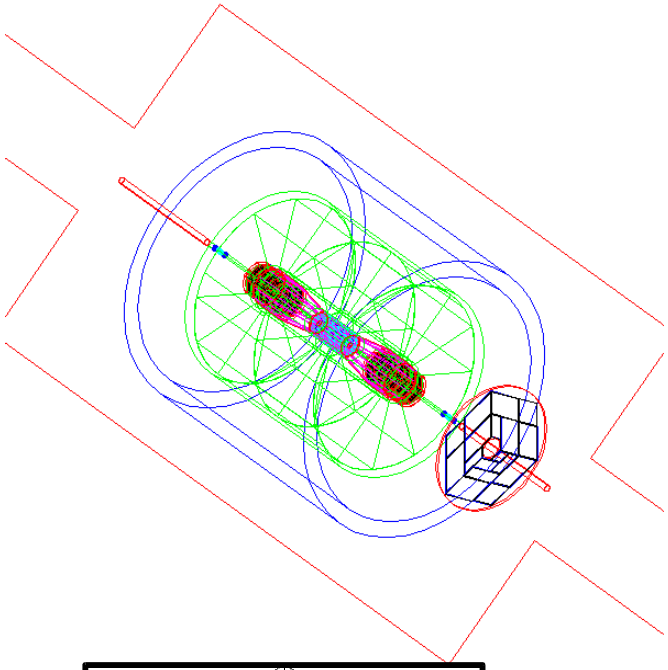
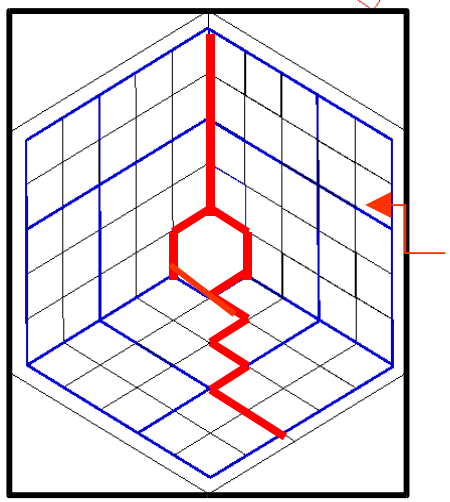
PMD @ STAR



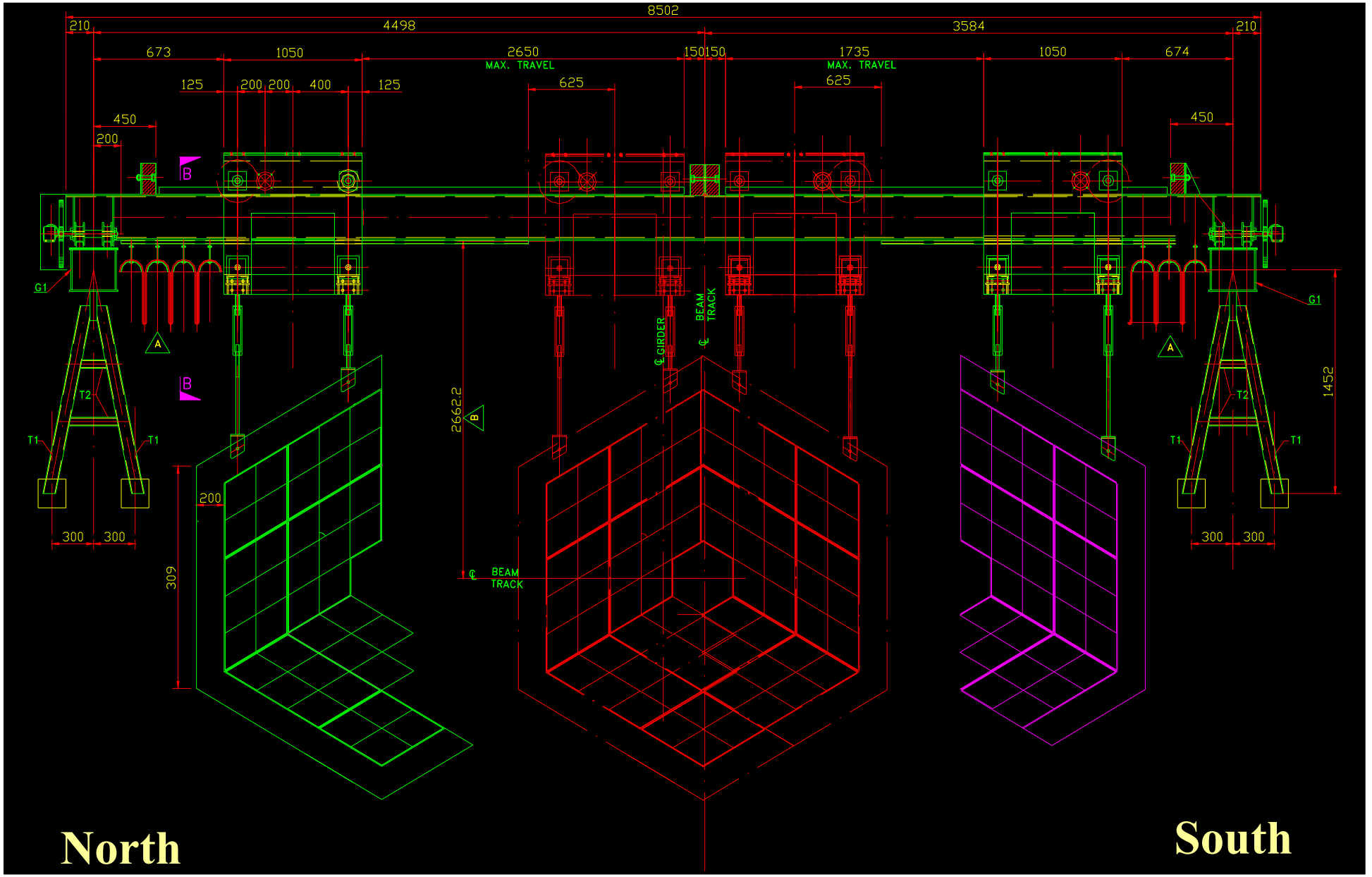


Preshower Detector with fine granularity

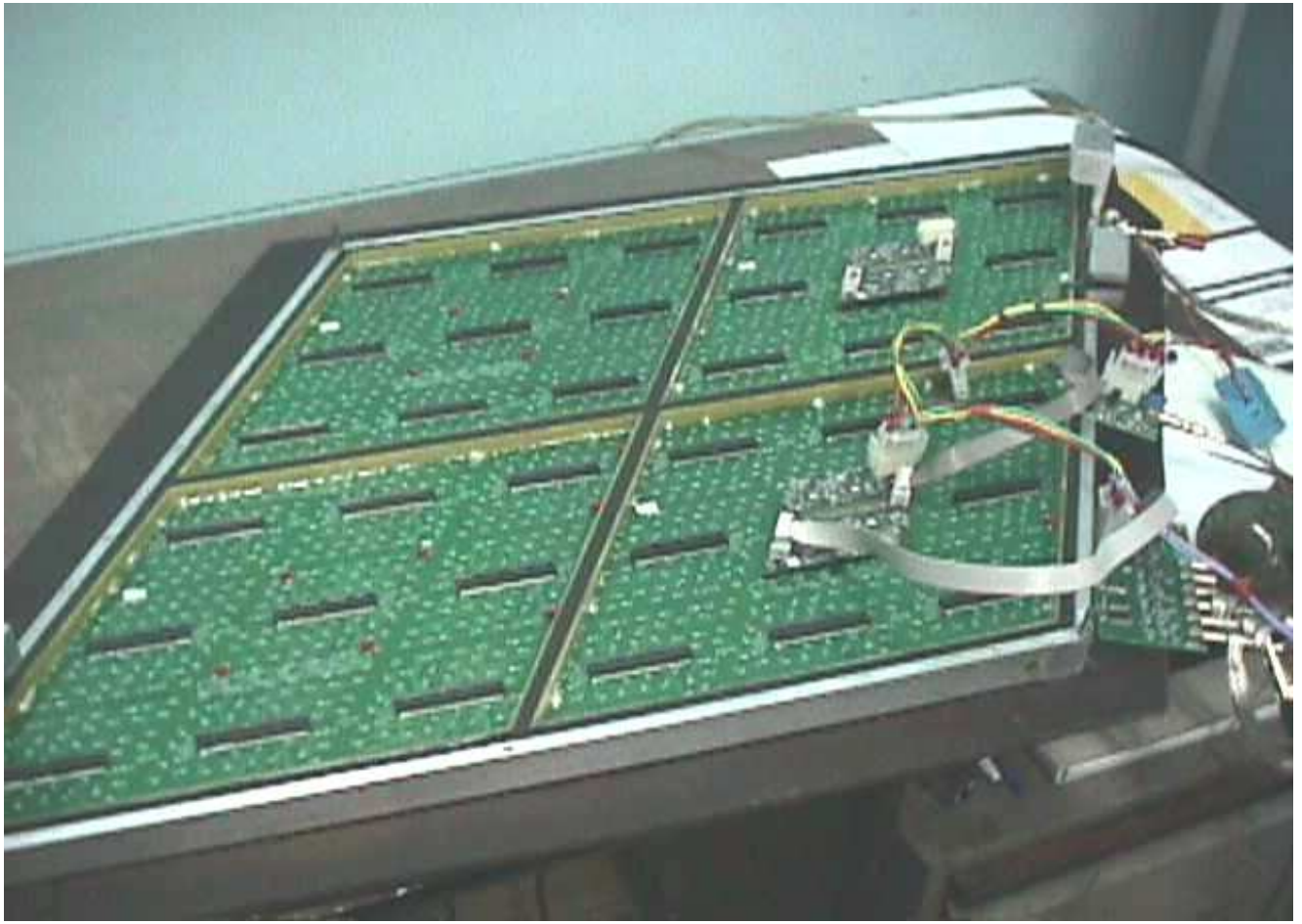
- Two planes: Veto + Pre-shower
- Total no. of cells: 82,944
- Distance from vertex: 550cm
- PMD is outside STAR magnet
- Gas detector with hexagonal cells
- η Coverage: 2.3 – 3.9
- Cell cross section: 1.0 cm^2, depth: 0.8 cm
- Area of the detector: 4.2m^2
- Readout: Gassiplex 0.7-3 chip

PMD front view

SUPPORT MECHANISM FOR PMD



FIRST SUPERMODULE FOR STAR PMD



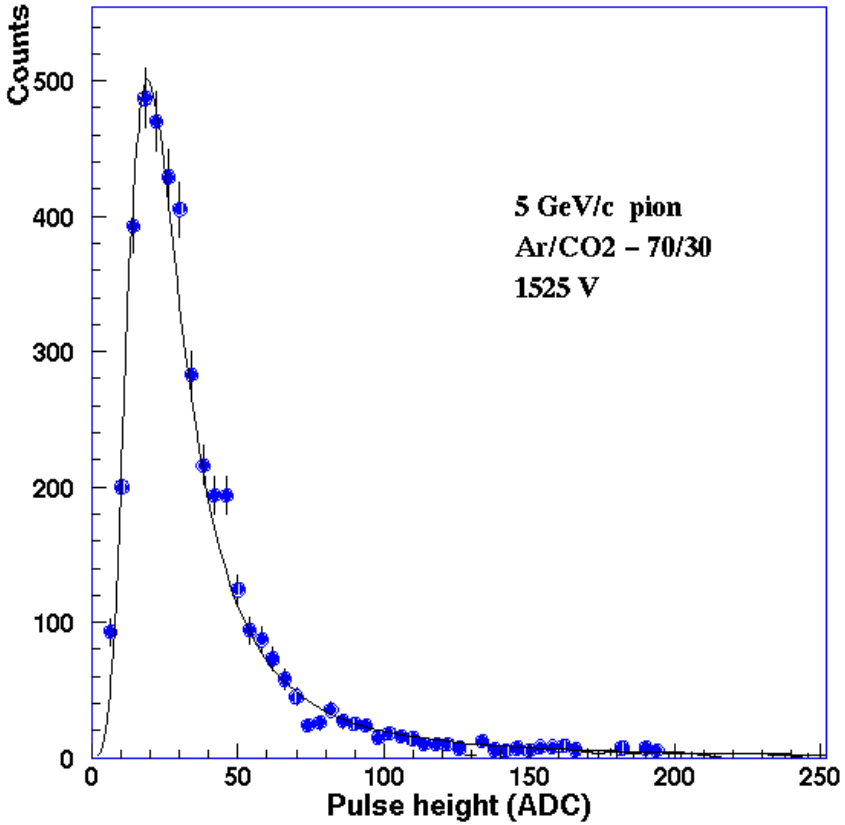
Preliminary tests performed on SM before shipping to CERN:

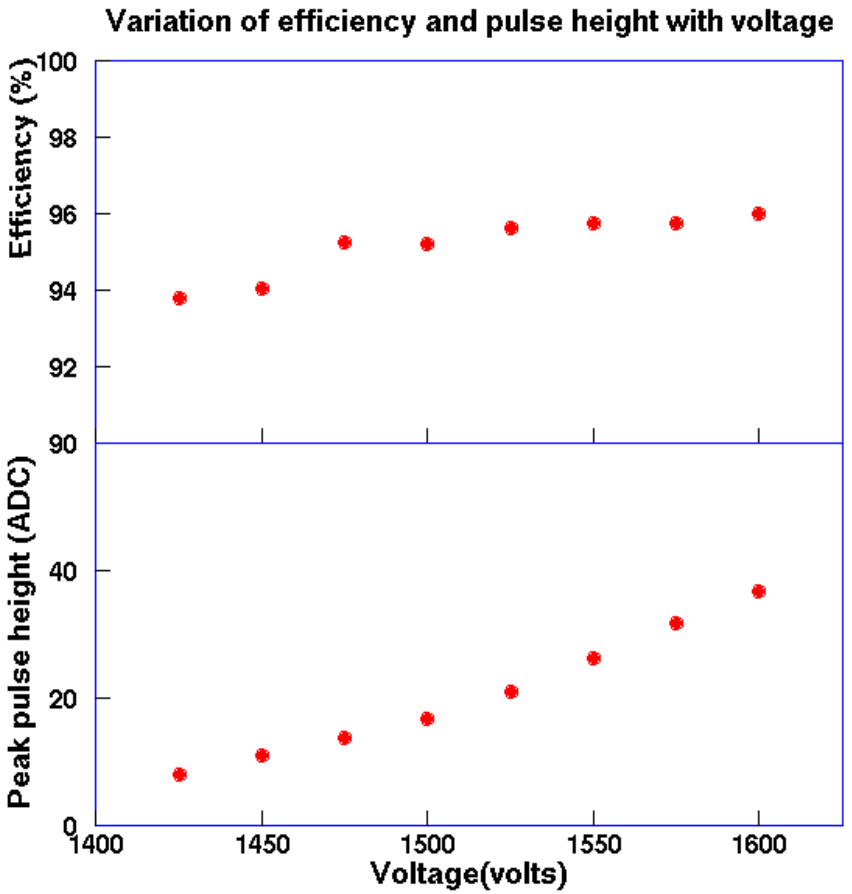
1. **Gas leakage test**
2. **HV test (50V above operating Voltage)**
3. **Pedestal with boards on the detector.**
4. **Signal seen on Cosmic.**

RESULTS FROM FIRST TEST AT CERN

Pion beam with 1 GeV/c to 6 GeV/c (MIP study)

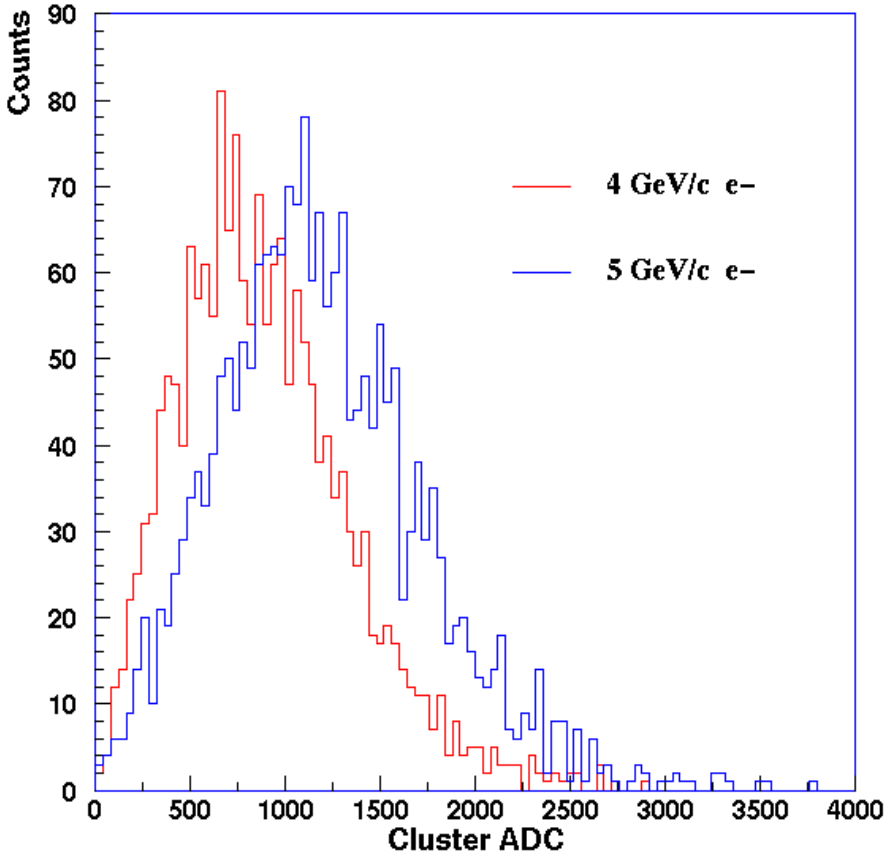
Electron beam with 1GeV/c to 6 GeV/c (preshower study)



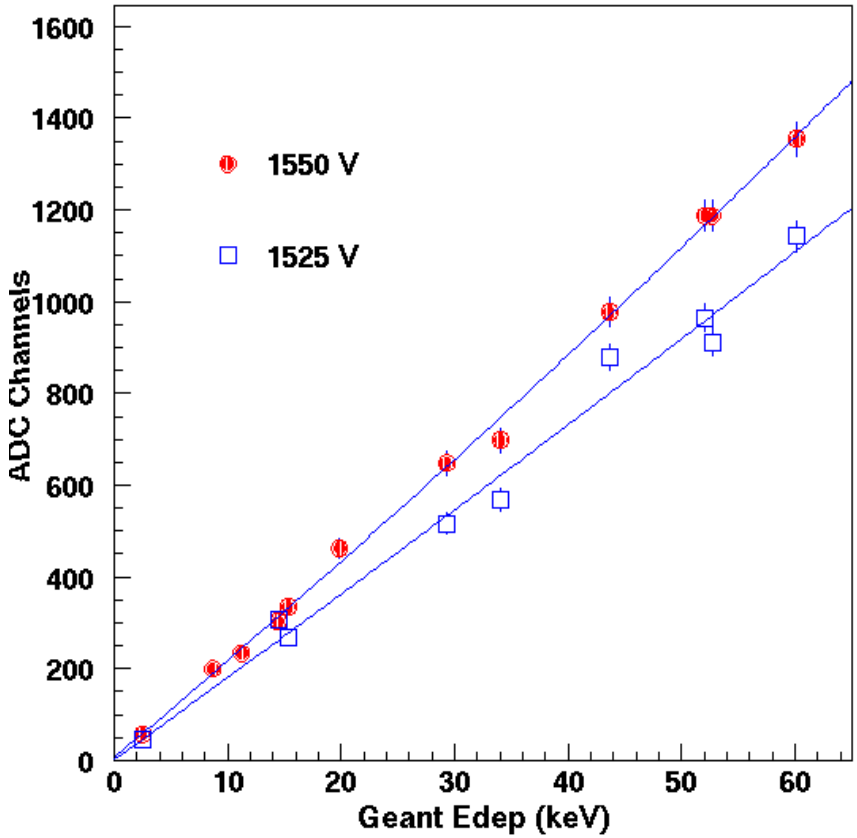


PRESHOWER DATA

ADC distribution for electrons At 3X0



Calibration curve



CALIBRATION APPROACH AND NEED

- **Absolute Calibration**
  - First guidance (MeV-ADC curve) is made with electron and pion test data
  - Curve will be scaled with MIP obtained from Heavy-ion run

- **Uniformity**
  - Super Module by Super Module
    - Accumulate hits on SMs and Normalize
  - Cell by Cell
    - By MIP (MIP finding from HI data was done in WA98)
    - Accumulate hits cell-by-cell and normalize

ESTMATES

- Detector is divided into two η rings: (1) 2.3 – 3.0 and (2) 3.0 – 3.9
- Estimations for d+Au and Au+Au using central Hijing events
  - d+Au: 25 charged hits per event in each η ring
  - Au+Au: 500 charged hits per event in each η ring
- **Number of events Required:**
  - SM by SM normalization: 10 – 20 K (less for Au+Au)
  - MIP peaks cell by cell (100 hits for each MIP spectra? – for good MIP spectra we need 1000 – so 10 times more events)

d+Au	Inner ring	CPV	50K
d+Au	Inner ring	Preshower	50K
d+Au	Outer ring	CPV	100K
d+Au	Outer ring	Preshower	100K
Au+Au	Inner ring	CPV	5K
Au+Au	Inner ring	Preshower	20K
Au+Au	Outer ring	CPV	10K
Au+Au	Outer ring	Preshower	40K