Test Beam with Full-Length FOCAL(Indian Group) at SPS

Sanjib Muhuri
For
Focal collaboration (Indian Group)

Planning for the Talk:

- ✓ **Quick Review of the physics motivation and design**
- ✓ **Earlier experience with the mini-FOCAL test beam**
- ✓ **Present experimental set up for SPS beam test.**
- ✓ **Primary results and discussion.**
- ✓ **Summery……**

Quick Recap……

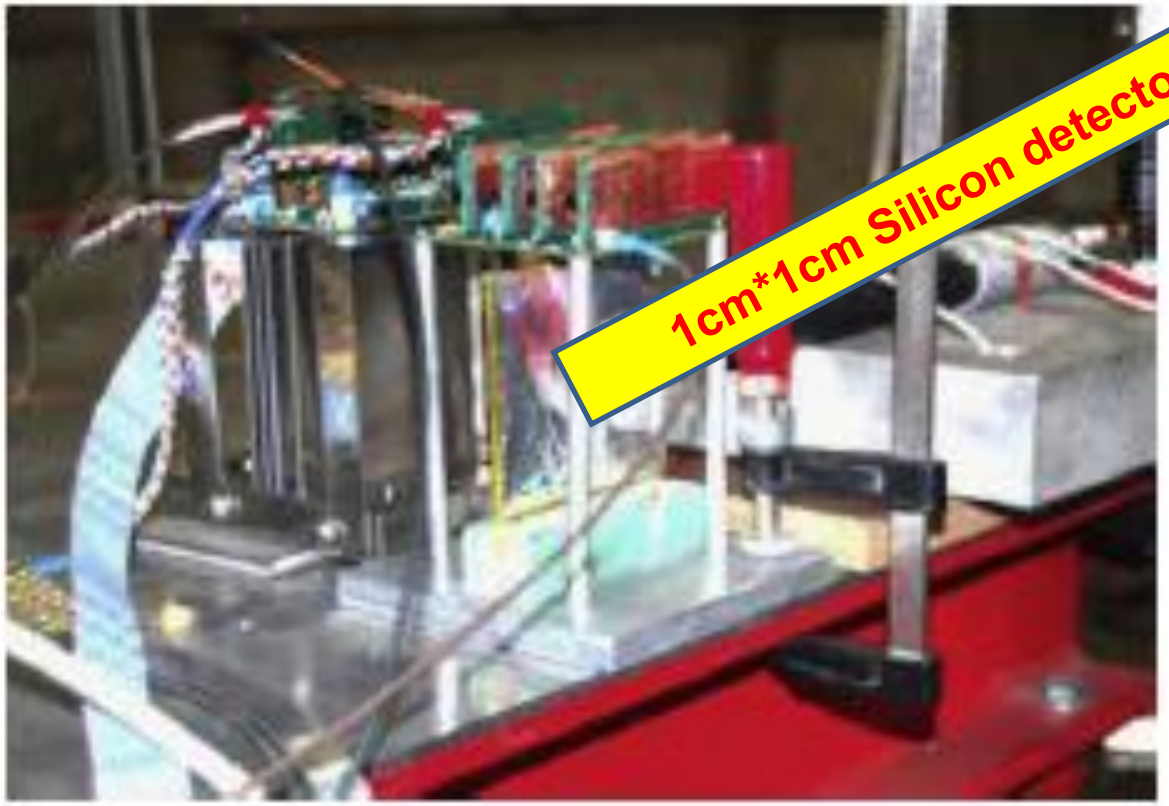
Physics Motivation:

:**Observables: Photons of different origin (decayed, direct)**

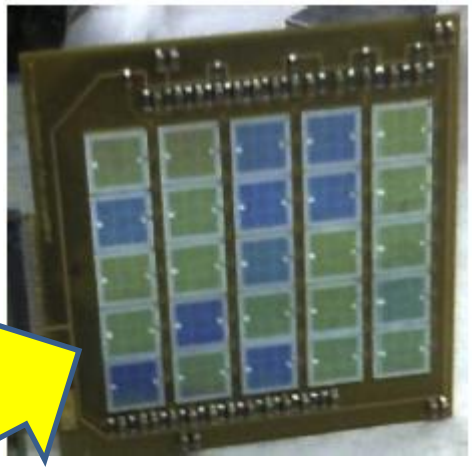
- ✓ Test of pQCD prediction (**pp collisions**)
  - ✓ Particle production
- ✓ To probe the initial condition (**p-A collisions**)
  - ✓ Distribution of Gluon density at small-x (down to 10^{-5} to 10^{-6})
  - ✓ Study of Color Glass Condensate
- ✓ To probe the final state effects (**A-A collisions**)
  - ✓ Measurement of opacity and the response of the medium through gamma-jets and jet-particle correlations
  - ✓ Parton energy loss in dense matter

Quick Recap……

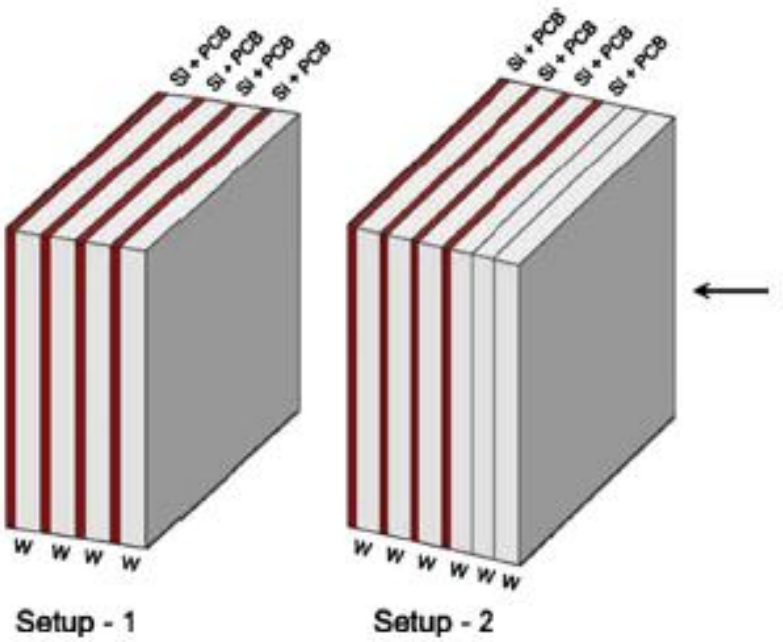
Earlier Test Beam with PS:



1cm*1cm Silicon detector



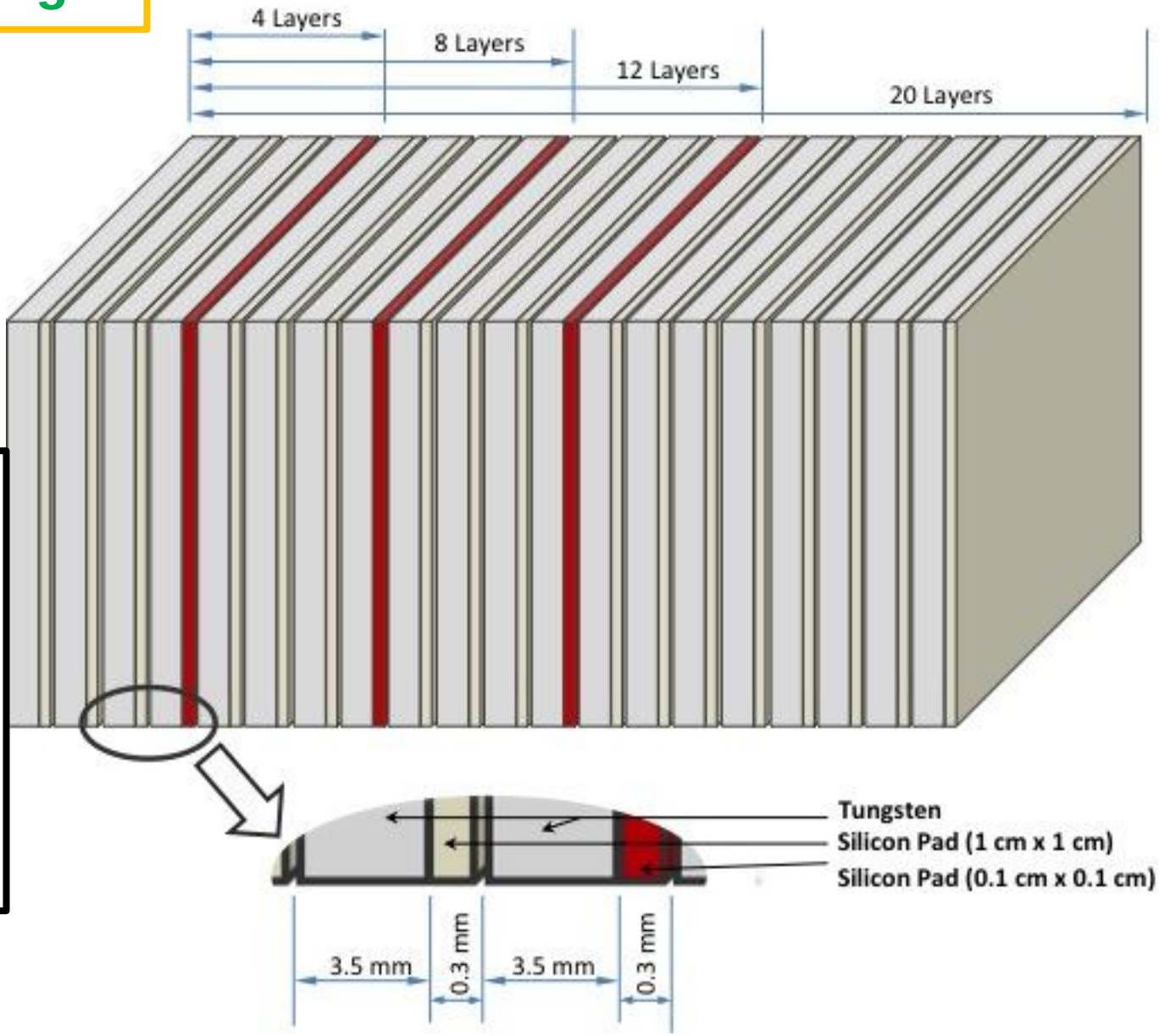
- 4-Layers of detector was tested.
- Could probe upto $6X_R$ using two setup.



Quick Recap……

Schematic of the design:

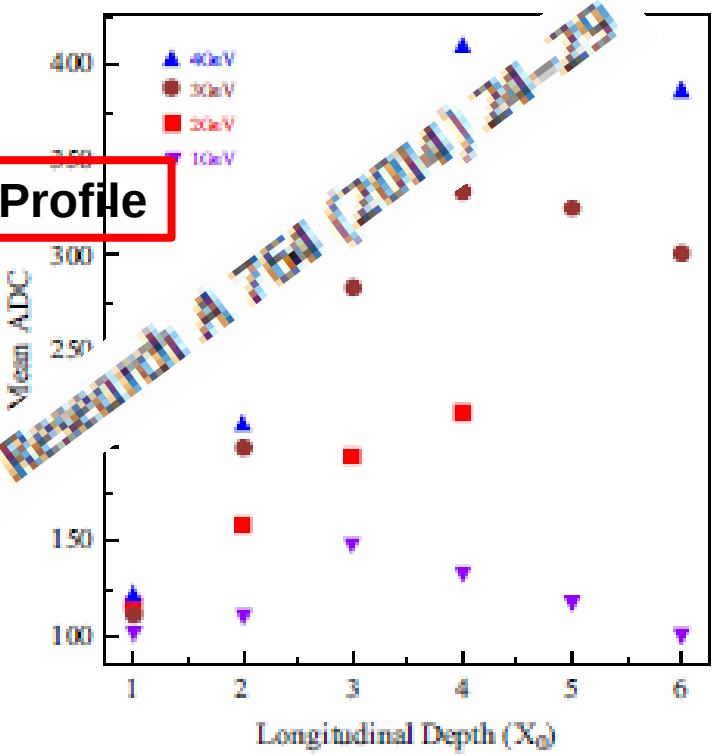
- There 20 Layers (each of $1X_R$)
- Thee High Granular layers (1mm*1mm).
- Rest are course layers (1cm*1cm).
- Tungsten as absorber/convertor and Silicon sensors.

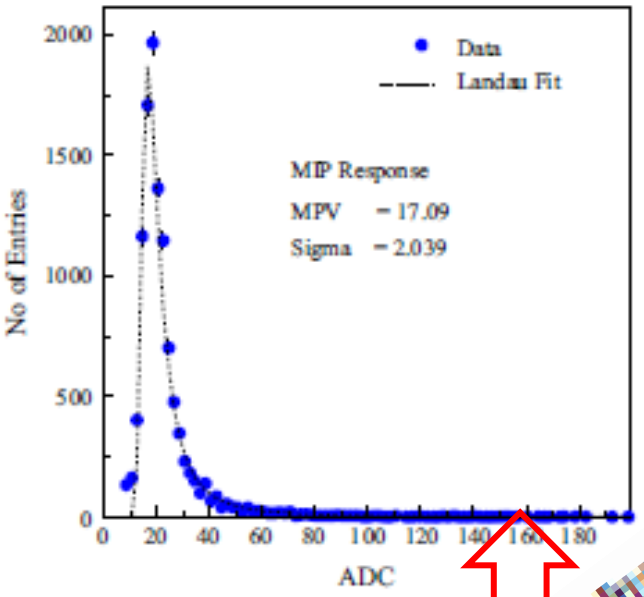


Quick Recap……

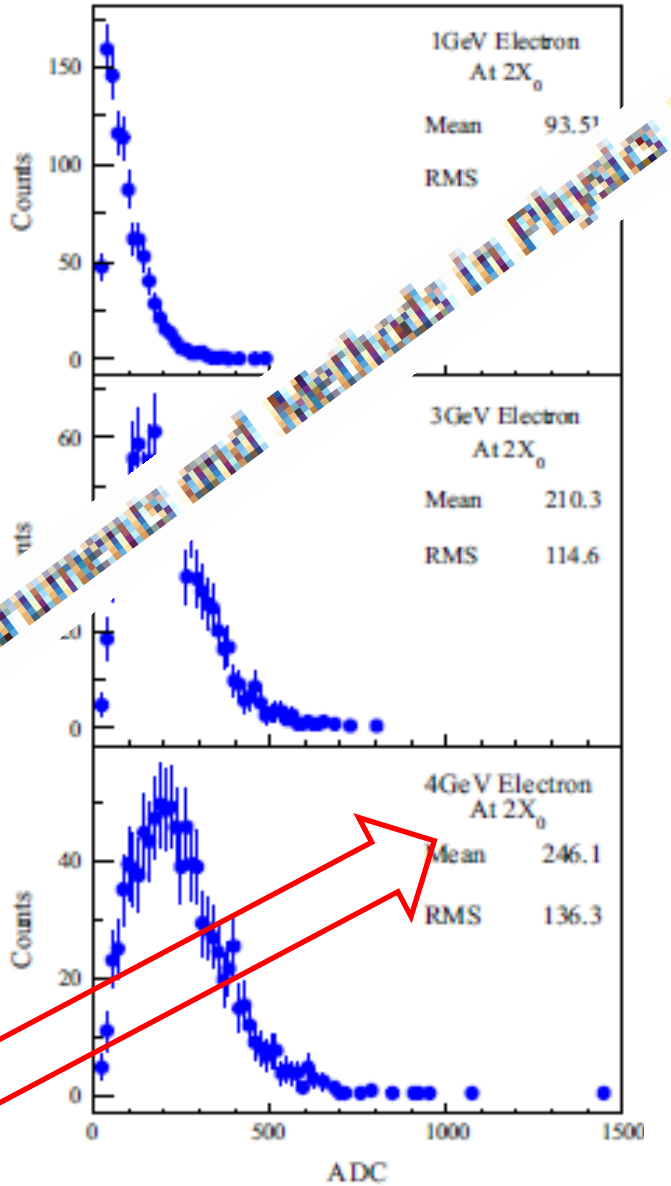
Results from earlier test:

Longitudinal Profile

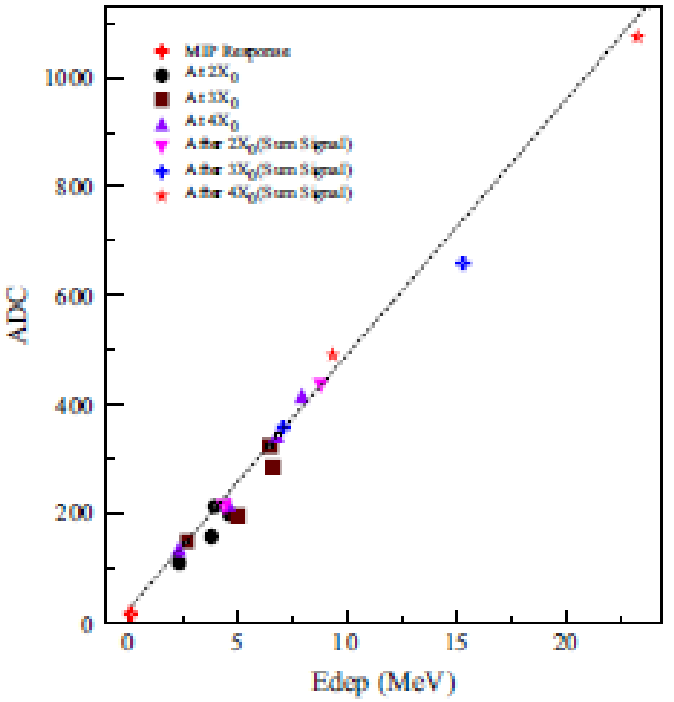




MIP Response

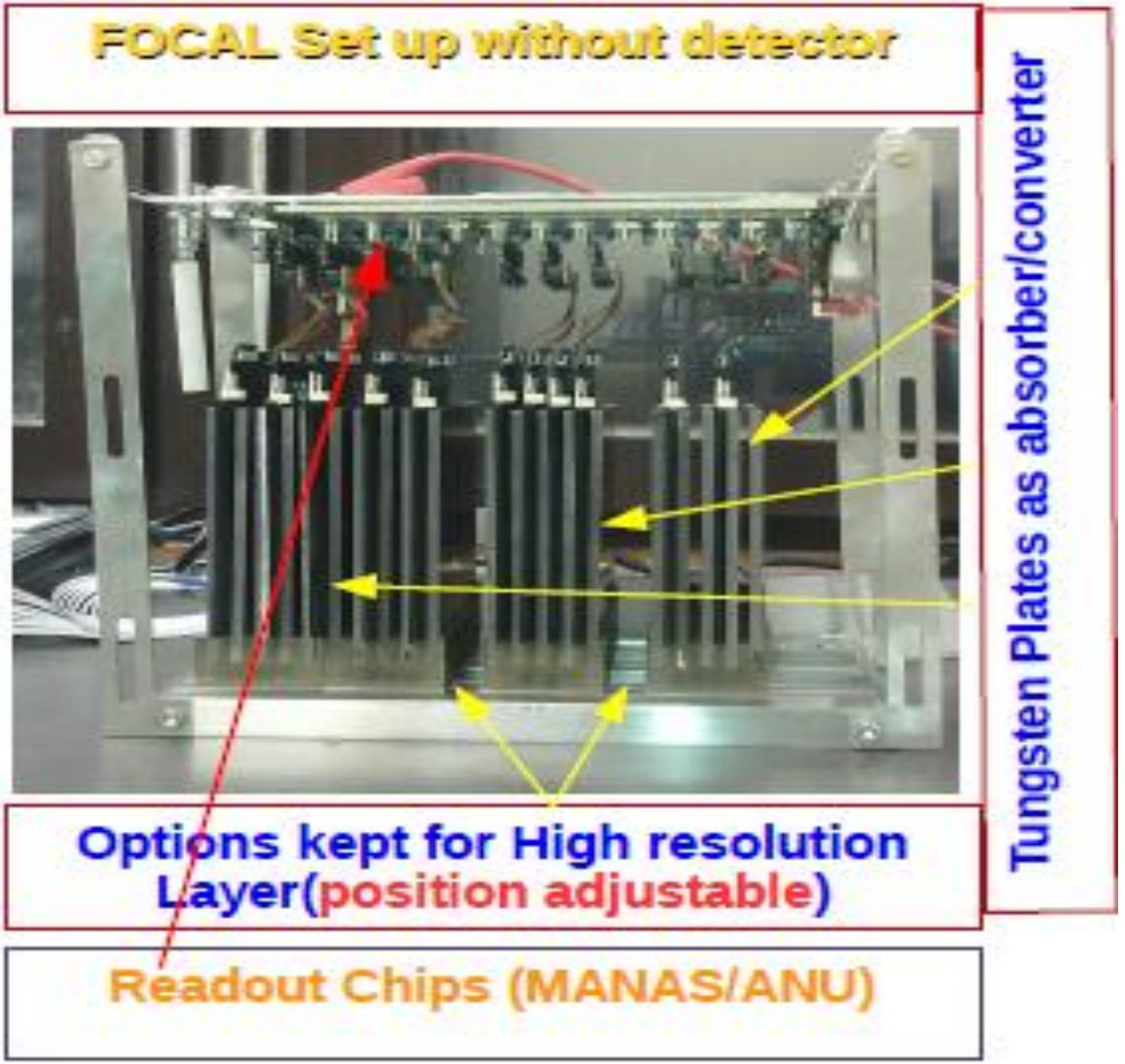


Electron Shower-Response

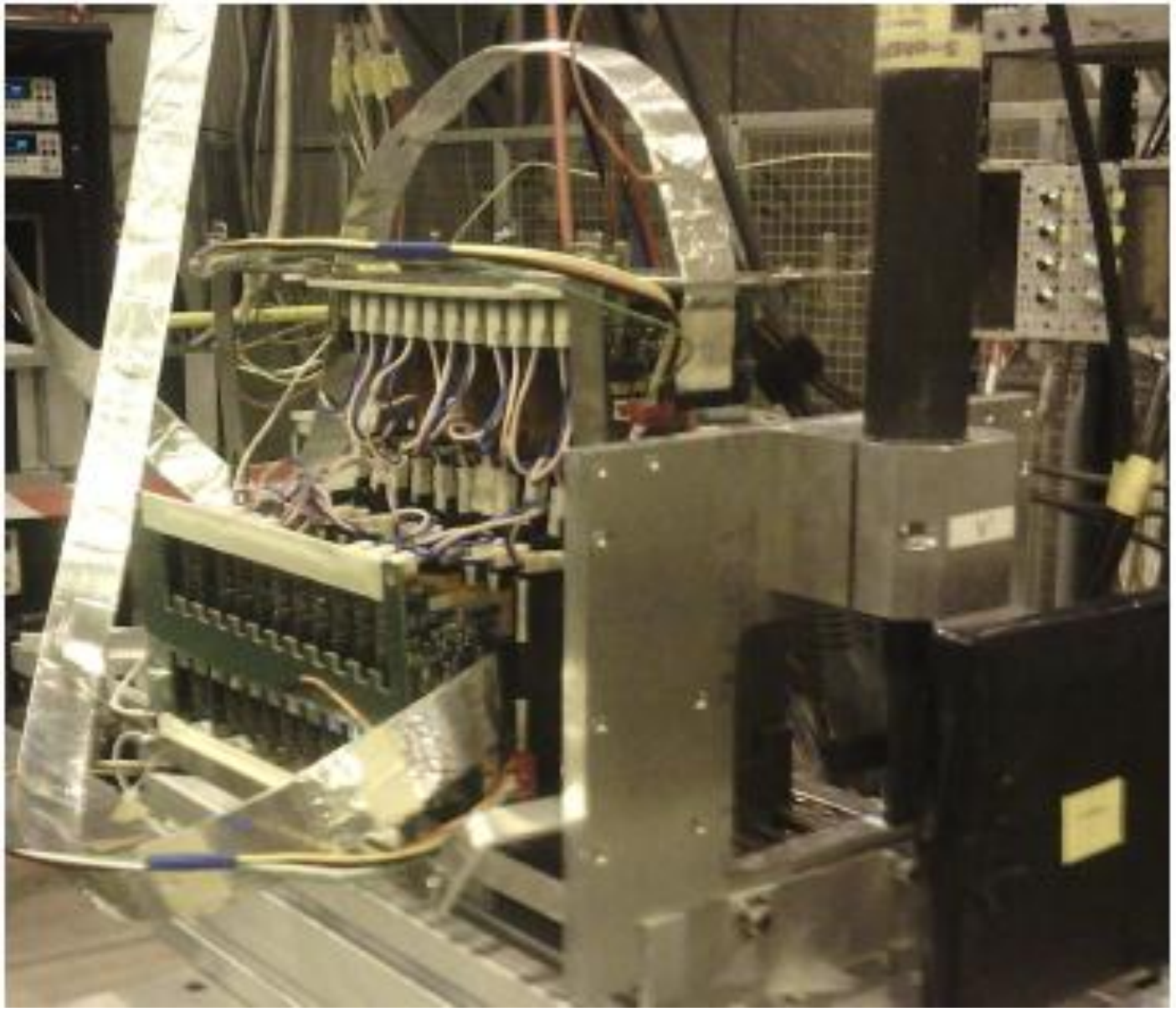


Test of Full Length FOCAL

Calorimeter arrangement)



Calorimeter arrangement)

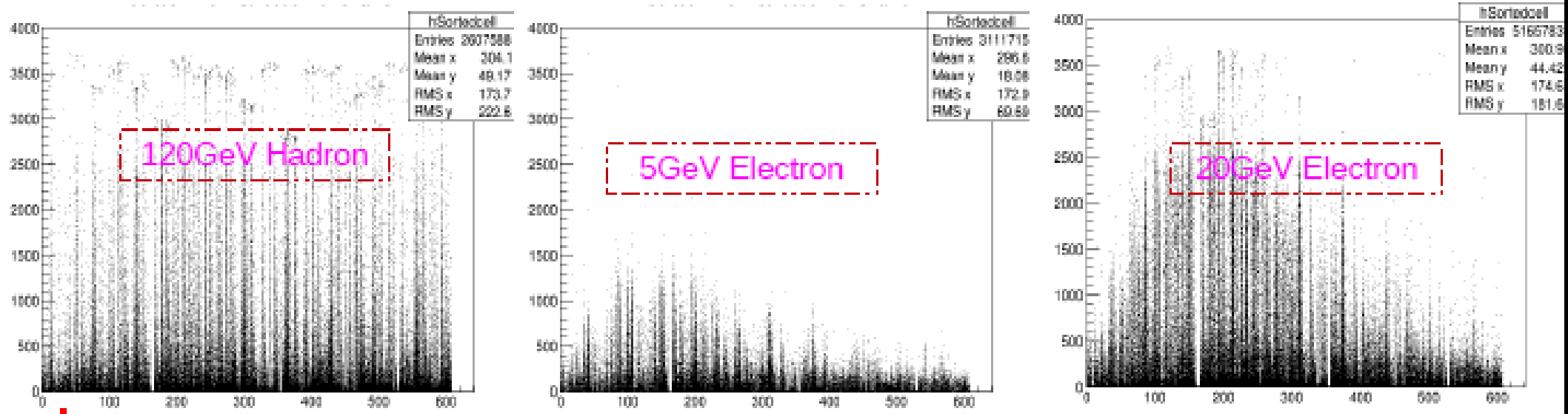


19-Layer full set used in SPS Beam-Line with Tungsten plates, Silicon sensors, associated electronics etc

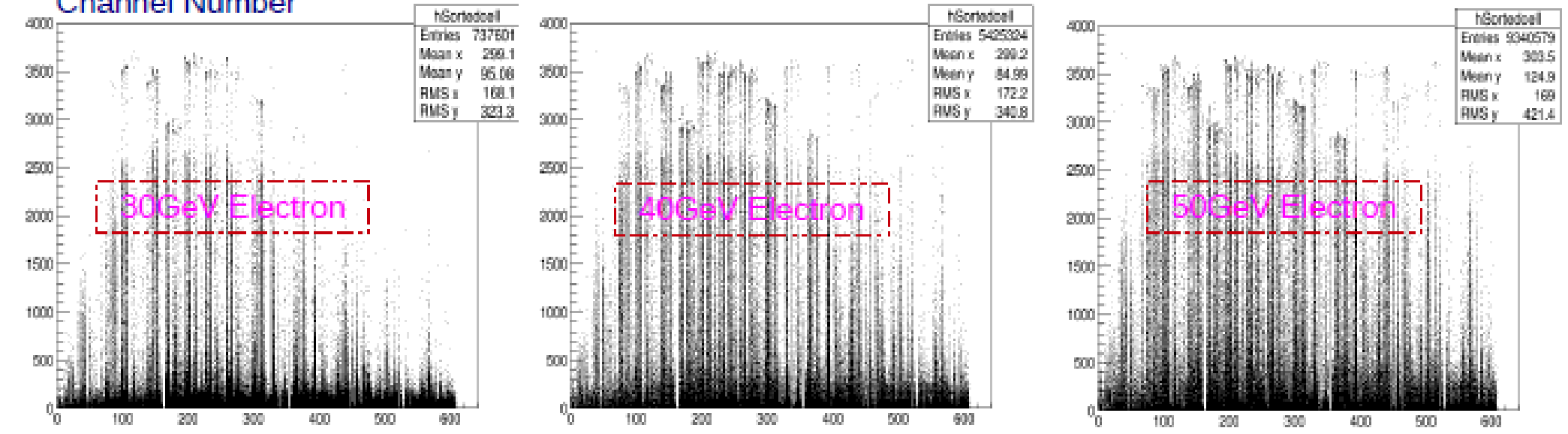
- Two types of readout electronics used (MANAS and ANU)
- Read-out arrangement were made from both top and side for alternative layers.
- Two X-Y and a big scintillator were used for triggering.
- Data has been taken for 5,10,20, 40 , 50, 60 GeV electron and 120GeV haron

Preliminary Results (Uncorrected Data)

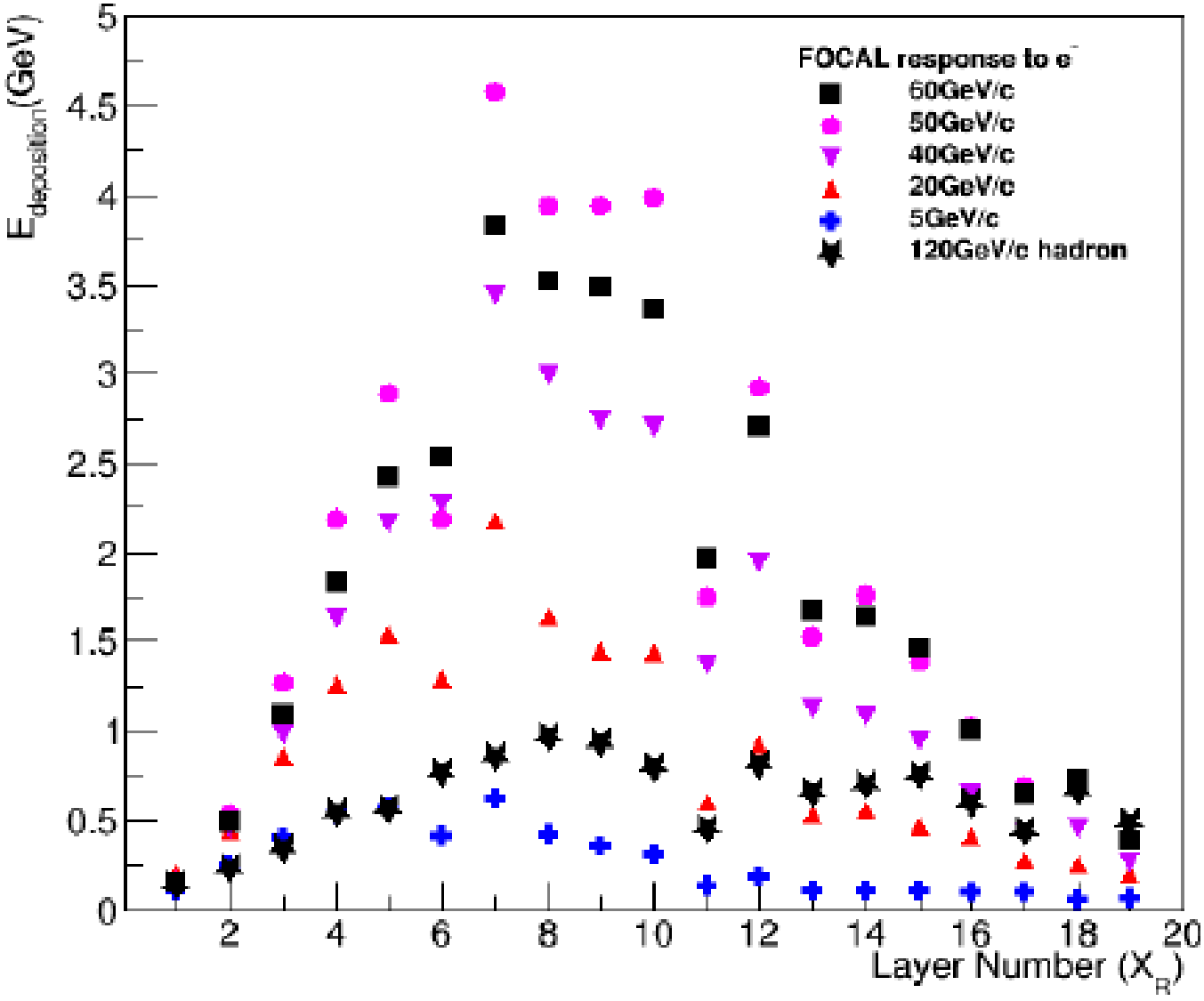
Each layer corresponds to 36 channels(1 --> 19 layer = 0 → 684)



Saturation effect started appearing from 30GeV onwards though the effect can be handled during analysis.



Preliminary Results (Uncorrected Data)

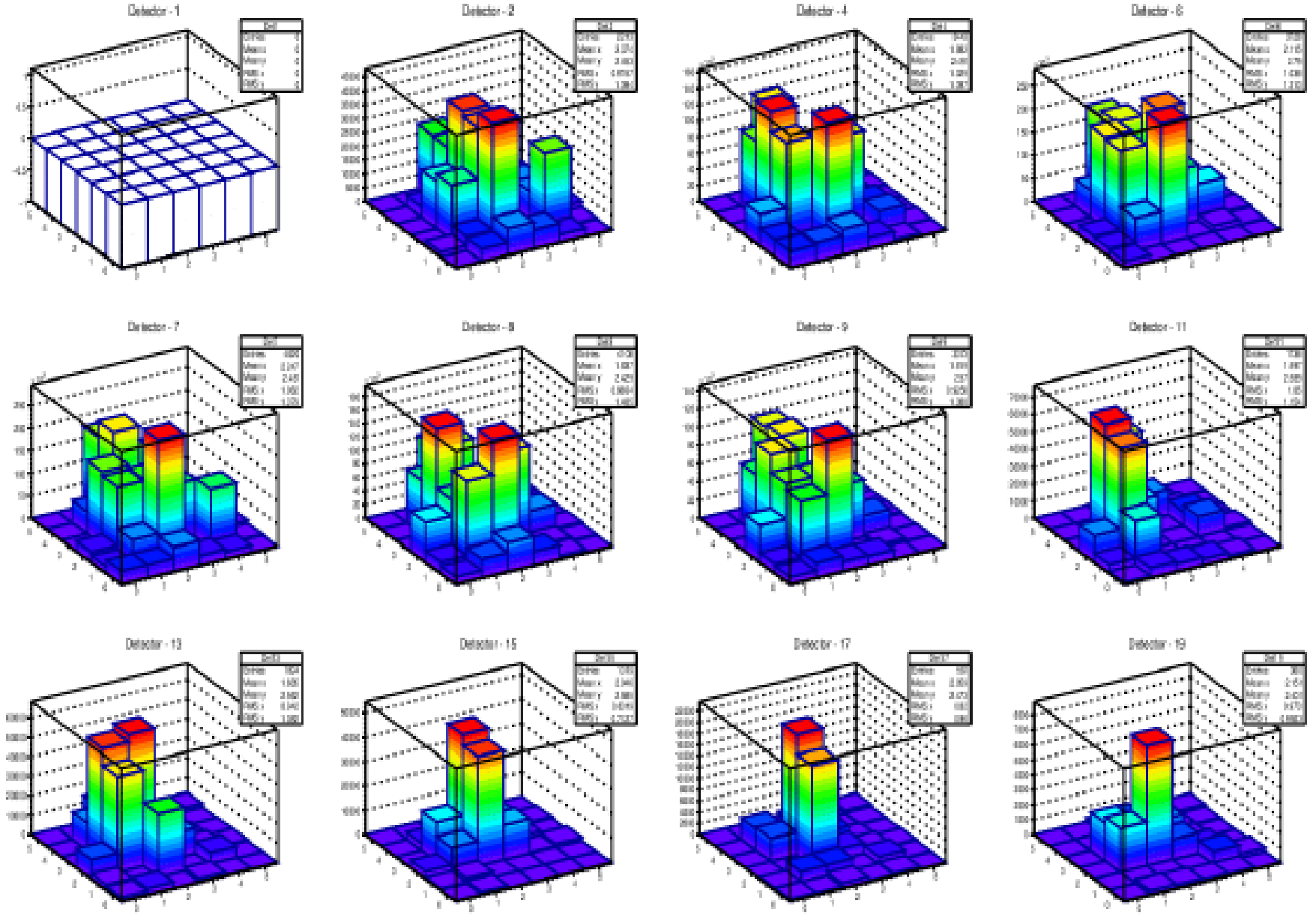


Apparently it seems that **Layer# 7 and 12** gives bit more ADC value than is expected and reverse is the case for **layer#11**

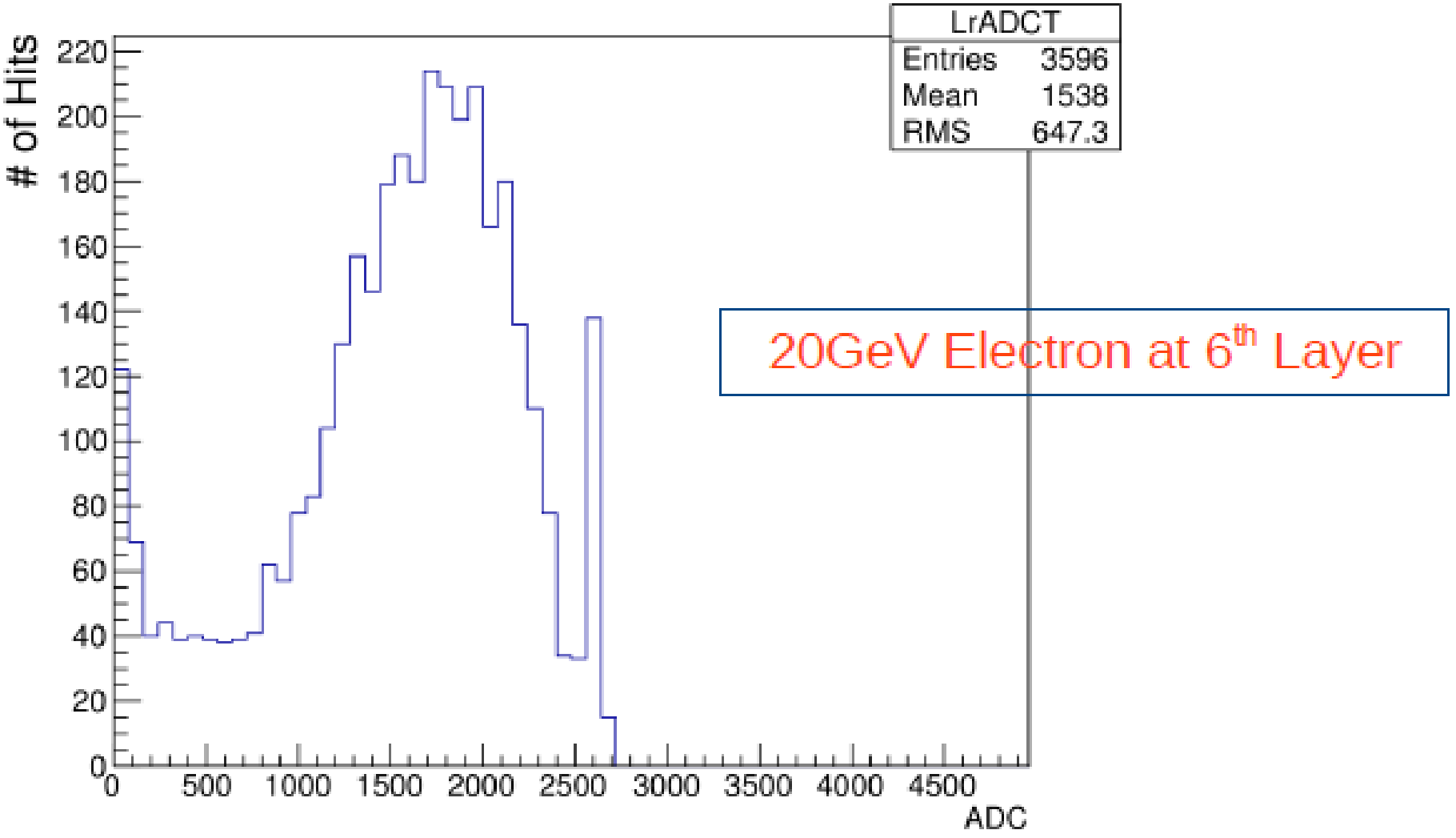
Data need to be calibrated before final comment but very first look gives a good impression about the longitudinal profile

Preliminary Results (Uncorrected Data)

20GeV Electron at 6th Layer



Preliminary Results (Uncorrected Data)



20GeV Electron at 6th Layer

Summery and upcoming planning

- ❑ Complete the data analysis for the last test beam.
- ❑ Development for new electronics overcome the saturation effect
- ❑ Preparation for the next SPS test beam (September 2016 !!)