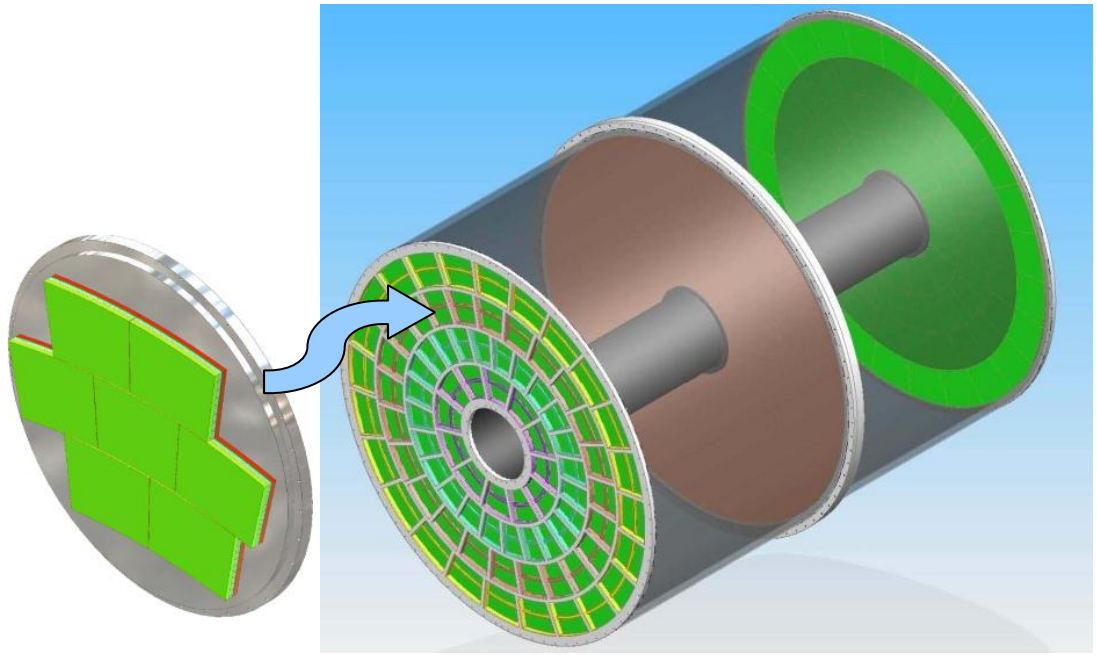
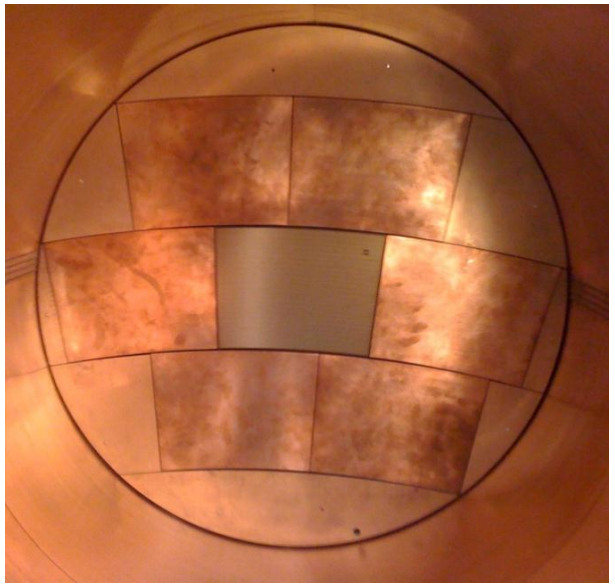
TPC endplate integration

Micromegas panels

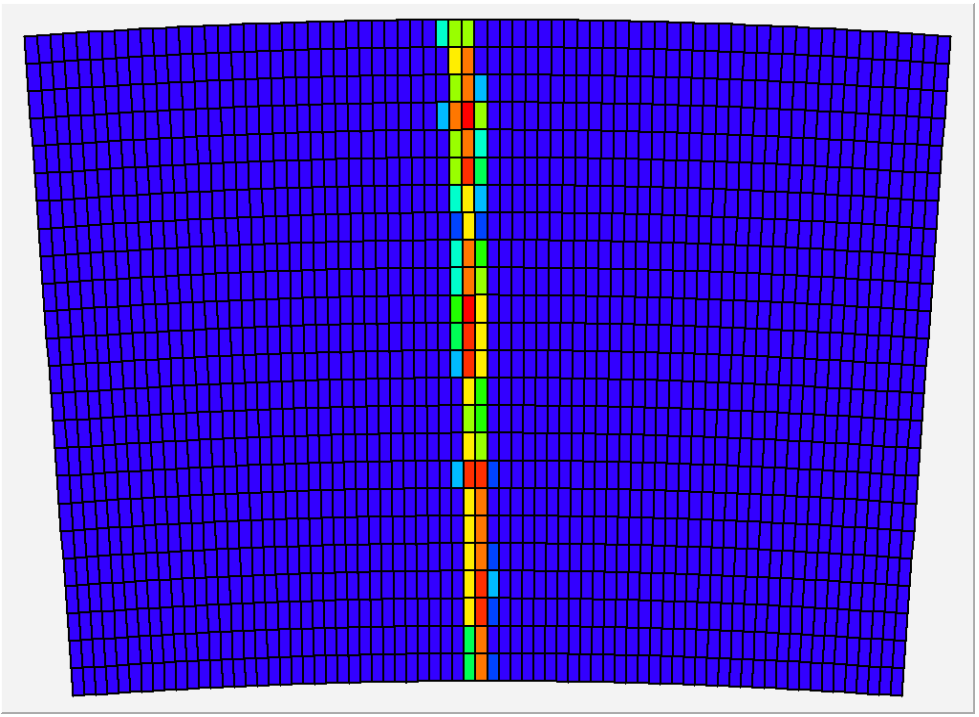




Goal (2011-2012+): build 9 identical modules and address all integration issues, serial production and characterization, multimodule issues (alignment, distortions). Testbench at CERN starting now (^{55}Fe source scan) and beam test mid-June at DESY (EUDET facility).

Phase I

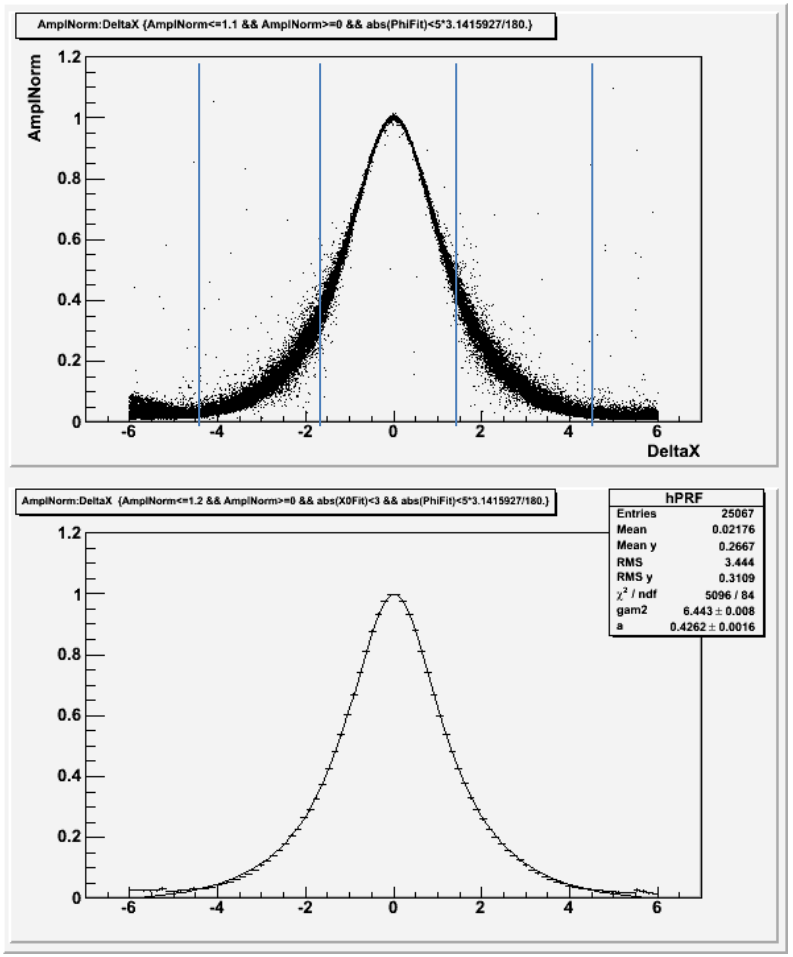
Relative fraction of 'charge' seen by the pad, vs x(pad)-x(track)



24 rows x 72 columns of 3 x 6.8 mm² pads

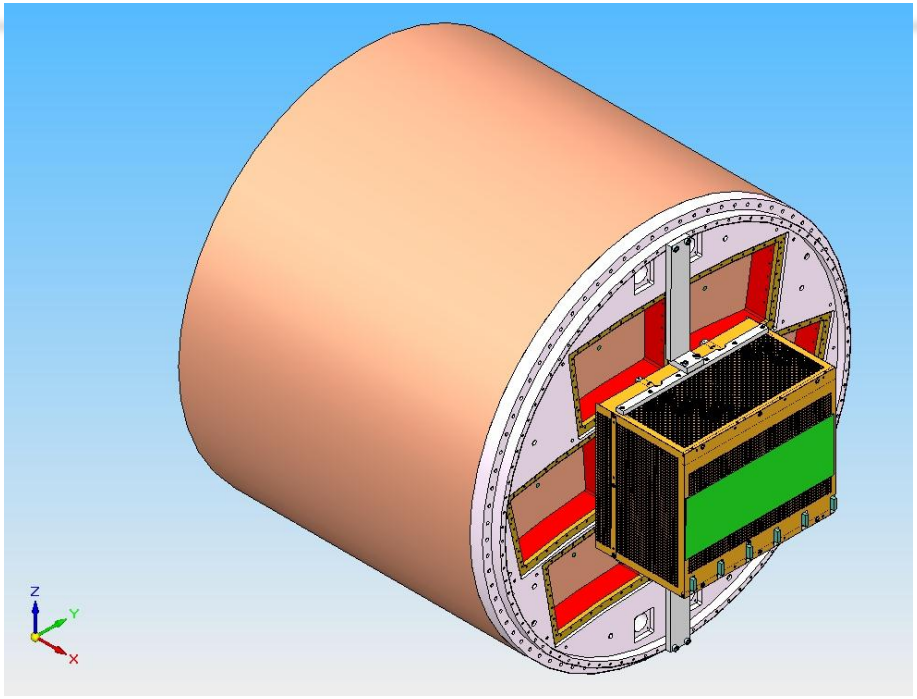
Results: 60 µ resolution at z=0 and homogeneity tested in beam. High-rate operation in a pion beam at CERN.

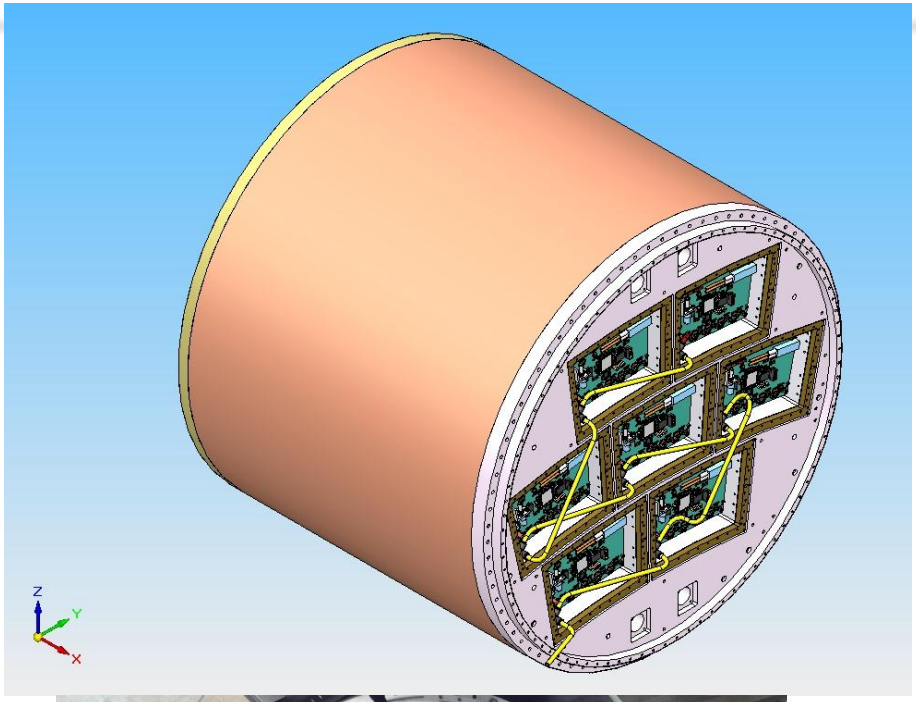
Z=20cm, 200 ns shaping

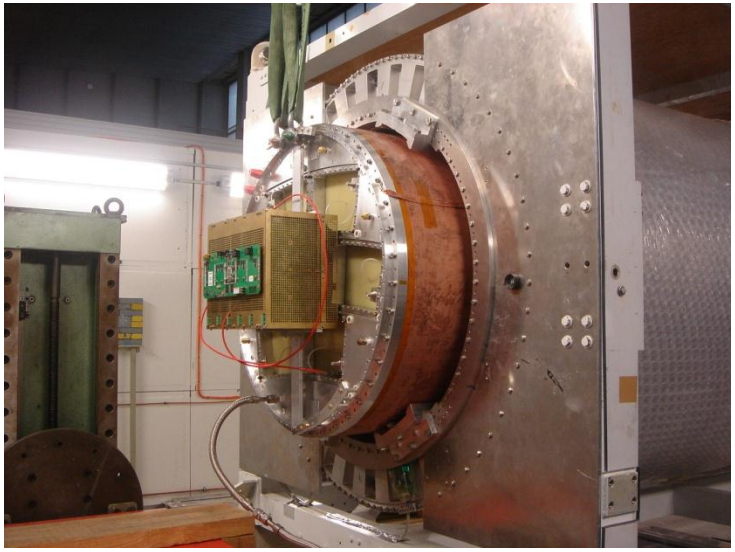


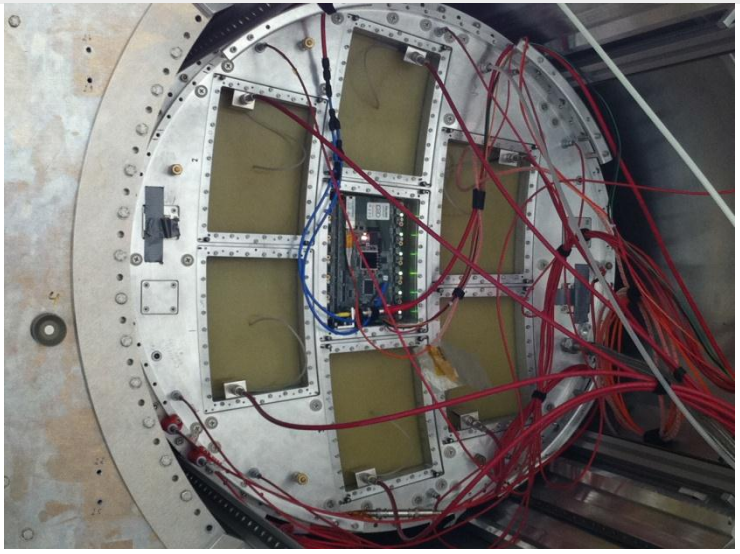
x(pad) – x(track) (mm)

Phase II: 7 module project – electronic integration









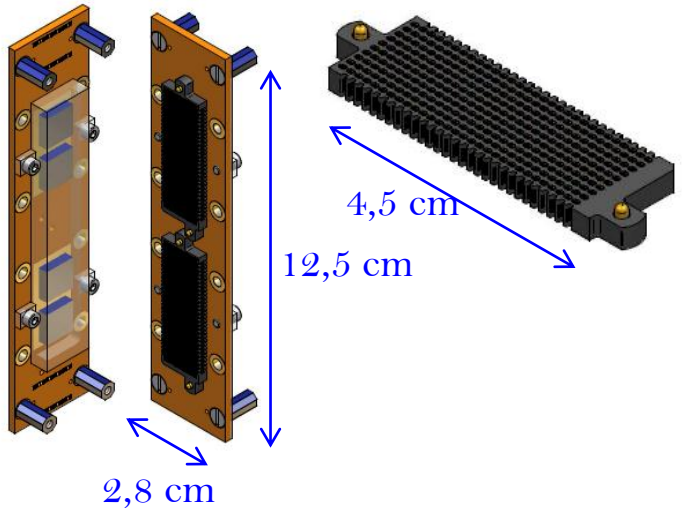
May 2011: beam test of a new module with fully integrated electronics

- New detector : new routing to adapt to new connectors, lower anode resistivity (3 MΩ/sq), new res. foil grounding on the edge of the PCB.
- New 300 points flat connectors
- New front end: keep naked AFTER chips and remove double diodes (count on resistive foil to protect against sparks)
- New Front End Mezzanine (FEMI)
- New backend ready for up to 12 modules
- New DAQ, 7-module ready and more compact format
- New trigger discriminator and logic (FPGA).

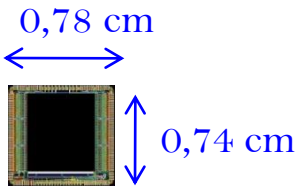
Integrated electronics for 7-module project

FEC

- Remove packaging and protection diodes
- Wire –bond AFTER chips
- Use 2 × 300 pins connector
- In tests in 2011, it was shown that the resistive foil protects against sparks

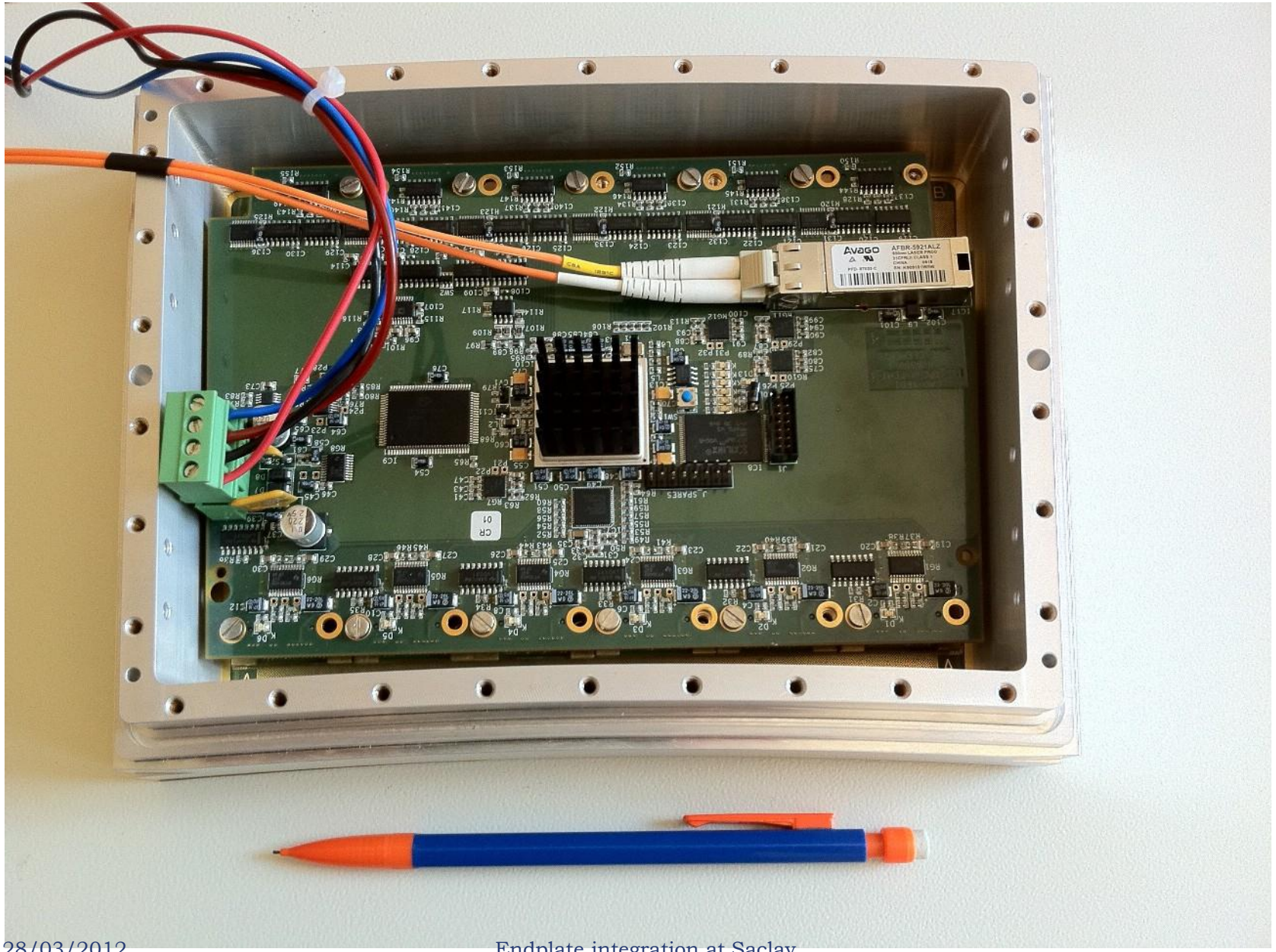


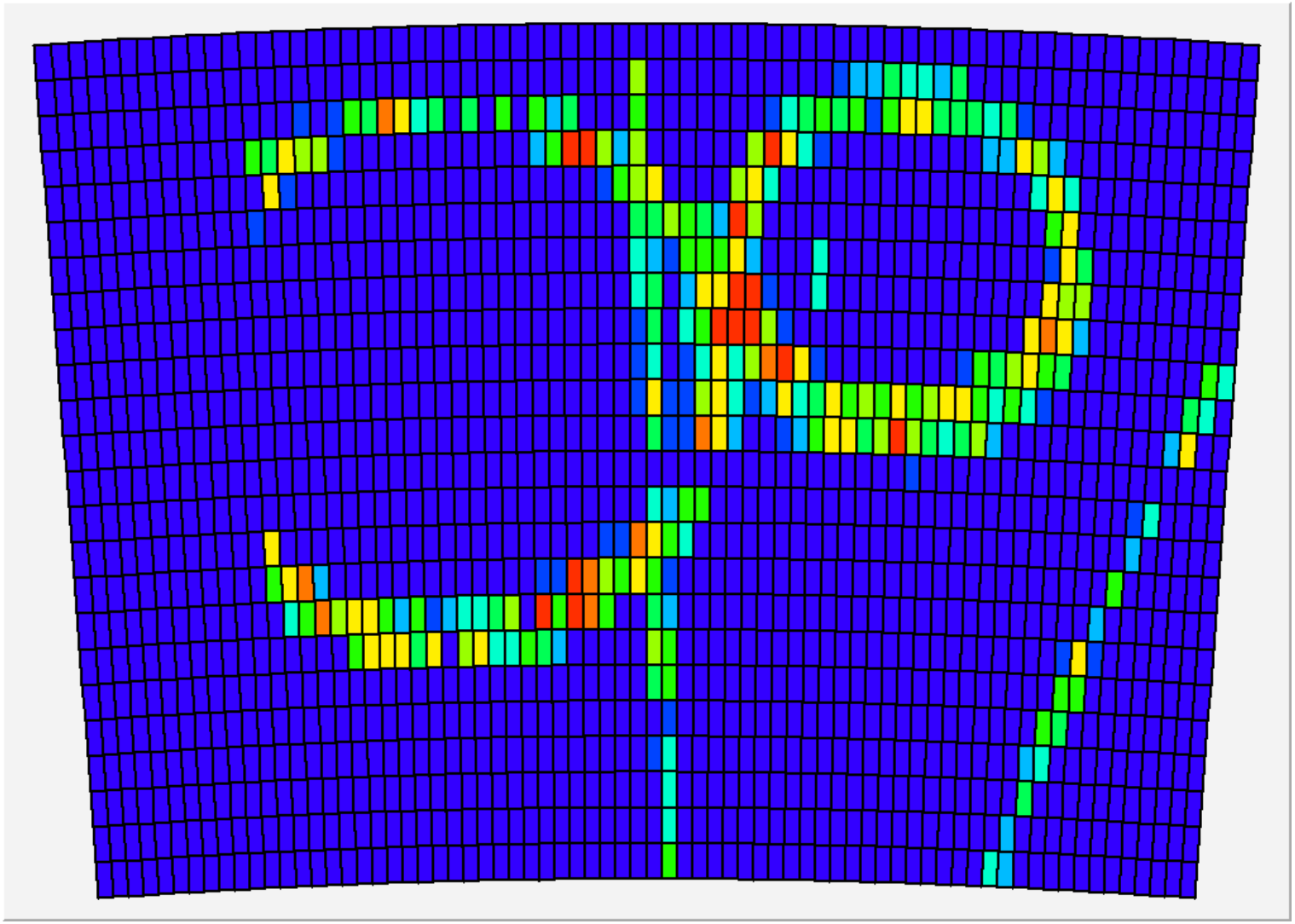
Chip



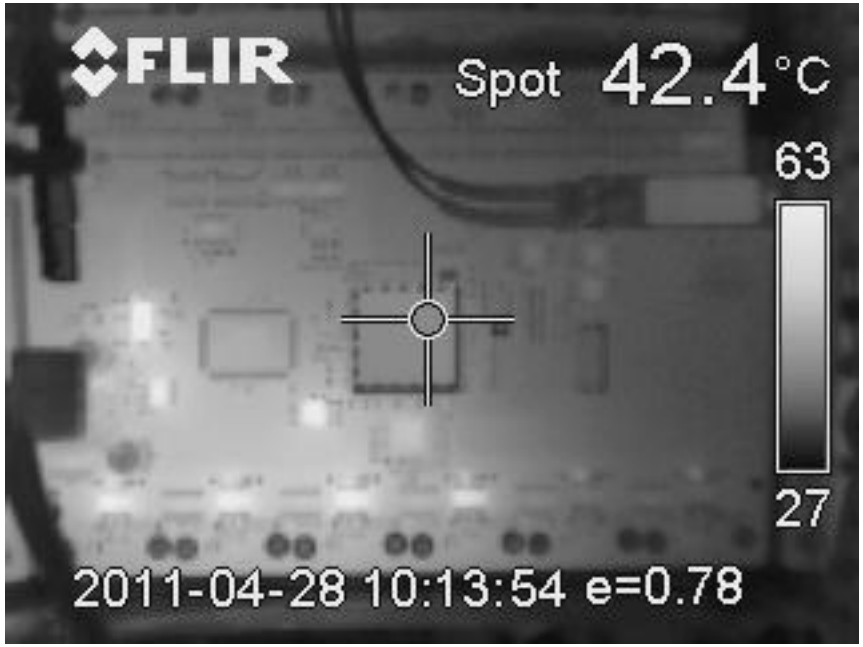
after 2 weeks of operation: no ASIC lost

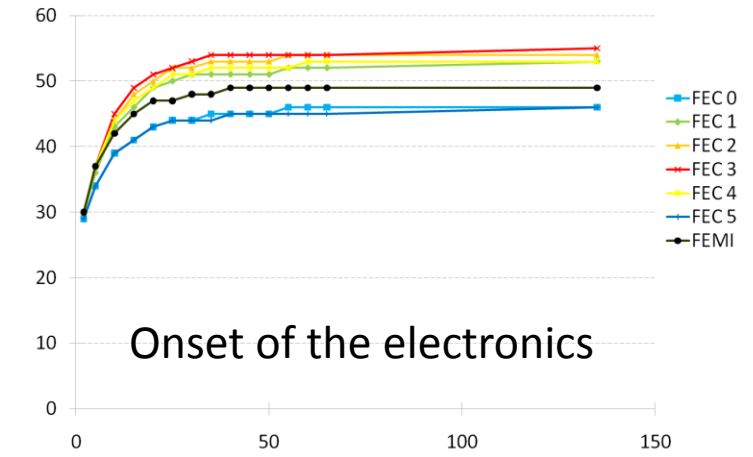
First prototype of the electronics

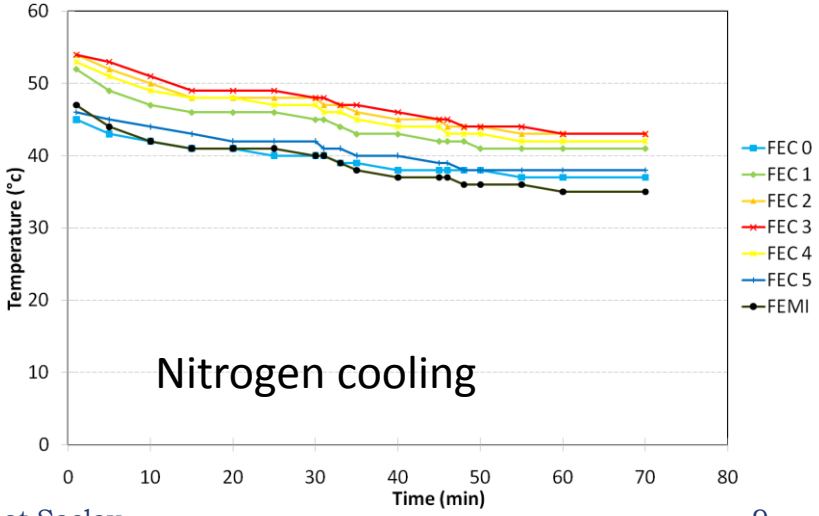




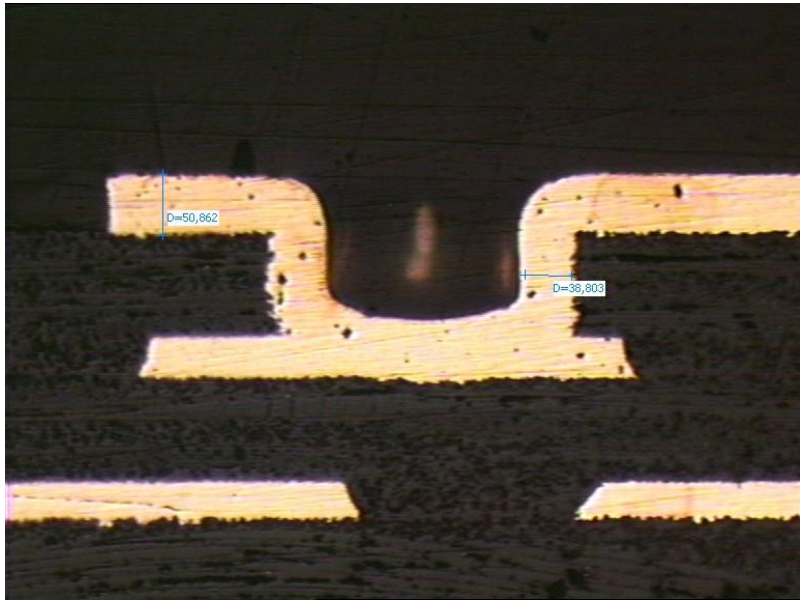
- Thermal studies. IR camera shows hot spots (regulators, ADC). T-probes on every component.
- 2-phase CO2 cooling under study (KEK, Nikhef)







High quality PCB study (by ELTOS with RD51). First 4 new PCBs return from fabrication.
Flatness better than 70 µ !



CERN - METROLOGIE

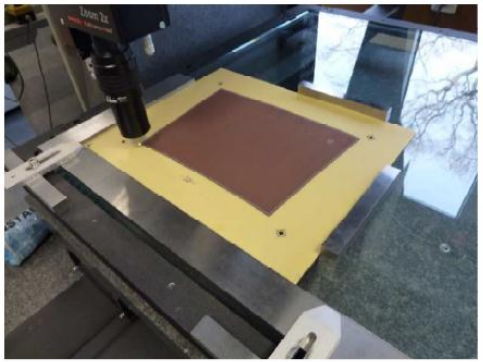
PIECE : LEITERPLATTEN

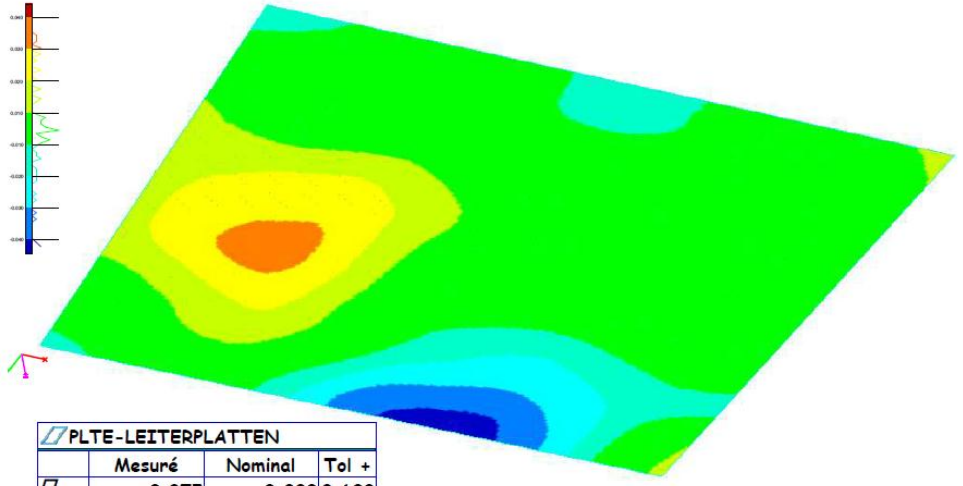
No EDMS 1203454

1 / 1

Controleur : Lilian REMANDET	Plan No : ---
Client : S. HERLANT	Fournisseur :---
Machine : Ferranti	Piece No : N°1
Temperature : 20°C ±1°C	Date : 07/03/12 16:05:13
Precision des mesures : ± 3 µm	Nom du programme :

CONCLUSION CONTROLE	VISA MME	ACCEPTATION CLIENT
OK	NOM :	NOM :
NON CONFORME	DATE :	DATE :





PLTE-LEITERPLATTEN

	Mesuré	Nominal	Tol +
▱	0.075	0.000	0.100

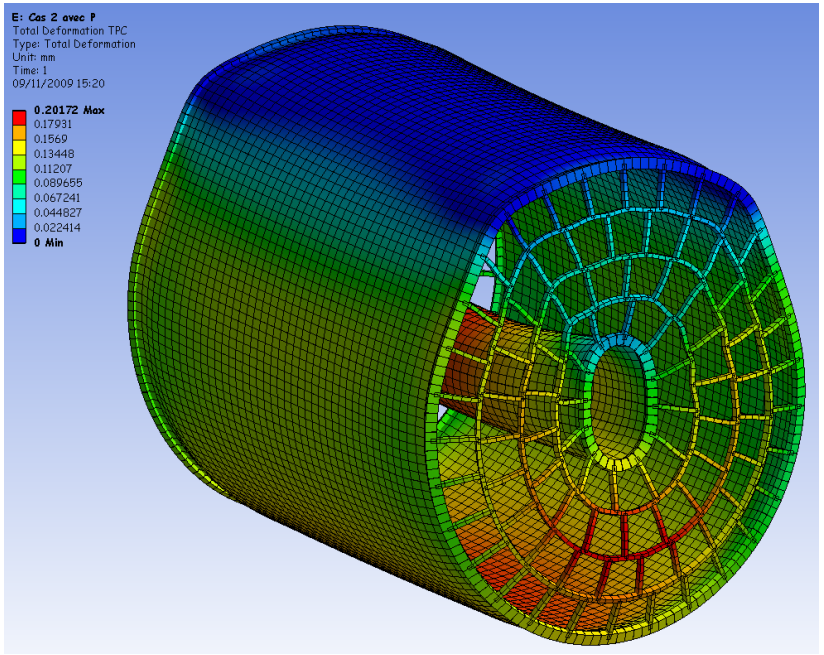
Metrologic Group - M8.1250.XG 13

Present status

- Front-End cards : first batch of 12 fully cabled and ready for testing this week.
- 4 PCB ready and measured. Resistive bulk being applied and gluing on frames this week.
- Production of 50 more cards and 5 more modules will start immediately after these tests if everything OK.

Mechanics (DESY and Saclay)

- Study models with 3, 4 and 8 wheels
- Study deformations under weight, overpressure, holding beams
- Compare optimizations
- Measure mechanical properties of various materials, Al-Cfibre hybrid samples



Outlook

- Building and characterizing detectors with a radioactive source is underway.
- Plan to be ready for mounting at DESY in May and start data taking mid-June 2012.