

Status of Detector Description

SPD collaboration meeting

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26.04.2023

- Flexibility;
- Ability for description of complicated geometry;
- Geometry version;
- Possibility of using the same geometry description in simulation (Geant4) and reconstruction.

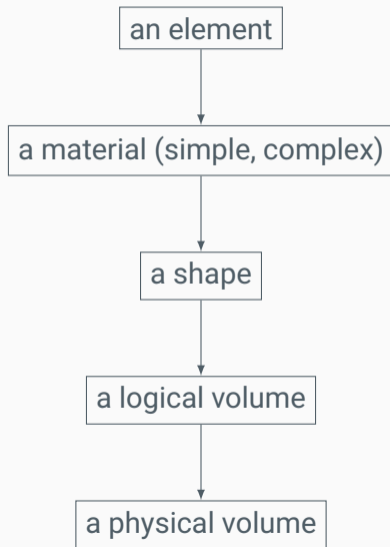
GeoModel (<https://gitlab.cern.ch/GeoModelDev/GeoModel>)

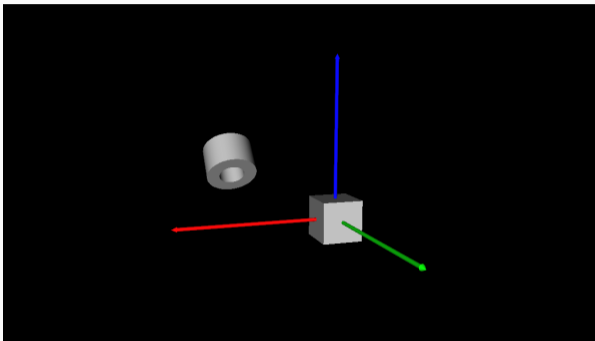
GeoModel has been used by the ATLAS experiment since 2004.

A toolkit meets all requirements for SPD geometry description.

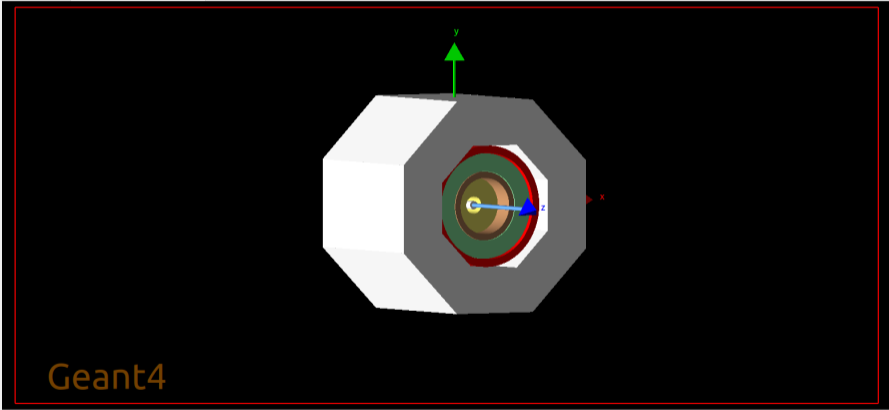
It doesn't contain magnetic field' description tools.

Documentation is available at <https://geomodel.web.cern.ch/home/>





```
GeoAlignableTransform *transform = new GeoAlignableTransform(  
GeoTrf::RotateX3D(45.0*degree)*GeoTrf::Translate3D(25*cm, 5*cm, 15*cm));  
world→ add(transform);  
world→ add(tubePhys);  
world→ add(cubePhys);
```



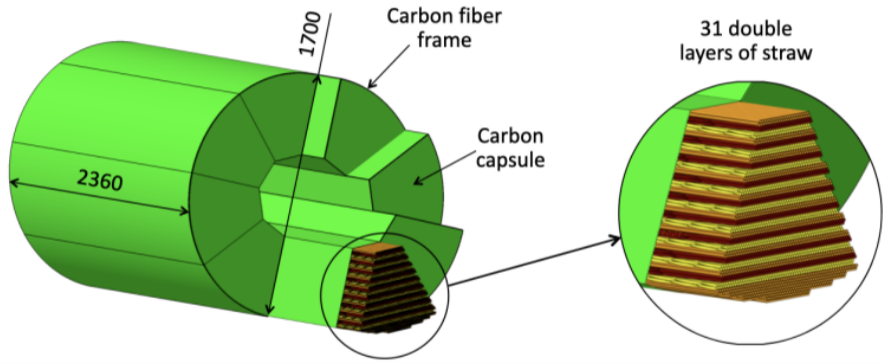


Figure: General layout of the barrel part of ST, which shows 8 modules (octants).

`GeoTrf::TranslateX3D((0.5+l)*pitch), pitch = stdiam/cos(alpha*deg)`

`GeoTrf::TranslateY3D(stdiam*((ln-
fabs(sin(90*ln*deg)))+(ln+fabs(sin(90*ln*deg)))*sin(60*deg)))`

`GeoTrf::RotateY3D(alpha*deg)`

`GeoTrf::TranslateZ3D(stlength-stlengthv)`

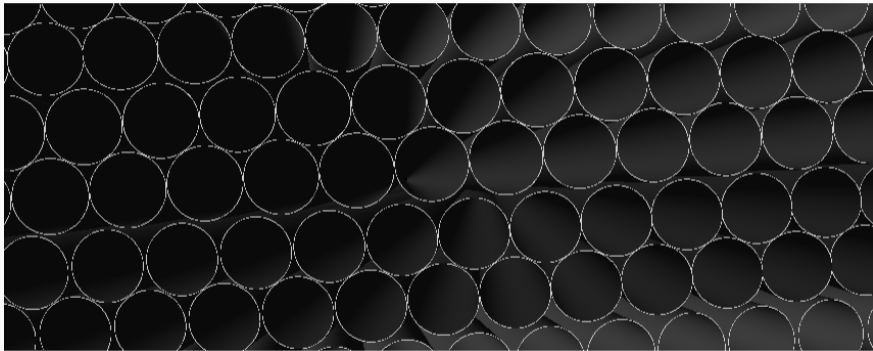


Figure: Straw tubes.

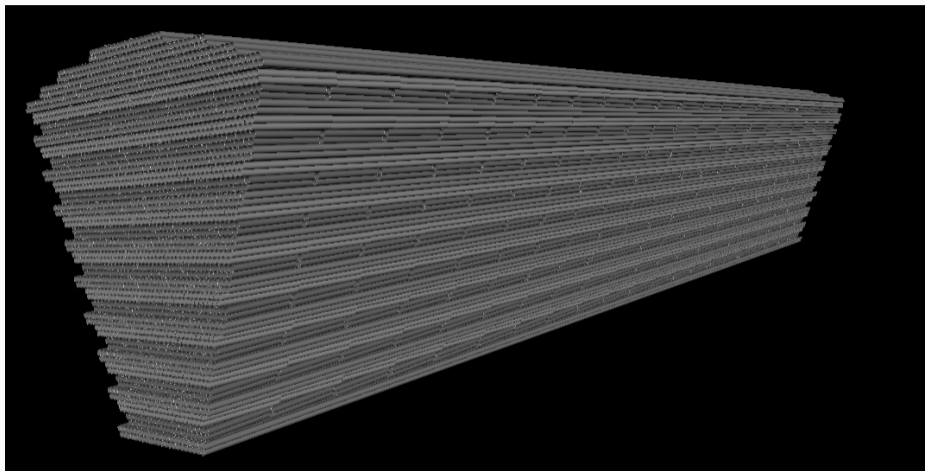


Figure: One module (octant) of the barrel part of the straw tracker.

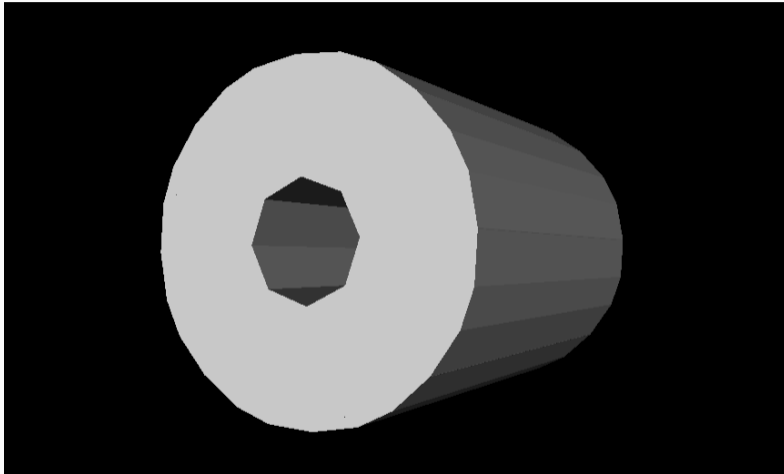


Figure: The barrel part of the straw tracker.

End-cap part of ST

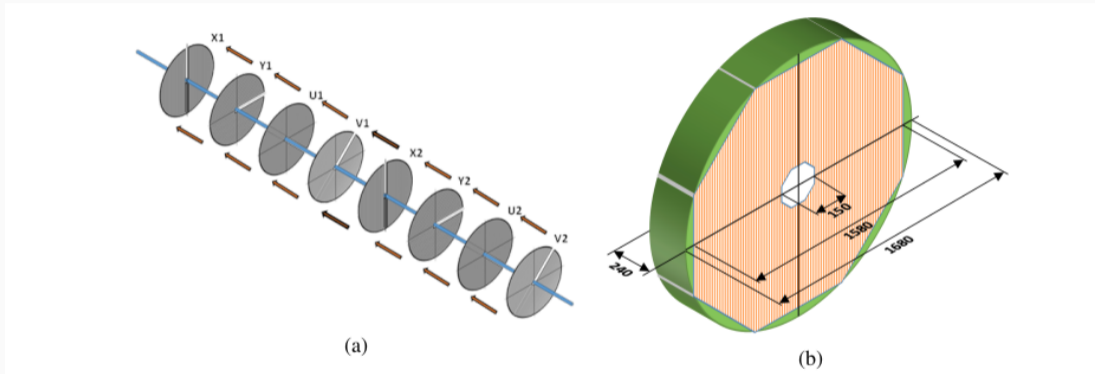


Figure: (a) ST end-cap consisting of 8 coordinate planes assembled together. (b) Common view and main dimensions.

GeoTrf::TranslateX3D((0.5+l)*pitch), pitch = stdiam/cos(alpha*deg)

GeoTrf::TranslateY3D(stdiam*((ln-
fabs(sin(90*ln*deg)))+(ln+fabs(sin(90*ln*deg)))*sin(60*deg)))

GeoTrf::RotateY3D(alpha*deg)

GeoTrf::TranslateZ3D(stlength-stlengthv)

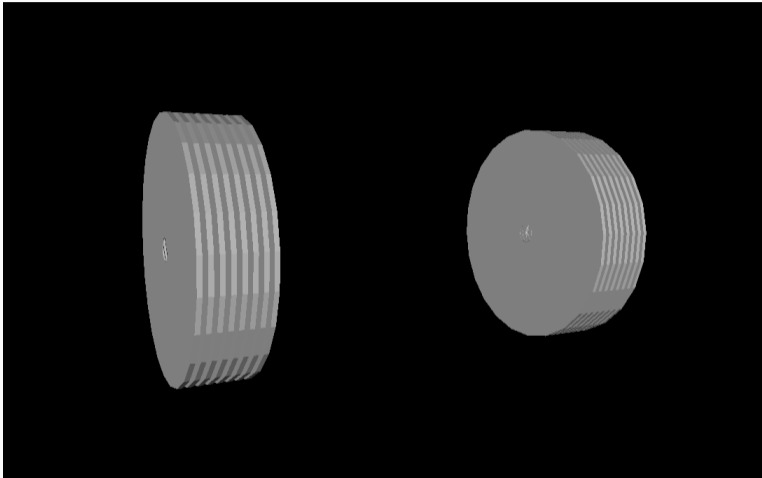


Figure: The end-cap part of the straw tracker.

Volume data collection and storage is provided by the class `ST_ID`.
Data access and output is provided by the class `ST_Manager`.

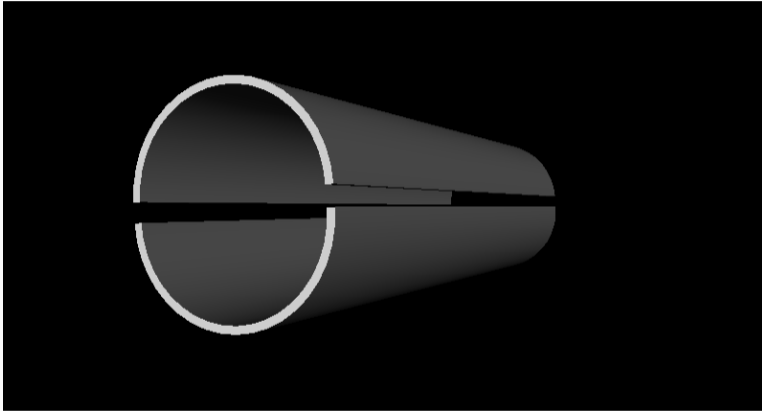


Figure: The 1 layer of MCT.

- Current TDR is not enough for detailed SPD geometry description;
- Necessity of naming convention. We need in common language. Its absence will complicate the interaction between us and hardware in future.

- Fixing of technical problems;
- Association with sensitive volumes of Geant4;
- Description of the inner structure of other detector subsystems.