Tutorial MC production for HepMC3

October 26, 2023

1 Setup installation

- Work on machine ui2.
- Initialization script:

```
source /cvmfs/cms.cern.ch/cmsset_default.sh
export SCRAM_ARCH=slc7_amd64_gcc700
cd CMSSW_10_6_9
eval ‘scramv1 runtime -sh‘
export EDITOR=’emacs -nw ’

# cmake
export LD_LIBRARY_PATH=/cvmfs/cms.cern.ch/slc7_amd64_gcc700/external/cmake/3.17.2/share:$LD_LIBR
export PATH=/cvmfs/cms.cern.ch/slc7_amd64_gcc700/external/cmake/3.17.2/bin:$PATH
```

- Create a working folder:

```
mkdir WorkingFolder
cd WorkingFolder
```

- Download HepMC3:

```
wget http://hepmc.web.cern.ch/hepmc/releases/HepMC3-3.2.6.tar.gz
tar -xzf HepMC3-3.2.6.tar.gz
```

- Building of HepMC3:

```
mkdir hepmc3-build
cd hepmc3-build
cmake -DHEPMC3_ENABLE_ROOTIO=OFF -DHEPMC3_ENABLE_PYTHON=OFF \
-DCMAKE_INSTALL_PREFIX=../hepmc3-install ../HepMC3-3.2.6
cd -
```

- Download Pythia8:

```
wget https://pythia.org/download/pythia83/pythia8310.tgz
tar -xzf pythia8310.tgz
```

- Building of Pythia8:

```
cd pythia8310/
./configure --with-hepmc3-bin=/AbsPathToWorkingFolder/hepmc3/hepmc3-install/bin/ \
--with-hepmc3-include=/AbsPathToWorkingFolder/hepmc3/hepmc3-install/include \
--with-hepmc3-lib=/AbsPathToWorkingFolder/hepmc3/hepmc3-install/lib64/
make -j8
```

2 Installation and running of the example

- Go to folder:

  `WorkingFolder/pythia8310/examples`

- Replace ths files main42.cc and main42.cmnd by the ones sent by email.
- Build the program:

  `make main42`

- Fix the XML doc path (to put to the initialization script):

  `export PYTHIA8DATA=/AbsPathToWorkingFolder/pythia8310/share/Pythia8/xmldoc`

- Running:

  `./main42 main42.cmnd input.lhe output.hepmc`

- Example:

  `./main42 main42.cmnd ttbar.lhe output.hepmc`