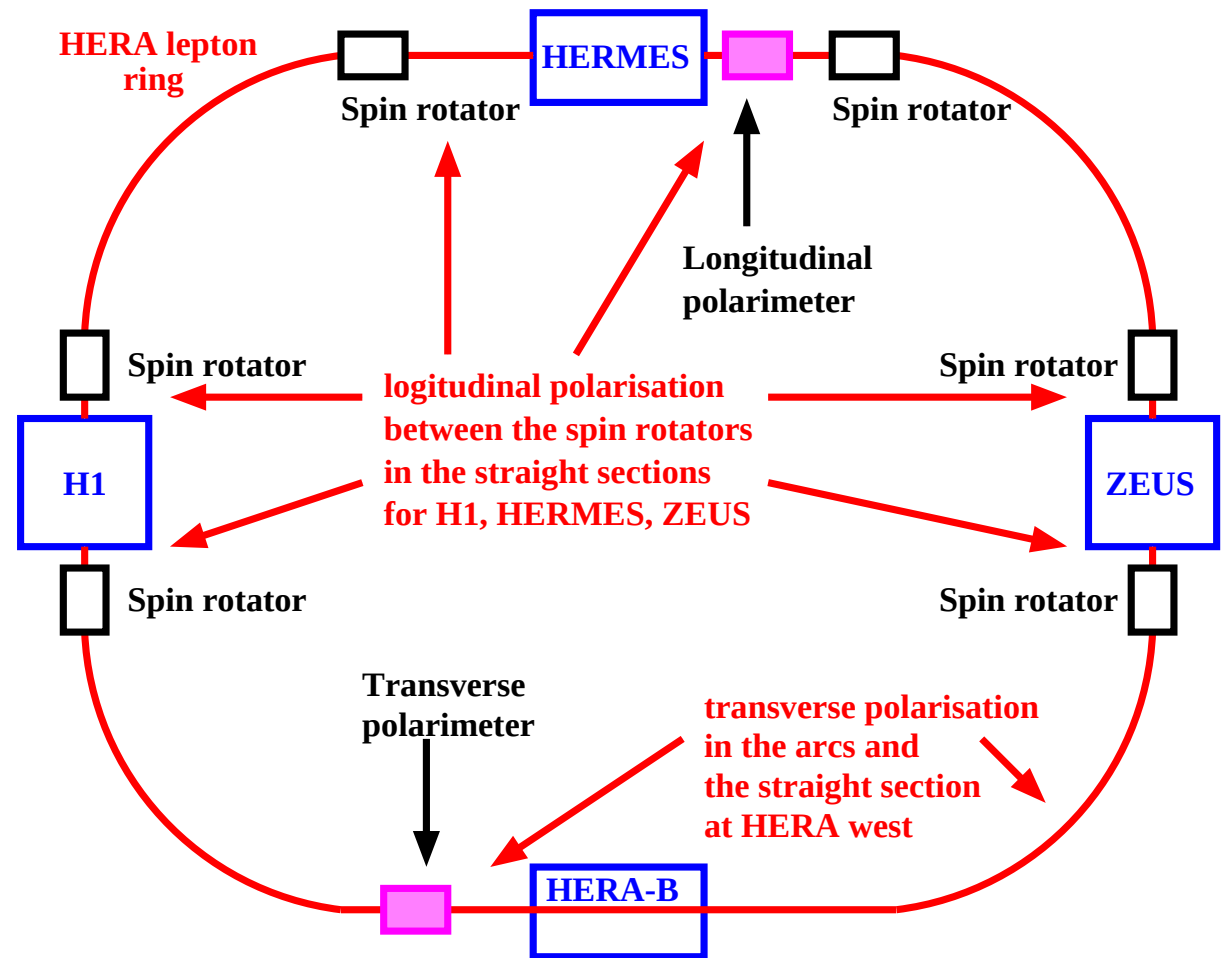
Stefan Schmitt, POL2000 group
HERA funding agencies meeting
November 5, 2002

The HERA polarimeters status and plans for 2003

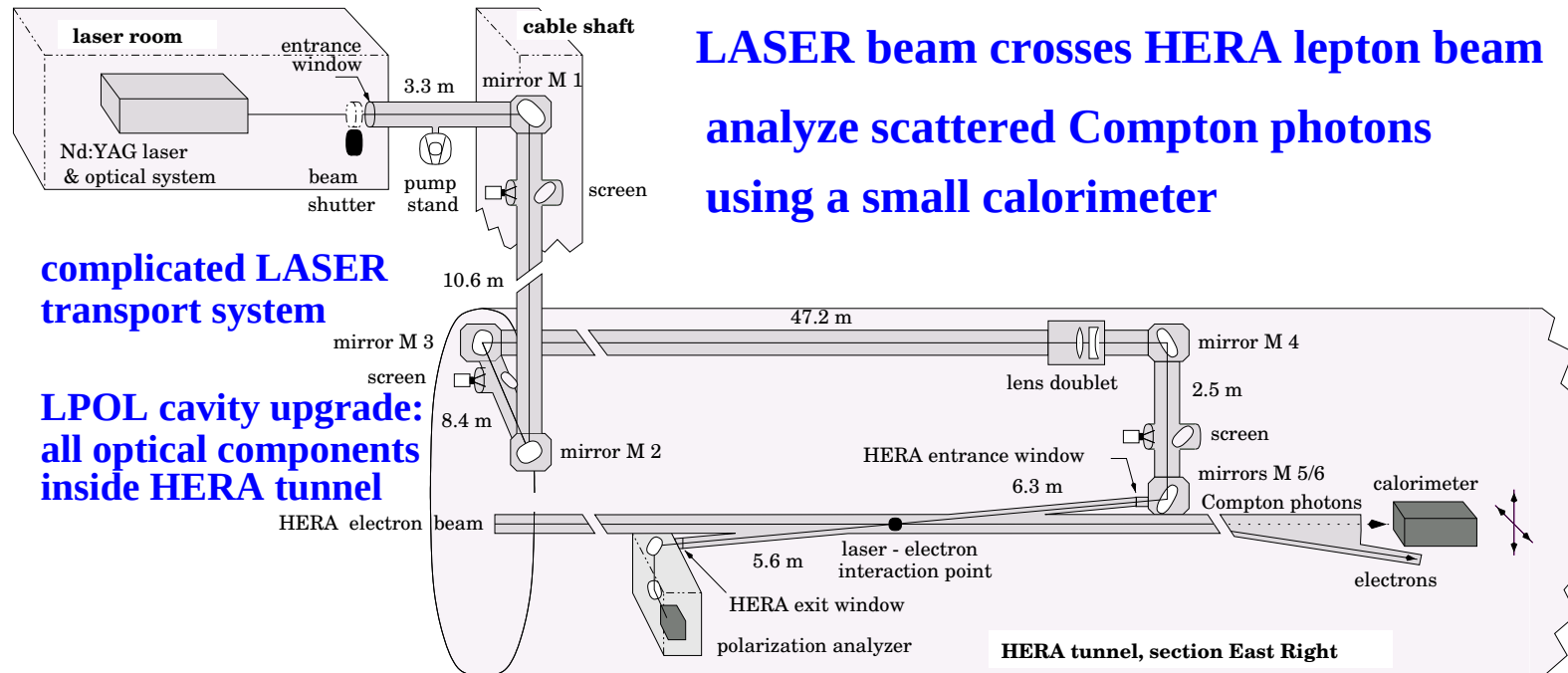
- Polarimeter status
- Longitudinal polarimeter: LASER cavity upgrade
- Transverse polarimeter: upgrade projects

Polarization and polarimeters at HERA

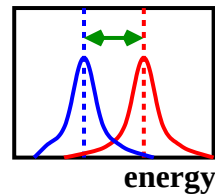
- Transverse polarimeter (TPOL) is located near HERA-B
- Longitudinal polarimeter (LPOL) is located between HERMES spin rotator



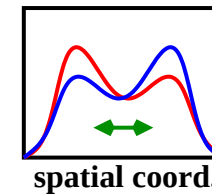
Polarimeter setup (LPOL)



**LPOL: measure
energy asymmetry
between left/right
circular LASER light**

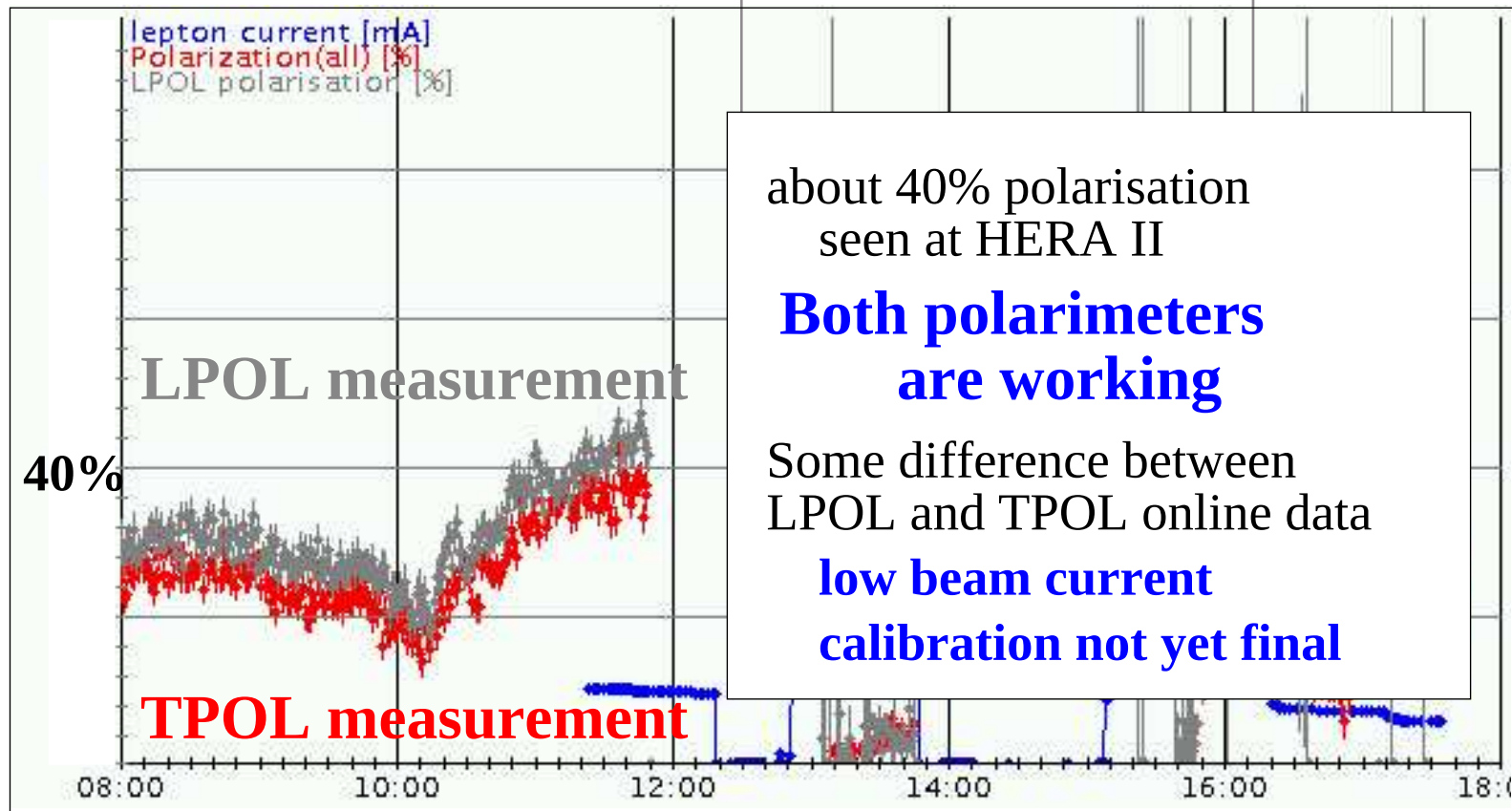


**TPOL: measure
spatial asymmetry
between left/right
circular LASER light**

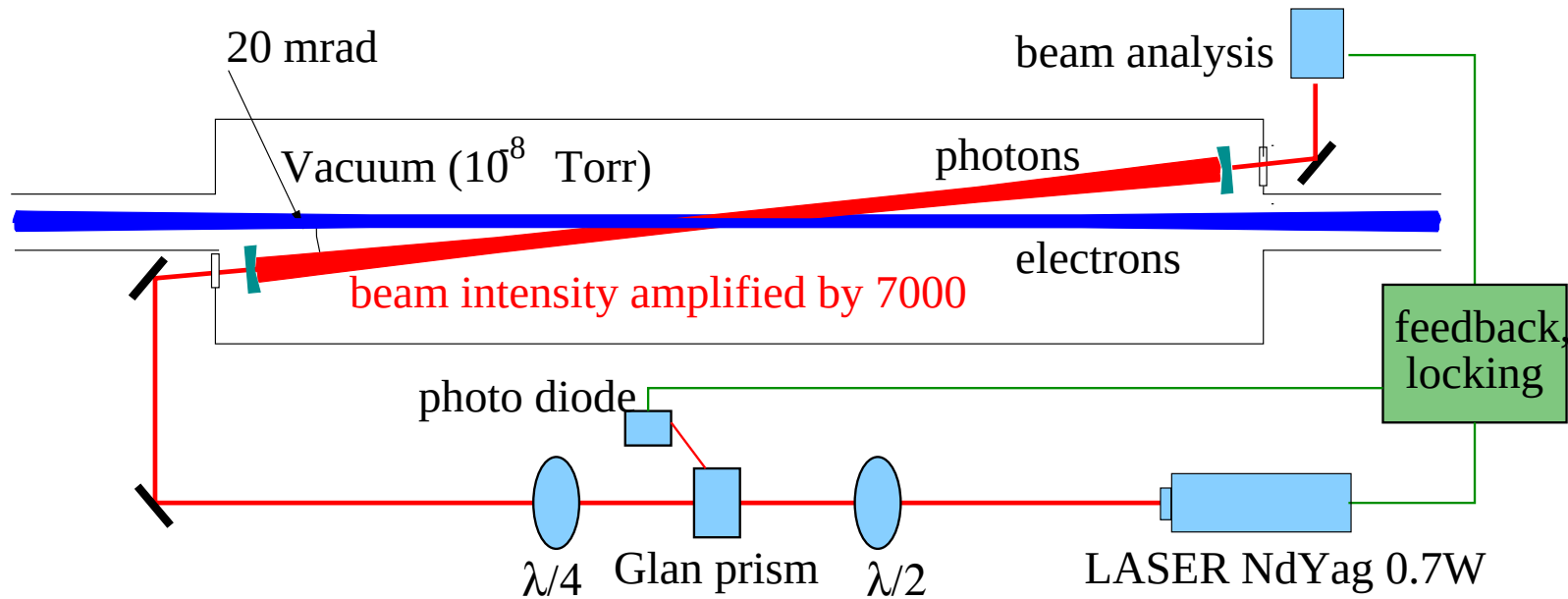


Polarimeter status

Polarimeter online display

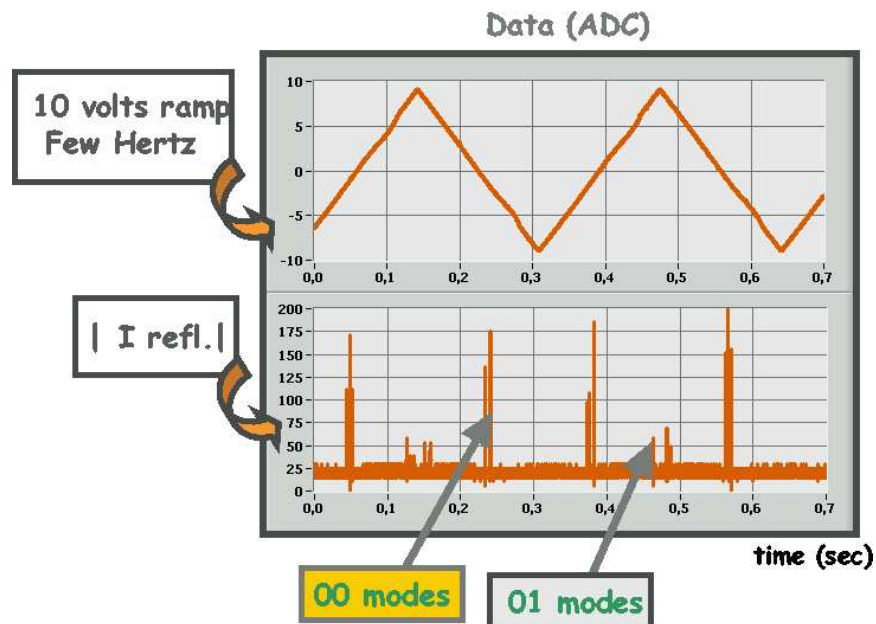


LPOL cavity upgrade



- LASER with 0.7 W intensity is amplified in a Fabry-Perot cavity
Increase probability for Compton scattering
- Similar cavity is operational at CEBAF
- HERA cavity being build by ECP (Orsay)

LPOL cavity upgrade: test cavity results

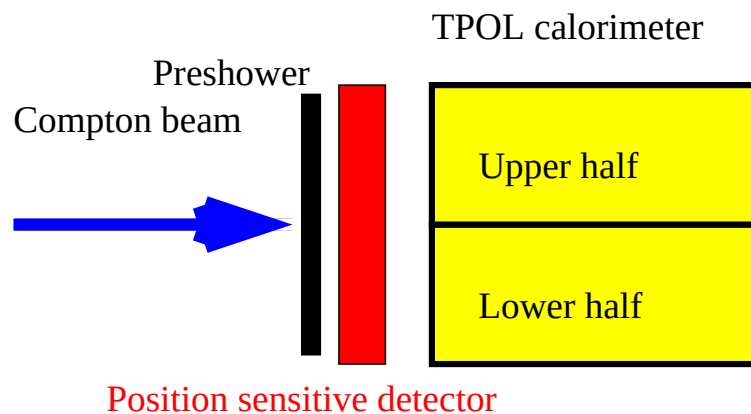


- Test cavity well understood
gain factor of 3000 was reached
- Final device being tested now
- Installation at HERA in 2003
shutdown
- Establish regular operation in
summer/autumn 2003

Feedback electronics and locking procedure working well
Light polarisation measurement understood to 0.1% accuracy

Aim for uncertainty $\Delta P/P < 1\%$ per bunch per min

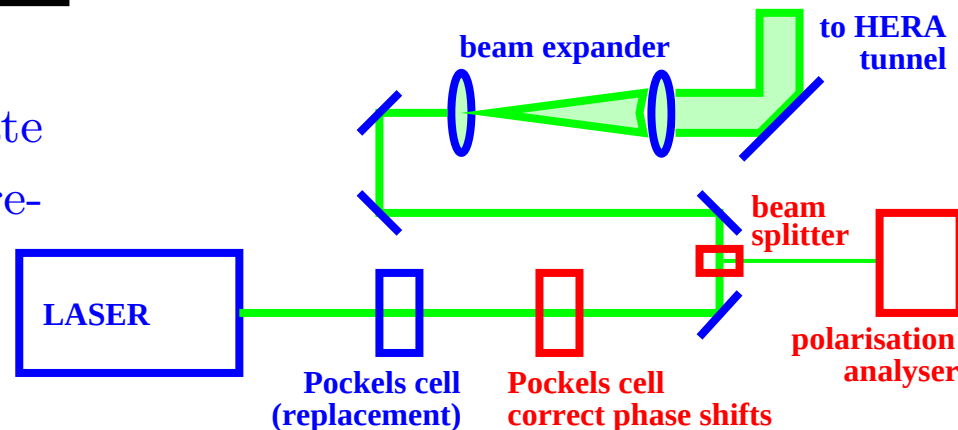
TPOL upgrade projects



- Silicon detector to calibrate calorimeter position measurement
- Built by IC London and Tokyo Met. Univ.
- Analysis is ongoing

TPOL optics repair/upgrade

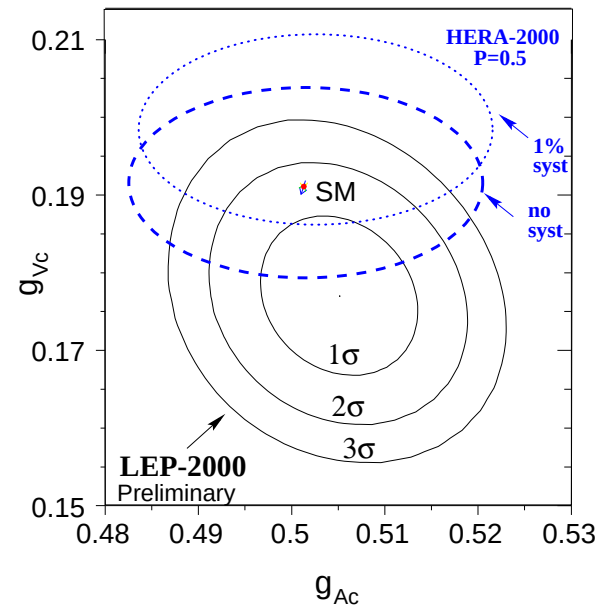
- Replace Pockel's cell
- Add second Pockel's cell
- Improve light-pol. monitoring



Aim for $\approx 1\%$ systematic uncertainty

Summary

- Both HERA polarimeters are ready to measure polarization
- Ongoing upgrade projects to improve statistical and systematic uncertainties
- LPOL cavity: measure single bunch polarization with 1% accuracy per minute
- TPOL: reduce systematic uncertainties to 1%
(statistical precision limited to 1% per minute averaged over all bunches)



Precision polarization
data is essential for
HERA II measurements
(e.g. electroweak couplings)