# Status report TPC task

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DESY

EUDET Extended SC Meeting JRA2
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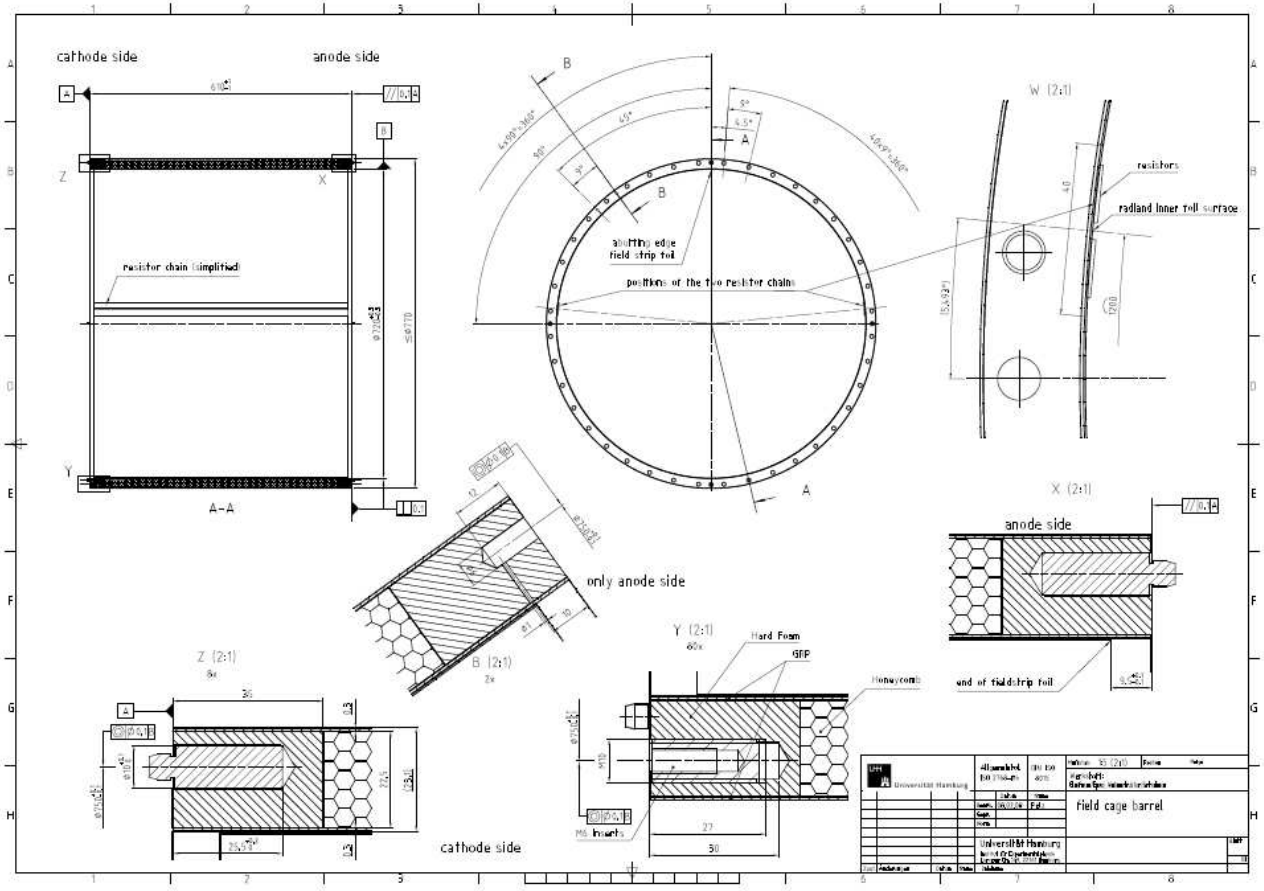
# LCTPC Large Prototype

## *Garniture*

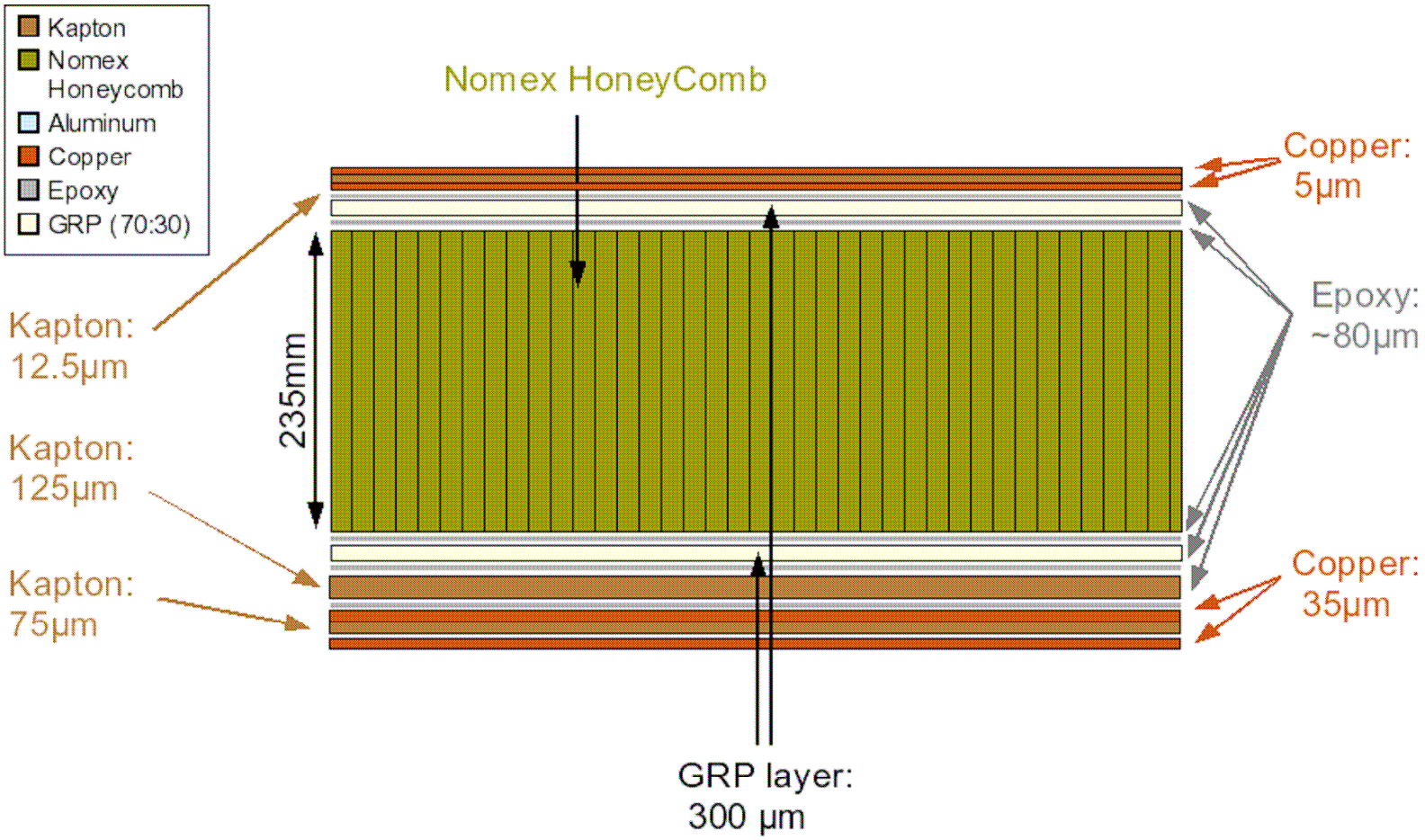
- **Field cage**
- **Endplate**
- **MPGD detector modules**
- **Readout electronics**
- **Gas system**
- **DAQ & Monitoring**
- **Software development**
- **SiLC envelope**
- **Cosmic trigger**
- **Magnet (PCMAG)**
- **Test beam T24/1**

# Field Cage




Inner Diameter 720 mm, Outer diameter 770 mm
Wall thickness 25 mm
Length 610 mm

# Field Cage

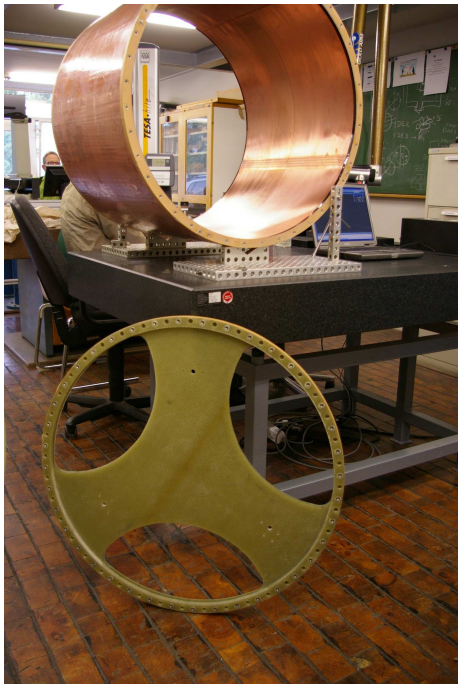

Kapton
Nomex Honeycomb
Aluminum
Copper
Epoxy
GRP (70:30)
Nomex HoneyComb
Copper: 5µm
Epoxy: ~80µm
Copper: 35µm
Kapton: 12.5µm
Kapton: 125µm
Kapton: 75µm
235mm
GRP layer: 300 µm

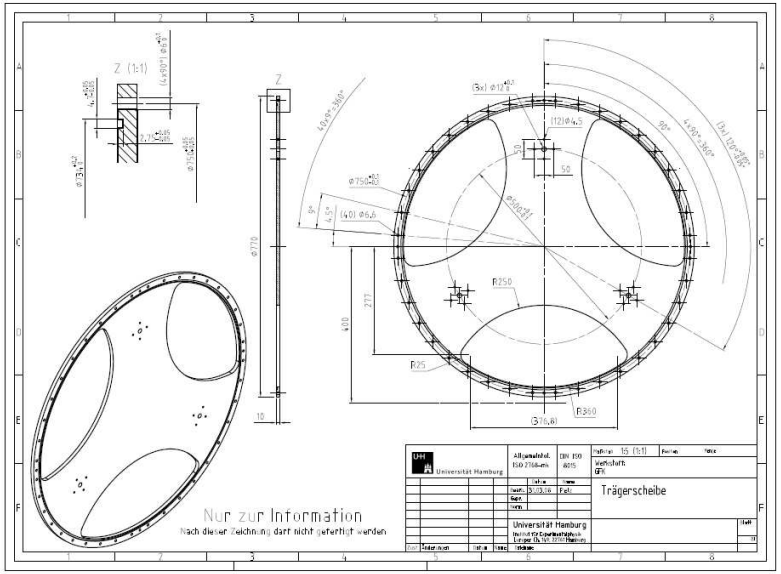
# Field Cage

Field Cage at DESY, being inspected and tested

# Field Cage

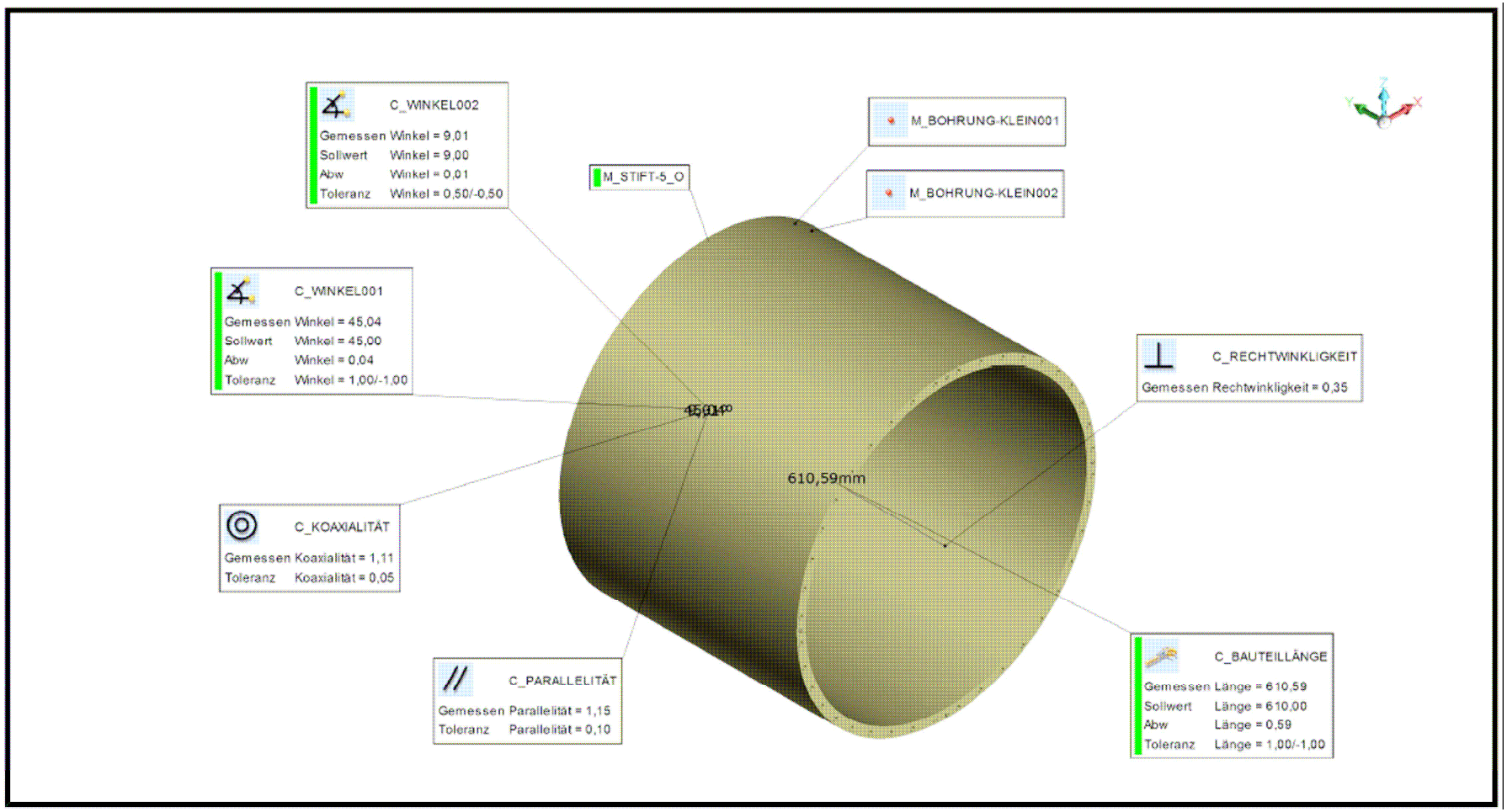
## Field Cage at DESY, being inspected and tested





# Field Cage

First survey results are promising: specs seem to be within the tolerances, however, need to analyze and understand the data



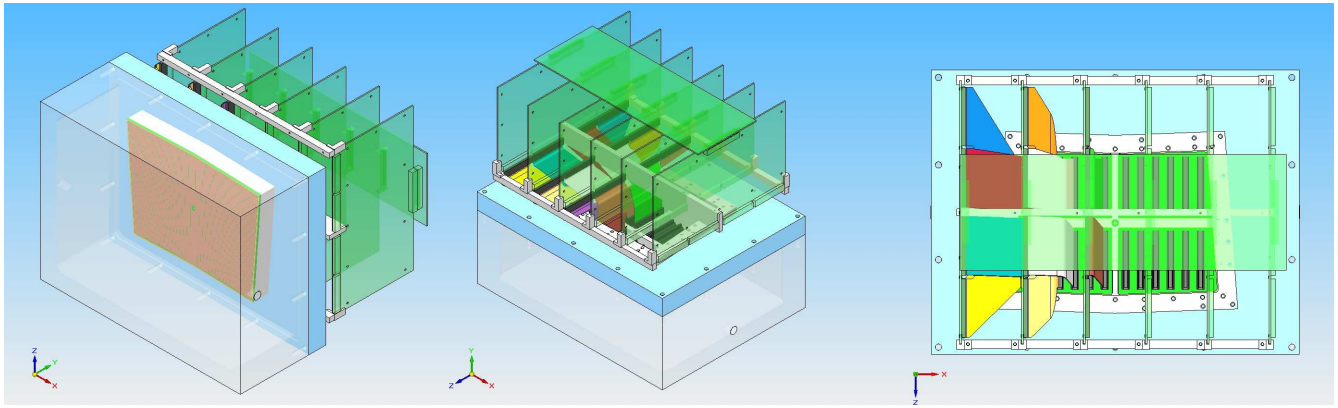
# Field Cage

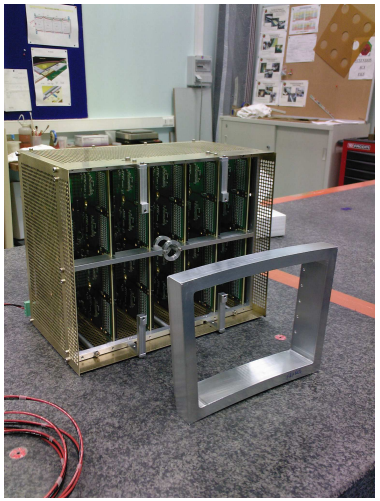
## Next steps

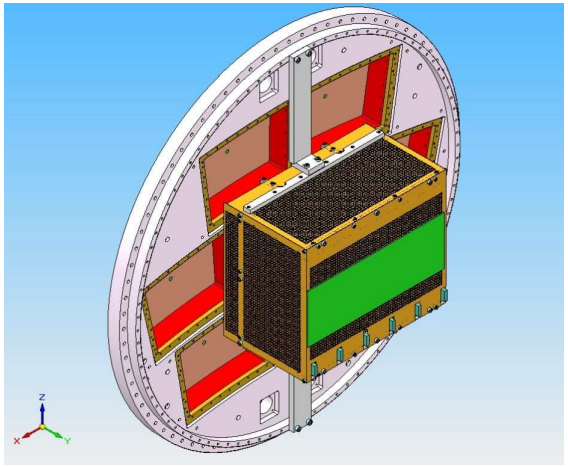
- Measurement of the basic mechanical parameters of FC
- Measurement of the position of strips (measure in a low-tech method by ourselves)
- Mount a few more resistors and HV connectors/contacts to outside
- LV test to check all electrical connections of the filed cage/strips
- Pressure test, leak test and gas purity test
- Pressure drop of TPC exhaust gas line (the gas monitor) for a nominal gas flow rate
- HV test
- Memo in preparation

# MPDG Detector Modules

MicroMegas module + AFTER electronics being finalized for first usage in LP/PCMAG/DESY





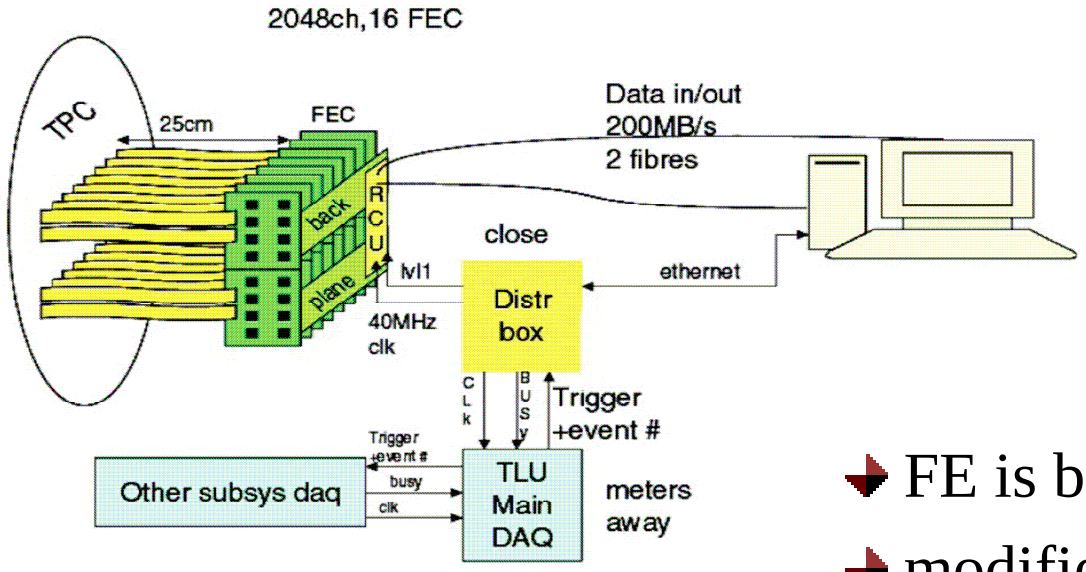


- One module (without resistive layer) is finished
- Received in Saclay and being tested. Others with different resistive coatings should follow.

# Readout Electronics

## Two strategies being followed:

- FADC-based (Lund, CERN)

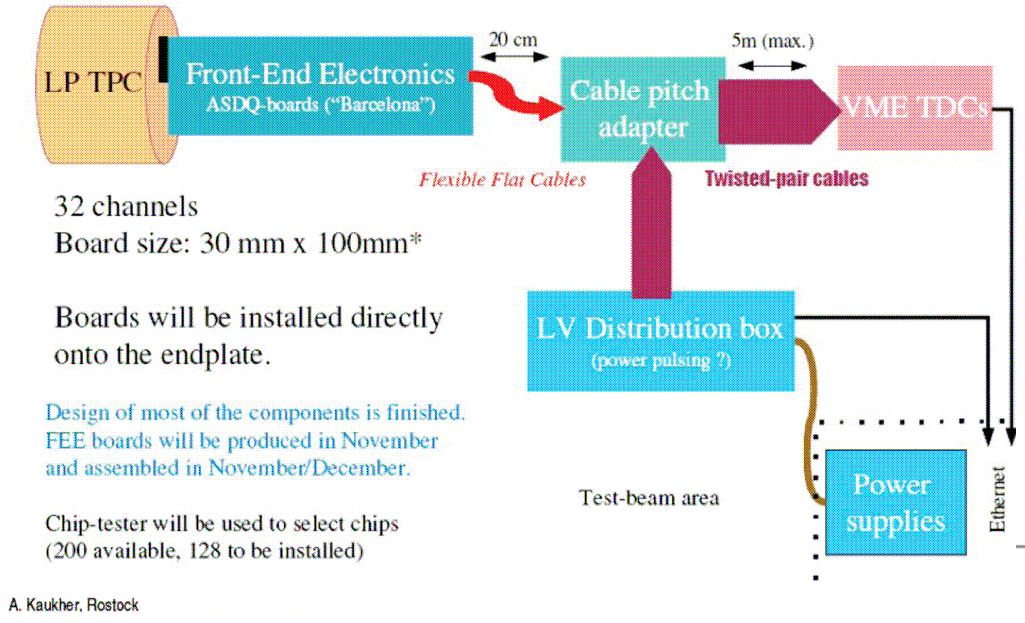


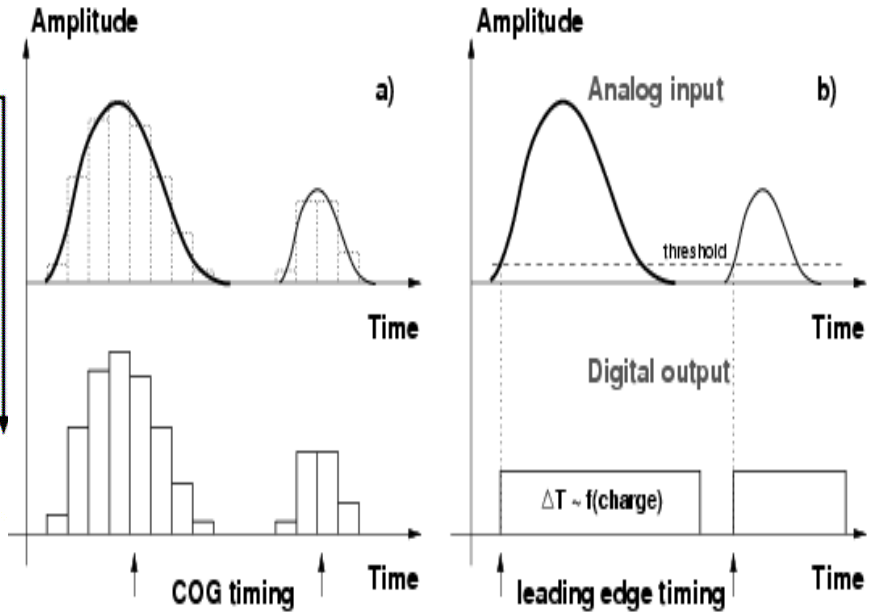

- FE is based on ALICE TPC FE
- modified amplifiers in order to adopt to the ILC environment
- designed within the EUDET DAQ schemes

# Readout Electronics

## Two strategies being followed:

- FADC-based (Lund, CERN)
- TDC (Rostock)



# Readout Electronics

- FADC-based (Lund, CERN)
  - 165 PCA16 chips have been tested in Lund, 17 have not passed the final tests → 2368 channels available
  - 800 remaining PCA16 chips are at CERN
  - Tests of the 2nd prototype FEC performed in Lund: performance as expected → 15 boards being produced
  - 40 MHz ALTRO chips are mounted onto 2nd prototype board
  - 1 DRORC, 1 SIU, 1 optical-cable has been sent to Lund for setting up a system to install the new firmware → system will later be used in the test setup at DESY

# Readout Electronics

- TDC (Rostock)
  - Barcelona boards are available, all components for assembly present (640 ch)
  - Assembling will start in September
  - ASDQ chips are being tested
  - Pitch adapter to be assembled
  - LV distribution boards are not yet available
  - 1st tests are planned with a dummy prototype
  - Beginning of October TDC electronics is expected to be fully available

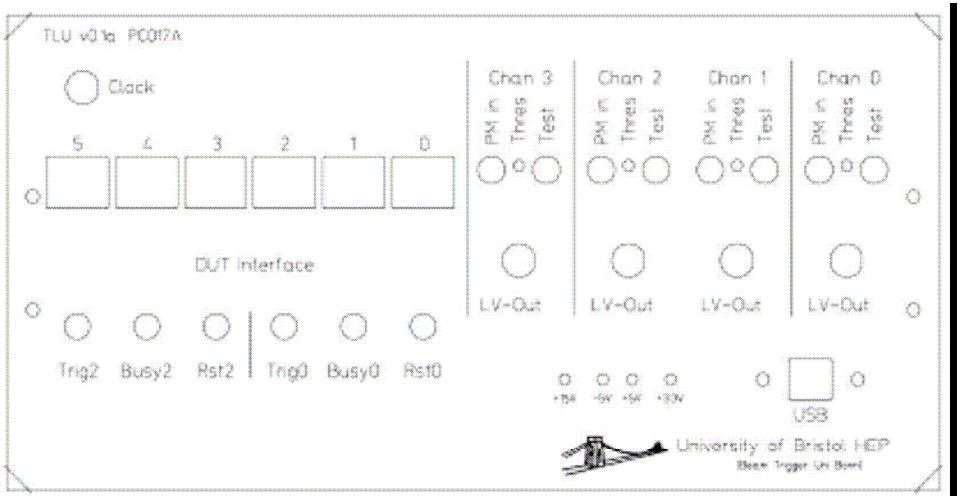
# DAQ & Monitoring

## Trigger Logic Unit (TLU) provided by University of Brussels:

- 4 comparators
- Beam trigger with scintillators

## TLU outputs:

- Trigger signal (LVDS)
- Event number (LVDS) pulled out by a data clock (LVDS)




## Distributor box:

- Get event# from TLU and tag event with time
- Send event # + time to DAQ computer, assert BUSY for a fixed time: waiting for DAQ PC end of r/o
- Provide common clock

# DAQ & Monitoring

Monitoring via DOOCS:

Distributed Object Oriented Control System; output as LCCD stream in LCIO format

hardware is connected to control system with Beckhoff devices

Monitored parameters (so far)

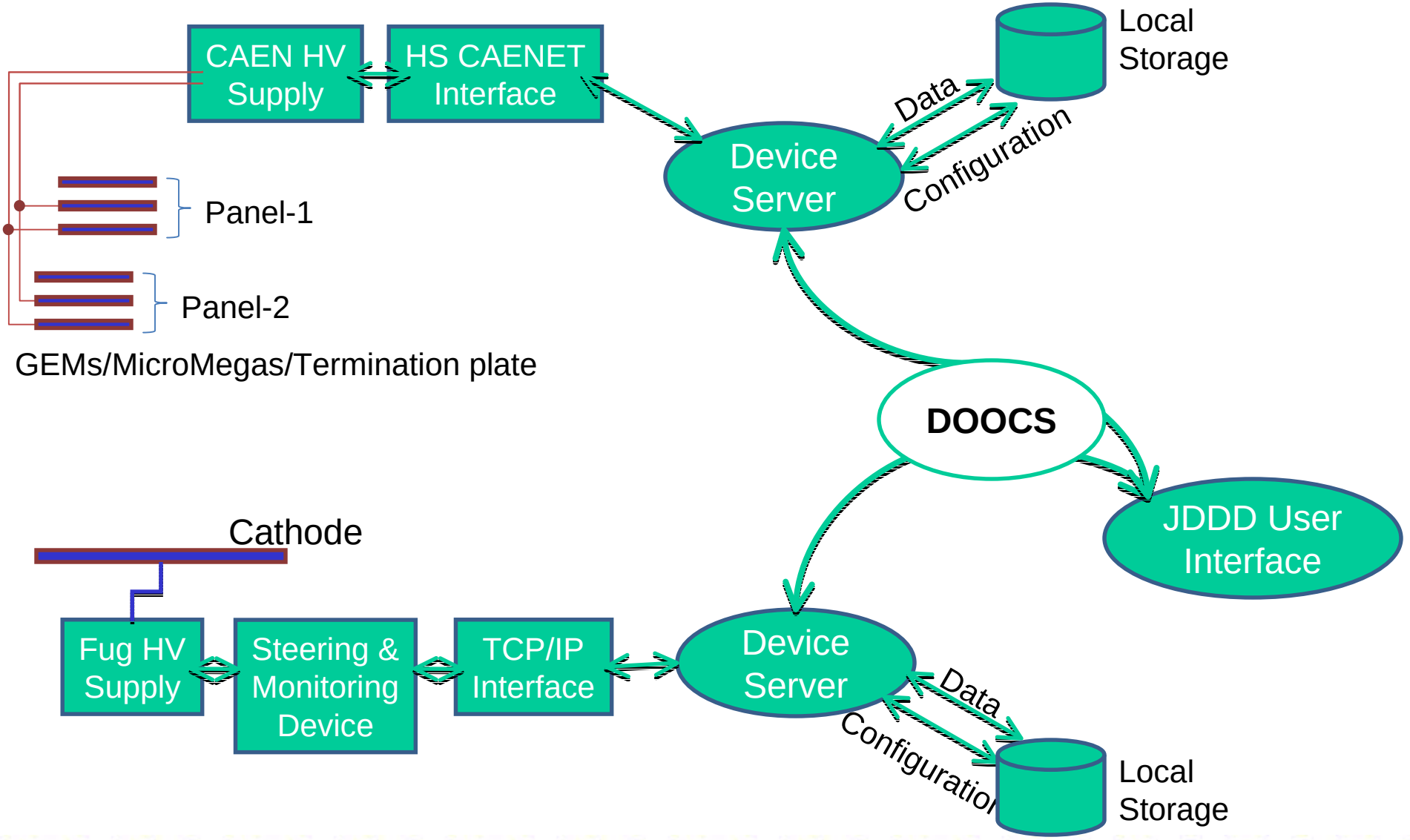
- Temperature
- Gas pressure
- Gas flow
- Impurities
- HV control

# Gas System

Basic gas system on the way:

- Mass flow controller → regulating chamber pressure
- Monitoring of pressure, temperature, impurities
- Stainless steel tubing
- Safety valve

# HV System Overview



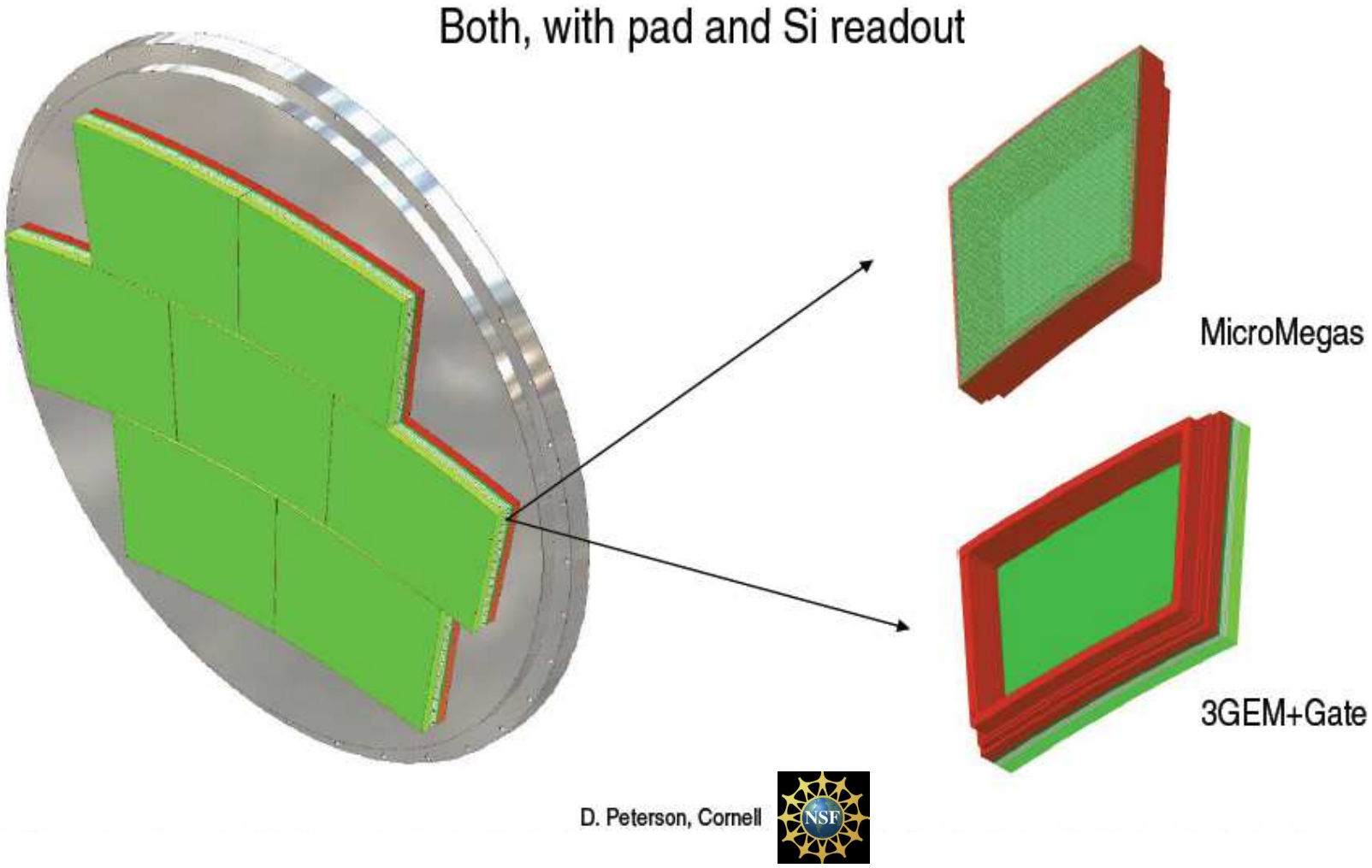
# Software Development

MarlinTPC software package rather advanced

- Tools available for
  - DAQ stream
  - Data processing, reconstruction, digitization
  - Data analysis
  - TPC simulation

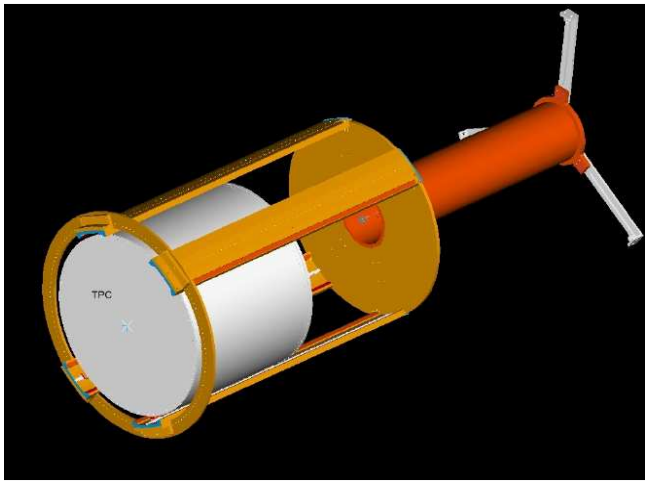
MarlinTPC is ready so far to be used with LP

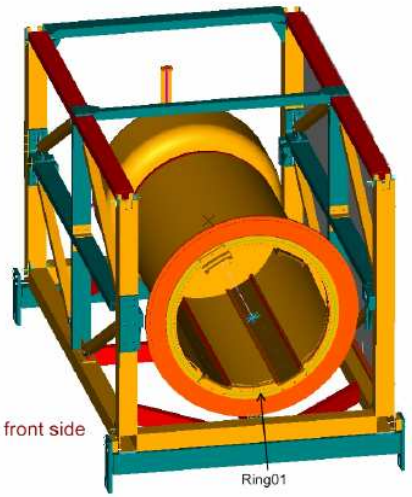
# Endplate

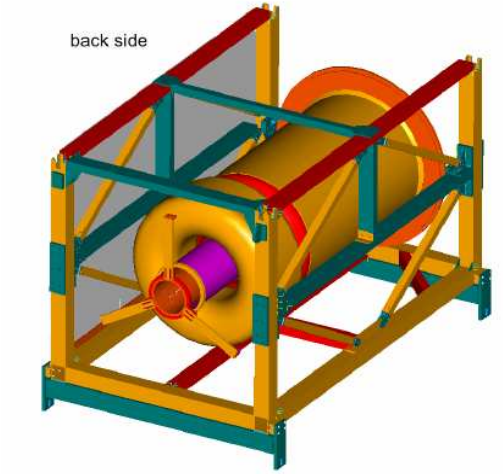



Endplate from Cornell just arrived at DESY

# Magnet PCMAG & T24/1

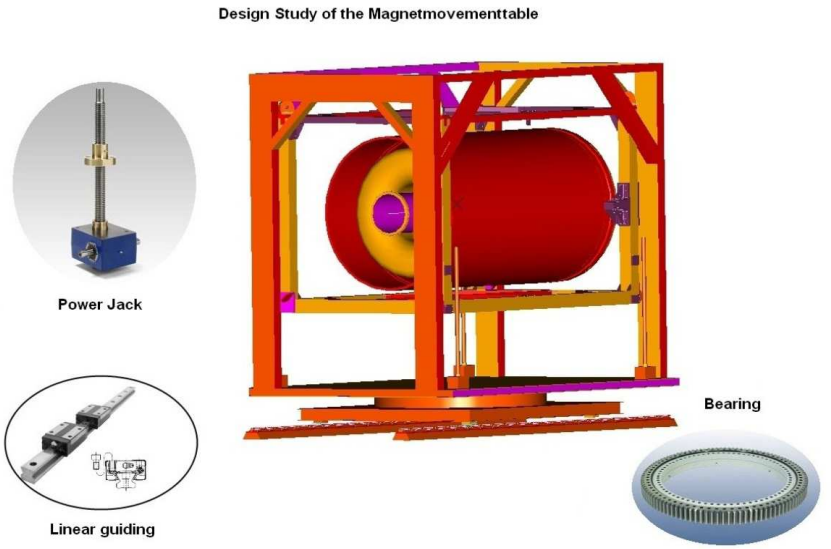



Support structures:

- TPC
- PCMAG



# Summary & Outlook

Main components are available:

- TPC needs to be assembled
- Assembled TPC needs to be commissioned
- DAQ components are available
- Slow Control / HV / Gas system available
- Magnet / T24/1 available
- GEM electronics (ALTRO) is expected to be finalized in October / November
- TPC support structure expected to arrive in mid September
- Open question about SiLC envelope → main work to be done by HEPHY Vienna