IST Sti Geometry

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- Minor updates for StiIstDetectorBuilder
- Test of Sti IST geometry

Minor updates on Sti IST geometry

1. A variable (bool type) added for StiIstDetectorBuilder to switch between the IST ideal geometry and survey geometry.

```
public:

   StiIstDetectorBuilder(bool active, const string &inputFile, bool buildIdealGeom=false);
   virtual void buildDetectors(StMaker &source);
   virtual void useVMCGeometry();

protected:

   StiMaterial  *mSiMaterial;
   StiMaterial  *mHybridMaterial;
   StIstDbMaker *mIstDb;
   bool         mBuildIdealGeom;
```

StiIstDetectorBuilder.h

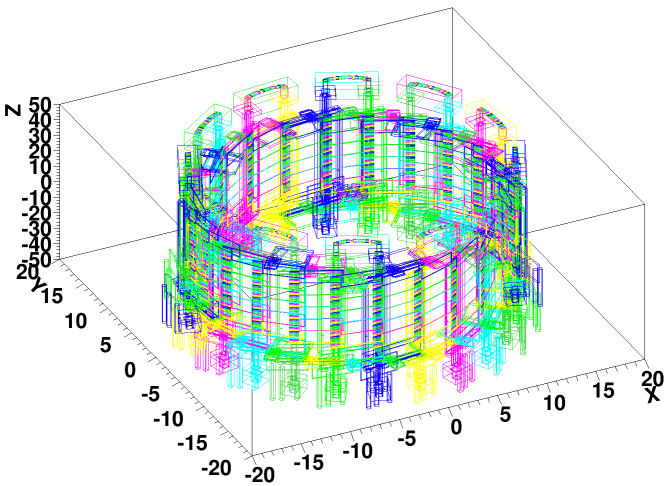
```
TGeoHMatrix *combI = 0;
if(!mBuildIdealGeom)
       combI = (TGeoHMatrix*) istRot->FindObject(Form("R%04i", matIst));
else
       combI = gGeoManager->GetCurrentMatrix();

if (combI) {
   combI->Print();
} else {
   Error("useVMCGeometry()", "Could not find TGeoHMatrix for sensor %d in database", matIst);
   continue;
}
```

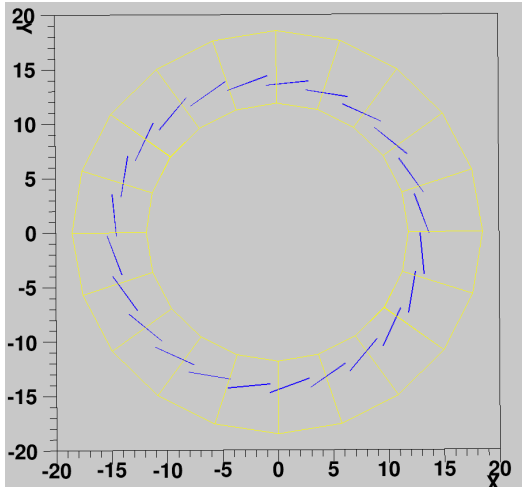
StiIstDetectorBuilder.cxx

2. Adjust the tube volume dimensions:
half depth: 60.09 cm (identical to the IBMO tube depth defined in GEANT, which includes the length of cooling lines on west/east side).
Z-center: -4.5 cm (6 sensors per IST stave are not placed symmetrically w.r.t the stave center)

Sti IST geometry test

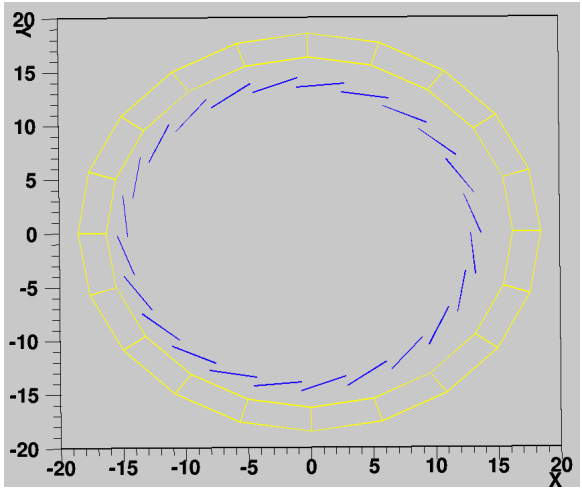


Sti geometry from TGeo



Simplified Sti geometry

Tube volume: same as IBMO

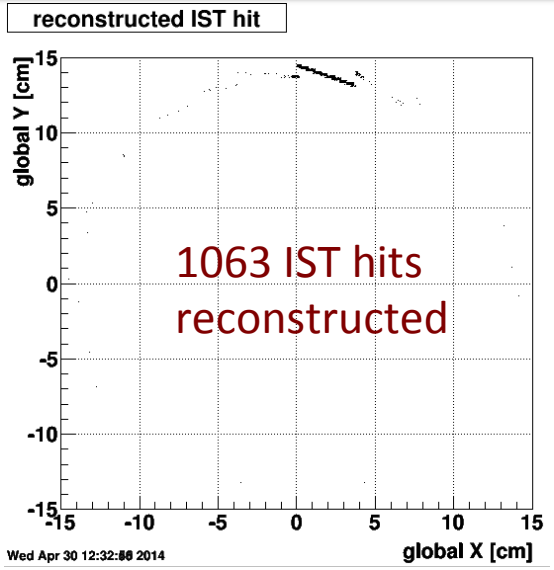


Simplified thin Sti geometry

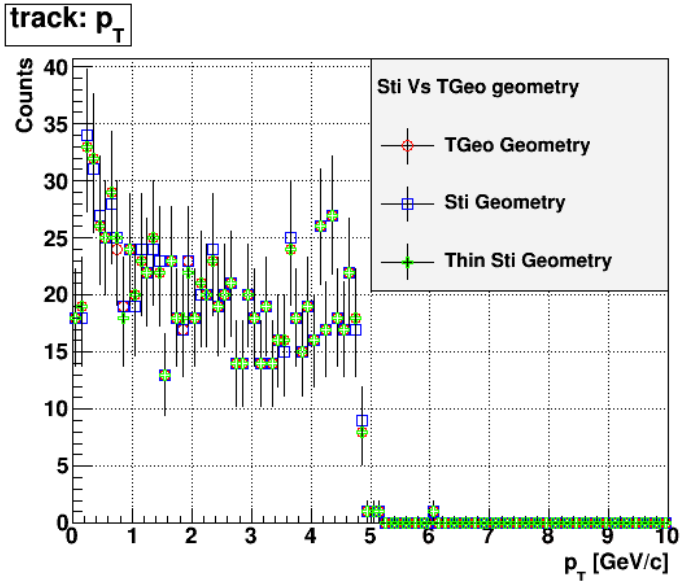
Tube volume: 1/3 thickness of IBMO

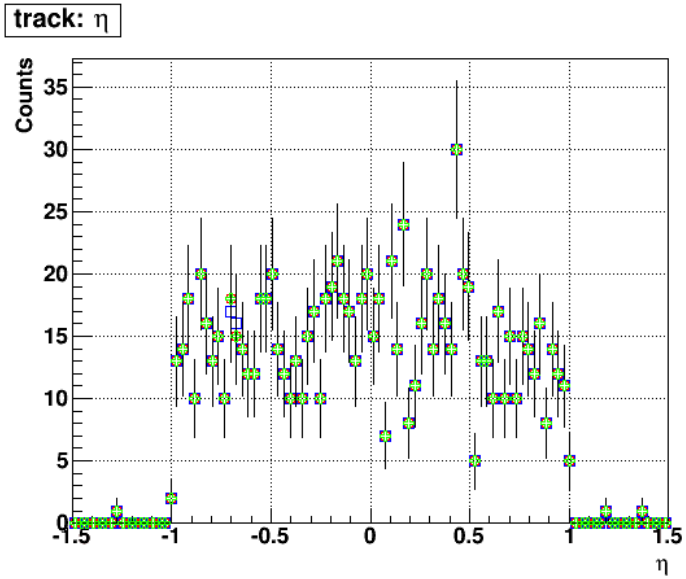
```
detp geom y2014
gexec $STAR_LIB/xgeometry.so
make sim/gstar
gclose all
gfile o 1pion_1000evts_pt0.5to5.fz
user/vxyz 0.001 0.001 0.01
user/vsig 0.01 5
aguser/gkine 1 8 0.2 5.0 -1.0 1.0 1.3 1.6
trig 1000
```

```
root4star -b -q 'bfc.C(1,1000,"tpcRS y2014 AgML MakeEvent ITTF VFMCE -pxlFastSim -pxlDb -PixelIt -StiPxl IstIT istDb istFastSim NoSsdIt StiIst NoSvtIt Idst BAna l0 Tree logger Sti tpcDB TpcHitMover TpxClu bbcSim btofsim tags emcY2 EEfs evout -dstout IdTruth geantout big fzin MiniMcMk clearmem","1pion_1000evts_pt0.2to5.fz")'
```

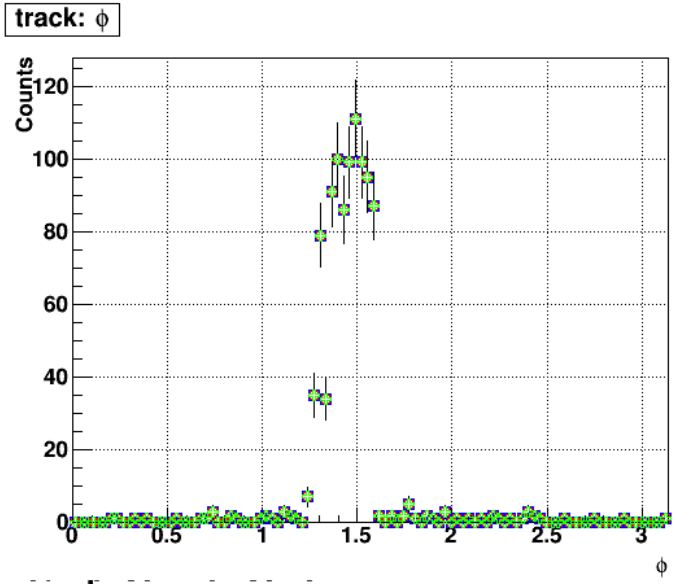


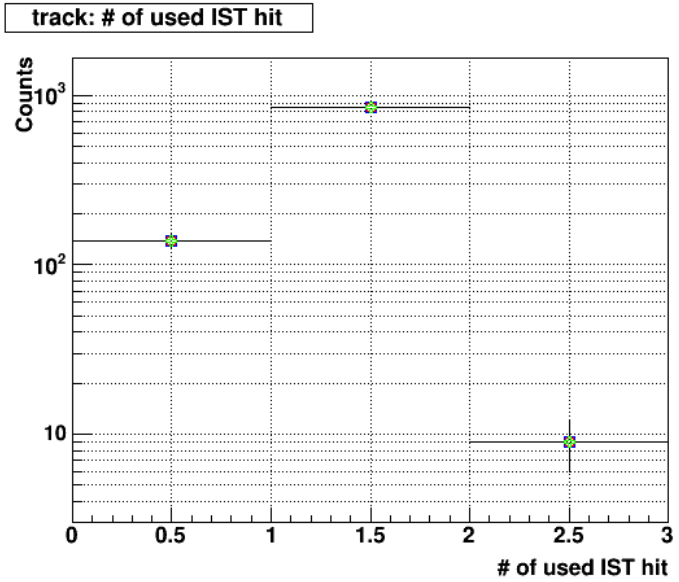
Sti IST geometry test





Minor difference found on track pT distribution while using the simplified tube volume with the identical thickness of IBMO volume.





To do:

1. Add inactive material to the inside of IST and validate material budget
2. Use the tube volume to describe IST inactive geometry?