

Status of Detector Description

VI SPD collaboration meeting

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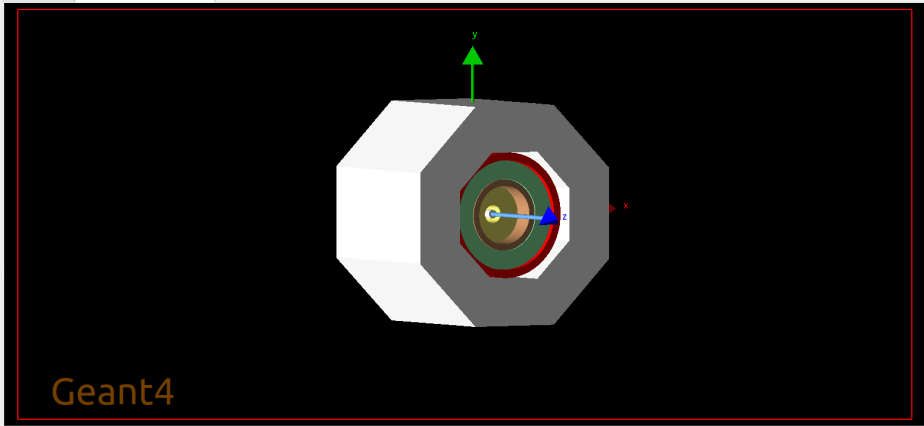


Figure: SPD geometry description on subsystems' level

- One of the requirements for SPD geometry description is possibility of using the same geometry description in simulation (Geant4) and reconstruction.
- Navigation among geometry objects in simulation. → Using Geant4 tools;
- Navigation among geometry objects in **reconstruction**. → **There are no ready-made tools. Need to be developed;**
- Navigation system:
 - creating of identifier for each detector element;
 - providing access to data via identifier.

- Int (32 bit);
- 4 bits: subsystem id;
- 2 bits: barrel/forward end cap/backward end cap;
- 26 bits: subsystem inner structure' information.

- **Naming convention is necessary** to code basic geometry properties.
- It plays **essential role** not only in the detector description, but also in offline software, DAQ and hardware.
- **Naming convention is our common language.** It will provide more convenient and faster interaction within the collaboration.

- **Subsystem identifiers:**
 - Beam pipe and BBC MCP detector id = 0;
 - Zero Degree Calorimeter id = 1;
 - Micromegas-based Central Tracker id = 2;
 - Silicon Vertex Detector id = 3;
 - Beam-Beam Counter id = 4;
 - Straw Tracker id = 5;
 - ...
 - Range(muon) System id = 10;
- **Barrel id = 0;**
- **Forward end cap id = 1;**
- **Backward end cap id = 2.**

Example: straw tracker barrel

- 7 bits: tube number;
- 2 bits: angle (U,V,Z);
- 6 bits: layer number;
- 3 bits: octant number;
- 2 bits: barrel id;
- 4 bits: straw tracker subsystem id.

reserved	tube number	angle (U,V,Z)	layer number	octant number	barrel id	subsystem id
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- **creating of unique identifier:**

```
ST_ID * STBarrelID = new ST_ID();
```

```
int id = 0;
```

```
id = STBarrelID→ createST_BarID(SubSystemID, BarrelID, OctantNum, LayerNum,  
Angle, STNumber);
```

- **adding id into detector description:**

```
GeolIdentifierTag * ID = new GeolIdentifierTag(id);
```

```
octant→ add(ID);
```

```
octant→ add(stphysvol);
```

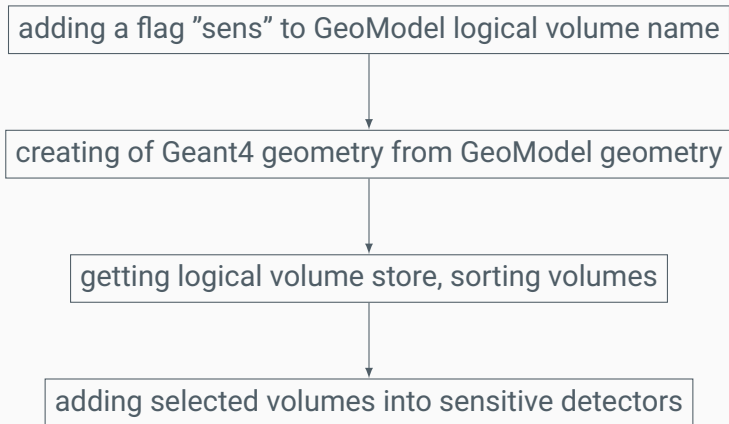


```
int volumeid = 67852;  
std::string path = "/path to db/name.db";  
IDManager * dbmanager = new IDManager(path);  
dbmanager->printVolume_info(volumeid);
```

```
Database has been opened successfully!  
ID is founded!  
Printing info from: 67852.  
Volume with ID: 67852 is on straw tracker in barrel in octant # 4 in layer # 4 with angle = -5 with tube number = 0
```

It is possible to get information about straw tube's radius, center position, length, etc.
Please inform me by email which geometrical parameters you need.

- The detector contains a large number of elements. Some of which are necessary to support the facility.
- Sensitive detector is used to distinguish detecting elements from others. It is a way to declare a geometric element sensitive to the passage of particles.
- GeoModel hasn't tools to such type declaration. → Need to be developed.



- Development of methods that produce the necessary geometric parameters;
- Association with sensitive volumes of Geant4;
- Electromagnetic calorimeter inner structure description.

Thank you for your attention!