



Test Beam: Plans for 2009



International Workshop on DEPFET Detectors and Applications

Heidelberg (Germany)

11th September 2008

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IFIC-Valencia



Outline



- Test Beam 2008
 - Short description of the experience
 - Things to repeat next year
 - Linux DAQ
 - Mechanics
- Test Beam 2009
 - Time schedule
 - Improvement of the set up
 - New elements (beam finder, bigger matrices...)



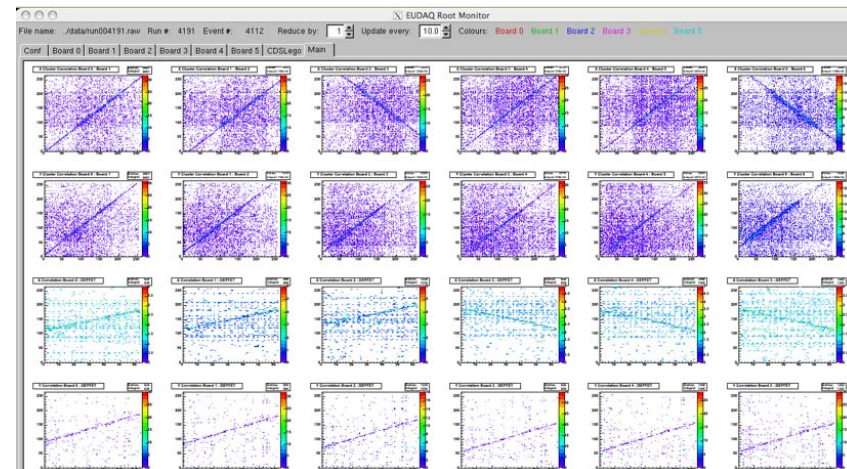
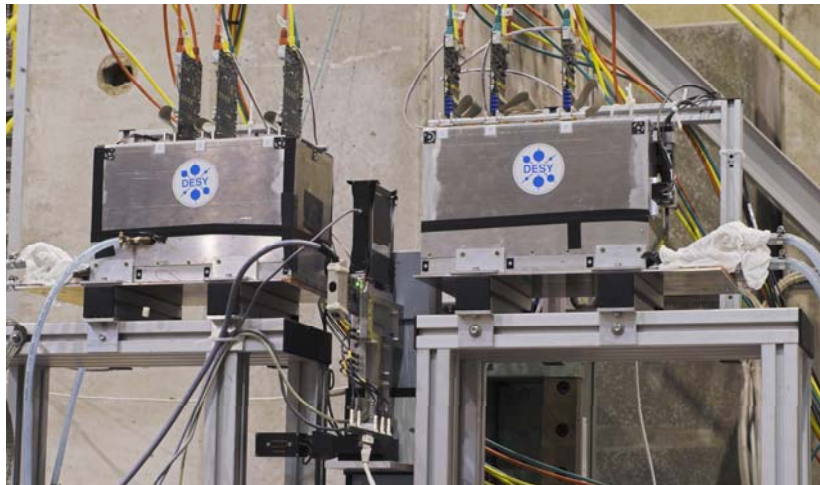
TB 2008 - EUDET



- EUDET DUT



- Good collaboration and understanding between the two groups.
- Useful discussions and ideas (E_{beam} scan)
- Let's see what comes out of Julia's analysis





TB 2008 - EUDET



17-July-2008

2008 SPS Fixed Target Programme

Version 1.6

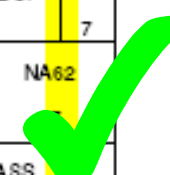
Colour code: blue (dark shading) - not yet allocated ; yellow (light shading) - not allocatable or Machine Development

	P1	P2	P3	P4	P5	P6
	24 19 May 12 Jun	28 12 Jun	35 10 Jul	28 14 Aug	28 11 Sep	34 9 Oct Nov
T2 -H2	EA NUCLEON ... 3 13					
T2 -H4	EA ... 3 8 5 3	8 3 4 2 7 6 7 13 6 13 8 7 6 14 8 6 22				
T4 -H6	EA SILC ATLAS ATLAS ATLAS ATLAS RD42 CERF ATLAS MONOP ... R&D BCM ... DIAMOND ... MINEGA ... 3 5 8 6 7 7 8 4 3 6 7 7 14 7 8 6 7 15 6 7 7 2 12					
T4 -H8	EA ... 3 13	TOTEM ATLAS MDT	ATLAS MDT	ATLAS ATLAS TOTEM RD22	ATLAS LHCb VELO AMS	AMS ATLAS-TRDUP ATLAS
T4 -P0	EA ... 3 13					NA62
T6 -M2	EA COMPASS ... 3 13	28	35	28	28	34
CNGS	EA CNGS ... 3 13	CNGS 28	CNGS 35	CNGS 28	CNGS 28	CNGS 34

- Although the official schedule
 - EUDET main user / DEPFET parasitic
 - DEPFET main user / EUDET parasitic



- 'Real' schedule
 - DEPFET and EUDET sharing the beam





TB 2008 - DAQ



- Linux DAQ
 - Includes: Run Control, USB Driver, Readout Software, Data Management, DQM (Data Quality Monitoring)
 - Very stable (keep on developing)
 - Easy to use once its running
 - Huge amount of information available online
 - Online Monitor (http://fourl.web.cern.ch/fourl/TB_2008/)
- Export to institutes to reduce dependency on experts (Sergey and Julia)



TB 2008

Run Control



Run Control Client

File Prefix:
 Run Num:

Command:
 Server:
 Port:

```

EVB:: N Events_Tot=503
EVB:: N_timed_out=0
EVB:: N_extra_mod=500
EVB:: shmem_error=0
EVB:: RUN_Flag=0
EVB:: RUN_Time=0 sec
EVB:: Average_Rate=100.60 Hz
EVB:: File_Max_Size=4290000000
EVB:: RUN Message: IN Buffer Empty, Waiting 2 sec
EVB:: N BOR=1 of tot=1
EVB:: N_EOR=1
EVB:: N Events File=503
EVB:: FILE_Flag=1 Format=0
EVB:: File_Prefix=Run
EVB:: File_Name=DATA/Run1000-000.dat
EVB:: Mod_tot=1 (max=6)
EVB:: IN_Buffer=0 (0.000000 %)
EVB:: EVB_Buffer=0 (0.000000 %)
EVB:: TTL=100000
EVB:: Shm.Lat.SEND:: Mean= 1.6 usec RMS= 6.6
EVB:: Shm.Lat.RECV:: Mean= 5.6 usec RMS= 35.3
EVB:: Shm.Lat.EVB:: Mean= 1.9 usec RMS= 8.0
EVB:: EVB ready
EVB:: N Producers=1
EVB:: N Musers=0
EVB:: N Clients=2
EVB:: Cl=0(0) REQ=0x05 Rate= 0.0 Hz N_evt=502 Host=localhost:11907
EVB:: Cl=1(4) REQ=0x03 Rate= 0.1 Hz N_evt=154344 Host=Ishtar.physik.uni-bonn.de:15534
*** Run is Stopped for 2 sec.. !!!
  
```

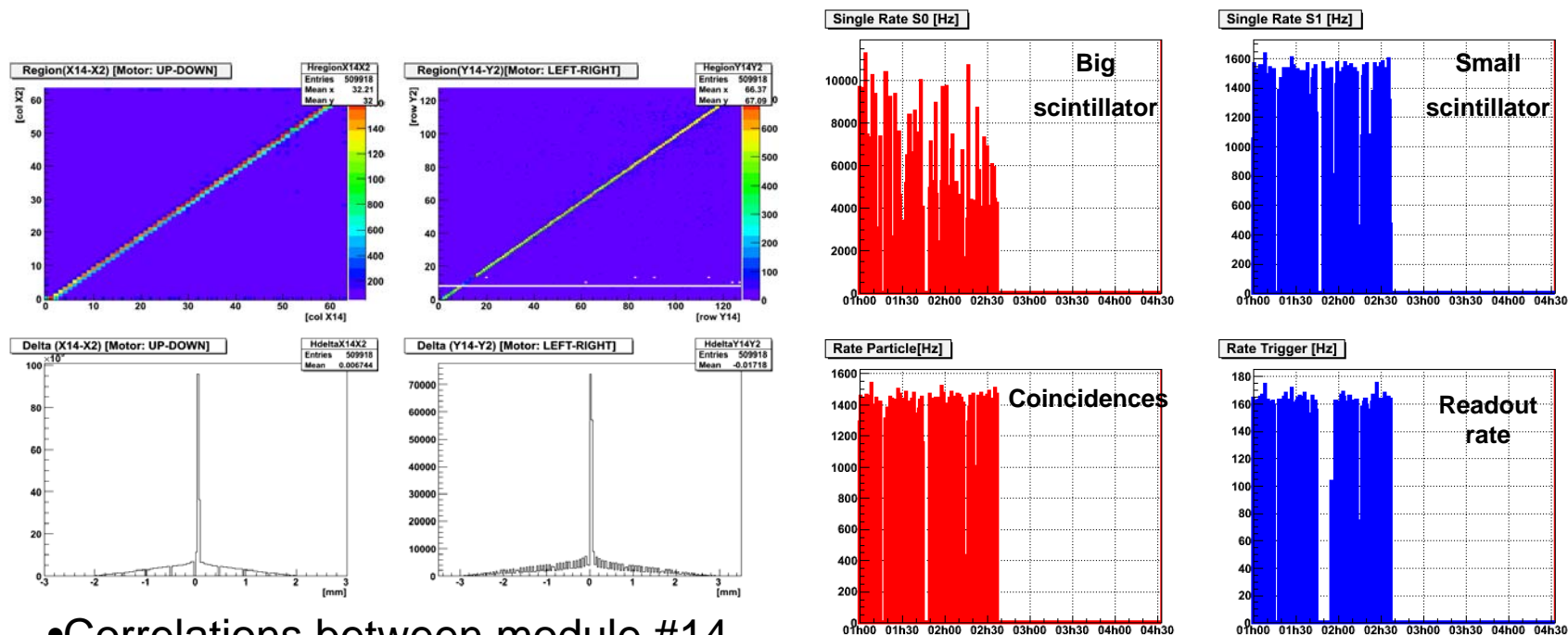
RUN_Number	1000
File_Prefix	Run
RUN_Flag	0
RUN_Time	0 sec
N_Events_Tot	503
N_timed_out	0
N_extra_mod	500
shmem_error	0
FILE_Flag	1 Format=0
File_Name	DATA/Run1000-000.dat
N_Events_File	503
IN_Buffer	0 (0.000000 %)
EVB_Buffer	0 (0.000000 %)
EVB_busy	
N_Producers	1
Mod_tot	1 (max=6)
N_Musers	0
N_Clients	2
N BOR	1 of tot=1
N_EOR	1
TTL	100000
Rate	1(4) REQ=0x03 Rate=



TB 2008 - Monitor



ROOT based DQM



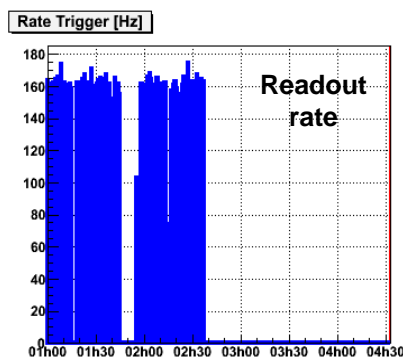
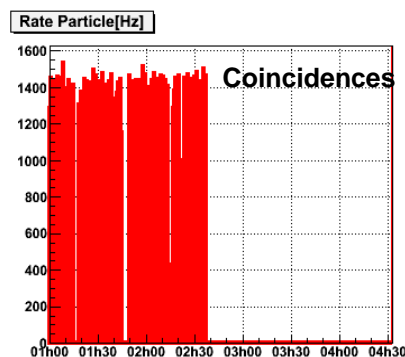
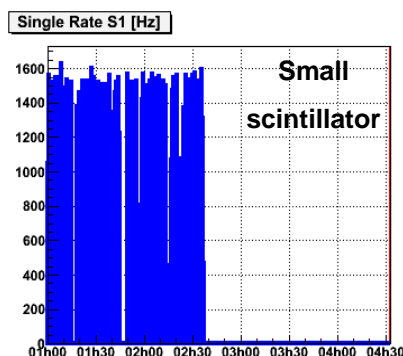
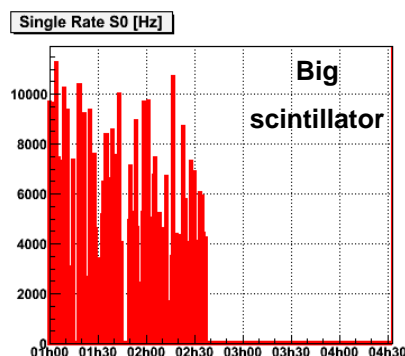
- Correlations between module #14 and #2
- Run 1284 (1 Mevents)

- Online evolution of the scintillators rates

Needed for alignment!



R/O rate



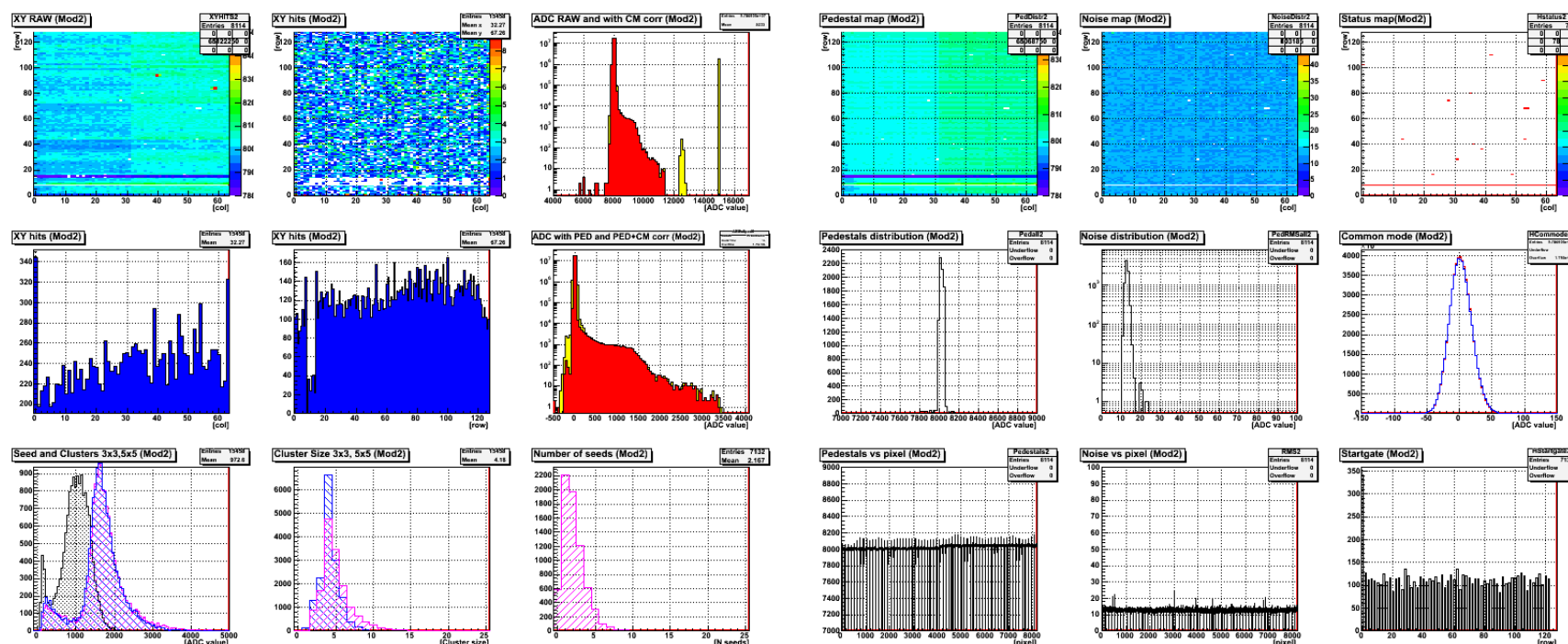
- We run out of space several times (~20GB/h)!!!
 - Zero suppression?
- Readout rate from 170Hz to 220Hz with DAQ separated into 2 PC (3+3 modules)



TB 2008 - Monitor



ROOT based DQM

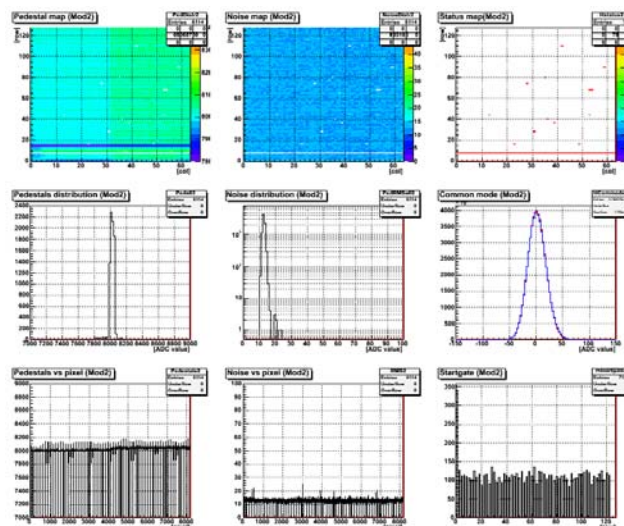
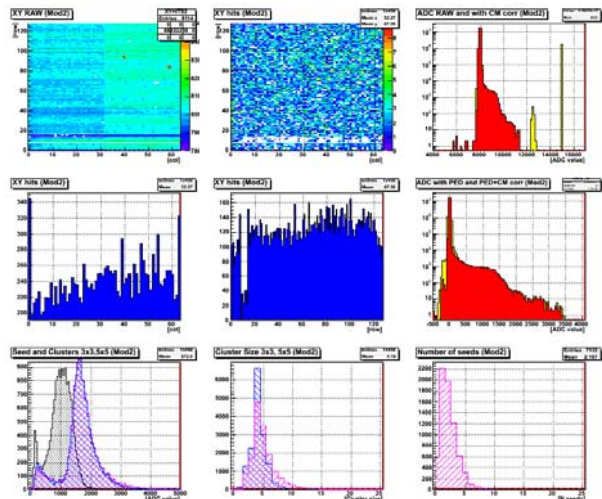


•Main distributions for module #2

•Run 1286 (70 kevents)



TB 2008 - Monitor



- New functionalities?
 - Cluster size NxM (e.g. 3x10)
 - Automatic restart after each run
 - Configuration of all parameters (thresholds...)
 - Reset histogram button
 - Reset pedestals button
 - Load pedestals button



TB 2008 - Analysis



- Analysis software: Looking into EUDET as a source of usable “standard” software.
They provide:
- Low-level data processing
 - Pedestals
 - Common mode
- Cluster building
 - Choose between several algorithms available
- Alignment and tracking
 - “Millipede” alignment module is very promising



TB 2008 - Analysis



- Integration of DEPFET with ILC software
 - Julia Fourletova implemented all the DEPFET custom processors required
 - Conversion .bdt → Lcio data format
 - Row-wise common mode calculation
- Installed and used also at Valencia
- For details... see Julia's talk!



TB 2008 - Analysis



- Data is stored on Bonn server
 - Login to depfet@ishtar.physik.uni-bonn.de
 - Directory: /DepSrv/DEPFET/0808_CERN
- Keep regular meetings over the next few months to help convergence of different analyses. Interested people, contact M. Vos
- Electronic logbook:
 - <http://aldebaran.hll.mpg.de/twiki/bin/view/DepfetInternal/TBlogbook2008>
- Prepare for LCWS08 (16-20 November)



TB 2008 - Logbook



DepfetInternal

[Edit](#) [Attach](#) [Printable](#)

You are here: [HLL](#) > [DepfetInternal Web](#) > [TestBeam2008](#) > [TBlogbook2008](#) > DAY17082008

r7 - 19 Aug 2008 - 09:07:38 - JuliaFurletova

17.08.2008

7:30 still taking statistics - ~68 GB of disk space left

7:55 continuing with clear high variations now: clh 19.5V cl low: 11V ccg 7V

9:05 run 1245: clh 21.25 cl low: 11: ccg 7V

16:50 finished clear high scan in module 11 four voltages: 19.5 / 20.25 / 21 / 21.5 @ ccg 7 clear low 11

Runs taken:

Run	events	time	date	comment
1243		19:55	16.08	mod 11 -> going back to the optimal settings @ cl high = 21.5V
1244	100k	7:55	17.08	clh 19.5V cl 11V ccg 7V (~optimal settings at 19.5V)
1245	100k	9:05	17.08	clh 20.25 cl 11V ccg 7V
1246	100k	10:11	17.08	clh 21 cl 11V ccg 7V
1247	100k	11:38	17.08	clh 21.5 cl 11V ccg 7V
1248	1.8 Million 😊	16:50	17.08	default settings: 21.5/10.5 ccg 6.7 (large statistics)

[Edit](#)

-- [StefanRummel](#) - 17 Aug 2008

[Edit](#) | [Attach](#) | [Printable](#) | [Raw View](#) | Backlinks: [Web](#), [All Webs](#) | [History](#): r7 < r6 < r5 < r4 < r3 | [More topic actions](#)

Hello [Carlos Marinás](#)!

[Log Out](#)

[Create personal sidebar](#)

DEPFET Internal

- Collaboration Meetings
- sBelle SVD
- Publications
- Talks
- Reviews
- Image Gallery
- Design Resources
- Shopping Mall
- ILC-DEPFET System
- Phone Directory

TWiki Docu and Help

- Tutorial
- User's Guide
- FAQs

Webs

- [Avalanche](#)
- [DEPFET](#)
- [DepfetInternal](#)
- [Main](#)
- [Sandbox](#)
- [TWiki](#)

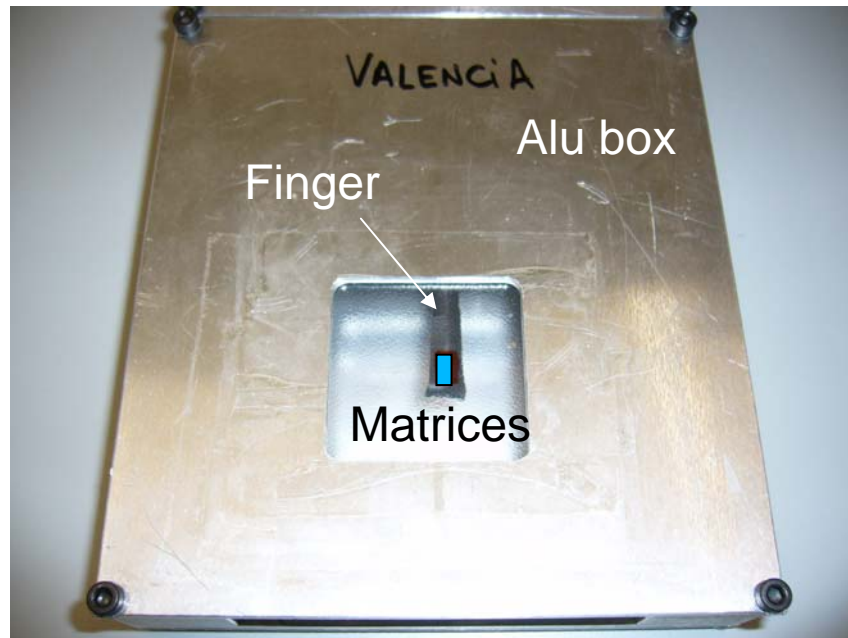


TB 2008 - Mechanics

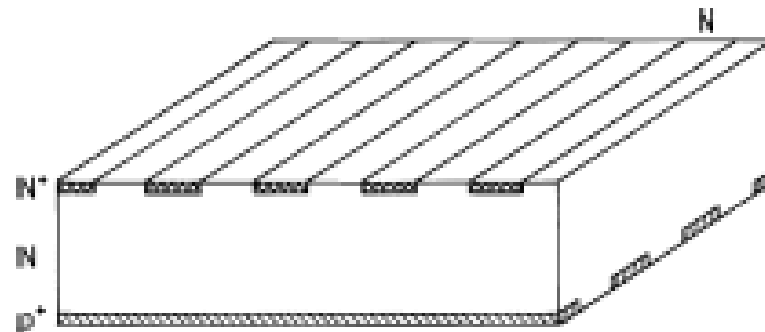


- Perfect mechanics
 - Alignment
 - Angle scans remotely
- Possibility to implement this software on linux?

Proposals

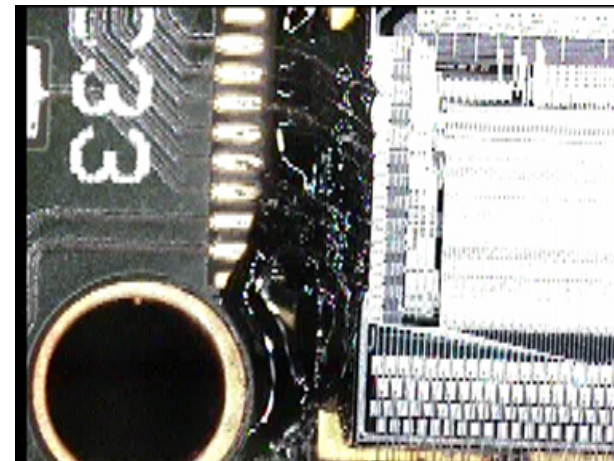
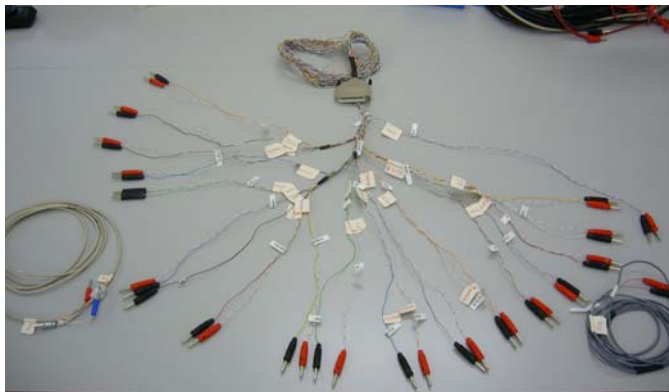
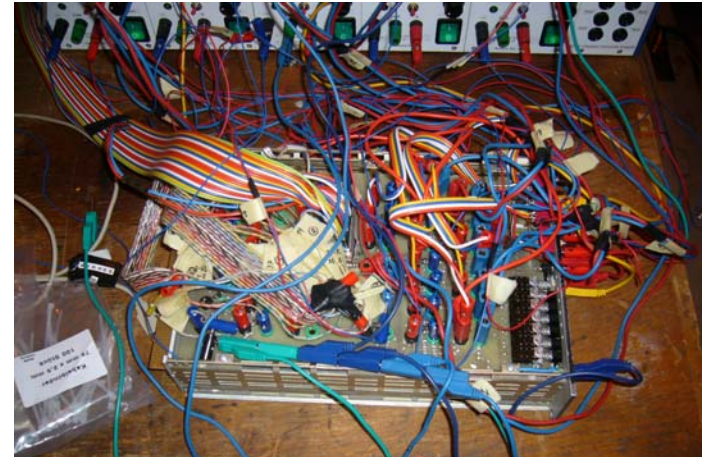
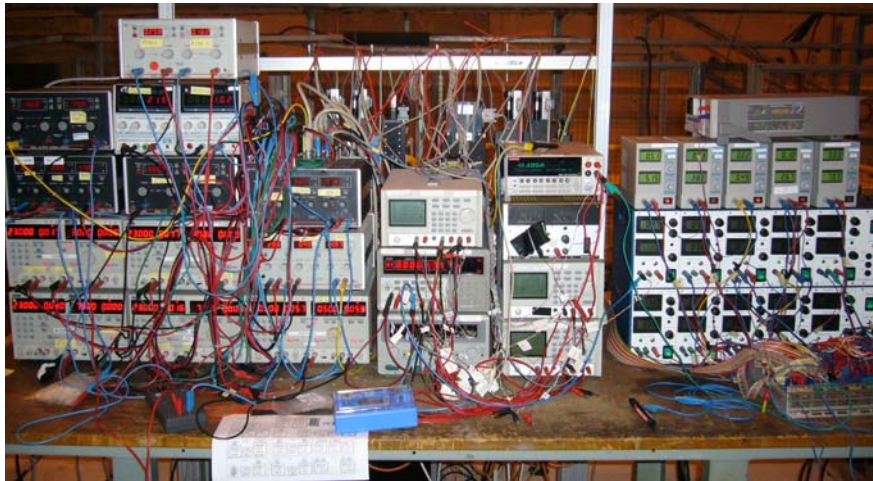


- Finger inside aluminium box
 - You don't know where the matrix is inside the box
- Big double sided strip detector





Things to change...





Things to change...



- Power supplies (See Johannes's talk!)
 - One per module
 - Identical for all modules
 - A single cable to connect from Patch Panel to the modules
 - Remote configuration, monitoring of currents...
- Or... at least a single patch panel





Schedule



- This year's experience (See Lars' talk!)
 - We had plenty of time: Been in the beam from half July until the end of August
 - Around 5 days beam loss, recovered by sliding the schedule
 - Much time spent setting up and aligning... in the PS. The SPS alignment was much easier. How sure can we be it will be as fast as in the SPS also next year?
 - Summer students playing

```
110 CERN SL
SPS-Protons updated: 09-08-08 14:52:19
User: SFTLONG1 400 GeV/c SC: 25408
Flat top: nullms SC length: 40 BP 48.0s
RATE#E10:
0 3 3 0 0
TT2 INJ1 END-FB FTOP SEXT DUMP
dumped at: 13798 ms
Targ I/E11 Mul %Sym Expmt
T2 0.0 0 0a H2
T4 0.0 0 0a H4
T6 0.0 0 0a H6
T10 0.0 COMPASS
T40.1 0.0 0.0 0.0 CNGS
T40.2 0.0 0.0 0.0 CNGS
Comments 09-08-08 14:37 :
CPS Electrostatic Septum problem.
No beam for CNGS nor North Area before
technical stop. More news Monday evening
-----> Phone: 77500 or 70475 <-----
```



Schedule II



- This year's experience (Cont.)
 - We had one mayor crisis: In one weekend we killed the Valencia DUT, damaged the Prague DUT and several modules of the telescope.
- How much beam time do we want to request?
 - Require 1 week of good stable SPS beam to perform our measurement program

1 Month in total should be enough!

(Connect to EUDET)



Measurements



- Larger matrices 128x128 telescope
 - Still read by CURO on a hybrid similar to the one used now
- Irradiated matrices
 - Can we operate these matrices stably?



Conclusions



- Time schedule
 - 1 month is enough (2 week of SPS data)
 - CERN's Card
 - Dosimeters
 - Internal transportation
 - Installation inside area
 - Alignment
 - Packaging
 - Coincidence in time with EUDET
 - With this stable software, NO night shifts are needed



Conclusions



- Software
 - Keep on using Linux DAQ (but implemented)
 - Share the code (more “experts”!)
 - More disk space (more HDD?, CASTOR?, GRID?)
 - Standard analysis framework (EUDET)
- Mechanics
 - Perfect XY-table remote control of motorstages
 - Alignment: “Beam finder” (microstrip detector) and finger inside aluminium box.



Conclusions



- Next year's measurements
 - Bigger matrices
 - Irradiated matrices ?
 - ...
- Power supplies: Simplify
 - One power supply and cable for each matrix.
 - Standardize!!



TB 2008 - Crew



Julia Furletova

Sergei Furlotov

Johannes Schneider

Lars Reuen

Ladislav Andricek

Stefan Rummel

Zbynek Drasal

Manuel Koch

Carlos Mariñas

Jan Scheirich

Kristof Schmieden

Marcel Vos

Juan Trenado

Peter Kvasnicka

Carlos Lacasta

Peter Kodys

Pablo Vázquez

Walter Ockenfels

Norbert Wermes

David Gascón

Thank you!



Backup slides



Set Up



- 4 Telescope modules
 - Bonn
 - 90 K02. COCG L. #14
 - S90 K02. COCG L. #2
 - 90 I00. COCG L. #7
 - 14b S90 I00. COCG L. #5
- 1 DUT working stably
 - Munich
 - S90 L03. CCCCCG. #11
- 1 DUT scanning voltages or angles
 - Prague
 - S90 I03. COCG S. #6



Set Up



06.08.2008

16:00

Hybrid	Type	Module	Where	Status
90 K02	COCG L	14	SPS	Working, telescope plane
S90 K02	COCG L	2	SPS	Working, telescope plane
90 J00	COCG L		CERN	Working, telescope plane, wire bond chaos!
90 I00	COCG L	7	SPS	Working, telescope plane
14b S90 I00	COCG L	5	SPS	Working, telescope plane
S90 I03	COCG S	6	SPS	Prague DUT, works but noisy
15b	PXD4	8	EUDET DUT	Working in EUDET telescope
S90 L03	CCCG		CERN B590	Munich DUT, in Carlos Office, VIP matrix
S90 J03	COCG S		CERN	Prague DUT, works m in BN, SW B chnls off
S90 K03	COCG L		Bonn	Valencia DUT, dead
90 J01	COCG L		CERN	Munich DUT, looks like dead
BN11b	Small A	12	CERN	old hybrid for testing purposes
BN 3a	PXD4 ???		CERN	old test hybrid, seems to work
BN2b	PXD4 ???		CERN	old test hybrid, seems to work
BN 13b S90H00	PXD5		CERN	old test hybrid, seems to work, extremely low signal
BN 12 b	PXD4 ???		CERN	dead, but current consumption okay for testing

COCG L = Common Clear Gate Large

CCCG = Capacitive Coupled Clear Gate

COCG S = Common Clear Gate Small

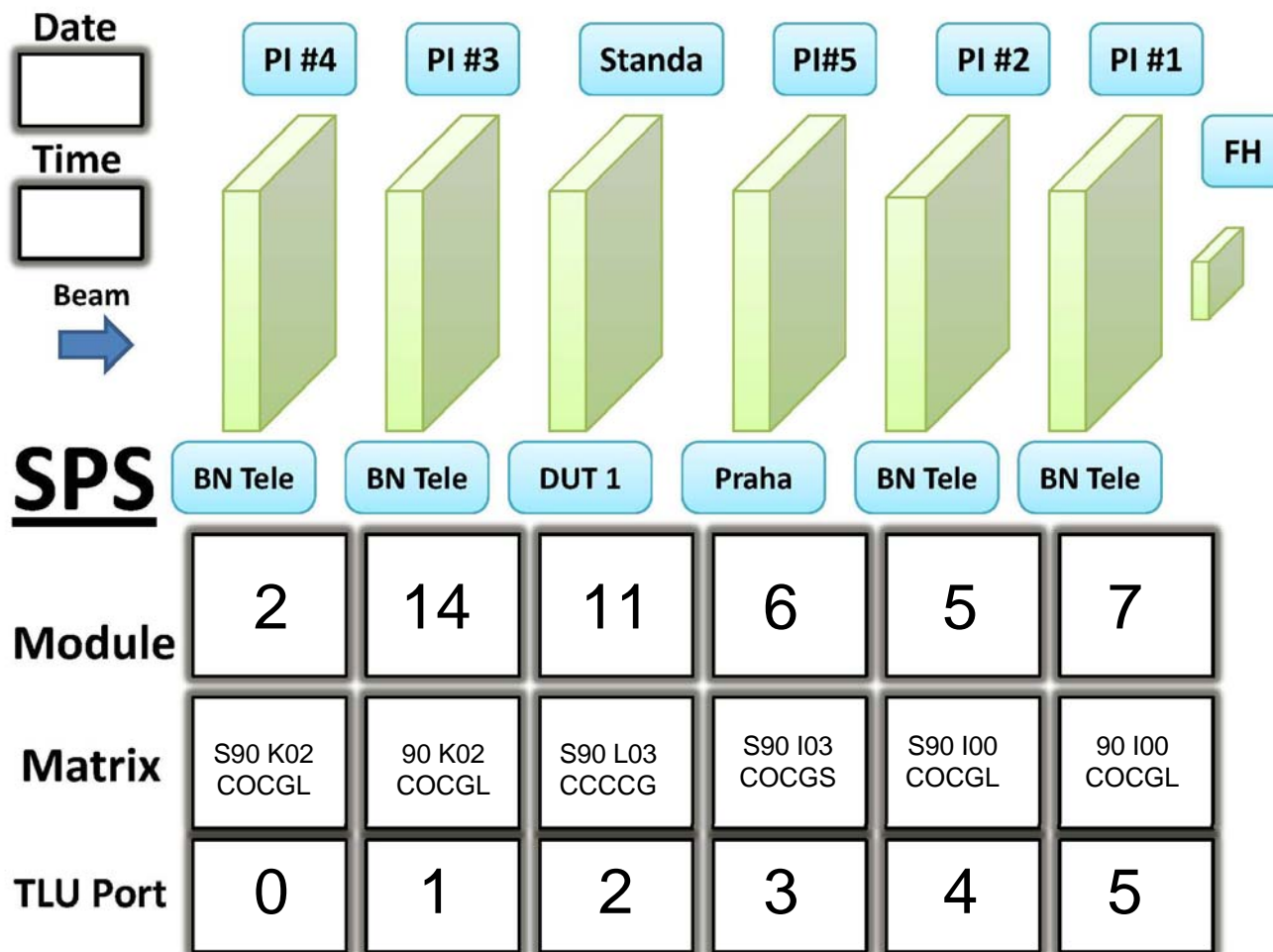
Small A = REC TESLA Small A

m|| = more or less

Lars Reuen



Set Up



Lars Reuen



Measurements



- Voltage scans: Cross-check we're running in optimal settings
 - V_{Bias} to the wafer 150-220V (I03)
 - V_{Edge} (I03)
 - $V_{\text{ClearHigh}}$ (CCCLG)
- Angular scan: To study resolution vs. cluster size
 - -5, -4, -3, -2, -1.5, -1, -0.5, 0, 0.5, 1, 1.5, 2, 3, 4, 5, 6, 9, 12, 18, 36, 72
- Beam energy scan: To analyse whether the separation “multi-scattering-intrinsic resolution” is performed correctly
 - 20, 40, 60, 80, 120 GeV
- Large statistics
 - Charge collection uniformity studies
 - 3 Million events in nominal conditions on I03