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SLIC

SLIC is the GEANT4 based full simulation software in the SiD software. It offers access to all default GEANT4 commands plus its own commands.

Installation

Precompiled Binaries

There are precompiled binaries available for selected architectures in the SLIC distribution directory. They have been tested and can be used with SLC4 and SLC5.

Installing from Scratch

Just follow the detailed instructions for Linux or Windows.

Preinstalled Versions on AFS

You can find several pre-installed versions on the CERN-LCD AFS space.

```
/afs/cern.ch/eng/clic/software/slic/
```

- 2.5.4
- 2.7.0
- 2.7.2
- 2.8.1
- 2.8.3
- 2.8.4
- 2.9.8

Running Interactively

```
slic -n
```

starts an interactive session. Use GEANT4 commands or type *help* to get a description of all commands.

Running with a GEANT4 Macro

```
slic -m [mymacro]
```

runs slic with the commands given in *mymacro*.

Running on LXBATCH

Since *bsub* on lxplus does not take command line arguments together with the executable you have to write a small script that will execute slic with a macro. Then you have to send this script to the batch queue.
An automatic submission script written by ChristianGrefe is also available here.

Running on the Grid using ILCDIRAC

Example python script for ILCDIRAC:

Show... Hide

```
from ILCDIRAC.Interfaces.API.DiracILC import DiracILC
from ILCDIRAC.Interfaces.API.NewInterface.UserJob import UserJob

dirac = DiracILC ( True , "repository.rep" )
job = UserJob ( )
slic = SLIC()
slic.setVersion("v2r8p4")
slic.setMacFile("myMacro.mac")
slic.setOutputFile("myOutput.slcio")
slic.setDetectorModel("myDetector")
slic.setNumberOfEvents(100)
res= job.append(slic)
if not res['OK']:
  print res['Message']
  exit(1)
job.setOutputSandbox ( [ "*.log", "*.mac" ] )
job.setOutputData ( "myOutput.slcio" )
job.setCPUTime( 100000 )
job.setSystemConfig ( 'x86_64-slc5-gcc43-opt' )
job.setName ( "mySlicJob" )
job.submit ( dirac )
```

Example Macros

Using an *stdhep* generator file as input:

Show... Hide

```
/lcio/PDGFlag true
/physics/select QGSP_BERT
/lcdd/url myDetector.lcdd
/run/initialize
/generator/filename myInput.stdhep
/lcio/filename myOutput.slcio
/random/seed 1234
/run/beamOn 1000
```

Using the general particle source to generate particles:

Show... Hide

```
/lcio/PDGFlag true
/physics/select QGSP_BERT
/lcdd/url myDetector.lcdd
/run/initialize
/generator/select gps
/gps/pos/type Point
/gps/pos/centre 0. 0. 0.
/gps/ang/type iso
/gps/ang/mintheta 179 deg
/gps/ang/maxtheta 181 deg
/gps/ang/minphi 0 deg
/gps/ang/maxphi 360 deg
/gps/ene/type Mono
/gps/ene/mono 10 GeV
/gps/particle pi+
/lcio/filename myOutput.slcio
/random/seed 1234
/run/beamOn 1000
```

SLIC Command Line Arguments

Argument	Full Name	Macro Command	Description
-h	--help	/slic/usage	Print SLIC usage.
-?	--help	/slic/usage	Print SLIC usage.
-n	--interactive	/control/interactive	Start a Geant4 interactive session.
-v	--version	/slic/version	Print SLIC version.
-m	--macro	/control/execute	Execute Geant4 commands from a file.
-g	--lcdd-url	/lcdd/url	Set LCDD geometry file URL.
-i	--event-file	/generator/filename	Set event input file full path.
-o	--lcio-file	/lcio/filename	Set name of LCIO output file.
-p	--lcio-path	/lcio/path	Set directory for LCIO output.
-O	--autoname	/lcio/autoname	Automatically name the LCIO output file.
-x	--lcio-delete	/lcio/fileExists delete	Delete an existing LCIO file.
-r	--run-events	/run/beamOn	Run # of events.
-s	--skip-events	/generator/skipEvents	Set number of events to skip.
-l	--physics-list	/physics/select	Set Geant4 physics list.
-L	--log-file	/log/filename	Set logfile name.
-d	--seed	/random/seed	Set the random seed. (No argument seeds with time.)
-G	--dump-gdml	/lcdd/dumpGDML	Dump geometry to GDML file.
-c	--optical	/physics/enableOptical	Enable optical physics processes.
-P	--pdg-file	/physics/setPDGFile	Set location of particle.tbl file.

FAQ

- Detector Simulation FAQ
- The official SLIC FAQ

In which order should commands be executed?

`/run/initialize` is used to initialize the geometry and is mandatory.
The physics list (`/physics/select`) and detector geometry (`/lcdd/url`) have to be set **before** `/run/initialize`.
Most other commands, like particle source commands etc. have to be executed **after** `/run/initialize`.
`/run/beamOn` is usually the last command to executed.

How to set a crossing angle?

/generator/setLorentzTransformationAngle 7 mrad

What does particle ID X stand for?

List of particle IDs in GEANT4

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