

TESTBEAM 2008: First Results

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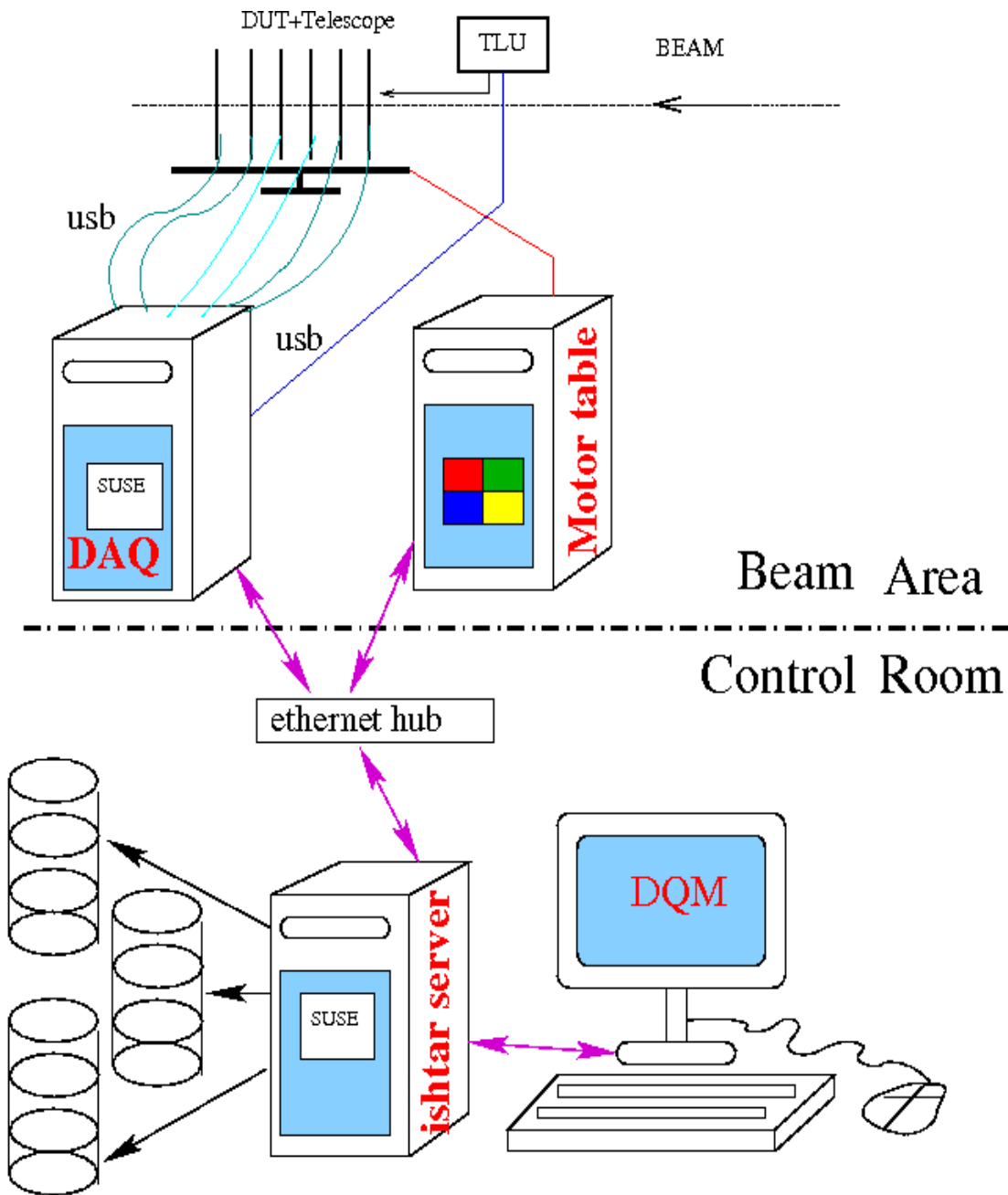


Outline

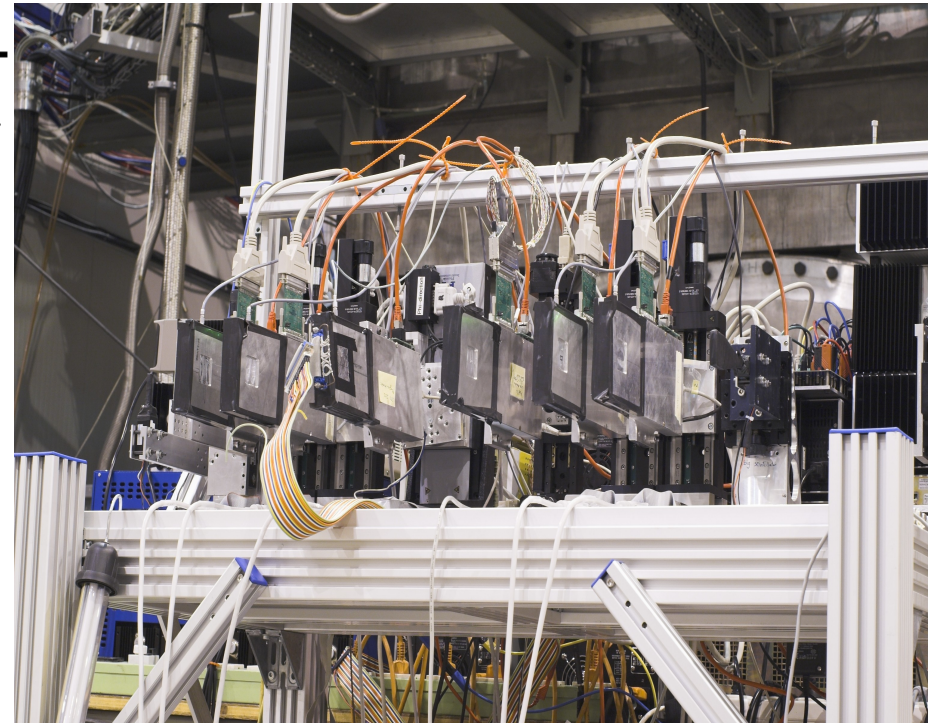
- DEPFET telescope
- DEPFET and EUDET integration

DEPFET Meeting, Heidelberg, 10-12 Sep. 2008

DEPFET Telescope

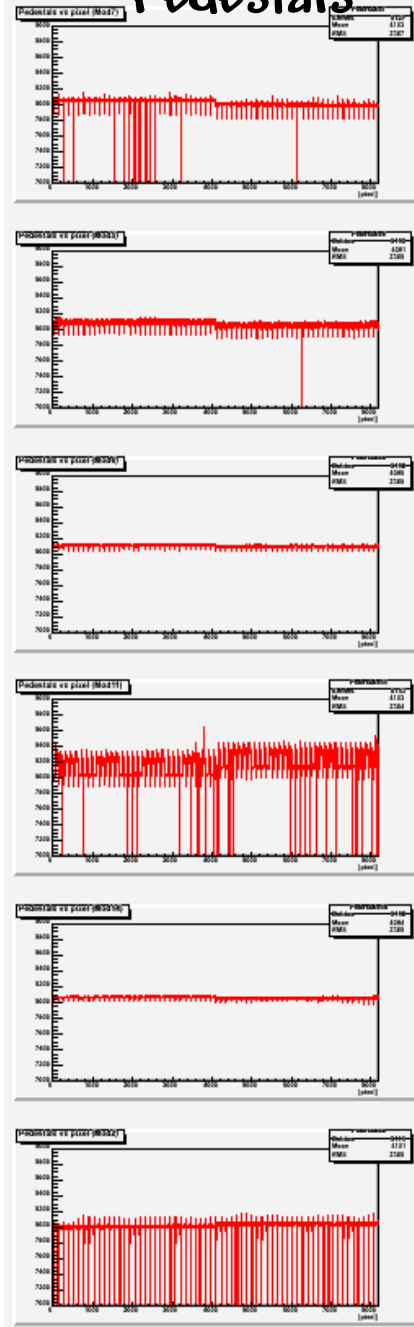


- Basic functions of Linux DAQ is working:
- new Linux USB Driver for DEPFET is running stable
 - Event server, Event Builder, Run Control Server and DQM showed a good performance

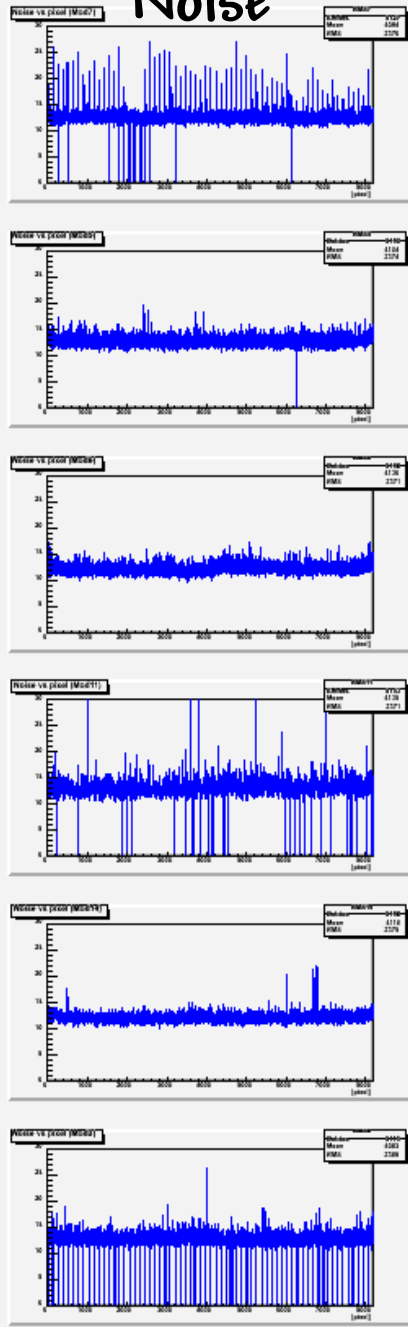


Pedestal and Noise (run1319)

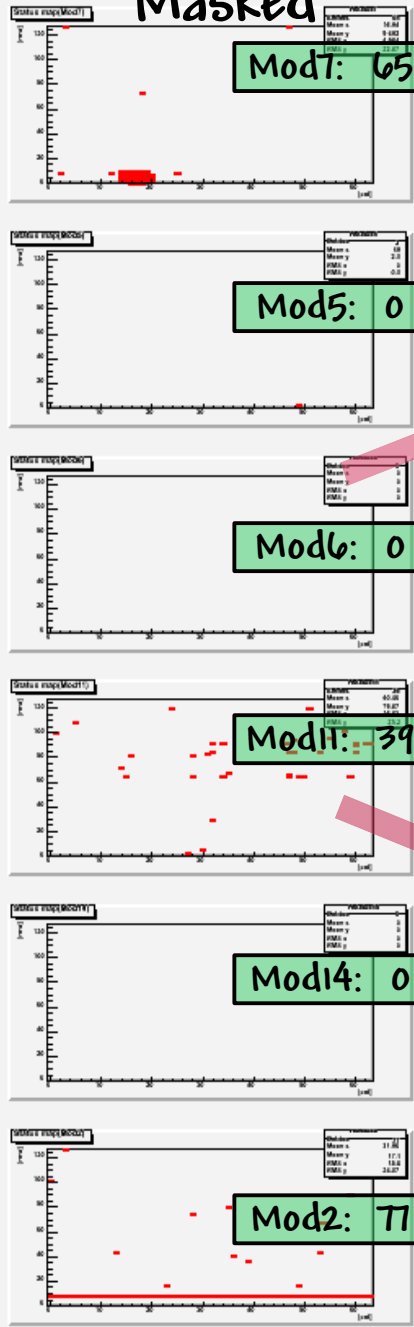
Pedestals



Noise



Masked



Mod7: 65

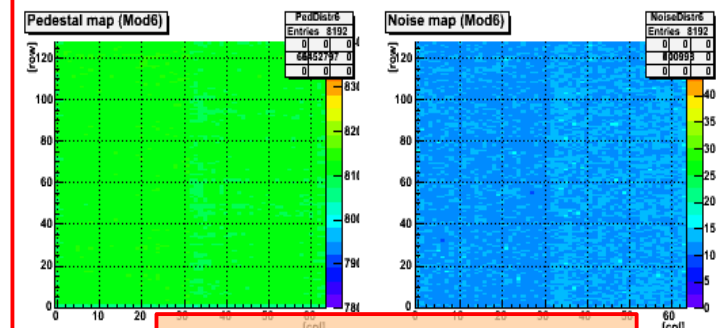
Mod5: 0

Mod6: 0

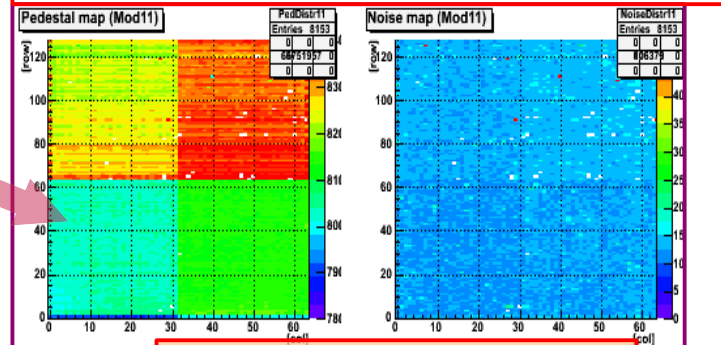
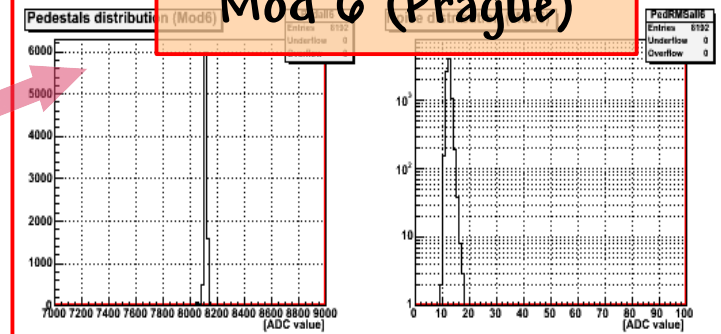
Mod11: 39

Mod14: 0

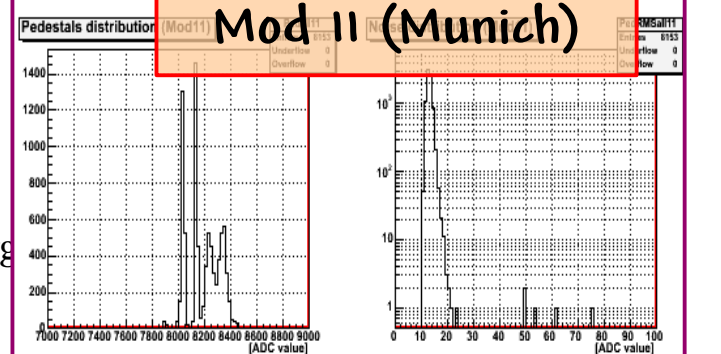
Mod2: 77



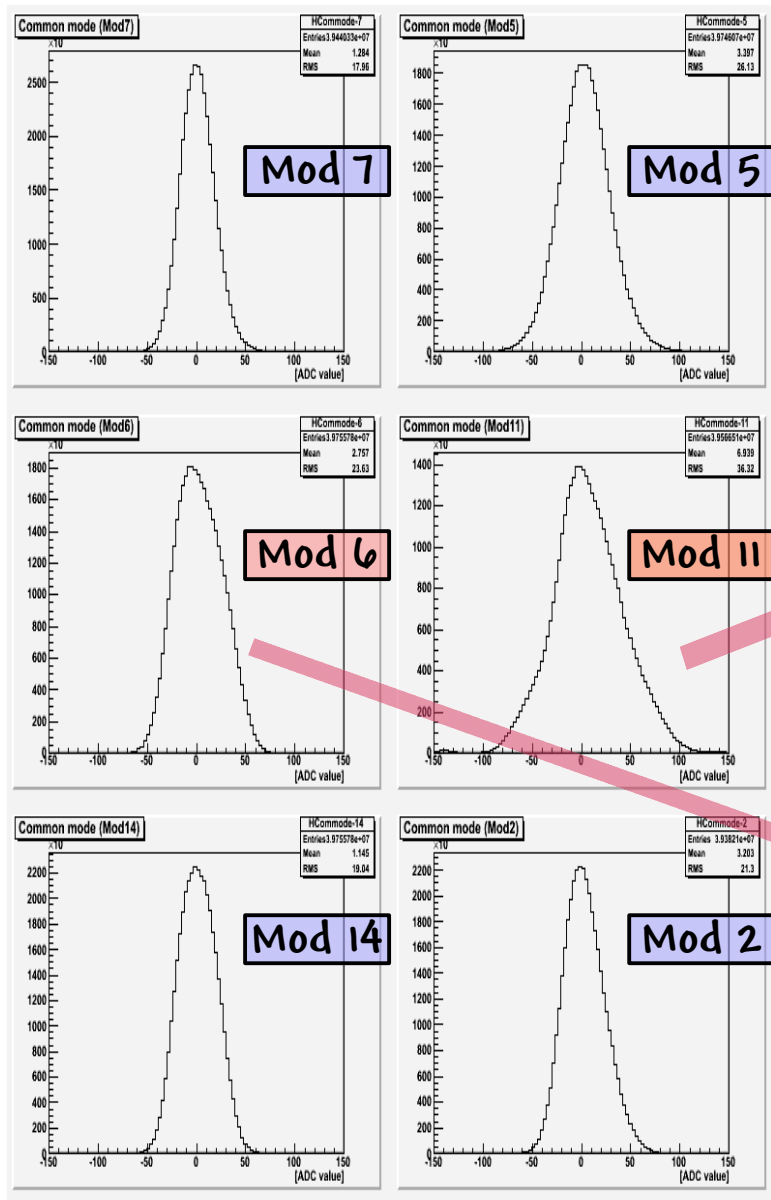
Mod 6 (Prague)



Mod 11 (Munich)

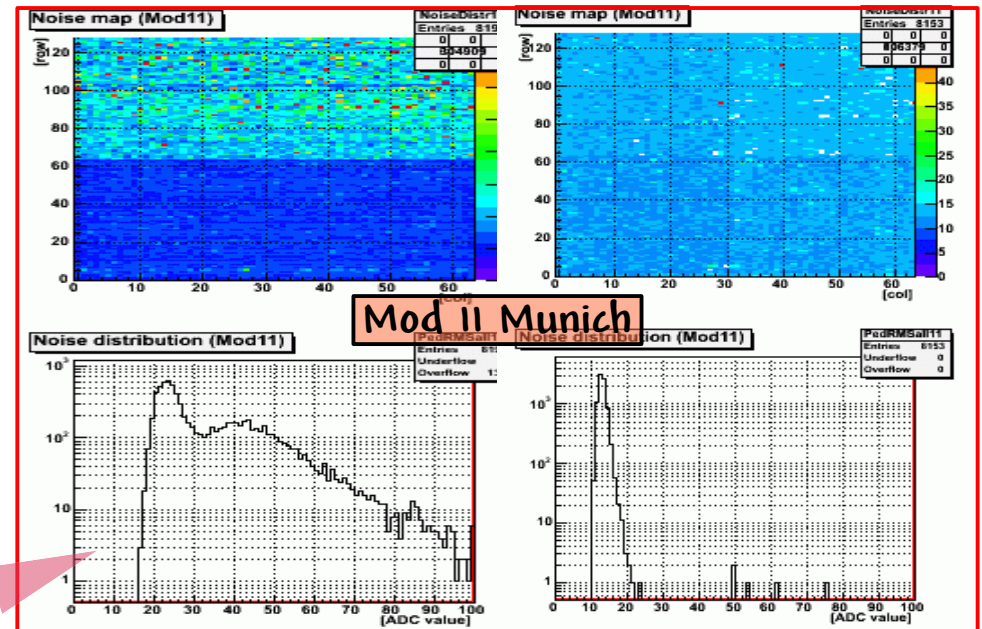


Common Mode (run1319)



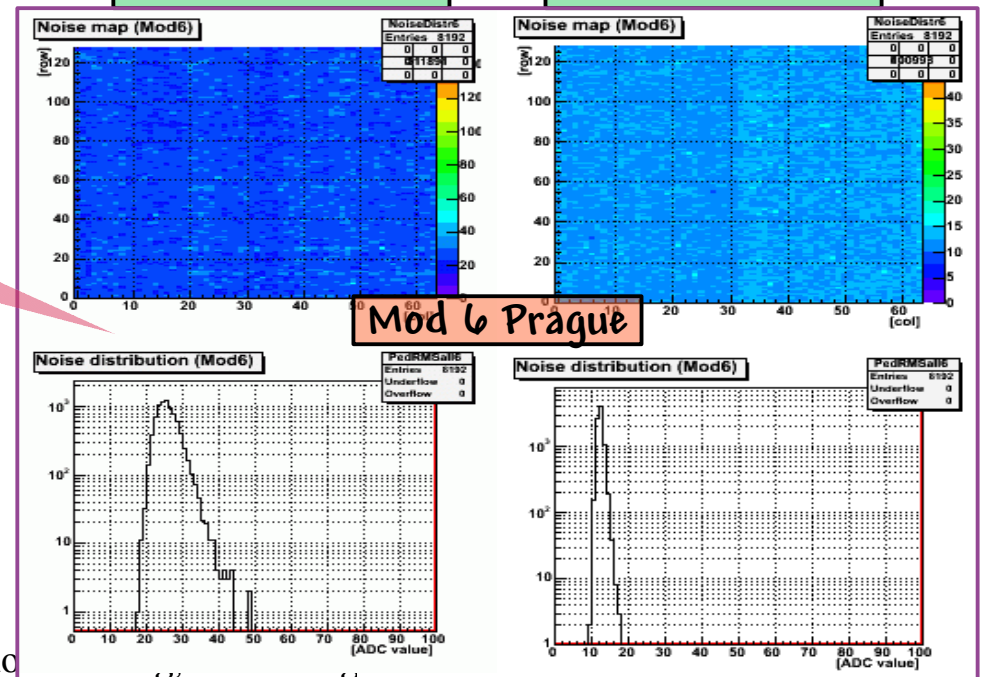
Noise for Module11 (Munich)
with and without CM

Noise for Module6 (Prague)
with and without CM

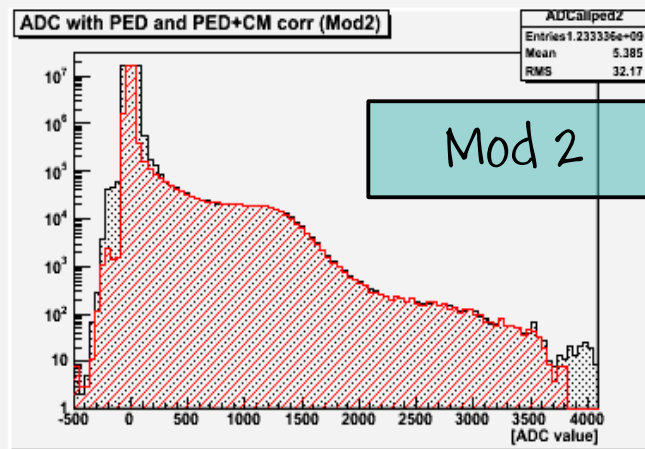
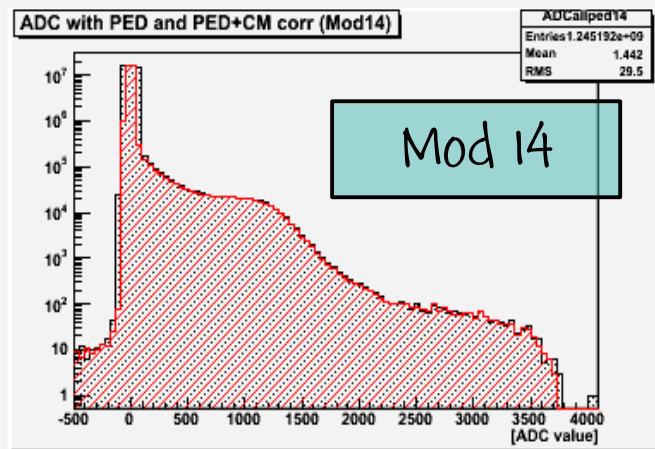
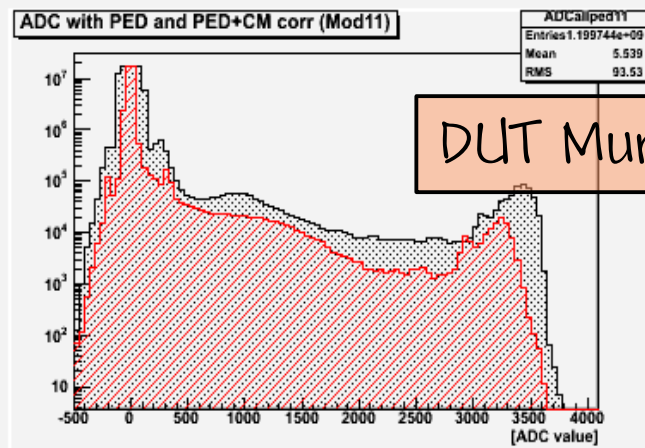
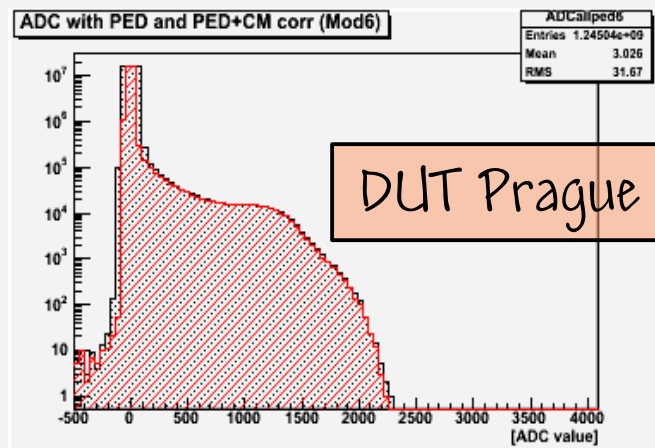
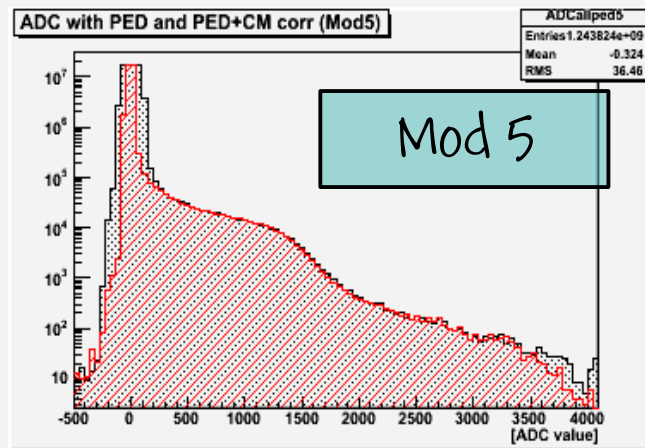
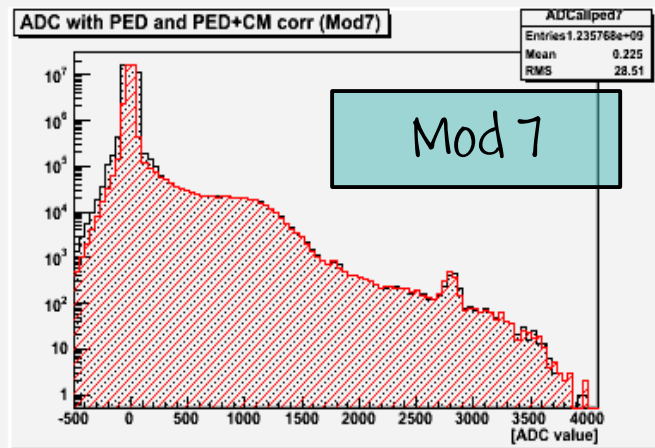


Without CM

With CM

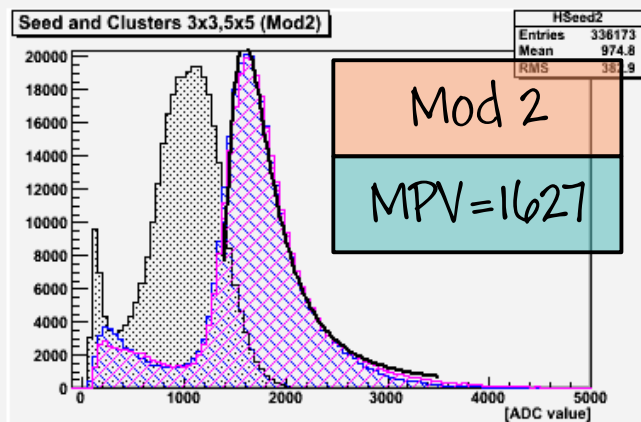
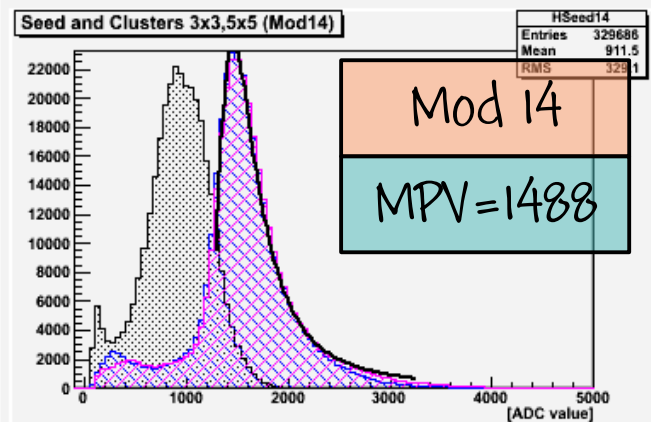
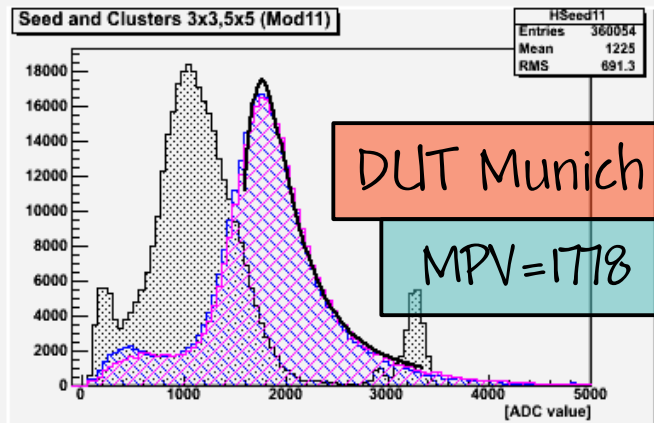
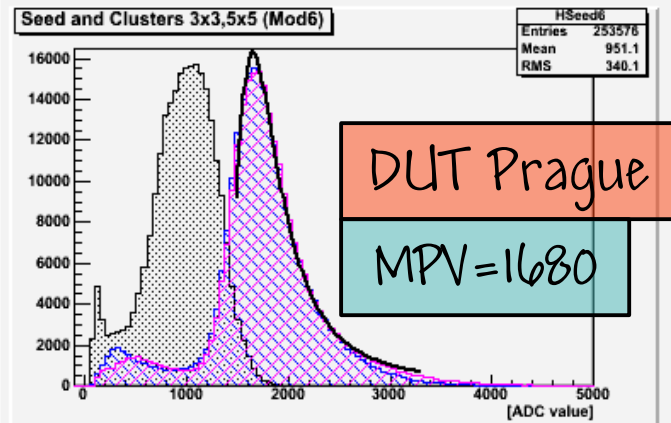
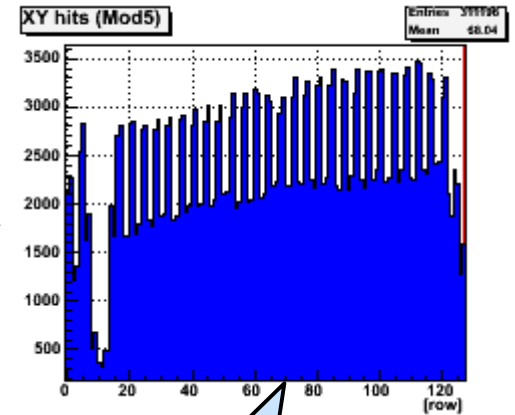
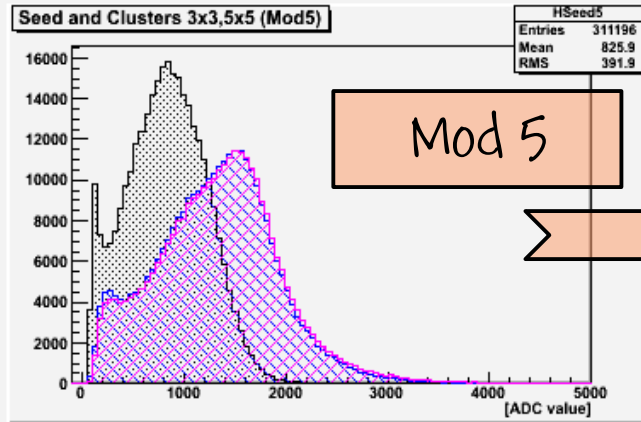
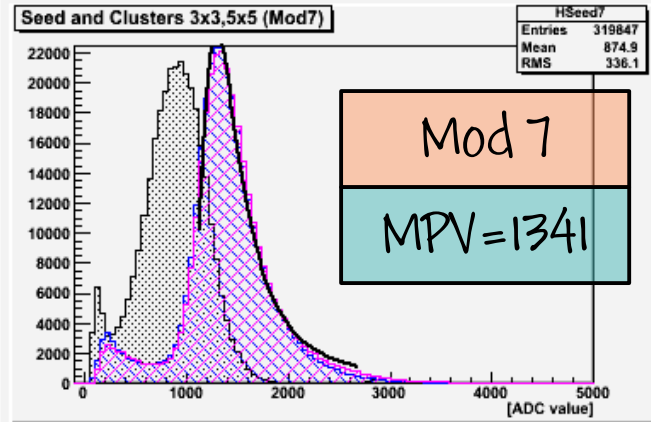


ADC distribution



Pitch size
Munich: 32x24 μm
Prague: 24x24 μm

Clusters (run1319)

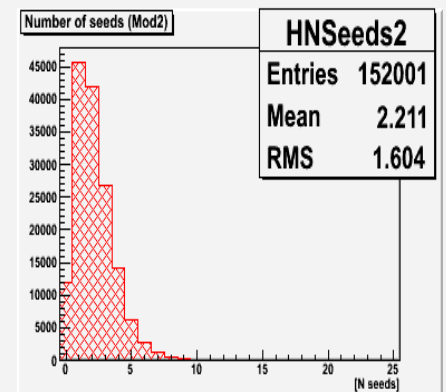
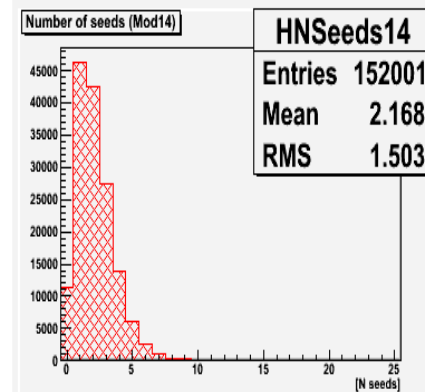
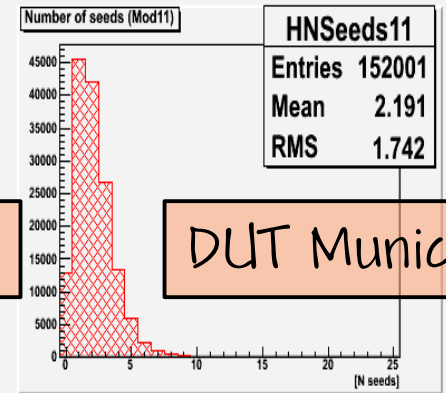
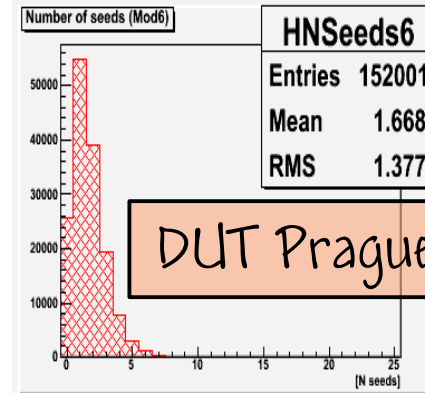
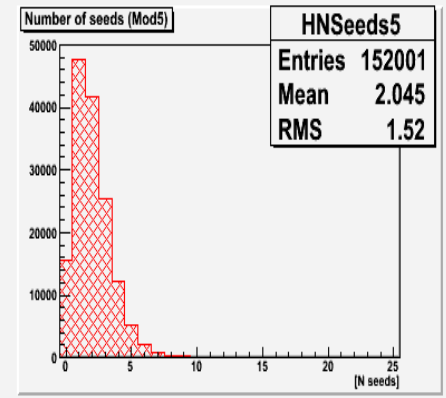
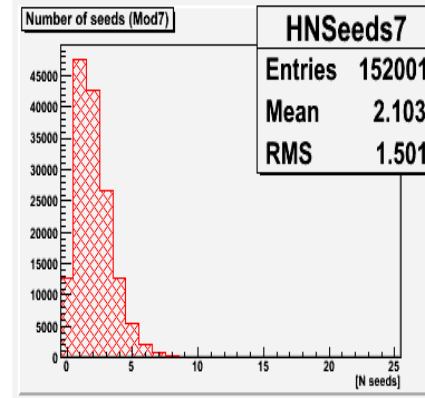
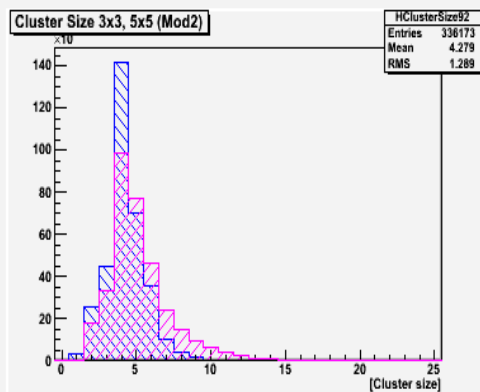
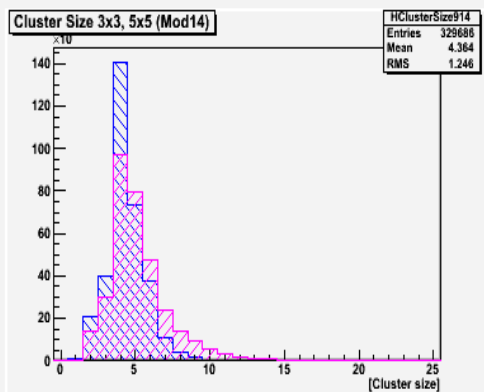
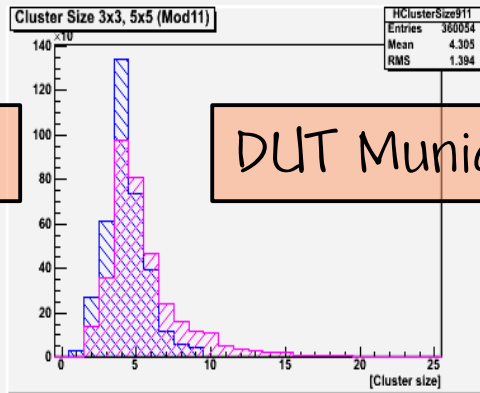
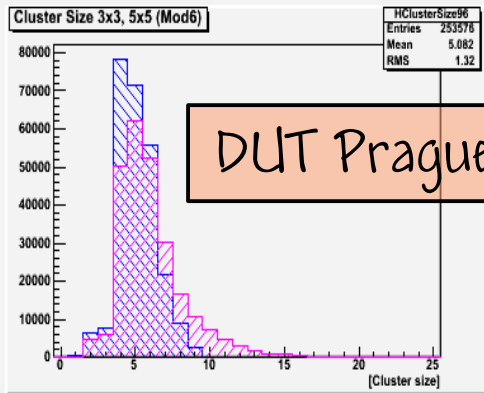
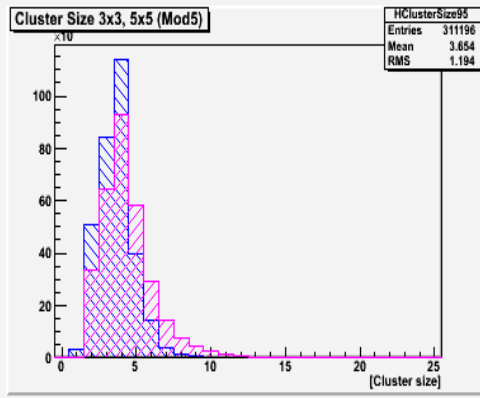
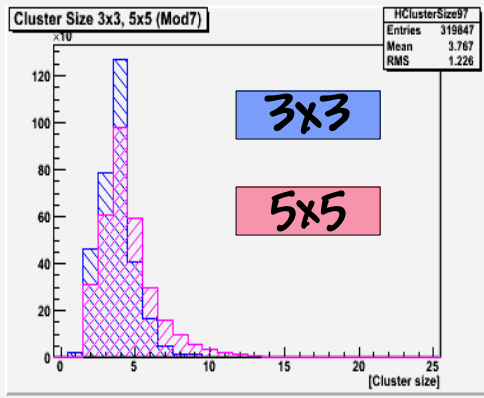


ClearLow Voltage too low
10.1 V -> 10.3 V

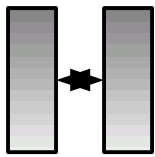
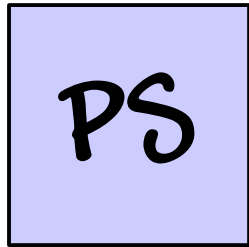
Seed cut: 7σ
Cluster cut: 2σ

Cluster Size and

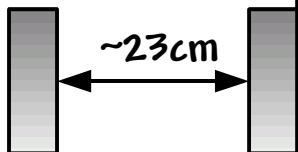
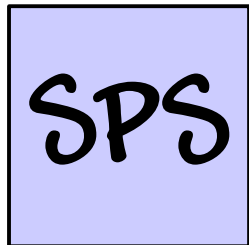
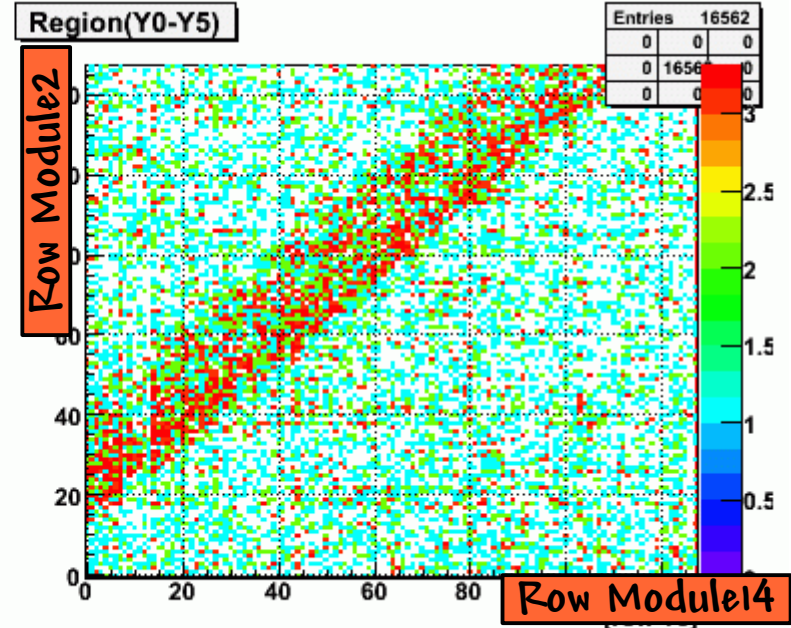
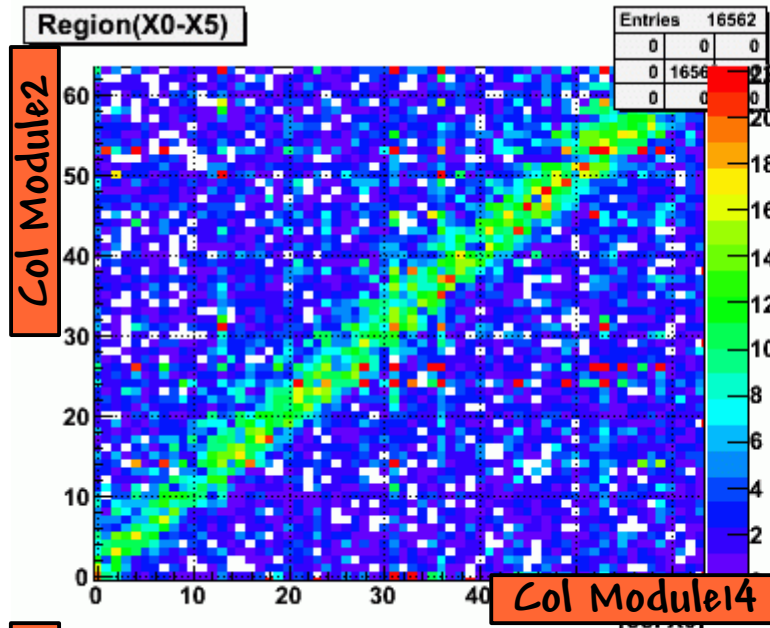
N Clusters (run1319)



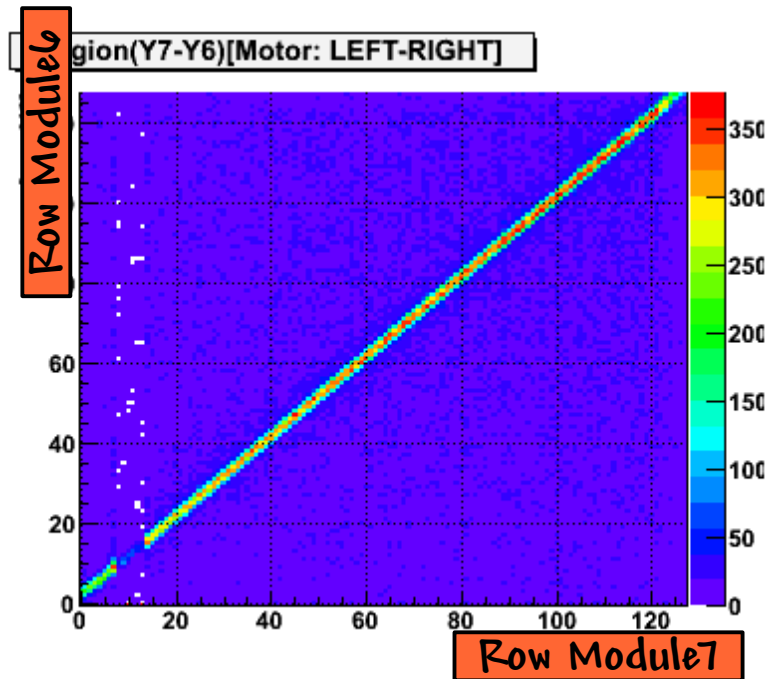
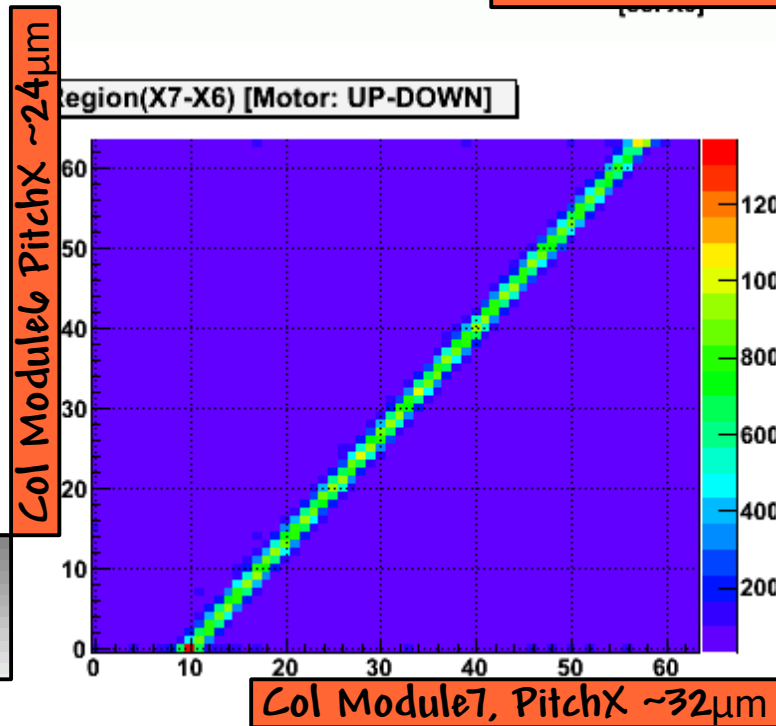
Correlation plots



~9cm

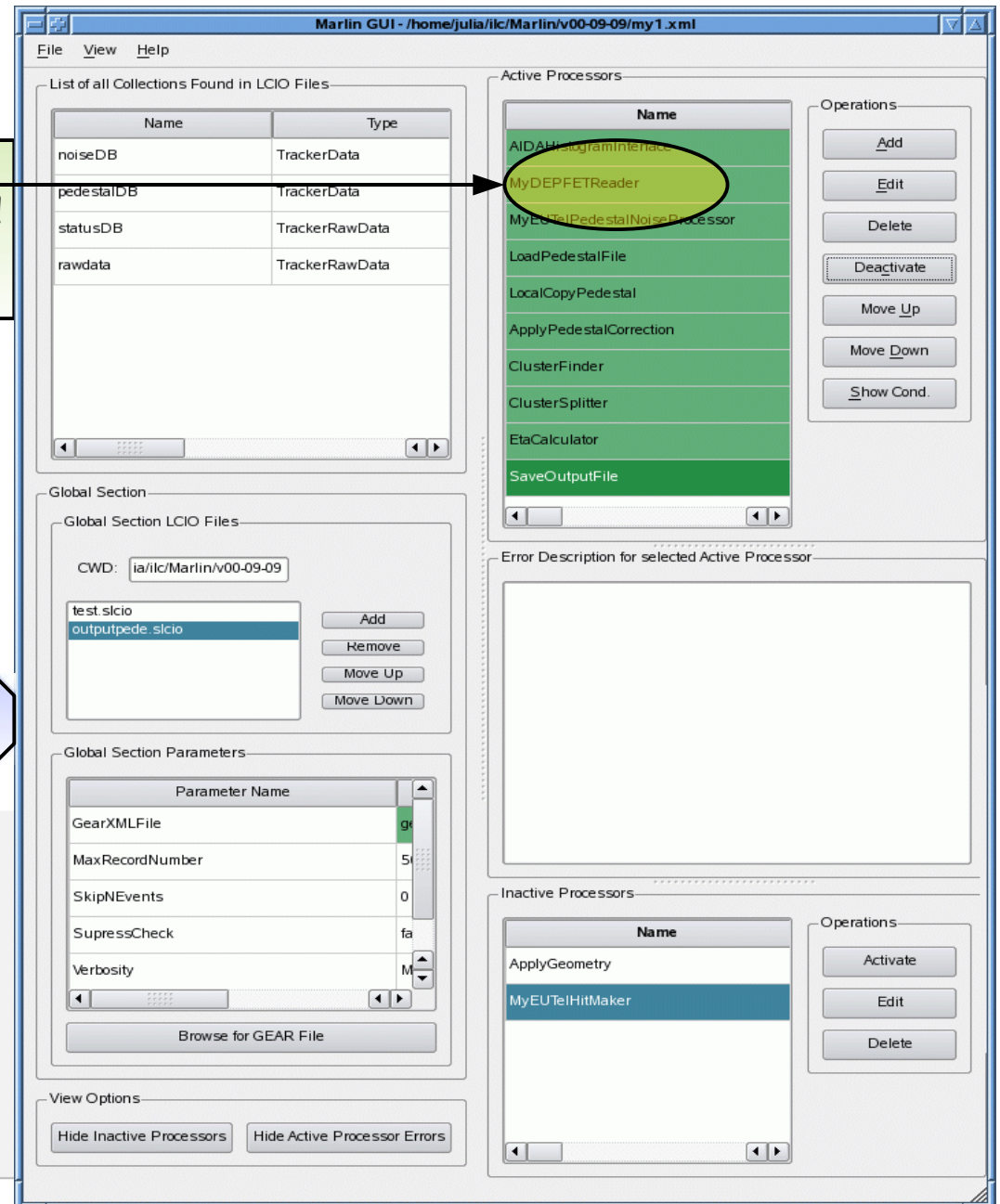
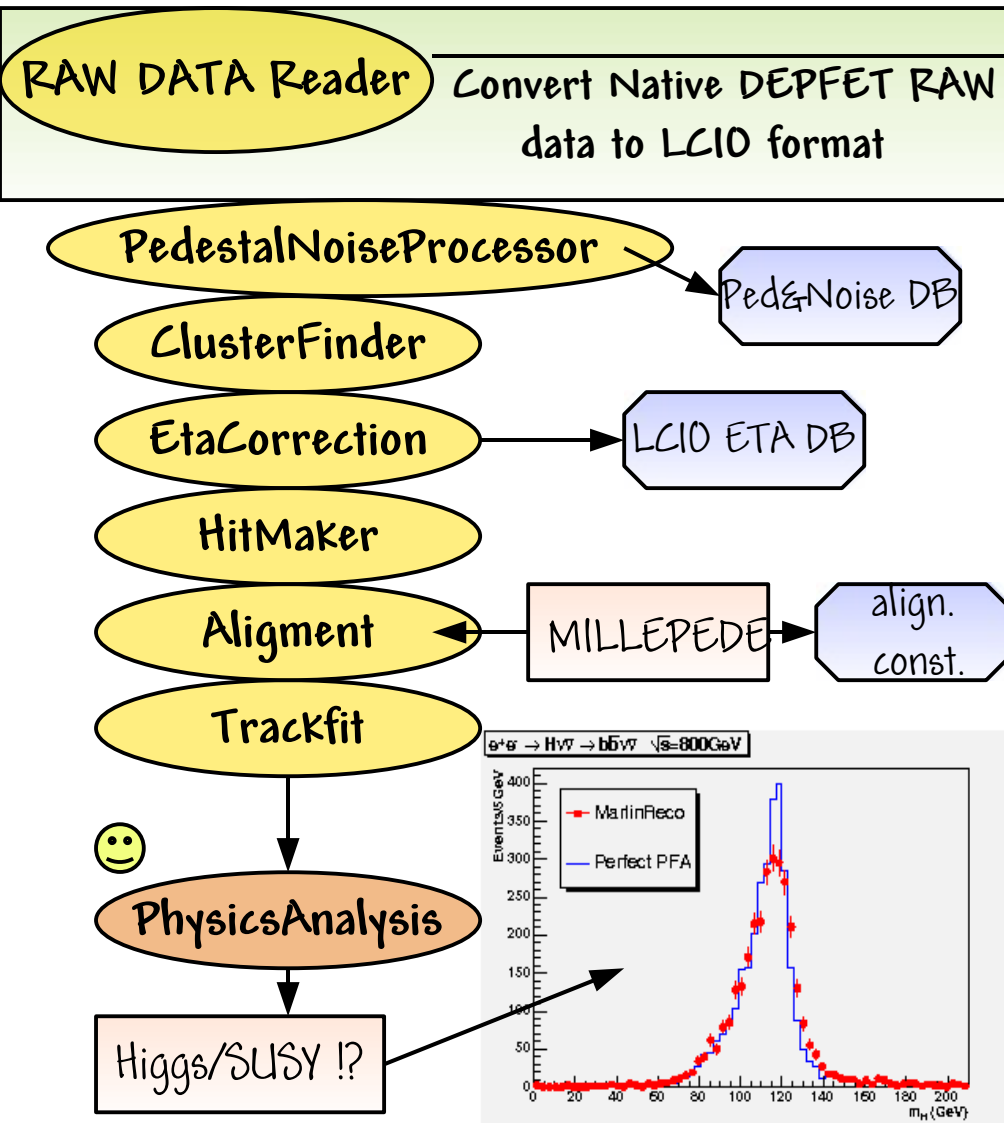


~23cm



11 Sep 2008,

ILC software for DEPFET analysis



Millepede alignment (Run 1277)

Before alignment

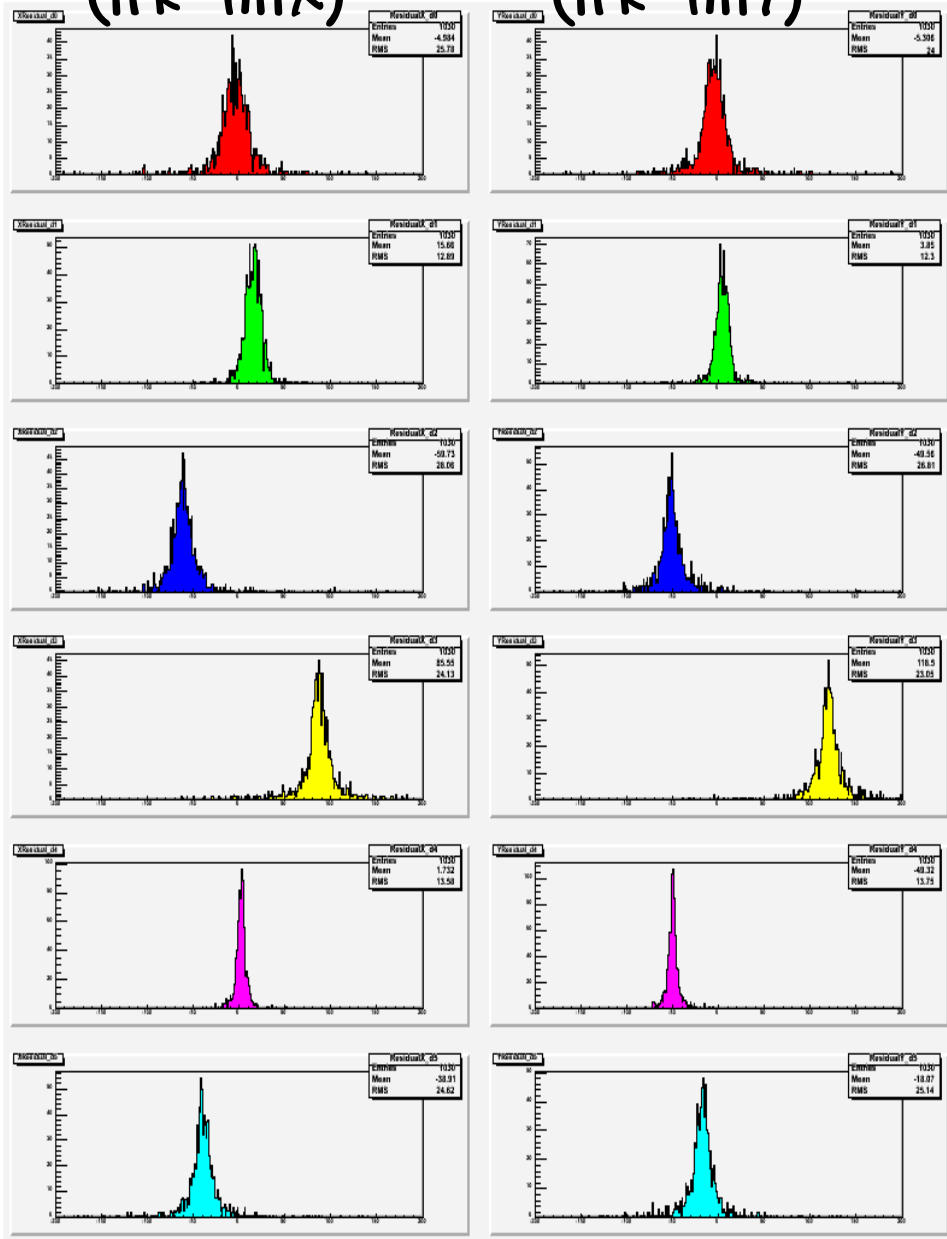
After alignment

(trk - hitX)

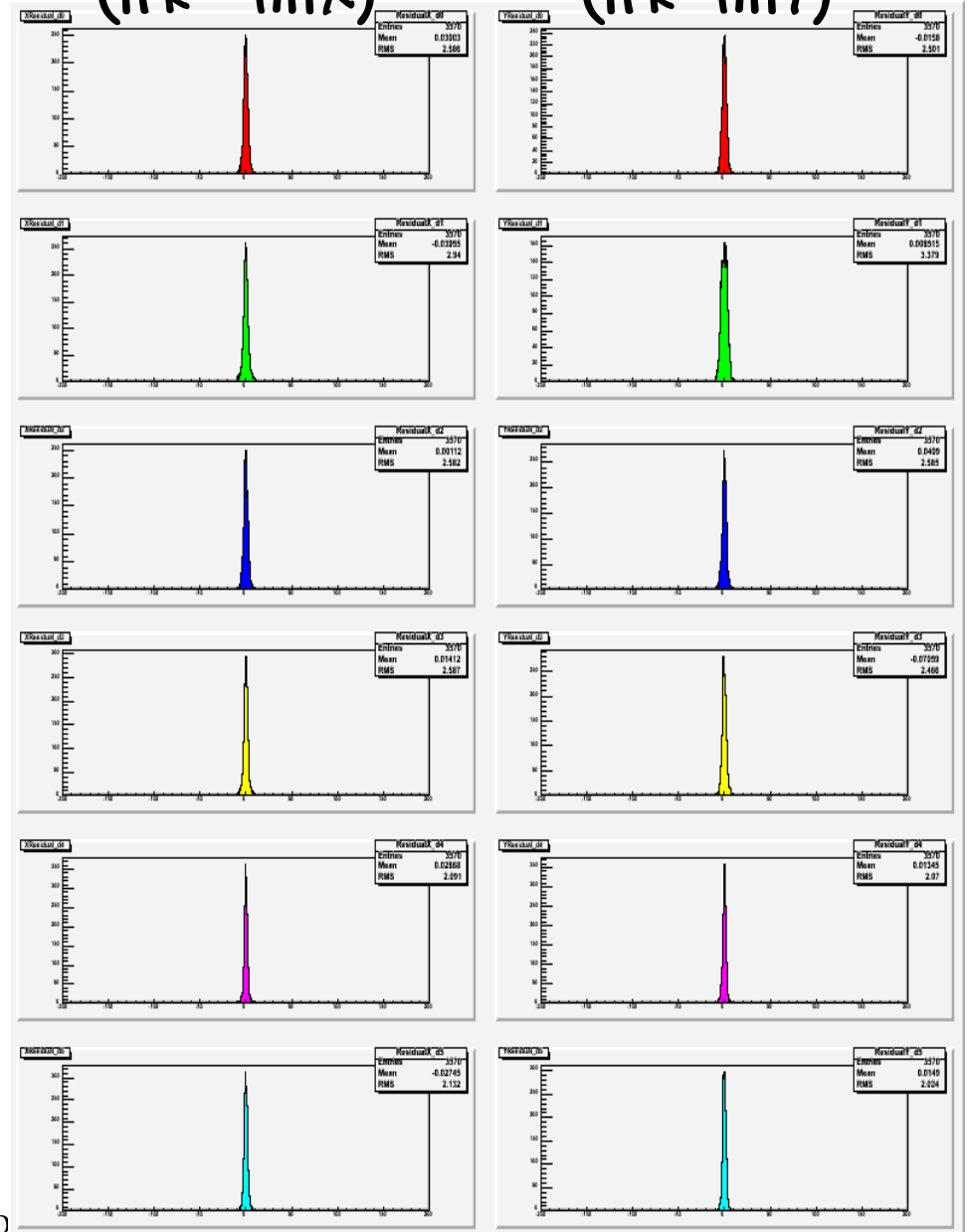
(trk - hitY)

(trk - hitX)

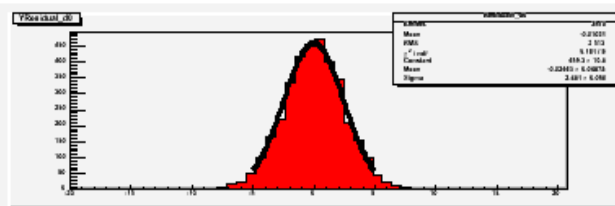
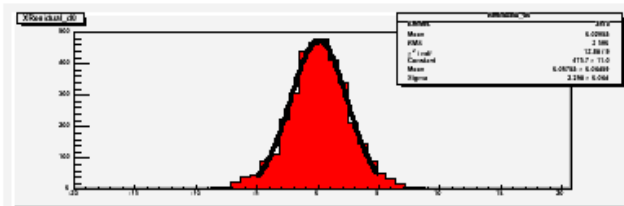
(trk - hitY)



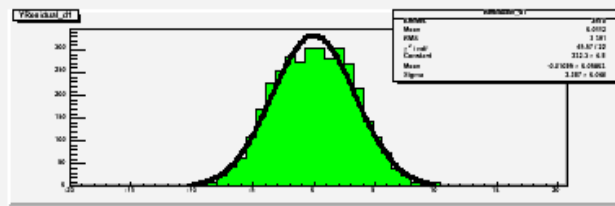
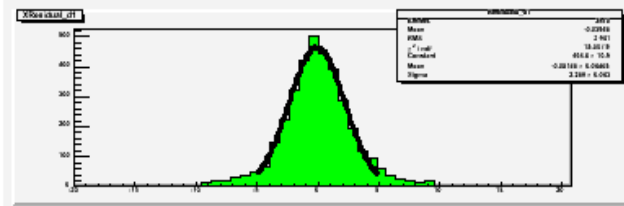
atio



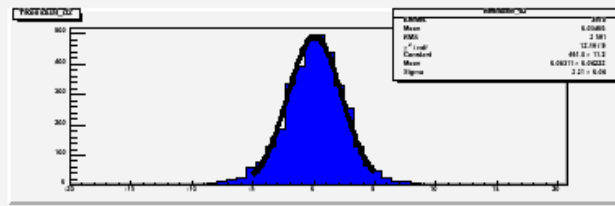
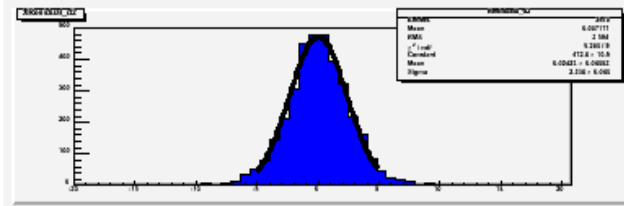
Tracking (run1273) 120GeV



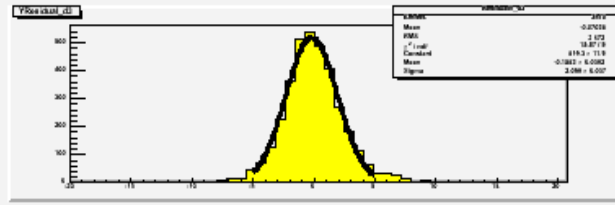
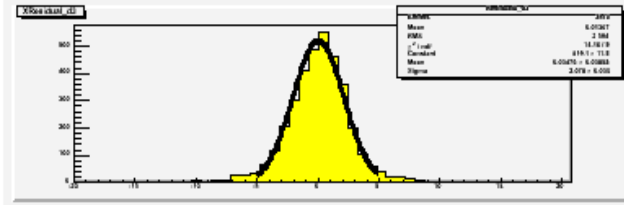
Module 7
X: $2.23 \pm 0.02 \mu\text{m}$ Y: $2.19 \pm 0.02 \mu\text{m}$



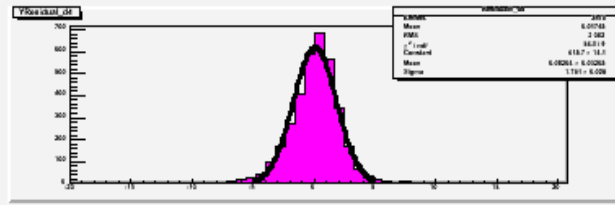
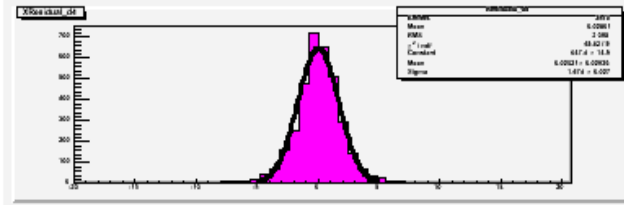
Module 5
X: $2.20 \pm 0.02 \mu\text{m}$ Y: $3.07 \pm 0.02 \mu\text{m}$



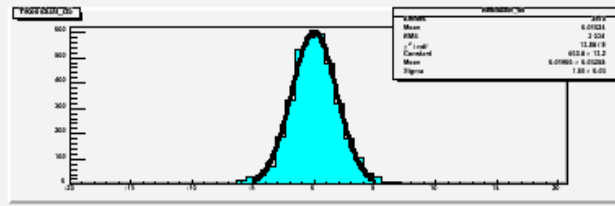
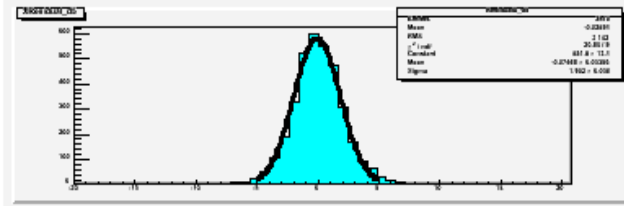
Module 6 (Prague)
X: $2.43 \pm 0.02 \mu\text{m}$ Y: $2.20 \pm 0.02 \mu\text{m}$



Module 11 (Munich)
X: $2.23 \pm 0.02 \mu\text{m}$ Y: $2.07 \pm 0.02 \mu\text{m}$



Module 14
X: $1.79 \pm 0.02 \mu\text{m}$ Y: $1.76 \pm 0.02 \mu\text{m}$



Module 2
X: $1.91 \pm 0.02 \mu\text{m}$ Y: $1.86 \pm 0.02 \mu\text{m}$

Beam energy scan (first results)

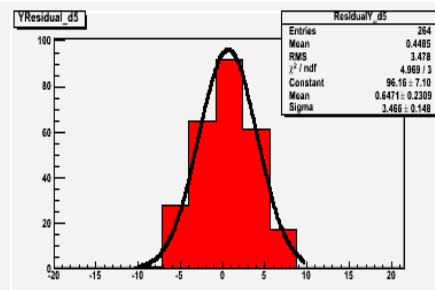
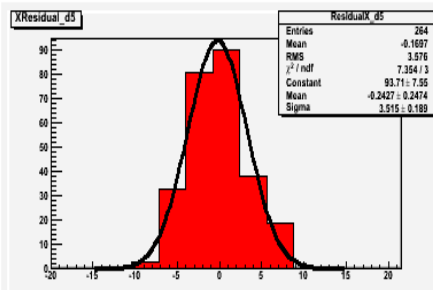
Residual X

Residual Y

20GeV(run1294)

X: $3.5 \pm 0.2 \mu\text{m}$

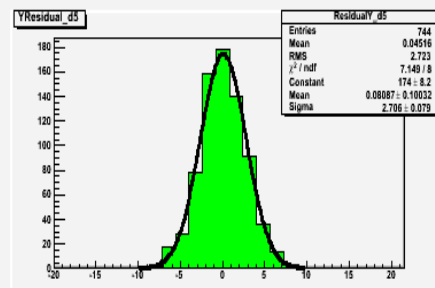
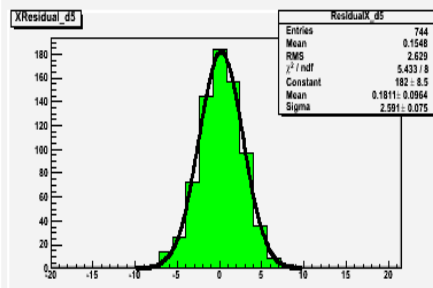
Y: $3.5 \pm 0.2 \mu\text{m}$



60GeV(run1280)

X: $2.59 \pm 0.08 \mu\text{m}$

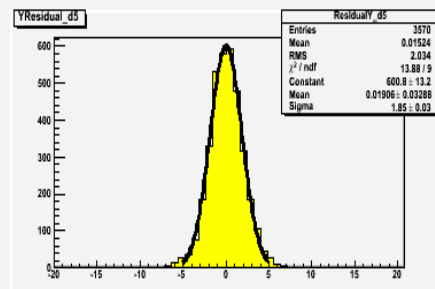
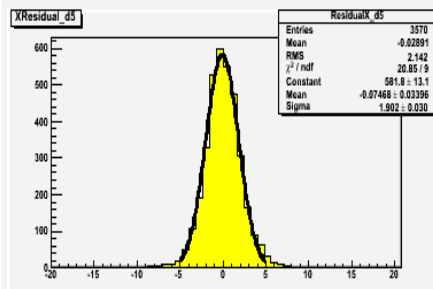
Y: $2.70 \pm 0.08 \mu\text{m}$



80GeV(run1277)

X: $1.90 \pm 0.03 \mu\text{m}$

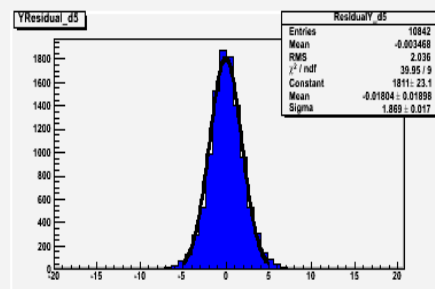
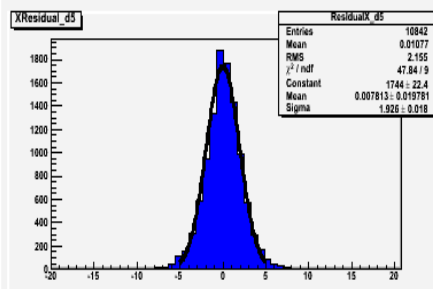
Y: $1.85 \pm 0.03 \mu\text{m}$



120GeV (run1273)

X: $1.91 \pm 0.02 \mu\text{m}$

Y: $1.86 \pm 0.02 \mu\text{m}$

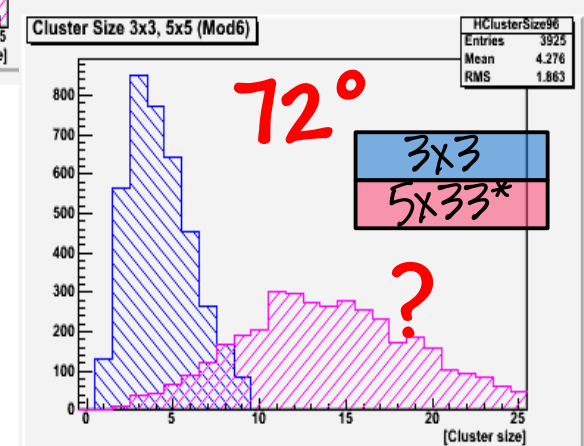
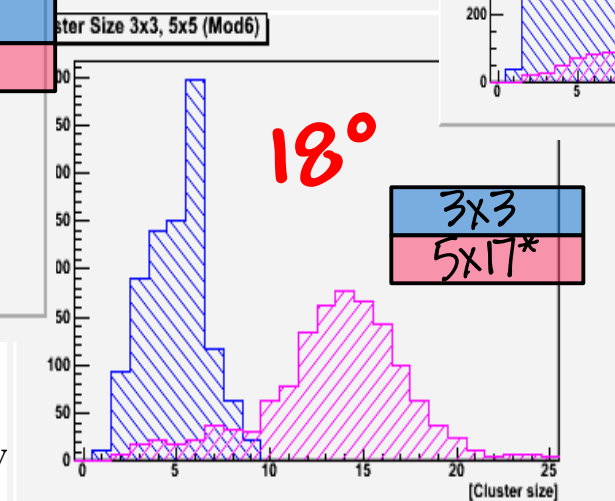
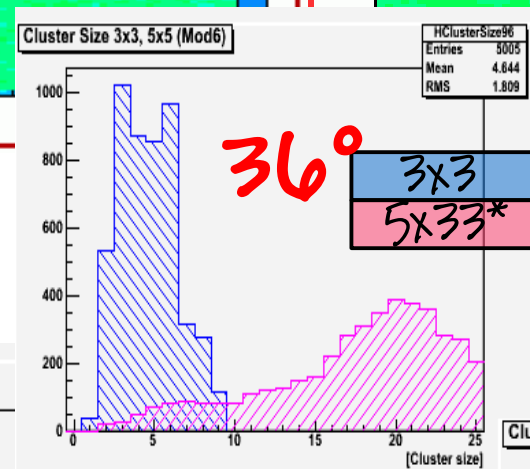
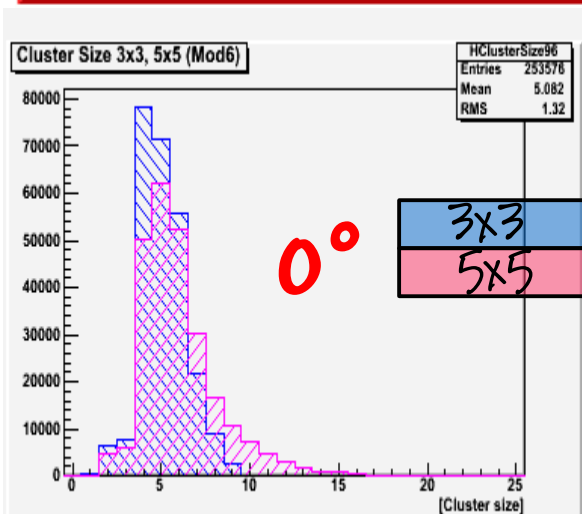
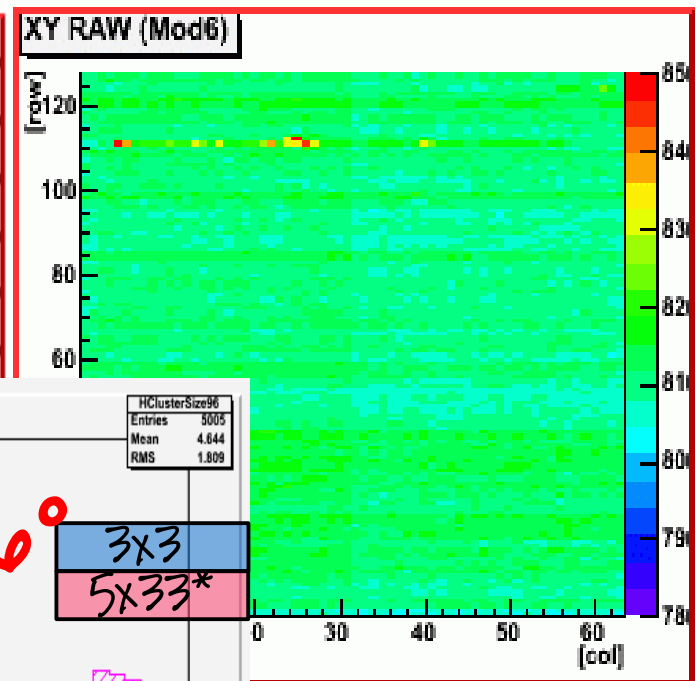
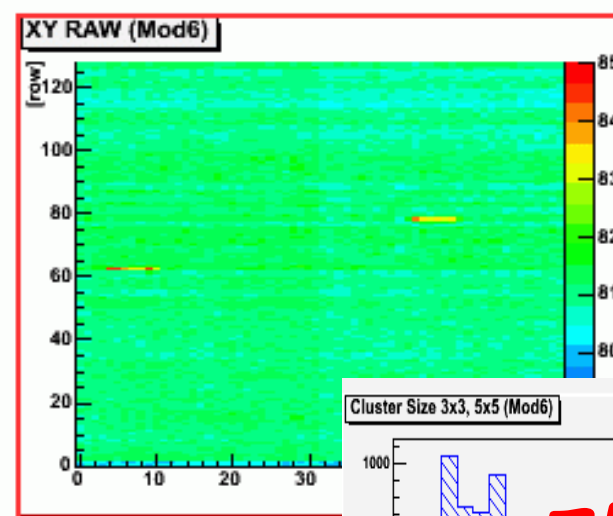
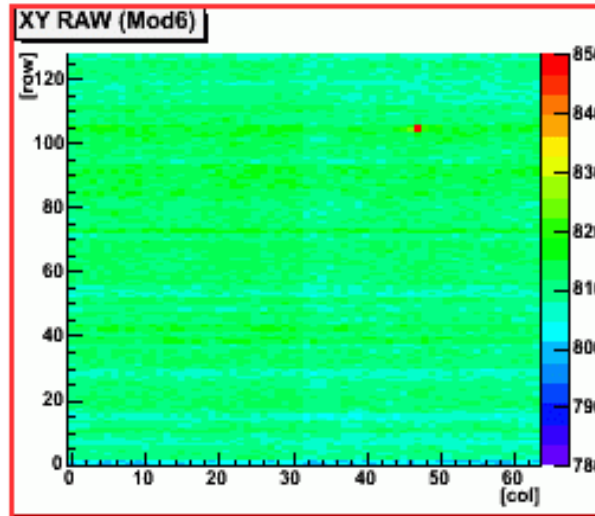


Angular scan: Module 6 (Prague)

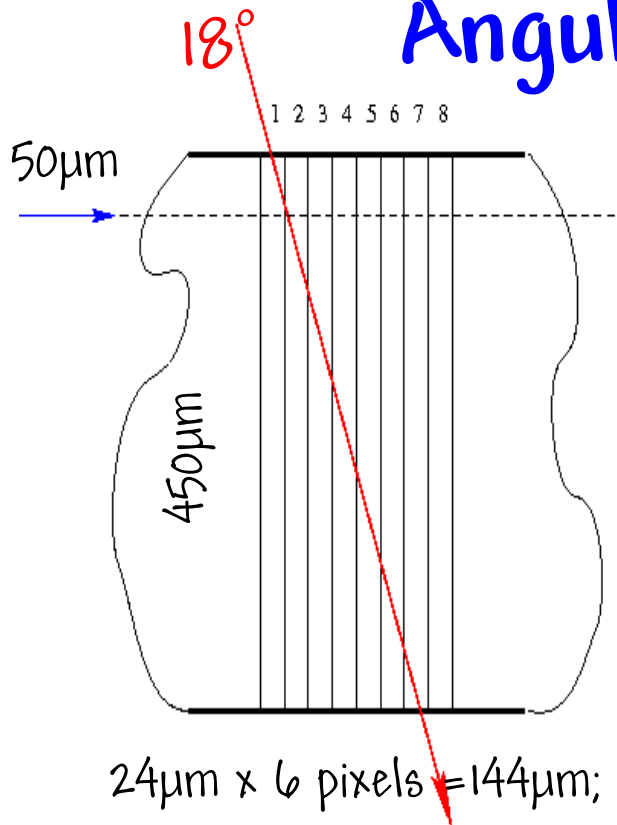
0°

18°

72°



Angular scan: Module 6 (Prague)



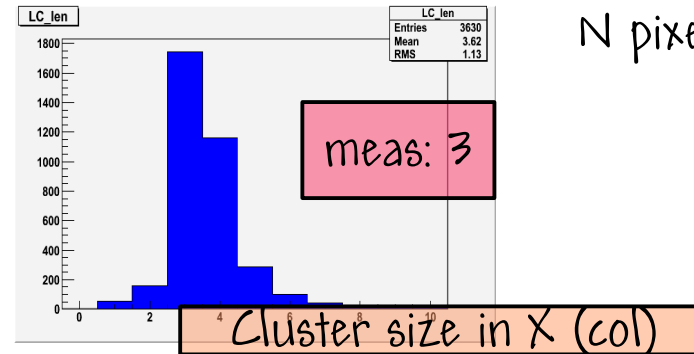
24µm x 6 pixels = 144µm;

for 72°
N pixels X(expected) = 58 + (1)

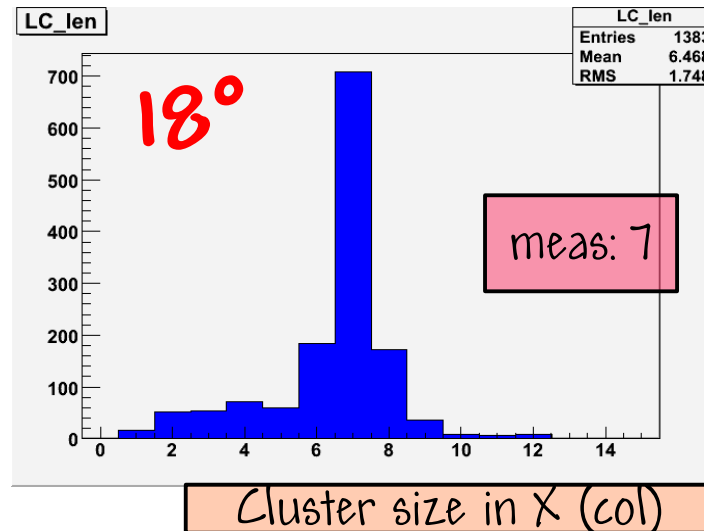
6°

N pixels X = $\tan(6^\circ) \cdot 450\mu\text{m} / 24\mu\text{m}$;

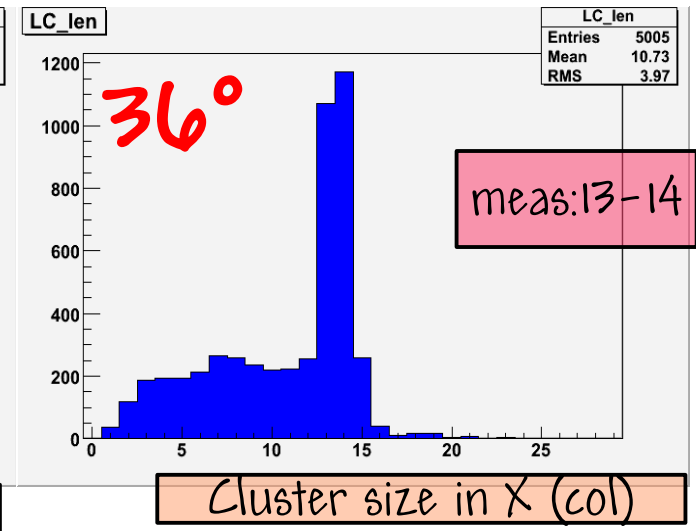
N pixels X = 2 + (1) pixels



N pixels X(expected) = 6 + (1)

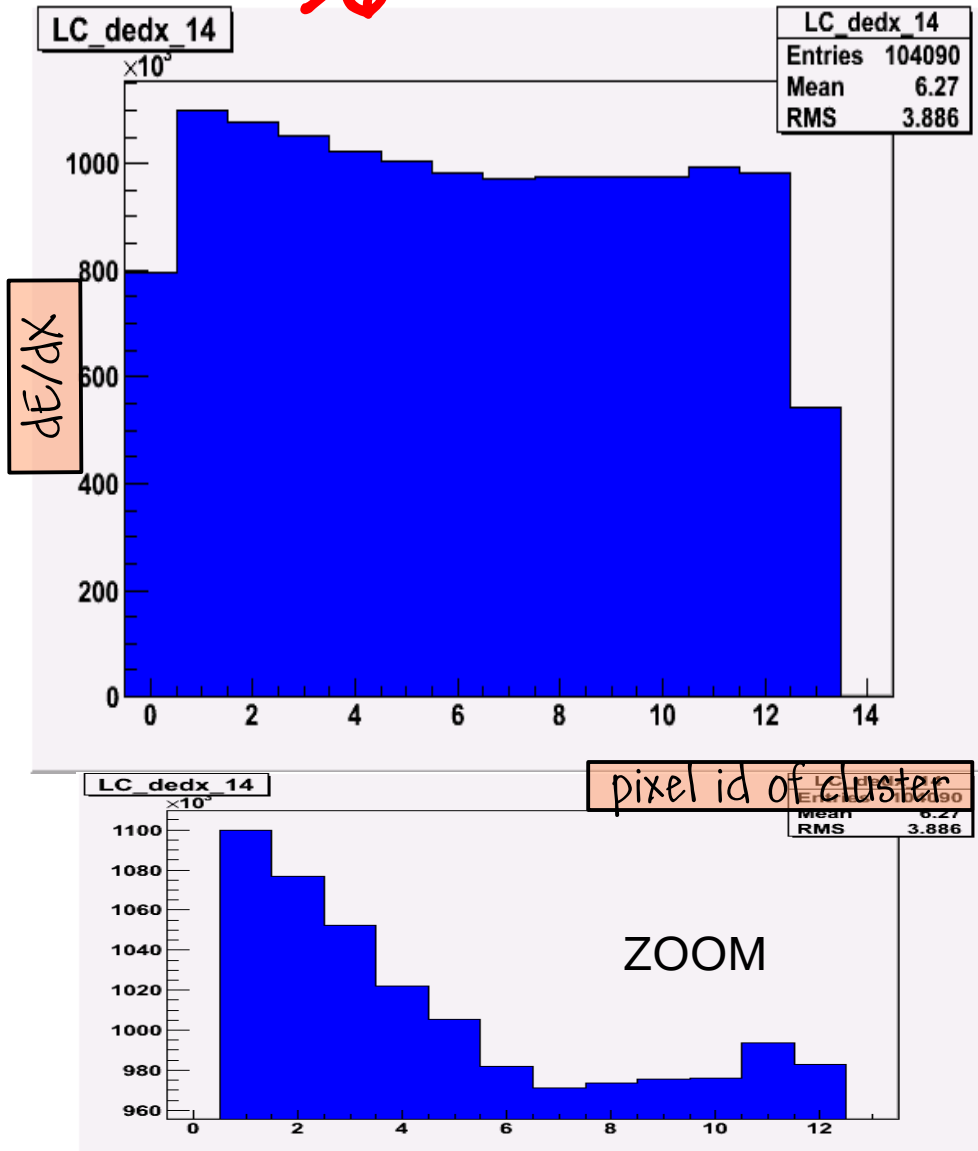


N pixels X (expected) = 13 + (1)

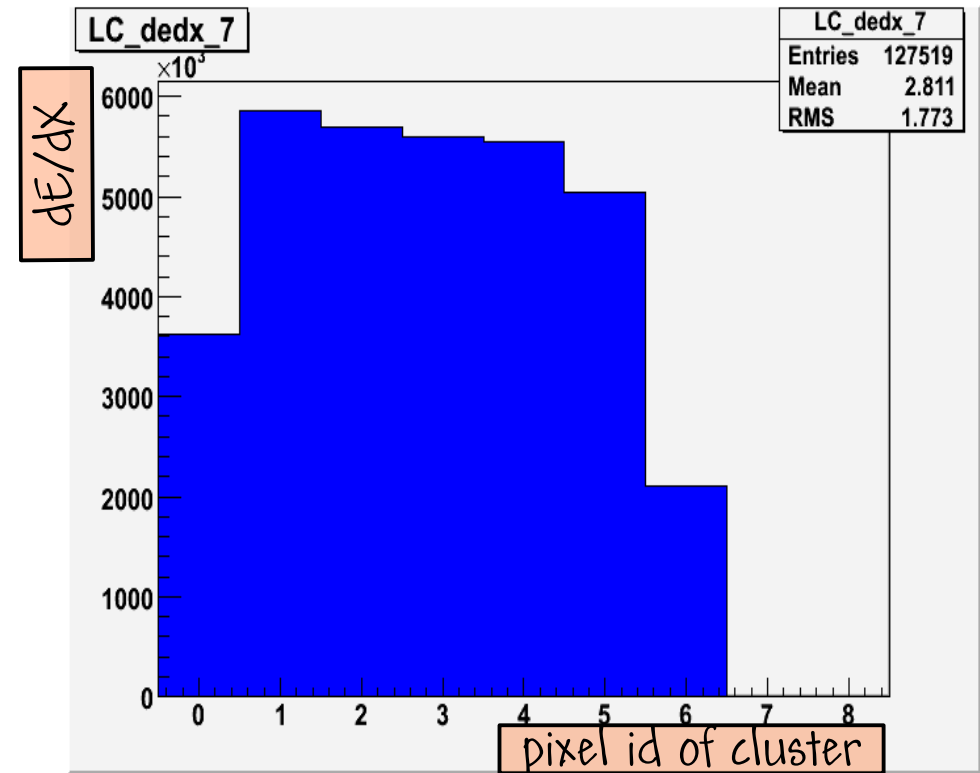


Angular scan: Module 6 (Prague)

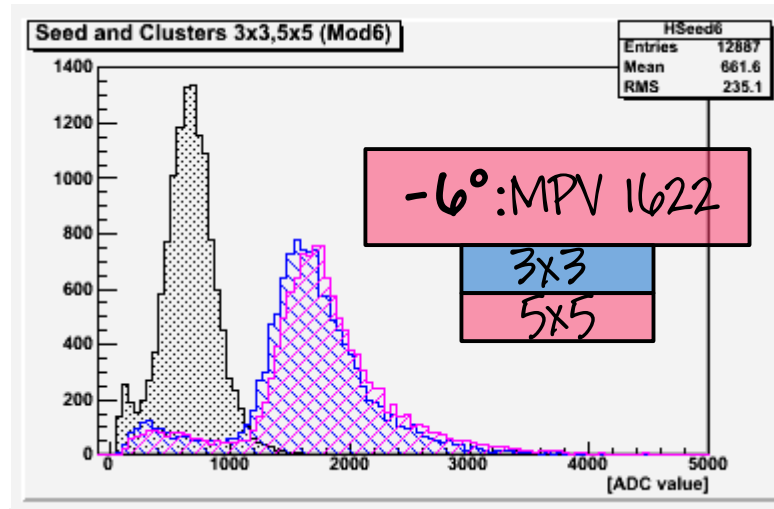
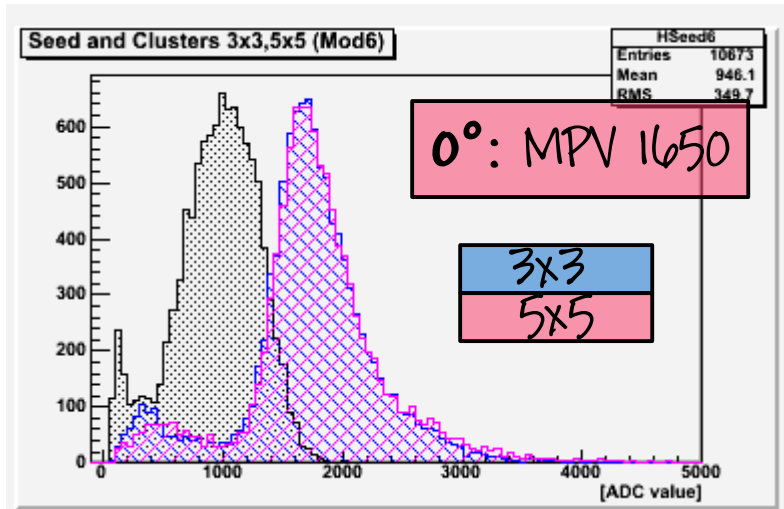
36°



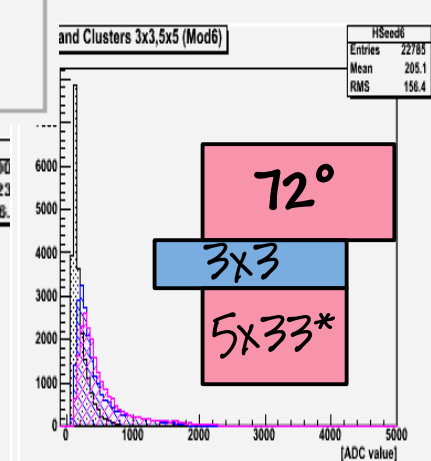
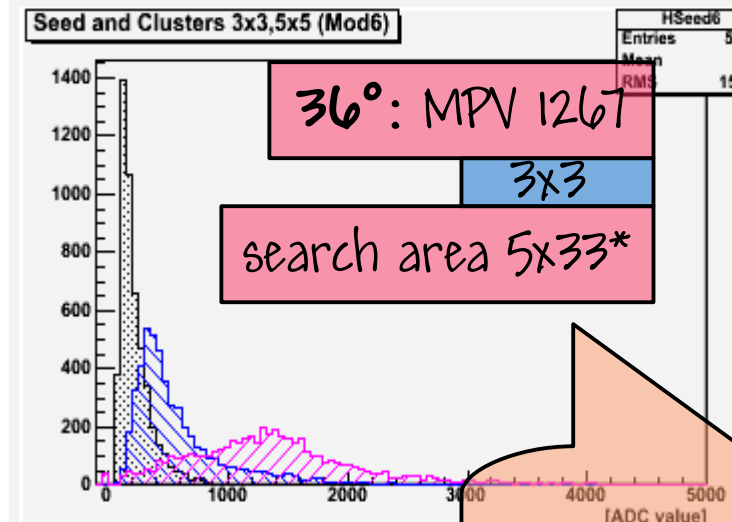
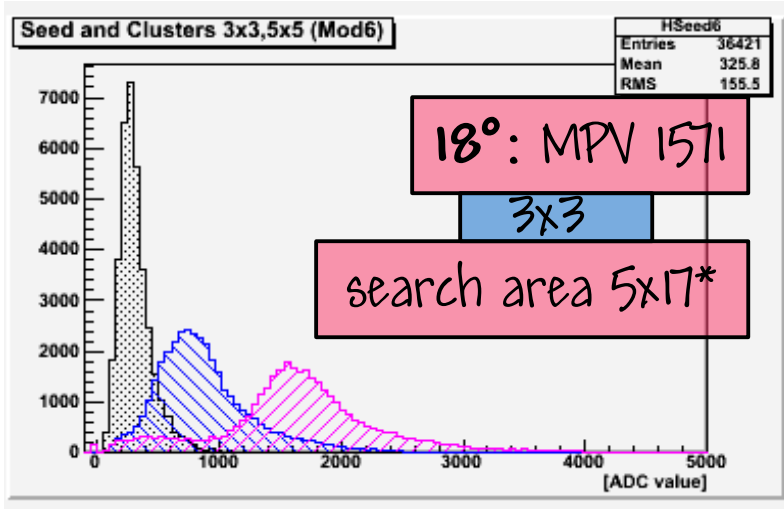
18°



Angular scan: Module 6 (Prague)

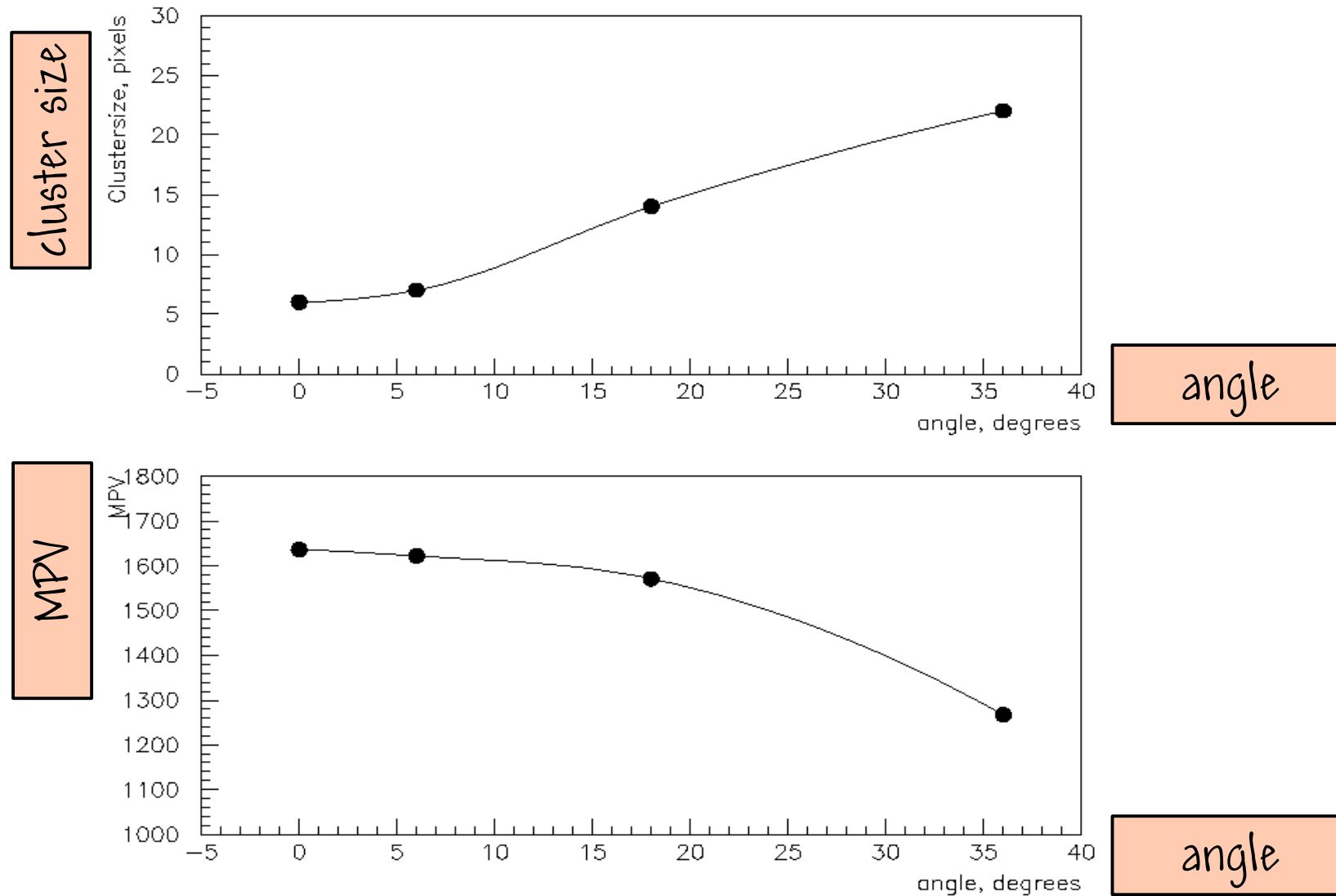


Seed cut = 7σ
Cluster cut = 2σ

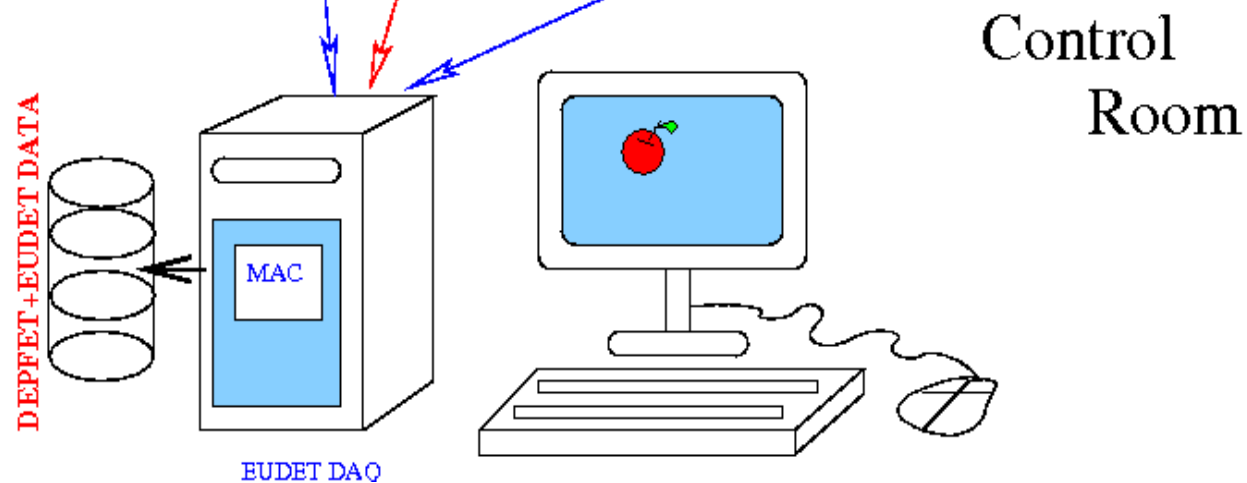
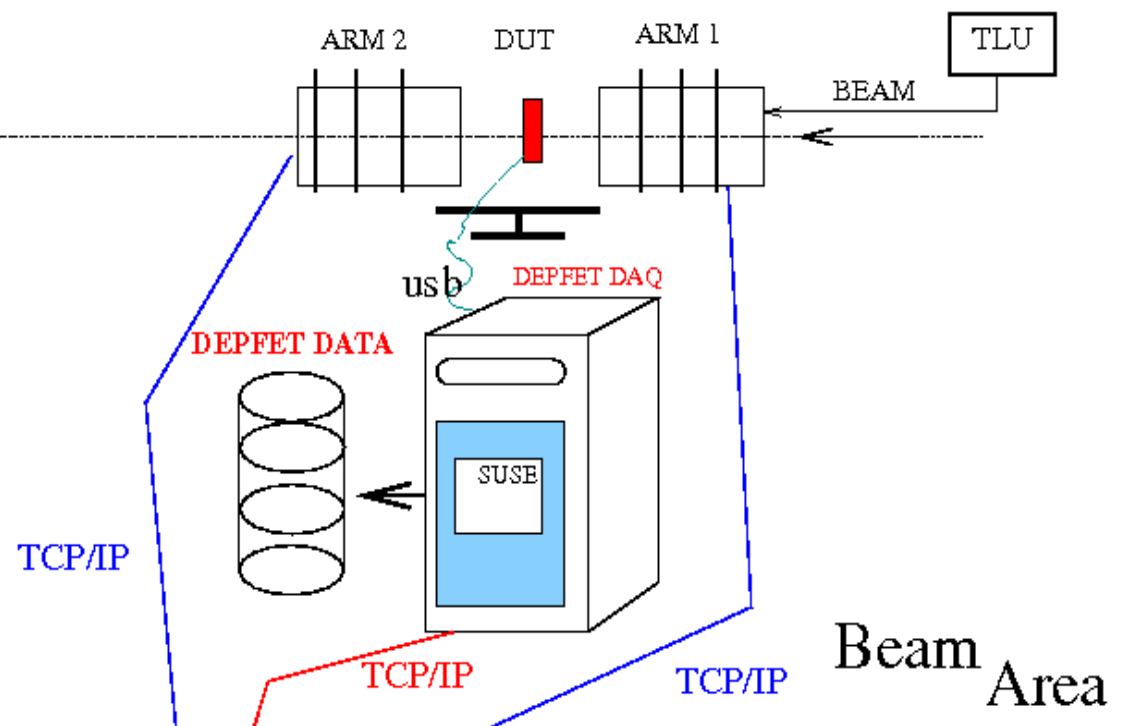
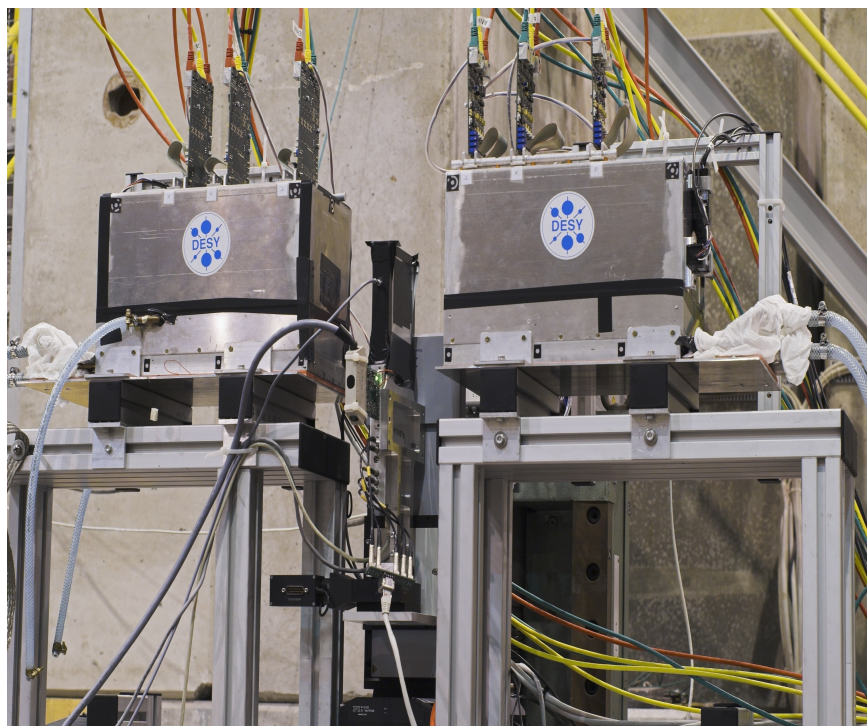


All thresholds has to be reduced

Angular scan: Module 6 (Prague)



DEPFET & EUDET: Setup



DEPFET & EUDET: Run Control

DEPFET PC

EUDET MAC PC

eudaq Run Control

Control

Config: ▼ Config

Run: Start

Log: Log

Reset Stop

Status

Run Number: (4944) Rate:

Triggers: 0 Mean Rate:

Events Built: File Bytes:

Connections

type ▼	name	state	connection
DataCollector		OK	127.0.0.1:53884
LogCollector		OK	127.0.0.1:53881
Monitor	Root	OK	127.0.0.1:53891
Producer	EUDRB	OK	129.194.55.111:32803
Producer	TLU	OK	129.194.55.245:33211
Producer	DEPFET	OK	127.0.0.1:53888

Run Control Client

Status Init USB ☒ Write to File Start Stop Exit PROD RCM Status EVB stat. HELP

Hist PLOT Hist RESET Hist EVB Hist RECV Hist SEND

Command: Server: silab11 Port: 32767 (Re)Connect Exit

```

46920 I      X
44880 I      X
42840 I      X
40800 I     XX
38760 I     XXX
36720 I     XXX
34680 I     XXX
32640 I     XXXX+
30600 I     XXXXX
28560 I     XXXXX
26520 I     ,XXXXX
24480 I     XXXXXXX
22440 I     XXXXXXX
20400 I     XXXXXXX
18360 I     +XXXXXXXX
16320 I     XXXXXXX
14280 I     XXXXXXX
12240 I     XXXXXXX
10200 I     +XXXXXXXXXX
8160 I     XXXXXXXXX
6120 I     ,XXXXXXXXXX
4080 I     ,XXXXXXXXXXXX+
2040 I     ,+XXXX,;XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
      80      160      240      320      400      480
  
```

stop

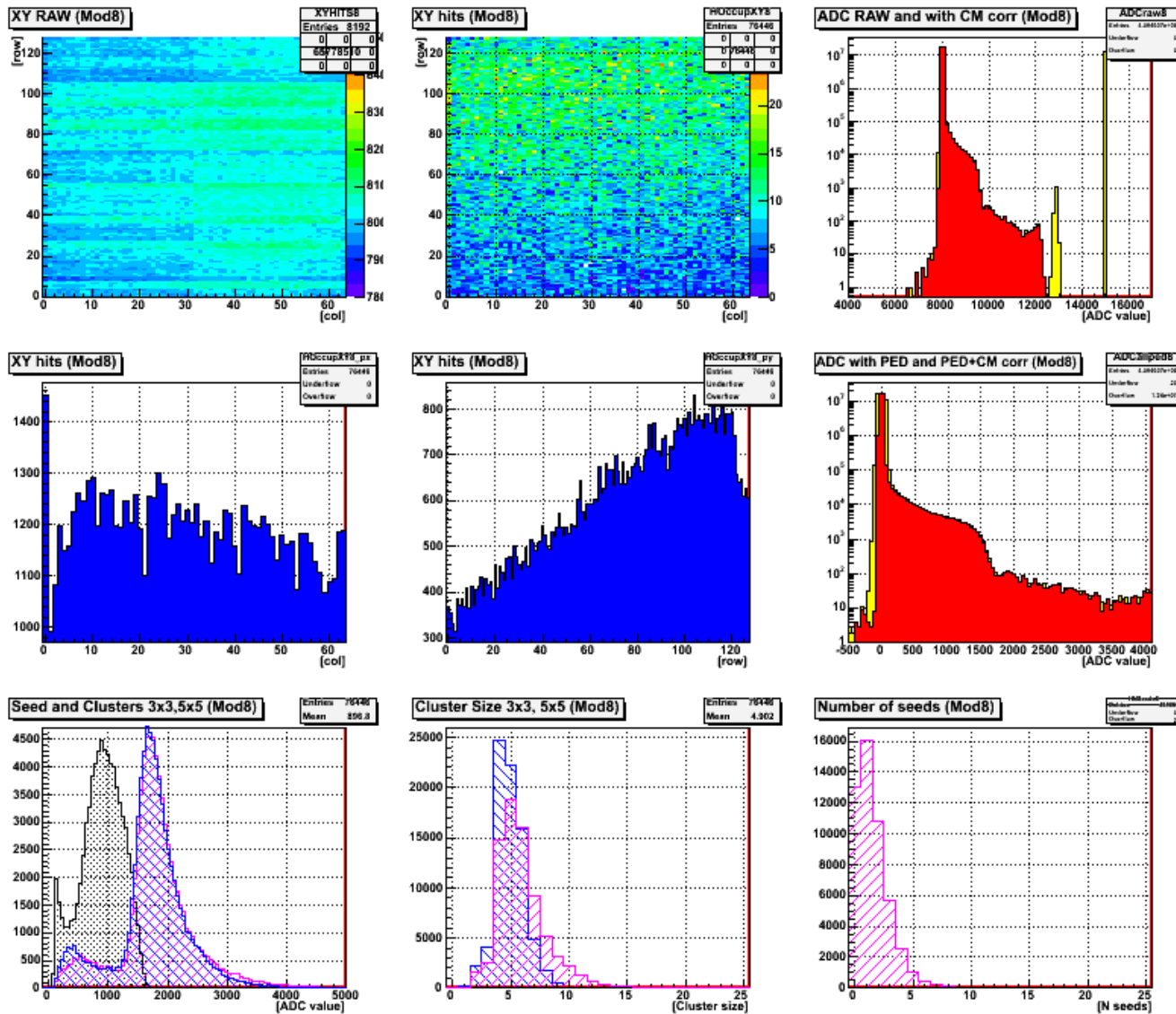
*** Run is Stopped for 2 sec. !!!
 *** Run is Stopped for 2 sec. !!!

Number_of_Boards	1
BoardID	5
RUN_Flag	2
RUN_Time	198 sec
N_Events_Tot	49873
N_timed_out	0
N_extra_mod	0
shmem_error	0
FILE_Flag	0 Format=0
File_Name	
N_Events_File	0
IN_Buffer	9 (0.450000 %)
EVB_Buffer	16 (4.000000 %)
EVB_busy	4166 msec
N_Producers	2
Mod_tot	2 (max=5)
N_Musers	1
N_Clients	3
N_BOR	2 of tot=2
N_EOR	0
TTL	100000
Rate	2(2) REQ=0x05 Rate=
Update	Quit

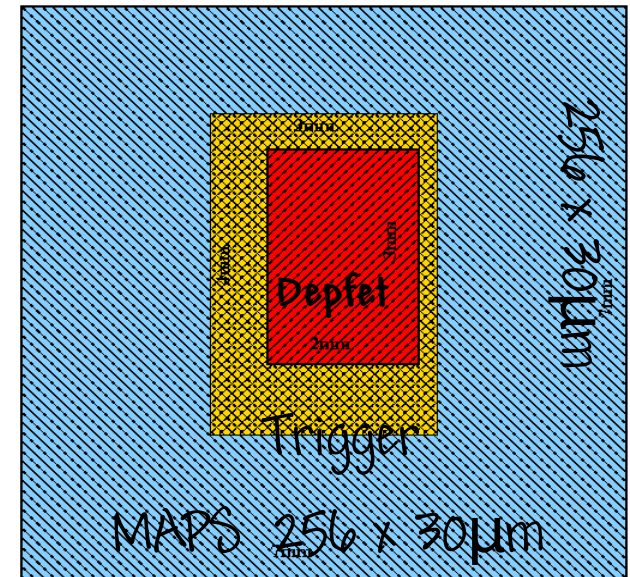
TCP/IP

```
cmd init
cmd start
cmd stop
```

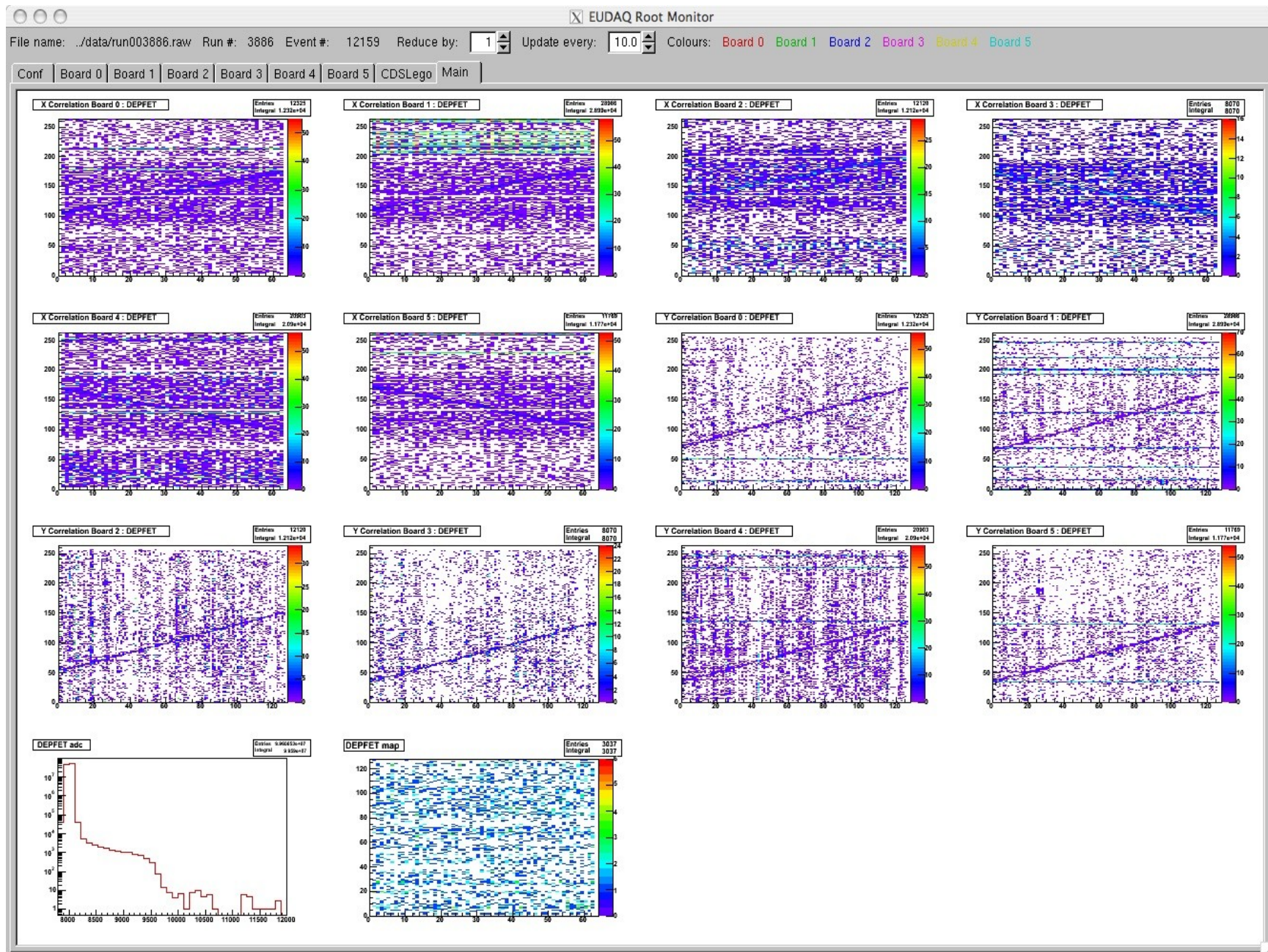
DEPFET & EUDET: DQM



- DEPFET DUTs: 15b, Prague
- Beam energy scan
- High statistic run with 120 GeV



DEPFET & EUDET: Correlations



Conclusions and Plans

- Conclusions

- Linux version of DEPFET DAQ was tested and showed a **good performance**.
- DAQ integration to EUDET Telescope system (via RunControl, DATA merging on a DAQ level and DQM) are **done**.

- Plans

- To analyze 10 Millions events.
- Finish analysis of angular and beam scans
- Perform analysis with EUDET Telescope and compare the results with the results from DEPFET Telescope.
-

