



Geant4 on Param Vikram-1000 HPC

[Geant4](#) is a toolkit for simulations of radiation with matter that is widely used in areas such as high energy physics, high energy astrophysics, and space sciences. Geant4 version 10.7.4 is now available on PRL Param Vikram-1000 HPC. This note briefs on how to compile and execute your Geant4 programs on PRL HPC.

[A] Compiling and executing Geant4 application using Master Node

- (a) To compile your Geant4 application program, cmake is required, which is installed as a module. To load Cmake, use the command:

```
module add cmake
```

- (b) In order to set the environment variables required for Geant4, execute the Geant4 initialization script, which is aliased as g41007init. Execute it by typing in terminal:

```
g41007init
```

Now, all required modules are available in the current session. If you want the configuration to persist, the above two commands can be added to your bashrc.

- (c) To compile your program, follow the usual procedure as given in Geant4 user guide. While running CMake, set the DGeant4_DIR parameter to point to Geant4 installation directory on HPC as:

```
cmake -DGeant4_DIR=/opt/ohpc/pub/utils/Geant/geant4-v10.7.4-install/lib64/Geant4-10.7.4/  
pathToSourceCode
```

After compiling the program, the binary can be executed by submitting it as a job with slurm script as done for any user program on HPC.

[B] Visualization of Geant4 application

- (a) For the purpose of visualizing the geometry, Geant4 is also set up on the visualization node of the PRL HPC. For this, first login to the visualization node of HPC by ssh:

```
ssh -X username@172.16.23.254
```

- (b) Initialize Geant4 as: **g41007init**

- (c) Note that the installation directory of Geant4 with visualization is different from that used in the master node of HPC. Thus, to execute your Geant4 application with visualization, it needs to be compiled again in the visualization node as:

```
cmake3 -DGeant4_DIR=/opt/geant4-v10.7.4/lib64/Geant4-10.7.4 pathToSourceCode
```

Important: Note that **cmake3** should be used instead of **cmake** on the visualization node. After completing the compilation, one can execute their Geant4 application in interactive mode which will open the visualization window.