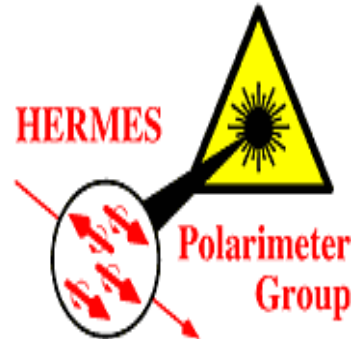


Reorganisation of LPOL Data

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-
- New Format for Data Storage
 - How to Process Data in New Format
 - Analysis Output
 - Conclusions and Future Plans
-

New Format for Data Storage

One set of files per HERMES run

ZEBRA FZ files

PAW hbook file

Raw Data
 -- Lpol Adc/Triggers
 -- E-beam bunch curr.

Slow Data
 -- P-beam bunch curr.
 -- Laser beam vars
 -- E-beam X pos/slope
 -- E-beam Y pos/slope
 -- Calorimeter X/Y
 -- Calo PMT HV
 -- Laser Optics
 -- Pockels Cell
 -- Online TPOL
 -- Online LPOL

μDST files
 -- Target status

Ntuple



Data Blocks

Files location:

[pol2000@h1repro7] /x03/data/lpol/RAW/2006/

● Program Lponl now runs over HBOOKs instead of FZ files
 ⇒ basic code modifications affect data input processing only

● Processing "LPOL Data" and "MDM Data" var. blocks provides same results as obtained by processing original FZ files

● Non-HERMES user has now easy access to raw data
 ⇒ PAW

● Analysis code now not-linked to specific HERMES libraries as ADAMO

How to Process Data in New Format

● Use STD (modified) analysis program Lponl

⇒ `exe: pol2000@h1repro7:/x03/data/lpol/ANALYSIS`

⇒ `source: pol2000@h1repro7:/x03/data/lpol/ANALYSIS_CODE`

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● How?

⇒ [pol2000@h1repro7] /x03/data/lpol/ANALYSIS \$./lponl

THIS IS PROGRAM lponl V3.0 February 09 RUNNING

=====

LPONL: ERROR! CMD line args should be provided!

=====

Online help is dumped

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=====

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=====

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⇒ ./lponl -polcut -boff 12 -c 20000 -fz <files_list>

→ -polcut: set $P = 0$ if $\delta P > P/2$

→ -boff XX: bunch nr. shift while trigger reaches laser, laser fires, and IP is reached

→ -c 20000: perform calibrations each 20K events (≈ 2 min)

Analysis Output

- **New HBOOKs (e.g., offline_lpol_001.hbook) generated each 5000 events in current working dir**
- **Output file for.12 from laser profile fit dumped**
⇒ **see output from MINUIT**
- **User can perform analysis of correlation between several relevant variables:**
 - **LPOL Polarisation values (diff methods)**
 - **Fit parameters**
 - **Calorimeter ADCs**
 - **Compton Beam (Lumi/position/..)**
 - **...**

Overview of the Offline Data Tables

● How to access the generated offline (per-minute level) data?

⇒ hi/file 1 <LPOL hbook> 4096

⇒ do not forget to set the 4096 words per record

● All tables are NOW synchronized: same Unix timestamp of LPOL measurement

● How does the file look like?

```
X rfabbri@Antares:...0/pol2000_01.04.09 <3>
[pol2000@h1repro7] /x03/data/lpol/ANALYSIS $ paw
*****
*          W E L C O M E   to   P A W          *
*          Version 2.14/04      12 January 2004  *
*          *          *          *          *
*****
Workstation type (?=HELP) <CR>=1 :
Version 1.29/04 of HIGZ started
*** No default PAWLOGON file "/afs/desy.de/user/p/pol2000/.,pawlogon.kumac" found
d
PAW > hi/file 1 offline_lpol_001.hbook 4096
PAW > nt/list

==> Directory :
      10 (N)  LPOL
      11 (N)  FIT
      12 (N)  ADC
      13 (N)  COMPT
PAW > □
```

The Offline LPOL Data Table

● Polarisation calculated using different methods

LpolTimeStart	Unixstamp of meas. start
LpolTimeStamp	(Start-Stop)/2. Unixstamp
LpolRun	HERMES run (≈ 640 Mb data)
LpolPol/LpoldPol	Pol/Error value (%)
LpolPol35	Pol using Trigger 35
LpolPol_SJW	Separate jitter Corr for each trig
LpolPol_NoJW	No jitter correction
LpolPol_NoCW	No bunch-current weight
LpolPol_ADC	Use bunch-ADC weight
LpolPol_No96	No ADC-corr of 96ns delayed line
LpolPol_NoLC	No corr from laser HF noise
LpolPol_NoDel	Take ped from undelayed line (LasOff/BunON)
LpolTPOL	TPOL (not yet)
LpolPol_Mean	Use ADC: $\langle RawSig \rangle - \langle MeanBg \rangle$

The Offline FIT Data Table

Variables relevant to the ADC vs jitter fit

LpolDelayOffset(35)	Laser delay offset with STD (35) Trigger
LpolChi2Fit(35)	Fit χ^2 using STD (35) Trigger
LpolFitParNorm/LpolFitdParNorm	Height of ADC profile (plus error)
LpolFitParPos	Timing of max ADC (plus error)
LpolFitParWid	Distrib width (plus error)
LpolFitParSkew	Skewness (plus error)
LpolFitParLwid	Skewness (plus error)
LpolFitParNorm35/...	Fit parameters/errors using Trigger 35
LpolJitMaxSig	Max signal in distribution
LpolJitMaxSigTime	Timing for max signal in distribution
LpolJitMaxStatTime	Timing for max of statistics
LpolJitMinTime	Timing of lowest bin
LpolJitMaxTime	Timing of highest bin
LpolJitMaxSig35/...	Distribution parameters using Trigger 35

The Offline ADC Data Table

● Mean variables relevant to ADCs (PMT lines)

AdcMPMT1p/2p/3p/4p	Mean pedestal in line 1/2/3/4
AdcSMPMT1p/...	Mean error for pedestal in line 1/2/3/4
AdcMPMT1p_96/...	Mean pedestal in 96ns delayed line 1/2/3/4
AdcSMPMT1p_96/...	Mean error for pedestal in 96ns delayed line 1/2/3/4
AdcMPMT1l/...	Mean ADC for laser HF noise (laser On/ Bunch OFF)
AdcSMPMT1l/...	ADC Mean error for laser HF noise (laser On/ Bunch OFF)
AdcMPMT1l_96/...	Laser noise in 96ns delayed line
AdcSMPMT1l_96/...	Error for mean laser noise in 96ns delayed line
AdcPMT1_s/...	Slope of undelayed vs delayed line linear correlation
AdcPMT1_o/...	Offset of undelayed vs delayed line linear correlation

The Offline COMPT Data Table

● Mean variables relevant to Comptons

LpoiMeanX/Y	<i>x</i> and <i>y</i> coordinate of reconstrcute Compton centroid in calo (trig3 + trig35)
LpoiMeanX3/Y3	<i>x</i> and <i>y</i> coordinate of reconstrcute Compton centroid in calo for trigger 3
LpoiMeanX35/Y35	<i>x</i> and <i>y</i> coordinate of reconstrcute Compton centroid in calo for trigger 35
LpoiNormCalo	Luminosity normalised to the current
LpoiMCaloSum	Luminosity: jitter corrected Mean ADC sum
LpoiEnReso	Energy resolution
LpoiNormCaloNoJC	Luminosity normalised to the current without jitter correction
LpoiMCaloSumNoJC	Luminosity: Mean ADC sum not correct for laser jitter
LpoiEnResoNoJC	Energy resolution without correcting for laser jitter

Conclusions and Future Plans

- **LPOL data reorganization for offline analysis LPOL data on going**
 - ⇒ 40/46K runs processed for 2006 data
 - ⇒ data from different sources combined into common HBOOK files
- **LPOL analysis code (Lponl) can now calculate polarisation from new files**
 - ⇒ code available in h1repro7 machine
 - ⇒ code tested and working
 - ⇒ Code/documentation on-going
 - this and following presentations (please, provide feedback)
 - LPOL-related thesis on h1repro7.desy.de:/x03/data/lpol/DOCU
 - commenting the analysis code: done in most of subroutines
- **Implementation of remaining variables features in analysis code on going**