

The Status of MUC Calibration

XIE Yuguang

BESIII Muon Group

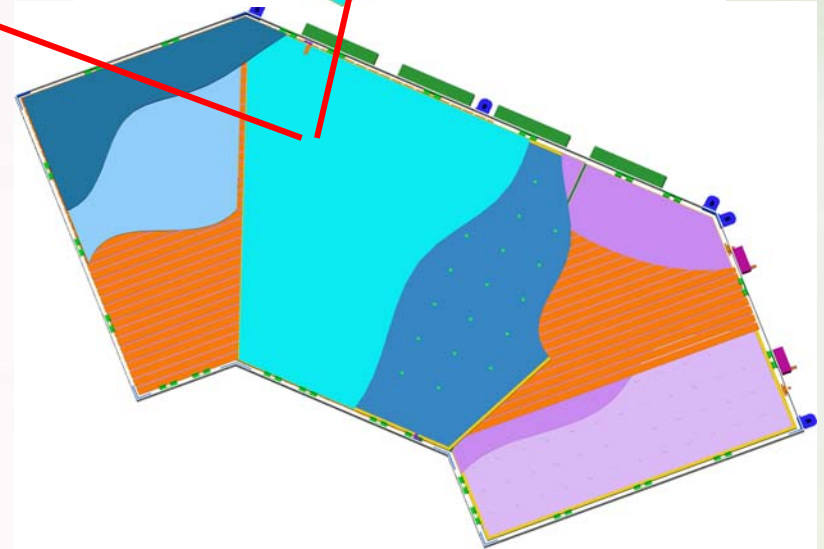
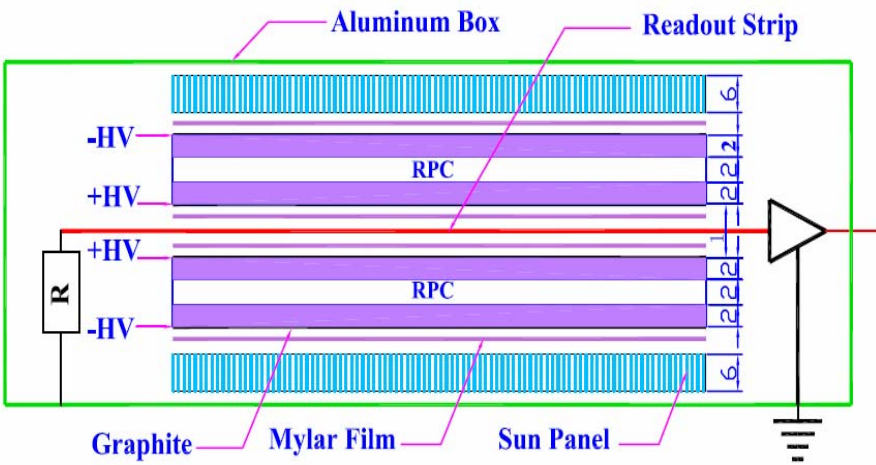
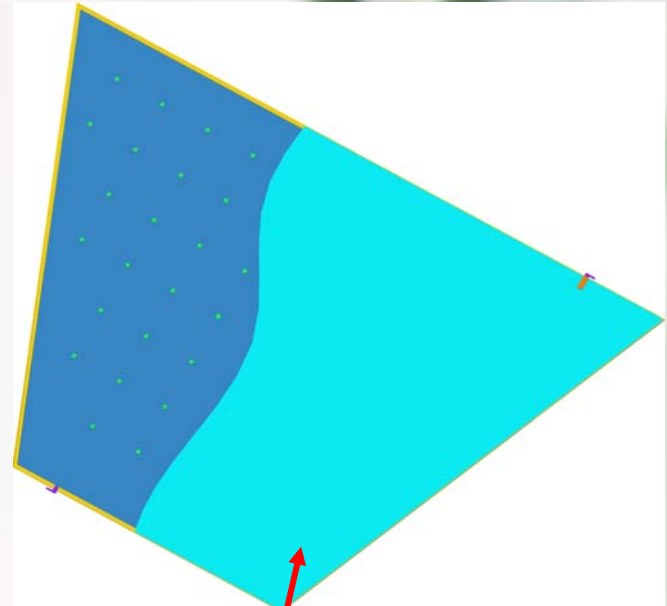
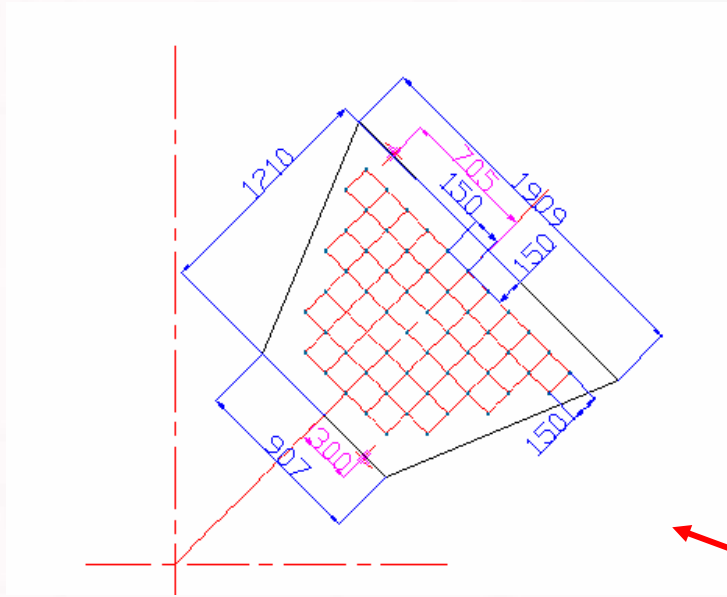
August 7, 2005

Outline

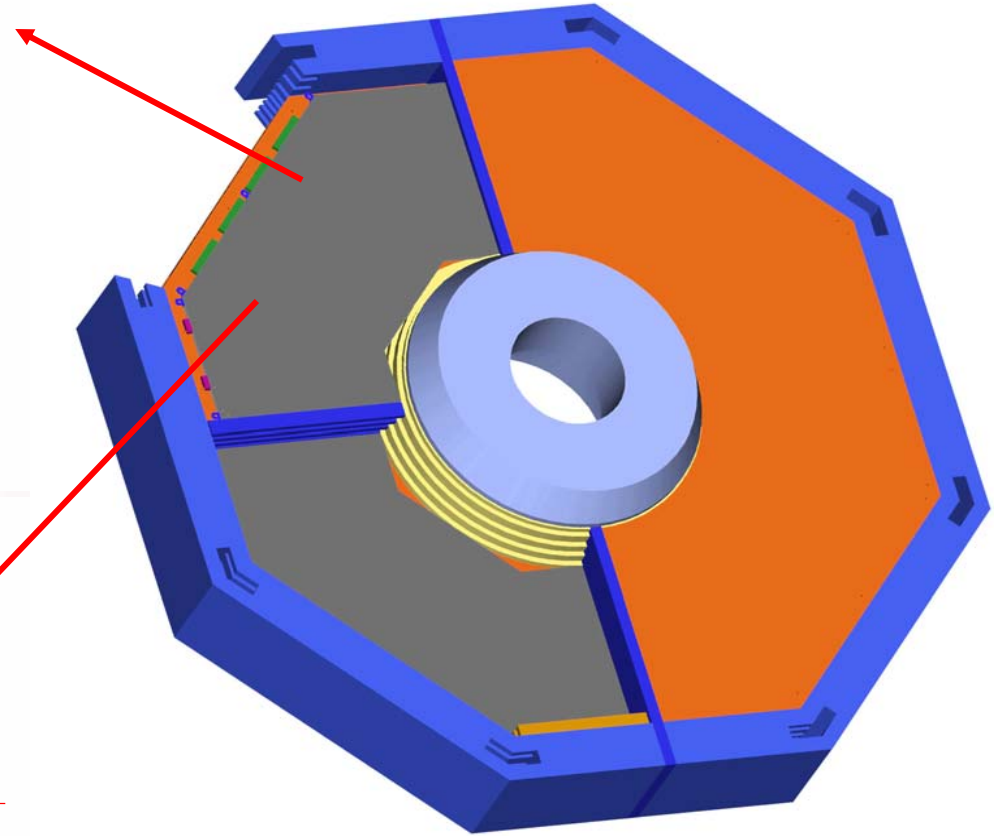
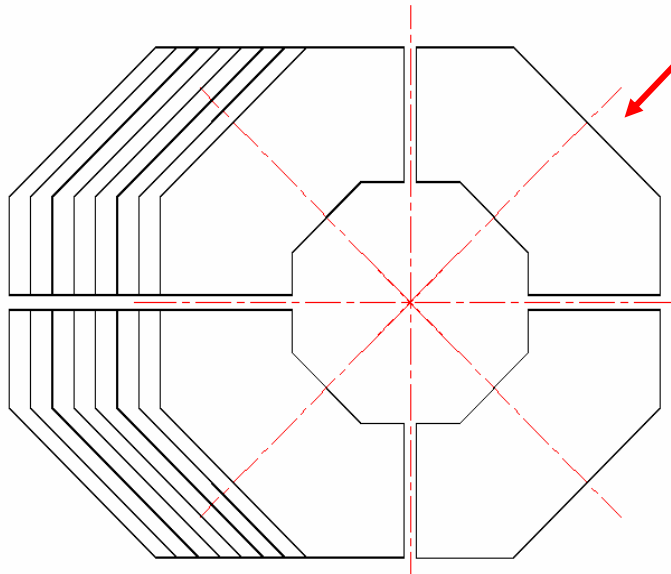
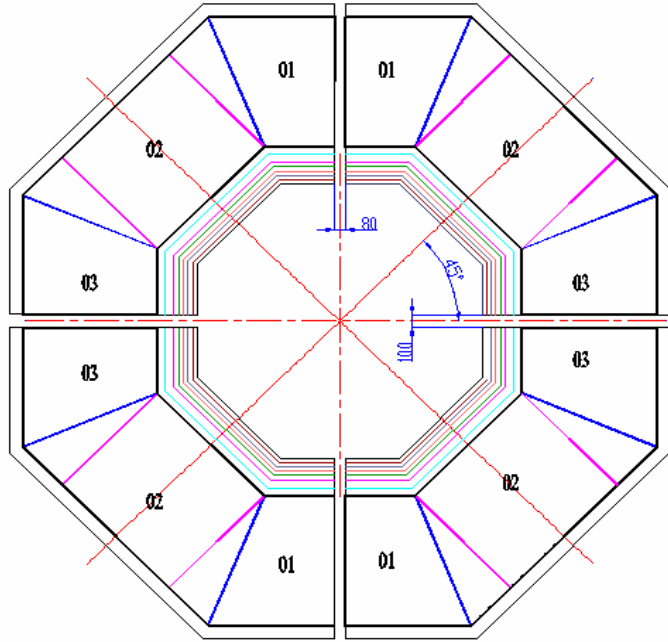
- ◆ **MUC structure**
- ◆ **Calibrated objects**
- ◆ **Data flow**
- ◆ **Algorithm**
- ◆ **Coming work**
- ◆ **MUC installation proceeding**

MUC Structure

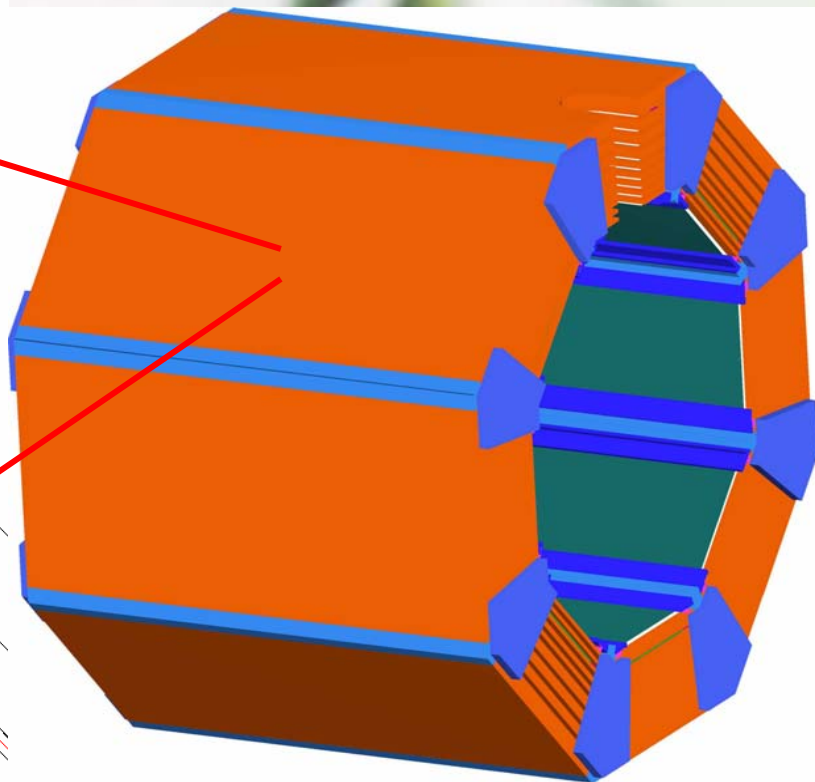
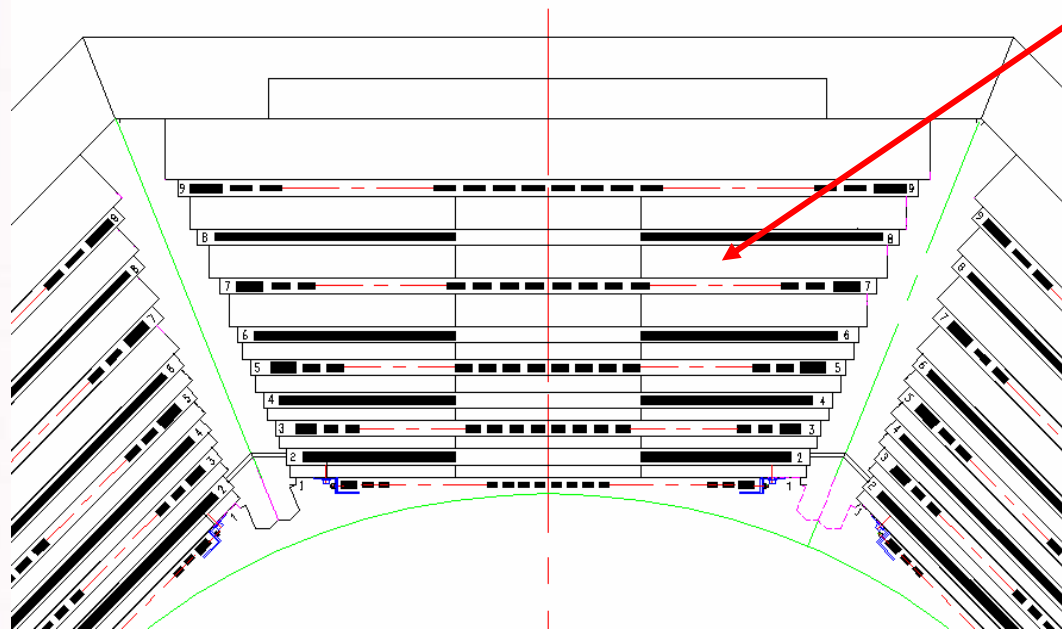
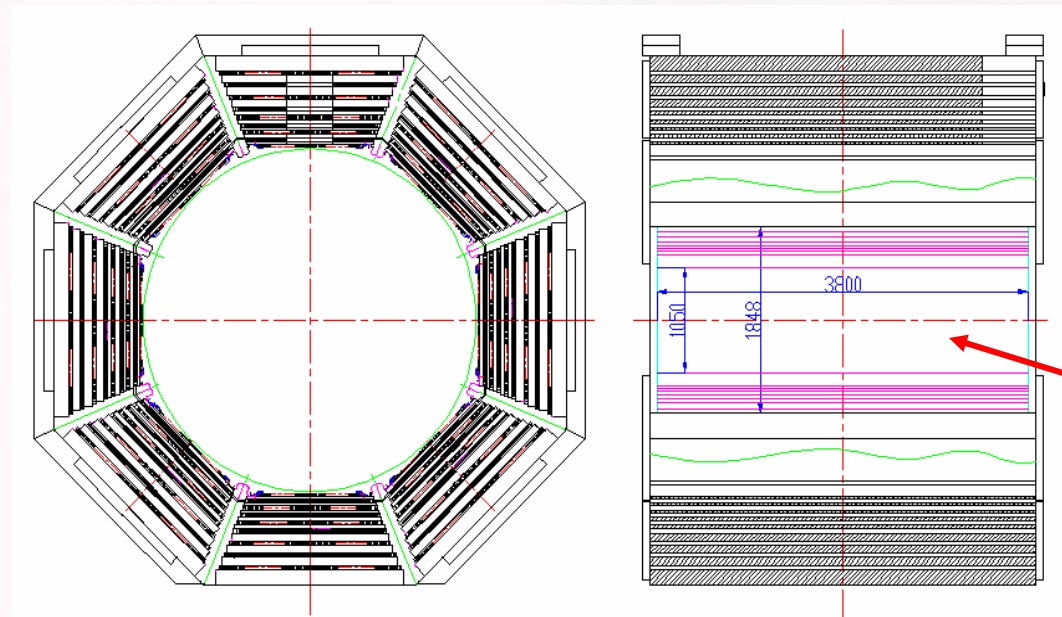
Module



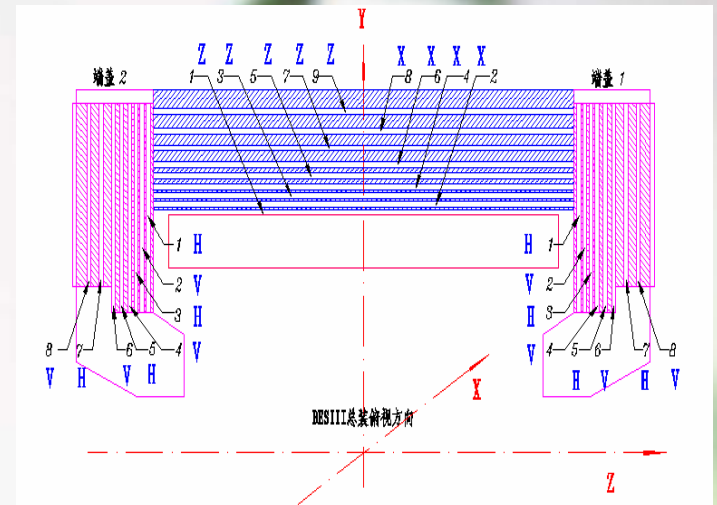
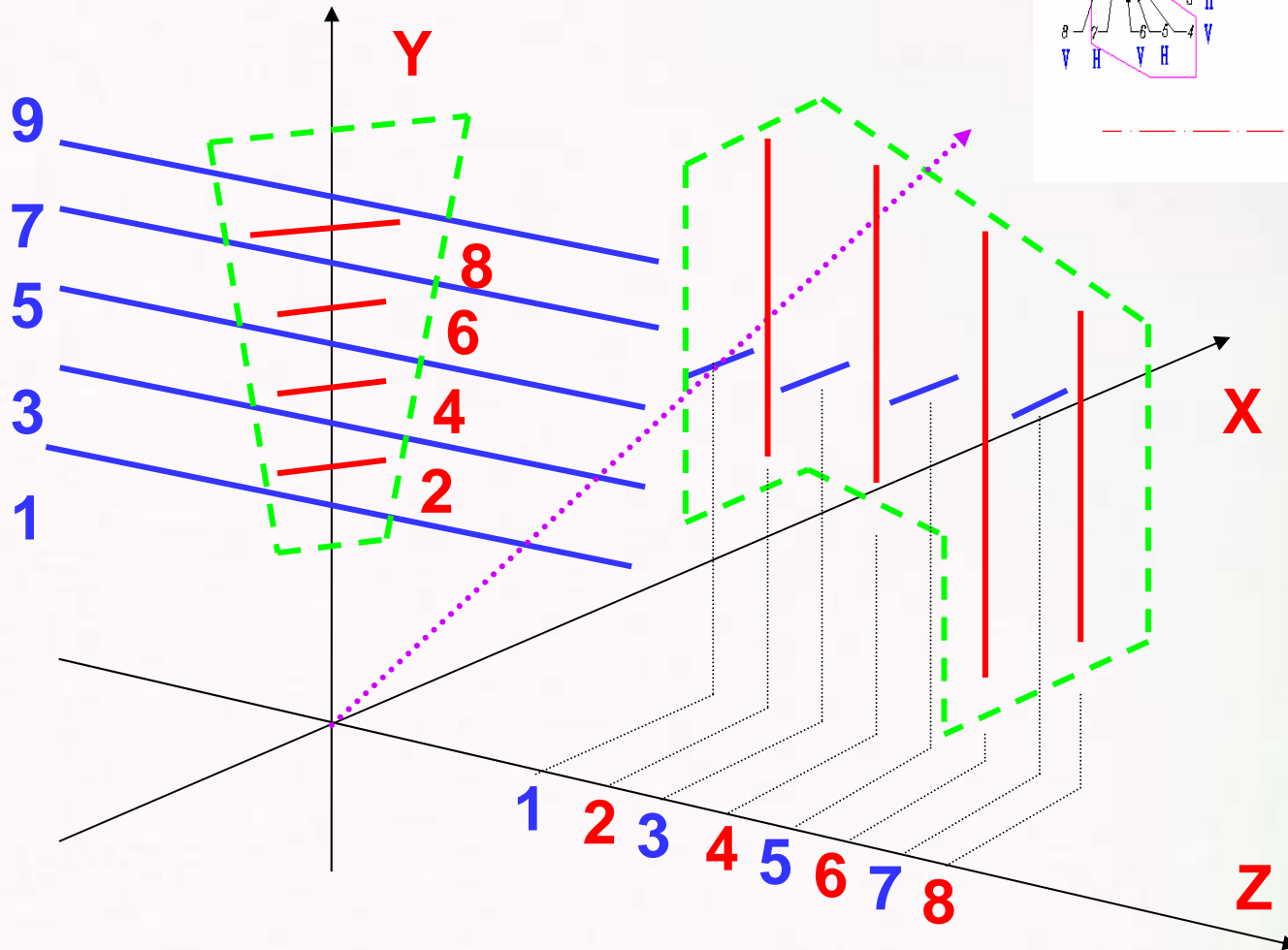
Endcap



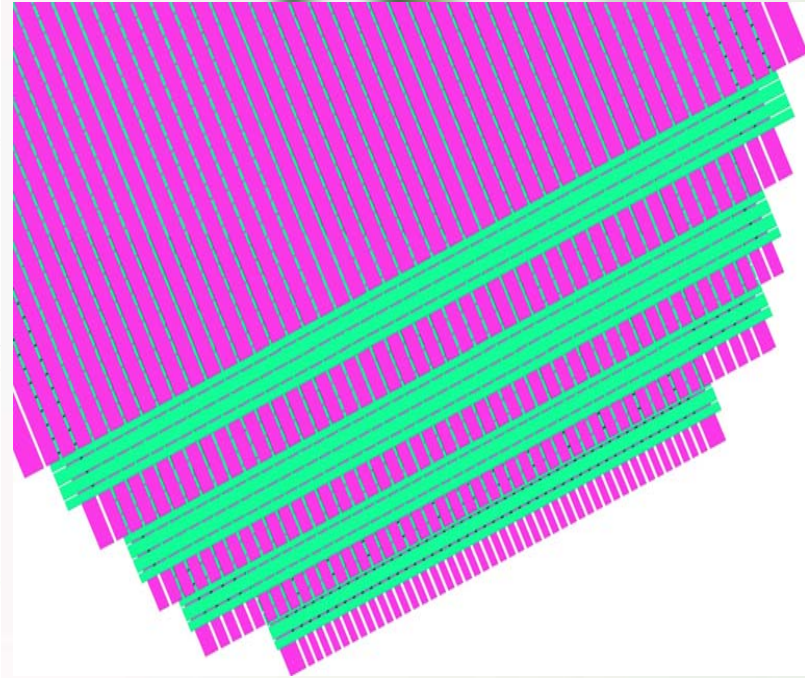
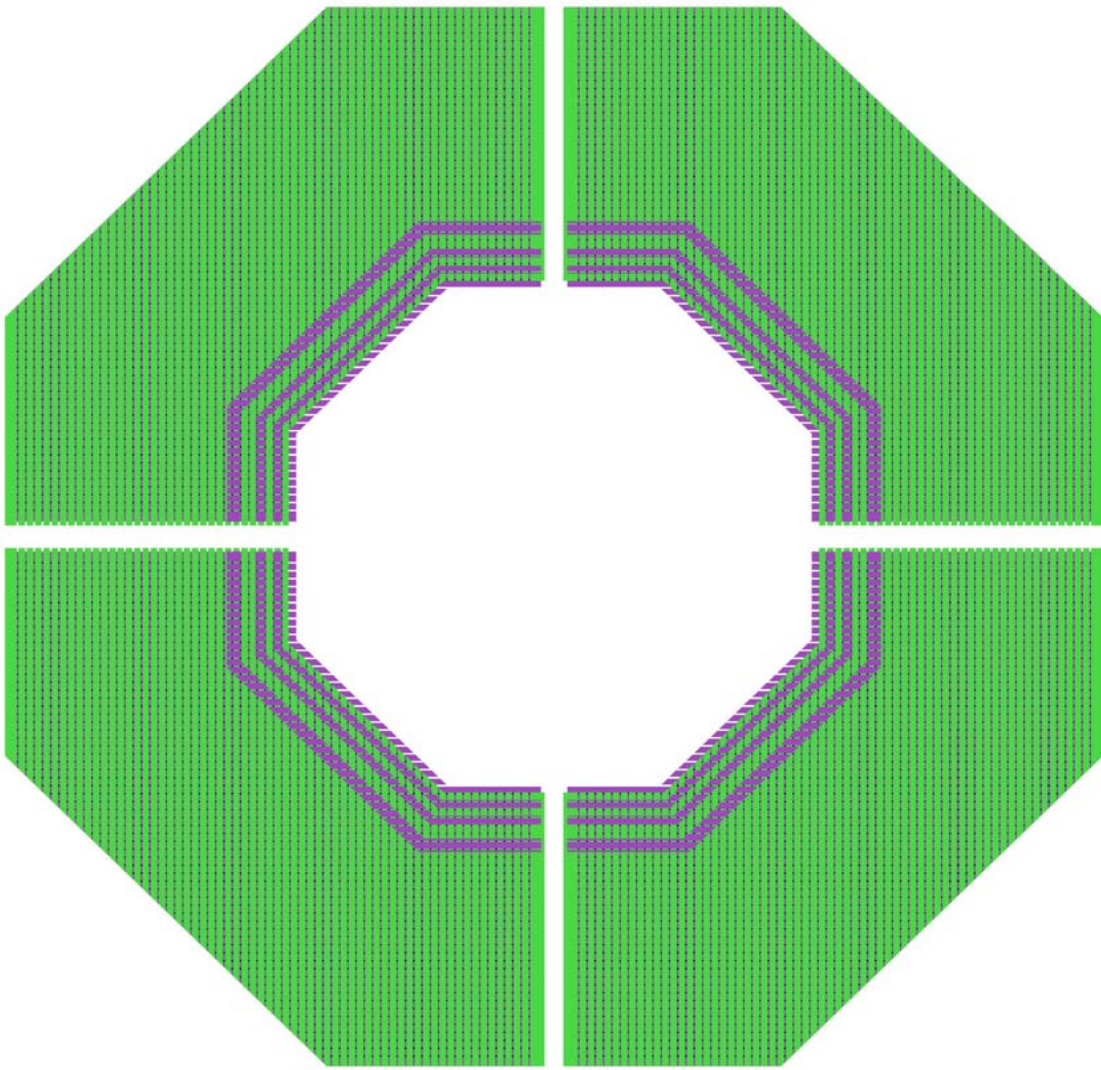
Barrel



Readout-Strip System(1)



Readout-Strip System(2)



Calibrated Objects(1)

Information from detector:

- Strip **position**

(center, center-line, length, width, etc)

by mechanical design, module assemblage and detector installation.

- Strip **fire** or not

by electronics FEC threshold (100mV) and chamber detection efficiency.

Calibrated Objects(2)

Influence factors:

➤ To geometry

- Produce precision
- Module assemblage
- **Detector installation**

➤ To physical parameters

- FEC threshold
- Gas mixture
- Temperature and humidity
- Aging
- **Strip failure**
- **Chamber failure**

Calibrated Objects(3)

Calibrated objects:

➤ Geometry (Alignment)

one-off, measurement data

total aluminium boxes : **136**

total RPC chambers : **978**

total strips : **9152**

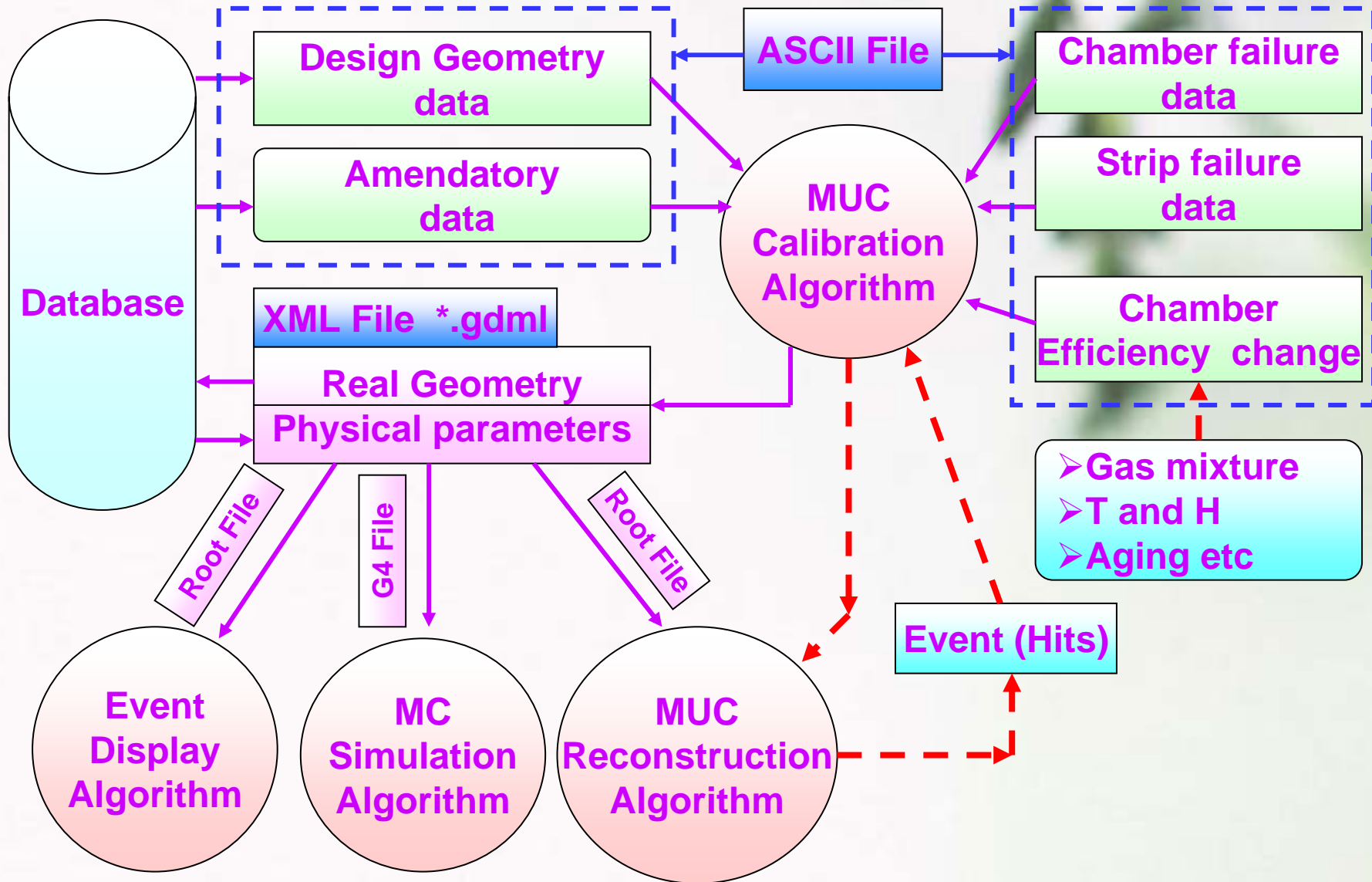
➤ Physical parameters (Efficiency)

repetitious

event hits, detector status data

total number : **978**

Data Flow



Algorithm

- **Input:**

ASCII files: **MucGeoDesign.dat** (Design Info)
MucGeoAmend.dat (Measurement Info)
MucEffChange.dat (Performance Info)

Events : Muc reconstruction hits

Run mode flag: 0 both geometry and efficiency

1 geometry

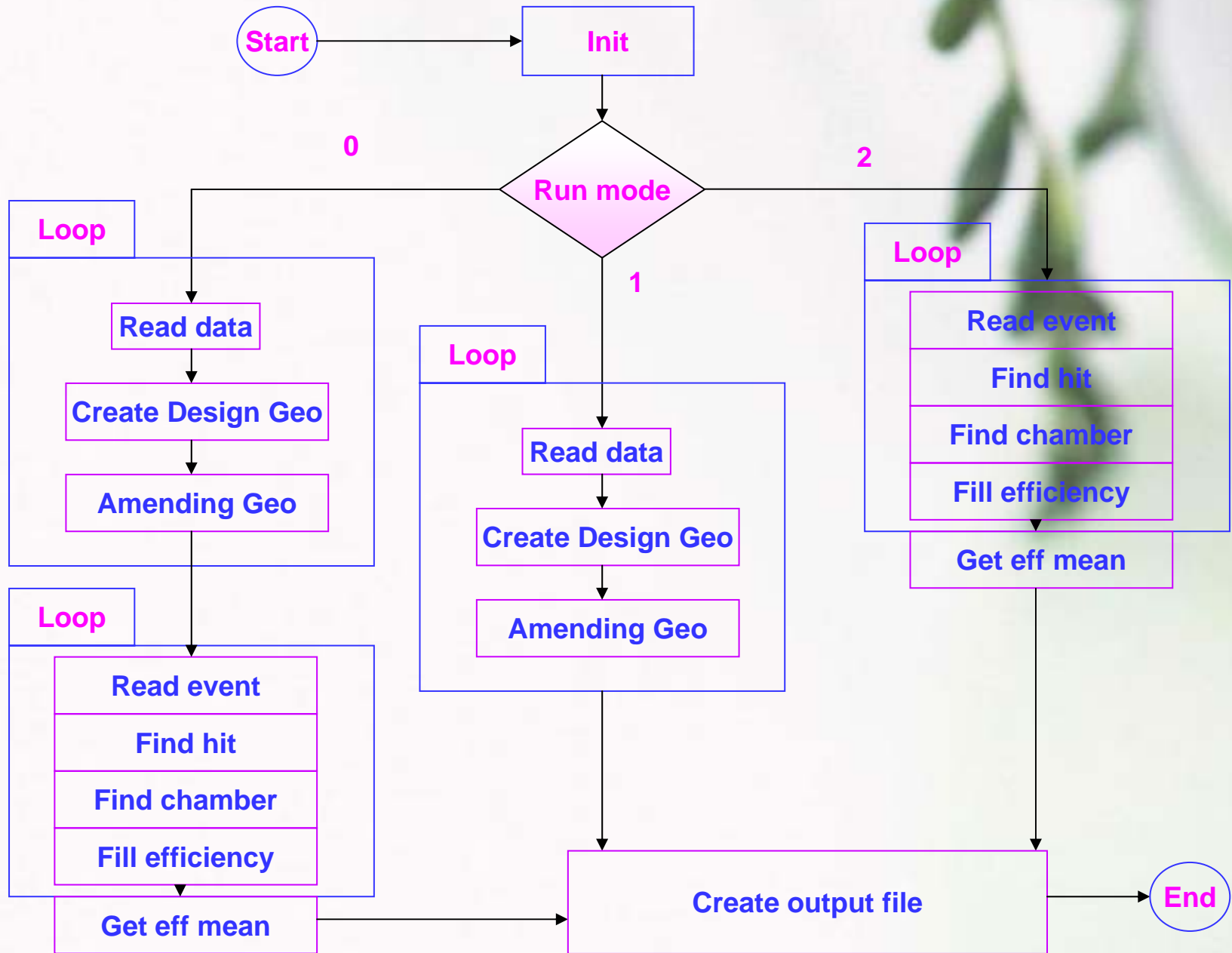
2 efficiency

- **Output:**

BesMucCal.root (Event display, Muc reconstruction)

BesMucCal.gdml (Muc simulation)

BesMucCal.dat (Calibration results check)



Create design geometry

```
//-----definition of class Strip-----
class Strip {
public:
    int layer; // Box layer
    int region; // Box region
    int CoverFlag; // 0 no, 1 full, 2 part
    float BoundHead; // bound head coordinate
    float BoundTail; // bound tail coordinate
    int type; // 0 vertical, 1 horizontal

    Strip(int StripType, int Blayer, int Bregion);
    ~Strip();
    int Initialize(int Snumber);
    int Set_Width();
    int Set_CenterLinePosition();
    int Set_Head();
    int Set_Tail();
    int Set_Cover(int SCoverFlag, float SBoundHead, float SBoundTail);

    int Get_Number() { return number; }
    float Get_Width() { return width; }
    float Get_CenterLinePosition() { return CenterLinePosition; }
    float Get_Head() { return head; }
    float Get_Tail() { return tail; }
    float Get_OriginalArea();
    float Get_CoverArea();

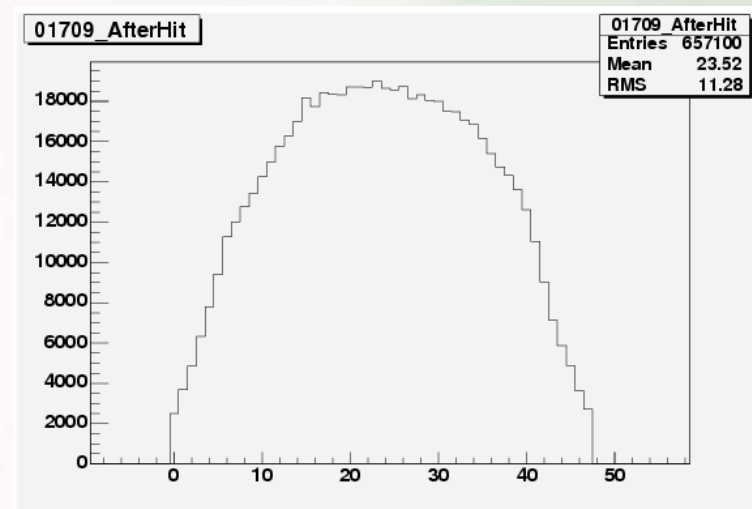
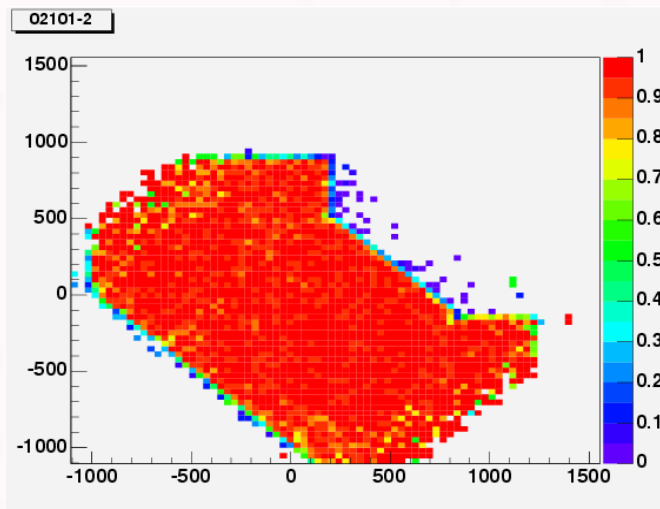
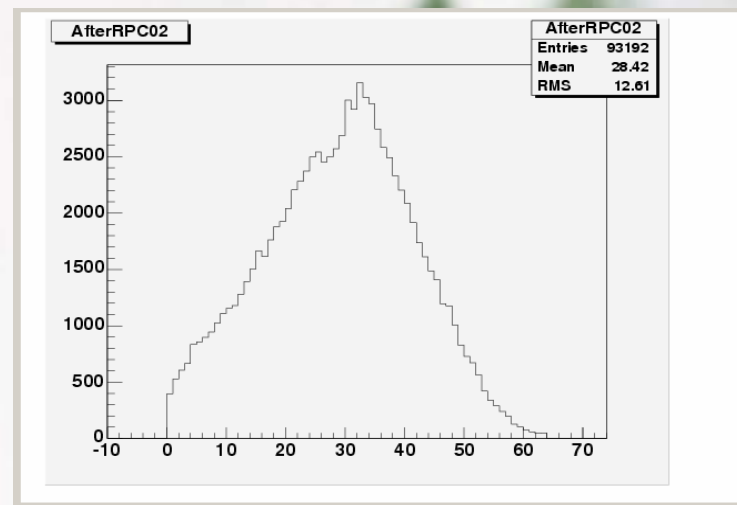
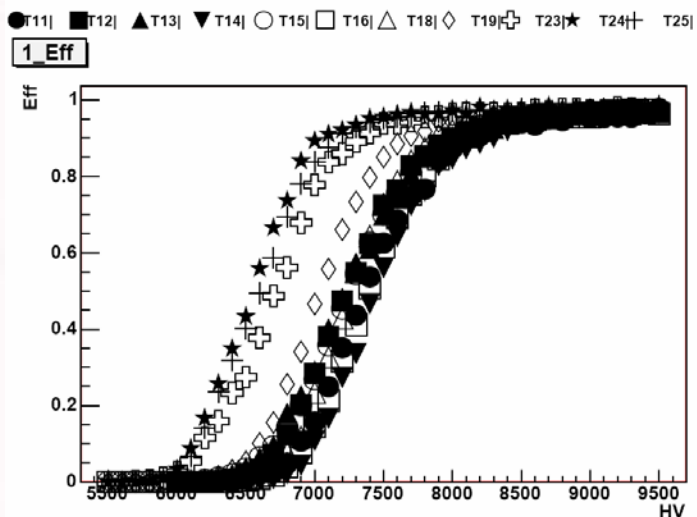
private:
    int number; // 0~MAX_Strip_Num-1
    float width; // unit mm
    float CenterLinePosition; // strip center line position
    float head; // strip head coordinate
    float tail; // strip tail coordinate
};
```

```
2101 0 0 1152 720
Layer: 1 Region: 1 StripType: 1 (1215.16, 1215.16)

(-108.541, 1520.63) (1520.63, -108.541) (2538.87, 909.693) (909.693, 2538.87)

0 2 14422.9 1314.59 1726.67 1092 2316 97.5 -1531.67 1314.59 1726.67 3351.06
1 2 16872.9 1279.59 1761.67 1092 2316 132.5 -1496.67 1279.59 1761.67 3316.06
2 2 19322.9 1244.59 1796.67 1092 2316 167.5 -1461.67 1244.59 1796.67 3281.06
3 2 21772.9 1209.59 1831.67 1092 2316 202.5 -1426.67 1209.59 1831.67 3246.06
4 2 24222.9 1174.59 1866.67 1092 2316 237.5 -1391.67 1174.59 1866.67 3211.06
5 2 26672.9 1139.59 1901.67 1092 2316 272.5 -1356.67 1139.59 1901.67 3176.06
6 2 29122.9 1104.59 1936.67 1092 2316 307.5 -1321.67 1104.59 1936.67 3141.06
7 2 30788.6 1092 1971.67 1092 2316 342.5 -1286.67 1069.59 1971.67 3106.06
8 2 32013.6 1092 2006.67 1092 2316 377.5 -1251.67 1034.59 2006.67 3071.06
9 2 33238.6 1092 2041.67 1092 2316 412.5 -1216.67 999.592 2041.67 3036.06
10 2 34463.6 1092 2076.67 1092 2316 447.5 -1181.67 964.592 2076.67 3001.06
11 2 35688.6 1092 2111.67 1092 2316 482.5 -1146.67 929.592 2111.67 2966.06
12 2 38138.6 1057 2146.67 1057 2316 517.5 -1111.67 894.592 2146.67 2931.06
13 2 40588.6 1022 2181.67 1022 2316 552.5 -1076.67 859.592 2181.67 2896.06
14 2 43038.6 987 2216.67 987 2316 587.5 -1041.67 824.592 2216.67 2861.06
15 2 45488.6 952 2251.67 952 2316 622.5 -1006.67 789.592 2251.67 2826.06
16 2 47938.6 917 2286.67 917 2316 657.5 -971.674 754.592 2286.67 2791.06
17 1 50190 882 2316 882 2316 692.5 -936.674 719.592 2321.67 2756.06
```

Efficiency change and distribution

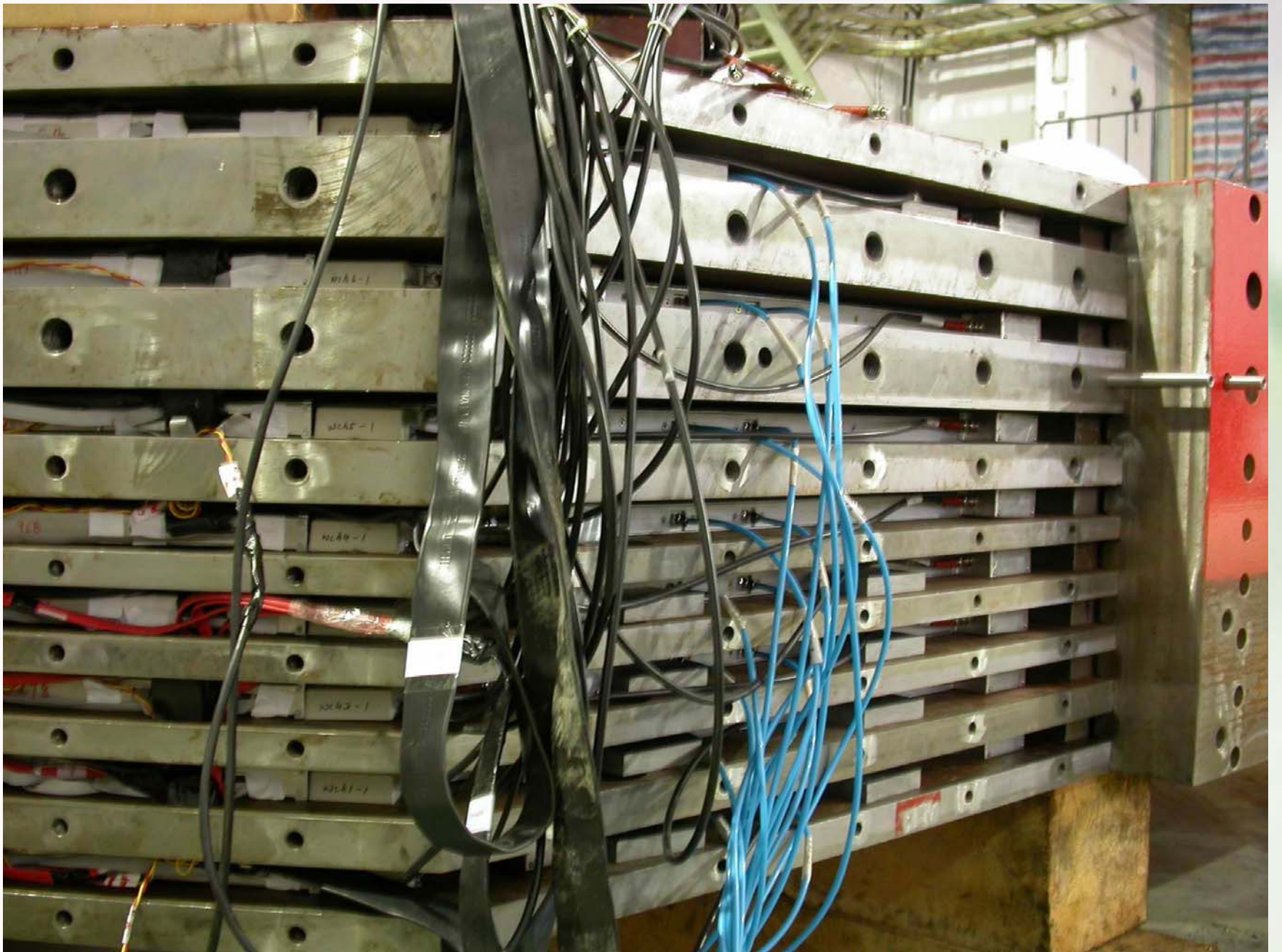


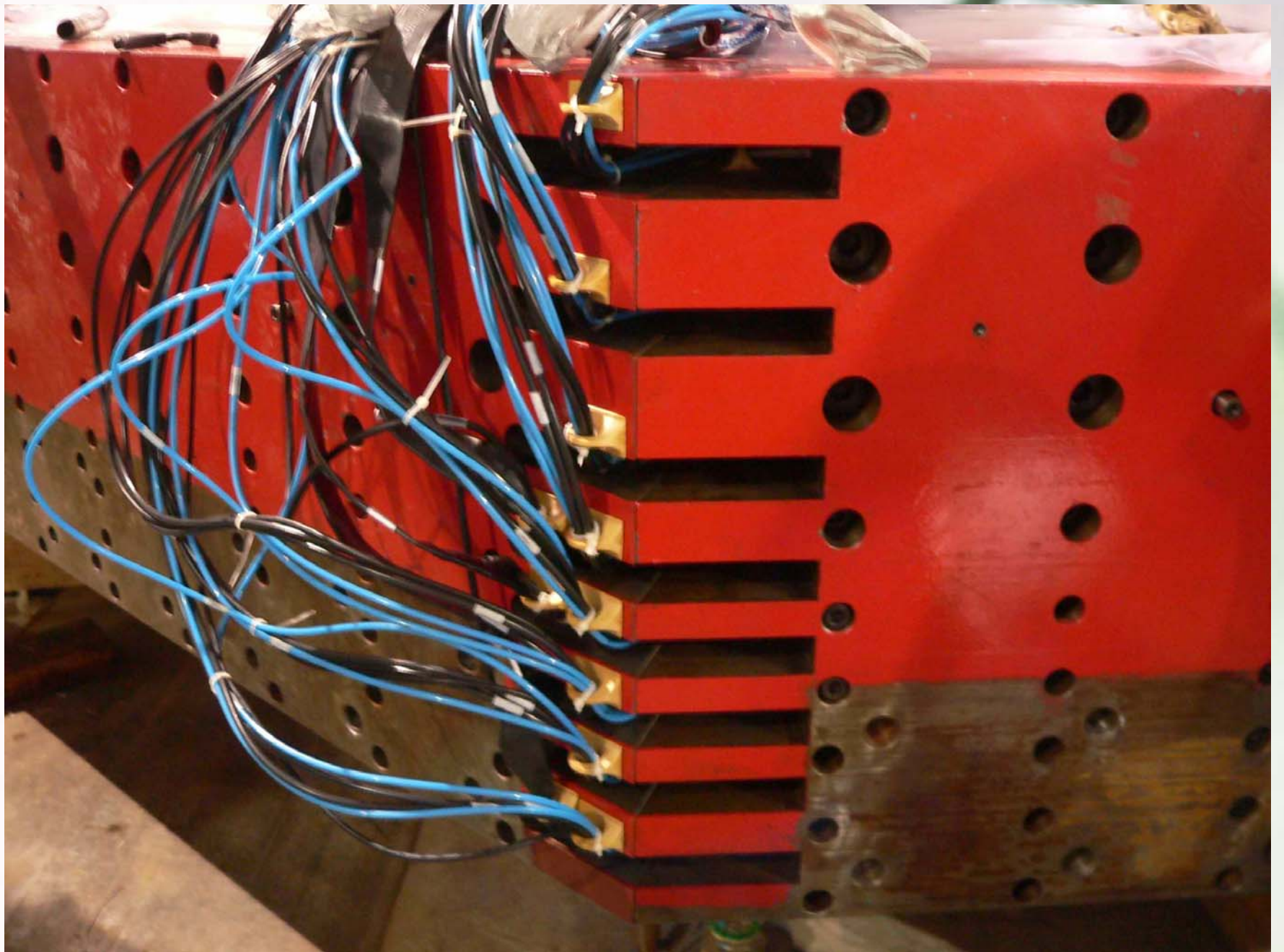
Coming Work

- **Real geometry description**
- **Gaudi framework I/O design**
- **Class definition**
- **Input data files creation**

MUC Installation Proceeding











Thank you !