Status of PMD in RHIC RUN-4

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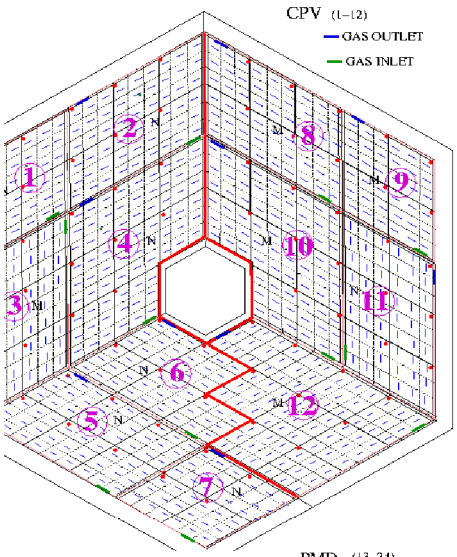
for the STAR PMD group

Outline

- PMD layout and parameters
- Measures & Physics goals
- Installation
- Results from first PMD data
- Future plan
- Conclusion

PMD



Pseudorapidity coverage	−3.8 to −2.3
Azimuthal coverage	2π
Distance from vertex	540 cm on East side
No. of planes	2 (veto + preshower)
Detector active area	5.6 m^2 (for each plane)
Lead plate + SS plate thickness	3 radiation length
Detector	Gas detector with hexagonal cells
Hexagonal cell dimensions	Depth: 8 mm, cross section: 1.0
Total number of cells (channels)	82944 (=>in each plane: 41472 cells)
No. of Supermodules per plane	12
Gas used in the detector	Ar + CO_2 (70%+30%)
Operational HV	1450 V
No. of HV channels	24
Photon counting efficiency	68%
Purity of photon sample	63%

Measures & Physics Goals

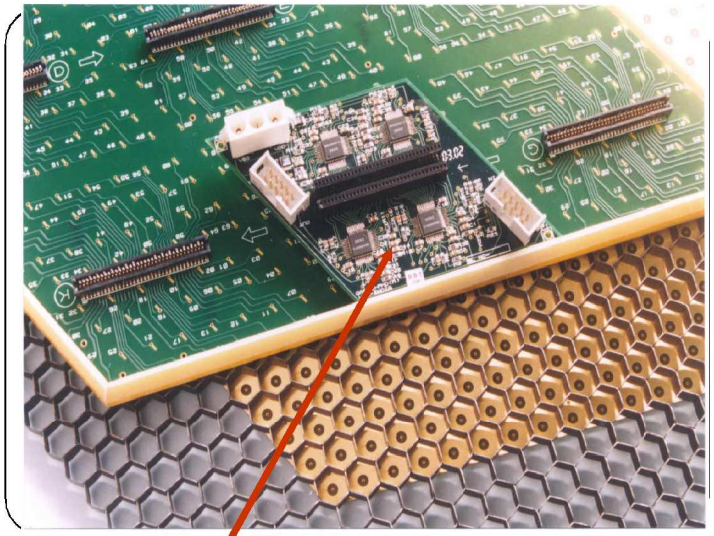
PMD Measures: multiplicity and spatial ($\eta - \phi$) distribution of Photons on an event-by-event basis.

Physics Goals :

- E-by-E Multiplicity fluctuation
- Disoriented Chiral Condensates
- Event shapes and Flow

Installation

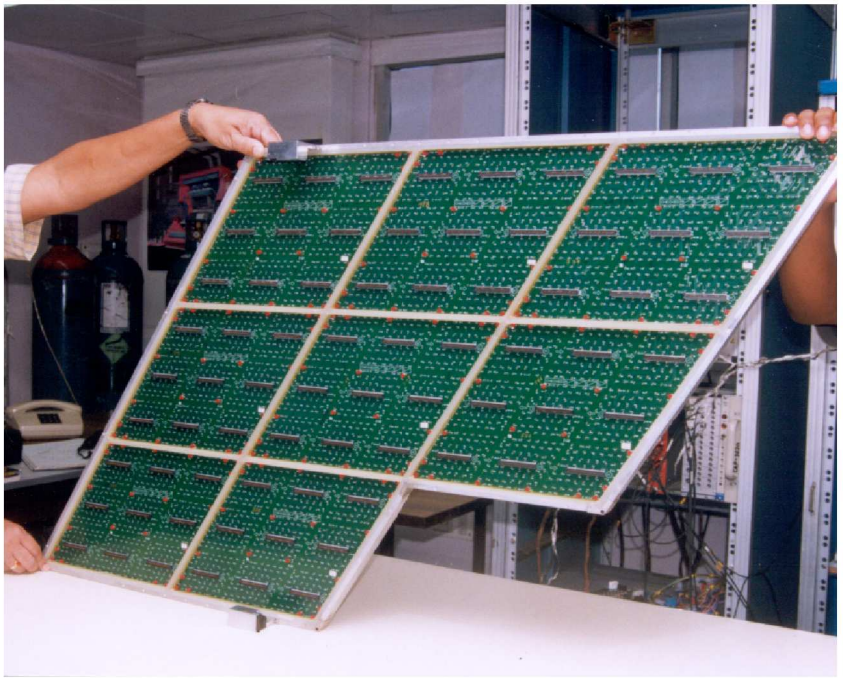
Unit Module Components



FEE board plugged onto the connector

- Each unit module contains 24x24 array of cells (576)
- Size of unit module: Rhombus of side 255 mm
- Weight of unit module: 700 gm

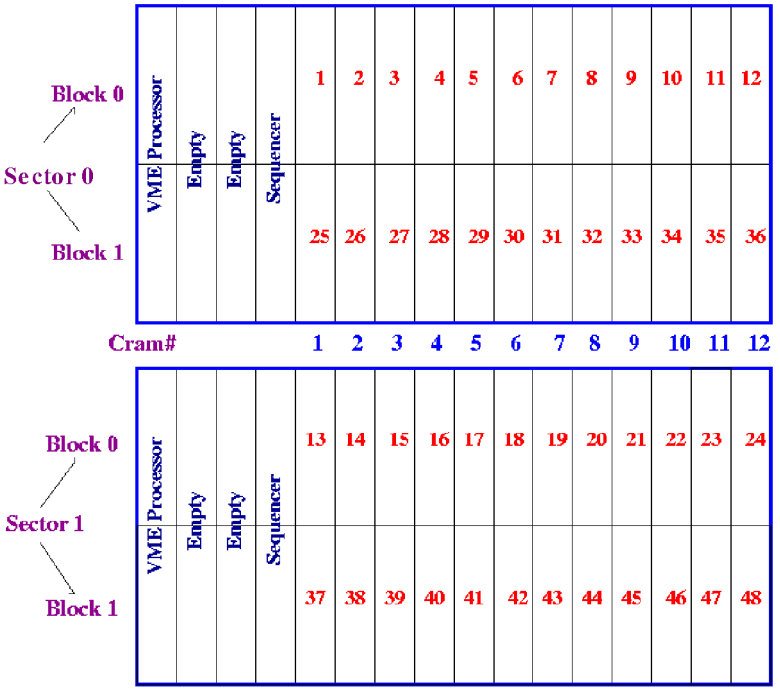
Super Module



- All the 12 SMs in Preshower plane has been mounted
- Another 2 SMs in the Veto plane to be mounted

Front-end Electronics and DAQ

The PMD signals uses 16-channel **GASSIPLEX** chips.
One UM has 9 FEE Boards each with 4 Gassiplex chips
3 of UM are daisy chained in one FEE Chain
ONE Chain: 27 FEE Boards
i.e. 27x64 = 1728 channels
Total Number of FEE chains is 48
The chains are readout by 24 C-RAMs.

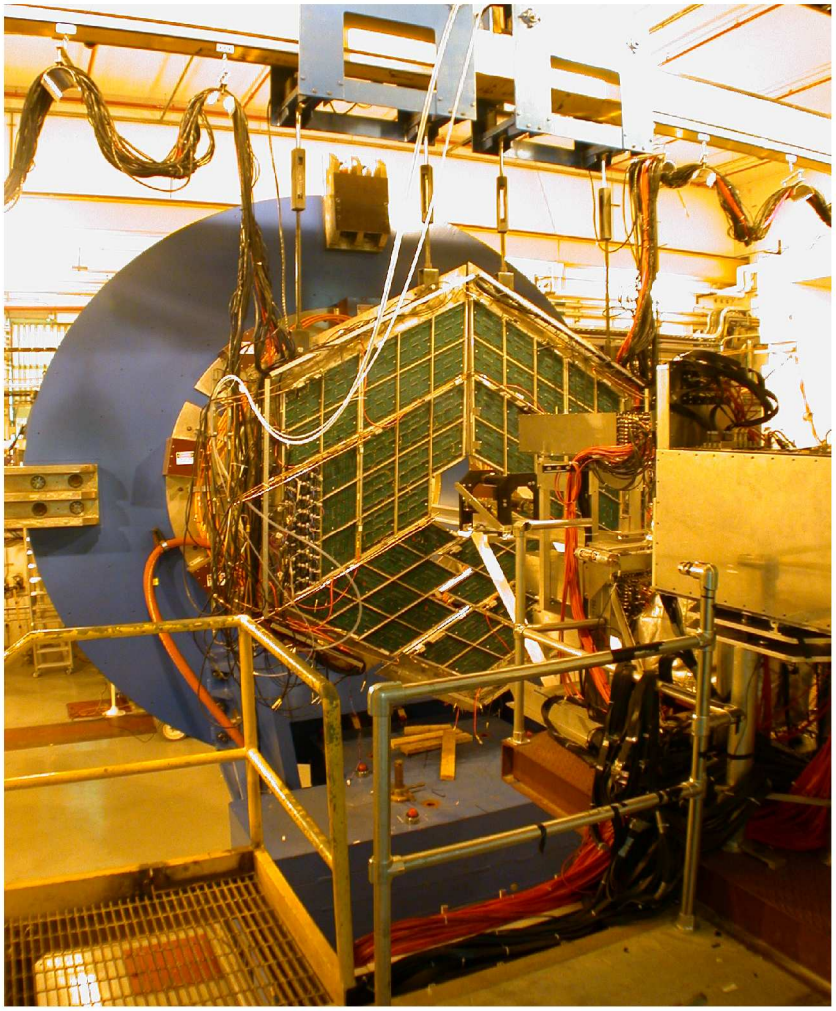


CRATE-1

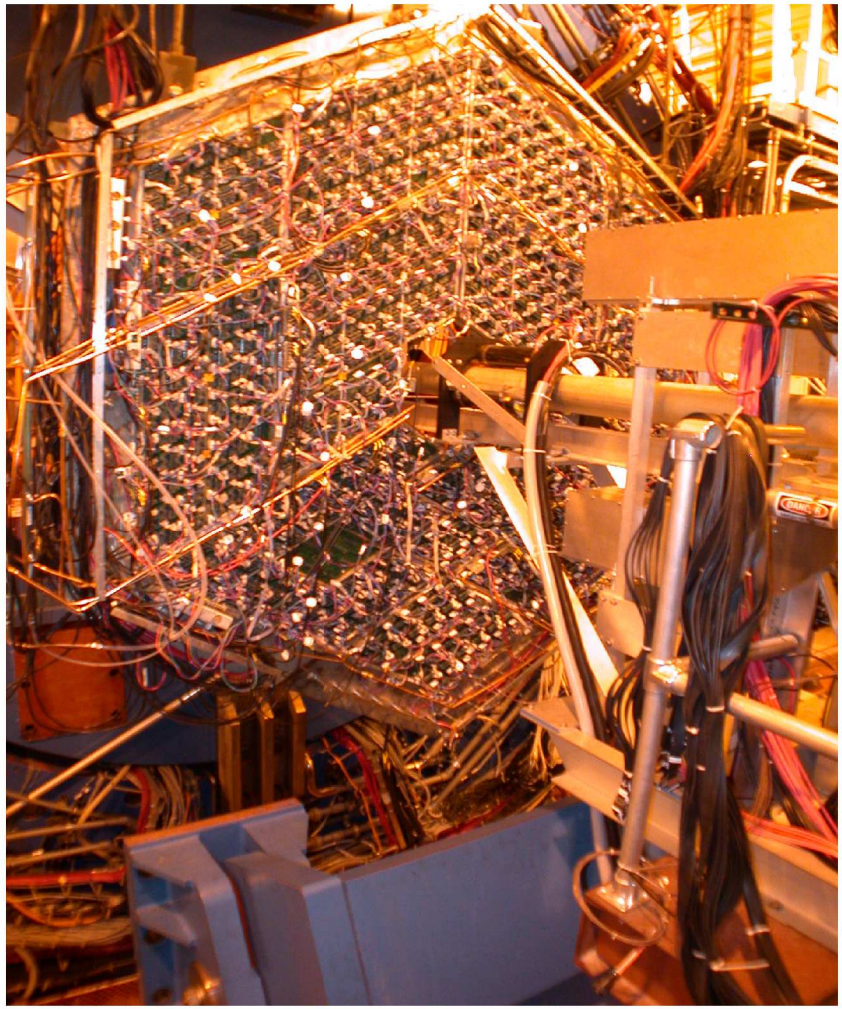
CRATE-2

DAQ Setup showing 24 C-RAMS in two VME Crates

Installation...



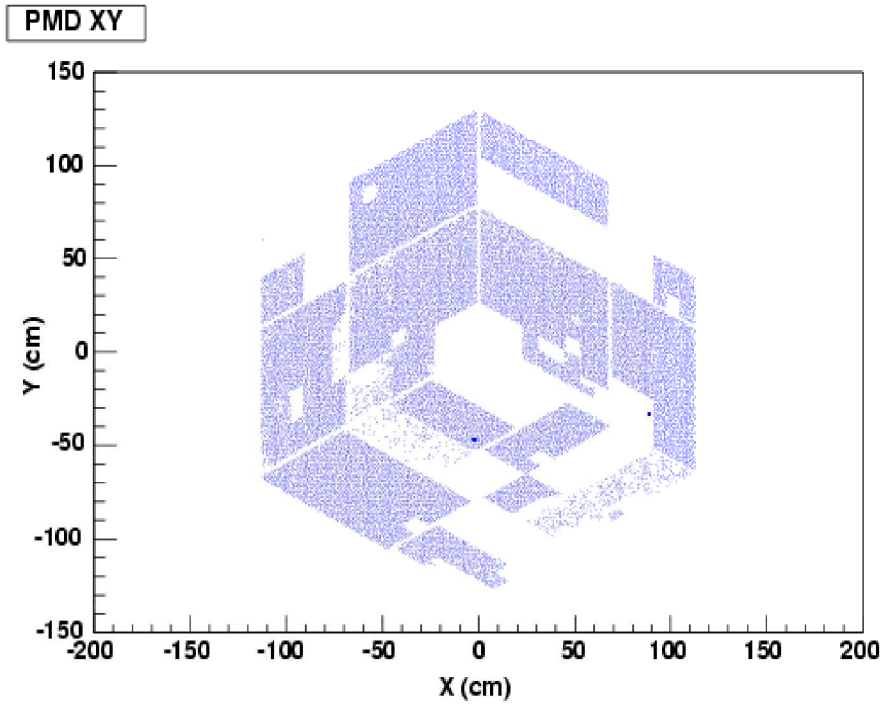
Before FEE mounting



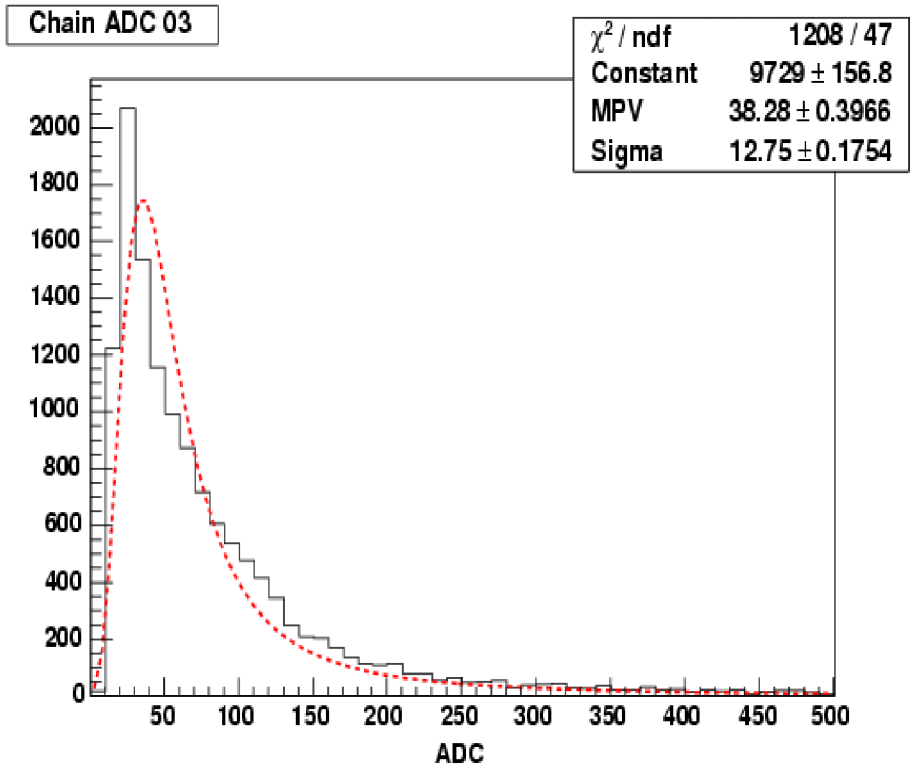
After FEE mounting

Results from First PMD data

X-Y display of hits in Preshower plane

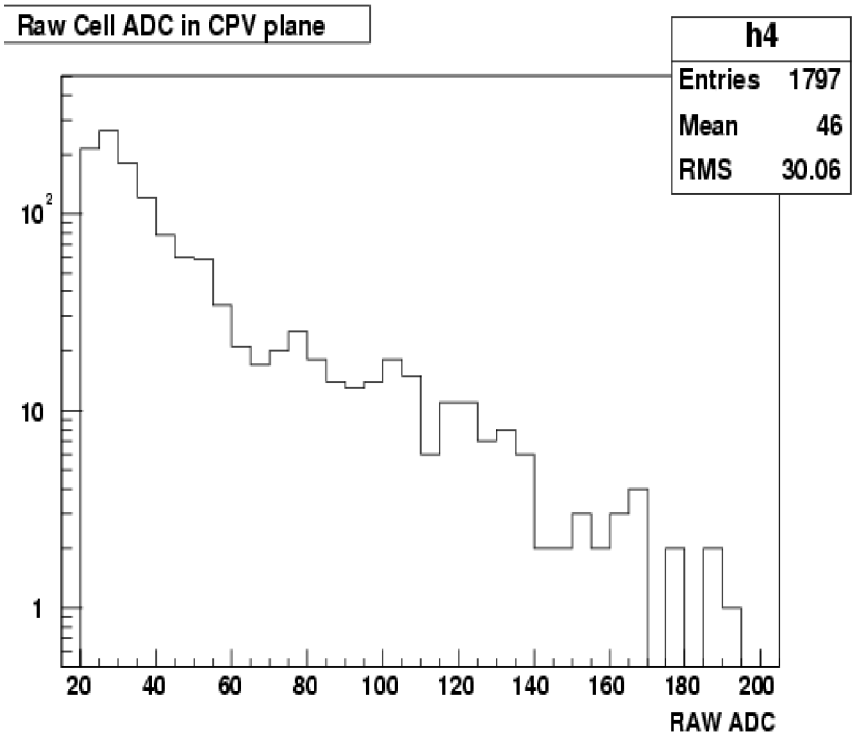


ADC spectrum from CPV plane

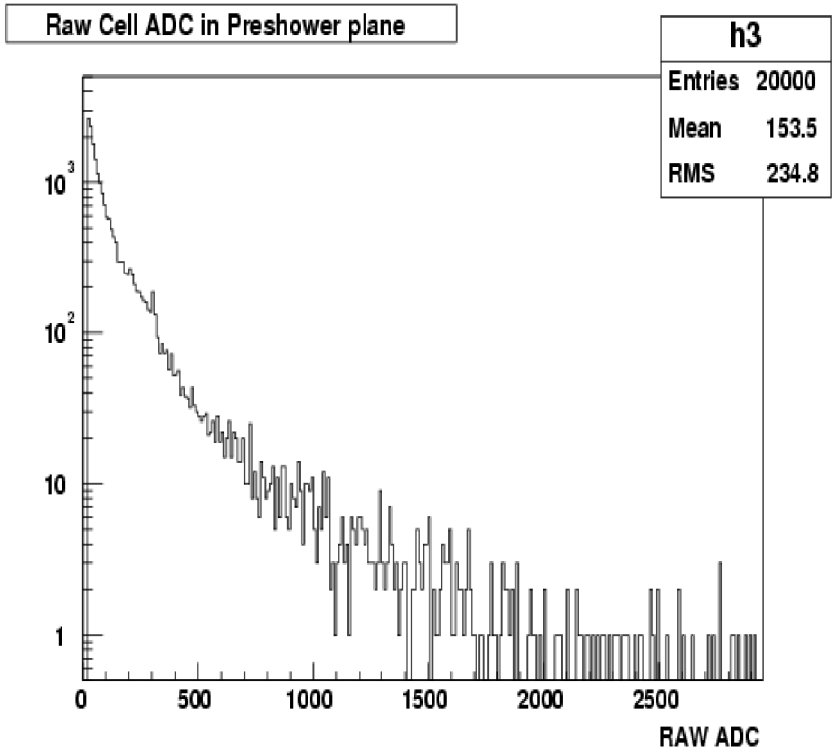


First results....

Raw Cell ADC from CPV plane

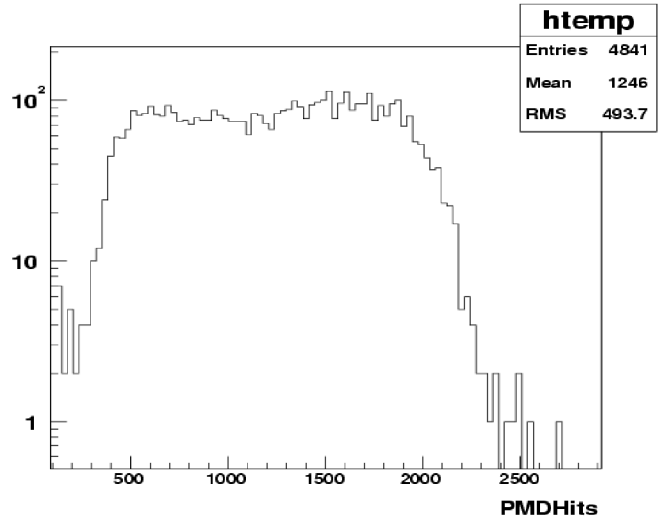


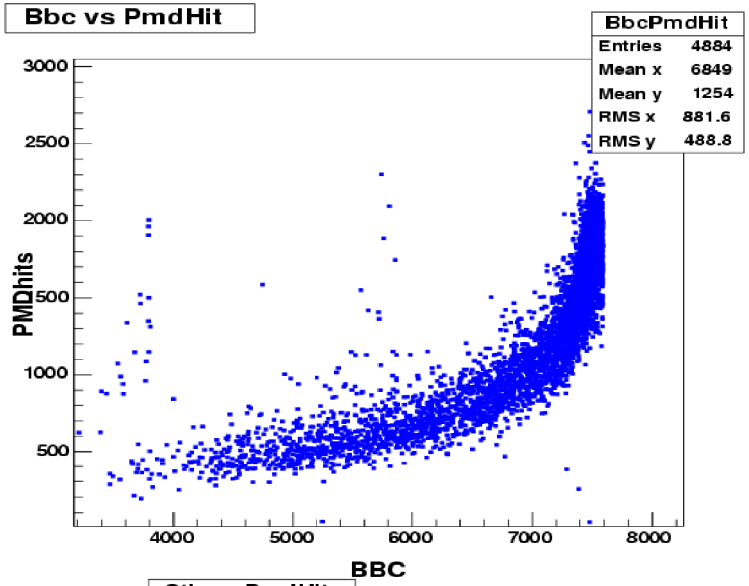
RAW Cell ADC from Preshower plane

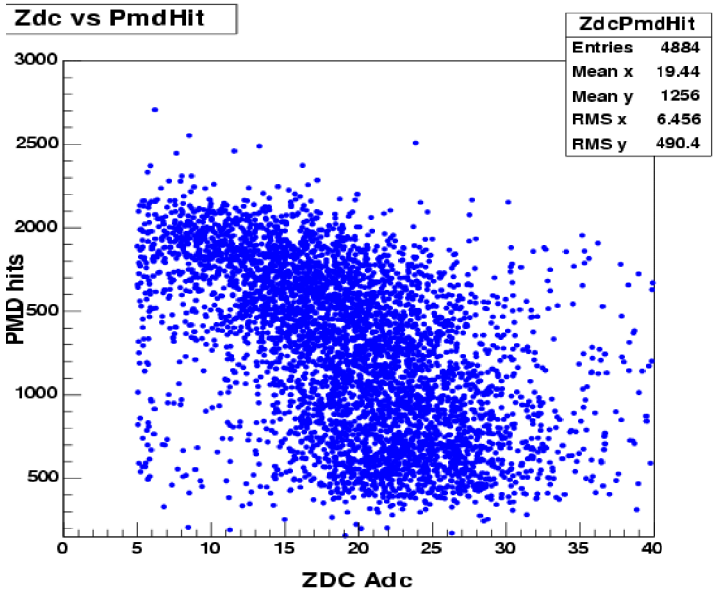


First results....

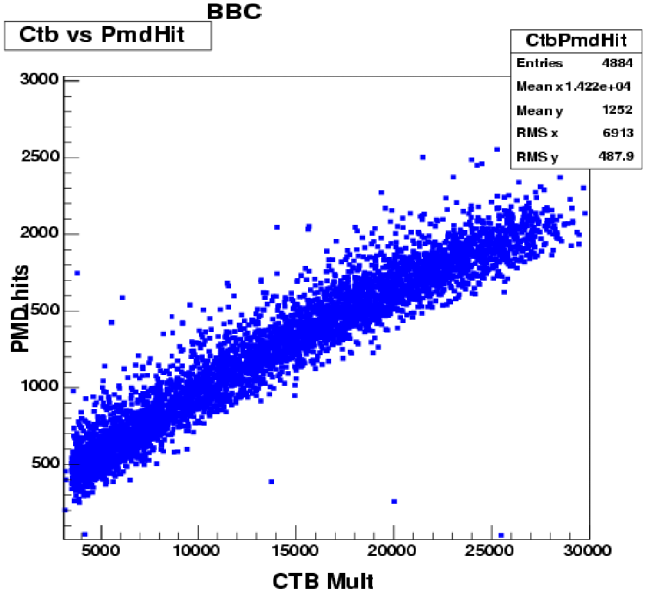
Multiplicity: Correlation with other detectors





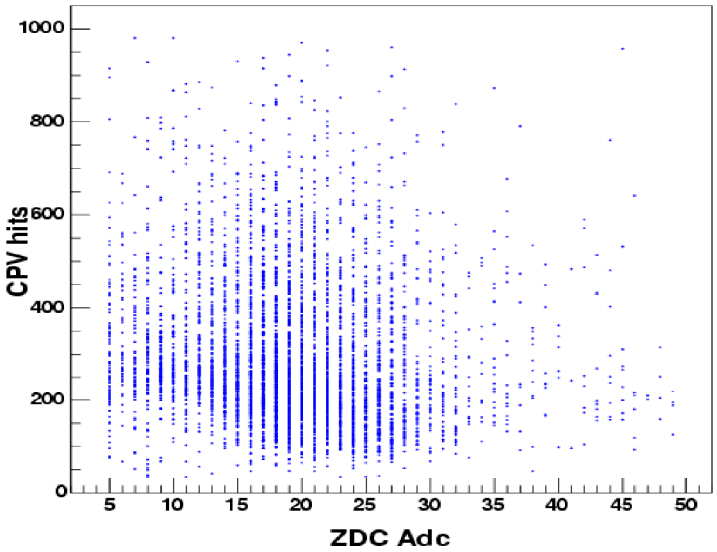


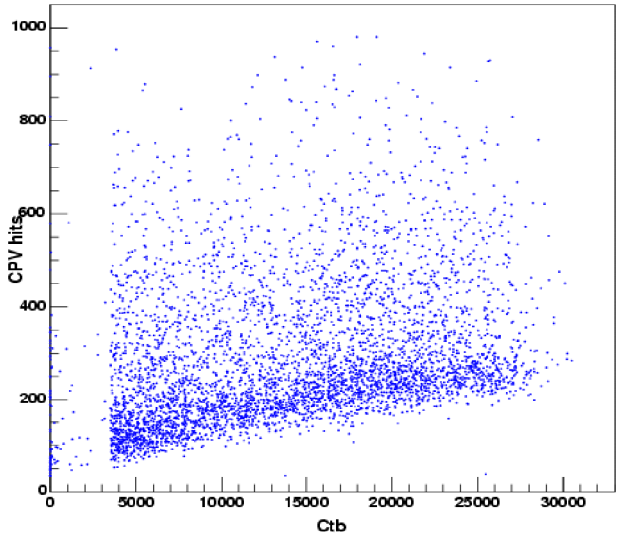
Preshower

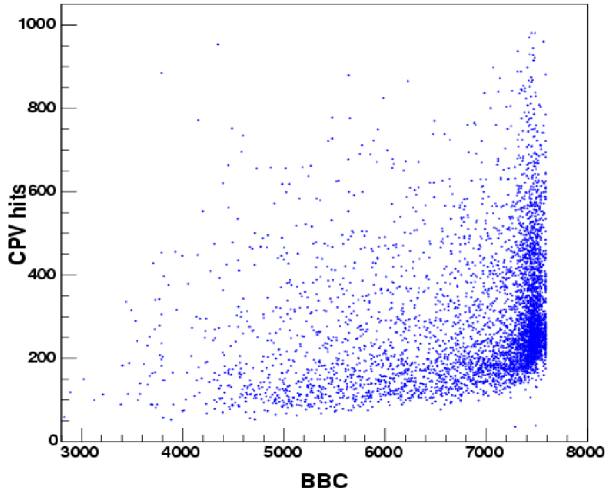


First Results...

Multiplicity: Correlation with Veto plane

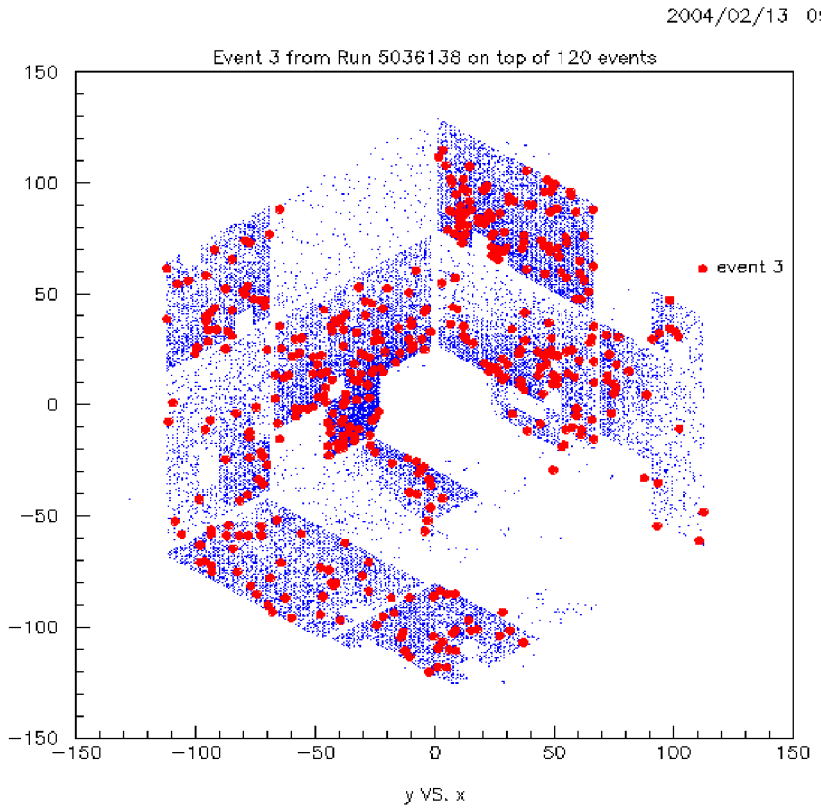




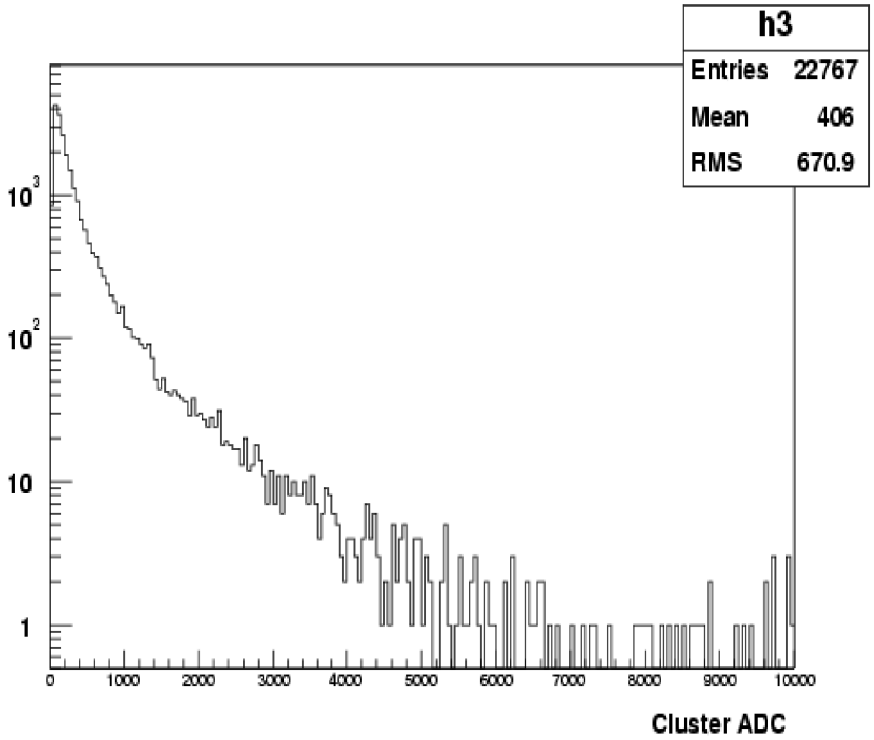


First Results...

Cluster X-Y distribution in Preshower



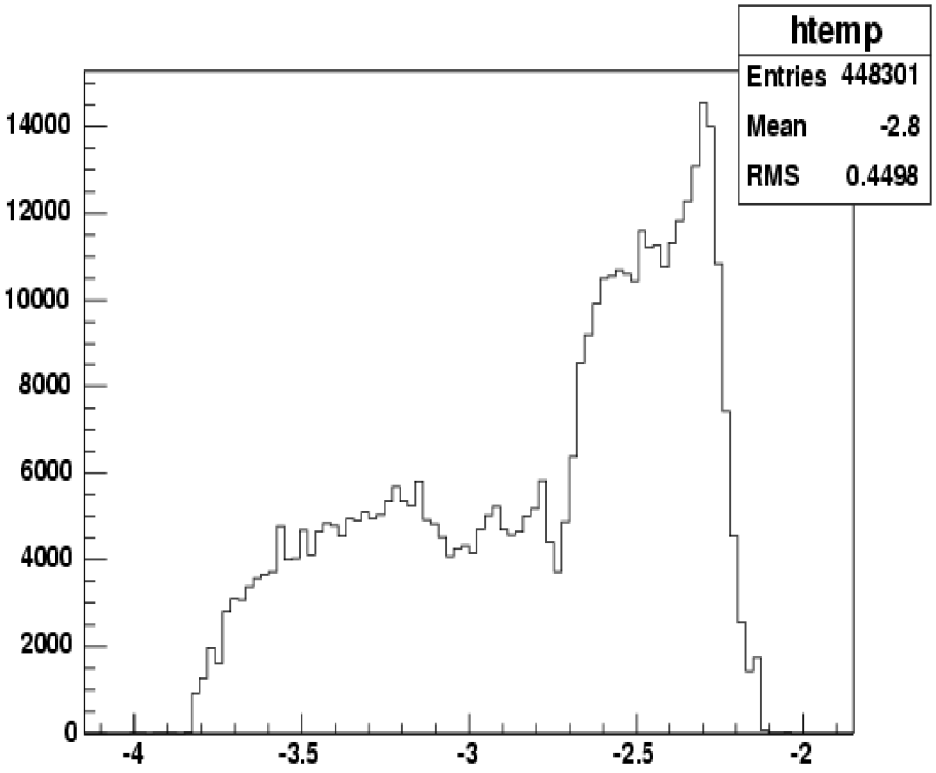
Cluster ADC distribution



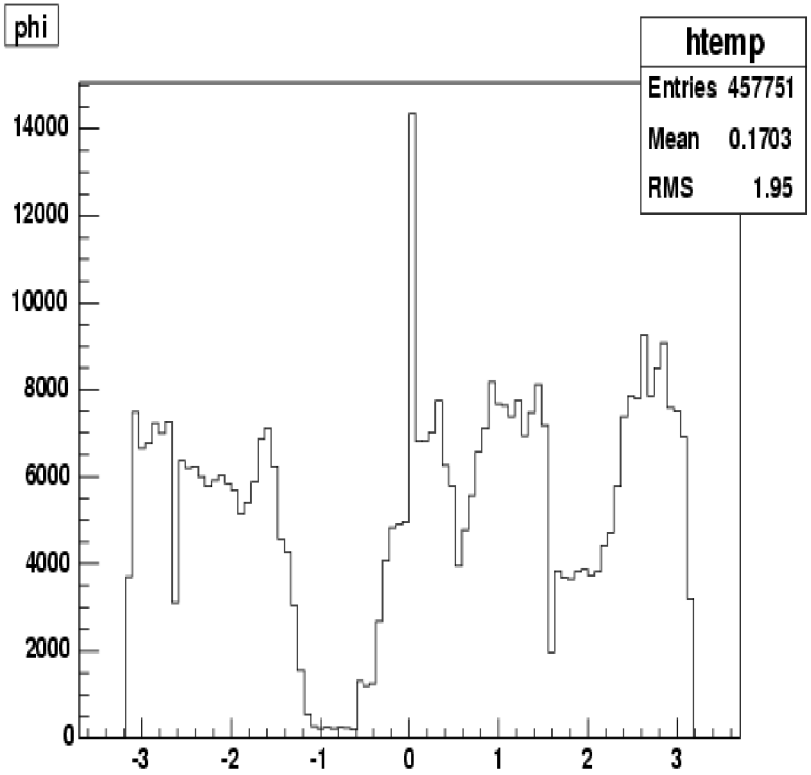
First Results...

Spatial distribution:

Cluster eta distribution



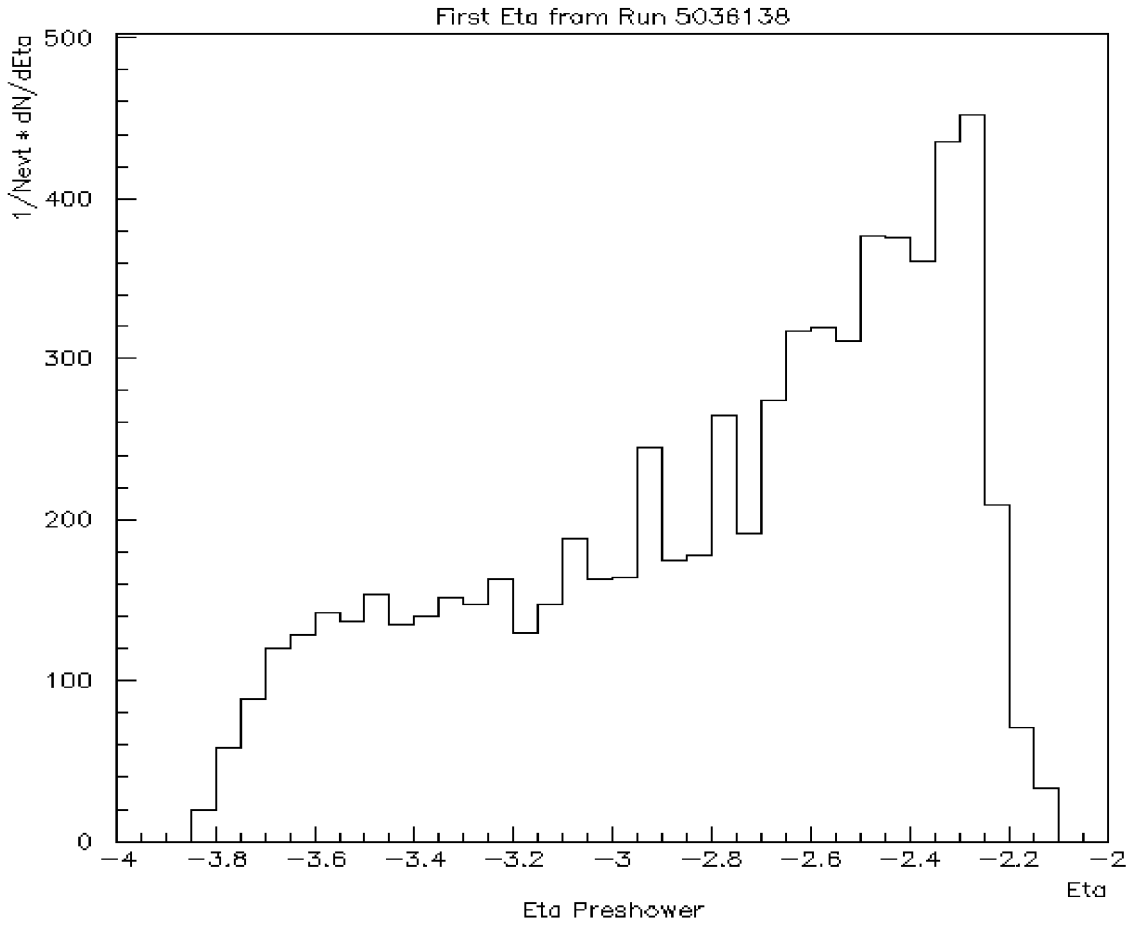
Cluster Phi distribution



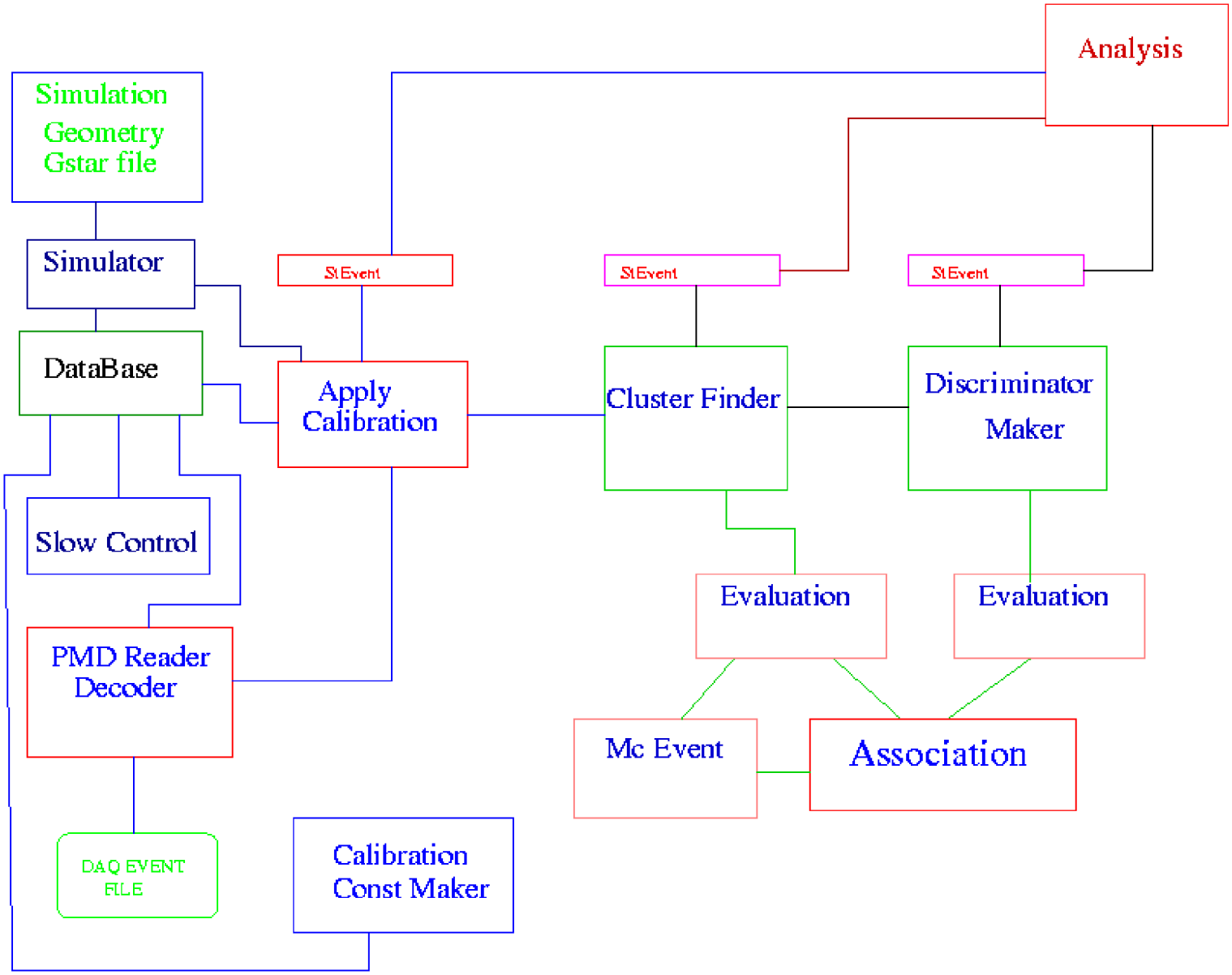
Preshower plane

First Results...

dN/deta plot by rough geometry correction



Reconstruction Chain for PMD



Next plan...

- Add more chains to the CPV plane
- Calibration: Cell to cell, SM to SM gain variation
- Reconstruction chain : DataBase, MuDst
- Physics study:

  a. dN/dη distribution (asap)

  b. flow

  c. N_γ & N_{ch} fluctuation (need FTPC running)

Conclusion

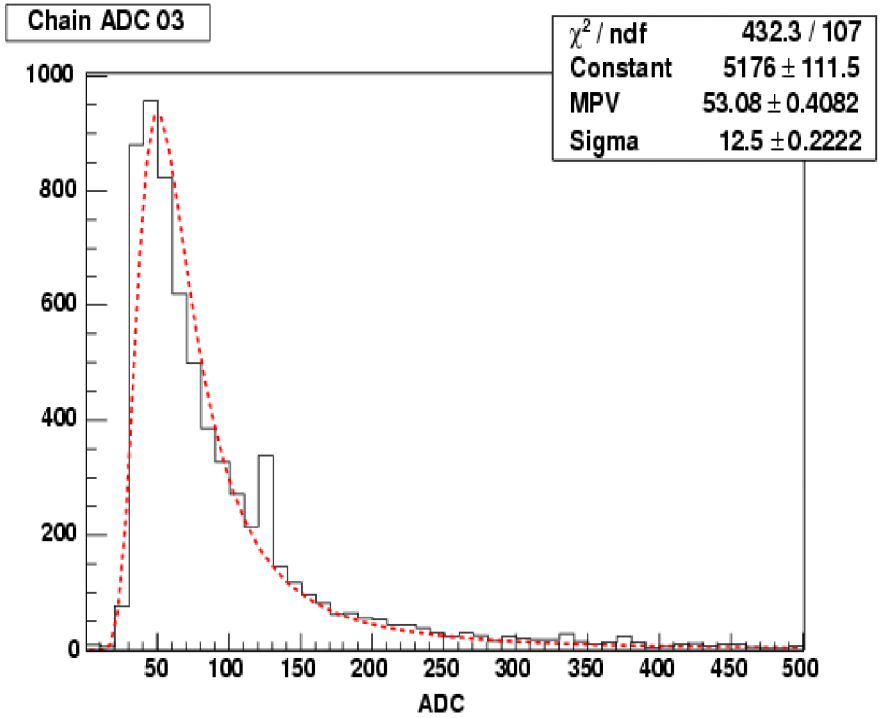
- All the 12 SMs of Preshower plane are mounted (one SM to be debugged again).
- 10 SMs in CPV plane are mounted
- Data taking is in progress
- Physics results will be available soon.

Requirement:

MinBias data needed(~5 M good events for PMD)

(with both PMD and FTPC in the run)

Extra slide...


Chain ADC 03
χ^2 / ndf 432.3 / 107
Constant 5176 ± 111.5
MPV 53.08 ± 0.4082
Sigma 12.5 ± 0.2222
1000
800
600
400
200
0
50
100
150
200
250
300
350
400
450
500
ADC