TPC Status

K.Fujii and R.Settles on behalf of LC-TPC

LCTPC MOA to R&D/design a TPC: Status August2008

Americas

BNL √
Carleton√
Montreal req
Victoria √
Triumf√
Cornell √
Indiana√
LBNL prom
Louisiana Tech req

Asia

Tsinghua√
CDC:
Hiroshima req
KEK √
JAX Kanagawa req
Kinki U√
Nagasaki InstAS req
Saga √
Kogakuin √
Tokyo UA&T req
U Tokyo req
Minadano SU-IIT req

Europe

Brussels√
LAL Orsay req
IPN Orsay req
CEA Saclay √
Aachen √
Bonn√
DESY √
EUDET√
U Hamburg √
Freiburg req
Karlsruhe req
MPI-Munich√
Rostock√
Siegen prom
NIKHEF√
Novosibirsk√
St. Petersburg prom
Lund√
CERN√

Observer groups

Iowa State
MIT
Purdue
Yale
TU Munich
UMM Krakow
Bucharest

Signatures 24
Promised 3
Requested 11
New groups welcome

Draft 11122008

Addendum 2008 to the LCTPC MOA: R&D organization

Overview

The status as of November 2008 about R&D responsibilities, structures and plans are outlined in this document. All issues for the TPC performance within the linear collider framework have been described at several reviews since 2001, most recently for the WWS R&D review in LC Note LC-DET-2007-005 at http://flcweb01.desy.de/lcnotes/. The names of LCTPC members will be updated at https://wiki.lepp.cornell.edu/wws/bin/view/Projects/TrackLCTPCcollab.

TPC Section of the LoI

Questions for LCTPC

LCTPC issues for the LOI

1. Performance goals
   - R&D plans/options/risks
   - How was the subdetector optimized?
     (e.g., using resolution, costing?)
2. Sensitivity to backgrounds
3. Calibration and alignment schemes
4. Engineering model for LOI and simulation
   - Size, weight, support, dead areas
   - Endplate, electronics, power
   - Fieldcage, chamber gas
5. Push-pull ability
6. √s coverage

TPC Section of the LoI

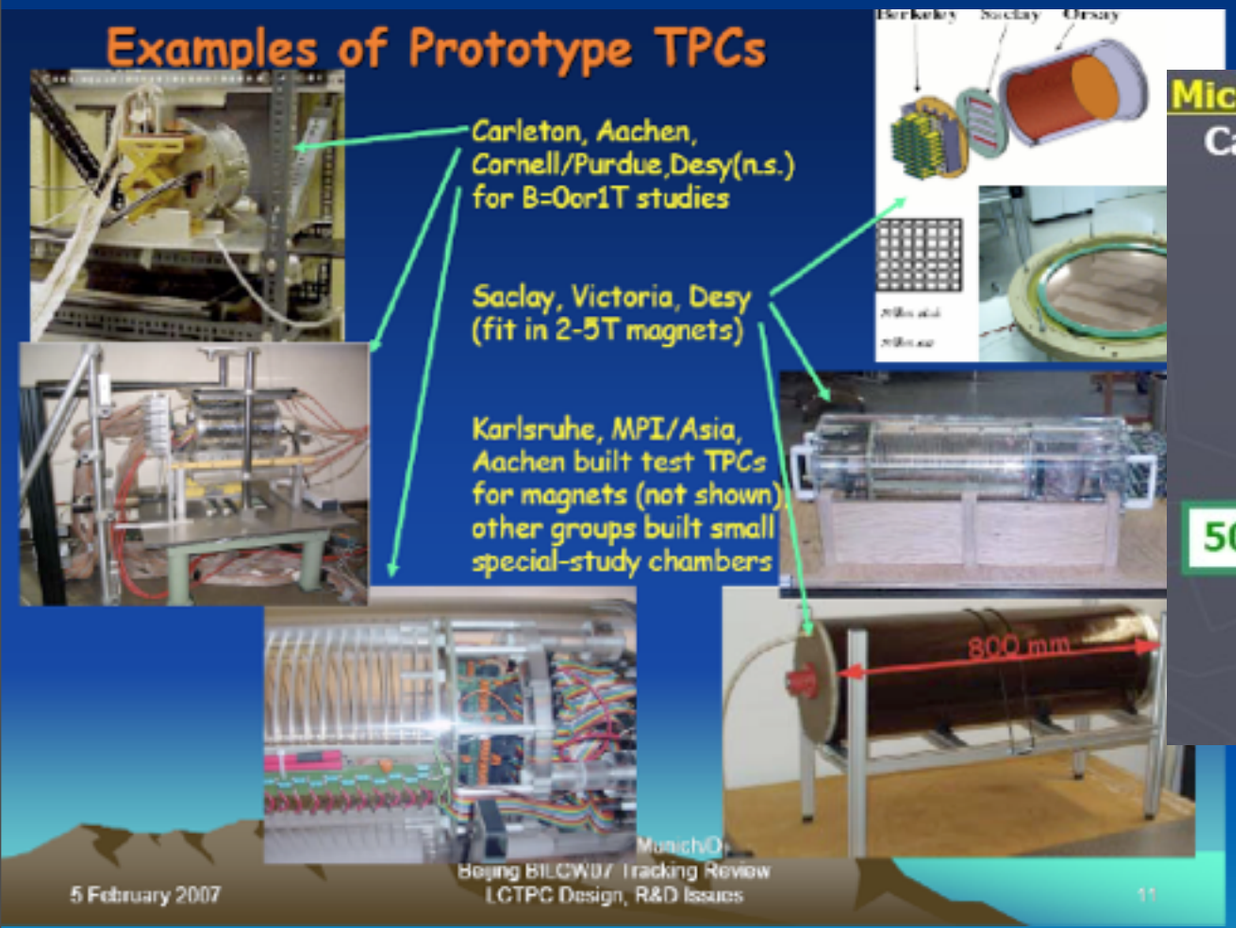
Status: Draft 15 being circulated in LCPTC

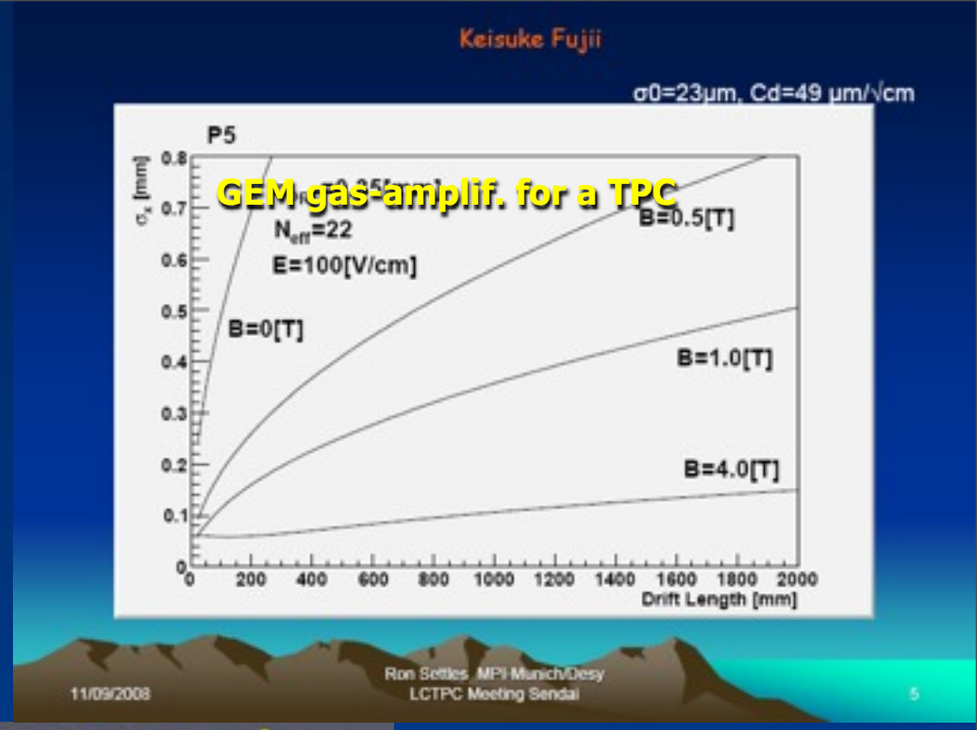
- Motivation: rationale for TPC
- Design Issues
  - Performance goals — 4T->3.5T translation
  - Endcaps: MPGD readout planes
  - Readout electronics
  - Field cage
  - BG issues: pattern recognition, E/B distortion
  - Alignment (push-pull)
- R&D
  - LCTPC collaboration
  - SP/LP status/results — to be inserted
  - Endcap drawings — to be updated

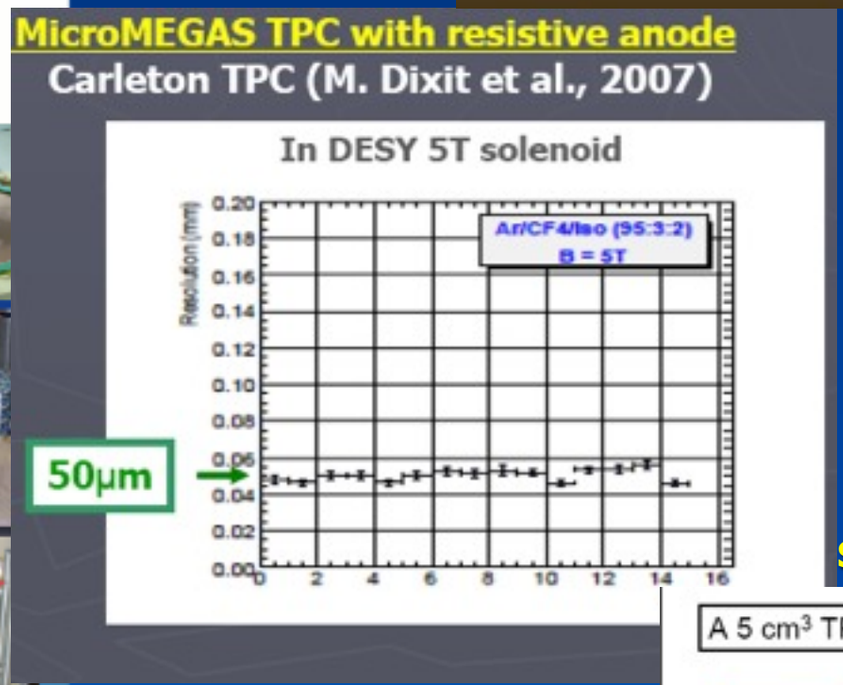
LCTPC performance goals

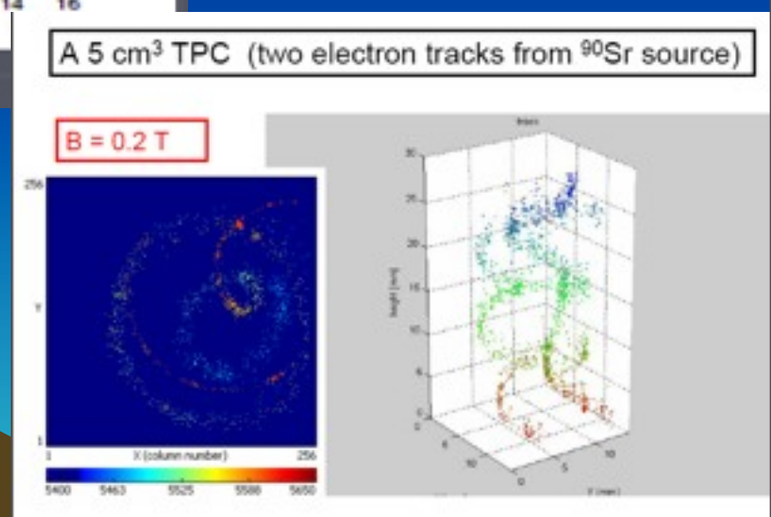
R&D plans/options

Present goals based on results from small prototypes using cosmics or beams at KEK, DESY, CERN. Three options left →

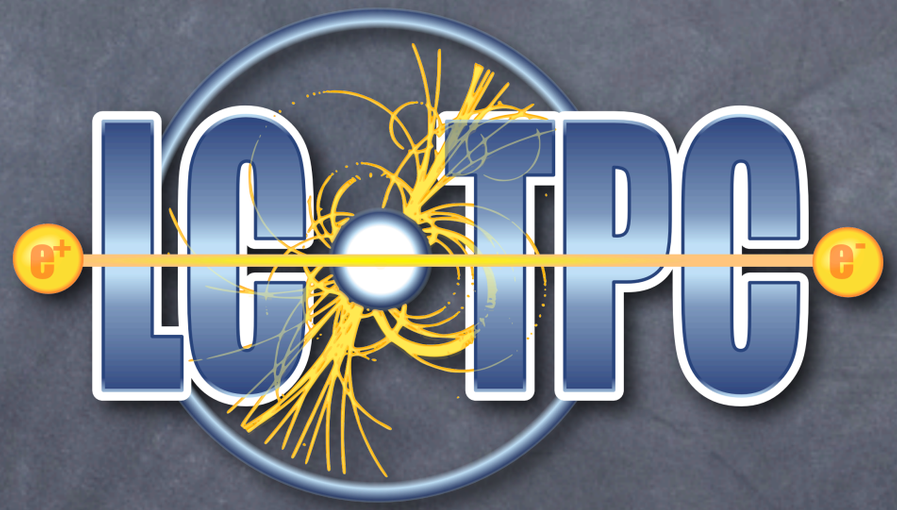








Important Milestone
LP1 Beam Tests

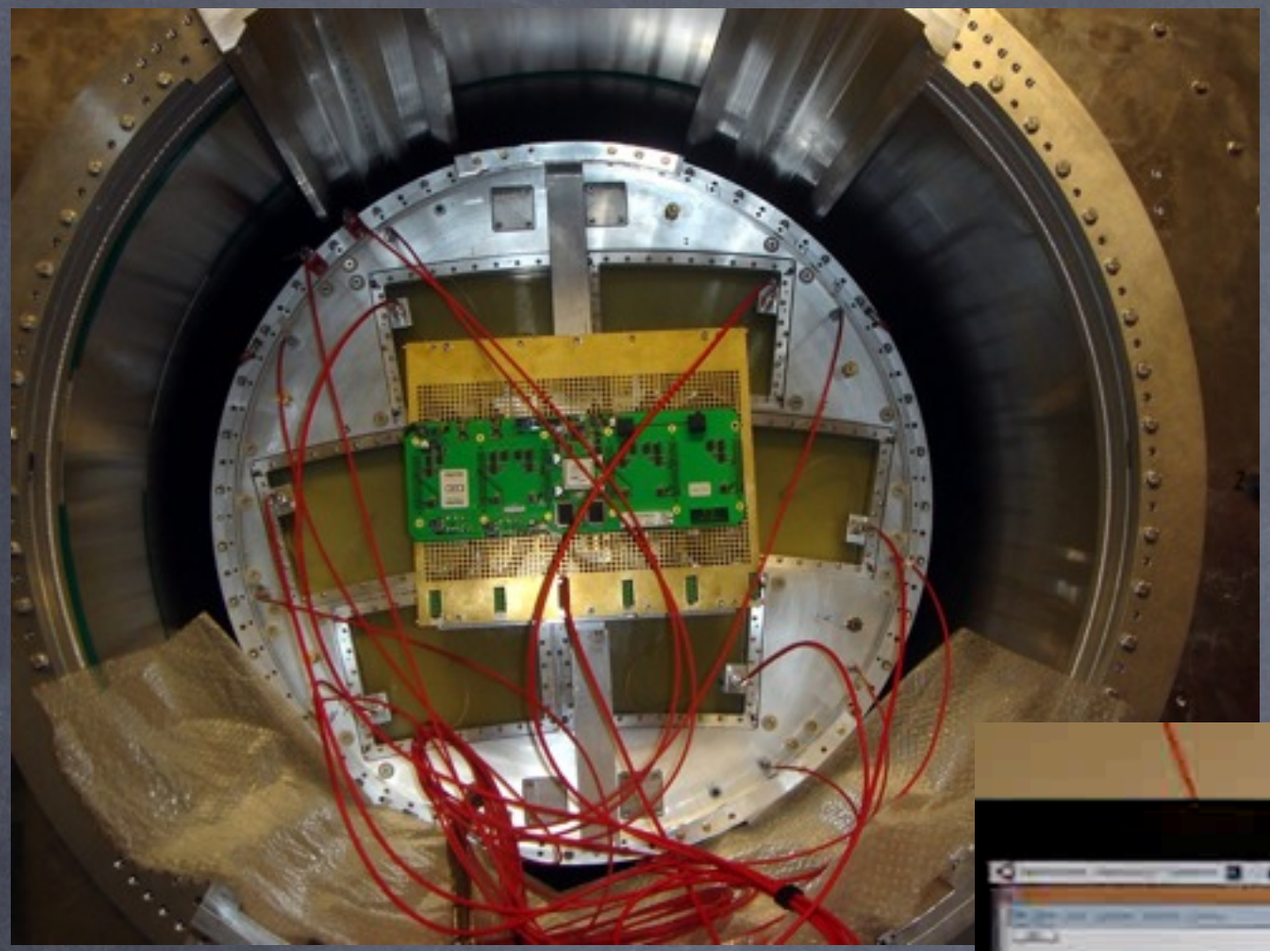


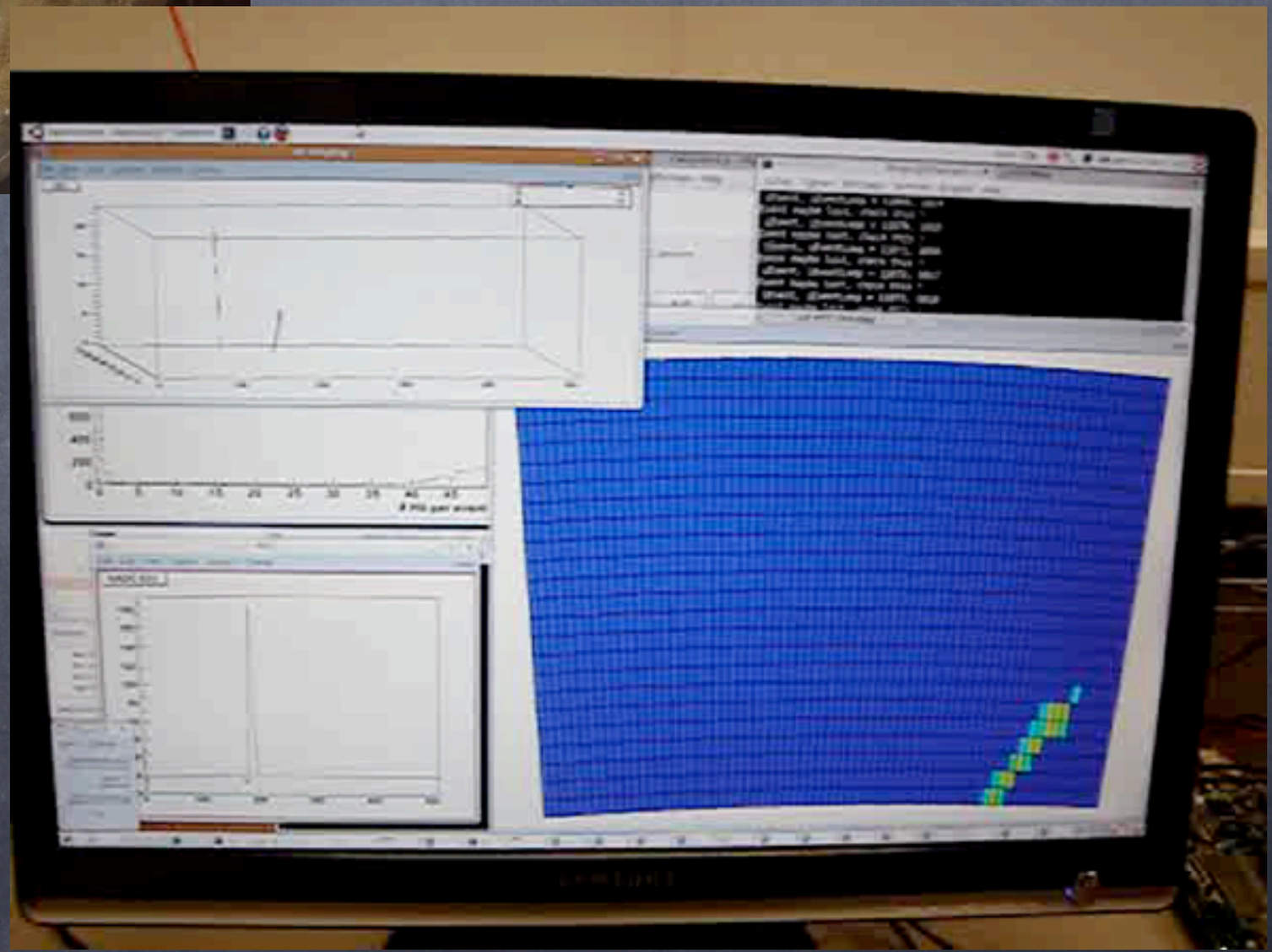
Micromegas module tests done in Nov./Dec. 2008
GEM module tests about to start

Micromegas Module Tests

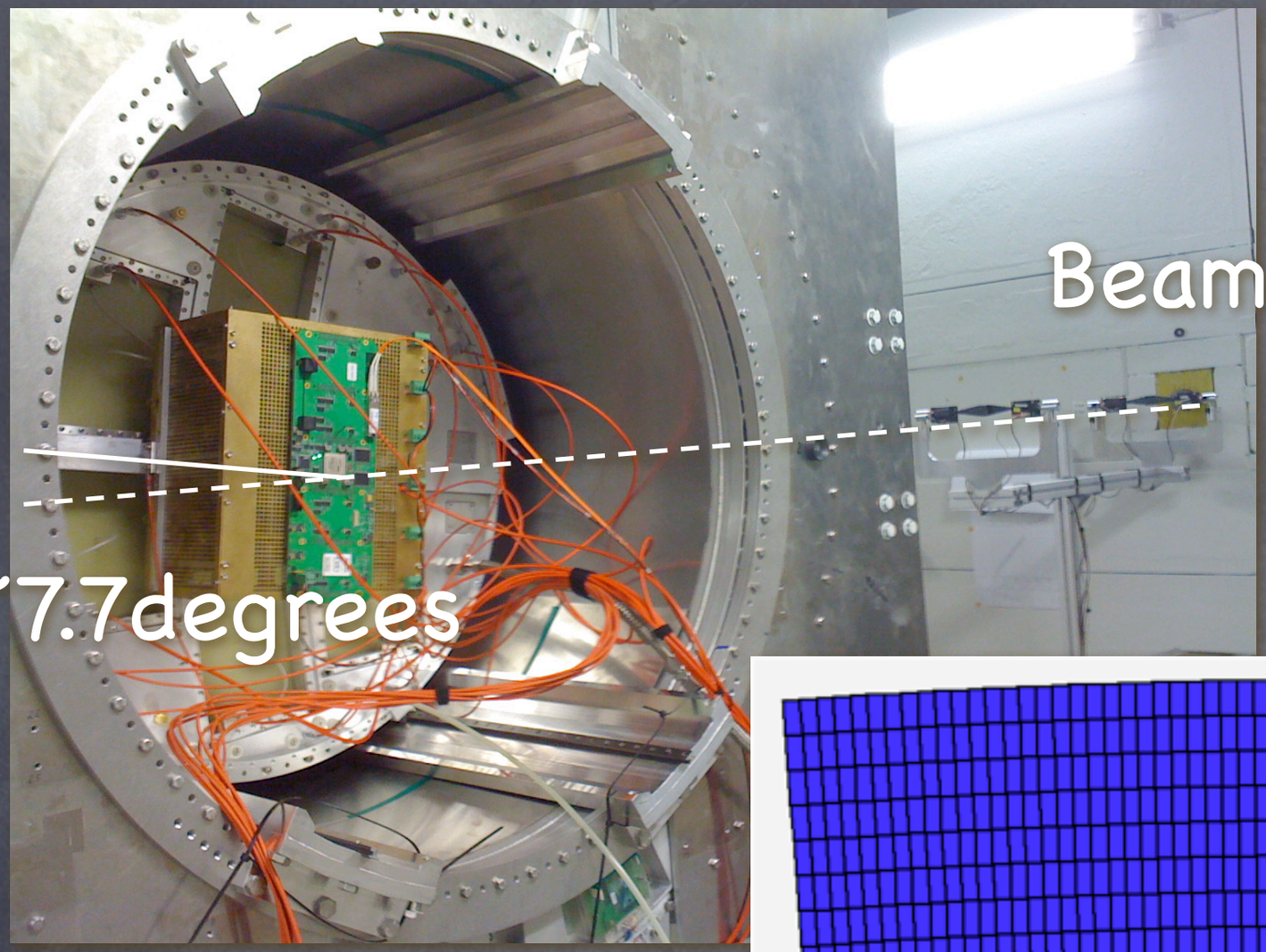
- Two modules, with and without resistive anode, exposed to beam
- New modules with different resistive anodes being fabricated and tested
- Analysis meeting held on Feb.11 at DESY
  - Data now on GRID

LP1 with a Micromegas Module and AFTER in the PCMAG





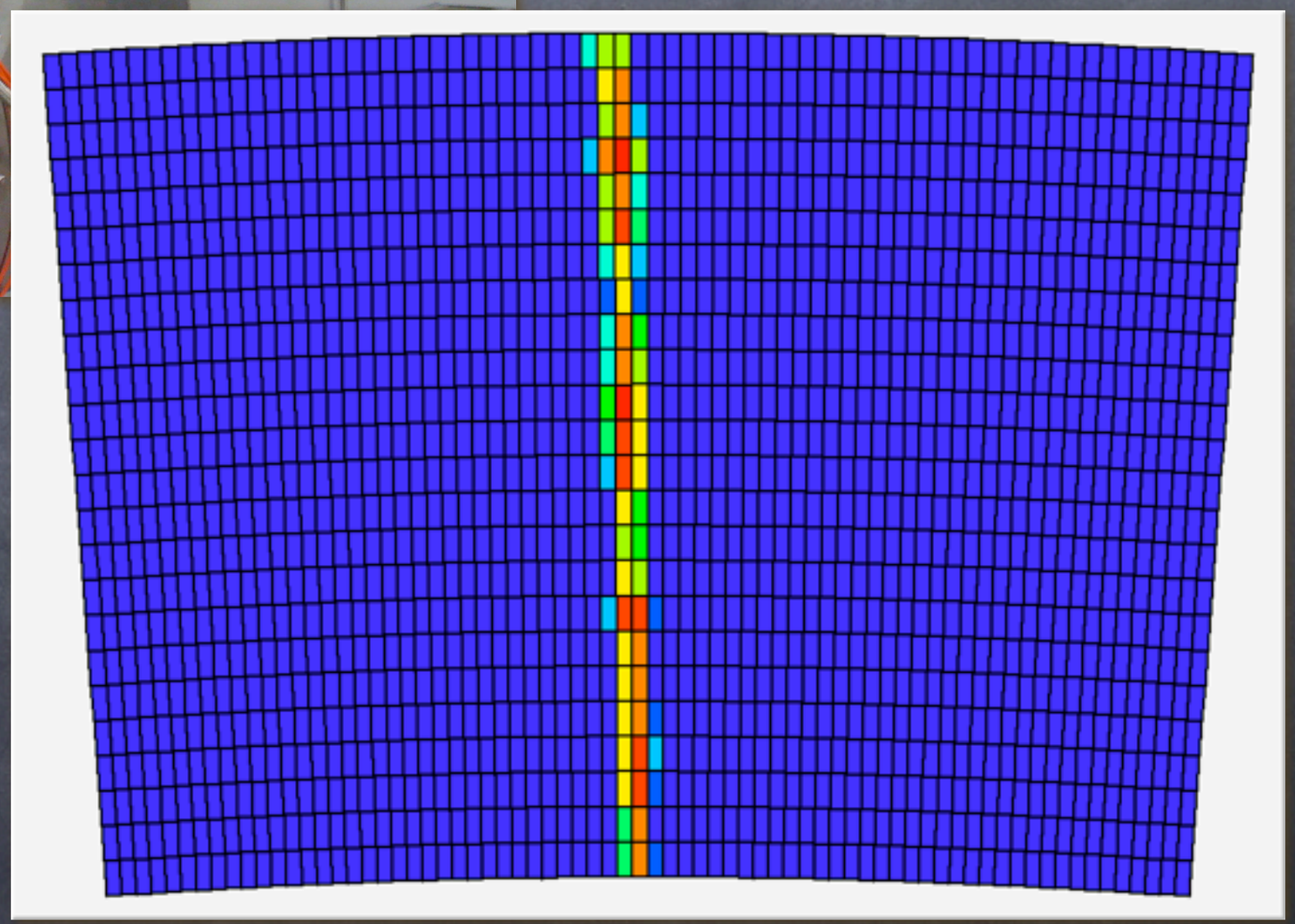
Cosmic Ray Events



~7.7degrees

Beam Position

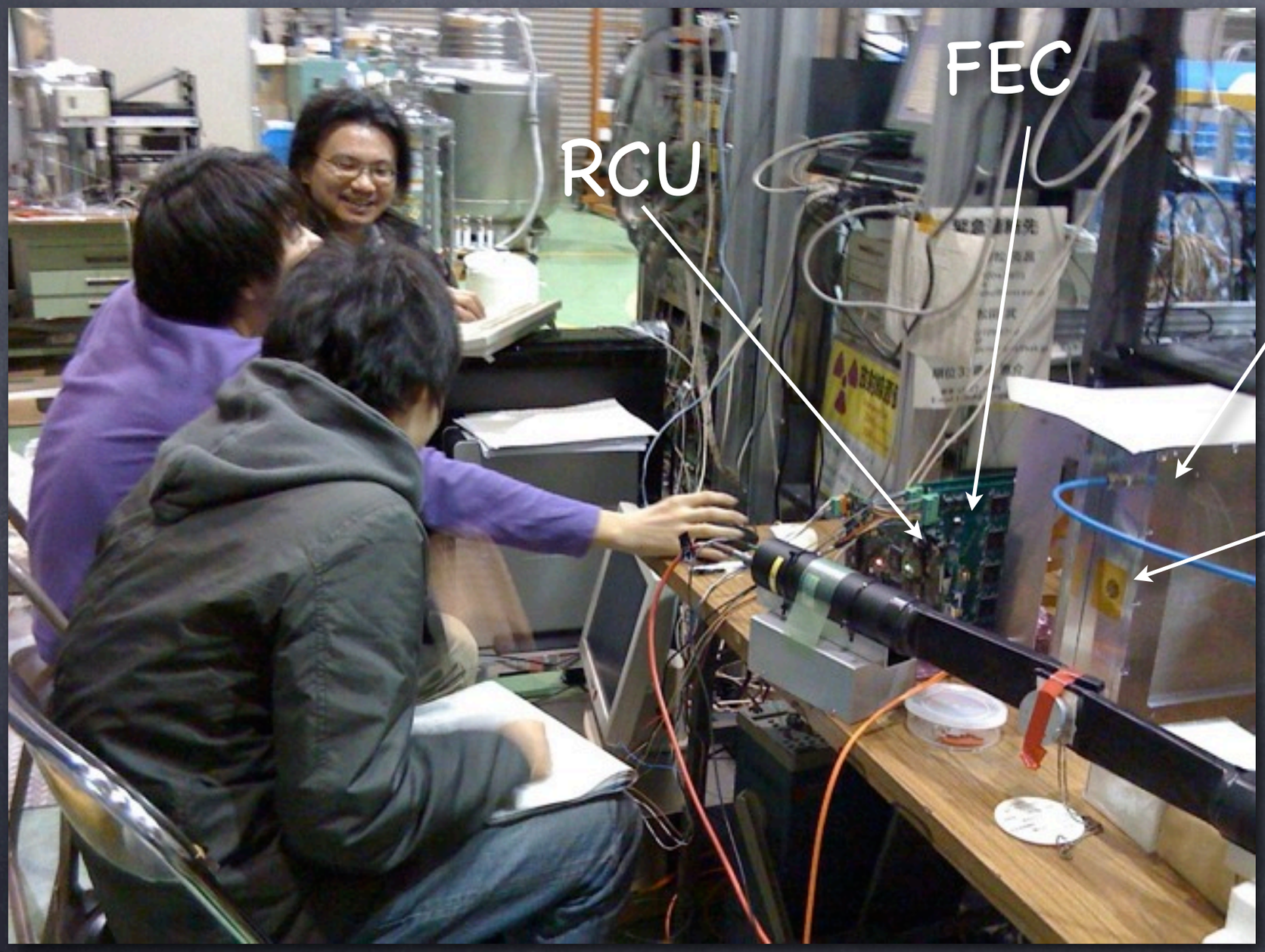
Beam Events



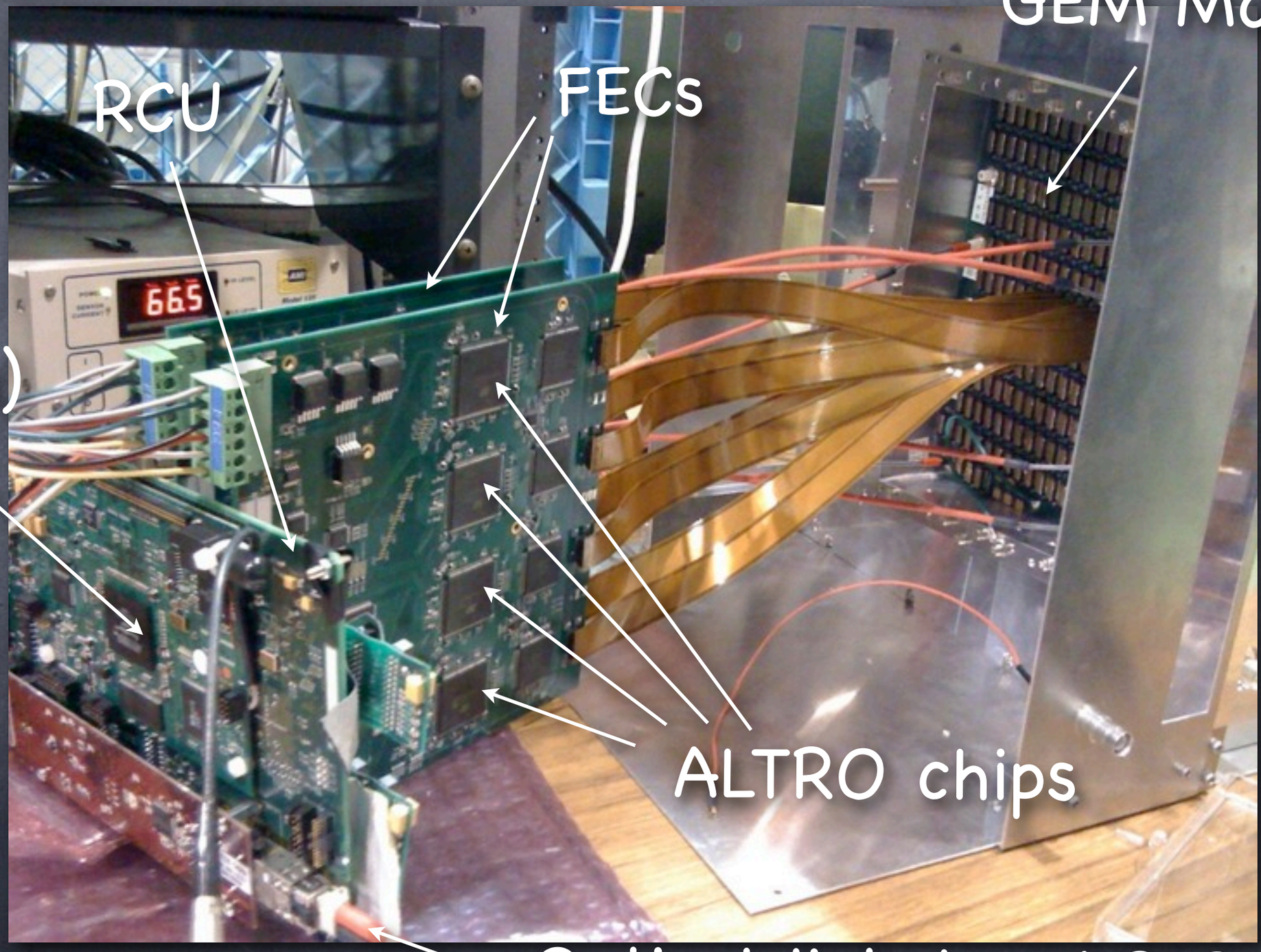
GEM Module Status

- 4 GEM modules fabricated at Saga Univ. The 1st one shipped from KEK and the other three shipped from Saga, all of them now at DESY.
- The 1st GEM module had been tested at the KEK cryo-hall with the ALTRO DAQ (1 RCU mounting 2 FECs, each carrying 8 ALTRO chips), all of them now being tested at DESY.

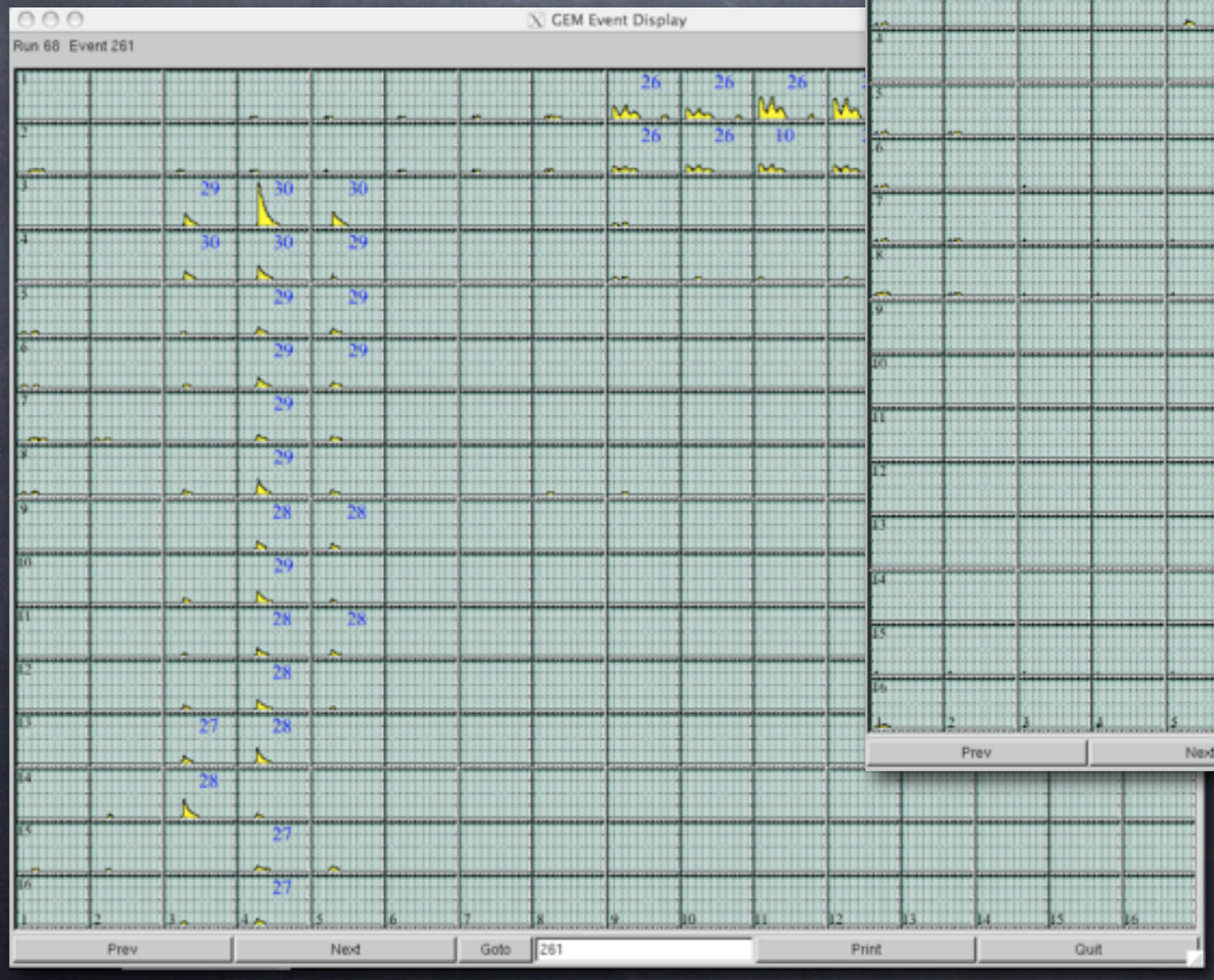
KEK Cryo-hall Test

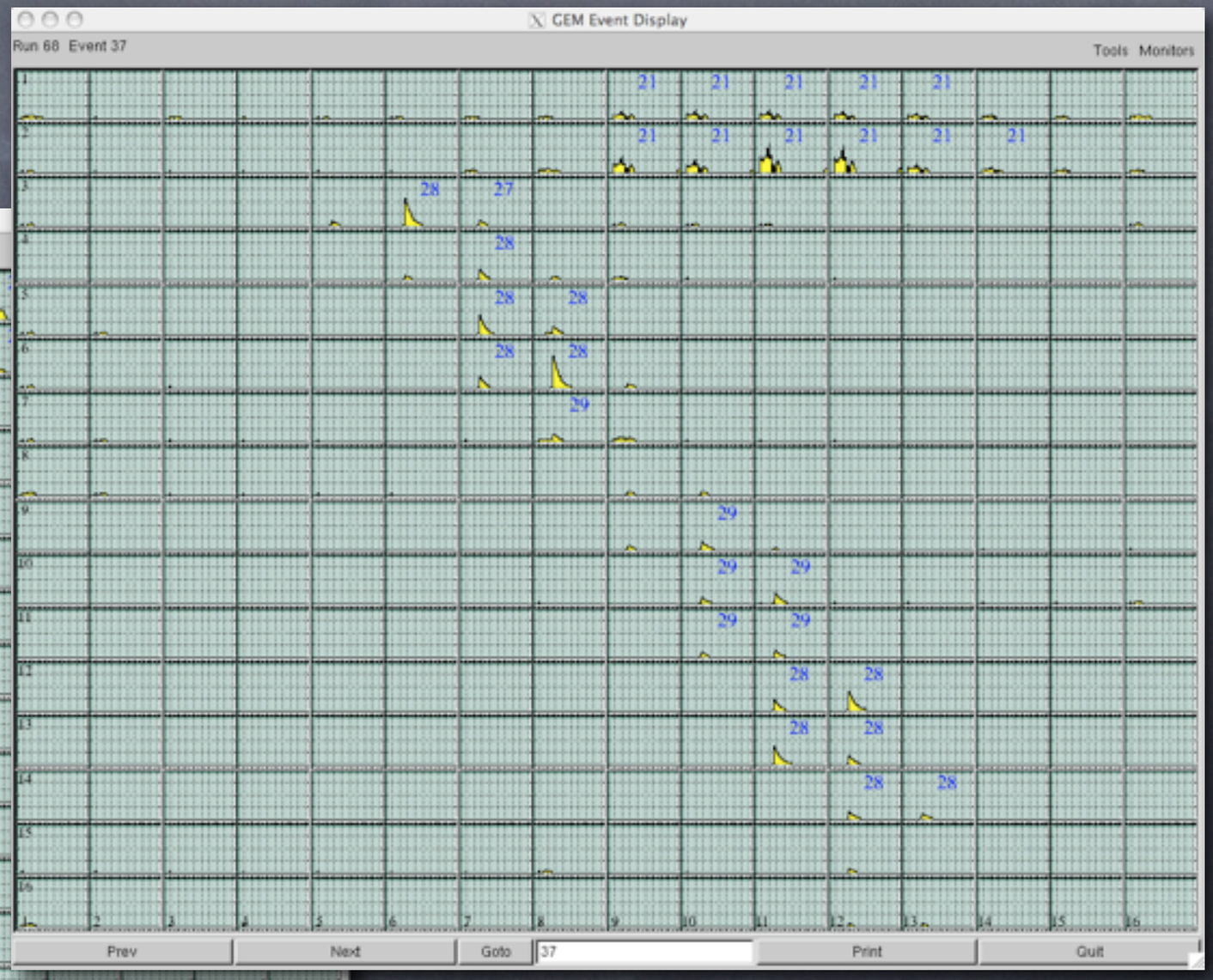


ALTRO DAQ from Lund

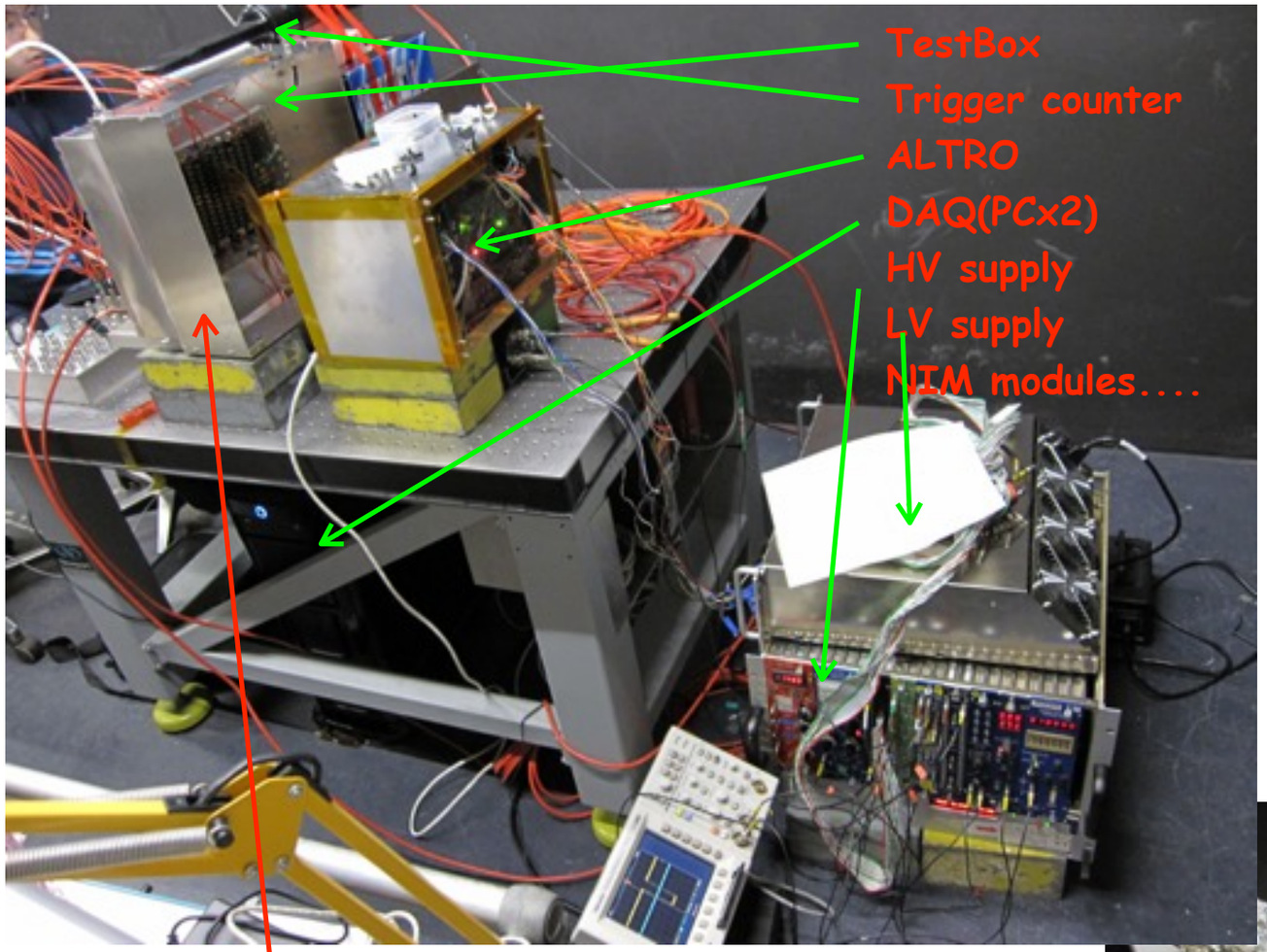


Sample Sr90 Events at KEK

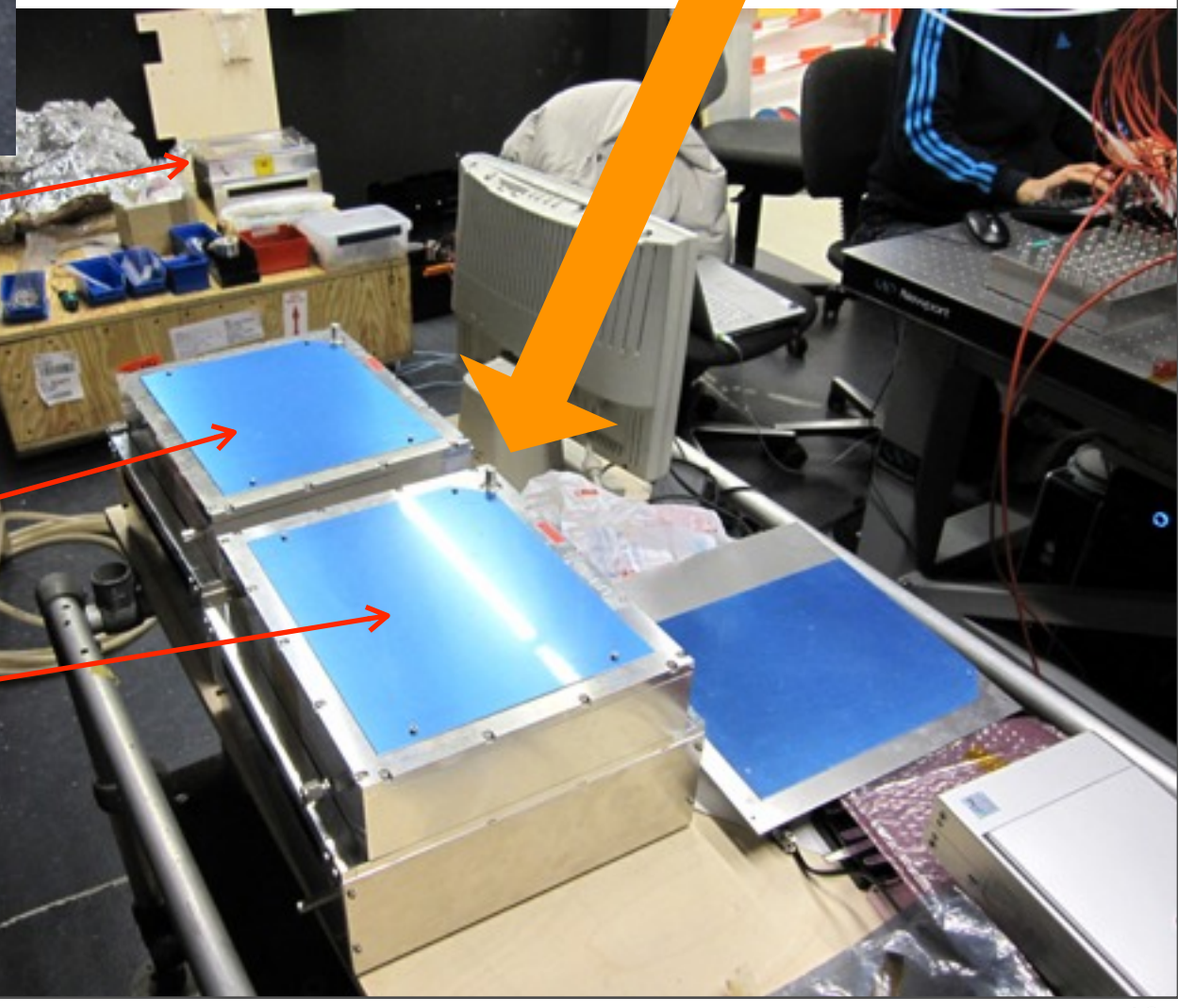




Package from Japan



PCB from Tsinghua



GEM module #1
is ready to be installed

GEM module #2
on test with cosmic ray

GEM module #3

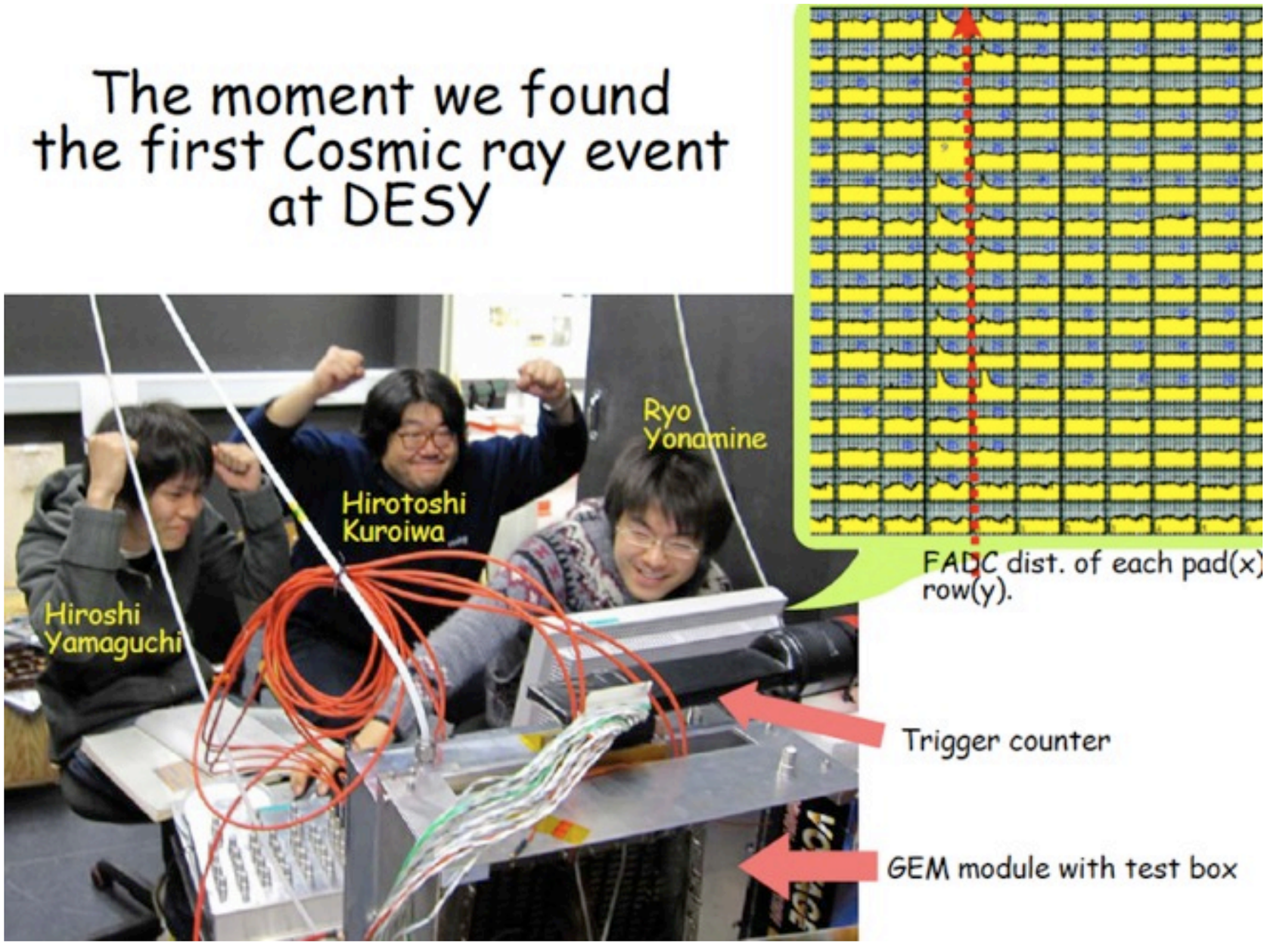
3 spare GEMs
3 Gate GEMS

GEM module #4

Everything now at DESY

Standalone Test at DESY

A GEM module with local DAQ



YATTAH !!

Standalone Test at DESY

A GEM module with local DAQ

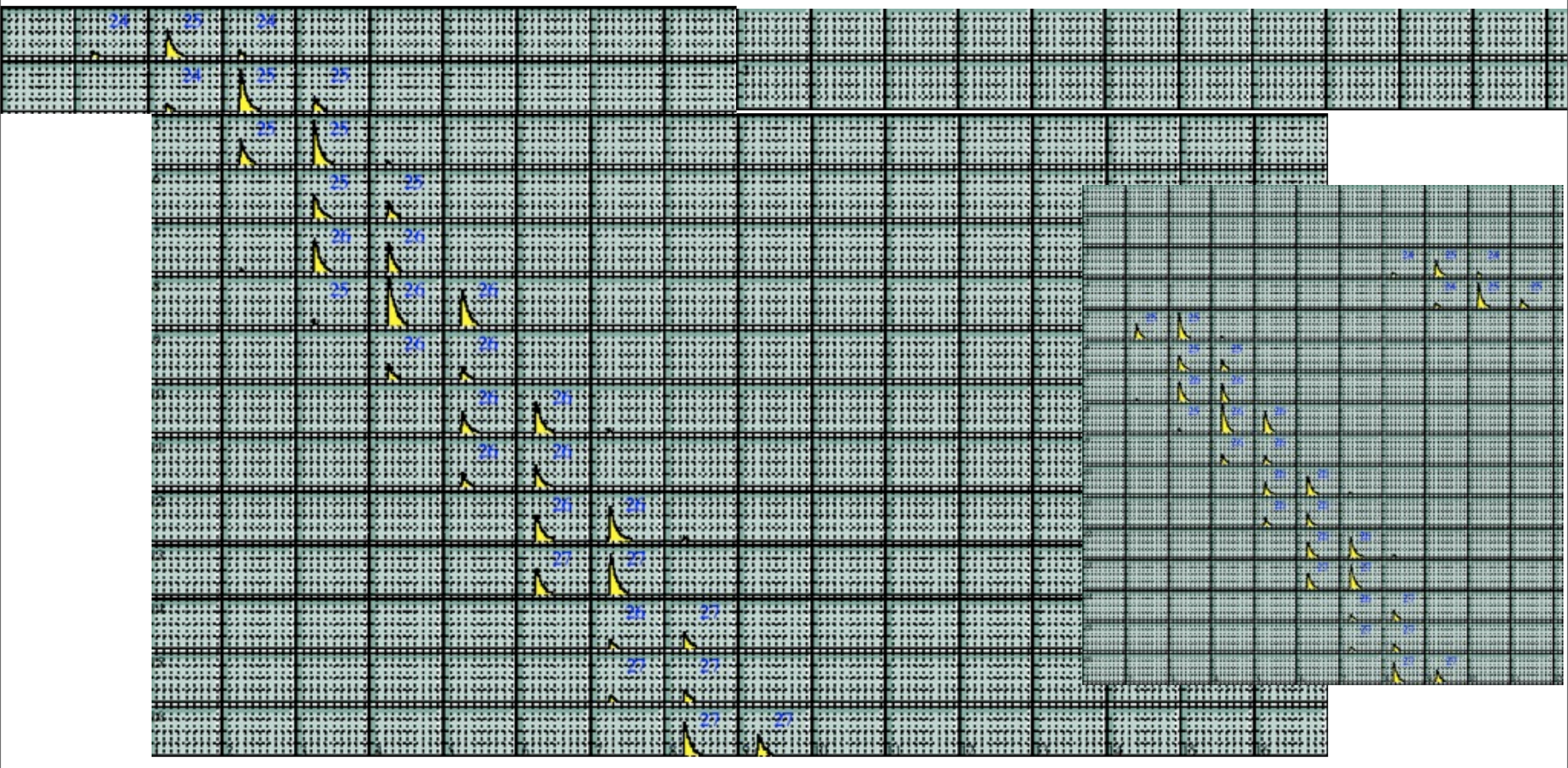
YATTAH !!

How cosmic ray data look

2 FECs available for local DAQ -> 8 connectors = 16 layers of 16 pad series

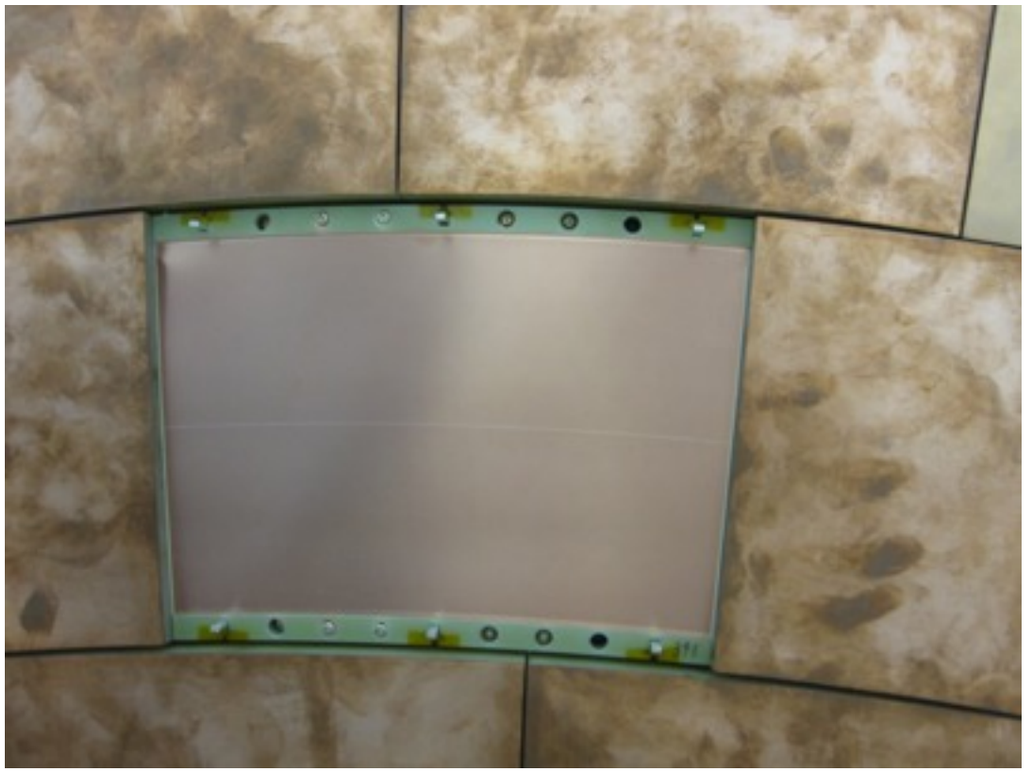
Offline quick monitor

Each hist. corresponds to a ADC-vs-time plot (flash ADC dist.) for each pad (~1x5 mm2)
you would reconstruct a track in your brain easily



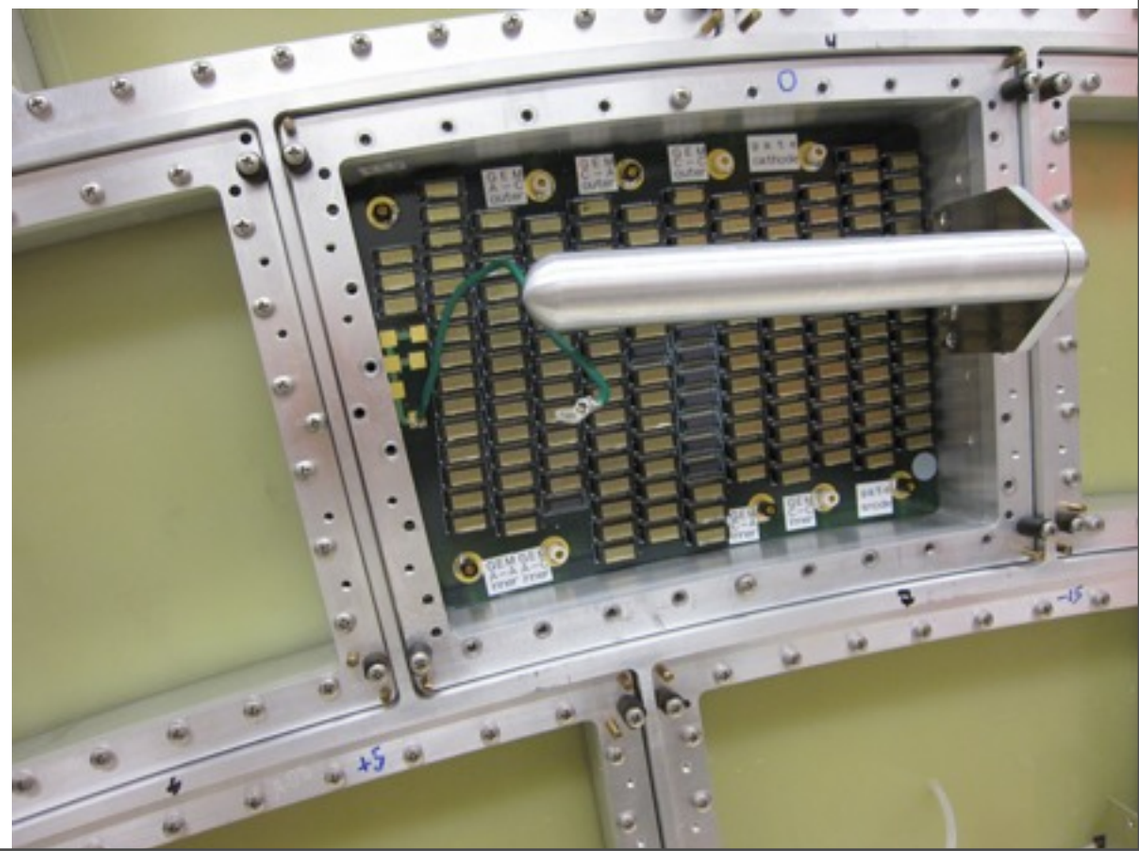
What we are testing before installation.

GEM is OK ? can be known from HV vs current
Cosmic ray data from ALTRO DAQ



We don't use a Gate GEM this time.
  How a GEM module fits into EP
!! Insulator is facing the drift region !!
!! There is 1cm GAP
    between the GEM surface and the dummy surface
--> apply 7th grid V to recover this difference

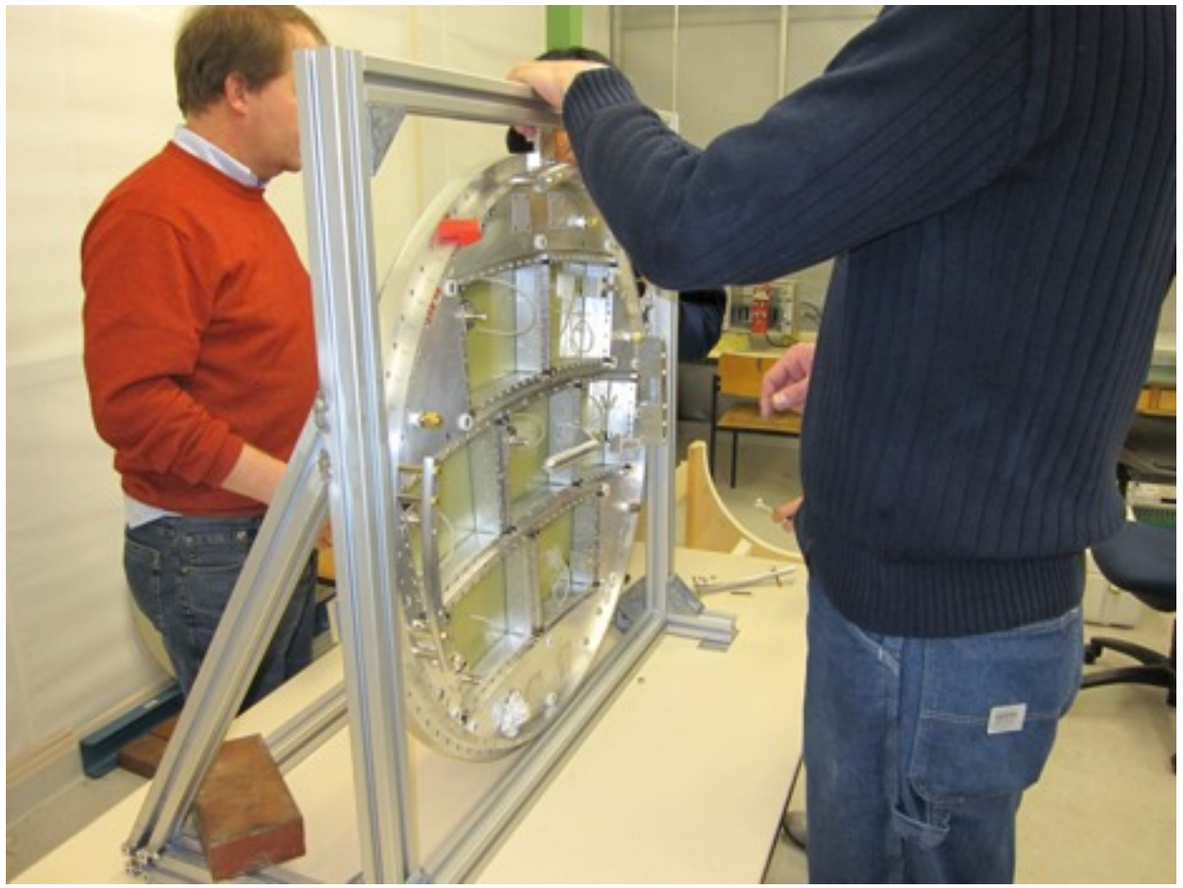
Bunch of tiny connectors
  grounding connectors (receptacles) are
    mounted on all unused connectors
      10 HV connectors
  2 for a segment of GEM x 2 segments x 2 layers
  2 for a GATE (unused this time)



Exercise of module installation

Klaus and Volker prepared a nice setup
for our exercise

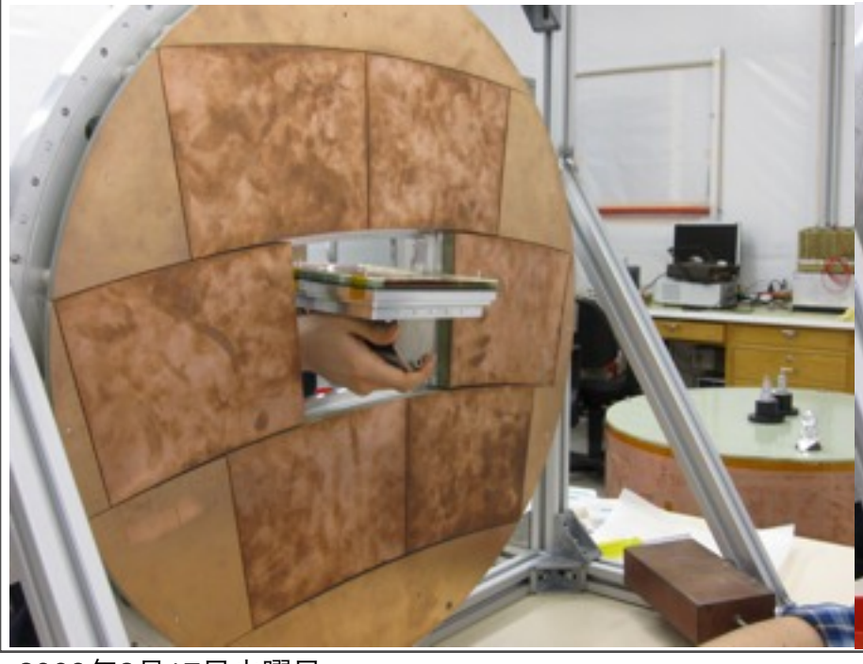
We started exercise of installation
with dummy module.



We also did practice with a real module.

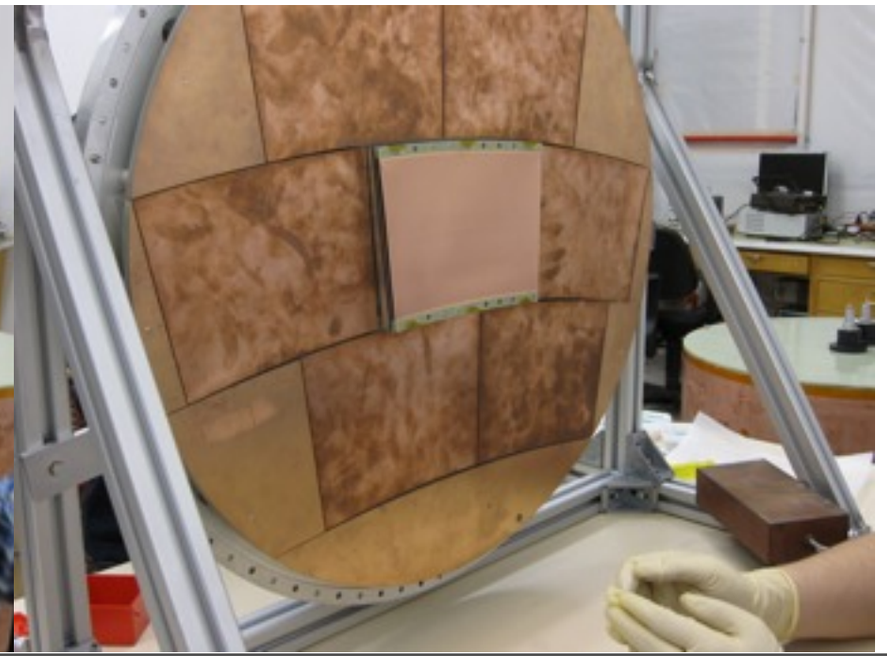
We made sure this module's alive after practice!

put GEM module into "LP1"



flip module right way

pull back to right position



Schedule

	2	Mon LP1	GEM moduke
Feb	3	Tue PCMAG cooling	
	4	Wed	GEM arrival
	5	Thr Stand-off replace	Standalone setup with local DAQ
	6	Fri	channel mapping
	7	Sat	noise study
	8	Sun	gain check/HV set
	9	Mon close EP+	cosmic ray test
	10	Tue cathode meas.	**install 1st GEM to LP1**
	11	Wed **LP1 move to testbeam**	EUDET/ALTRO elec. Arriv
	12	Thr	local test of
	13	Fri	2nd/3rd/4th module setup @LP1
	14	Sat	
	15	Sun	
	16	Mon take Beam data	
	17	Tue w/ 1st Module	ALTRO/FEC tuning shaping....
	18	Wed	drift distance
	19	Thr	phi angle
	20	Fri	
	21	Sat	**install 2nd/3rd module**
	22	Sun	
	23	Mon take Beam data	
	24	Tue w/ 3modules	
	25	Wed	
	26	Thr	
	27	Fri w/ TDC electronics	replace elec. Of 1 module
	28	Sat	
Mar	1	Sun	
	2	Mon take Beam data	back to ALTRO electronics
	3	Tue w/ 0 Tesla	
	4	Wed	
	5	Thr	
	6	Fri	
	7	Sat	
	8	Sun	
	9	Mon	

We are only a few days behind schedule

- The ALTRO DAQ being setup by Lund people. Hopefully be ready by the end of this week.
- 3 GEM modules to be installed in LP1 very soon.
- The 1st beam the end of this week?