

2021 summer school setup for likelihood analysis with fermipy

There are some extra steps we need to make in Week 2 to prepare for running analysis tutorials and projects. Please follow the instructions below and reach out for help if needed.

Download data and configuration files

To run the example you will need a few additional files.

- 3C 279 photon and spacecraft files, PH00.fits PH01.fits and SC00.fits.
- Configuration file for fermipy, config.yaml
- Jupyter notebook, LikelihoodWithFermipy2021.ipynb
- Precomputed data files (so you can go through the example quickly the first time without waiting for calculations).

Prepare FermiBottle for analysis

Is FermiBottle running? You should have a window with a fermi prompt similar to this.

```
fermi@76e734507a6f:~  
(fermi) [fermi@76e734507a6f ~]$  
(fermi) [fermi@76e734507a6f ~]$  
(fermi) [fermi@76e734507a6f ~]$  
(fermi) [fermi@76e734507a6f ~]$  
(fermi) [fermi@76e734507a6f ~]$  
(fermi) [fermi@76e734507a6f ~]$  
(fermi) [fermi@76e734507a6f ~]$  
(fermi) [fermi@76e734507a6f ~]$  
(fermi) [fermi@76e734507a6f ~]$  
(fermi) [fermi@76e734507a6f ~]$  
(fermi) [fermi@76e734507a6f ~]$  
(fermi) [fermi@76e734507a6f ~]$  
(fermi) [fermi@76e734507a6f ~]$  
(fermi) [fermi@76e734507a6f ~]$ pwd  
/home/fermi  
(fermi) [fermi@76e734507a6f ~]$ ls  
astrosoft  pfiles  
(fermi) [fermi@76e734507a6f ~]$
```

If you don't have a window open to FermiBottle, follow the instructions to start docker on your host system and attach to the FermiBottle container. Remember to activate the Fermi analysis using "conda activate fermi" when you restart the FermiBottle container. You'll know this has been done when you see the fermi prompt. The steps to start docker and set up the Fermi environment are described in [Using FermiBottle instructions](#).

Update fermipy

To run the example, you will need to update to the latest version of fermipy, 1.0.1.

In your FermiBottle window run the command
`pip install --upgrade fermipy`

```
fermi@76e734507a6f:~  
(fermi) [fermi@76e734507a6f ~]$  
(fermi) [fermi@76e734507a6f ~]$  
(fermi) [fermi@76e734507a6f ~]$  
(fermi) [fermi@76e734507a6f ~]$  
(fermi) [fermi@76e734507a6f ~]$  
(fermi) [fermi@76e734507a6f ~]$  
(fermi) [fermi@76e734507a6f ~]$  
(fermi) [fermi@76e734507a6f ~]$  
(fermi) [fermi@76e734507a6f ~]$  
(fermi) [fermi@76e734507a6f ~]$  
(fermi) [fermi@76e734507a6f ~]$  
(fermi) [fermi@76e734507a6f ~]$  
(fermi) [fermi@76e734507a6f ~]$ pwd  
/home/fermi  
(fermi) [fermi@76e734507a6f ~]$ ls  
astrosft  pfiles  
(fermi) [fermi@76e734507a6f ~]$ pip install --upgrade fermipy
```

This will take a little time to download and install the packages.

Make a new directory for the fermipy tutorial in FermiBottle

Follow these steps to prepare to run the Likelihood With Fermipy notebook

In the FermiBottle window

1. Change directory to make /data your working directory
2. Create a directory for this tutorial in /data. Let's call it FermipyTutorial.
3. Change directory to make /data/FermipyTutorial your working directory

```
fermi@76e734507a6f:/data/FermipyTutorial
(fermi) [fermi@76e734507a6f ~]$ cd /data
(fermi) [fermi@76e734507a6f data]$ mkdir FermipyTutorial
(fermi) [fermi@76e734507a6f data]$ cd FermipyTutorial
(fermi) [fermi@76e734507a6f FermipyTutorial]$
```

Download and unzip the tutorial file in FermiBottle

Next, in the FermiBottle window, use `wget` to download the data file into the tutorial directory using the command shown below.

`wget https://fermi.gsfc.nasa.gov/science/mtgs/summerschool/2021/fermipyTutorialData.tgz`

```
fermi@76e734507a6f:/data/FermipyTutorial
(fermi) [fermi@76e734507a6f FermipyTutorial]$
(fermi) [fermi@76e734507a6f FermipyTutorial]$
(fermi) [fermi@76e734507a6f FermipyTutorial]$ wget https://fermi.gsfc.nasa.gov/science/mtgs/summerschool/2021/fermipyTutorialData.tgz
--2021-06-14 16:54:24-- https://fermi.gsfc.nasa.gov/science/mtgs/summerschool/2021/fermipyTutorialData.tgz
Resolving fermi.gsfc.nasa.gov (fermi.gsfc.nasa.gov)... 129.164.179.26
Connecting to fermi.gsfc.nasa.gov (fermi.gsfc.nasa.gov)|129.164.179.26|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 576496751 (550M) [application/x-tar]
Saving to: â

 9% [====>] 55,086,160 4.90MB/s eta
100%[=====] 576,496,751 4.29MB/s in 2m 7s

2021-06-14 16:56:30 (4.34 MB/s) - â saved [576496751/576496751]
(fermi) [fermi@76e734507a6f FermipyTutorial]$
```

Then unzip and extract the archived files.

```
fermi@76e734507a6f:/data/FermipyTutorial
(fermi) [fermi@76e734507a6f FermipyTutorial]$ ls
FermipyTutorialData.tgz
(fermi) [fermi@76e734507a6f FermipyTutorial]$ tar -zxvf FermipyTutorialData.tgz
LikelihoodWithFermipy2021.ipynb
config.yaml
data/PH00.fits
data/PH01.fits
data/SC00.fits
data/events.txt
data/evfile_00.txt
data/evfile_01.txt
data/evfile_02.txt
data/evfile_03.txt
data/ccube_00.fits
data/ccube_01.fits
data/ccube_02.fits
data/ccube_03.fits
data/ccube.fits
data/bxmap_00.fits
data/bxmap_01.fits
data/bxmap_02.fits
data/bxmap_03.fits
data/bxmap_roi_00.fits
data/bxmap_roi_01.fits
data/bxmap_roi_02.fits
data/bxmap_roi_03.fits
data/lcube_00.fits
data/lcube_01.fits
data/lcube_02.fits
data/lcube_03.fits
data/srcmap_00.fits
data/srcmap_01.fits
data/srcmap_02.fits
data/srcmap_03.fits
data/srcmdl_00.xml
data/srcmdl_01.xml
data/srcmdl_02.xml
data/srcmdl_03.xml
(fermi) [fermi@76e734507a6f FermipyTutorial]$
```

You should see something like this when you list the directory contents.

```
fermi@76e734507a6f:/data/FermipyTutorial
(fermi) [fermi@76e734507a6f FermipyTutorial]$ ls
config.yaml data FermipyTutorialData.tgz LikelihoodWithFermipy2021.ipynb
(fermi) [fermi@76e734507a6f FermipyTutorial]$ ls data
bxmap_00.fits bxmap_roi_02.fits ccube.fits ltcube_00.fits SC00.fits srcmdl_01.xml
bxmap_01.fits bxmap_roi_03.fits events.txt ltcube_01.fits srcmap_00.fits srcmdl_02.xml
bxmap_02.fits ccube_00.fits evfile_00.txt ltcube_02.fits srcmap_01.fits srcmdl_03.xml
bxmap_03.fits ccube_01.fits evfile_01.txt ltcube_03.fits srcmap_02.fits
bxmap_roi_00.fits ccube_02.fits evfile_02.txt PH00.fits srcmap_03.fits
bxmap_roi_01.fits ccube_03.fits evfile_03.txt PH01.fits srcmdl_00.xml
(fermi) [fermi@76e734507a6f FermipyTutorial]$
```

Start the Jupyter notebook

In that same directory, you can now run the notebook command to start the tutorial.