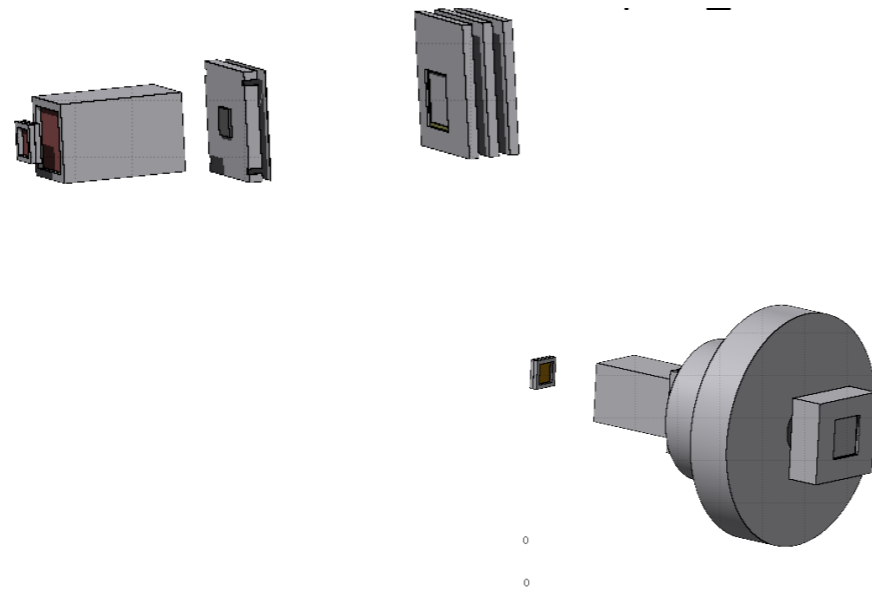


ROOT geometry for FOOT

Introduction

□ Passive material

- MC level done by Giuseppe, Yun and Silvia



□ Different simulation campaigns with passive material

- GSI21PS_MC:
run: 400 (C), 401 (C2H4), 402 (AIR), 200, 201, 202
- HIT22PS_MC:
run: 100, 140, 200, 220
- CNAO22PS_MC:
run: 200 (C), 201 (C2H4)
- CNAO23PS_MC:
run: 200 (C), 201 (C2H4), 202 (AIR)

Root Geometry (i)

□ STC:

- Add support info in file (before hard coded)

```
// -+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
// Parameters of the start counter
// -+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
SizeX:    5.0          SizeY: 5.0          SizeZ: 0.025
Material: "EJ228"
Density:   1.023

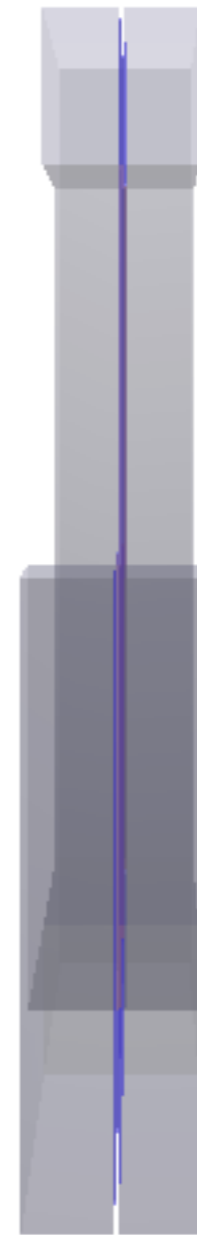
SupportInfo: 1

FrameMat: "Al"
FrameDensity: 2.7
FrameSizeX: 7.0   FrameSizeY: 7.0   FrameSizeZ: 1.0

FoilMat: "Mylar"
FoilDensity: 1.4
FoilThick: 0.001
```

```
class TASTparGeo : public TAGparTools {
. . .
  TGeoVolume*    BuildFrame(const char* frameName = "FrameStc",
                           const char* holeName  = "HoleStc");
. . .
};
```

- ➔ Update all geometry files
- ➔ Update TASTparGeo class for reading



Root Geometry (ii)

□ VTX (i):

- Add support info in file corresponding raw data file

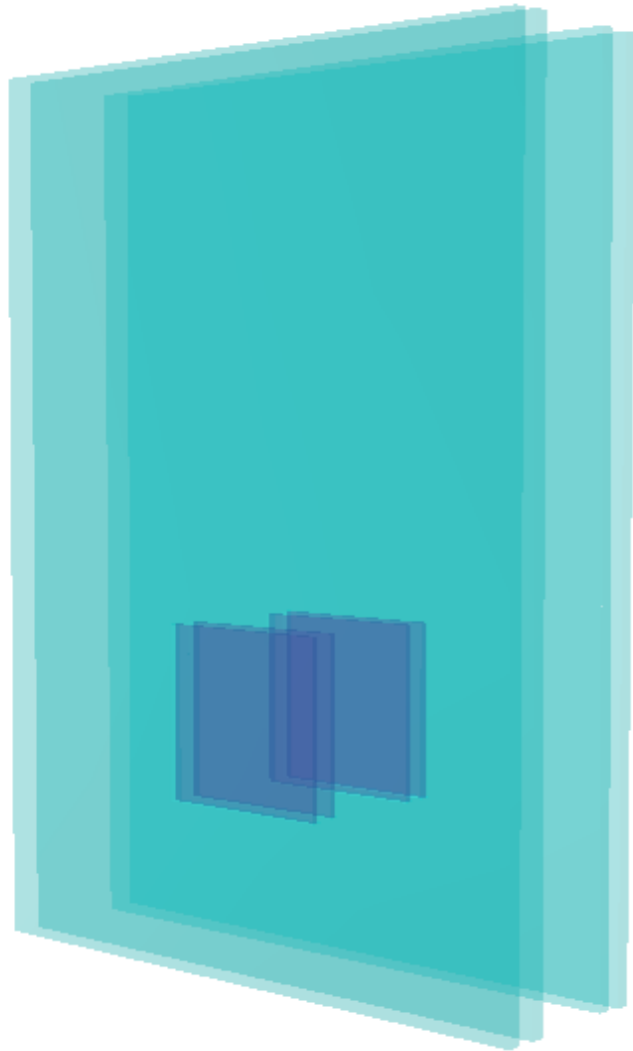
```
class TAVTparGeo : public TAVTbaseParGeo {  
    . . .  
    // Add CMOS board geometry to vertex  
    TGeoVolume* BuildBoard(const char* basemoduleName = "M28pcb", const char* name = "M28hole");  
  
    // Add box vertex to geometry  
    TGeoVolume* BuildBox(const char* boxName = "BoxVtx", const char* holeName = "BoxHole");  
  
    // Build Vertex  
    TGeoVolume* BuildVertex(. . ., Bool_t board = false, Bool_t box = false);  
  
    . . .  
};
```

- ➔ Add new methods in TAVTparGeo class
- ➔ Flag for drawing board(PCB) or/and box

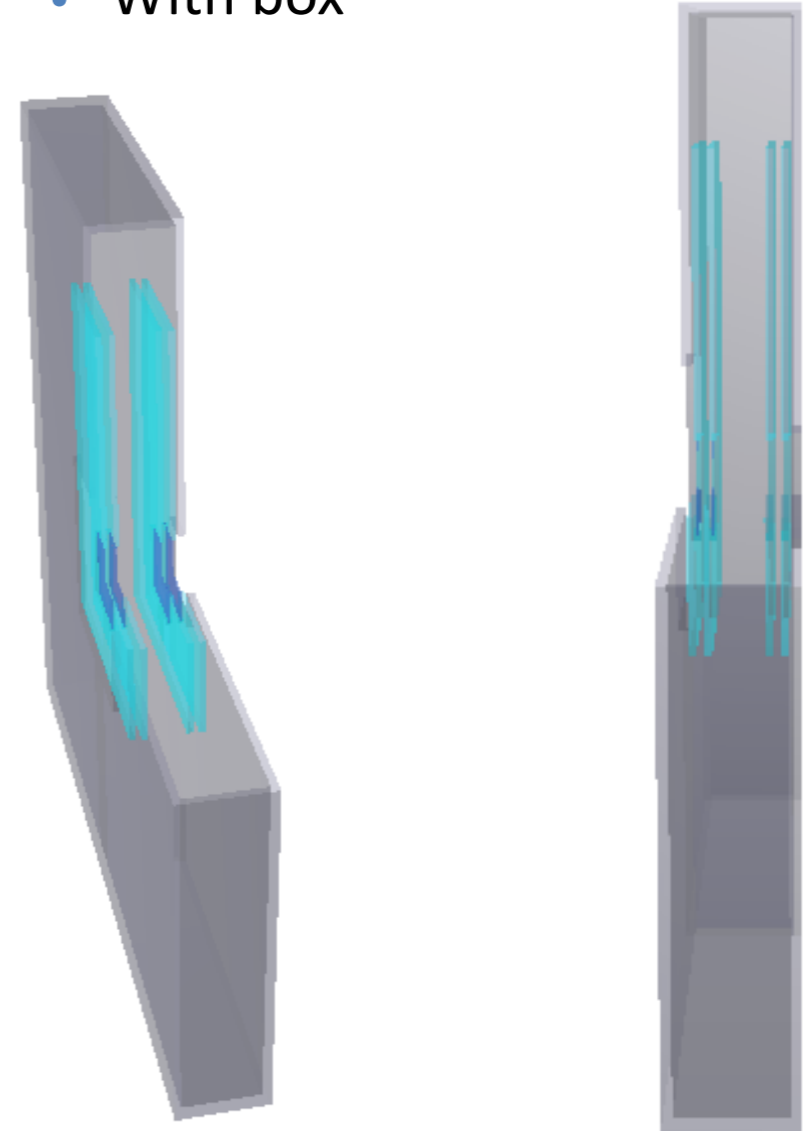
Root Geometry (iii)

□ VTX (ii):

- With PCB board



- With box



- ➔ Only implemented version 3
- ➔ Need to check number (box thickness)

Root Geometry (iii)

□ VTX (iii):

- Geometry file

```

// -+-+-+-----+-----+-----+-----+-----+-----+-----+-----+
// Parameters of the Sensors
// -+-+-+-----+-----+-----+-----+-----+-----+-----+-----+
. . .
BoxMat:      "Al"
BoxDensity:  2.7
Box1SizeX:   19.8  Box1SizeY:   19.8  Box1SizeZ:   2.5
Box2SizeX:   19.8  Box2SizeY:   19.8  Box2SizeZ:   0.2
BoxOffX:     0.0   BoxOffY:     0.0   BoxOffZ:     0.0
BoxHole1X:   2.2   BoxHole1Y:   2.2   BoxHole1Z:   0.3
BoxHole2X:   5.0   BoxHole2Y:   5.0   BoxHole2Z:   0.2
. . .

```



➔ Should add here position (orientation) of box

Root Geometry (iv)

□ MSD (i):

- Add for PCB mixture, densities/proportions for Epoxy/Eg mixture

➔ Hard coded in class, cleanup class

```
// -+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
// Parameters of the Sensors
// -+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
. . .
PCBoardThickness: 0.16
PCBoardMat: "Epoxy/Eg"
PcbBoardDensities: "2.61/1.19"
PcbBoardProp: "0.6/0.4"
PCBoardDensity: 1.85
. . .
```

```
class TAMSDparGeo : public TAVTbaseParGeo {
. . .

// Add board geometry to MSD
TGeoVolume* BuildBoard(const char* basemoduleName = "PCB",
const char* name = "PCBhole");

// Add box MSD to geometry
TGeoVolume* BuildBox(const char* boxName = "BoxMsd",
const char* holeName = "BoxHole");

//! Build MSD
TGeoVolume* BuildMicroStripDetector(. . . Bool_t board = false, Bool_t box = false);
};
```

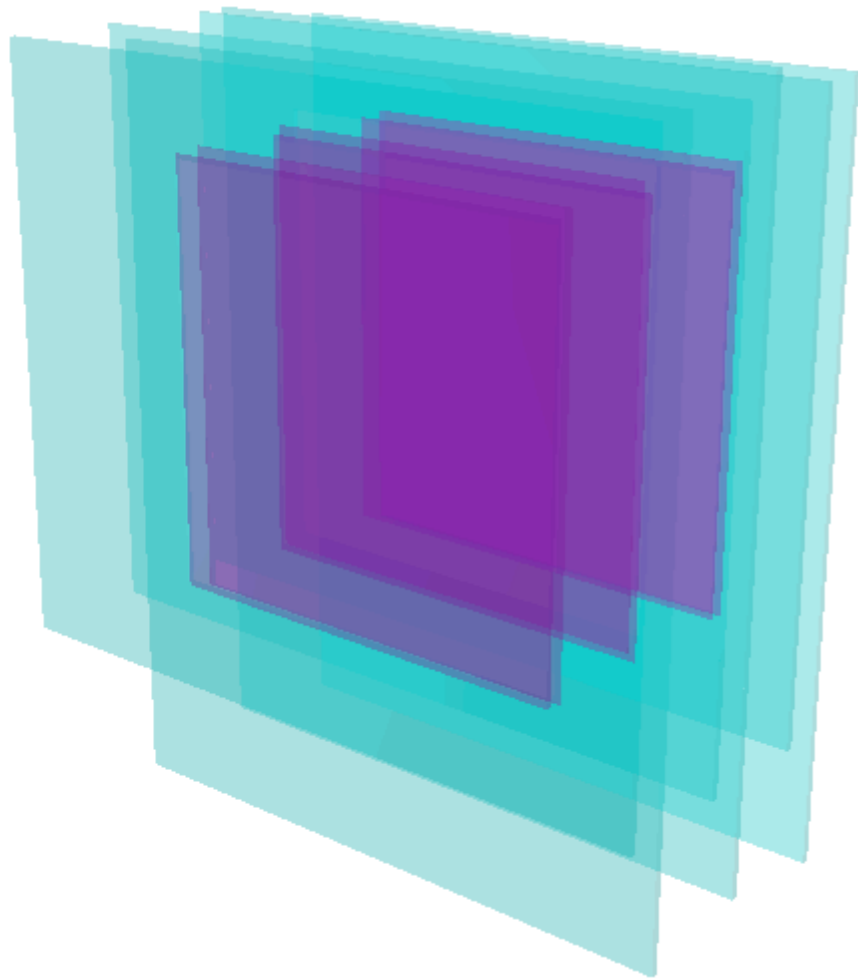
➔ Update all geometry files

➔ Update TAMSDparGeo class for reading

Root Geometry (v)

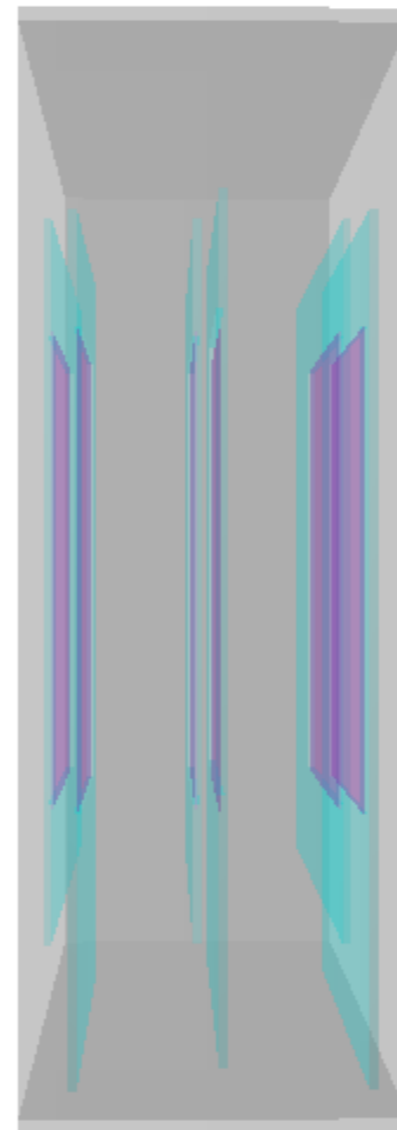
□ MSD (iii):

- With frame



→ Need some checks

- With box



- Version 3



- Version 1-2

Root Geometry (vi)

□ MSD (iv):

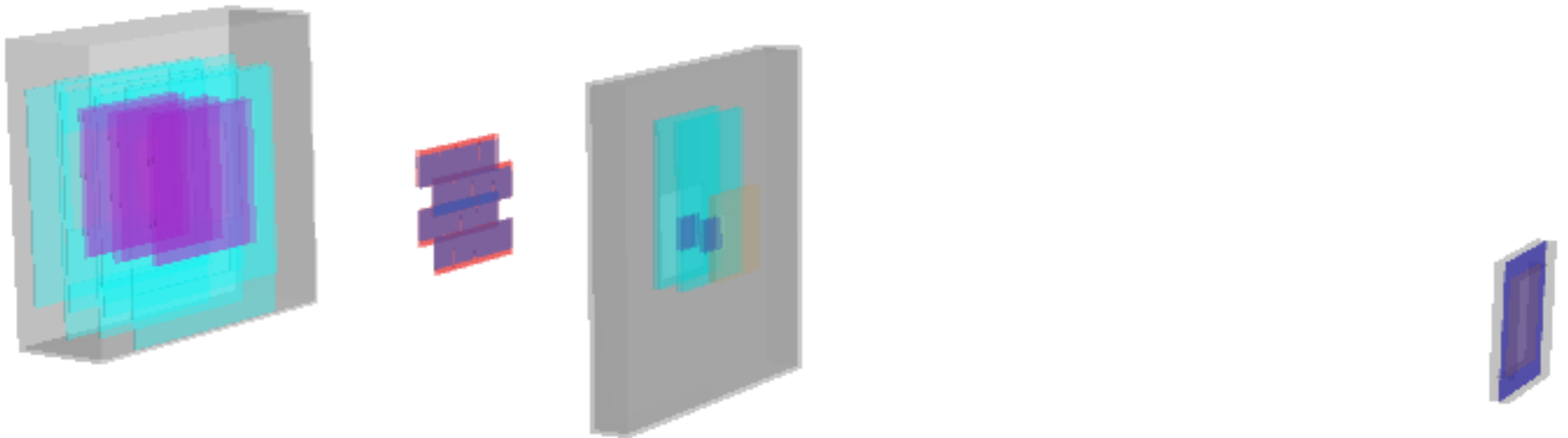
- Some issues

```
// -+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
// 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
. . .
PCBdHoleSizeX:  9.2    PCBdHoleSizeY: 9.6    PCBdHoleSizeZ: 0.16
. . .
BoxMat:        "Al"
BoxDensity:    2.7
BoxOutSizeX:   21.0   BoxOutSizeY:   19.50   BoxOutSizeZ:   8.2
BoxInSizeX:    20.6   BoxInSizeY:    19.10   BoxInSizeZ:    6.8
BoxOffX:       0.0    BoxOffY:       -0.25   BoxOffZ:       0.0
BoxHoleSizeX:  9.2   BoxHoleSizeY: 9.6   BoxHoleSizeZ: 0.70
BoxHoleOffX:   0.2    BoxHoleOffY:   0.0    BoxHoleOffZ:   0.0
```

➔ Pb with holes dimension X-Y inversion and too small

Root Geometry (vii)

□ Interaction region:



➔ Add a flag to draw passive material for geometry

Conclusions

- ➔ Implemented passive material
 - STC: frame
 - VTX: PCB+Box (version 3, some checks needed)
 - MSD: PCB+Box (version 1-3, some issues)
- ➔ Cleaning classes, fixing some volume names conflicts
- ➔ Discovered that GF creates by default the geometry (collides with event display)
(Add new interface to be used by GF avoid doubling geometries)
- ➔ Continuing implementation