LHAPDF Python Setup for CFNS School 2024:

Stony Brook University

Download and install the LHAPDF software, including the Python wrappers, from here:

https://lhapdf.hepforge.org

For reference: https://lhapdf.hepforge.org/hierarchy.html

If your installation is correct, you should be able to load the LHAPDF library:

```
import
print(lhapdf.version()) lhapdf
```

Some other useful libraries are:

```
import os
import sys
import glob
import numpy as np
from math import *
import matplotlib.pyplot as plt
```

You may need to add to the sys path to find the library:

```
import sys
sys.path.insert(0,'/home/user/…MySubDir…/lhapdf')
```

You can then tell LHAPDF where the PDF grids are located

```
lhapdf.pathsAppend('/home/olness/Documents/XFIT/LHAPDF')
```

You can print the contents of the directory to check this is correct.

```
os.listdir('/home/olness/Documents/XFIT/LHAPDF')
```

Now you are ready to load the PDFs.

```
xf0 = lhapdf.getPDFSet('rsFixed')
xf0=xf0.mkPDFs()
xf0[0].xfxQ(2,0.1,10.)
```

Or, add a different set.

```
xf1 = lhapdf.getPDFSet('rsFree')
xf1=xf1.mkPDFs()
xf1[0].xfxQ(2,0.1,10.)
```

NOTE: LHAPDF stores x*PDF. Be sure you take this into account.

lhapdf.getPDFSet	Get all PDFs in a named set
xf0.mkPDFs()	Make all the PDFs in the named set
xf0[0].xfxQ(2,0.1,10.)	Evaluate a PDF value

xf0[iset].xfxQ(iParton,x,Q) where:

iset=[0, Max #]. 0 is the “central” value, and #’s 1…Max # are the error sets

Look at len(xf0)

iParton = Parton #. d=1, u=2 ,,, t=6, dbar=-1, gluon = 21 or 0 (Becareful: #1 is NOT u quark.)

Q is the scale in GeV