

# Systematic Analysis Efforts in the LPOL Group

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LPOL Group

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# Overview

Laser Repair

Systematic Uncertainty

Offline Re-analysis

Offline Monitoring

Manpower

# Laser Repair

## What was done

- ▶ Nd:YAG rod replaced → higher efficiency
- ▶ Spatial filter old → multiple mode interference
- ▶ Second harmonic generation crystal replaced

## Possible effects

- ▶ Pulse time profile may be caused by spatial filter
- ▶ Beam shape improved
- ▶ Intensity higher

## Measurements

- ▶ No change in laser polarization
- ▶ Not measured electron polarization yet

# Systematic Uncertainty

## Periodic studies, when hardware allows

- ▶ Laser polarization stable and symmetric for L and R
- ▶ Laser intensity, PMT high voltage do not affect measurement
- ▶ Beam position and slope at interaction point
- ▶ Artificial deviations of calorimeter alignment: no effect
- ▶ Agreement between crystal and sampling calorimeters
- ▶ No false asymmetries with unpolarized laser ( $< 0.5\%$ )
- ▶ Visual inspection calorimeter on access days

## Planned for low- $E$ proton run (most importantly)

- ▶ Beam position and slope at interaction point

No reason to assume higher systematic uncertainty than quoted.

# Offline Re-analysis

## Noise correction

- ▶ 100 ns delayed signal is subtracted from signal
- ▶ Delayed signal in different ADC channel: different pedestal
- ▶ Difference pedestals determined during Laser OFF
- ▶ Laser ON introduces some noise

## Ongoing analysis

- ▶ Each noise correction turned off, one by one
- ▶ Polarization evaluated without noise corrections
- ▶ Evolution of size of corrections

Never seen any large effect from noise correction (only on resolution), no reason to expect any now. . .

# Offline Monitoring

## Suspicious events

- ▶ Jumps in ratio LPOL/TPOL
- ▶ Sudden increase in LPOL uncertainty

## Ongoing analysis

- ▶ Online spectra reconstructed every 5 minutes
- ▶ Look for changes in mean and width

Not very flexible, slow and large.

# Manpower

## Involvement (at the moment, not contract, indicative)

- ▶ Avetik: 33.3333... % LPOL (mostly hardware, online, phone)
- ▶ Riccardo: 35% LPOL (hardware, offline, online, phone)
- ▶ Wouter: 5% (writing thesis, phone)

## Some others related to LPOL

- ▶ Beni: leaving in two weeks

If someone will do all of the previous, it will be Avetik and Riccardo, in between Hermes data analysis, release reports,...