

ROOT geometry for FOOT

Root Geometry (i)

□ New geometry class:

- TAGgeometryConstructor

```
class TAGgeometryConstructor : public TNamed
{
public:
    TAGgeometryConstructor(const TString expName = "", Int_t runNumber = -1,
                          Bool_t parGeoExt = true, BaseReco* reco = 0x0);
    ...
};
```

➔ Beside experiment name and runNumber, two other parameters

- parGeoExt: geometry parameters come from outside
 - parGeoExt = false, reco = 0x0: read parameter inside class
 - parGeoExt = true, reco = 0x0: read parameter using gTAGroot->FindParaDsc(...)
 - parGeoExt = true, reco != 0x0: read parameter via fReco
- reco: pointer to reconstruction (where geometry parameters were read)

➔ Can be used for TAGgeometryConstructor class

Root Geometry (ii)

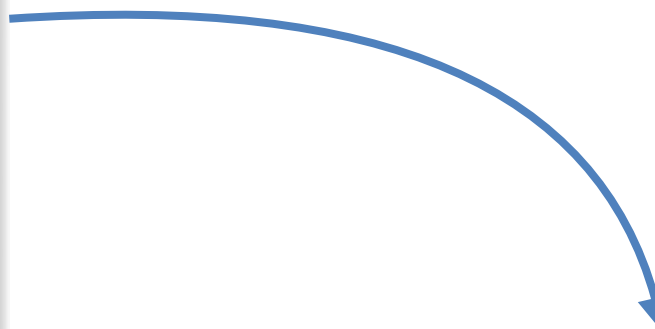
□ Event display classes (i)

- TAEDbaseInterface: mix btw ED interface and geometry

```
class TAEDbaseInterface : public TEveEventManager
{
protected:
    TString          fExpName;          ///< Experiment name
    Int_t            fType;              ///< type (MC/raw data)
    Int_t            fRunNumber;        ///< run number
    Float_t          fWorldSizeZ;       ///< World size Z
    Float_t          fWorldSizeXY;      ///< World size XY
    TString          fWorldName;        ///< World name
    TGeoMedium*      fWorldMedium;      ///< World medium

    TGeoVolume*      fTopVolume;        ///< top volume of geometry
    TAGeoTrafo*      fpFootGeo;         ///< trafo pointer
    . . .
};
```

```
class TAEDbaseInterface : public TEveEventManager
{
protected:
    Bool_t           fFlagMC;           ///< MC data flag
    . . .
};
```



- ➔ Using new class for event display
- ➔ Re-arrange event display interface and base classes

Root Geometry (ii)

□ Event display classes (ii)

- TAGbaseEventDisplay

```
TAGbaseEventDisplay::TAGbaseEventDisplay(const TString expName, Int_t runNumber, Bool_t mcFlag)
: TAEDbaseInterface(mcFlag),
  fExpName(expName),
  fRunNumber(runNumber),
  fReco(0x0),
  fGeomConstructor(new TAGgeometryConstructor(expName, runNumber)),
  . . .
}
```

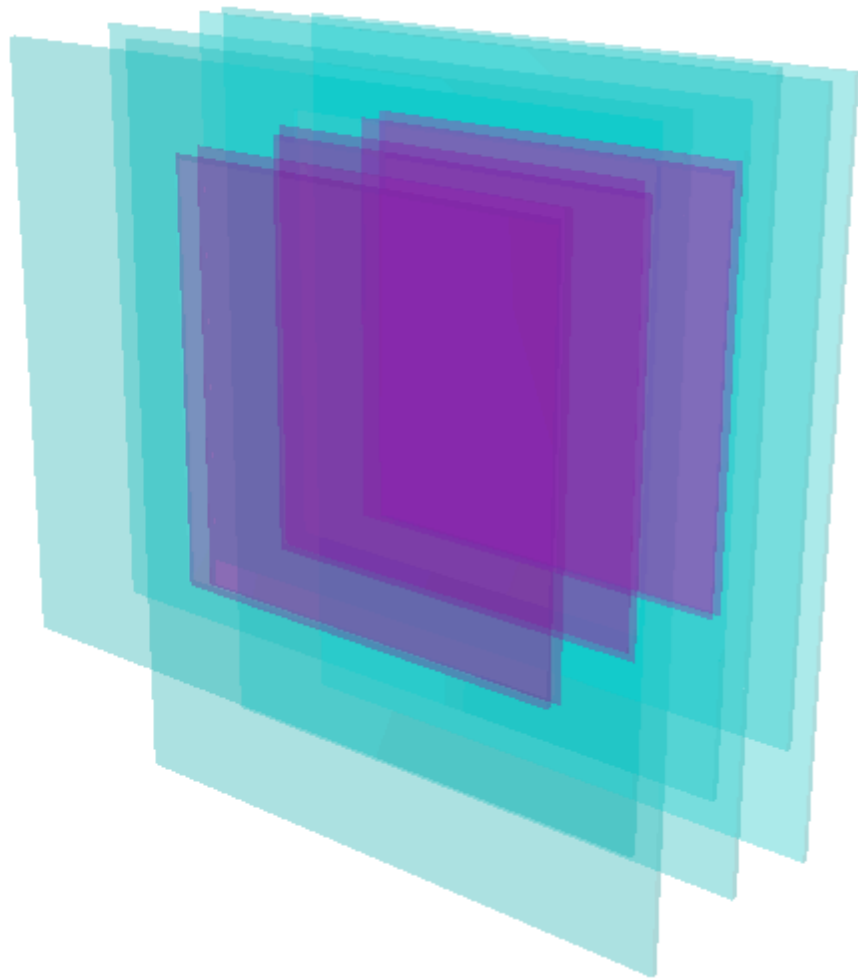
```
//
//! Build default geometry
void TAGbaseEventDisplay::BuildDefaultGeometry(Bool_t box, Bool_t board)
{
  fGeomConstructor->BuildGeometry(box, board);
}
```

➔ Geometry now build via the geometry class

MSD Geometry (i)

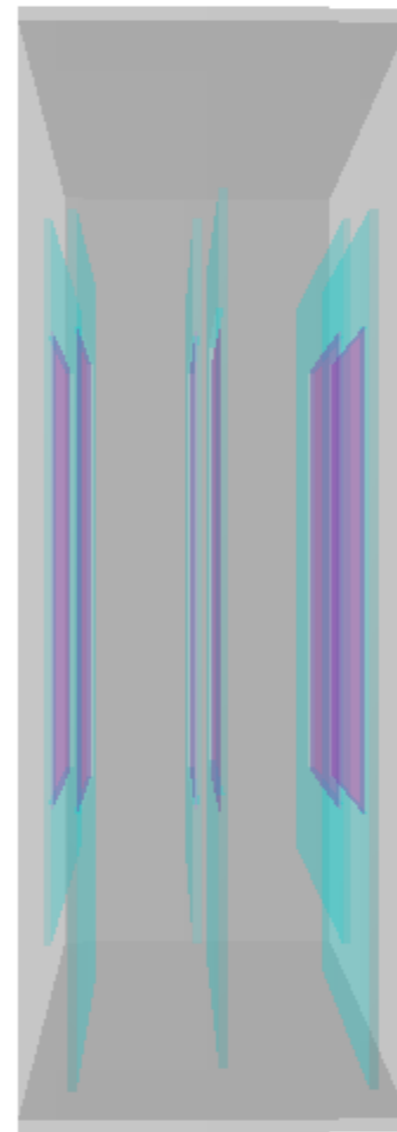
□ Passive elements:

- With frame



➔ Need some checks

- With box



- Version 3




- Version 1-2

MSD Geometry (ii)

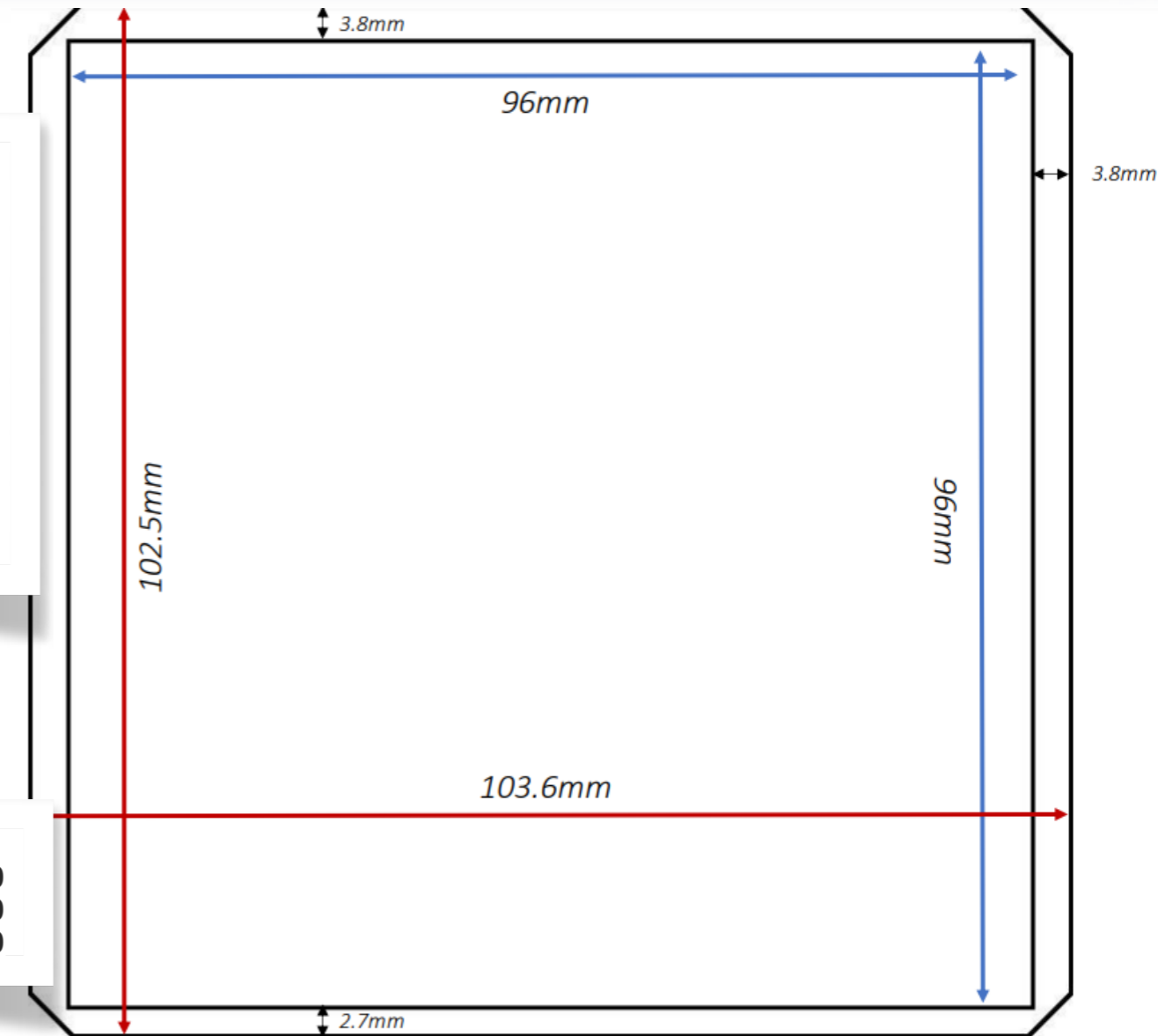
Some issues (i)

```
// -+-+-+-----+-+-+-----+-+-+-----+-+-+-----+-+-+-----
// Parameters of the Sensors
// -+-+-+-----+-+-+-----+-+-+-----+-+-+-----+-+-+-----
. . .
/ MSD
TypeName:      "MSD"
TypeNumber:   1
StripN:       640

Pitch:         0.0150
TotalSizeX:    9.815   TotalSizeY:    9.815   TotalSizeZ:    0.0200
EpiSizeX:      9.600   EpiSizeY:    9.390   EpiSizeZ:      0.0150
EpiOffsetX:    0.1075  EpiOffsetY:  0.2125  EpiOffsetZ:    0.0000
```



```
Pitch:         0.0150
TotalSizeX:    10.360  TotalSizeY:    10.250  TotalSizeZ:    0.0200
EpiSizeX:      9.600   EpiSizeY:     9.600   EpiSizeZ:      0.0150
EpiOffsetX:    0.380   EpiOffsetY:    0.270   EpiOffsetZ:    0.0000
```



- ➔ Wrong dimensions for total/epitaxial sizes (numbers never been updated since March 2020)
- ➔ Is the MSD centred on the epitaxial layer ?

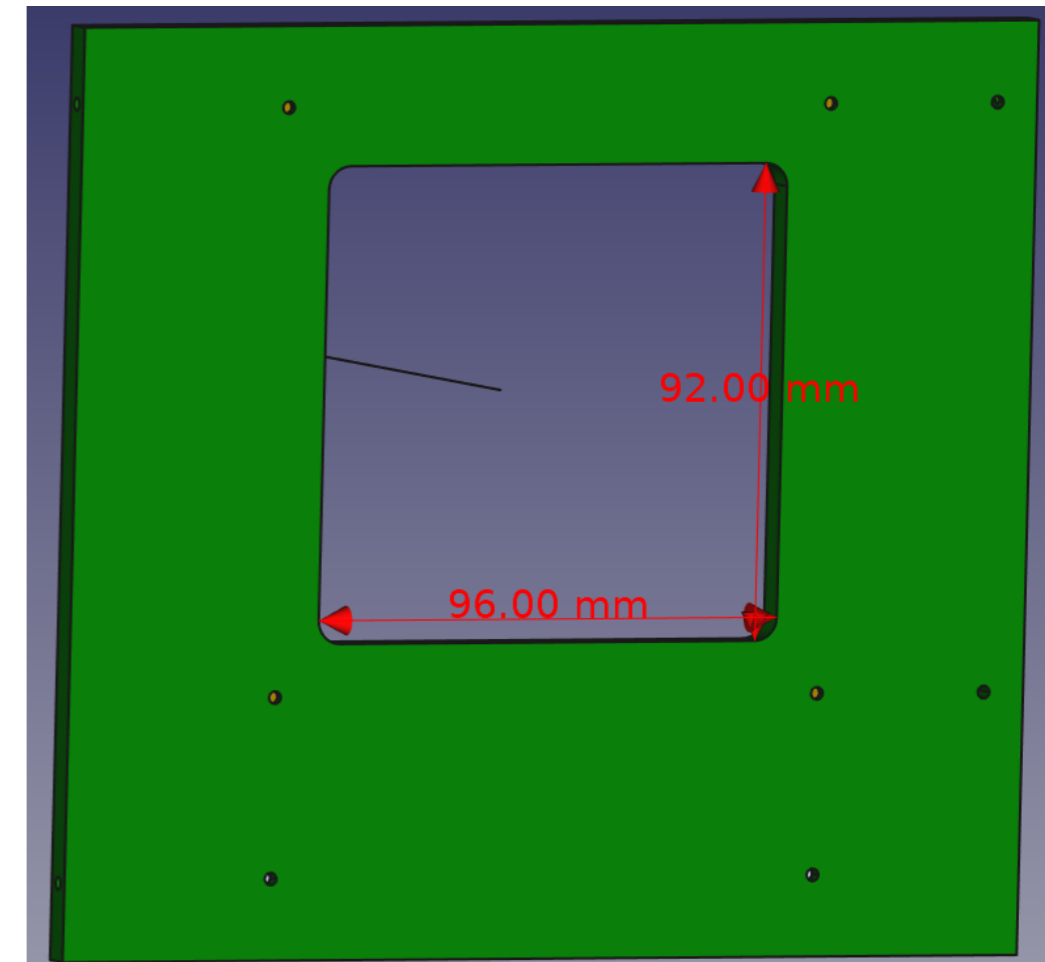
MSD Geometry (iii)

Some issues (ii)

```
// -+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
// Parameters of the Sensors
// -+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
. . .
/ MSD
TypeName:      "MSD"
TypeNumber:    1
StripN:        640

Pitch:         0.0150
TotalSizeX:    10.360  TotalSizeY:  10.250  TotalSizeZ:  0.0200
EpiSizeX:      9.600   EpiSizeY:  9.600   EpiSizeZ:  0.0150
EpiOffsetX:    0.380   EpiOffsetY: 0.270   EpiOffsetZ: 0.0000

. . .
PCBdHoleSizeX: 9.2    PCBdHoleSizeY: 9.6    PCBdHoleSizeZ: 0.16
```

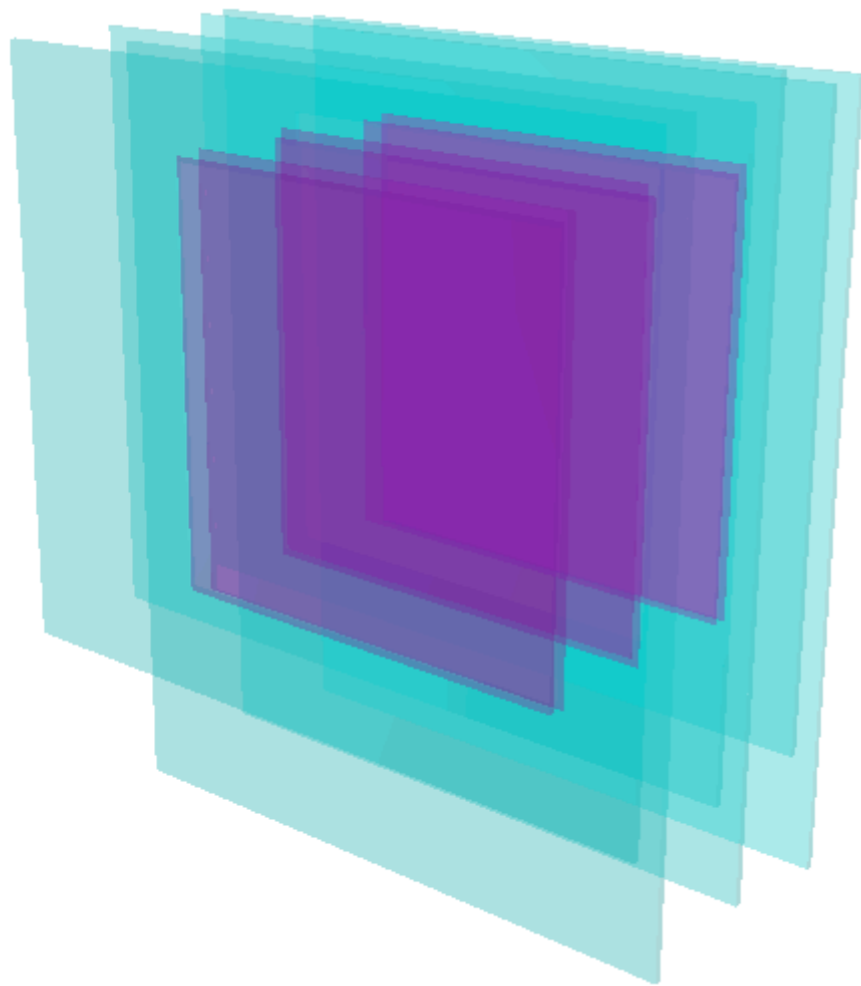


- Confirming the PCB holes < epitaxial layer
- Is active area behind the PCB (offset ?)

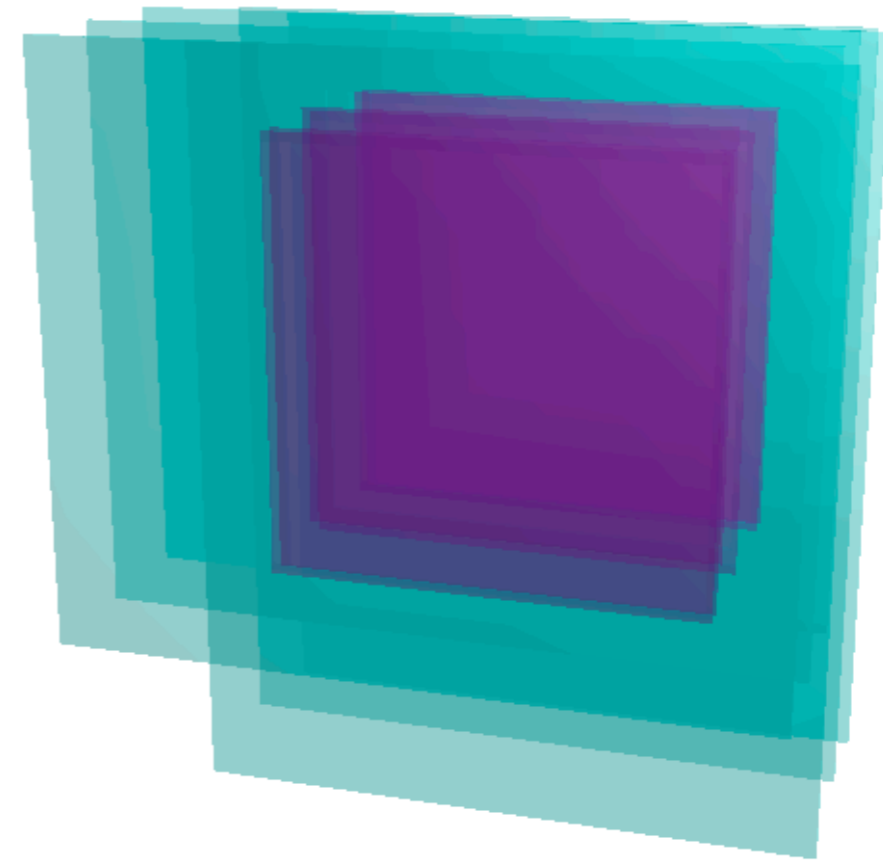
MSD Geometry (iv)

□ Passive elements:

- With frame



- Old values



- New values

➔ No big changes

Conclusions

➔ New geometry class

➔ Issues with MSD

- PCB and epitaxial sizes not good, need to change numbers 🤔
- Hole in PCB too small 🙄

➔ Continuing investigations