

# Geant4 Installation

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# Installation process

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- 1) Check that you meet all the requirements**
- 2) Download Geant4 source code**
- 3) Configure the build using CMake**
- 4) Make & install**
- 5) Configure your environment to use Geant4**

# ① Supported platforms & requirements

- **Operating system**
  - “recent” Linux (e.g. CentOS 7), best support
  - macOS 10.10+
  - Windows 7+ (limited support, not recommended)
- **Compilers**
  - C++11 compliance
  - such as GCC 4.8.5+, clang 3.6+, Visual C++ 14.0 (2015)
- **CMake** (configuration generation tool) 3.3+
- **System libraries** (as development packages):
  - expat, xerces-c

Virtual Machine:  
CentOS 7 with gcc 4.8.5

These may or may not be necessary. Just keep this in mind when compilation fails.

# CMake installation (if not provided)

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- Depending on the OS installation, CMake may not be installed by default. In that case you have to install it:
  - **Linux**: it is recommended to use the CMake provided by the package management system of your distribution.

If version 3.3+ is not available:

1. [download](http://www.cmake.org/) the latest version (<http://www.cmake.org/>)
  2. [unzip](#) the tar-ball
  3. [\*\*./bootstrap, make, make install\*\*](#)
- **macOS**: install it using the Darwin64 [dmg installerpackage](#)
  - **Windows**: install it using the Win64/32 [exe installerpackage](#)

**Note:** You may also want to install [ccmake](#) and/or [cmake-gui](#) tools for user-friendly configuration

# Optional libraries

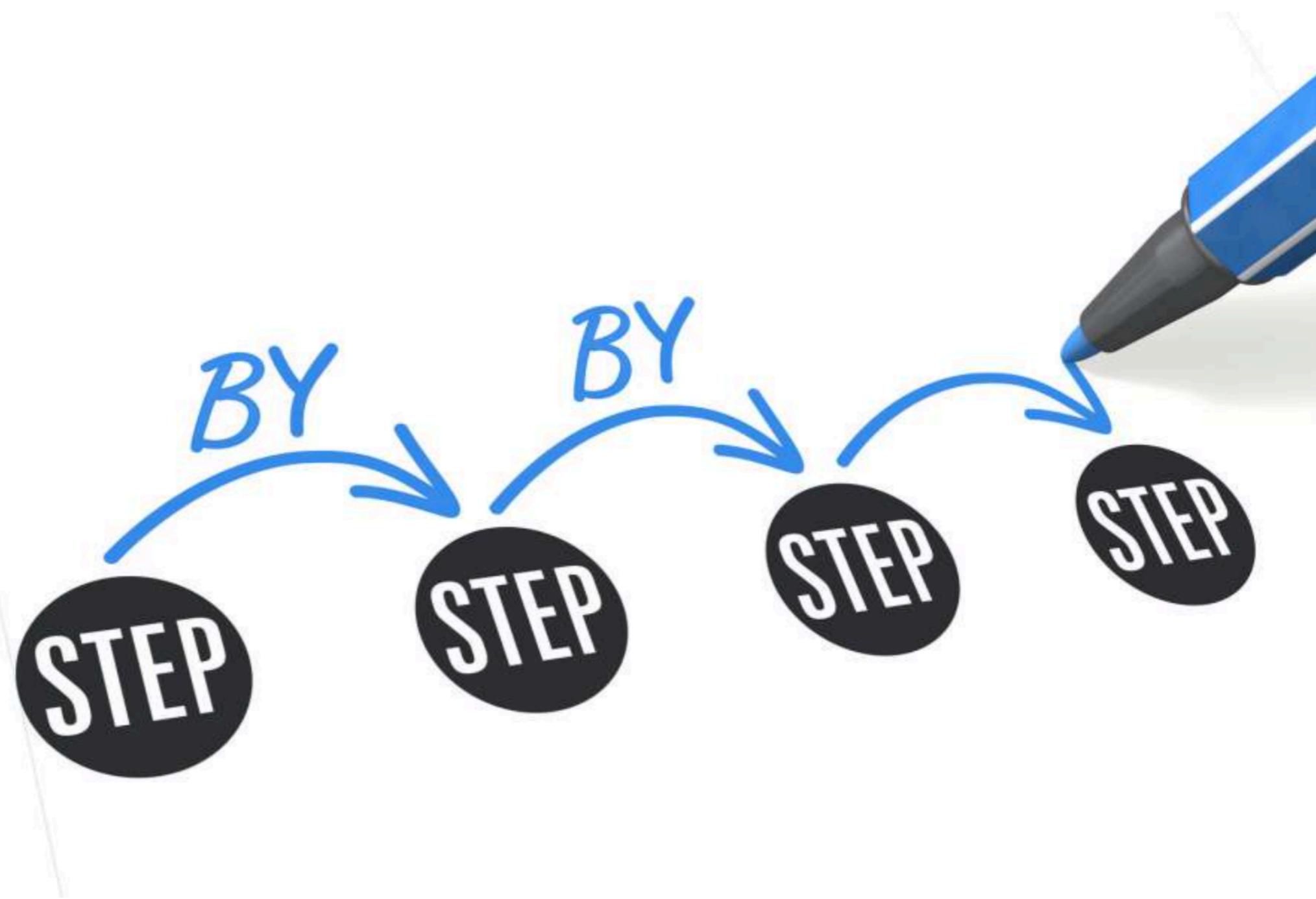
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- **X11** for simple graphical user interface and ray-tracing
- **OpenGL** for visualization
- **Qt4** or **Qt5** for graphical user interface
- **ROOT** for data analysis (even inside Geant4)

Less frequently used libraries/tools:

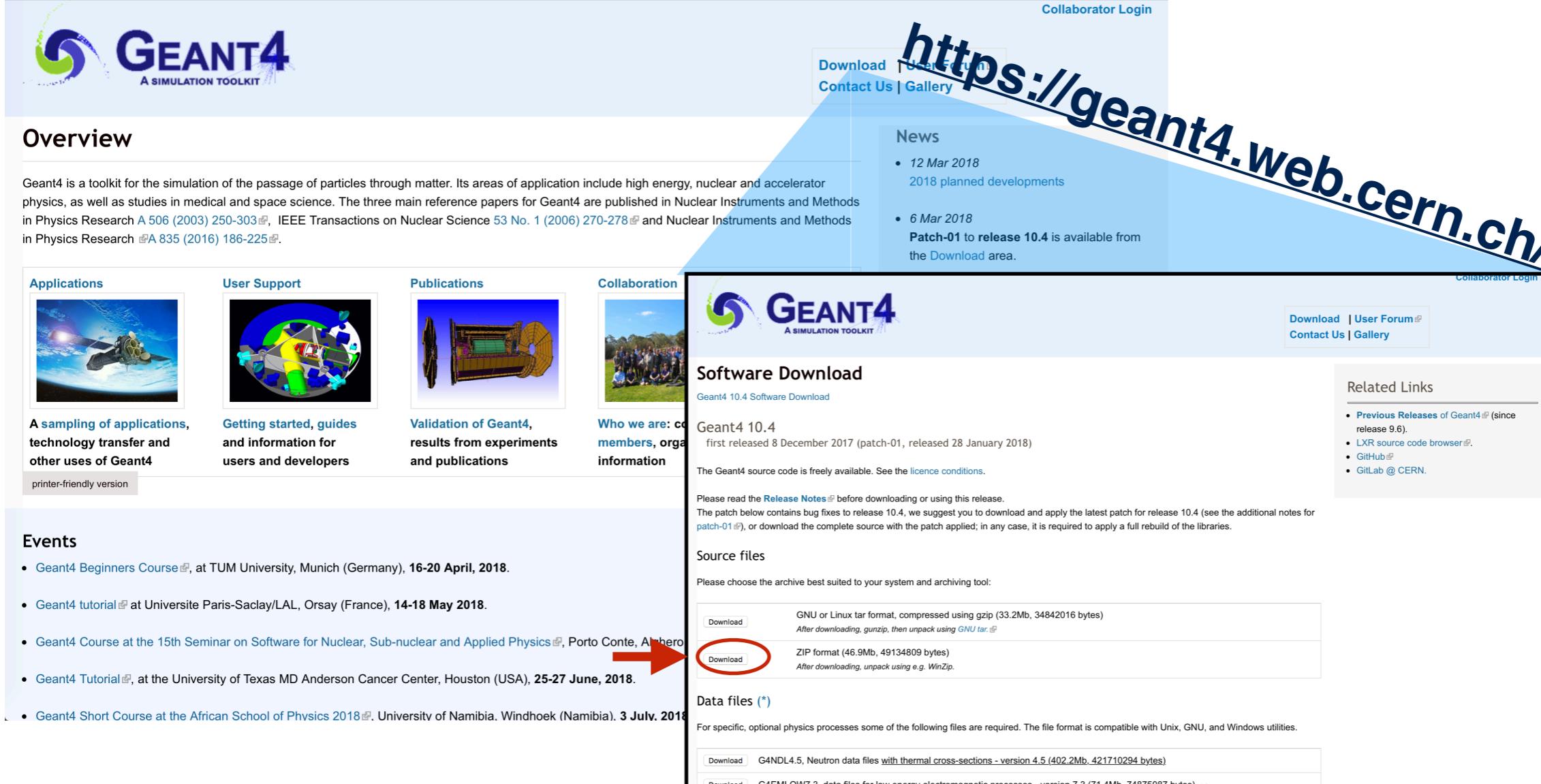
Motif, OpenInventor, DAWN, RayTracer X11,  
HepRApp, WIRED JAS Plug-in, AIDA, VRML browser,  
(external) CLHEP, Wt...

and now.... we can proceed with the Geant4 installation



# Geant4 Installation

## Download the code



The screenshot shows the Geant4 website homepage. At the top right, there are links for "Collaborator Login", "Download", "User Forum", "Contact Us", and "Gallery". Below these, there is a "News" section with two items:

- 12 Mar 2018  
2018 planned developments
- 6 Mar 2018  
Patch-01 to release 10.4 is available from the [Download](#) area.

The main content area features four categories: "Applications", "User Support", "Publications", and "Collaboration". Each category has a thumbnail image and a brief description. The "Applications" category includes a "printer-friendly version" link. The "User Support" category has a red arrow pointing to the "Download" button in the "Source files" section of the software download page.

**Software Download**

Geant4 10.4 Software Download

Geant4 10.4

first released 8 December 2017 (patch-01, released 28 January 2018)

The Geant4 source code is freely available. See the [licence conditions](#).

Please read the [Release Notes](#) before downloading or using this release.

The patch below contains bug fixes to release 10.4, we suggest you to download and apply the latest patch for release 10.4 (see the additional notes for [patch-01](#)), or download the complete source with the patch applied; in any case, it is required to apply a full rebuild of the libraries.

**Source files**

Please choose the archive best suited to your system and archiving tool:

[Download](#) GNU or Linux tar format, compressed using gzip (33.2Mb, 34842016 bytes)  
After downloading, gunzip, then unpack using [GNU tar](#).

[Download](#) ZIP format (46.9Mb, 49134809 bytes)  
After downloading, unpack using e.g. WinZip.

**Data files (\*)**

For specific, optional physics processes some of the following files are required. The file format is compatible with Unix, GNU, and Windows utilities.

[Download](#) G4NDL4.5, Neutron data files with thermal cross-sections - version 4.5 (402.2Mb, 421710294 bytes)

[Download](#) G4EMLOW7.3, data files for low energy electromagnetic processes - version 7.3 (71.4Mb, 74875087 bytes)

## Extract the file

```
$ cd Downloads
$ tar -xzf geant4.10.04.p02.tar.gz
```

# Geant4 Installation

[Collaborator Login](#)



[Download](#) | [User Forum](#) [Contact Us](#) | [Gallery](#)

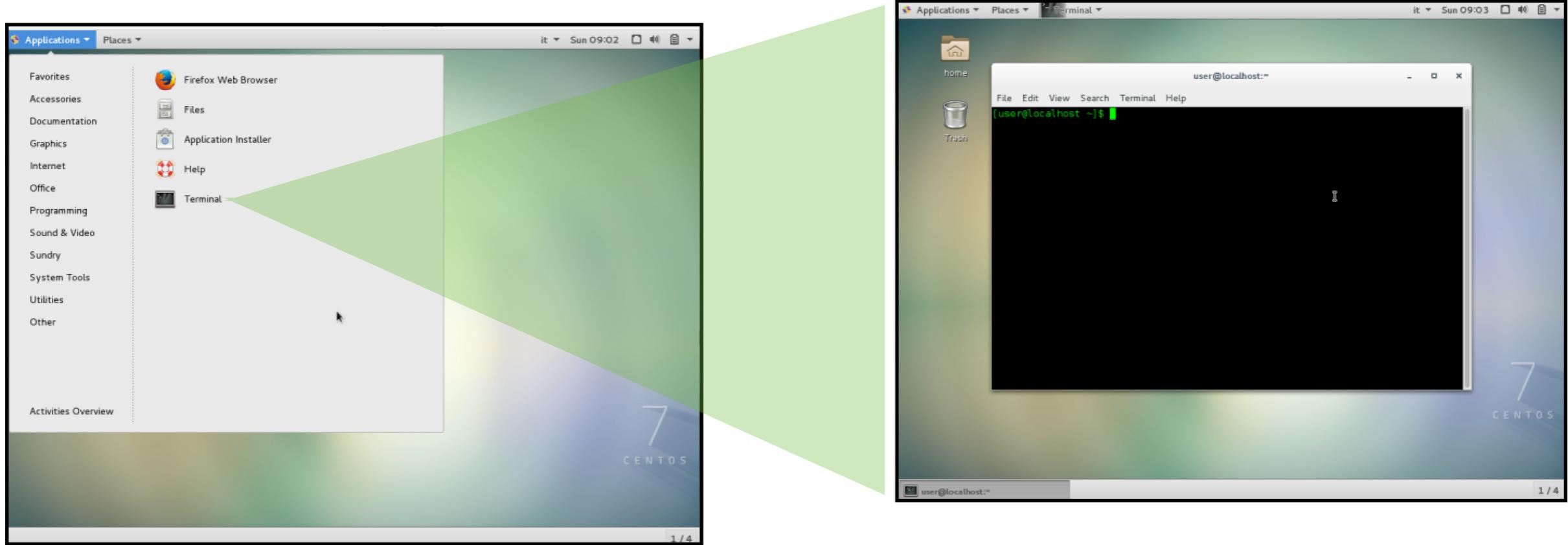
## Data files (\*)

For specific, optional physics processes some of the following files are required. The file format is compatible with Unix, GNU, and Windows utilities.

<a href="#">Download</a>	G4NDL4.5, Neutron data files <a href="#">with thermal cross-sections - version 4.5 (402.2Mb, 421710294 bytes)</a>
<a href="#">Download</a>	G4EMLOW7.3, data files for low energy electromagnetic processes - version 7.3 (71.4Mb, 74875087 bytes)
<a href="#">Download</a>	G4PhotonEvaporation5.2, data files for photon evaporation - version 5.2 (9.6Mb, 10084513 bytes)
<a href="#">Download</a>	G4RadioactiveDecay5.2, data files for radioactive decay hadronic processes - version 5.2 (1.0Mb, 1057501 bytes)
<a href="#">Download</a>	G4SAIDDATA1.1, data files from evaluated cross-sections in SAID data-base - version 1.1 (25.2kb, 25800 bytes)
<a href="#">Download</a>	G4NEUTRONXS1.4, data files for evaluated neutron cross-sections on natural composition of elements - version 1.4 (2.1Mb, 2249001 bytes)
<a href="#">Download</a>	G4ABLA3.1, data files for nuclear shell effects in INCL/ABLA hadronic mode - version 3.1 (104.8kb, 107286 bytes)
<a href="#">Download</a>	G4PII1.3, data files for shell ionisation cross-sections - version 1.3 (4.1Mb, 4293607 bytes)
<a href="#">Download</a>	G4ENSDFSTATE2.2, data files for nuclides properties - version 2.2 (283.8kb, 290632 bytes)
<a href="#">Download</a>	G4RealSurface2.1, <a href="#">Optional data files for measured optical surface reflectance</a> - version 2.1 (126.0Mb, 132130413 bytes)
<a href="#">Download</a>	G4TENDL1.3.2, <a href="#">Optional data files for incident particles</a> - version 1.3.2 (558.0Mb, 585100935 bytes)

- Low Energy Nuclear Data (LEND) files can be downloaded from: <ftp://gdo-nuclear.ucllnl.org/>

# Create the “environment”



Choose a path for your installation

```
$ cd Desktop
```

Create a new directory

```
$ mkdir Geant4
```

# Create the “environment”

Geant4 folder

Build

Source  
code

Install

# Create the “environment”

Geant4 folder

Build

Source  
code

Install

Automatically created

# Copy the source code

Choose a path for your installation

```
$ cd Desktop
```

Create a new directory

```
$ mkdir Geant4  
$ cd Geant4
```

Copy the source code in the new directory

```
$ cd /home/user/Downloads  
  
$ cp -r geant4.10.04.p02 /home/user/Desktop/Geant4
```

# Copy the source code

Choose a path for your installation

```
$ cd Desktop
```

Create a new directory

```
$ mkdir Geant4  
$ cd Geant4
```

Copy the source code in the new directory

```
$ cd /home/user/Downloads
```

```
$ cp -r geant4.10.04.p02 /home/user/Desktop/Geant4
```

What?

Where?

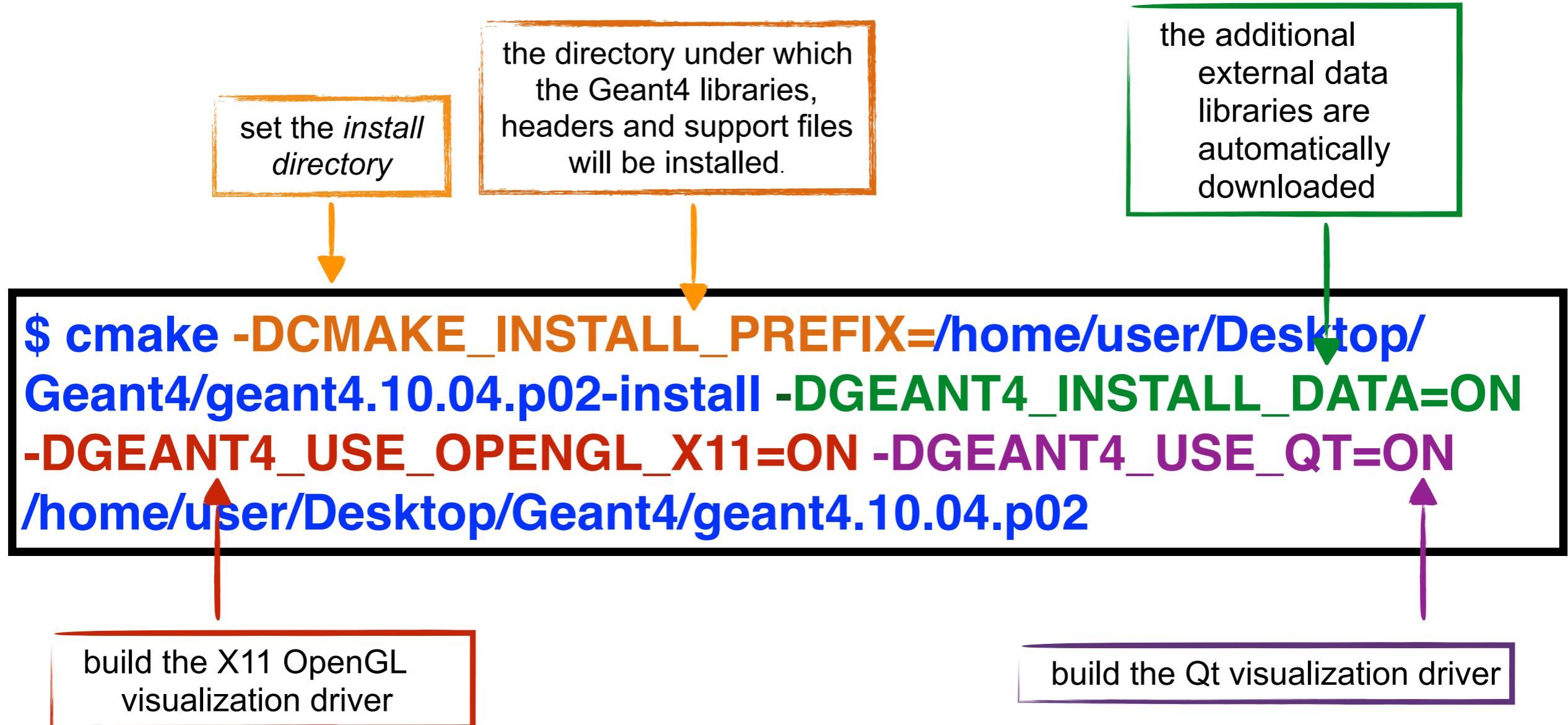
# Geant4 Installation

## Create the folder build

```
$ cd /home/user/Desktop/Geant4  
$ ls  
$ mkdir geant4.10.04.p02-build  
$ cd geant4.10.04.p02-build
```

```
$ cmake -DCMAKE_INSTALL_PREFIX=/home/user/Desktop/  
Geant4/geant4.10.04.p02-install  
-DGEANT4_INSTALL_DATA=ON  
-DGEANT4_USE_OPENGL_X11=ON -DGEANT4_USE_QT=ON  
/home/user/Desktop/Geant4/geant4.10.04.p02
```

# Geant4 Installation



# Other Options

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## Important options:

- DCMAKE\_INSTALL\_PREFIX= ... installation\_path
- DGEANT4\_INSTALL\_DATA=ON/OFF
- DGEANT4\_BUILD\_MULTITHREADED=ON/OFF

## Further options:

- DGEANT4\_USE\_OPENGL\_X11=ON/OFF
- DGEANT4\_USE\_QT=ON/OFF

.....

# Geant4 Installation

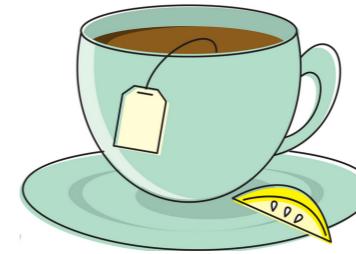
## Start the Geant4 installation

\$ make -jN

\$ make install

```
[ 0%] Built target G4EMLOW
[ 0%] Built target G4NDL
[ 1%] [ 1%] Built target G4NEUTRONXS
[ 1%] [ 1%] [ 1%] Built target RealSurface
[ 2%] Built target RadioactiveDecay
Built target G4PII
Built target PhotonEvaporation
Built target G4SAIDDATA
Built target G4zlib
[ 4%] Built target G4global
make[2]: *** Pas de règle pour fabriquer la cible « /usr/lib/x86_64-linux-gnu/libGL.so », nécessaire pour « outputs/library/Linux-g++/libG4gl2ps.so ». Arrêt.
make[1]: *** [source/visualization/externals/gl2ps/CMakeFiles/G4gl2ps.dir/all] Erreur 2
make[1]: *** Attente des tâches non terminées....
Scanning dependencies of target G4intercoms
[ 4%] [ 4%] [ 4%] Building CXX object source/intercoms/CMakeFiles/G4intercoms.dir/src/G4UIaliasList.cc.o
[ 4%] [ 4%] [ 4%] Building CXX object source/intercoms/CMakeFiles/G4intercoms.dir/src/G4UIcmdWith3Vector.cc.o
[ 4%] [ 4%] Building CXX object source/intercoms/CMakeFiles/G4intercoms.dir/src/G4UIcmdWith3VectorAndUnit.cc.o
Building CXX object source/intercoms/CMakeFiles/G4intercoms.dir/src/G4UIbatch.cc.o
Building CXX object source/intercoms/CMakeFiles/G4intercoms.dir/src/G4UIcmdWithABool.cc.o
Building CXX object source/intercoms/CMakeFiles/G4intercoms.dir/src/G4UIcmdWithADoubleAndUnit.cc.o
[ 4%] Building CXX object source/intercoms/CMakeFiles/G4intercoms.dir/src/G4UIcmdWithADouble.cc.o
[ 4%] Building CXX object source/intercoms/CMakeFiles/G4intercoms.dir/src/G4UIcmdWithAString.cc.o
Building CXX object source/intercoms/CMakeFiles/G4intercoms.dir/src/G4UIcmdWithoutParameter.cc.o
[ 4%] Building CXX object source/intercoms/CMakeFiles/G4intercoms.dir/src/G4UIcmdWithAnInteger.cc.o
[ 4%] [ 4%] [ 4%] Building CXX object source/intercoms/CMakeFiles/G4intercoms.dir/src/G4UIcommand.cc.o
Building CXX object source/intercoms/CMakeFiles/G4intercoms.dir/src/G4UIcommandTree.cc.o
Building CXX object source/intercoms/CMakeFiles/G4intercoms.dir/src/G4UIcontrolMessenger.cc.o
Building CXX object source/intercoms/CMakeFiles/G4intercoms.dir/src/G4UImanager.cc.o
Building CXX object source/intercoms/CMakeFiles/G4intercoms.dir/src/G4UIDirectory.cc.o
Building CXX object source/intercoms/CMakeFiles/G4intercoms.dir/src/G4UIMessenger.cc.o
[ 5%] Building CXX object source/intercoms/CMakeFiles/G4intercoms.dir/src/G4UIparameter.cc.o
[ 5%] Building CXX object source/intercoms/CMakeFiles/G4intercoms.dir/src/G4UIsession.cc.o
/home/bellla/Software/geant4/geant4.9.6.p03/source/intercoms/src/G4UIcontrolMessenger.cc: In member function 'virtual void G4UIcontrolMessenger::SetnewValue(G4UIcommand*, G4String)':
/home/bellla/Software/geant4/geant4.9.6.p03/source/intercoms/src/G4UIcontrolMessenger.cc:328:21: warning: ignoring return value of 'int system(const char*)', declared with attribute warn_unused_result [-Wunused-result]
    system(newValue);
^
[ 5%] Building CXX object source/intercoms/CMakeFiles/G4intercoms.dir/src/G4UnitsMessenger.cc.o
[ 5%] Building CXX object source/intercoms/CMakeFiles/G4intercoms.dir/src/G4VGlobalFastSimulationManager.cc.o
[ 5%] [ 5%] Building CXX object source/intercoms/CMakeFiles/G4intercoms.dir/src/G4GenericMessenger.cc.o
Building CXX object source/intercoms/CMakeFiles/G4intercoms.dir/src/G4AnyType.cc.o
Linking CXX shared library ../../outputs/library/Linux-g++/libG4intercoms.so
[ 5%] Built target G4intercoms
```

and  
wait....



# Geant4 Installation

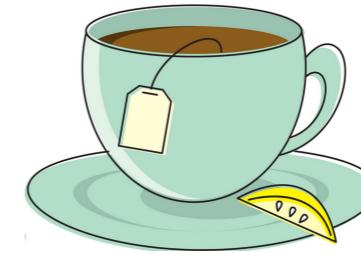
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and  
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[ 4%] Building CXX object source/intercoms/CMakeFiles/G4intercoms.dir/src/G4UIcmdWith3VectorAndUnit.cc.o
Building CXX object source/intercoms/CMakeFiles/G4intercoms.dir/src/G4UIbatch.cc.o
Building CXX object source/intercoms/CMakeFiles/G4intercoms.dir/src/G4UIcmdWithABool.cc.o
Building CXX object source/intercoms/CMakeFiles/G4intercoms.dir/src/G4UIcmdWithADoubleAndUnit.cc.o
[ 4%] Building CXX object source/intercoms/CMakeFiles/G4intercoms.dir/src/G4UIcmdWithADouble.cc.o
[ 4%] Building CXX object source/intercoms/CMakeFiles/G4intercoms.dir/src/G4UIcmdWithAString.cc.o
Building CXX object source/intercoms/CMakeFiles/G4intercoms.dir/src/G4UIcmdWithoutParameter.cc.o
[ 4%] Building CXX object source/intercoms/CMakeFiles/G4intercoms.dir/src/G4UIcmdWithAnInteger.cc.o
[ 4%] [ 4%] Building CXX object source/intercoms/CMakeFiles/G4intercoms.dir/src/G4UIcommand.cc.o
Building CXX object source/intercoms/CMakeFiles/G4intercoms.dir/src/G4UIcontrolMessenger.cc.o
Building CXX object source/intercoms/CMakeFiles/G4intercoms.dir/src/G4UImanager.cc.o
Building CXX object source/intercoms/CMakeFiles/G4intercoms.dir/src/G4UIDirectory.cc.o
Building CXX object source/intercoms/CMakeFiles/G4intercoms.dir/src/G4UIMessenger.cc.o
[ 5%] Building CXX object source/intercoms/CMakeFiles/G4intercoms.dir/src/G4UIparameter.cc.o
[ 5%] Building CXX object source/intercoms/CMakeFiles/G4intercoms.dir/src/G4UIsession.cc.o
/home/bella/Software/geant4/geant4.9.6.p03/source/intercoms/src/G4UIcontrolMessenger.cc: In member function 'virtual void G4UIcontrolMessenger::SetNewValue(G4UIcommand*, G4string)':
/home/bella/Software/geant4/geant4.9.6.p03/source/intercoms/src/G4UIcontrolMessenger.cc:328:21: warning: ignoring return value of 'int system(const char*)', declared with attribute warn_unused_result [-Wunused-result]
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^
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Linking CXX shared library ../../outputs/library/Linux-g++/libG4intercoms.so
[ 5%] Built target G4intercoms
```



→ each time you open a new shell **remember** to source the ***geant4.sh*** script before executing an application !!!

**Okay  
that's all.**