

# INSTRUCTION SHEET FOR HANDSON SESSION

## (22<sup>nd</sup> December, 2019)

**Some basis linux command that will be helpful during the Handson session.**

- 1) Create a directory: **mkdir <directory name>**
- 2) Change directory : **cd <directory name>**
- 3) Deleting a directory : **rm -rf <directory name>**
- 4) Deleting a file : **rm <file name>**
- 5) Renaming a file : **mv <old filename> <new filename>**
- 6) Go directly to home directory : **cd**
- 7) To see the current working directory : **pwd**
- 8) To see the list of files in a directory : **ls**
- 9) To see the list of files according to the time of creation and some more information : **ls -ltr**
- 10) To go to the parent directory : **cd ..**
- 11) To clear the screen : **clear**

### **Softwares that will be used during Handson session**

- 1) Any linux distribution (Ubuntu)
- 2) Simulation Software (Geant4)
- 3) Analysis Software (ROOT)
- 4) Build system used to compile the code (Cmake)

### **Commands to compile the Geant4 Simulation Code**

- 1) Unzip the code **orientationSympnp2019.tar.gz**  
**tar -zxvf orientationSympnp2019.tar.gz**
- 2) Go inside the unzipped directory orientationSympnp2019  
**cd orientationSympnp2019**
- 3) Create a directory t(say build) o compile the code  
**mkdir build**  
**cd build**
- 4) Run the cmake command  
**cmake ..**
- 5) Run the make command. This will actually compile your code  
**make -j2**
- 6) Run the code by specifying macro file

`./main sympnp.mac`

## Visualize the Generated Output

The output are stored in ROOT file, the file contains two histogram and a scatter plot

1) **First Histogram** : 1D Histogram of scattering angle (milliradians) and of injected muon

2) **Second Histogram** : 2D Histogram of XY coordinate of reconstructed PoCA point

This will give first of reconstruction

3) **Scatter Plot** : That actually plot the XY coordinate of reconstructed PoCA point and give the idea of actual shape of scatterer under test.

To visualize these histogram and plot use following steps

1) Goto the ROOT prompt from the build directory and link the generated **data.root** file

**root -l data.root**

2) Create an object of ROOT browser

**new TBrowser**

3) Now explore the ROOT file

## Playing with the code

1) Try to modify the simulation geometry code and create the scatterers of different shapes and sizes like Cube, Cuboid, Solid Sphere, Hollow Tube, Section of a tube etc.

2) Try to increase or decrease the number of simulated events to see its effect on reconstructed shape.

3) Explore various options available in ROOT browser to visualize the histograms in different ways