Status of MUON calibration

Alignment tracker (see Ivana's talk)

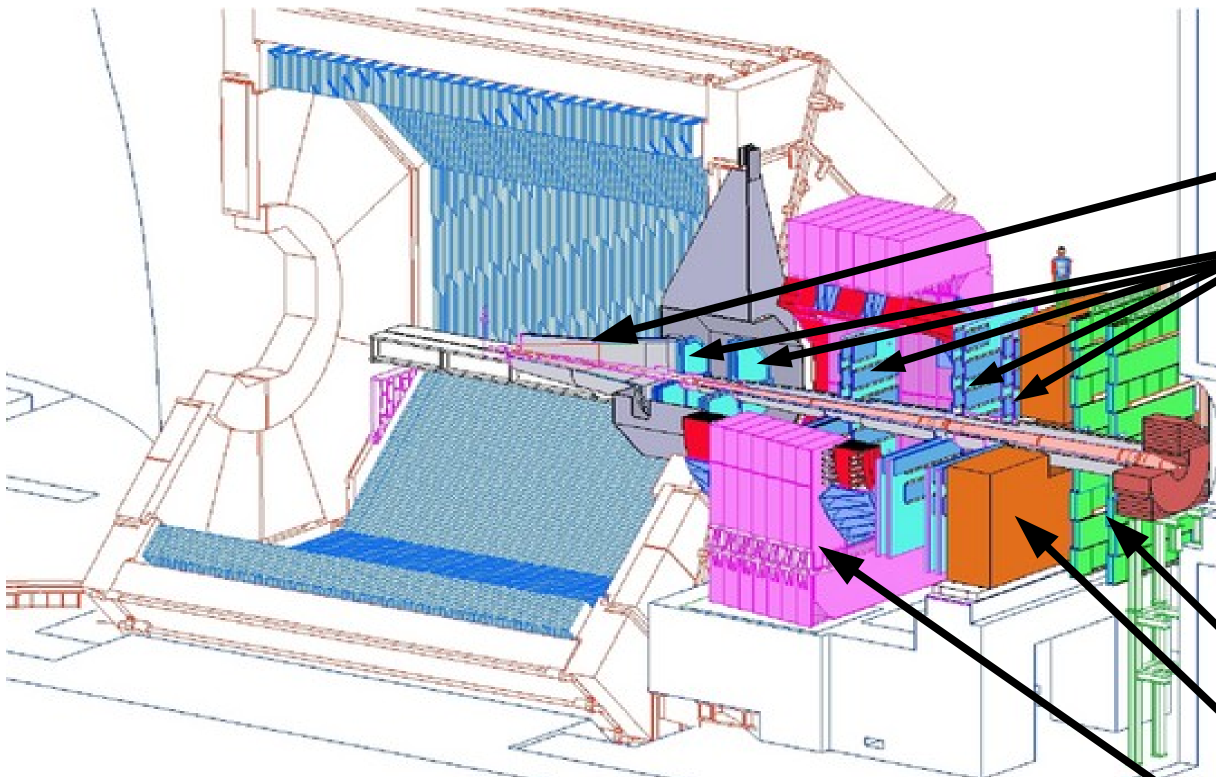
Calibration tracker

Calibration & alignment trigger

Realistic mapping

Conclusion & ToDo

MUON Spectrometer

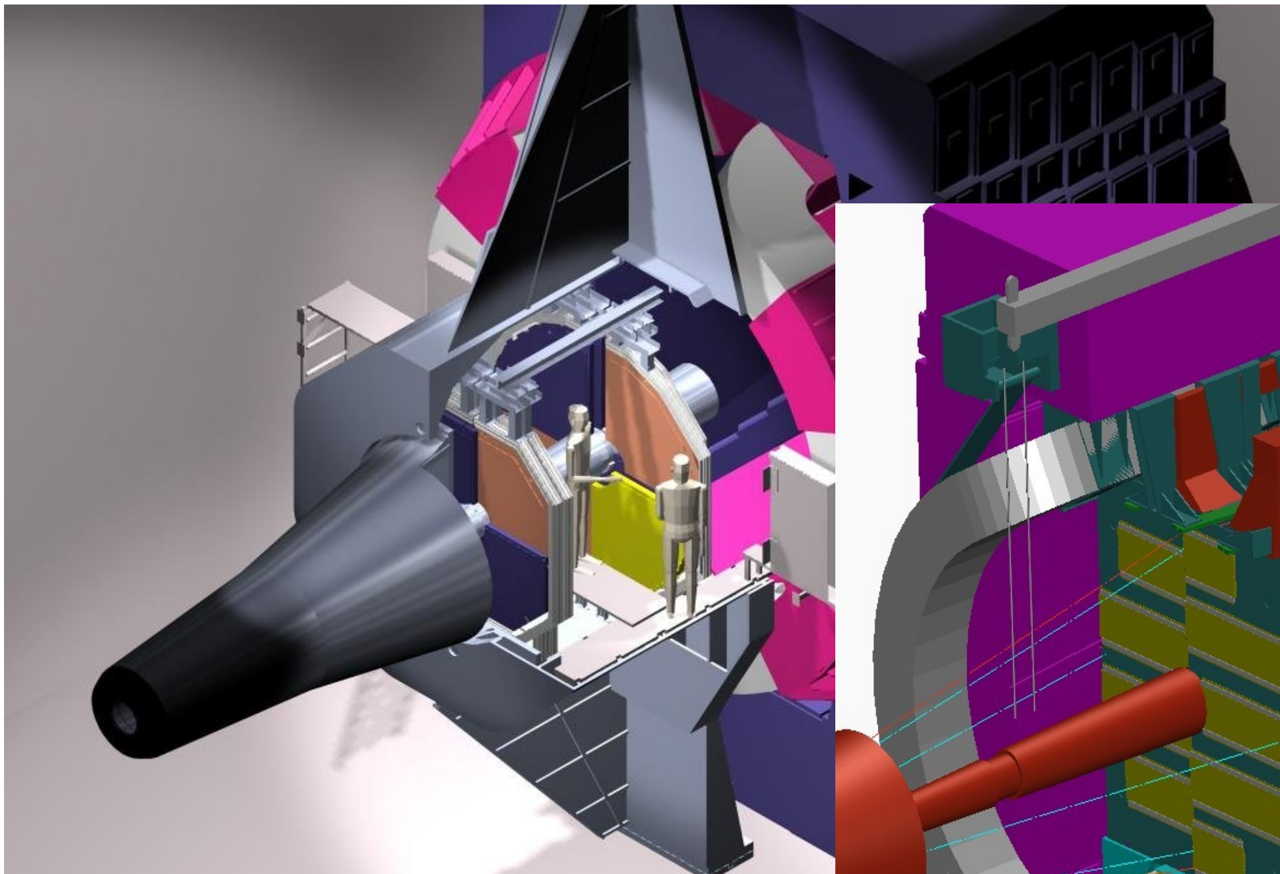


DIMUON Arm :

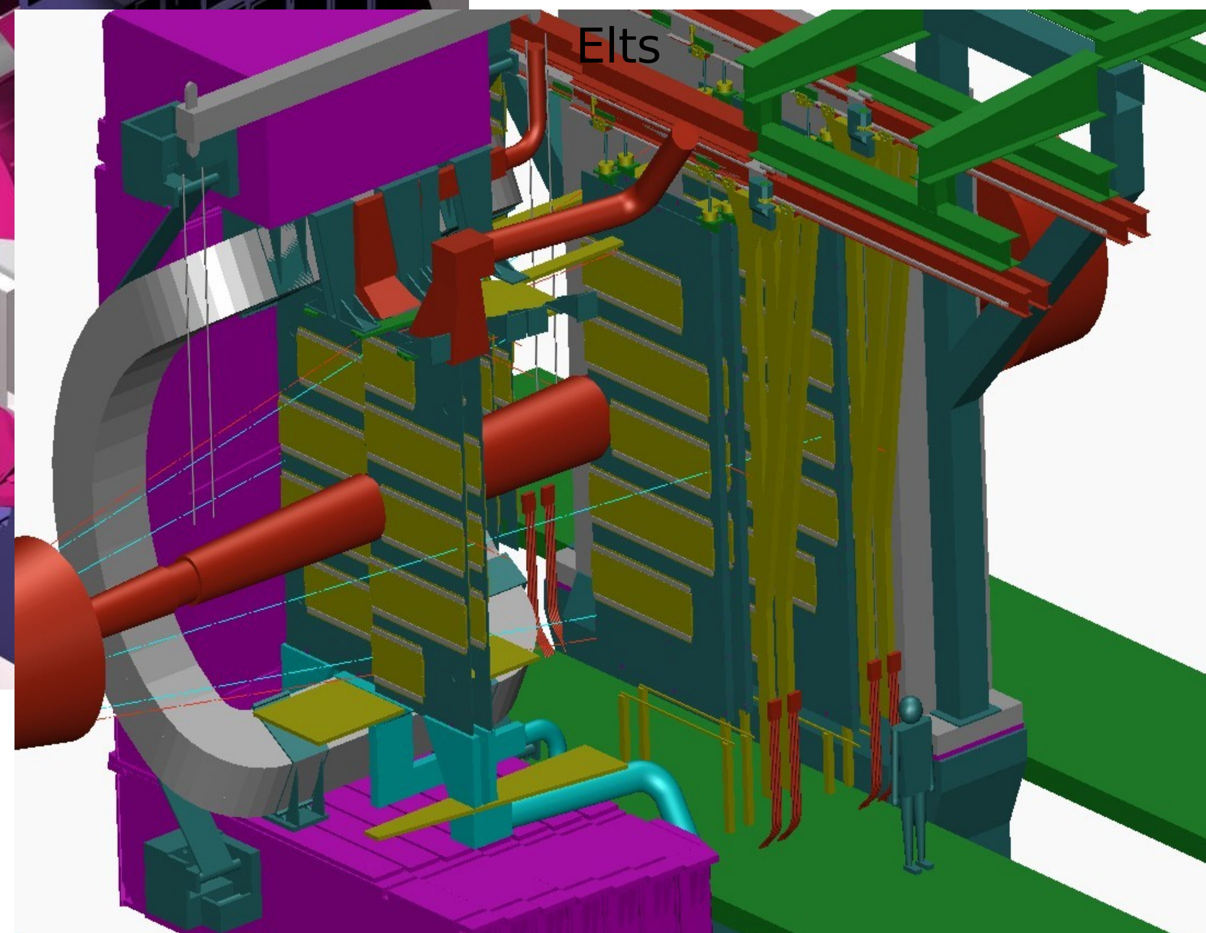
- Absorber
- 5 Tracking Stations
- 2 Trigger Stations (RPC)
- Filter (Iron Wall)
- Dipole

- Pseudo-rapidity range : $-4.0 < \eta < -2.5$

Tracking Stations



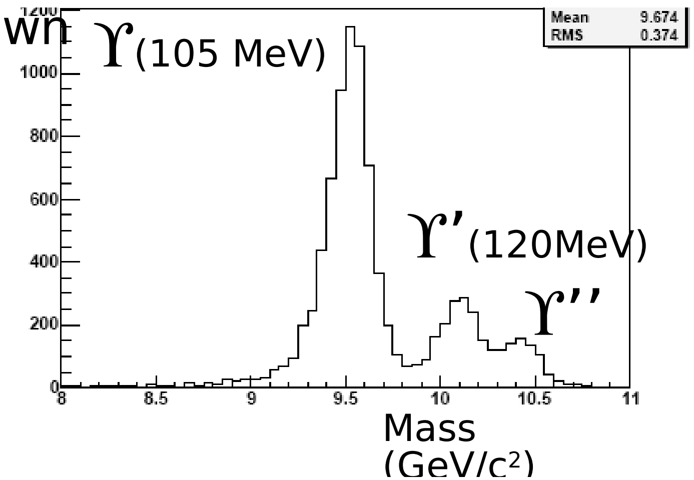
- 4*4 Detection Elts



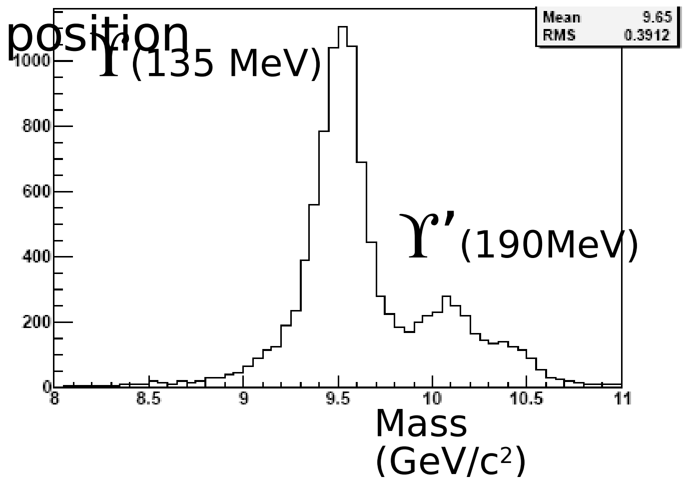
- 2*18 + 4*26 Detection Elts

Alignment and Performances

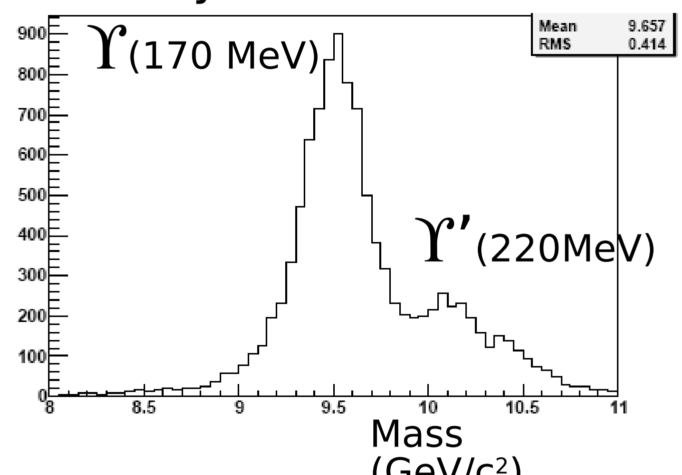
Chamber position exactly known



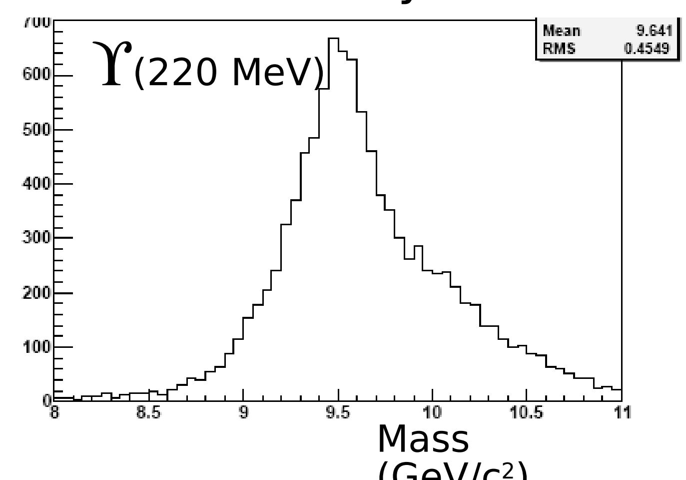
100 μ uncertainty on chamber position



500 μ uncertainty on chamber position



1 mm uncertainty on chamber position



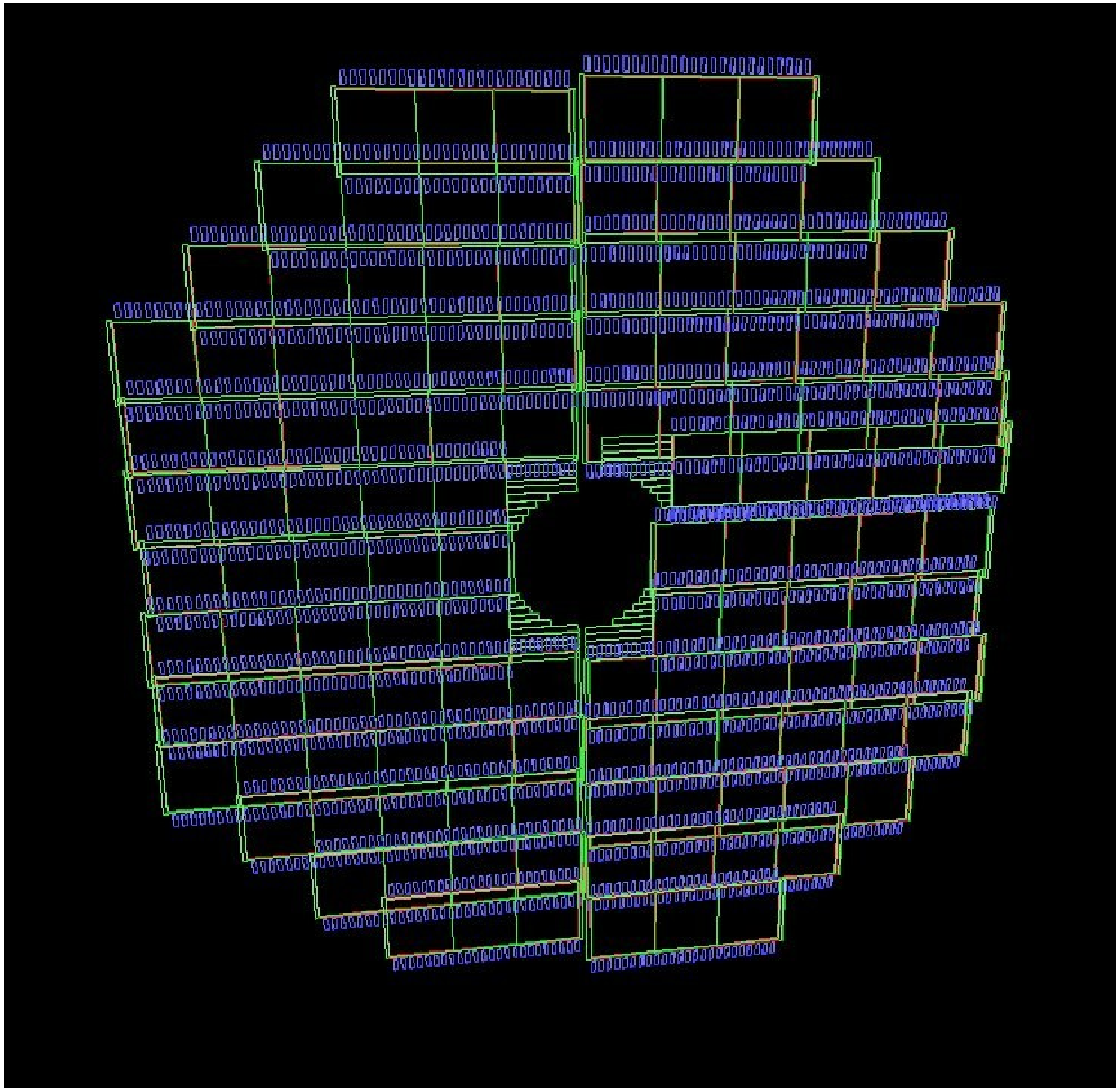
Figures from E. Dumonteil thesis

Alignment scenario

- **Alignment (~30 microns precision):**
  - 1 TTransformation per tracking detection element: 156 detection elements (23KB)
  - At most, an alignment per day.
  - Physics alignment algorithm need around 60000 tracks without magnetic field (~ 1-5 minutes of beam).
  - GMS need 5 minutes after switching on the magnet.
  - One physics (straight tracks) and GMS alignment per beam fill should be possible.
  - Algorithm in AliRoot (Bruce BECKER from Saclay) convert STL to Root

Alignment

- **Geometry:**
  - The position of the « envelops » could be stored in a ASCII file.
  - Config file: MUON->SetAlign(kTRUE) (see Ivana's talk).
  - Link with database could be done easely.



Calibrations for tracking system

- **Gains :**
  - Initial FEE calibration in Industry (FEE serial number + 4 parameters)

    ⇒ ~10 MB for database.
  - Calibration during the experiment: address (int) & 3 calibration coefficients (float)

    ⇒ ~40 MB for database.
  - We could expect, at most, two calibrations per day (40MB x 2 x 300 = ~25 GB per PbPb + pp run). This is raw estimation and an upper limit!
- **Pedestals:**
  - Mapping between FEE serial number and FEE address ~9 MB
  - Address (int) & Mean (float) & Sigma (float) for all channels

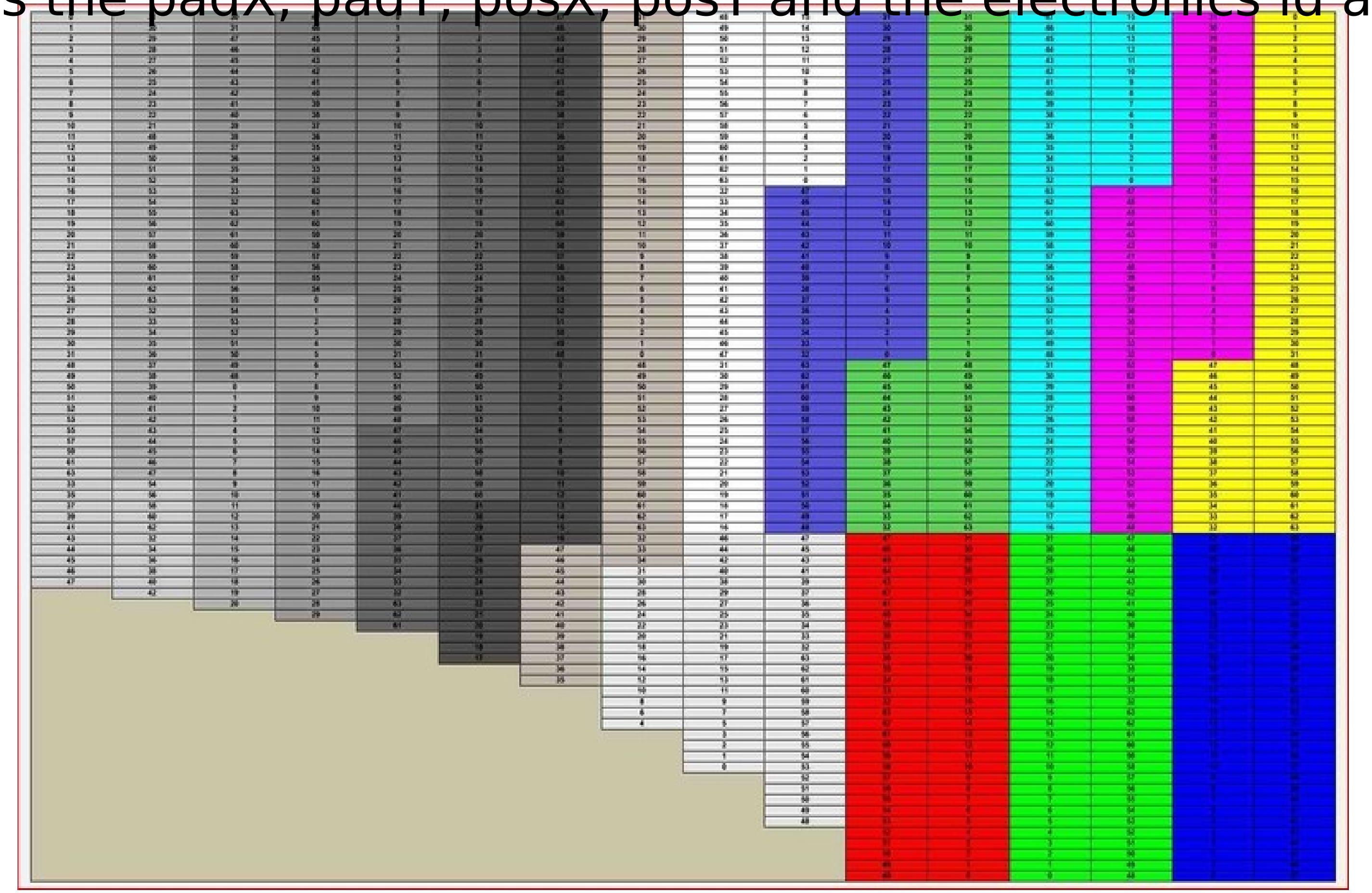
    ⇒ ~40 MB for database.
  - Should be handled by DAQ-ECS (need 'link' between on- and off-line database).
  - In principle one pedestal run per beam filling period (~8 hours).
- **Dead Map:**
  - 1 Dead map per filling period (~8 hours)
  - 1.1 million channels, if everything is dead a 8.8MB

Calibration for trigger system

- **Calibration & pedestals:**
  - No calibration & pedestals needed (no charge measurement).
- **Alignment (1mm precision):**
  - A unique alignement before the data taken.
  - 1 Ttransformation per trigger detection element. 72 detection elements
    $\Rightarrow$ 10 KB.
- **Dead Map:**
  - 1 Dead map per filling period (~8 hours)
  - 21000 channels, if everything is dead a 160KB

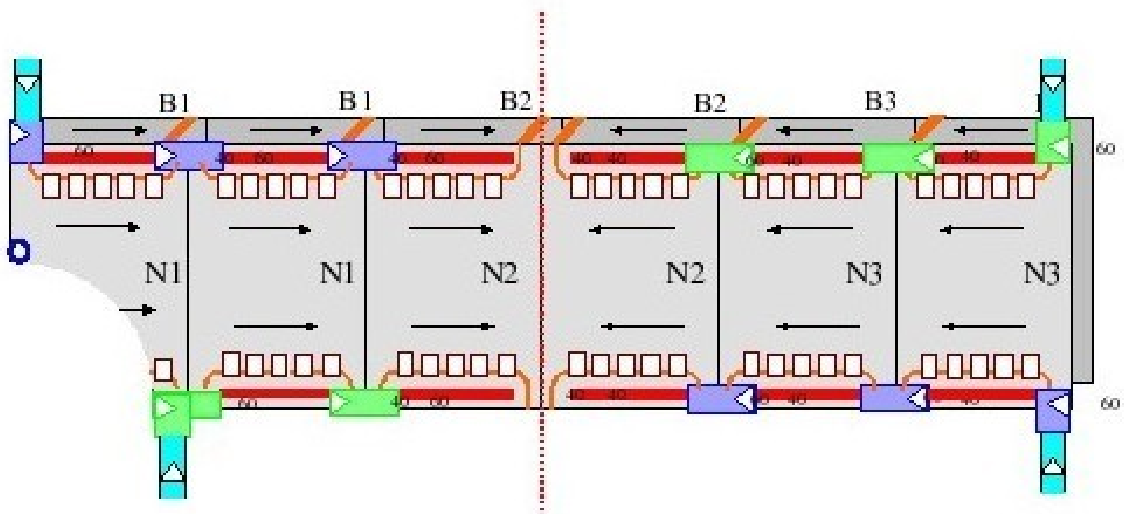
Realistic Mapping (i)

- **Motif method :**
  - Defines base motifs that could be use to 'assemble' sectors (St1 & 2) and slats (St345).
  - Gives the padX, padY, posX, posY and the electronics id and channels.
  - Gives the padX, padY, posX, posY and the electronics id and channels.



Realistic Mapping (ii)

- **Slat assembly :**
  - Those motifs describe the PCBs which compose the slat



  - The 1.1 millions channels has been mapped.
  - The generation of rawdata is working as well as the reconstruction (including ESD) from rawdata.

Conlusion & ToDo

- We have defined our needs for the calibration & pedestal database.
- The framework with the real mapping is working.

- Since we do not know whether our electronic needs or not calibration, the forseen test with database will be with pedestals (not substracted online).
  - Generates pedestal
  - Store into database
  - Retrieve the pedestal
  - Subtract pedestal

⇒ should be done in next weeks.