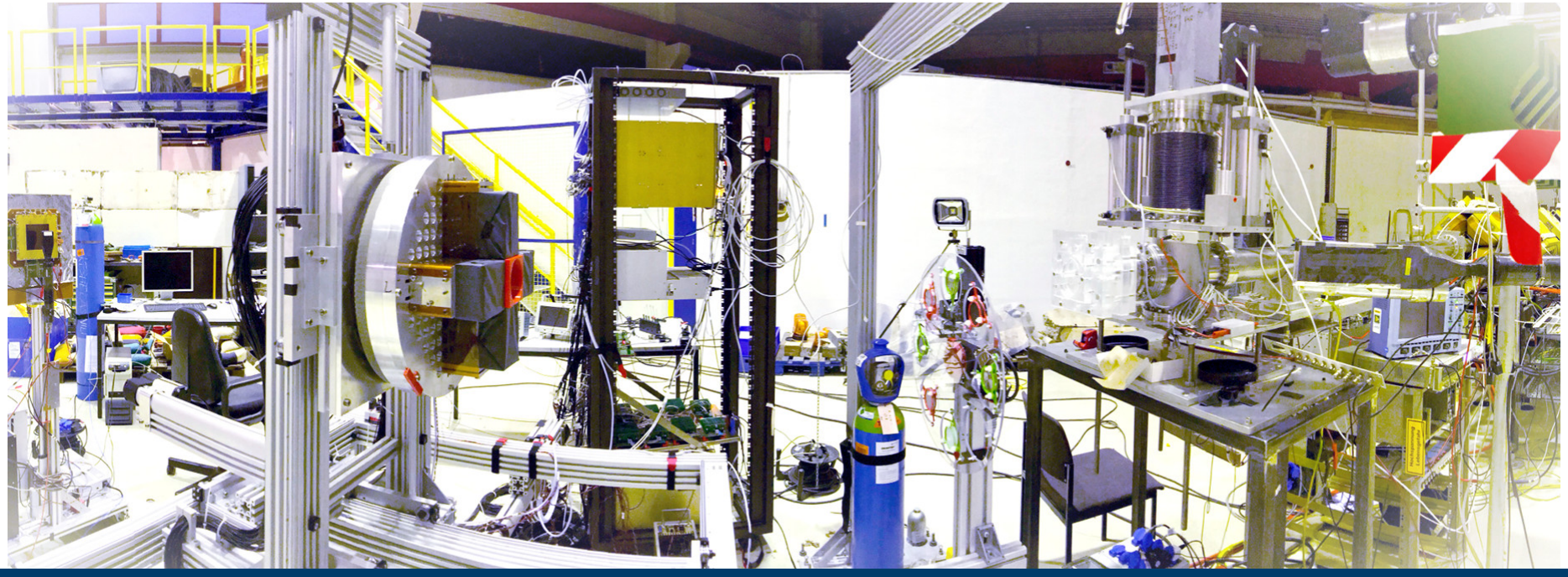


TOWARDS EDM POLARIMETRY

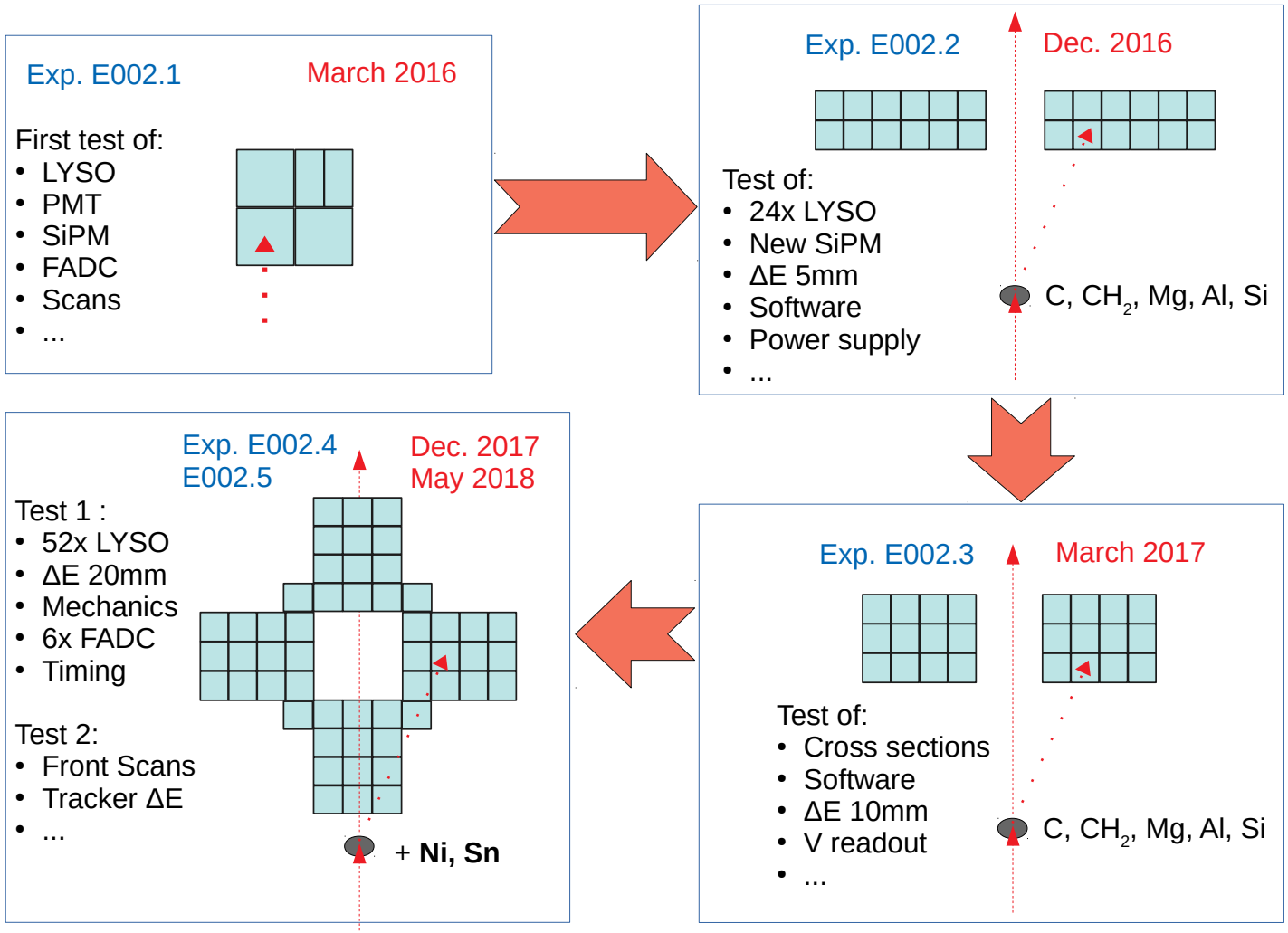
Spokespersons: I. Keshelashvili, D. Mchedlishvili, B. Lorentz

CBAC 2019 #9 | Exp. No.: E002.6

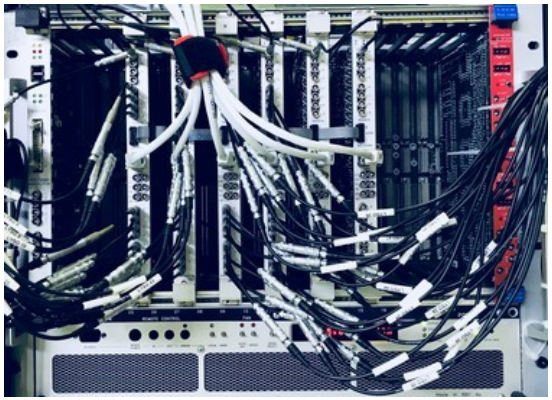
January 14th, 2019 | Irakli Keshelashvili | IKP-2

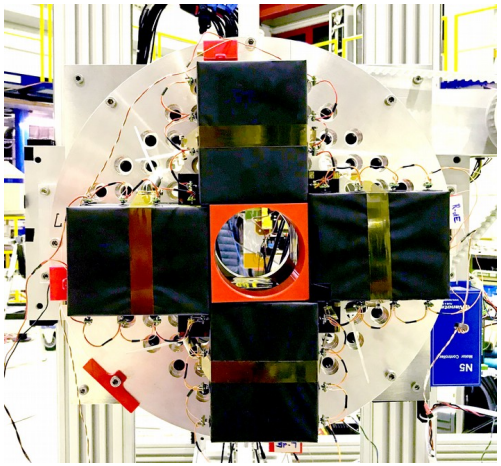
OVERVIEW

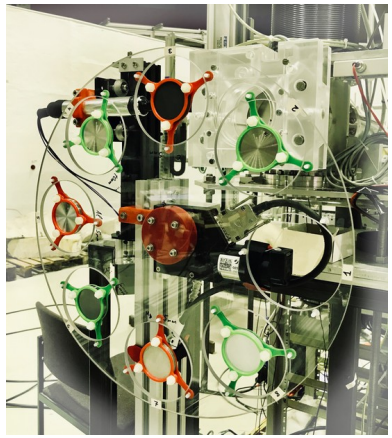
Steps & achievements up to now

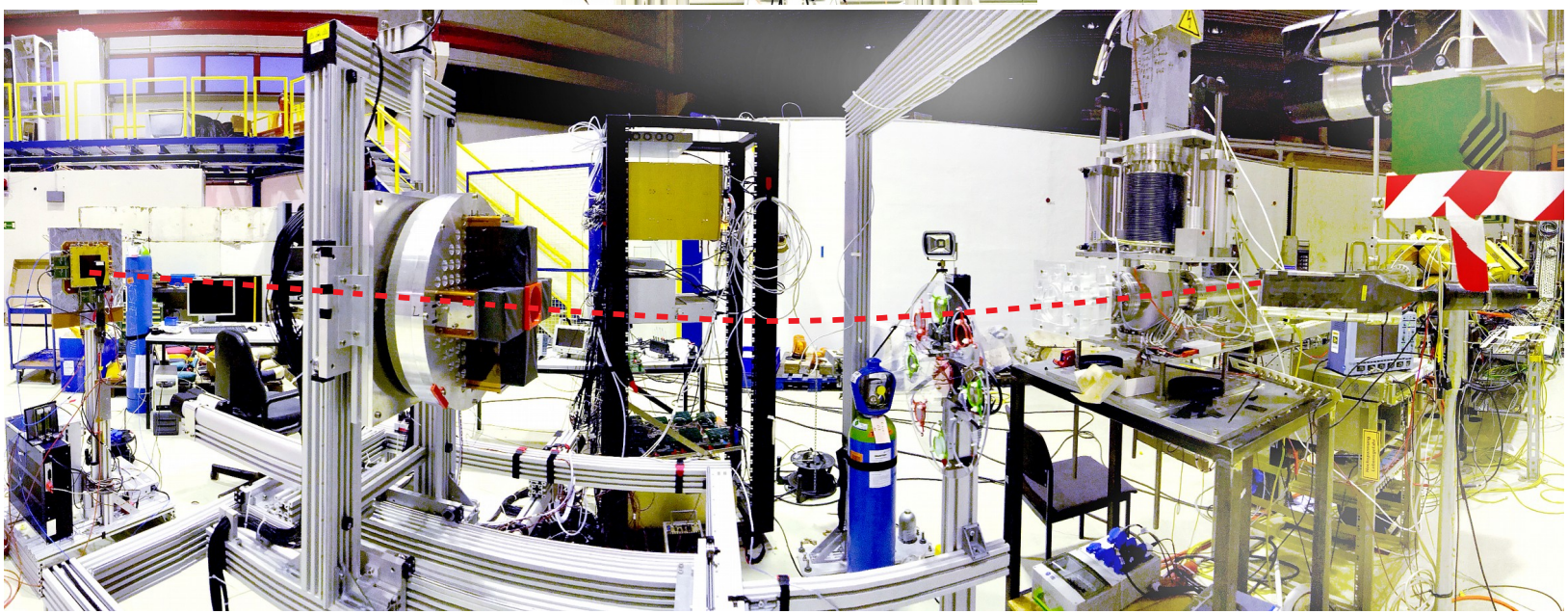


BIG KARL EXP. HALL

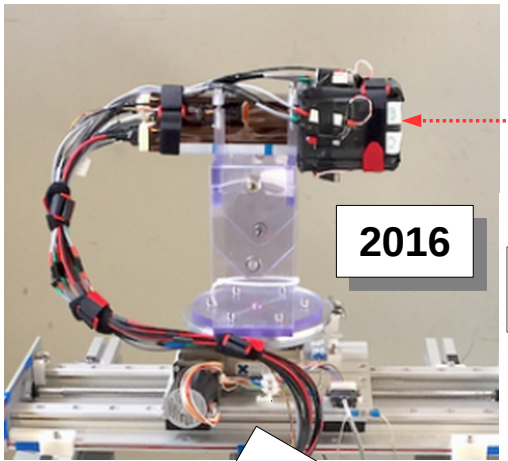




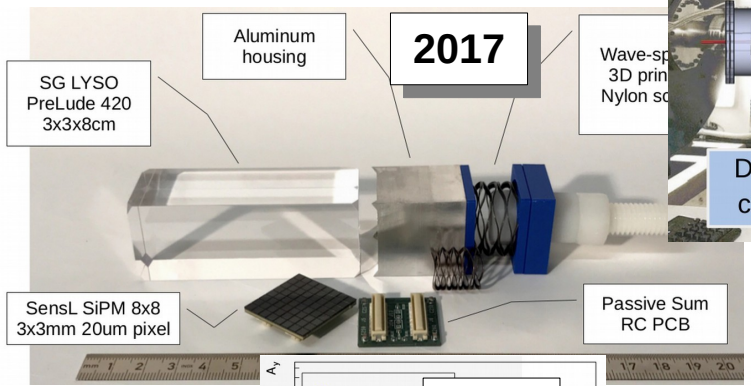


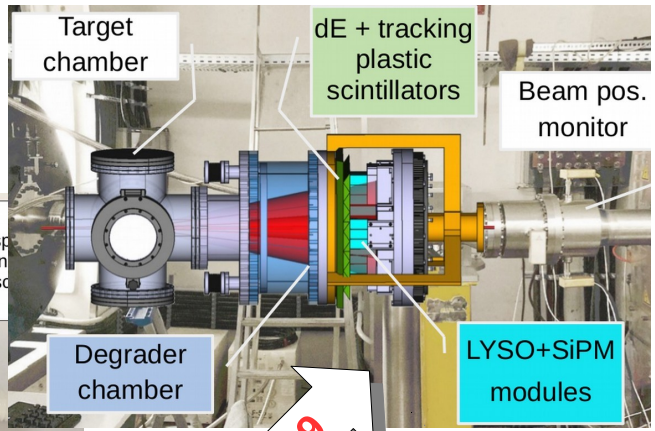


PROGRESS SINCE 2016



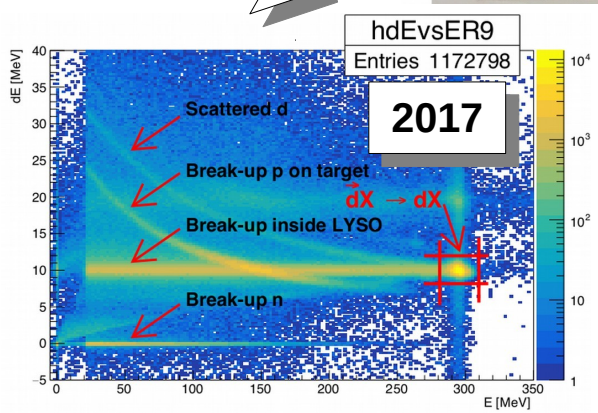
JEDI Polarimeter

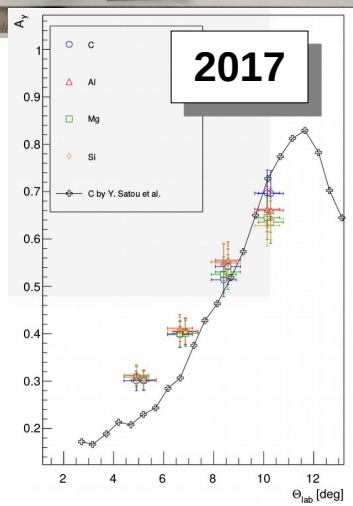


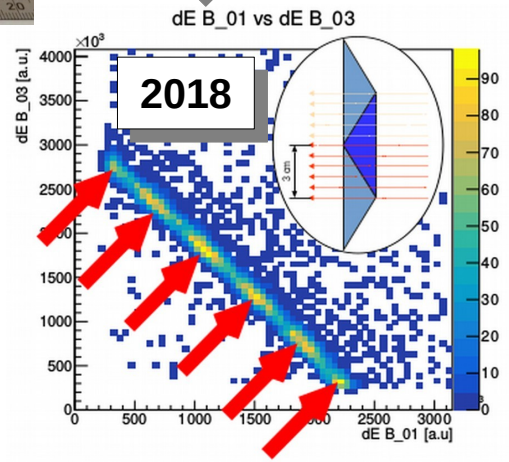


2016 →

← 2019

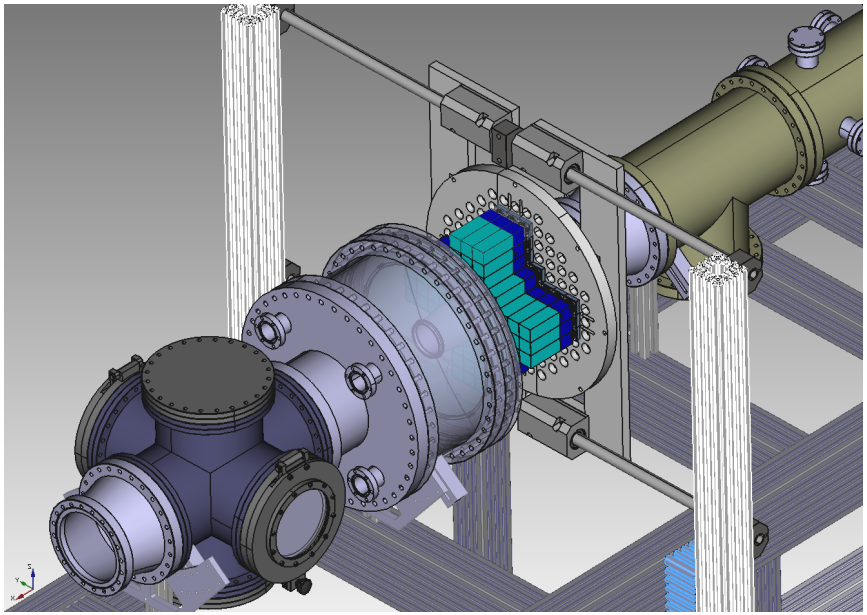




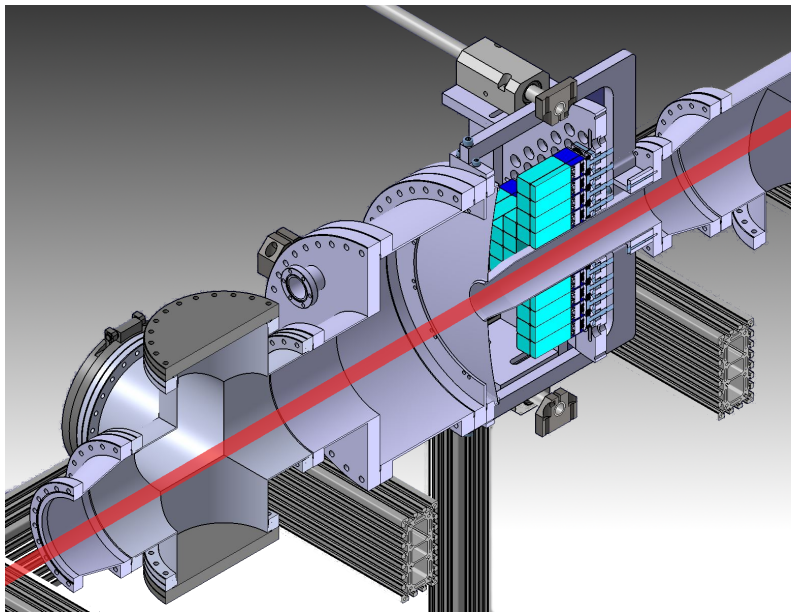


POLARIMETRI SETUP IN RING

Support & Cutaway



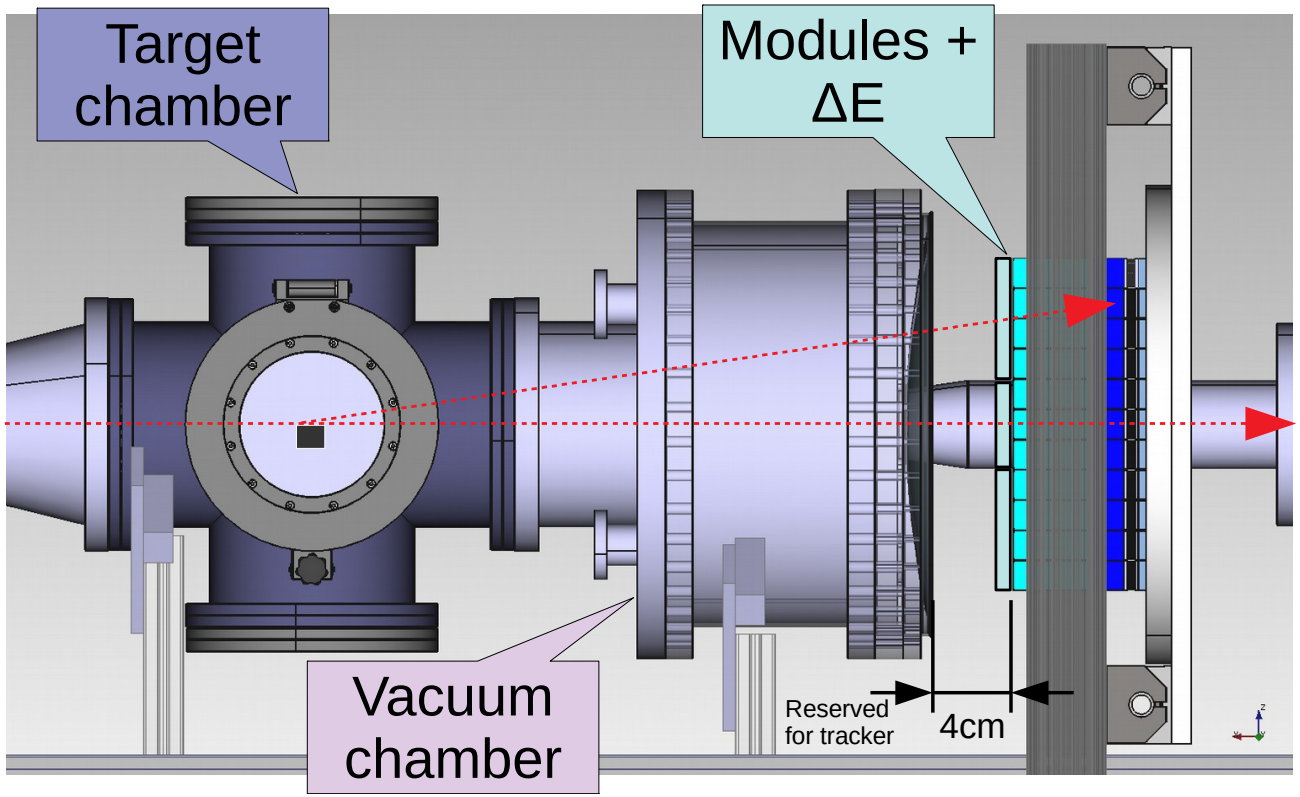
The JEDI polarimeter mounted on the support table. The crystals can be easily installed/repaired thanks to its openable support rods.



Cutaway drawing of the detector without the degrader (degrader is foreseen) and the plastic scintillator tracker.

JEDI POLARIMETER @ ANKE

Planned for spring 2019

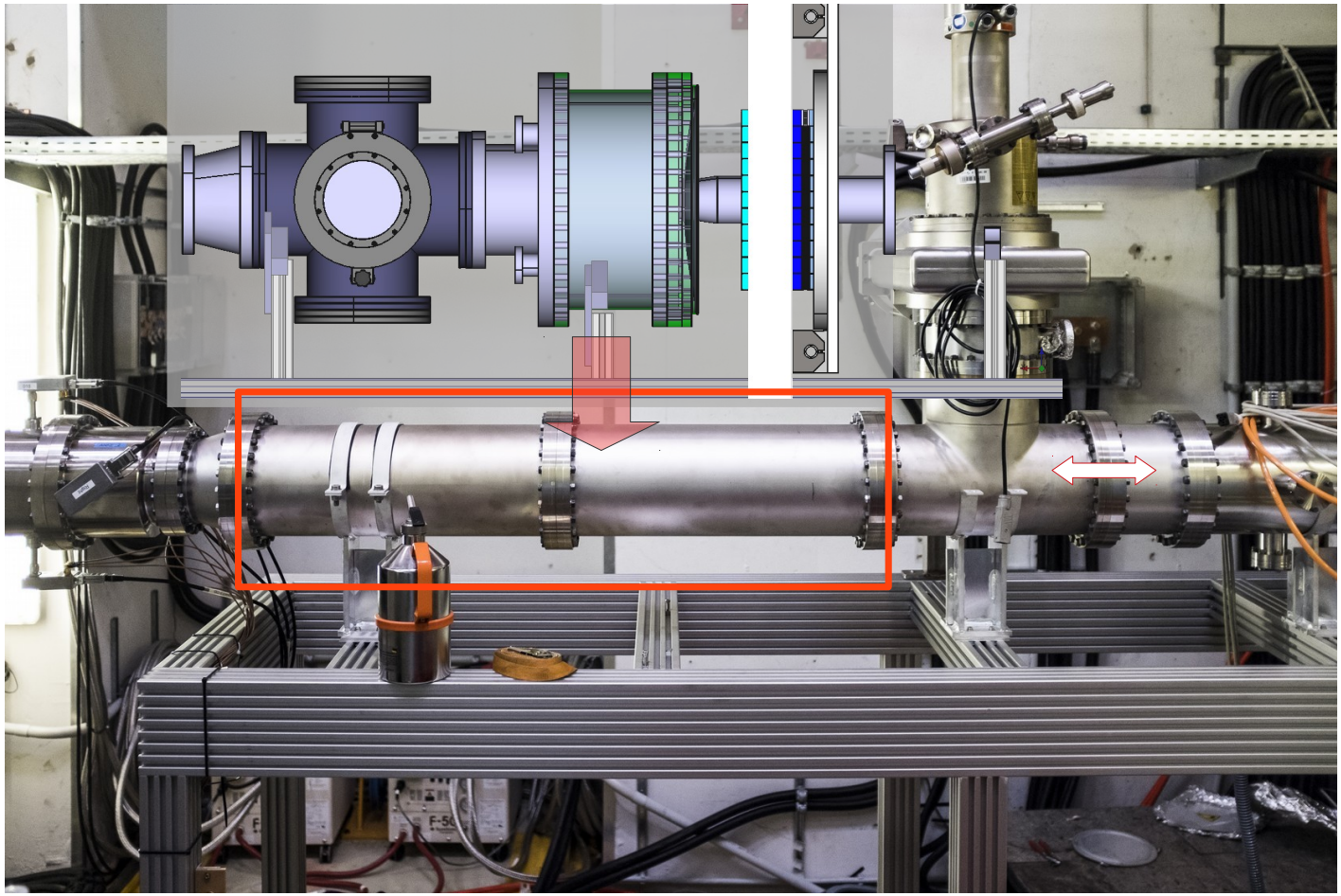


The JEDI polarimeter (JePo) inserted at the former ANKE detector location.

The total length is 127 *cm*.

ACTUAL SETUP AT ANKE TARGET SECTION

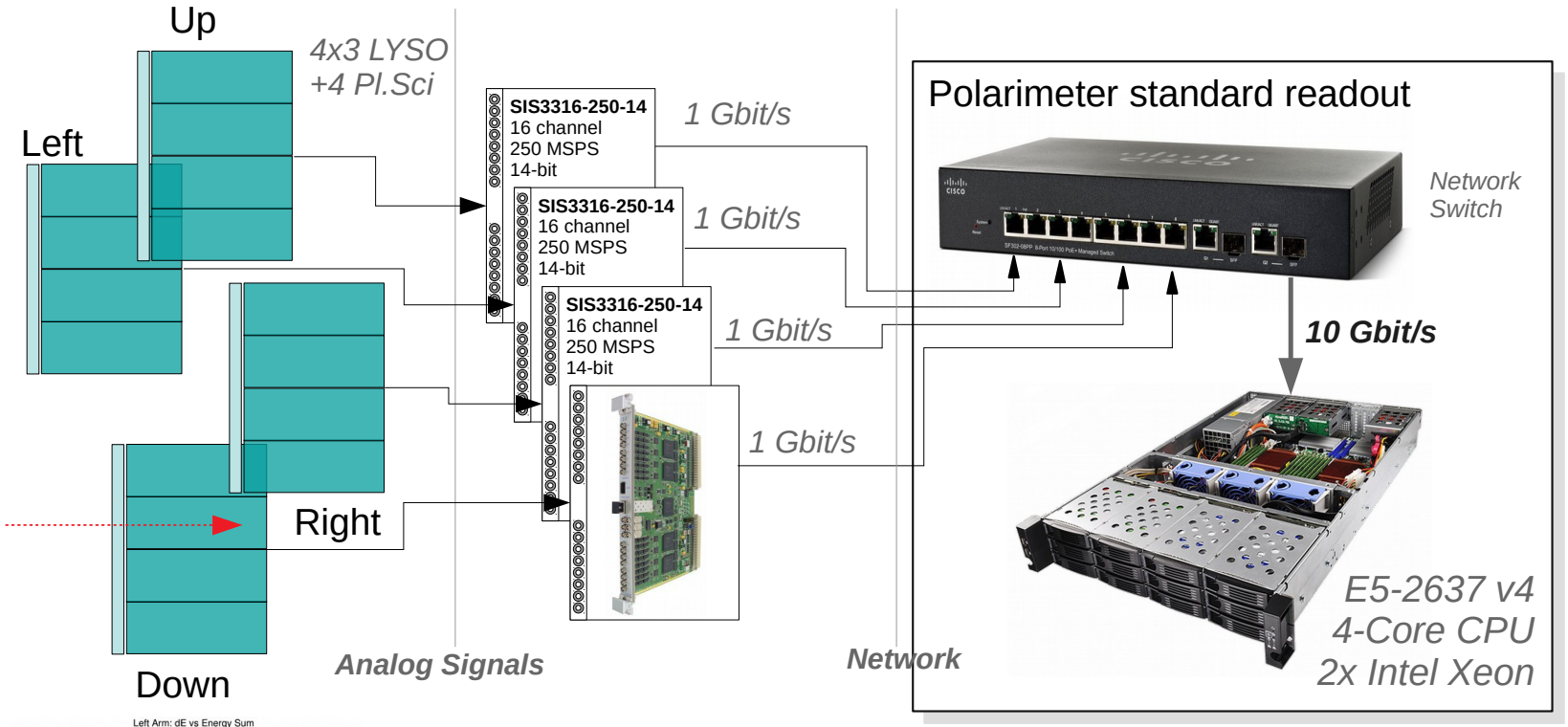
The Polarimeter Insertion

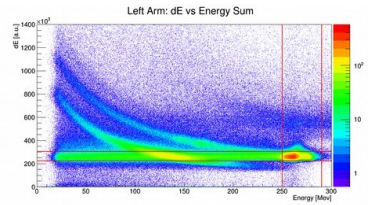


Actual photograph of the former ANKE cave. The insert drawing of the polarimeter shows the installation place into the beam position.

NEW DATA ACQUISITION SCHEMATIC (TWO PARALLEL TS-TDC)

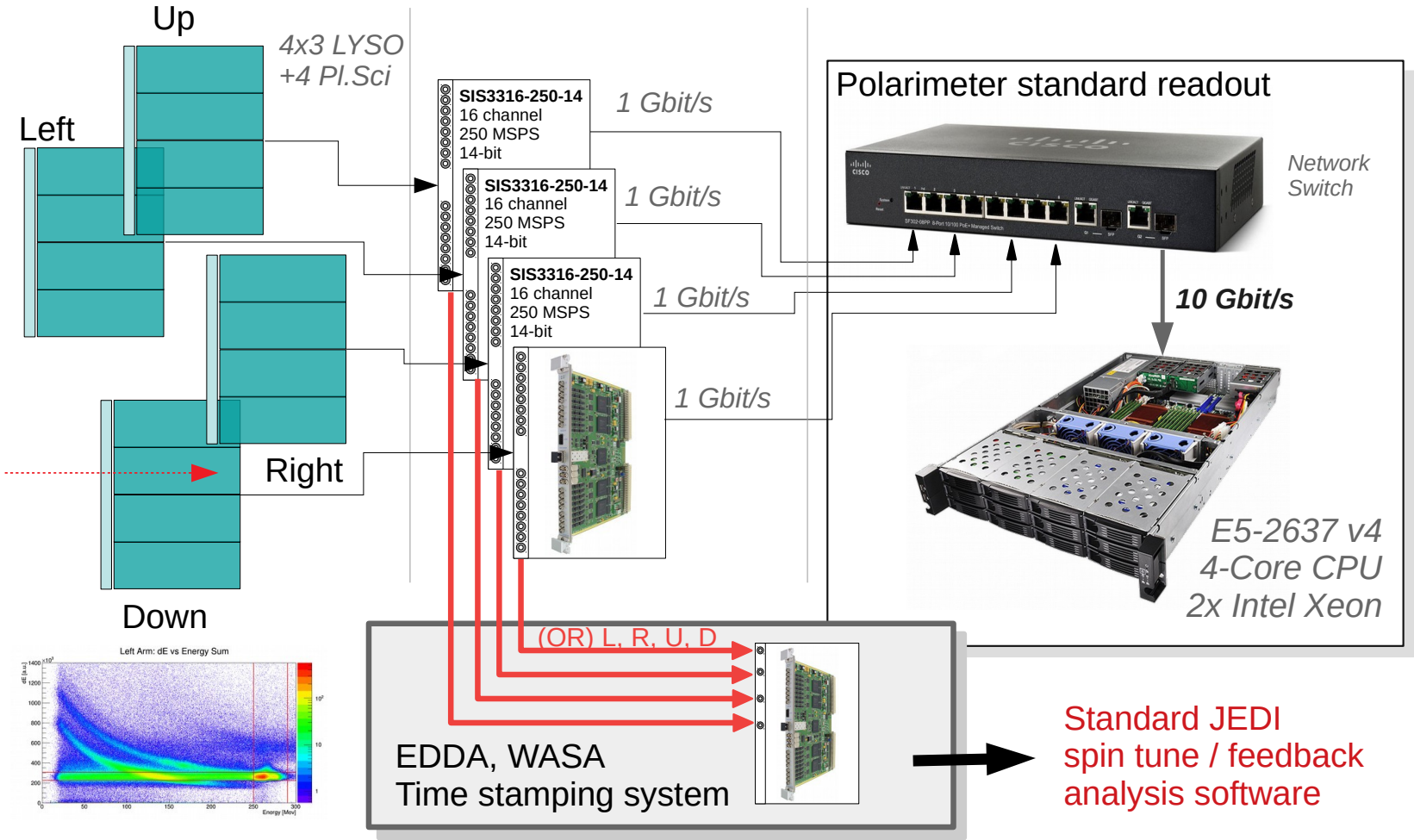
Standard JePo DAQ System





NEW DATA ACQUISITION SCHEMATIC (TWO PARALLEL TS-TDC)

Combined JePo and JEDI Time-stamping TDC



time stamping TDC readout are fed with OR signals from each polarimeter arm.

BEAM TIME REQUEST FOR COMMISSIONING

- Internal $\vec{d}$ beam

  (ANKE target station)

- Variable intensity and

  extraction rate

- RF-WF exp. beam momentum

  $P_d = \mathbf{970}\ MeV/c$

- Commissioning of dual DAQ system

- 2 Week Spring of 2019^{th}

  (pure measurement time)

COSY Beam Time Request

For Lab. use

Exp. No.:	Session No.
E2.6	**9**

Collaboration: JEDI

Towards the EDM Polarimetry:
Commissioning of the internal polarimeter based on LYSO crystals at COSY

Spokespersons for the beam time: **Irakli Keshelashvili (Jülich)**, **Bernd Lorentz (Jülich)**, **David Mchedlishvili (HEPI TSU)**

Spokespersons for the collaboration: **Jörg Pretz (Jülich)**, **Paolo Lenisa (Ferrara)**

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Phone: **+49 2461 615603** Fax: **+49 2461 613930** E-mail: **pretz@fz-juelich.de**, **lenisa@fe.infn.it**, **i.keshelashvili@fz-juelich.de**, **b.lorentz@fz-juelich.de**, **d.mchedlishvili@fz-juelich.de**

Total number of particles and type of beam (p,d,polarization)	Beam momentum (MeV/c)	Intensity or internal reaction rate (particles per second)	
		minimum needed	maximum useful
Internal beam of polarized deuterons	**970 MeV/c**	**10^8**	**10^9**
Experimental area	Safety aspects (if any)	Earliest date of installation	Total beam time (No.of shifts)
Set-up with LYSO crystals at former ANKE area	**none**	**15th March 2019**	**2 weeks (+ MD)**

ACKNOWLEDGMENT

People contributing to the experiment

This work has been supported by

Shota Rustaveli National Science Foundation of Georgia
(SRNSFG grant agreement #217854),
"A first-ever measurement of the Electric Dipole Moment (EDM) of the deuteron at COSY"

- Mechanics: N. DeMary, M. Maubach, G. D'Orsaneo & D. Spölgen
- Electronics: Tanja Hahnraths-von der Gracht & T. Sefzick
- DAQ & FEE: D. Mchedlishvili, & P. Wüstner
- G4: **M. Abuladze (Master)** , G. Macharashvili, & N. Lomidze
- **Ms.: G. Kvantrishvili, M. Gagoshidze, & D. Kordzaia**
- **PhD: F. Müller, D. Shergelashvili, O. Javakhishvili & S. Basile**

Appendix

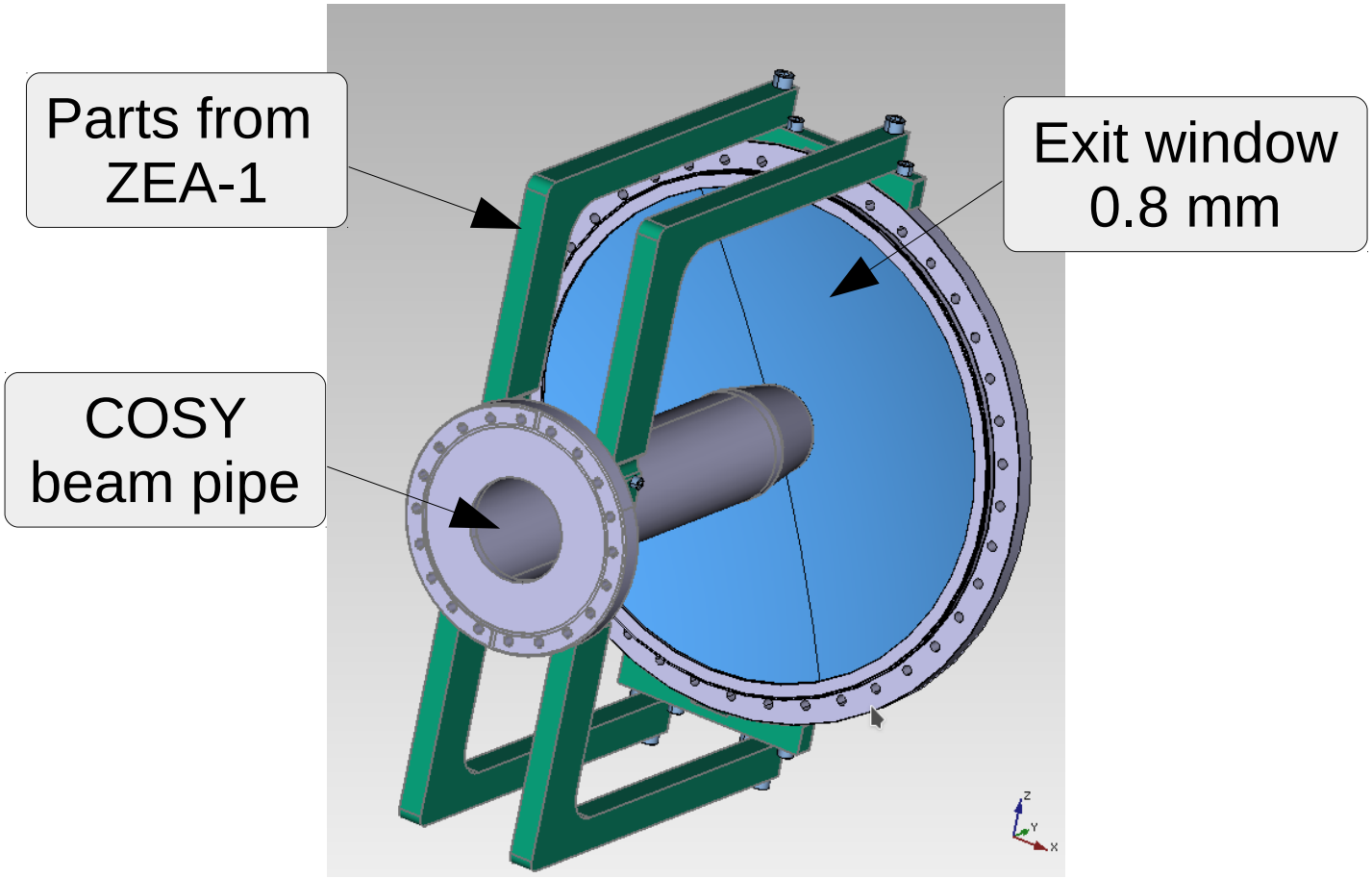
CONTACT

Contacting me via e-mail

Click here: i.keshelashvili@fz-juelich.de

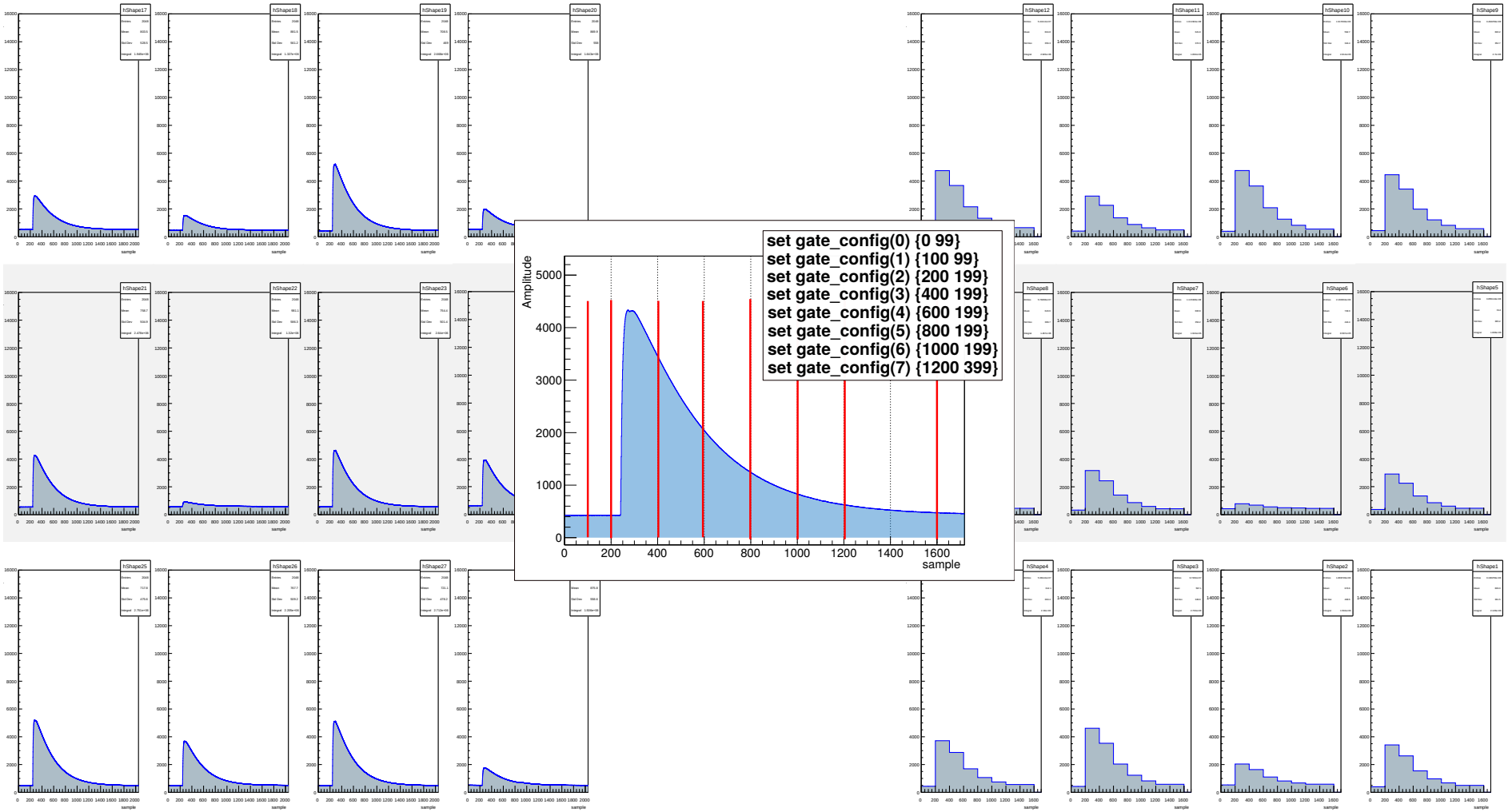
EXIT WINDOW

Under construction at ZEA-1



SIGNAL SHAPES

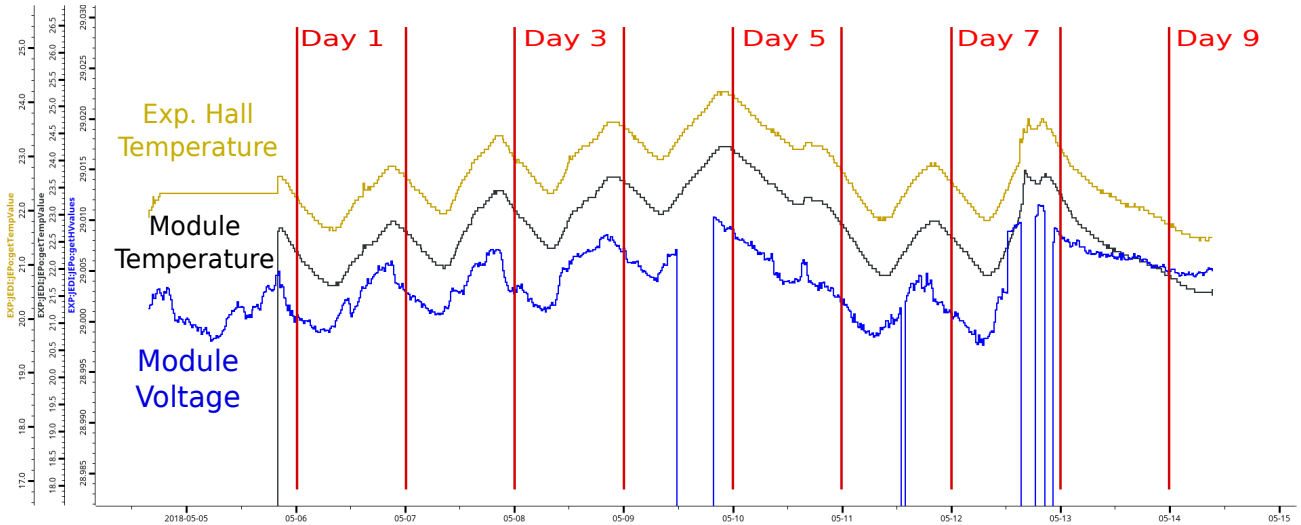
Full signal shape vs 8 accumulator/integral region



DETECTOR MONITORING AND ARCHIVING SYSTEM

The EPICS based system

- COSY compatible EPICS CSS slow control system
- Monitoring of voltage, temperature, ...)



LYSO module internal temperature

Big Karl exp. hall (brown) temperature variation

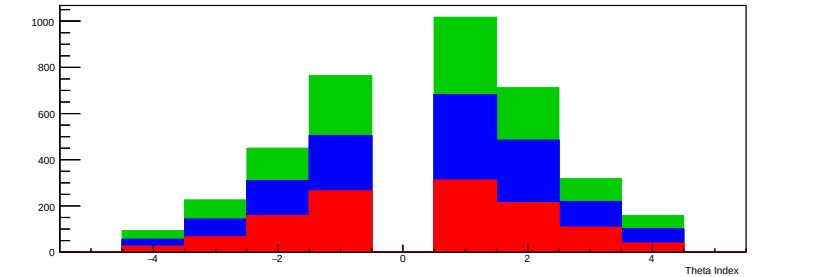
Blue graph, the supply voltage for the same module

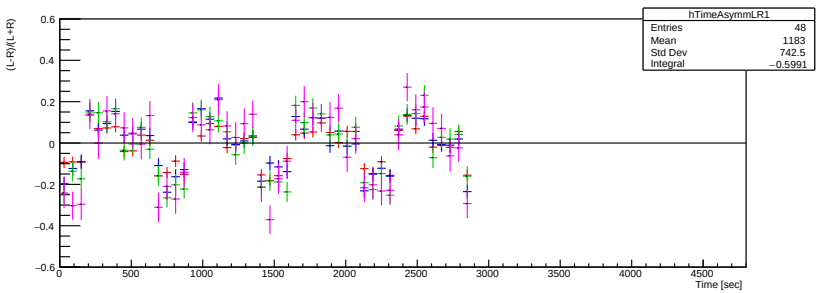
The apparent correlation between all the values is evident.

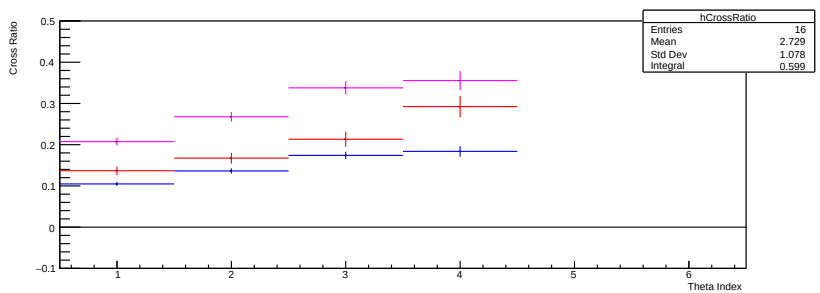
ONLINE ASYMMETRY MONITORING

Elastic $\vec{d}C \rightarrow dC$ scattering

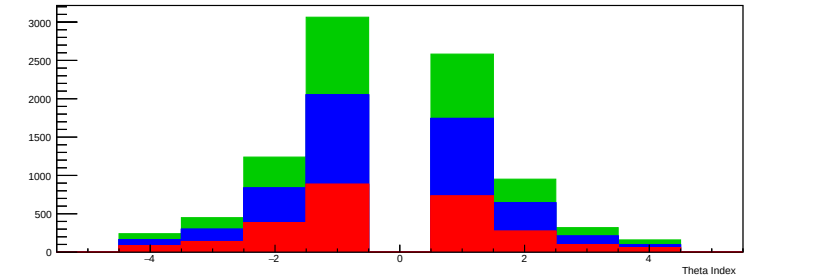
$\Theta = 4° \rightarrow 9°$

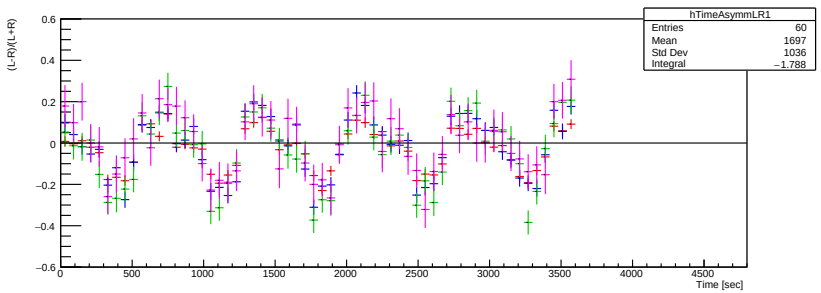


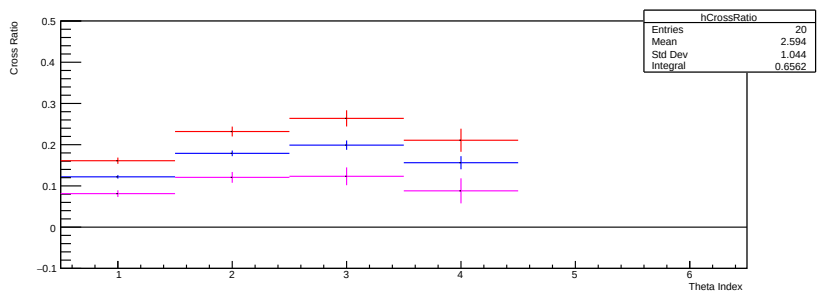




$\Theta = 4° \rightarrow 15°$



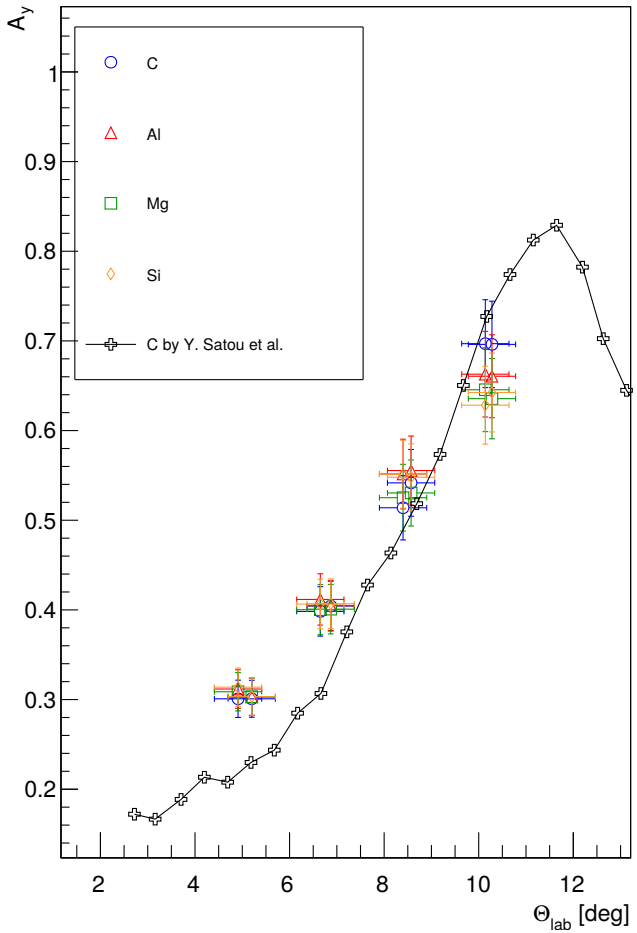




VECTOR ANALYZING POWER

Elastic $\vec{d}C \rightarrow dC$ scattering

$T_{\vec{d}} = 270\ MeV$



$T_{\vec{d}} = 300\ MeV$