

Run PYTHIA simulation with root and LHAPDF:

1, install LHAPDF6 <https://lhpdf.hepforge.org>

(used for changing proton PDF, not necessary for the current study. If skipping this step, then remove lhpdf options in your Makefile when running pythia)

Install instruction: <https://lhpdf.hepforge.org/install.html>

Then add path into the local library, see step 2.

install root v6 <https://root.cern/install/>

install the latest Pythia8 version: <https://pythia.org>

cd /your/pythia/directory

./configure --with-lhapdf6-lib=\$LHAPDF/lib

make

2, add Pythia and LHAPDF into library path:

For example for ~/.bashrc:

```
export PYTHIA8="/global/home/users/yuanjing/software/pythia8/pythia8306"
```

```
export PATH=${PATH}:$PYTHIA8/bin
```

```
export LD_LIBRARY_PATH=${LD_LIBRARY_PATH}:$PYTHIA8/lib
```

```
export PYTHIA8DATA=$PYTHIA8/share/Pythia8/xmldoc
```

```
LHAPDF="/global/home/users/yuanjing/software/LHAPDF-6.4.0-build"
```

```
export PATH=$PATH:$LHAPDF/bin
```

```
export LD_LIBRARY_PATH=$LD_LIBRARY_PATH:$LHAPDF/lib
```

```
export LHAPDF_DATA_PATH=$LHAPDF/share/LHAPDF
```

3,

Example of running Pythia:

See CR_200GeV.zip

How to run:

```
make # compile
```

```
./test.sh
```

Output file: test.root

Pythia setup file: card/EP.cmnd

Test code on ITD cluster:

```
/global/home/users/yuanjing/test/CR_200GeV
```

Or in git:

https://github.com/JiYuanjing/EIC/tree/master/CR_200GeV

Run PYTHIA8.3 on the RCF

We can directly utilize EIC software.

Set up EIC environment:

```
setenv EIC_LEVEL dev; source  
/cvmfs/eic.opensciencegrid.org/x8664_sl7/MCEG/releases/etc/eic_cshrc.csh
```

An easy way is to put the following command in your ~/.cshrc:

```
alias eic 'setenv EIC_LEVEL dev; source  
/cvmfs/eic.opensciencegrid.org/x8664_sl7/MCEG/releases/etc/eic_cshrc.csh'
```

Then directly type “eic” in the terminal every time you wanna load EIC software.

This will populate the environment with

```
PYTHIA8=/cvmfs/eic.opensciencegrid.org/x8664_sl7/MCEG/releases/env/EIC2021a  
PYTHIA8DIR=/cvmfs/eic.opensciencegrid.org/x8664_sl7/MCEG/releases/env/EIC2021a  
PYTHIA8_ROOT_DIR=/cvmfs/eic.opensciencegrid.org/x8664_sl7/MCEG/releases/env/  
EIC2021a  
PYTHIA8DATA=/cvmfs/eic.opensciencegrid.org/x8664_sl7/MCEG/releases/env/EIC202  
1a/share/Pythia8/xmldoc
```

Current version is 8.303

(Maybe newer versions will be installed in the future.)

And of course pythia6 is installed as well,

```
PYTHIA6=/cvmfs/eic.opensciencegrid.org/x8664_sl7/MCEG/releases/env/EIC2021a  
and the executable is pythia-eic.
```

Note that c++ version should be `-std=c++11` in EIC software. Check if PYTHIA and LHAPDF addresses have been set up properly in Makefile before running.