In[1]:=
```
Clear["Global`*"];
```

In[2]:=
```
$Version
```

Out[2]=
```
12.1.0 for Linux x86 (64-bit) (March 14, 2020)
```

Required PDF sets:

For this notebook to run, it requires the following PDF sets;

LHA SETS: {CT10,MSTW2008lo68cl,NNPDF30_nlo_as_0118}

PDS SETS: {ct10.pds,ctq66m.pds}

Manual file for ManeParse Package Version 5.0

Version 23.0
18 October 2019

Comments and questions to:

Fred Olness olness@physics.smu.edu

Set Absolute Directory Paths Here

Here we set up all the main directories.
The rest of the notebook uses only RELATIVE paths.
We'll show what goes in each directory below.

In[3]:=
```
(* This just drops the leading path
 info to make the list of files easier to read *)
(* dropPath=Take[(FileNameSplit /@ # ) //Transpose ,-1][[1]]&; *)
dropPath = ((Take[#, -1] & /@ (FileNameSplit /@ #)) // Flatten) &
```

Out[3]=
```
Flatten[(Take[#1, -1] &) /@ FileNameSplit /@ #1] &
```

In[4]:=
```
(* Remove files that start with "/.*"
   These are the pre-modified CTEQ PDS files and should not be used.  *)
Clear[noDot]
noDot[list_] := Select[list, ! StringMatchQ [#, "*/.*"] &]
```

In[6]:=
```
(* This is where the main notebook file resides *)
workDir = NotebookDirectory [];
FileNames["*", workDir] // dropPath
```

Out[7]=
```
{Demo5.nb, Demo5.pdf, figs4paper_v5.nb, MakeDemo.py, ManeParse_v2.pdf,
 manual_v5.nb, MP_packages, noe2.perl, PDFDIR, README, README~, User.pdf}
```

In[8]:=
```
(* This is where the ManeParse files reside *)
dirPackages = workDir <> "/MP_packages";
FileNames["*.m", dirPackages] // dropPath
```

Out[9]=
```
{pdfCalc.m, pdfErrors.m, pdfParseCTEQ.m, pdfParseLHA.m}
```

In[10]:=
```
(* This is where the LHAPDF files are located *)
lhaDir = "/usr/local/share/LHAPDF";
Select[FileNames["*", lhaDir], DirectoryQ] // dropPath
```

Out[11]=
```
{abm12lhc_5_nnlo, ABMP16_3_nlo, CJ15nlo, CT10, CT10nlo, CT14nlo, CT18ANLO, CT18ANNLO,
 CT18NLO, CT18NNLO, CT18ptxg, CT18ZNLO, CT18ZNNLO, cteq6, EPPS16nlo_CT14nlo_Ag108,
 EPPS16nlo_CT14nlo_Al27, EPPS16nlo_CT14nlo_Au197, EPPS16nlo_CT14nlo_Be9,
 EPPS16nlo_CT14nlo_C12, EPPS16nlo_CT14nlo_Ca40, EPPS16nlo_CT14nlo_Cu64,
 EPPS16nlo_CT14nlo_Fe56, EPPS16nlo_CT14nlo_He4, EPPS16nlo_CT14nlo_Li6,
 EPPS16nlo_CT14nlo_Pb208, EPPS16nlo_CT14nlo_Pt195, EPPS16nlo_CT14nlo_Sn119,
 EPPS16nlo_CT14nlo_W184, HERAPDF20_NLO_VAR, lha_20Rs2, lha_21Rs2, lha_22Rs2,
 lha_22Rs2ver2, lha_22Rs2ver3, MSTW2008lo68cl, MSTW2008nlo68cl, MSTW2008nnlo68cl,
 nCTEQ15_108_54, nCTEQ15_1_1, nCTEQ15_119_59, nCTEQ15_12_6, nCTEQ15_131_54,
 nCTEQ15_14_7, nCTEQ15_184_74, nCTEQ15_197_79, nCTEQ15_197_98, nCTEQ15_20_10,
 nCTEQ15_207_103, nCTEQ15_208_82, nCTEQ15_2_1, nCTEQ15_27_13, nCTEQ15_3_1,
 nCTEQ15_3_2, nCTEQ15_40_18, nCTEQ15_40_20, nCTEQ15_4_2, nCTEQ15_56_26,
 nCTEQ15_56_28, nCTEQ15_6_3, nCTEQ15_64_32, nCTEQ15_7_3, nCTEQ15_84_42,
 nCTEQ15_9_4, nCTEQ15FullNuc, nCTEQ15FullNuc_108_54, nCTEQ15FullNuc_1_1,
 nCTEQ15FullNuc_119_59, nCTEQ15FullNuc_12_6, nCTEQ15FullNuc_131_54,
 nCTEQ15FullNuc_14_7, nCTEQ15FullNuc_184_74, nCTEQ15FullNuc_197_79,
 nCTEQ15FullNuc_197_98, nCTEQ15FullNuc_20_10, nCTEQ15FullNuc_207_103,
 nCTEQ15FullNuc_208_82, nCTEQ15FullNuc_2_1, nCTEQ15FullNuc_27_13,
 nCTEQ15FullNuc_3_2, nCTEQ15FullNuc_40_18, nCTEQ15FullNuc_40_20, nCTEQ15FullNuc_4_2,
 nCTEQ15FullNuc_56_26, nCTEQ15FullNuc_6_3, nCTEQ15FullNuc_64_32, nCTEQ15FullNuc_7_3,
 nCTEQ15FullNuc_84_42, nCTEQ15FullNuc_9_4, nCTEQ15np_1_1, nCTEQ15np_208_82,
 NNPDF30_nlo_as_0118, NNPDF30_nnlo_as_0118, NNPDF30_nnlo_as_0118_nf_6,
 NNPDF31_nlo_as_0118, NNPDF31_nlo_as_0118_hessian, NNPDF31_nnlo_as_0118,
 nuanua1_12_6, nuanua1_13_7, nuanua1_16_8, nuanua1_208_82, nuanua1_40_18,
 nuanua1_56_26, nuanua1FullNuc_12_6, nuanua1FullNuc_13_7, nuanua1FullNuc_16_8,
 nuanua1FullNuc_208_82, nuanua1FullNuc_40_18, nuanua1FullNuc_56_26}
```

In[12]:=
```
(* This is where the PDS format files are located *)
pdsDir = workDir <> "/PDFDIR/PDS";
Select[FileNames["*", pdsDir], DirectoryQ] // dropPath
```

Out[13]=
```
{ct10.pds, ctq66m.pds}
```

Required PDF sets:

For this notebook to run, it requires the following PDF sets;

LHA SETS: {CT10,MSTW2008lo68cl,NNPDF30_nlo_as_0118}

PDS SETS: {ct10.pds,ctq66m.pds}

Just step through and demo each function:

Load the packages

Set Interpolator

In[18]:=
```
? pdfSetInterpolator
```

Out[18]=

Symbol

pdfSetInterpolator [[key]]: This function selects the interpolation routine to use for pdfFunction .

Available functions include : "MMA ", the default interpolation routine from Mathematica or "ManeParse ", a custom cubic Lagrange interpolation routine .

The x-power for the ManeParse interpolation can be set with pdfSetXpower .

Note : The input is optional for this function . No input will reset the default Mathematica interpolator .

In[19]:=
```
pdfSetInterpolator ["MMA"]
```

```
Default Mathematica interpolator will be used.
```

In[20]:=
```
pdfSetInterpolator ["ManeParse "]
```

```
ManeParse cubic interpolation will be used.
The x-power of the interpolation is set to 1
```

In[21]:=
```
? pdfSetXpower
```

Out[21]=

Symbol

pdfSetXpower [[power]]: This function sets the x-power to be used with the ManeParse interpolation routine .

The defult value of *power* = 1 will interpolate in x^1*pdf(x,Q).

Note : The input is optional for this function . No input will reset the default value .

In[22]:= **pdfSetXpower []**

```
ManeParse cubic interpolation will be used.
The x-power of the interpolation is set to 1
```

In[23]:= **pdfSetXpower [2]**

```
ManeParse cubic interpolation will be used.
The x-power of the interpolation is set to 2
```

In[24]:= **pdfSetInterpolator ["MMA"]**

```
Default Mathematica interpolator will be used.
```

In[25]:= **pdfSetXpower [1.5]**

```
ManeParse cubic interpolation will be used.
The x-power of the interpolation is set to 1.5
```

pdfReset

In[26]:= **pdfReset []**

```
Default Mathematica interpolator will be used.
All internal variables have been reset.
```

Read Individual LHAPDF files

read lhapdf file

In[27]:=
```
lhaList = FileNames["*", lhaDir] // noDot;
(* Remove files that are not directories: i.e., of the form *.*  *)
lhaList = lhaList // Select[#, ! StringMatchQ[#, "*.*"] &] &;
lhaList // dropPath
```

Out[29]=
```
{abm12lhc_5_nnlo, ABMP16_3_nlo, CJ15nlo, CT10, CT10nlo, CT14nlo, CT18ANLO, CT18ANNLO,
 CT18NLO, CT18NNLO, CT18ptxg, CT18ZNLO, CT18ZNNLO, cteq6, EPPS16nlo_CT14nlo_Ag108,
 EPPS16nlo_CT14nlo_Al27, EPPS16nlo_CT14nlo_Au197, EPPS16nlo_CT14nlo_Be9,
 EPPS16nlo_CT14nlo_C12, EPPS16nlo_CT14nlo_Ca40, EPPS16nlo_CT14nlo_Cu64,
 EPPS16nlo_CT14nlo_Fe56, EPPS16nlo_CT14nlo_He4, EPPS16nlo_CT14nlo_Li6,
 EPPS16nlo_CT14nlo_Pb208, EPPS16nlo_CT14nlo_Pt195, EPPS16nlo_CT14nlo_Sn119,
 EPPS16nlo_CT14nlo_W184, HERAPDF20_NLO_VAR, lha_20Rs2, lha_21Rs2, lha_22Rs2,
 lha_22Rs2ver2, lha_22Rs2ver3, MSTW2008lo68cl, MSTW2008nlo68cl, MSTW2008nnlo68cl,
 nCTEQ15_108_54, nCTEQ15_1_1, nCTEQ15_119_59, nCTEQ15_12_6, nCTEQ15_131_54,
 nCTEQ15_14_7, nCTEQ15_184_74, nCTEQ15_197_79, nCTEQ15_197_98, nCTEQ15_20_10,
 nCTEQ15_207_103, nCTEQ15_208_82, nCTEQ15_2_1, nCTEQ15_27_13, nCTEQ15_3_1,
 nCTEQ15_3_2, nCTEQ15_40_18, nCTEQ15_40_20, nCTEQ15_4_2, nCTEQ15_56_26,
 nCTEQ15_56_28, nCTEQ15_6_3, nCTEQ15_64_32, nCTEQ15_7_3, nCTEQ15_84_42,
 nCTEQ15_9_4, nCTEQ15FullNuc, nCTEQ15FullNuc_108_54, nCTEQ15FullNuc_1_1,
 nCTEQ15FullNuc_119_59, nCTEQ15FullNuc_12_6, nCTEQ15FullNuc_131_54,
 nCTEQ15FullNuc_14_7, nCTEQ15FullNuc_184_74, nCTEQ15FullNuc_197_79,
 nCTEQ15FullNuc_197_98, nCTEQ15FullNuc_20_10, nCTEQ15FullNuc_207_103,
 nCTEQ15FullNuc_208_82, nCTEQ15FullNuc_2_1, nCTEQ15FullNuc_27_13,
 nCTEQ15FullNuc_3_2, nCTEQ15FullNuc_40_18, nCTEQ15FullNuc_40_20, nCTEQ15FullNuc_4_2,
 nCTEQ15FullNuc_56_26, nCTEQ15FullNuc_6_3, nCTEQ15FullNuc_64_32, nCTEQ15FullNuc_7_3,
 nCTEQ15FullNuc_84_42, nCTEQ15FullNuc_9_4, nCTEQ15np_1_1, nCTEQ15np_208_82,
 NNPDF30_nlo_as_0118, NNPDF30_nnlo_as_0118, NNPDF30_nnlo_as_0118_nf_6,
 NNPDF31_nlo_as_0118, NNPDF31_nlo_as_0118_hessian, NNPDF31_nnlo_as_0118,
 nuanua1_12_6, nuanua1_13_7, nuanua1_16_8, nuanua1_208_82, nuanua1_40_18,
 nuanua1_56_26, nuanua1FullNuc_12_6, nuanua1FullNuc_13_7, nuanua1FullNuc_16_8,
 nuanua1FullNuc_208_82, nuanua1FullNuc_40_18, nuanua1FullNuc_56_26}
```

In[30]:=
```
file = Select[lhaList, StringMatchQ[#, "*CT10nlo"] &]
```

Out[30]=
```
{/usr/local/share/LHAPDF/CT10nlo}
```

In[31]:=
```
FileNames["*", file // First] // noDot // dropPath
```

Out[31]=
```
{CT10nlo_0000.dat, CT10nlo_0001.dat, CT10nlo_0002.dat,
 CT10nlo_0003.dat, CT10nlo_0004.dat, CT10nlo_0005.dat,
 CT10nlo_0006.dat, CT10nlo_0007.dat, CT10nlo_0008.dat, CT10nlo_0009.dat,
 CT10nlo_0010.dat, CT10nlo_0011.dat, CT10nlo_0012.dat, CT10nlo_0013.dat,
 CT10nlo_0014.dat, CT10nlo_0015.dat, CT10nlo_0016.dat, CT10nlo_0017.dat,
 CT10nlo_0018.dat, CT10nlo_0019.dat, CT10nlo_0020.dat, CT10nlo_0021.dat,
 CT10nlo_0022.dat, CT10nlo_0023.dat, CT10nlo_0024.dat, CT10nlo_0025.dat,
 CT10nlo_0026.dat, CT10nlo_0027.dat, CT10nlo_0028.dat, CT10nlo_0029.dat,
 CT10nlo_0030.dat, CT10nlo_0031.dat, CT10nlo_0032.dat, CT10nlo_0033.dat,
 CT10nlo_0034.dat, CT10nlo_0035.dat, CT10nlo_0036.dat, CT10nlo_0037.dat,
 CT10nlo_0038.dat, CT10nlo_0039.dat, CT10nlo_0040.dat, CT10nlo_0041.dat,
 CT10nlo_0042.dat, CT10nlo_0043.dat, CT10nlo_0044.dat, CT10nlo_0045.dat,
 CT10nlo_0046.dat, CT10nlo_0047.dat, CT10nlo_0048.dat, CT10nlo_0049.dat,
 CT10nlo_0050.dat, CT10nlo_0051.dat, CT10nlo_0052.dat, CT10nlo.info}
```

In[32]:=
```
? pdfParseLHA
```

Out[32]=

Symbol

pdfParseLHA [fileNameInfo , fileNameData , [verbose]]: This function reads an individual .info file and .data file specified by *fileNameInfo* and *fileNameData* , respectively , into memory .

The function returns a set number that corresponds to the listing of the .dat file in *pdfSetList* .

Additionally , the function checks that the number and the order of the flavors are the same in both files.

The optional input allows the user to supress the output of this function by choosing *verbose* to be *False* .

Read in First LHA file

In[33]:=
```
file = Select[lhaList , StringMatchQ [#, "*CT10nlo"] &]
files = FileNames["*", file // First] // noDot;
files // dropPath // Short
```

Out[33]=
```
{/usr/local/share/LHAPDF/CT10nlo}
```

Out[35]//Short=
```
{CT10nlo_0000.dat, CT10nlo_0001.dat, CT10nlo_0002.dat,
 CT10nlo_0003.dat, CT10nlo_0004.dat, ≪45≫, CT10nlo_0050.dat,
 CT10nlo_0051.dat, CT10nlo_0052.dat, CT10nlo.info}
```

In[36]:=
```
info = Select[files, StringMatchQ[#, "*.info"] &] // First
```

Out[36]=
```
/usr/local/share/LHAPDF/CT10nlo/CT10nlo.info
```

In[37]:=
```
dat = Select[files, StringMatchQ[#, "*.dat"] &] // First
```

Out[37]=
```
/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0000.dat
```

In[38]:=
```
pdfParseLHA[info, dat]
```

```
Successfully read /usr/local/share/LHAPDF/CT10nlo/CT10nlo.info.
Successfully read /usr/local/share/LHAPDF/CT10nlo/CT10nlo_0000.dat.
```

Out[38]=
```
1
```

Read in Second LHA file

In[39]:=
```
file = Select[lhaList, StringMatchQ[#, "*MSTW2008lo68cl "] &]
files = FileNames["*", file // First] // noDot;
files // dropPath // Short

info = Select[files, StringMatchQ[#, "*.info"] &] // First
dat = Select[files, StringMatchQ[#, "*.dat"] &] // First
```

Out[39]=
```
{/usr/local/share/LHAPDF/MSTW2008lo68cl}
```

Out[41]//Short=
```
{MSTW2008lo68cl_0000.dat, MSTW2008lo68cl_0001.dat, MSTW2008lo68cl_0002.dat, <<36>>,
  MSTW2008lo68cl_0039.dat, MSTW2008lo68cl_0040.dat, MSTW2008lo68cl.info}
```

Out[42]=
```
/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl.info
```

Out[43]=
```
/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0000.dat
```

In[44]:=
```
pdfParseLHA[info, dat]
```

```
Successfully read /usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl.info.
Successfully read /usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0000.dat.
```

Out[44]=
```
2
```

Read in Third LHA file

In[45]:=
```
file = Select[lhaList, StringMatchQ[#, "*NNPDF30_nlo_as_0118"] &]
files = FileNames["*", file // First] // noDot;
files // dropPath // Short

info = Select[files, StringMatchQ[#, "*.info"] &] // First
dat = Select[files, StringMatchQ[#, "*.dat"] &] // First
```

Out[45]=
```
{/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118}
```

Out[47]//Short=
```
{NNPDF30_nlo_as_0118_0000.dat, NNPDF30_nlo_as_0118_0001.dat,
  NNPDF30_nlo_as_0118_0002.dat, ≪96≫, NNPDF30_nlo_as_0118_0099.dat,
  NNPDF30_nlo_as_0118_0100.dat, NNPDF30_nlo_as_0118.info}
```

Out[48]=
```
/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118.info
```

Out[49]=
```
/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0000.dat
```

In[50]:=
```
pdfParseLHA[info, dat]
```

```
Successfully read /usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118.info.
Successfully read /usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0000.dat.
```

Out[50]=
```
3
```

Read Individual PDS files

read PDS files

In[51]:=
```
pdsList = FileNames["*", pdsDir];
pdsList // dropPath
```

Out[52]=
```
{ct10.pds, ctq66m.pds}
```

In[53]:=
```
? pdfParseCTEQ
```

Out[53]=

Symbol

pdfParseCTEQ [fileName , [verbose]]: This function reads an individual .pds file specified by *fileName* into memory .

The function returns a set number that corresponds to the listing of the .pds file in *pdfSetList* .

The optional input allows the user to supress the output of this function by choosing *verbose* to be *False* .

Read in First PDS file

In[54]:=
```
file = Select[pdsList , StringMatchQ [#, "*ct10.pds"] &]
files = FileNames["*", file // First] // noDot;
files // dropPath // Short
```

Out[54]= {/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo//PDFDIR/PDS/ct10.pds}

Out[56]//Short=
```
{ct10.00.pds, ct10.01.pds, ct10.02.pds, ct10.03.pds,
  ct10.04.pds, ct10.05.pds, ≪41≫, ct10.47.pds, ct10.48.pds,
  ct10.49.pds, ct10.50.pds, ct10.51.pds, ct10.52.pds}
```

In[57]:=
```
pdfParseCTEQ[files // First]
```

```
PDF Table for Fit #: cx22a
```

Out[57]= 4

Read in Second PDS file

In[58]:=
```
file = Select[pdsList , StringMatchQ [#, "*ctq66m.pds"] &]
files = FileNames["*", file // First] // noDot;
files // dropPath // Short
```

Out[58]= {/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo//PDFDIR/PDS/ctq66m.pds}

Out[60]//Short=
```
{ctq66.00.pds, ctq66.01.pds, ctq66.02.pds, ctq66.03.pds,
  ctq66.04.pds, ctq66.05.pds, ≪33≫, ctq66.39.pds, ctq66.40.pds,
  ctq66.41.pds, ctq66.42.pds, ctq66.43.pds, ctq66.44.pds}
```

In[61]:=
```
pdfParseCTEQ[files // First]
```

```
PDF Table for Fit #: p82a3
```

Out[61]= 5

Current PDFs

In[62]:=
```
pdfSetListDisplay []
```

Out[62]=

Set Number	File Name	Max Flavors	Valance Flavors
1	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0000.dat	5	n/a
2	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0000.dat	5	n/a
3	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0000.dat	5	n/a
4	/home/olness/Dropbox/mp/ManeParse5_DEMO/FORWEB/ManeParse5_Demo//PDFDIR/PDS/ct10.pds/ct10.00.pds	5	2
5	/home/olness/Dropbox/mp/ManeParse5_DEMO/FORWEB/ManeParse5_Demo//PDFDIR/PDS/ctq66m.pds/ctq66.00.pds	5	2

In[63]:=
```
isetMax = Length[pdfSetList]
```

Out[63]= 5

In[64]:=
```
Table[{iSet, pdfFunction[iSet, 0, 0.1, 10.]}, {iSet, 1, isetMax}] // TableForm
```

Out[64]//TableForm=

```
1    11.2014
2    10.873
3    12.207
4    11.2111
5    11.0883
```

PDF short-hand:

We save the short name "pdf" for a user defined function. If you wish, you can put in some error checking or impose boundaries or positivity here.

In[65]:=
```
pdf[args___] := pdfFunction[args]
SetAttributes[pdf, Listable];
```

In[67]:=
```
Range[isetMax]
```

Out[67]=
```
{1, 2, 3, 4, 5}
```

In[68]:=
```
pdf[Range[isetMax], 0, 0.1, 10.] // TableForm
```

Out[68]//TableForm=
```
11.2014
10.873
12.207
11.2111
11.0883
```

In[69]:=
```
pdfPositive[args__] := Module[{},
  tmp = pdf[args];
  tmp = Max[tmp, 0.0];
  Return[tmp];
 ]

{pdf[1, 0, 0.9, 2.0], pdfPositive[1, 0, 0.9, 2.0]}
```

Out[70]=
```
{0.000336604 , 0.000336604 }
```

pdfReset

In[71]:=
```
pdfReset[]
```

```
Default Mathematica interpolator will be used.

All internal variables have been reset.
```

Read Groups of LHAPDF files

read lhapdf file

In[72]:=
```
lhaList = FileNames["*", lhaDir] // Select[#, ! StringMatchQ[#, "*.*"] &] &;
(* Remove "pdfsets.index" and similar *)
lhaList // dropPath
```

Out[73]=
```
{abm12lhc_5_nnlo, ABMP16_3_nlo, CJ15nlo, CT10, CT10nlo, CT14nlo, CT18ANLO, CT18ANNLO,
 CT18NLO, CT18NNLO, CT18ptxg, CT18ZNLO, CT18ZNNLO, cteq6, EPPS16nlo_CT14nlo_Ag108,
 EPPS16nlo_CT14nlo_Al27, EPPS16nlo_CT14nlo_Au197, EPPS16nlo_CT14nlo_Be9,
 EPPS16nlo_CT14nlo_C12, EPPS16nlo_CT14nlo_Ca40, EPPS16nlo_CT14nlo_Cu64,
 EPPS16nlo_CT14nlo_Fe56, EPPS16nlo_CT14nlo_He4, EPPS16nlo_CT14nlo_Li6,
 EPPS16nlo_CT14nlo_Pb208, EPPS16nlo_CT14nlo_Pt195, EPPS16nlo_CT14nlo_Sn119,
 EPPS16nlo_CT14nlo_W184, HERAPDF20_NLO_VAR, lha_20Rs2, lha_21Rs2, lha_22Rs2,
 lha_22Rs2ver2, lha_22Rs2ver3, MSTW2008lo68cl, MSTW2008nlo68cl, MSTW2008nnlo68cl,
 nCTEQ15_108_54, nCTEQ15_1_1, nCTEQ15_119_59, nCTEQ15_12_6, nCTEQ15_131_54,
 nCTEQ15_14_7, nCTEQ15_184_74, nCTEQ15_197_79, nCTEQ15_197_98, nCTEQ15_20_10,
 nCTEQ15_207_103, nCTEQ15_208_82, nCTEQ15_2_1, nCTEQ15_27_13, nCTEQ15_3_1,
 nCTEQ15_3_2, nCTEQ15_40_18, nCTEQ15_40_20, nCTEQ15_4_2, nCTEQ15_56_26,
 nCTEQ15_56_28, nCTEQ15_6_3, nCTEQ15_64_32, nCTEQ15_7_3, nCTEQ15_84_42,
 nCTEQ15_9_4, nCTEQ15FullNuc, nCTEQ15FullNuc_108_54, nCTEQ15FullNuc_1_1,
 nCTEQ15FullNuc_119_59, nCTEQ15FullNuc_12_6, nCTEQ15FullNuc_131_54,
 nCTEQ15FullNuc_14_7, nCTEQ15FullNuc_184_74, nCTEQ15FullNuc_197_79,
 nCTEQ15FullNuc_197_98, nCTEQ15FullNuc_20_10, nCTEQ15FullNuc_207_103,
 nCTEQ15FullNuc_208_82, nCTEQ15FullNuc_2_1, nCTEQ15FullNuc_27_13,
 nCTEQ15FullNuc_3_2, nCTEQ15FullNuc_40_18, nCTEQ15FullNuc_40_20, nCTEQ15FullNuc_4_2,
 nCTEQ15FullNuc_56_26, nCTEQ15FullNuc_6_3, nCTEQ15FullNuc_64_32, nCTEQ15FullNuc_7_3,
 nCTEQ15FullNuc_84_42, nCTEQ15FullNuc_9_4, nCTEQ15np_1_1, nCTEQ15np_208_82,
 NNPDF30_nlo_as_0118, NNPDF30_nnlo_as_0118, NNPDF30_nnlo_as_0118_nf_6,
 NNPDF31_nlo_as_0118, NNPDF31_nlo_as_0118_hessian, NNPDF31_nnlo_as_0118,
 nuanua1_12_6, nuanua1_13_7, nuanua1_16_8, nuanua1_208_82, nuanua1_40_18,
 nuanua1_56_26, nuanua1FullNuc_12_6, nuanua1FullNuc_13_7, nuanua1FullNuc_16_8,
 nuanua1FullNuc_208_82, nuanua1FullNuc_40_18, nuanua1FullNuc_56_26}
```

In[74]:=
```
? pdfFamilyParseLHA
```

Symbol

pdfFamilyParseLHA [path, [fileType]]: This function reads all the files of type *fileType* in the directory *path* and stores them in memory.

The function returns a list of set numbers that can be used to define a list. These set numbers correspond to the listing of the .dat files in *pdfSetList*.

Out[74]=

The optional input *fileType* has a default value of "*.dat".

Example:

pdfFamilyParseLHA ["MyGrids ","ct10*.dat"] reads all .dat files in the subdirectory "MyGrids " beginning with "ct10" into memory.

Read in First LHA file group

In[75]:=
```
file = Select[lhaList, StringMatchQ[#, "*CT10nlo"] &]
```

Out[75]=
```
{/usr/local/share/LHAPDF/CT10nlo}
```

In[76]:=
```
ct10 = pdfFamilyParseLHA[file // First]
```

```
Successfully read /usr/local/share/LHAPDF/CT10nlo/CT10nlo.info.
Included 53 files in the PDF family.
```

Out[76]=
```
{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18,
 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35,
 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53}
```

Read in Second LHA file group

In[77]:=
```
file = Select[lhaList, StringMatchQ[#, "*MSTW2008lo68cl"] &]
```

Out[77]=
```
{/usr/local/share/LHAPDF/MSTW2008lo68cl}
```

In[78]:=
```
mstw = pdfFamilyParseLHA[file // First]
```

```
Successfully read /usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl.info.
Included 41 files in the PDF family.
```

Out[78]=
```
{54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74,
 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94}
```

Read in Third LHA file group

In[79]:=
```
file = Select[lhaList, StringMatchQ[#, "*NNPDF30_nlo_as_0118"] &]
```

Out[79]=
```
{/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118}
```

In[80]:=
```
nnpdf = pdfFamilyParseLHA[file // First]
```

```
Successfully read /usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118.info.
Included 101 files in the PDF family.
```

Out[80]=
```
{95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113,
 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130,
 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146,
 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162,
 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178,
 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195}
```

Read Groups of PDS files

read pds file

In[81]:=
```
pdsList = FileNames["*", pdsDir];
pdsList // dropPath
```

Out[82]=
```
{ct10.pds, ctq66m.pds}
```

In[83]:=
```
? pdfFamilyParseCTEQ
```

Out[83]=

Symbol

pdfFamilyParseCTEQ [path, [fileType]]: This function reads all the files of type *fileType* in the directory *path* and stores them in memory.

The function returns a list of set numbers that can be used to define a list. These set numbers correspond to the listing of the .pds files in *pdfSetList*.

The optional input *fileType* has a default value of "*.pds".

Example:
pdfFamilyParseCTEQ ["MyGrids","ct10*pds"] reads all .pds files in the subdirectory "MyGrids" beginning with "ct10" into memory.

Read in First PDS file group

In[84]:=
```
file = Select[pdsList , StringMatchQ [#, "*ct10.pds"] &]
```

Out[84]=
```
{/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo //PDFDIR/PDS/ct10.pds}
```

In[85]:=
```
ct10pds = pdfFamilyParseCTEQ [file // First]
```

General : $\frac{5.91609}{1.0000000000000 \times 10^{315}}$ is too small to represent as a normalized machine number ; precision may be lost .

General : $\frac{5.91609}{1.0000000000000 \times 10^{315}}$ is too small to represent as a normalized machine number ; precision may be lost .

```
/home/olness/Dropbox/mp/ManeParse5_DEMO /FOR WEB/ManeParse5_Demo /PDFDIR/PDS/ct10.pds/ct10.35.pds
  was not initialized : 2 error messages

Included 52 files in the PDF family .
```

Out[85]=
```
{196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213,
 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230,
 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247}
```

Read in Second PDS file group

In[86]:=
```
file = Select[pdsList , StringMatchQ [#, "*ctq66m.pds"] &]
```

Out[86]=
```
{/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo //PDFDIR/PDS/ctq66m.pds}
```

In[87]:=
```
cteq66 = pdfFamilyParseCTEQ [file // First]
```

```
Included 45 files in the PDF family .
```

Out[87]=
```
{248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262,
 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277,
 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292}
```

Current PDFs

In[88]:=
```
pdfSetListDisplay []
```

Set Number	File Name	Max Flavors	Valance Flavors
1	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0000.dat	5	n/a
2	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0001.dat	5	n/a
3	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0002.dat	5	n/a

4	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0003.dat	5	n/a
5	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0004.dat	5	n/a
6	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0005.dat	5	n/a
7	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0006.dat	5	n/a
8	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0007.dat	5	n/a
9	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0008.dat	5	n/a
10	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0009.dat	5	n/a
11	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0010.dat	5	n/a
12	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0011.dat	5	n/a
13	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0012.dat	5	n/a
14	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0013.dat	5	n/a
15	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0014.dat	5	n/a
16	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0015.dat	5	n/a
17	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0016.dat	5	n/a
18	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0017.dat	5	n/a
19	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0018.dat	5	n/a
20	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0019.dat	5	n/a
21	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0020.dat	5	n/a
22	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0021.dat	5	n/a
23	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0022.dat	5	n/a

24	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0023.dat	5	n/a
25	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0024.dat	5	n/a
26	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0025.dat	5	n/a
27	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0026.dat	5	n/a
28	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0027.dat	5	n/a
29	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0028.dat	5	n/a
30	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0029.dat	5	n/a
31	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0030.dat	5	n/a
32	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0031.dat	5	n/a
33	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0032.dat	5	n/a
34	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0033.dat	5	n/a
35	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0034.dat	5	n/a
36	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0035.dat	5	n/a
37	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0036.dat	5	n/a
38	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0037.dat	5	n/a
39	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0038.dat	5	n/a
40	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0039.dat	5	n/a
41	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0040.dat	5	n/a
42	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0041.dat	5	n/a
43	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0042.dat	5	n/a

44	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0043.dat	5	n/a
45	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0044.dat	5	n/a
46	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0045.dat	5	n/a
47	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0046.dat	5	n/a
48	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0047.dat	5	n/a
49	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0048.dat	5	n/a
50	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0049.dat	5	n/a
51	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0050.dat	5	n/a
52	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0051.dat	5	n/a
53	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0052.dat	5	n/a
54	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0000.dat	5	n/a
55	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0001.dat	5	n/a
56	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0002.dat	5	n/a
57	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0003.dat	5	n/a
58	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0004.dat	5	n/a
59	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0005.dat	5	n/a
60	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0006.dat	5	n/a
61	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0007.dat	5	n/a
62	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0008.dat	5	n/a
63	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0009.dat	5	n/a

64	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0010.dat	5	n/a
65	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0011.dat	5	n/a
66	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0012.dat	5	n/a
67	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0013.dat	5	n/a
68	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0014.dat	5	n/a
69	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0015.dat	5	n/a
70	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0016.dat	5	n/a
71	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0017.dat	5	n/a
72	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0018.dat	5	n/a
73	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0019.dat	5	n/a
74	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0020.dat	5	n/a
75	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0021.dat	5	n/a
76	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0022.dat	5	n/a
77	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0023.dat	5	n/a
78	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0024.dat	5	n/a
79	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0025.dat	5	n/a
80	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0026.dat	5	n/a
81	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0027.dat	5	n/a
82	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0028.dat	5	n/a
83	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0029.dat	5	n/a

84	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0030.dat	5	n/a
85	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0031.dat	5	n/a
86	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0032.dat	5	n/a
87	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0033.dat	5	n/a
88	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0034.dat	5	n/a
89	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0035.dat	5	n/a
90	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0036.dat	5	n/a
91	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0037.dat	5	n/a
92	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0038.dat	5	n/a
93	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0039.dat	5	n/a
94	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0040.dat	5	n/a
95	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0000.dat	5	n/a
96	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0001.dat	5	n/a
97	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0002.dat	5	n/a
98	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0003.dat	5	n/a
99	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0004.dat	5	n/a
100	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0005.dat	5	n/a
101	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0006.dat	5	n/a
102	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0007.dat	5	n/a
103	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0008.dat	5	n/a

104	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0009.dat	5	n/a
105	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0010.dat	5	n/a
106	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0011.dat	5	n/a
107	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0012.dat	5	n/a
108	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0013.dat	5	n/a
109	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0014.dat	5	n/a
110	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0015.dat	5	n/a
111	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0016.dat	5	n/a
112	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0017.dat	5	n/a
113	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0018.dat	5	n/a
114	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0019.dat	5	n/a
115	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0020.dat	5	n/a
116	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0021.dat	5	n/a
117	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0022.dat	5	n/a
118	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0023.dat	5	n/a
119	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0024.dat	5	n/a
120	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0025.dat	5	n/a
121	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0026.dat	5	n/a
122	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0027.dat	5	n/a
123	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0028.dat	5	n/a

124	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0029.dat	5	n/a
125	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0030.dat	5	n/a
126	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0031.dat	5	n/a
127	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0032.dat	5	n/a
128	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0033.dat	5	n/a
129	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0034.dat	5	n/a
130	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0035.dat	5	n/a
131	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0036.dat	5	n/a
132	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0037.dat	5	n/a
133	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0038.dat	5	n/a
134	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0039.dat	5	n/a
135	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0040.dat	5	n/a
136	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0041.dat	5	n/a
137	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0042.dat	5	n/a
138	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0043.dat	5	n/a
139	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0044.dat	5	n/a
140	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0045.dat	5	n/a
141	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0046.dat	5	n/a
142	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0047.dat	5	n/a
143	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0048.dat	5	n/a

144	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0049.dat	5	n/a
145	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0050.dat	5	n/a
146	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0051.dat	5	n/a
147	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0052.dat	5	n/a
148	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0053.dat	5	n/a
149	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0054.dat	5	n/a
150	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0055.dat	5	n/a
151	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0056.dat	5	n/a
152	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0057.dat	5	n/a
153	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0058.dat	5	n/a
154	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0059.dat	5	n/a
155	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0060.dat	5	n/a
156	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0061.dat	5	n/a
157	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0062.dat	5	n/a
158	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0063.dat	5	n/a
159	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0064.dat	5	n/a
160	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0065.dat	5	n/a
161	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0066.dat	5	n/a
162	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0067.dat	5	n/a
163	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/ NNPDF30_nlo_as_0118_0068.dat	5	n/a

Out[88]=

164	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0069.dat	5	n/a
165	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0070.dat	5	n/a
166	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0071.dat	5	n/a
167	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0072.dat	5	n/a
168	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0073.dat	5	n/a
169	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0074.dat	5	n/a
170	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0075.dat	5	n/a
171	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0076.dat	5	n/a
172	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0077.dat	5	n/a
173	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0078.dat	5	n/a
174	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0079.dat	5	n/a
175	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0080.dat	5	n/a
176	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0081.dat	5	n/a
177	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0082.dat	5	n/a
178	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0083.dat	5	n/a
179	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0084.dat	5	n/a
180	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0085.dat	5	n/a
181	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0086.dat	5	n/a
182	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0087.dat	5	n/a
183	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0088.dat	5	n/a

184	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0089.dat	5	n/a
185	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0090.dat	5	n/a
186	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0091.dat	5	n/a
187	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0092.dat	5	n/a
188	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0093.dat	5	n/a
189	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0094.dat	5	n/a
190	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0095.dat	5	n/a
191	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0096.dat	5	n/a
192	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0097.dat	5	n/a
193	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0098.dat	5	n/a
194	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0099.dat	5	n/a
195	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0100.dat	5	n/a
196	/home/olness/Dropbox/mp/ManeParse5_DEMO/FORWEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.00.pds	5	2
197	/home/olness/Dropbox/mp/ManeParse5_DEMO/FORWEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.01.pds	5	2
198	/home/olness/Dropbox/mp/ManeParse5_DEMO/FORWEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.02.pds	5	2
199	/home/olness/Dropbox/mp/ManeParse5_DEMO/FORWEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.03.pds	5	2
200	/home/olness/Dropbox/mp/ManeParse5_DEMO/FORWEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.04.pds	5	2

201	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.05.pds	5	2
202	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.06.pds	5	2
203	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.07.pds	5	2
204	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.08.pds	5	2
205	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.09.pds	5	2
206	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.10.pds	5	2
207	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.11.pds	5	2
208	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.12.pds	5	2
209	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.13.pds	5	2
210	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.14.pds	5	2
211	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.15.pds	5	2
212	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.16.pds	5	2
213	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.17.pds	5	2

214	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.18.pds	5	2
215	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.19.pds	5	2
216	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.20.pds	5	2
217	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.21.pds	5	2
218	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.22.pds	5	2
219	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.23.pds	5	2
220	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.24.pds	5	2
221	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.25.pds	5	2
222	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.26.pds	5	2
223	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.27.pds	5	2
224	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.28.pds	5	2
225	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.29.pds	5	2
226	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.30.pds	5	2

227	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.31.pds	5	2
228	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.32.pds	5	2
229	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.33.pds	5	2
230	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.34.pds	5	2
231	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.36.pds	5	2
232	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.37.pds	5	2
233	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.38.pds	5	2
234	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.39.pds	5	2
235	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.40.pds	5	2
236	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.41.pds	5	2
237	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.42.pds	5	2
238	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.43.pds	5	2
239	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.44.pds	5	2

240	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.45.pds	5	2
241	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.46.pds	5	2
242	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.47.pds	5	2
243	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.48.pds	5	2
244	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.49.pds	5	2
245	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.50.pds	5	2
246	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.51.pds	5	2
247	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds/ct10.52.pds	5	2
248	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.00.pds	5	2
249	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.01.pds	5	2
250	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.02.pds	5	2
251	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.03.pds	5	2
252	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.04.pds	5	2

253	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.05.pds	5	2
254	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.06.pds	5	2
255	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.07.pds	5	2
256	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.08.pds	5	2
257	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.09.pds	5	2
258	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.10.pds	5	2
259	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.11.pds	5	2
260	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.12.pds	5	2
261	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.13.pds	5	2
262	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.14.pds	5	2
263	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.15.pds	5	2
264	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.16.pds	5	2
265	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.17.pds	5	2

266	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.18.pds	5	2
267	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.19.pds	5	2
268	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.20.pds	5	2
269	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.21.pds	5	2
270	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.22.pds	5	2
271	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.23.pds	5	2
272	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.24.pds	5	2
273	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.25.pds	5	2
274	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.26.pds	5	2
275	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.27.pds	5	2
276	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.28.pds	5	2
277	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.29.pds	5	2
278	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.30.pds	5	2

279	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.31.pds	5	2
280	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.32.pds	5	2
281	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.33.pds	5	2
282	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.34.pds	5	2
283	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.35.pds	5	2
284	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.36.pds	5	2
285	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.37.pds	5	2
286	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.38.pds	5	2
287	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.39.pds	5	2
288	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.40.pds	5	2
289	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.41.pds	5	2
290	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.42.pds	5	2
291	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.43.pds	5	2

292	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds /ctq66.44.pds	5	2

In[89]:=
```
pdfSetList // Short[#, 10] &
```

Out[89]//Short=
```
{{1, /usr/local/share/LHAPDF/CT10nlo/CT10nlo_0000.dat, 5, n/a},
 {2, /usr/local/share/LHAPDF/CT10nlo/CT10nlo_0001.dat, 5, n/a},
 {3, /usr/local/share/LHAPDF/CT10nlo/CT10nlo_0002.dat, 5, n/a},
 {4, /usr/local/share/LHAPDF/CT10nlo/CT10nlo_0003.dat, 5, n/a},
 {5, /usr/local/share/LHAPDF/CT10nlo/CT10nlo_0004.dat, 5, n/a},
 {6, /usr/local/share/LHAPDF/CT10nlo/CT10nlo_0005.dat, 5, n/a},
 {7, /usr/local/share/LHAPDF/CT10nlo/CT10nlo_0006.dat, 5, n/a},
 {8, /usr/local/share/LHAPDF/CT10nlo/CT10nlo_0007.dat, 5, n/a},
 «277», {286, /home/olness/Dropbox/mp/ManeParse5_DEMO/FOR
    WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.38.pds, 5, 2},
 {287, /home/olness/Dropbox/mp/ManeParse5_DEMO/FOR
    WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.39.pds, 5, 2},
 {288, /home/olness/Dropbox/mp/ManeParse5_DEMO/FOR
    WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.40.pds, 5, 2},
 {289, /home/olness/Dropbox/mp/ManeParse5_DEMO/FOR
    WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.41.pds, 5, 2},
 {290, /home/olness/Dropbox/mp/ManeParse5_DEMO/FOR
    WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.42.pds, 5, 2},
 {291, /home/olness/Dropbox/mp/ManeParse5_DEMO/FOR
    WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.43.pds, 5, 2},
 {292, /home/olness/Dropbox/mp/ManeParse5_DEMO/FOR
    WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.pds/ctq66.44.pds, 5, 2}}
```

In[90]:=
```
isetMax = Length[pdfSetList]
```

Out[90]=
```
292
```

In[91]:=
```
pdf[Range[isetMax], 0, 0.1, 10.]
```

Out[91]=
```
{11.2014 , 11.2315 , 11.1738 , 11.2381 , 11.1643 , 11.279 , 11.1302 , 11.5737 , 10.859 ,
 11.2493 , 11.1387 , 11.2151 , 11.1936 , 11.2642 , 11.0981 , 11.1442 , 11.2548 , 11.1252 ,
 11.2399 , 11.0694 , 11.2642 , 11.0875 , 11.3126 , 11.4493 , 10.9359 , 11.1544 , 11.2957 ,
 11.2079 , 11.2005 , 11.2515 , 11.1637 , 11.0603 , 11.3426 , 11.6538 , 10.9 , 11.181 ,
 11.2153 , 11.1927 , 11.205 , 11.057 , 11.3065 , 11.2367 , 11.173 , 11.2159 , 11.185 ,
 11.16 , 11.2527 , 11.0324 , 11.1563 , 11.1996 , 11.1994 , 11.276 , 11.1983 , 10.873 ,
 10.855 , 10.883 , 10.876 , 10.871 , 10.849 , 10.904 , 10.853 , 10.885 , 10.847 , 10.89 ,
 10.904 , 10.841 , 10.861 , 10.882 , 10.779 , 10.969 , 10.844 , 10.894 , 10.9 , 10.838 ,
 10.96 , 10.778 , 10.813 , 10.917 , 10.873 , 10.875 , 10.991 , 10.75 , 10.826 , 10.921 ,
 10.876 , 10.873 , 10.923 , 10.849 , 10.87 , 10.873 , 10.962 , 10.766 , 10.736 , 10.938 ,
 12.207 , 12.5159 , 12.3313 , 12.6324 , 11.88 , 12.4589 , 12.3173 , 12.1461 , 12.1531 ,
 12.5251 , 12.2188 , 11.5647 , 12.3295 , 11.6583 , 12.2525 , 12.4926 , 12.4428 , 12.3161 ,
 12.4497 , 12.2567 , 12.9039 , 12.2476 , 12.1758 , 12.2701 , 12.3423 , 12.0201 , 12.3131 ,
 12.2846 , 12.1049 , 12.6721 , 12.6727 , 12.0485 , 11.939 , 11.8537 , 12.2906 , 12.3333 ,
 11.9892 , 12.3866 , 12.1174 , 12.2578 , 11.9409 , 12.2117 , 12.143 , 12.0268 , 12.4167 ,
 12.2573 , 12.4035 , 12.1066 , 12.224 , 12.1717 , 12.0302 , 12.1057 , 12.1563 , 12.4831 ,
 11.682 , 11.9222 , 12.3201 , 12.0099 , 12.0033 , 12.7423 , 12.1389 , 12.1197 , 12.5887 ,
 11.7591 , 12.2829 , 12.051 , 12.148 , 12.7144 , 12.163 , 11.7889 , 11.7722 , 11.9971 ,
 12.324 , 12.088 , 12.4275 , 12.1174 , 12.0023 , 11.9895 , 12.1092 , 12.1207 , 11.9701 ,
 12.2022 , 11.8597 , 12.8039 , 12.1035 , 12.2958 , 12.0569 , 12.3436 , 12.1236 , 12.592 ,
 12.0457 , 12.0285 , 12.043 , 12.3269 , 12.5831 , 12.1724 , 12.205 , 12.212 , 12.0737 ,
 12.1698 , 12.2588 , 11.2111 , 11.2411 , 11.1835 , 11.2478 , 11.1739 , 11.2892 , 11.1395 ,
 11.584 , 10.8682 , 11.2591 , 11.1483 , 11.2247 , 11.2033 , 11.2734 , 11.1084 , 11.1538 ,
 11.2646 , 11.1343 , 11.25 , 11.0791 , 11.2739 , 11.0974 , 11.3223 , 11.4609 , 10.9436 ,
 11.164 , 11.3055 , 11.2178 , 11.21 , 11.2612 , 11.1734 , 11.0699 , 11.3524 , 11.664 ,
 10.9091 , 11.2257 , 11.2024 , 11.2147 , 11.066 , 11.3169 , 11.2463 , 11.1828 , 11.2255 ,
 11.1947 , 11.1695 , 11.2626 , 11.0419 , 11.1654 , 11.2094 , 11.209 , 11.2859 , 11.2087 ,
 11.0883 , 11.1187 , 11.0573 , 11.1202 , 11.0572 , 11.0862 , 11.0903 , 11.2019 , 10.9682 ,
 11.2574 , 10.9013 , 11.3857 , 10.7655 , 10.9657 , 11.2108 , 11.0705 , 11.1066 , 11.1095 ,
 11.0642 , 11.0989 , 11.0751 , 10.9216 , 11.2274 , 11.1034 , 11.072 , 11.1813 , 10.9852 ,
 11.0453 , 11.1219 , 11.0529 , 11.1283 , 10.9425 , 11.194 , 11.0119 , 11.1392 , 11.1182 ,
 11.0519 , 10.8565 , 11.3081 , 11.1406 , 11.0347 , 11.1061 , 11.0658 , 11.082 , 11.0617}
```

details after here :

Sum Rules

Check sum rule:

In[92]:=
```
Off[NIntegrate::slwcon]
Off[NIntegrate::izero]
Off[NIntegrate::ncvb]
Off[NIntegrate::inumr]
```

In[96]:=
```
mom[iset_, ipart_ : 0, q0_ : 10.] := NIntegrate[x pdfFunction[iset, ipart, x, q0], {x, 0, 1}]
```

In[97]:=
```
momSum[iset_, q0_ : 10.] :=
 NIntegrate[Sum[ x pdfFunction[iset, ipart, x, q0], {ipart, -6, 6, 1}], {x, 0, 1}]
```

In[98]:=
```
tab1 = Table[mom[1, ipart], {ipart, -6, 6}]
```

Out[98]=
```
{0., 0.00412059 , 0.0129208 , 0.0252945 , 0.0324004 , 0.0380001 ,
 0.457143 , 0.130345 , 0.257059 , 0.0252945 , 0.0129208 , 0.00412059 , 0.}
```

In[99]:=
```
{momSum[1], Plus @@ tab1}
```

Out[99]=
```
{0.99962 , 0.99962}
```

In[100]:=
```
{Table[pdfFlavor[i], {i, -6, 6}], tab1} // Transpose  // TableForm
```

Out[100]//TableForm=

tbar	0.
bbar	0.00412059
cbar	0.0129208
sbar	0.0252945
ubar	0.0324004
dbar	0.0380001
gluon	0.457143
down	0.130345
up	0.257059
strange	0.0252945
charm	0.0129208
bottom	0.00412059
top	0.

In[101]:=
```
tab2 = Table[mom[iset, ipart], {ipart, -6, 6}, {iset, 1, 3}]
```

Out[101]=
```
{{0., 0., 0.}, {0.00412059, 0.004123, 0.00411838},
 {0.0129208, 0.0129305, 0.012912}, {0.0252945, 0.0249498, 0.0256129},
 {0.0324004, 0.0318514, 0.0329076}, {0.0380001, 0.0372897, 0.0386565},
 {0.457143, 0.457403, 0.456905}, {0.130345, 0.130502, 0.1302},
 {0.257059, 0.258567, 0.255665}, {0.0252945, 0.0249498, 0.0256129},
 {0.0129208, 0.0129305, 0.012912}, {0.00412059, 0.004123, 0.00411838}, {0., 0., 0.}}
```

In[102]:=
```
100 * tab2 // Transpose //
 TableForm[#, TableHeadings → {Range[Length[tab2]], pdfFlavor /@ Range[-6, 6]}] &
```

Out[102]//TableForm=

	tbar	bbar	cbar	sbar	ubar	dbar	gluon	down
1	0.	0.412059	1.29208	2.52945	3.24004	3.80001	45.7143	13.0345
2	0.	0.4123	1.29305	2.49498	3.18514	3.72897	45.7403	13.0502
3	0.	0.411838	1.2912	2.56129	3.29076	3.86565	45.6905	13.02

Plot PDFs

In[103]:=
```
q0 = 100.;
iset0 = 1;
iParton0 = 0;
```

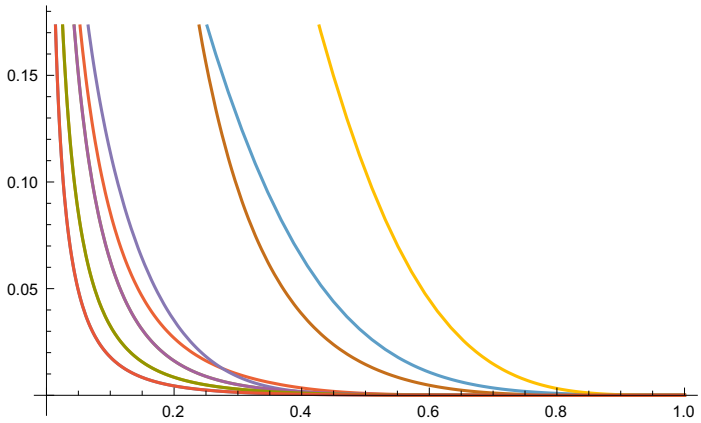
In[106]:=
```
fullSetList = {ct10, mstw, nnpdf, ct10pds, cteq66};
setList = First /@ fullSetList
```

Out[107]=
```
{1, 54, 95, 196, 248}
```

Plot flavors of a single PDF

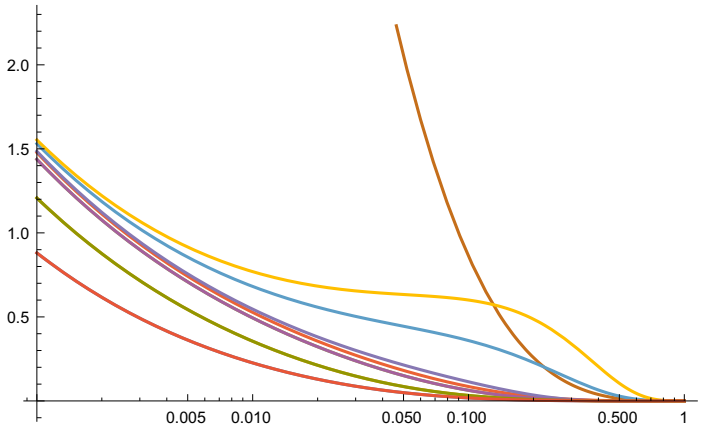
In[108]:=
```
Plot[
 Table[x pdf[iset0, iPart, x, q0], {iPart, -5, 5}] // Evaluate
 , {x, 10^-3, 1}]
```

Out[108]=



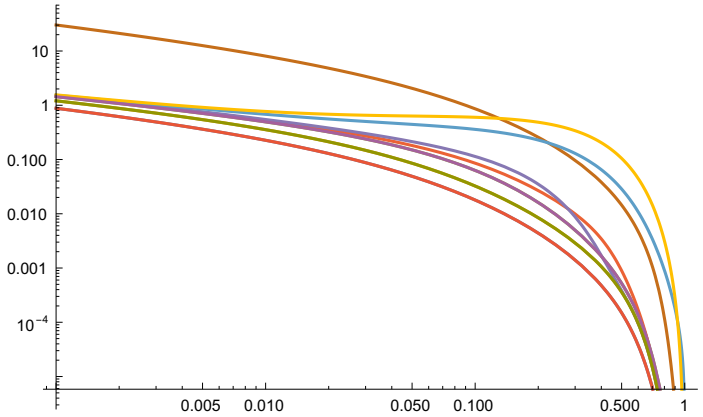
In[109]:=
```
LogLinearPlot[
 Table[x pdf[iset0, iPart, x, q0], {iPart, -5, 5}] // Evaluate
 , {x, 10^-3, 1}]
```

Out[109]=



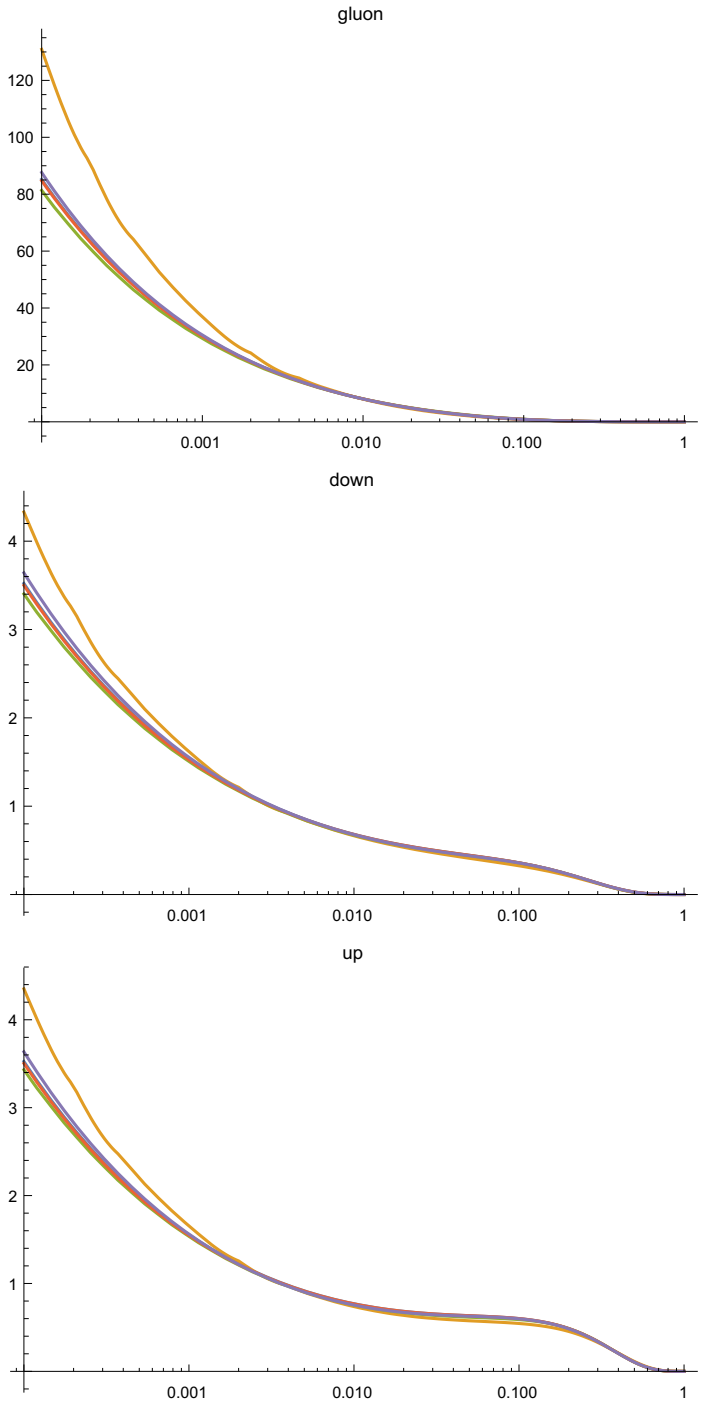
In[110]:=
```
LogLogPlot[
 Table[x pdf[iset0, iPart, x, q0], {iPart, -5, 5}] // Evaluate
 , {x, 10^-3, 1}]
```

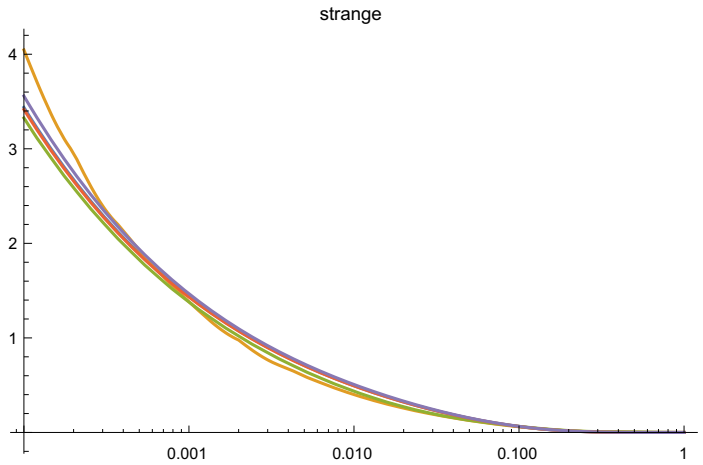
Out[110]=

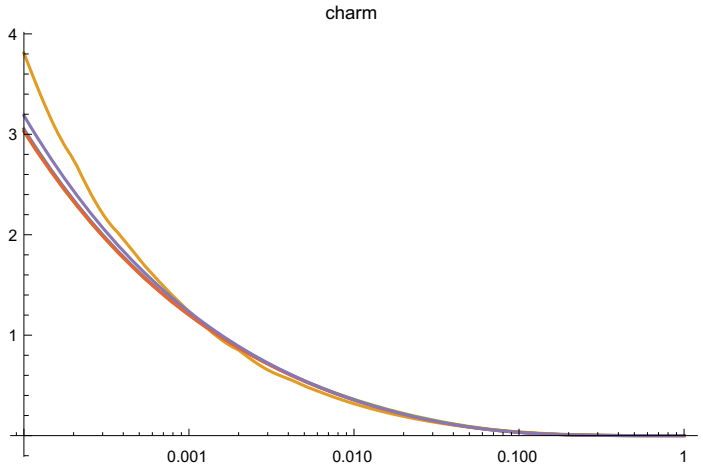


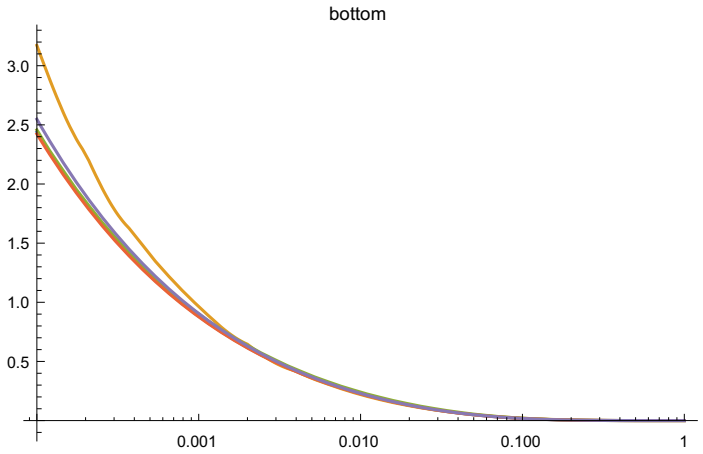
Plot single flavor of multiple PDF

In[111]:=
```
Do[
 LogLinearPlot[
   Table[x pdf[setList[[i]], ipart, x, q0], {i, 1, Length[setList]}] // Evaluate
   , {x, 10^-4, 1}, PlotLabel → pdfFlavor[ipart]] // Print
 , {ipart, 0, 5}]
```


gluon
120
100
80
60
40
20
0.001
0.010
0.100
1
down
4
3
2
1
0.001
0.010
0.100
1
up
4
3
2
1
0.001
0.010
0.100
1


strange
4
3
2
1
0.001
0.010
0.100
1

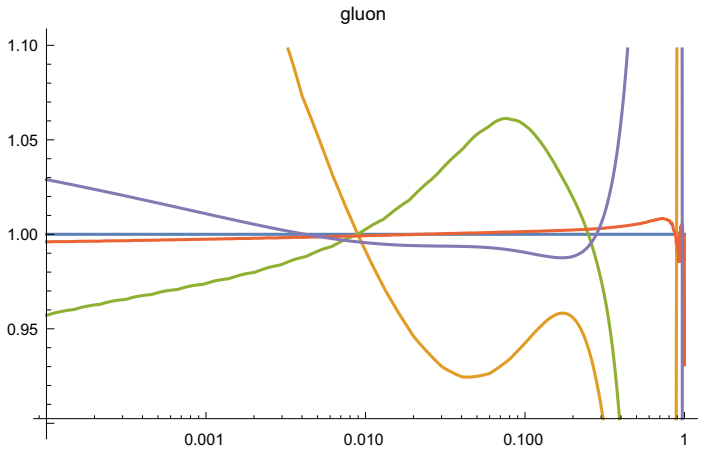

charm
4
3
2
1
0.001
0.010
0.100
1

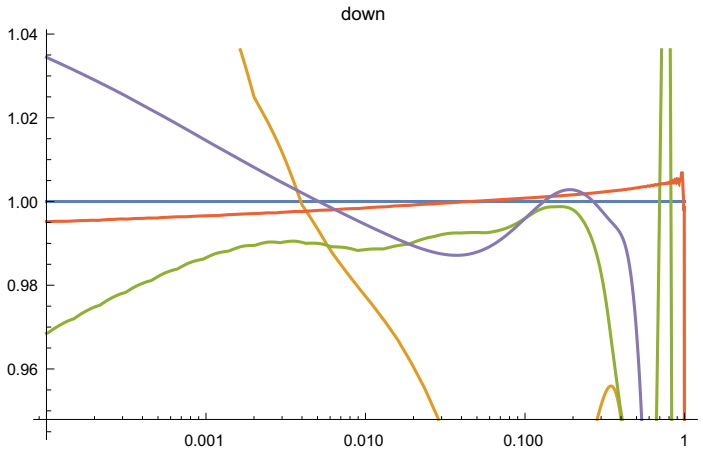

bottom
3.0
2.5
2.0
1.5
1.0
0.5
0.001
0.010
0.100
1

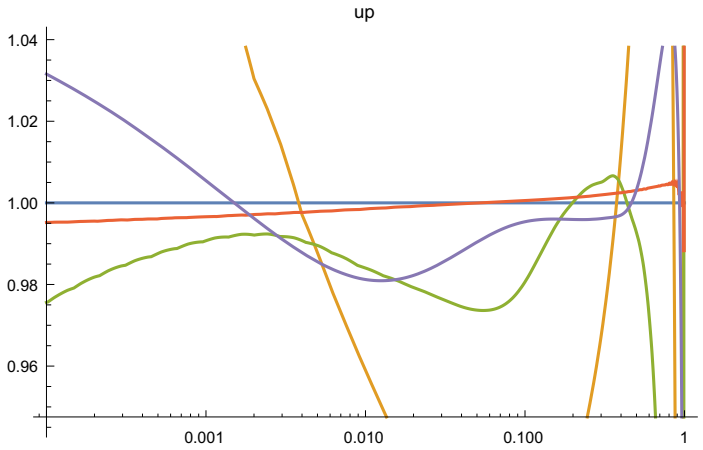
Plot Ratios of single flavor of multiple PDF

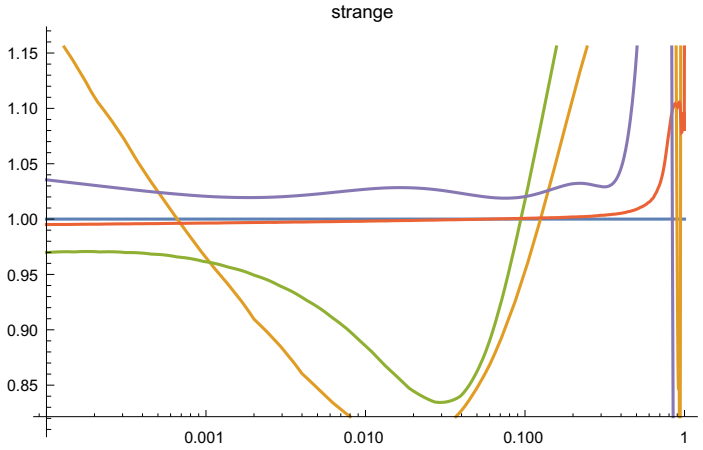
In[112]:=
```
pdfSetXpower[1]

Do[
 LogLinearPlot[
  Table[ pdf[setList[[i]], ipart, x, q0] / pdf[setList[[1]], ipart, x, q0], {i, 1, Length[setList]}] // Evaluate
  , {x, 10^-4, 1}, PlotLabel → pdfFlavor[ipart]] // Print
 , {ipart, 0, 5}]
```

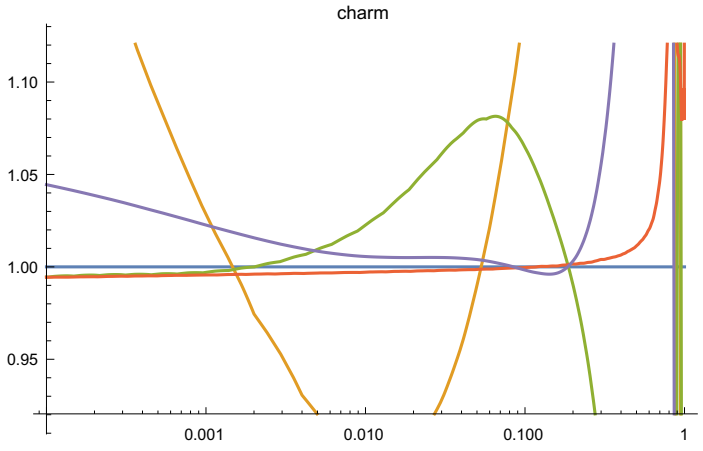
```
ManeParse cubic interpolation will be used.
The x-power of the interpolation is set to 1
```

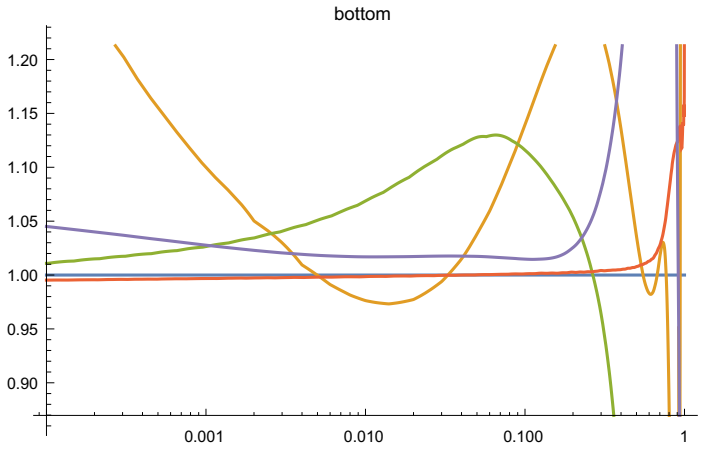





up
1.04
1.02
1.00
0.98
0.96
0.001
0.010
0.100
1


strange
1.15
1.10
1.05
1.00
0.95
0.90
0.85
0.001
0.010
0.100
1


charm
1.10
1.05
1.00
0.95
0.001
0.010
0.100
1



Speed Test: 1000 calls of each set

In[114]:=
```
pdfSetInterpolator ["MMA"]
```

```
Default Mathematica interpolator will be used.
```

In[115]:=
```
fullSetList = {ct10, mstw, nnpdf, ct10pds, cteq66};
setList = First /@ fullSetList
```

Out[116]=
```
{1, 54, 95, 196, 248}
```

In[117]:=
```
q0 = 10.;
Do[
 Print["iset =", setList[[i]]];
 Table[pdf[setList[[i]], RandomInteger[{-5, 5}], RandomReal[], q0], {j, 1000}] // Timing //
   First // Print;
 , {i, 1, Length[setList]}]
```

```
iset =1
0.734992
iset =54
0.612173
iset =95
0.770472
iset =196
0.732774
iset =248
0.730468
```

Error PDF w/ Hessian sets

In[119]:=
```
xlist = Table[10. ^ i, {i, -4, 0, 1 / 8}] // Drop[#, -1] &
```

Out[119]=
```
{0.0001 , 0.000133352 , 0.000177828 , 0.000237137 , 0.000316228 , 0.000421697 ,
 0.000562341 , 0.000749894 , 0.001 , 0.00133352 , 0.00177828 , 0.00237137 ,
 0.00316228 , 0.00421697 , 0.00562341 , 0.00749894 , 0.01 , 0.0133352 ,
 0.0177828 , 0.0237137 , 0.0316228 , 0.0421697 , 0.0562341 , 0.0749894 , 0.1 ,
 0.133352 , 0.177828 , 0.237137 , 0.316228 , 0.421697 , 0.562341 , 0.749894}
```

In[120]:=
```
pdf[cteq66 , 0, 0.1, 10.]
```

Out[120]=
```
{11.0883 , 11.1187 , 11.0573 , 11.1202 , 11.0572 , 11.0862 , 11.0903 , 11.2019 , 10.9682 ,
 11.2574 , 10.9013 , 11.3857 , 10.7655 , 10.9657 , 11.2108 , 11.0705 , 11.1066 , 11.1095 ,
 11.0642 , 11.0989 , 11.0751 , 10.9216 , 11.2274 , 11.1034 , 11.072 , 11.1813 , 10.9852 ,
 11.0453 , 11.1219 , 11.0529 , 11.1283 , 10.9425 , 11.194 , 11.0119 , 11.1392 , 11.1182 ,
 11.0519 , 10.8565 , 11.3081 , 11.1406 , 11.0347 , 11.1061 , 11.0658 , 11.082 , 11.0617}
```

In[121]:=
```
? pdfHessianError
```

Out[121]=

Symbol

pdfHessianError [family ,flavor ,x,Q,[method]]: This function returns the PDF uncertainty for Hessian PDF error sets in *family* , at given momentum fraction *x* and scale *Q* .

The optional input *method* defaults to "sym" for the symmetric error. You may also set this input to "plus" or "minus" for the positive and negative asymmetric errors.

Warning : The function assumes that the first member of family is the central value PDF set followed by an even number of PDF eigenvector sets.

The eigenvector sets should alternate between the plus and minus errors for each of the parameters .

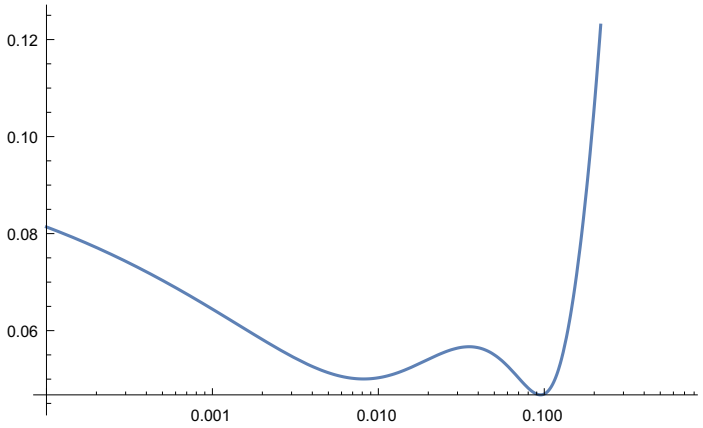
pdfHessianError [f[setNumber],[method]]: Will accept a list or function *f* of sets *setNumber* obtained over a Hessian PDF family.

In[122]:=
```
pdfHessianError [pdf[cteq66 , 0, 0.1, 10.]]
```

Out[122]=
```
0.520415
```

In[123]:=
```
ipart0 = 0;
q0 = 10.;
LogLinearPlot[pdfHessianError[pdf[cteq66, ipart0, x, q0]] / pdf[cteq66[[1]], ipart0, x, q0], {x, 10.^-4, 0.7}]
```

Out[125]=



In[126]:=
```
central = pdf[cteq66[[1]], ipart0, #, q0] & /@ xlist
```

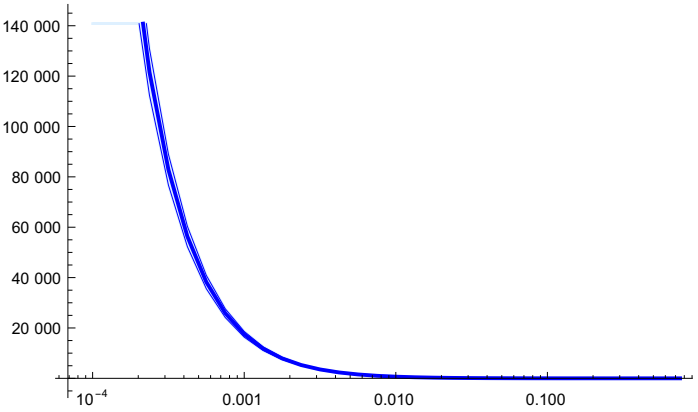
Out[126]=
```
{380 767., 260 692., 178 178., 121 603., 82 842.7, 56 333.9, 38 224., 25 881.3,
 17 480.9, 11 775.3, 7907.2, 5292.29, 3528.32, 2341.95, 1546.03, 1014.43,
 660.461, 426.012, 271.568, 170.516, 105.053, 63.1767, 36.8505, 20.691,
 11.0883, 5.618, 2.66386, 1.16846, 0.467216, 0.166503, 0.0492013, 0.00729601}
```

In[127]:=
```
error = pdfHessianError[pdf[cteq66, ipart0, #, q0]] & /@ xlist
```

Out[127]=
```
{30 982.9, 20 777.3, 13 880.2, 9238.42, 6122.95, 4040.23, 2652.71, 1733.19, 1126.33,
 728.137, 468.283, 299.938, 191.603, 122.434, 78.5327, 50.7992, 33.2095,
 21.9059, 14.4603, 9.41753, 5.94106, 3.55473, 1.97668, 1.01649, 0.520415,
 0.321429, 0.233165, 0.164019, 0.10583, 0.062599, 0.0314524, 0.00786853}
```

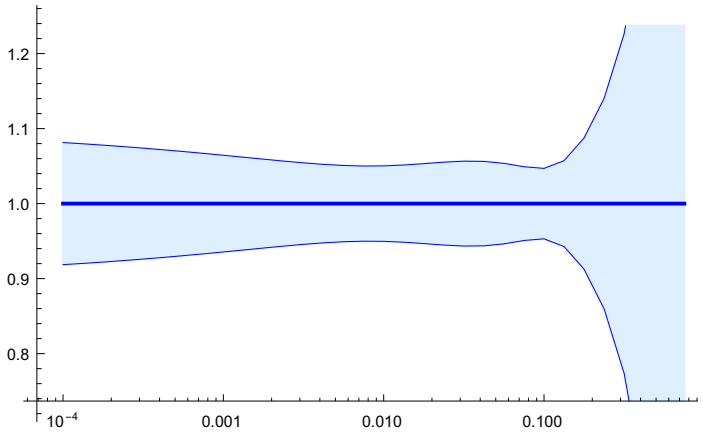
In[128]:=
```
mid = Transpose[{xlist, central}];
up = Transpose[{xlist, central + error}];
down = Transpose[{xlist, central - error}];

ListLogLinearPlot[{up, mid, down},
 Joined → True,
 Filling → {2},
 FillingStyle → LightBlue,
 PlotStyle → ({#, Blue} & /@ {Thin, Thick, Thin})
]
```

Out[131]=



In[132]:=
```
mid = Transpose[{xlist, central/central}];
up = Transpose[{xlist, (central + error)/central}];
down = Transpose[{xlist, (central - error)/central}];

ListLogLinearPlot[{up, mid, down},
 Joined → True,
 Filling → {2},
 FillingStyle → LightBlue,
 PlotStyle → ({#, Blue} & /@ {Thin, Thick, Thin})
]
```

Out[135]=



Error PDF w/ MC sets

In[136]:=
```
xlist = Table[10.^i, {i, -4, 0, 1/8}] // Drop[#, -1] &
```

Out[136]=
```
{0.0001, 0.000133352, 0.000177828, 0.000237137, 0.000316228, 0.000421697,
 0.000562341, 0.000749894, 0.001, 0.00133352, 0.00177828, 0.00237137,
 0.00316228, 0.00421697, 0.00562341, 0.00749894, 0.01, 0.0133352,
 0.0177828, 0.0237137, 0.0316228, 0.0421697, 0.0562341, 0.0749894, 0.1,
 0.133352, 0.177828, 0.237137, 0.316228, 0.421697, 0.562341, 0.749894}
```

In[137]:=
```
pdf[nnpdf, 0, 0.1, 10.]
```

Out[137]=
```
{12.207, 12.5159, 12.3313, 12.6324, 11.88, 12.4589, 12.3173, 12.1461, 12.1531,
 12.5251, 12.2188, 11.5647, 12.3295, 11.6583, 12.2525, 12.4926, 12.4428,
 12.3161, 12.4497, 12.2567, 12.9039, 12.2476, 12.1758, 12.2701, 12.3423,
 12.0201, 12.3131, 12.2846, 12.1049, 12.6721, 12.6727, 12.0485, 11.939,
 11.8537, 12.2906, 12.3333, 11.9892, 12.3866, 12.1174, 12.2578, 11.9409,
 12.2117, 12.143, 12.0268, 12.4167, 12.2573, 12.4035, 12.1066, 12.224, 12.1717,
 12.0302, 12.1057, 12.1563, 12.4831, 11.682, 11.9222, 12.3201, 12.0099,
 12.0033, 12.7423, 12.1389, 12.1197, 12.5887, 11.7591, 12.2829, 12.051, 12.148,
 12.7144, 12.163, 11.7889, 11.7722, 11.9971, 12.324, 12.088, 12.4275, 12.1174,
 12.0023, 11.9895, 12.1092, 12.1207, 11.9701, 12.2022, 11.8597, 12.8039,
 12.1035, 12.2958, 12.0569, 12.3436, 12.1236, 12.592, 12.0457, 12.0285,
 12.043, 12.3269, 12.5831, 12.1724, 12.205, 12.212, 12.0737, 12.1698, 12.2588}
```

In[138]:=
```
? pdfMCError
```

Out[138]=

Symbol

pdfMCError [family ,flavor ,x,Q]: This function returns the symmetric PDF uncertainty for Monte Carlo PDF error sets in *family* .

pdfMCError [f[setNumber],[method]]: Will accept a list or function *f* of sets *setNumber* obtained over a Monte Carlo PDF replica family .

The optional input *method* defaults to "sym" for the symmetric error. You may also set this input to "plus" or "minus" for the positive and negative asymmetric errors.

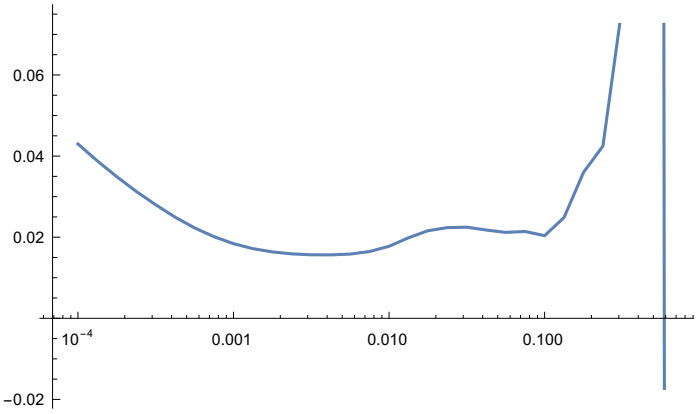
In[139]:=
```
pdfMCError[pdf[nnpdf, 0, 0.1, 10.]]
```

Out[139]=
```
0.248746
```

In[140]:=
```
ipart0 = 0;
q0 = 10.;
(* THIS TAKES A LONG TIME
 LogLinearPlot[pdfMCError[pdf[nnpdf,ipart0,x,q0]]/pdf[nnpdf[[1]],ipart0,x,q0],{x,10.^-4,0.7}]
*)
```

In[142]:=
```
ListLogLinearPlot[
 Transpose[{xlist, (pdfMCError[pdf[nnpdf, ipart0, #, q0]] / pdf[nnpdf[[1]], ipart0, #, q0]) & /@ xlist}]
 , Joined → True]
```

Out[142]=



In[143]:=
```
central = pdf[nnpdf[[1]], ipart0, #, q0] & /@ xlist
```

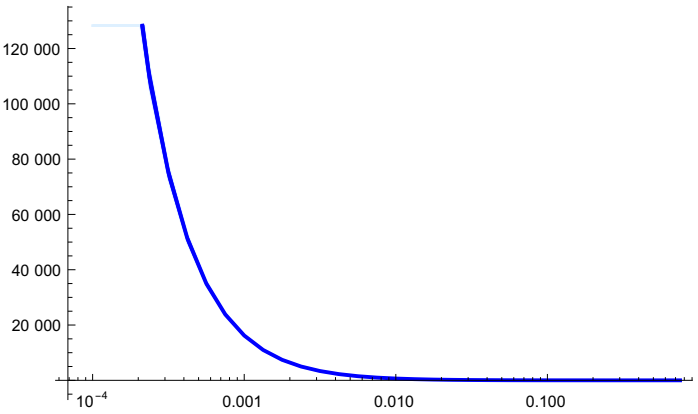
Out[143]=
```
{337 356., 232 042., 159 521., 109 549., 75 101.3, 51 310.2, 34 997.4, 23 834.7,
 16 203., 10 979., 7414.15, 4995.76, 3356.82, 2246.81, 1493.12, 987.221,
 648.563, 422.67, 272.164, 172.957, 108.225, 66.2964, 39.4227, 22.49, 12.207,
 6.16079, 2.88124, 1.24194, 0.479058, 0.151288, 0.0246692, -0.00145215}
```

In[144]:=
```
error = pdfMCError[pdf[nnpdf, ipart0, #, q0]] & /@ xlist
```

Out[144]=
```
{14 502.7, 9003.64, 5567.8, 3427.03, 2102.27, 1279.47, 780.347, 479.487, 298.252,
 188.497, 121.336, 79.3764, 52.5759, 35.137, 23.6488, 16.2579, 11.521,
 8.39164, 5.87751, 3.86822, 2.43145, 1.443, 0.835067, 0.481493, 0.248746,
 0.153142, 0.103677, 0.0527781, 0.0370578, 0.0285079, 0.0127916, 0.00411808}
```

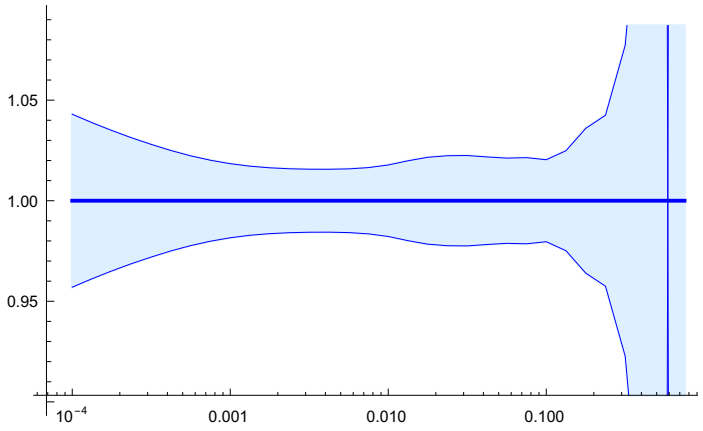
In[145]:=
```
mid = Transpose[{xlist, central}];
up = Transpose[{xlist, central + error}];
down = Transpose[{xlist, central - error}];

ListLogLinearPlot[{up, mid, down},
 Joined → True,
 Filling → {2},
 FillingStyle → LightBlue,
 PlotStyle → ({#, Blue} & /@ {Thin, Thick, Thin})
]
```

Out[148]=



In[149]:=
```
mid = Transpose[{xlist, central/central}];
up = Transpose[{xlist, (central + error)/central}];
down = Transpose[{xlist, (central - error)/central}];

ListLogLinearPlot[{up, mid, down},
 Joined → True,
 Filling → {2},
 FillingStyle → LightBlue,
 PlotStyle → ({#, Blue} & /@ {Thin, Thick, Thin})
]
```

Out[152]=



Luminosity

In[153]:= `? pdfLuminosity`

Out[153]=

Symbol

pdfLuminosity [setNumber ,sqrtS ,mX ,flavor1 ,flavor2 ,[precisionGoal]]: This function returns the integrated parton–parton luminosity for collider energy *sqrtS* = $S^{1/2}$, particle mass *mX* , and PDF flavors *flavor1* and *flavor2* , for the set *setNumber* .

The numerical integral is performed with the precision goal in the optional parameter *precisionGoal* , which has a default value of *precisionGoal* = 3.

The parton luminosity is defined according to Eq.(46) in Campbell , Huston , Stirling , arXiv :hep–ph/0611148 v1

In[154]:=

In[155]:= `pdfLuminosity[1, 14000, 80.3, 1, -2]`

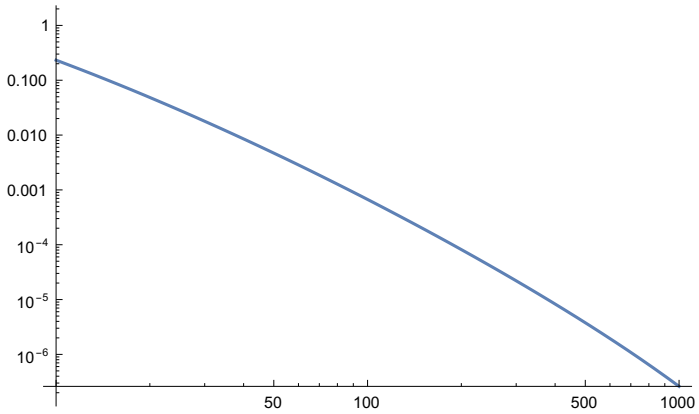
Out[155]= `0.00125959`

In[156]:= `massTable = Table[10.^i, {i, 1, 3, 1/10}]`

Out[156]= `{10., 12.5893, 15.8489, 19.9526, 25.1189, 31.6228, 39.8107, 50.1187, 63.0957, 79.4328, 100., 125.893, 158.489, 199.526, 251.189, 316.228, 398.107, 501.187, 630.957, 794.328, 1000.}`

In[157]:= `LogLogPlot[pdfLuminosity[1, 14000, m, 1, -2], {m, 10., 1000}]`

Out[157]=

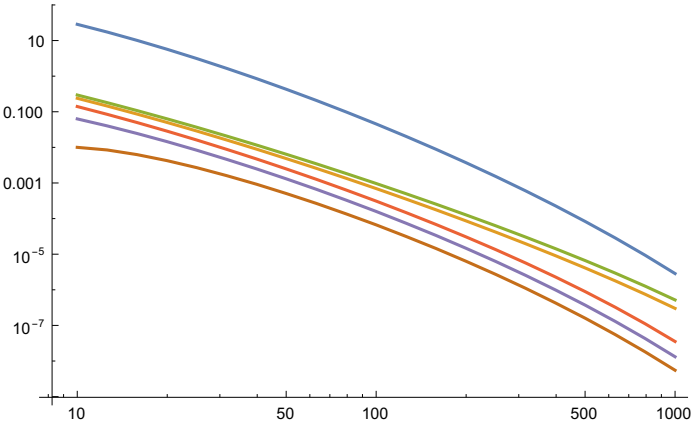


In[158]:=
```
lum[i_] :=
 lum[i] = Transpose[{massTable, pdfLuminosity[1, 14000, #, i, -i] & /@ massTable}]
```

In[159]:= `Table[lum[i], {i, 1, 5}];`

In[160]:=
```
ListLogLogPlot[Table[lum[i], {i, 0, 5}], Joined → True]
```

Out[160]=



Alpha-s

In[161]:=
```
? pdfAlphaS
```

Out[161]=

Symbol

pdfAlphaS [setNumber , Q]:This function returns the value of α_S at hard scattering energy Q when this information is available in the .pds or .info file.

Warning : This function will print a text message and return a Null value if the α_S information is not available .

In[162]:=
```
setList
```

Out[162]=
```
{1, 54, 95, 196, 248}
```

In[163]:=
```
Table[{setList[[i]], pdfAlphaS[setList[[i]], 91.2]}, {i, 1, Length[setList]}] // TableForm
```

```
Created  pdfAlphaS  for  iSet  =  1

1  has   1  sub-grid

Created  pdfAlphaS  for  iSet  =  54

PDF  Set  =  54  has   3  sub-grids

Created  pdfAlphaS  for  iSet  =  95

PDF  Set  =  95  has   3  sub-grids
```

Out[163]//TableForm=

1	0.117998
54	0.139384
95	0.118003
196	Null[]
248	Null[]

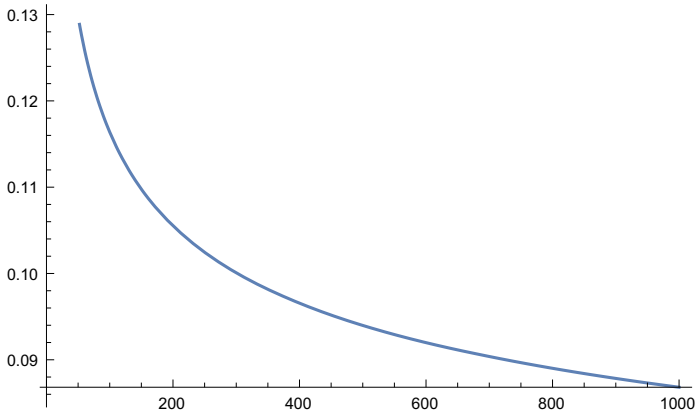
In[164]:=
```
pdfSetList[[setList]] // TableForm
```

Out[164]//TableForm=

1	/usr/local/share/LHAPDF/CT10nlo/CT10nlo_0000.dat
54	/usr/local/share/LHAPDF/MSTW2008lo68cl/MSTW2008lo68cl_0000.dat
95	/usr/local/share/LHAPDF/NNPDF30_nlo_as_0118/NNPDF30_nlo_as_0118_0000.dat
196	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ct10.pds
248	/home/olness/Dropbox/mp/ManeParse5_DEMO/FOR WEB/ManeParse5_Demo/PDFDIR/PDS/ctq66m.p

In[165]:=
```
Plot[pdfAlphaS[1, q], {q, 10, 1000}]
```

Out[165]=



Small x

In[166]:=
```
? pdfLowFunction
```

Out[166]=

Symbol

pdfLowFunction [setNumber , flavor , x, Q, [power]]: This function returns the value of the PDF as in pdfFunction , but with an extrapolation below the minimum x value that goes as $\frac{1}{x^{power}}$.

The optional input , *power* , has a default value of power = 1.0 .

In[167]:=
```
LogLogPlot [
 Table[pdfLowFunction [1, 0, x, 100. , i], {i , 0.4 , 1.6 , 0.2}] // Evaluate ,
 {x, 10. ^ -15, 0.5},
 PlotRange → {{Log[10 ^ -1], Log[10 ^ 15]}, All},
 PlotStyle → {Red , Green , Orange , Magenta , Cyan , Yellow , Blue , Purple}
]
```

Out[167]=