PXD Cosmic Test

Rachid Ayad
University of Tabuk

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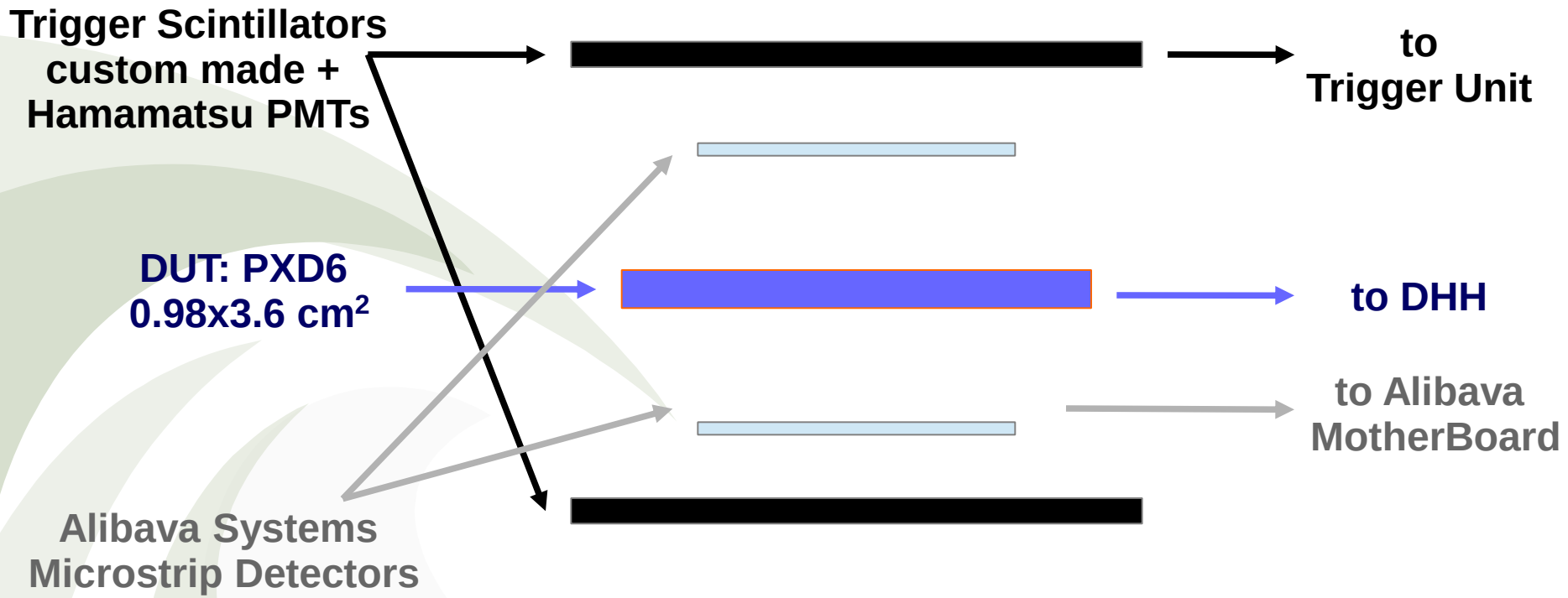
Overview

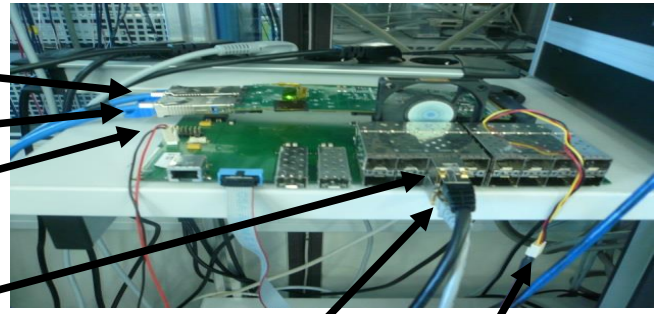
- *Tabuk University is involved in PXD tasks: mainly software development and preparation of cosmic-ray test setup at Tabuk*
- *The main aim for Tabuk cosmic test is to study PXD Tracking characteristics on long term (efficiency and environmental stability etc) before cosmic test at KEK*
- *Setup will proceed in two steps:*
  - *first the readout for the PXD using EMCM (Electronic Multi Chip Module) and DAQ will be setup*
  - *later the telescope and scintillators will be added for tracking and triggering*

Basic layout

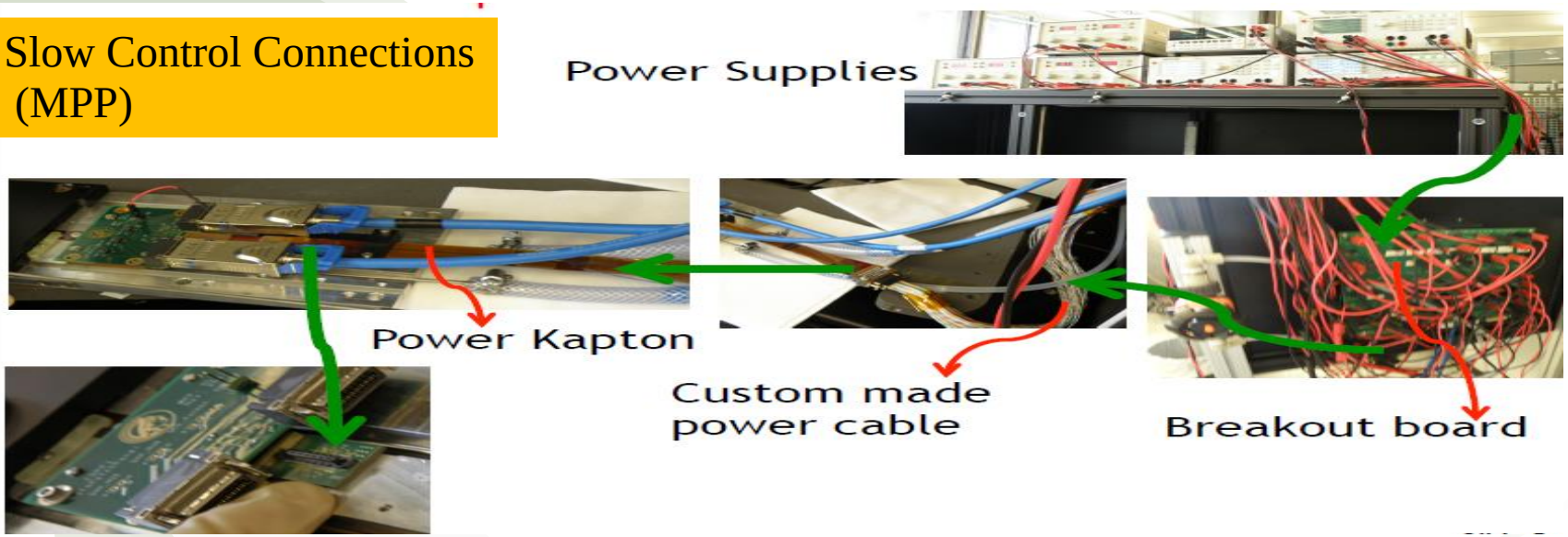


System as it is installed at MPP

Full Setup (MPP)

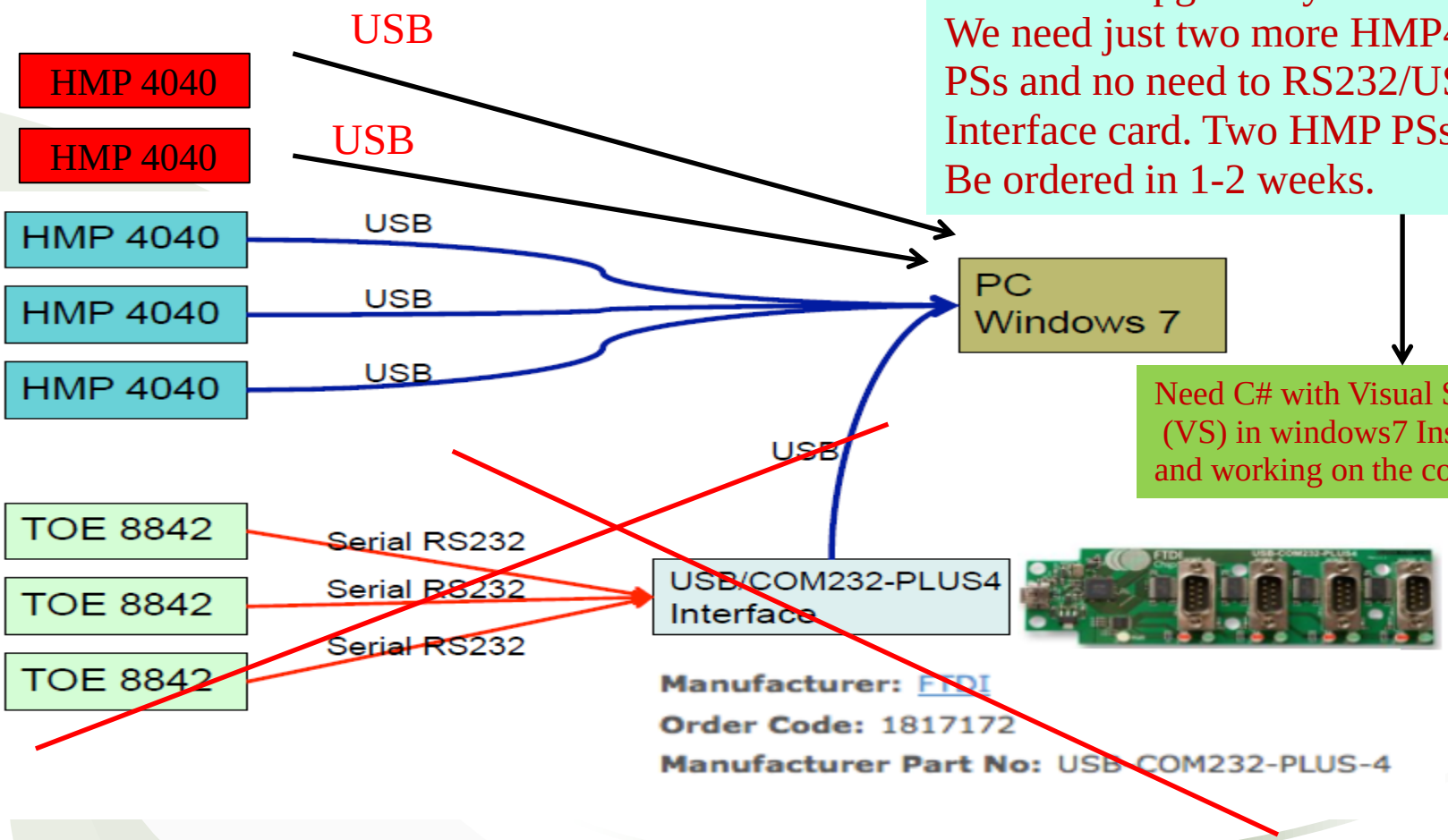


Slow Control Connections (MPP)



Slow Control (PSs for now) I

In Red an Upgrade by Felix.
We need just two more HMP404 PSs and no need to RS232/USB Interface card. Two HMP PSs will Be ordered in 1-2 weeks.



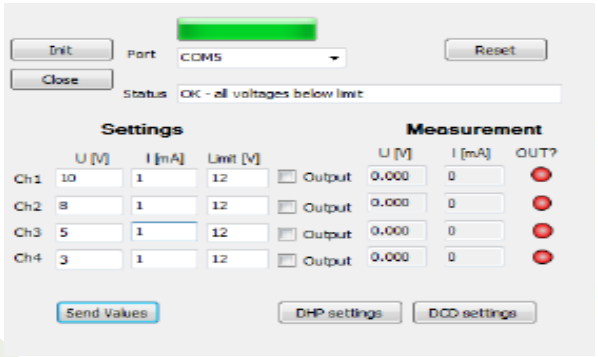
Need C# with Visual Studio (VS) in windows7 Installed and working on the code.

Slow Control (PSs for now) II Status

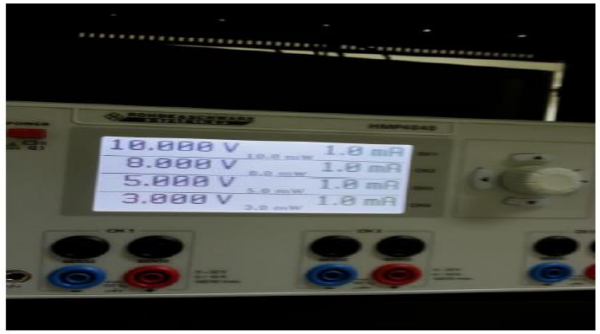
- HMP4040 PSs fully standalone tested: Driver installed, Serial Ports configured, and finally communication with computer tested.

PSs sit on a Rack near Control PC

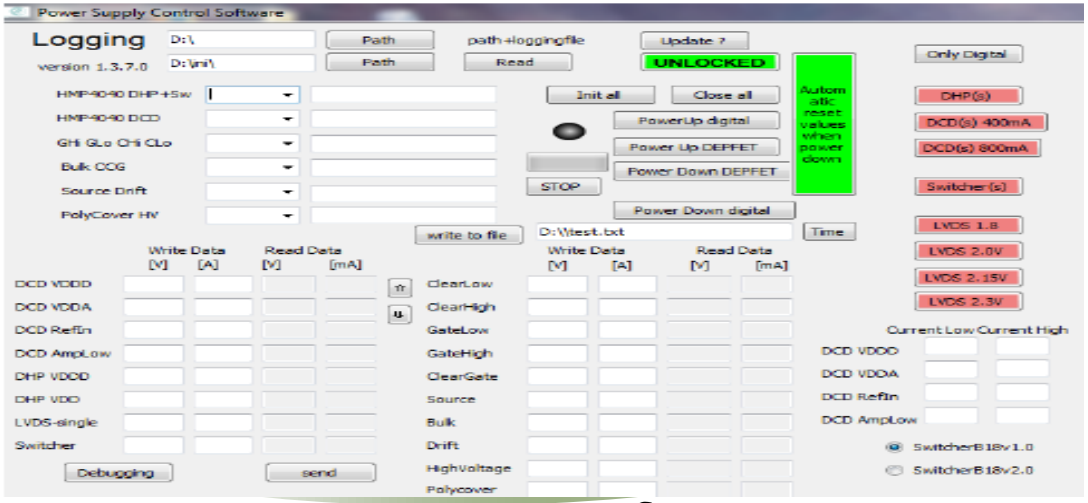
Standalone test Program



Values set on the PS

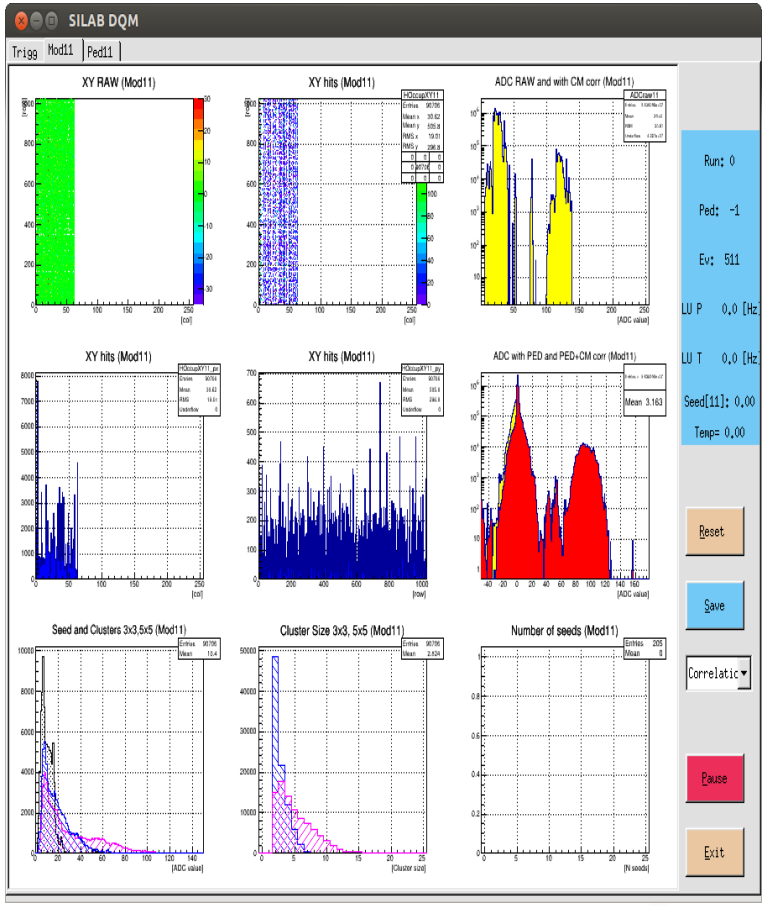


The SL program to set PSs Values is here in the right. We need to have all the PSs Including TOE ones to run it (from Felix).



PXD hardware and DAQ

- All Hardware is ready at MPP to be shipped
- A PC fully installed with BonnDAQ is also ready for shipment. The software tested by Ben Oberhof while at MPP.
- Expect to arrive in a couple of weeks.
- Chiller will arrive in two weeks.
- ATCA crate by Igor is out of order from Pentair And need to find a replacement. Igor is looking.



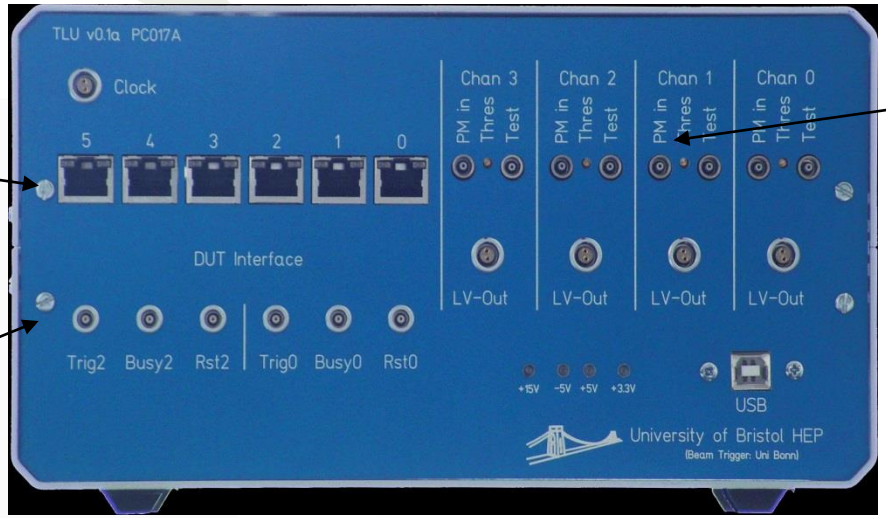
Alibava System

- *Telescope will be made up from Alibava Systems*
- *For each system:*
  - *1 Mother Board directly connected to PC*
  - *1 Detector board connected to each Mother Board*
  - *Aluminium casing for all boards*

- *Telescope will consist of 2D 1x1 cm^2 strip silicon sensors with 80um pitch.*
- *Every Detector Board can handle 128 channels for each direction (u, v)*
- *Full telescope will consist of two raws of planes upstream and downstream*

Trigger Logic Unit (TLU)

- *TLU unit was developed for EUDET telescope, different possible operating modes (simple, trigger-busy handshake, trigger-data handshake)*
- *TLU would be the ideal SIMPLE solution to trigger PXD and Alibava with ALIBAVA DAQ sending a BUSY signal and clear when done.*
- *DHH naturally accepts signal triggers via ethernet cable from TLU*
- *Lemo outputs with NIM standard are available for Alibava System*

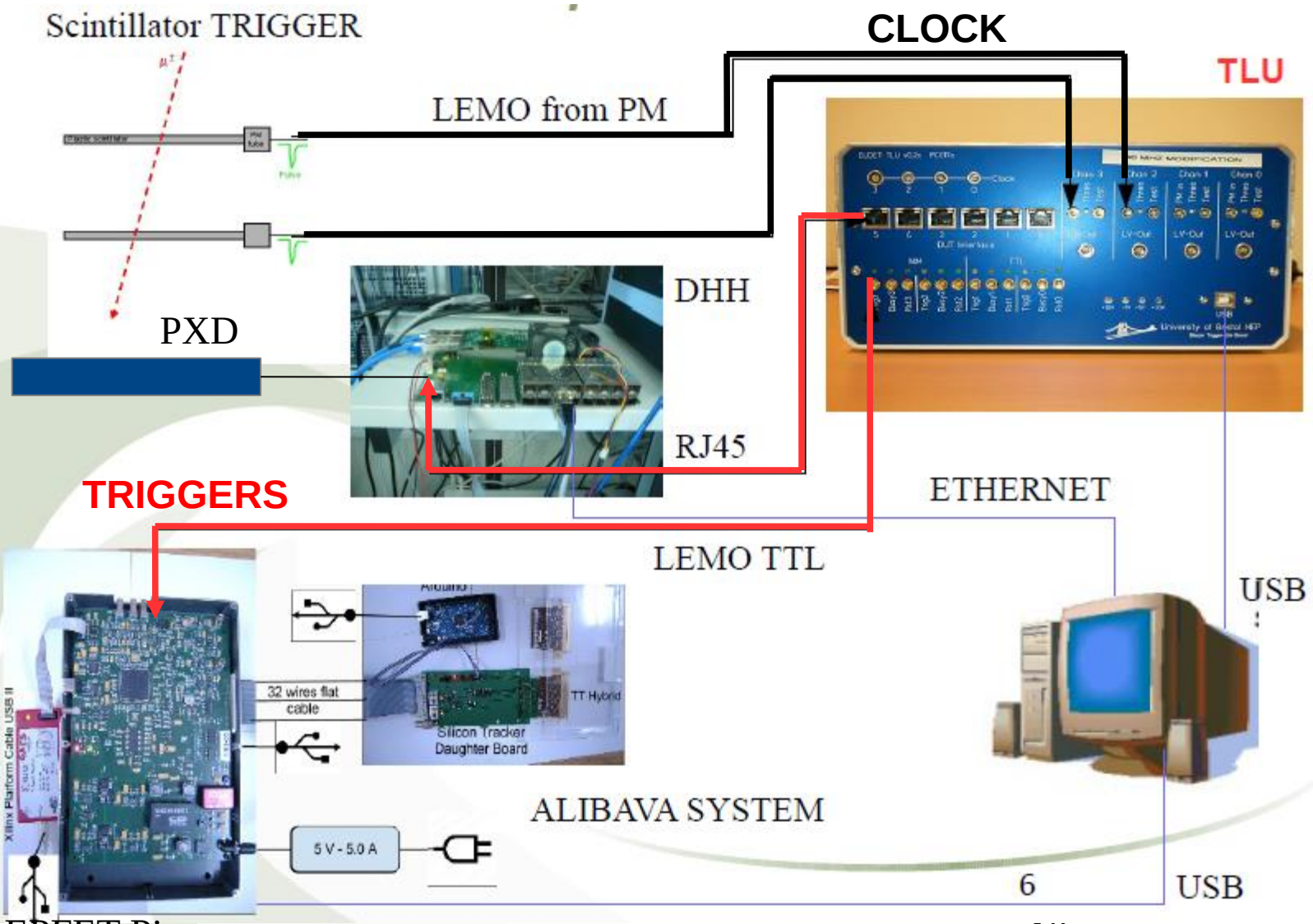


Output for DHH

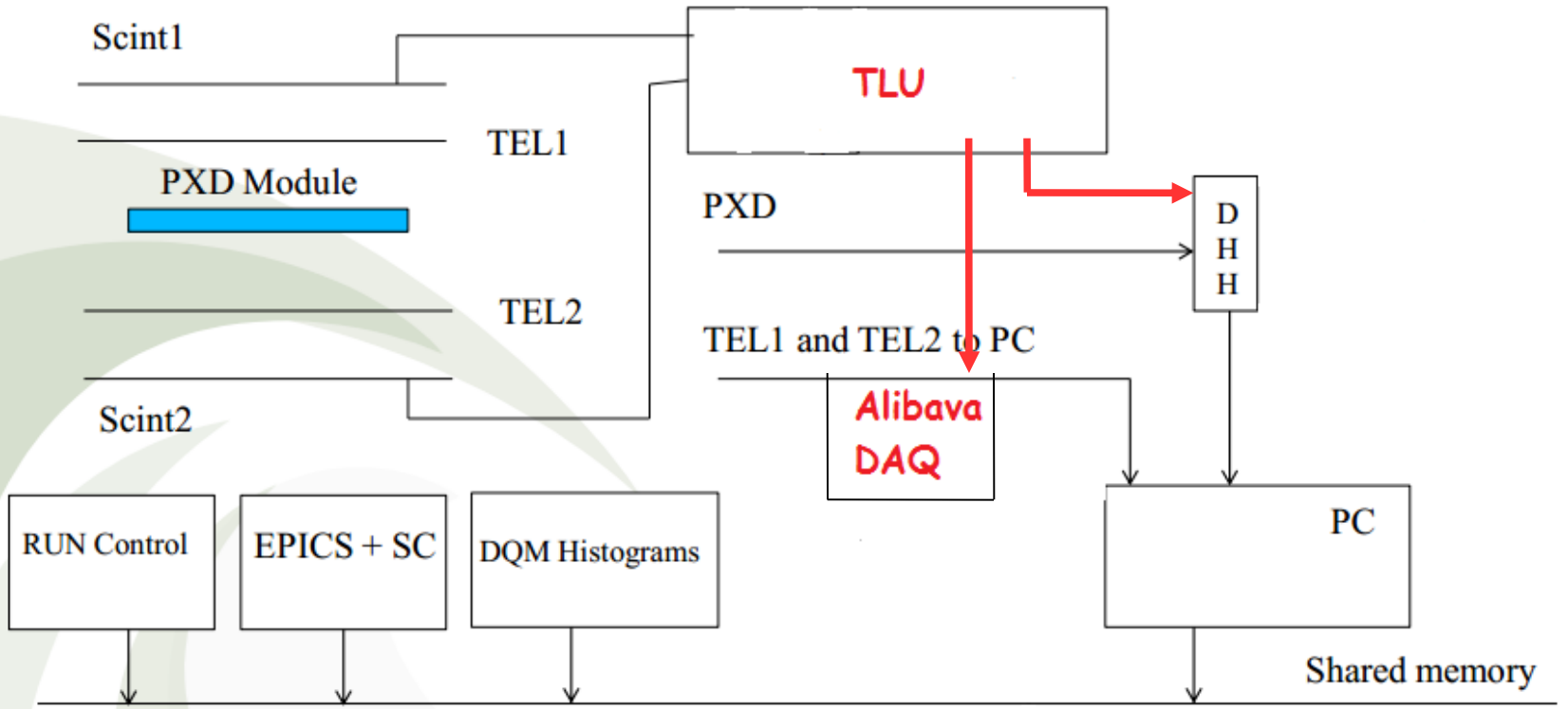
Output for Alibava

PMT Input

Full system sketch



Full system sketch (2)



Conclusion and Schedule

- Some PSs (HMP4040) received and tested at Tabuk. Also SL software installed. Optionally use just HMP4040 PS (so only USBs) and modify the C# program on windows7.

- Full DAQ with EMCM setup fully configurated and tested at MPP. PC ready. Parts and the PC will shipped soon to Tabuk.

- Three 2D 1x1cm^2 Alibava trackers planes were ordered. Full Telscope system with many planes will be ordered with the new budget next year.

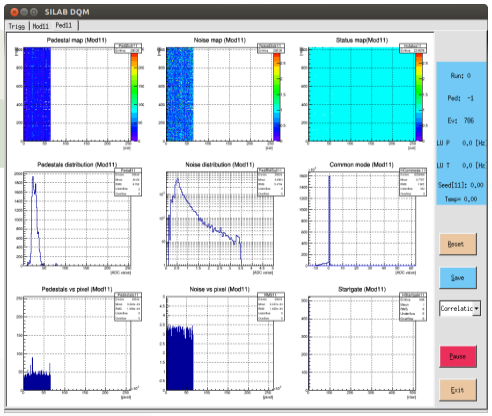
- Trigger: Manufacturing of scintillators at MPP and we are discussing with Hamamatsu for the right small PMTs.

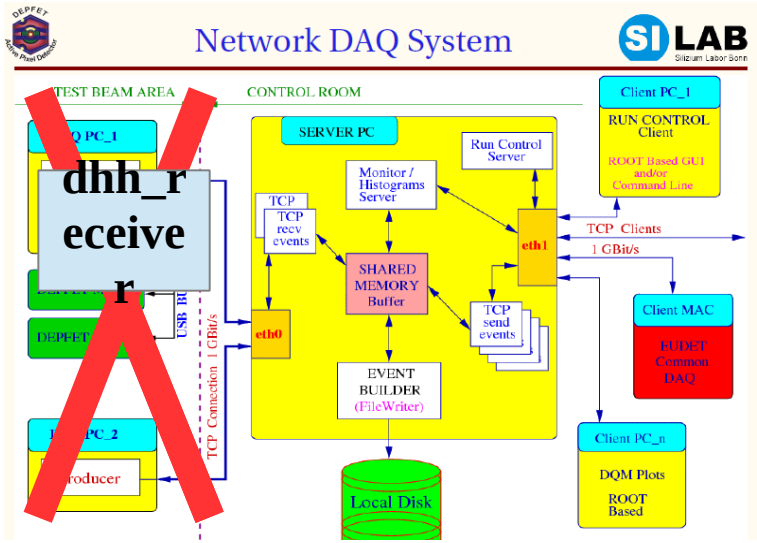
- *Cosmic test is expected to be ready to run in 2015 for, at least, 1 year*
- *Most crucial now:*
  - *check for availability of TLU unit, otherwise we will have to think of a plan-B: Now CAEN is looking to build a simular one ...*

Backing slides

DAQ software: to-do

- *Most of the aforementioned SW is currently used at MPP*
- *There are still some open issues on software*
- *Bonn DAQ needs some development to properly read out full PXD matrix*

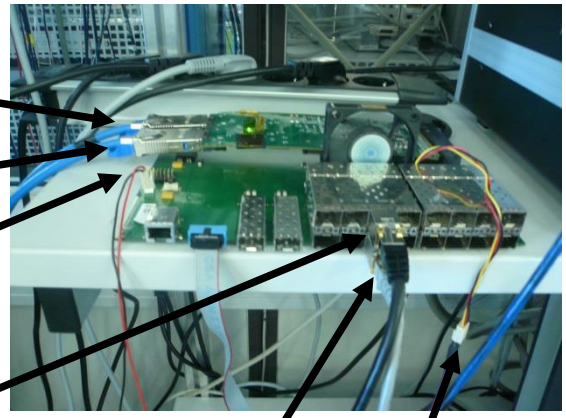




- *We have to implement PS control in EPICS (currently a Win-app on a separate machine)*
- *Furthermore: need to decide how to merge data from PXD and Alibava for tracking and analysis (basf2?)*

PXD Readout

- *The PXD is readout via DataPatchPanel by the DHH*
- *DHH is connected directly and via router to PC and data is aquired via BonnDAQ*

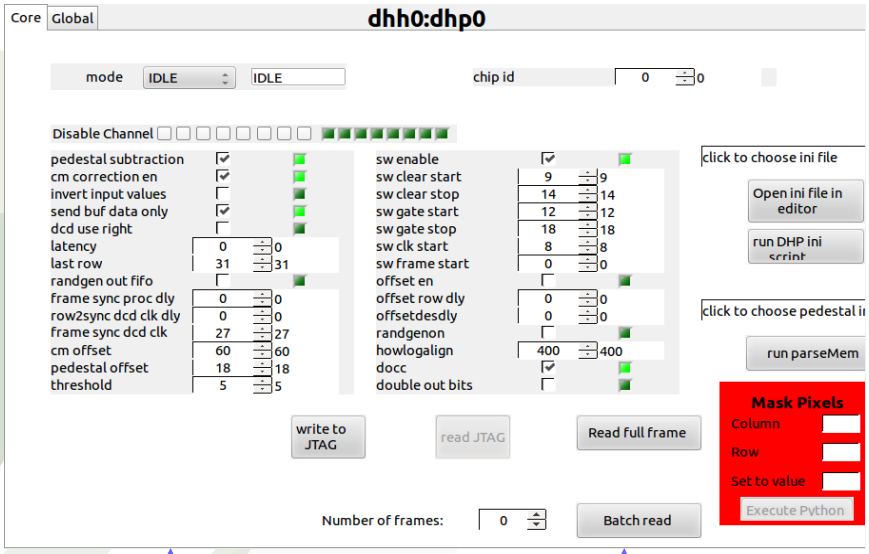


- *The trigger signal is given to DHH via ethernet*

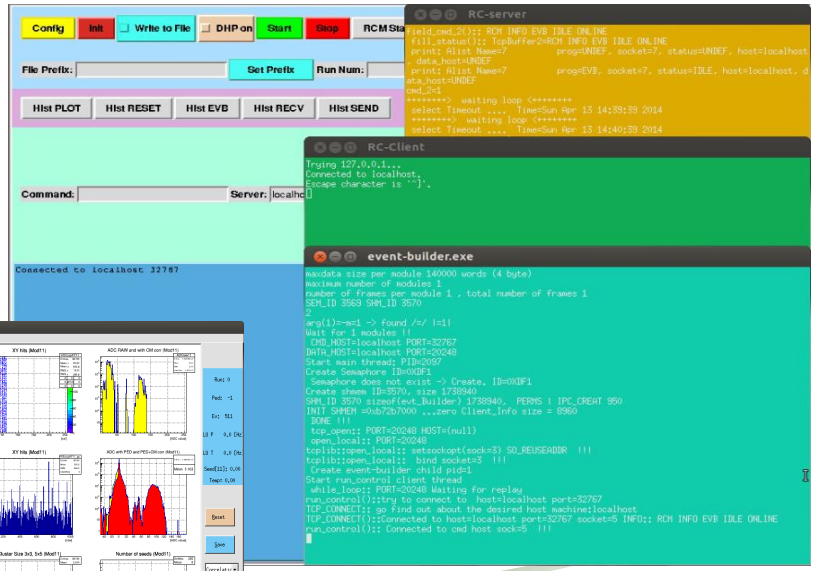
PXD-DAQ sofware overview

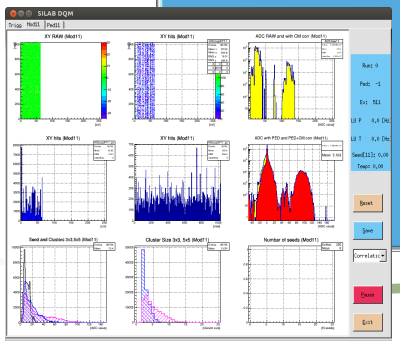
CSS interface for Epics:
chip parameters control, DHH config
JTAG control for DHP read-out

PS control on Adorea
Windows Desktop



Bonn DAQ:
Run control, Event builder, DQM





DHH
dhh_receiver:
DHH read out

DAQ software: to-do

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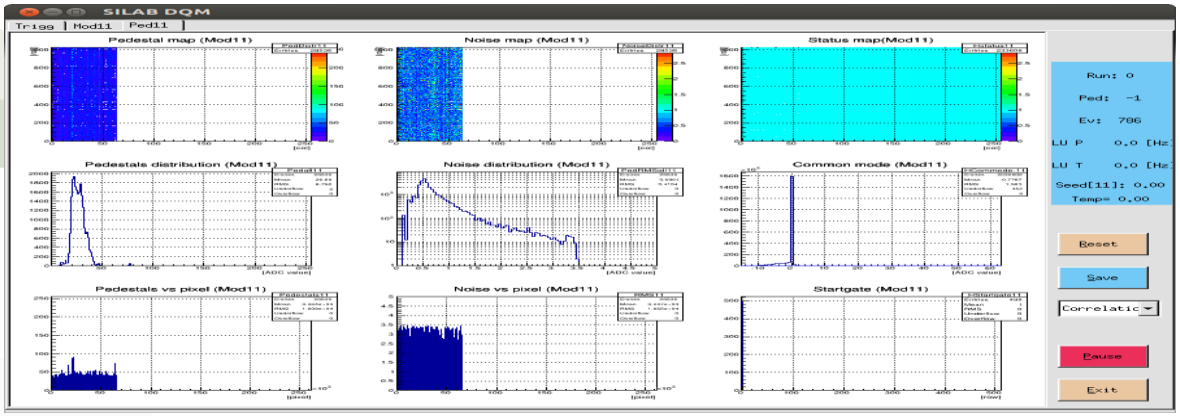
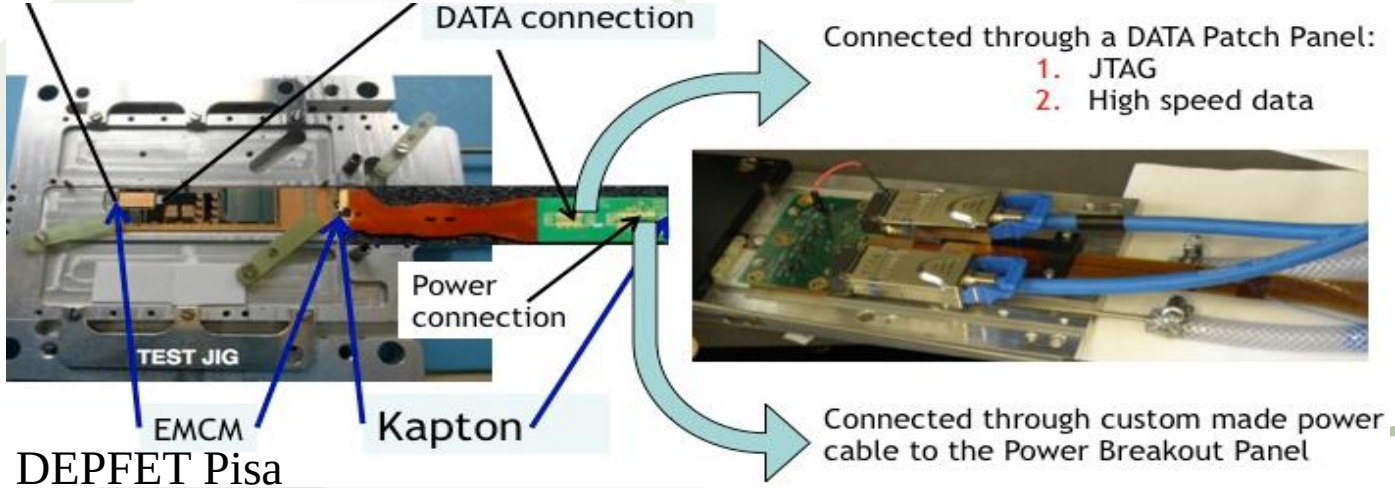


- *We have to implement PS control in EPICS (currently a Win-app on a separate machine)*
- *Furthermore: need to decide how to merge data from PXD and Alibava for tracking and analysis (basf2?)*

Preliminary Setup

- *In order to test PXD-DAQ and software we will EMCM as test setup*

- *DHH will be connected to the EMCM to test DAQ, PS, cooling and SW*
- *Almost the same setup as for cosmic test but without telescope+scintillators and trigger unit (TLU)*
- *Basic components: EMCM, DataPatchPanel, DHH, PS, Cooling and PC*



Study of Trigger and the Alibava Trackers

- *We are continually in contact with Carlos and Carmen at Alibava systems*

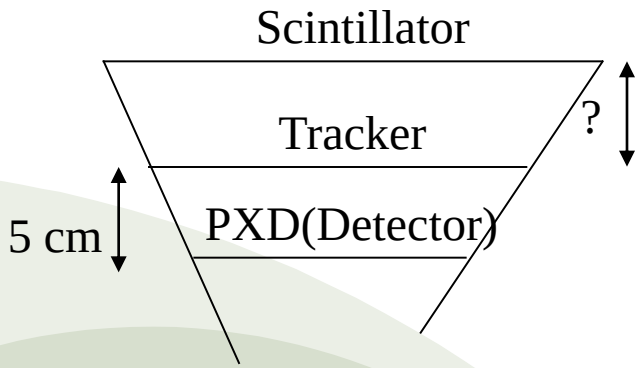
- *Now available and can be produced 2x2cm^2 1D silicon strips planes and 1x1cm^2 2D silicon planes. We have chosen 2D 1x1cm^2 Planes to avoid systematics from mounting many 1D planes. 2D planes will also make things easier. Available PXD6 modules (up to 4.6cmx0.96cm).*

- *The 2D planes has x and y strips layers 300 microns, 80 micron pitch, width and separated with a 1.6 mm substrate gap between x and y strips planes.*

- *Need to define scintillators that maximize data taking rate.*

- *A simulation task started to find best design of trigger and tracker system.*

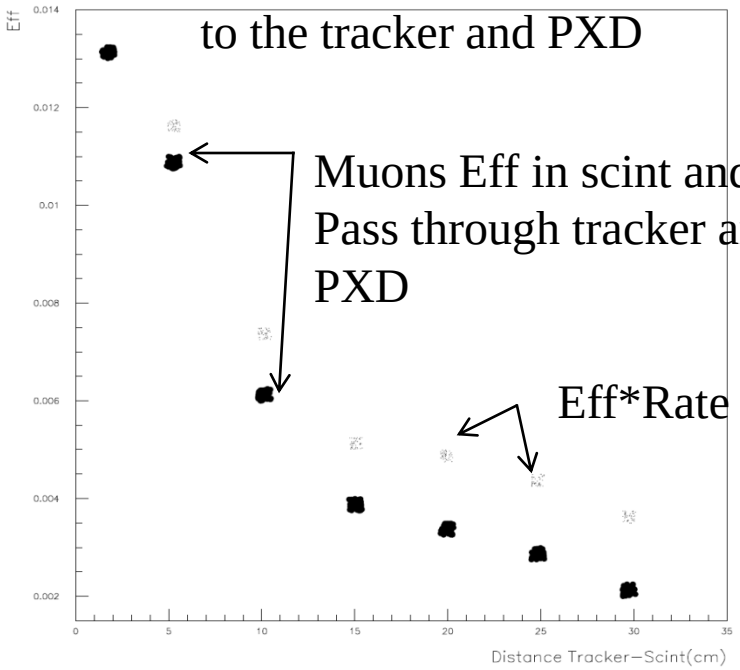
Some simulation issues (tracker 2D planes)



Define the size
Of the scintillator

5000 muons on the Scintillator

We need the Scint close to the tracker and PXD



Muons Eff in scint and Pass through tracker and PXD

Eff*Rate

Residuals show bumps due to tilted Muons. 1D planes separation will add such effect so 2D planes is better. Residuals will be studied more.