Hands-On Session 2

Code without Solution: hands-on-2.tar.gz

Code with Solution: hands-on-2-solution.tar.gz

Update login script

To get the environment automatically called when a new terminal is opened, you can add the following to your login script ${HOME}/.bashrc or ${HOME}/.bash_profile

```
# Geant4 environment
test -r /opt/geant4.10.02.p02/bin/geant4.sh && . /opt/geant4.10.02.p02/bin/geant4.sh
```

Exercise 2

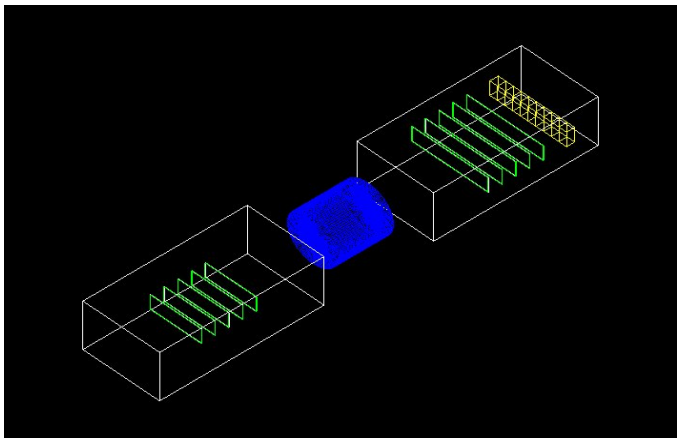

Figure 1: Geometry which will be implemented in this session

- Inspect the code of the implemented geometry and modify materials to correspond to the geometry description below. The code already present describes the geometry of the first arm detector.
  - Identify the code used for printing all materials.
- Implement geometry of a second arm described below.
  - Get inspired by the code already present
  - ***Proceed step by step. After adding each piece of geometry, recompile and test your application with visualization***
  - Note that the Second Arm detector has similar components as the First Arm detector

Explore implemented geometry:

- Add visualization attributes for added volumes in vis.mac macro

- Add axes on your scene to check your geometry
- Check your geometry with geometry tree browser and with tracking geantinos with tracking verbose level=1
- Add the run and event number in the viewer (use User Interface online help)

Geometry already implemented:

- Material Air defined using NIST manager
- World volume
  - represented as a box of hx=10.*m, hy=3.*m, hz=10.*m of Air material
- Tube volume
  - of a tube shape with rmin = 0.*m, rmax=1.*m, hz=1.*m of Air material
- First arm detector:
  - represented as a box of hx=1.5*m, hy=1.0*m, hz=3.0*m of Air material
  - placed in -5.*m in zdirection (in front of Tube (in blue colour))
  - including:
    1. 5 Drift chambers (in green colour)
       - of a box shape with hx=1.*m, hy=30.*cm, hz=1.*cm of Argon gas material
       - placed along zaxis with a distance of 0.5*m from each other with the middle one in the center of the parent volume
    2. Wire plane
       - of a box shape with hx=1.*m, hy=30.*cm, hz=0.1*mm of Copper material
       - placed inside each drift chamber in its center

Geometry to be implemented

- Add following materials (using NIST manager) and update materials in First Arm detector
  1. Argon gas (G4_AR)
  2. CsI (G4_CESIUM_IODIDE)
  3. Copper (G4_Cu)
- Second arm detector
  - represented as a box of hx=1.5*m, hy=1.*m, hz=3.*m of Air material
  - placed in 5.*m in z-direction (behind Tube (in blue color)).
  - Including:

1. 5 Drift chambers (in green color)
   * of a box shape with hx=1.5*m, hy=30.*cm, hz=1.*cm of Argon gas material
   * placed along z-axis with a distance of 0.5*m from each other with the middle one in the center of the parent volume.
2. Wire plane
   * of a box shape with hx=1.5*m, hy=30.*cm, hz=0.1*mm of Copper material
   * placed inside each drift chamber in its center
3. EM calorimeter (in yellow color)
   * of a box shape with hx=1.5*m, hy=30.*cm, hz=15.*cm of CsI material
   * placed at 2*m in z-direction from the center of its parent volume (Second Arm Detector).
4. Fill the EM calorimeter with 15*cm layers along x-direction of the same material (CsI)