

Sherpa MSU Manual for GoSam Ntuples

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December 5, 2016

The official Sherpa manual can be found here:

<https://sherpa.hepforge.org/doc/SHERPA-MC-2.2.1.html>

1 Installation

Here is a list of prerequisite software with the tested versions.

- ROOT 6.02.12
- FastJet 3.2.1, contrib 1.025
- LHAPDF 6.1.6
- YODA 1.6.5
- OpenLoops 1.3.1
- HepMC 2.06.09
- Rivet 2.5.2
- Sherpa 2.2.1

In the following, we assume that for every library a corresponding environmental variables of the form *LIBRARY_PREFIX* set to the respective installation directories were defined. This is not necessary. It is only assumed to simplify notation in this document. It can be convenient to install Sherpa and its dependencies in the same directory.

1.1 FastJet

```
$ wget http://fastjet.fr/repo/fastjet-3.2.1.tar.gz
$ tar xvfz fastjet-3.2.1.tar.gz
$ cd fastjet-3.2.1
$ ./configure --prefix=$FASTJET_PREFIX --enable-allcxxplugins
$ make
$ make install
```

Note the `--enable-allcxxplugins` option. This is a necessary option here.

```
$ wget http://fastjet.hepforge.org/contrib/downloads/fjcontrib-1.025.tar.gz
$ tar xvzf fjcontrib-1.025.tar.gz
$ cd fjcontrib-1.025
$ ./configure --prefix=$FASTJET_PREFIX \
  --fastjet-config=$FASTJET_PREFIX/bin/fastjet-config
$ make
$ make install
```

1.2 LHAPDF

```
$ wget http://www.hepforge.org/archive/lhapdf/LHAPDF-6.1.6.tar.gz
$ tar xvzf LHAPDF-6.1.6.tar.gz
$ cd LHAPDF-6.1.6
$ ./configure --prefix=$LHAPDF_PREFIX
$ make
$ make install
```

LHAPDF does not ship with PDF sets. They can be downloaded and installed with a command like

```
$ wget http://www.hepforge.org/archive/lhapdf/pdfsets/6.1.6/CT10nlo.tar.gz -O- \
| tar xz -C $LHAPDF_PREFIX/share/LHAPDF
```

1.3 YODA

```
$ wget http://www.hepforge.org/archive/yoda/YODA-1.6.5.tar.gz
$ tar xvzf YODA-1.6.5.tar.gz
$ cd YODA-1.6.5
$ ./configure --prefix=$YODA_PREFIX
$ make
$ make install
```

1.4 OpenLoops

```
$ wget http://www.hepforge.org/archive/openloops/OpenLoops-1.3.1.tar.gz
$ tar xvzf OpenLoops-1.3.1.tar.gz
$ cd OpenLoops-1.3.1
$ ./scons
```

Note that OpenLoops does not use make.

1.5 HEPMC

```
$ wget http://lcgapp.cern.ch/project/simu/HepMC/download/HepMC-2.06.09.tar.gz
$ tar xvzf HepMC-2.06.09.tar.gz
$ cd HepMC-2.06.09
$ ./configure --prefix=$HEPMC_PREFIX --with-momentum=GEV --with-length=CM
$ make
$ make install
```

1.6 Rivet

Requires YODA, FastJet, and HepMC.

```
$ wget http://www.hepforge.org/archive/rivet/Rivet-2.5.2.tar.gz
$ tar xvzf Rivet-2.5.2.tar.gz
$ cd Rivet-2.5.2
$ ./configure --prefix=$RIVET_PREFIX \
  --with-yoda=$YODA_PREFIX \
  --with-fastjet=$FASTJET_PREFIX \
  --with-hepmc=$HEPMC_PREFIX
$ make
$ make install
```

1.7 Sherpa

```
$ wget http://www.hepforge.org/archive/sherpa/SHERPA-MC-2.2.1.tar.gz
$ tar xvzf SHERPA-MC-2.2.1.tar.gz
$ cd SHERPA-MC-2.2.1
$ ./configure --prefix=$SHERPA_PREFIX \
  --enable-analysis \
  --enable-lhole \
  --enable-fastjet=$FASTJET_PREFIX \
  --enable-lhapdf=$LHAPDF_PREFIX \
  --enable-openloops=$OPENLOOPS_PREFIX \
  --enable-hepmc2=$HEPMC_PREFIX \
  --enable-rivet=$RIVET_PREFIX \
  --enable-mcfm=`pwd -P`/AddOns/MCFM \
  --enable-root=$ROOT_PREFIX \
  --with-sqlite3=install \
  CPPFLAGS=-std=c++11
$ make
$ make install
```

2 Running

Assuming `$SHERPA_PREFIX/bin` has `bin` added to the `PATH`, Sherpa can be run using the following command,

```
$ Sherpa -f analysis.dat
```

A minimal analysis file for running over GoSam ntuples with MINLO is given below.