



Set-up for documentation tutorials and datasets access

Jose Enrique Ruiz – IAA / CSIC

Gammapy Coding Sprint

Madrid - October 1st 2018

FIG 4 - Setup for tutorial notebooks and data

- Author: José Enrique Ruiz, Christoph Deil
- Created: May 16, 2018
- Accepted: tbd
- Status: draft
- Discussion: [GH 1419](#)

Abstract

For the past years, we have had tutorial notebooks and example datasets in a second `gammapy-extra` repository. The motivation was to keep the main `gammapy` code repository small. But we always had problems with code, tutorials and data changing and versions not being linked.

We propose to move the notebooks to the `gammapy` repository so that code and tutorials can be version-coupled, and to only use stable datasets in tutorials to mostly save the versioning issues. The datasets will remain in `gammapy-extra` repository.

To ship tutorials and datasets to users, we propose to add a `gammapy download` command. The `gammapy-extra` repository will remain as a repository for developers and as one place where datasets can be put, but it will not be mentioned to users.



gammapy

A Python package for gamma-ray astronomy

python awesome astronomy astropy

Python 73 82 Updated 32 minutes ago

gammapy-docs

Gammapy docs build & deploy on Github pages

Python 1 Updated 20 hours ago

gammapy-webpage

Repository for the Gammapy webpage

HTML 1 6 MIT Updated 23 hours ago

gamma-cat

An open data collection and source catalog for gamma-ray astronomy

astronomy dataset gamma-ray-astronomy source-catalog

Python 7 14 BSD-3-Clause 13 issues need help Updated on 16 Jul

gammapy-extra

Gammapy extras (datasets, notebooks, ...)

Jupyter Notebook 4 30 Updated 2 days ago

gammapy-fermi-lat-data

This repository contains pre-computed Fermi-LAT datasets.

Shell 1 2 Updated 10 days ago

File	Commit Message
examples	Updating astropy-helpers to 2.0.6
gammapy	Remove devformat_crab_sed.py
licenses	Mention light_curve tutorial in docs/tutorials.rst
tutorials	Run black
.gitignore	Update downloadclass.py
.gitmodules	Merge remote-tracking branch 'template/master'
.travis.yml	Fix broken link in hess.pyrib
CHANGES.rst	Various fixes minor to tutorials and get started docs page
Dockerfile	Updating to the actual astropy-helpers
LONG_DESCRIPTION.rst	Update .travis.yml
MANIFEST.in	Update CHANGES.rst for v0.8
Makefile	Update Dockerfile
README.rst	Changing all readthedocs.org to readthedocs.io
ah_bootstrap.py	Add conda environment-dev.yml
appveyor.yml	Params for docs-building in make-docs
binder.py	Update README.rst
environment-dev.yml	Updating helpers to v2.0.5
ez_setup.py	Add CI testing for Python 3.7
lgdm.yml	Configure Binder
setup.cfg	Use gammapy.scripts.jupyter.test_notebooks
setup.py	Update astropy-helpers to v2.0rc1
	Update lgdm.yml
	Update setup.cfg
	Require regions>=0.3 in setup.py

File	Commit Message
experiments	Add sky image estimator prototype
figures	clean up code and comments
logo	Add Gammapy logos in PNG format
posters	Adds poster presented at the MSSL/UCL Wavelength conference February ...
presentations	Add presentations/2017-01-13_Gammapy.pdf
test_datasets	Add test_datasets/unbundled/tev_spectra/format_crab_sed.py
valhalla	Add valhalla/cta_simulation
.gitignore	Change
README.rst	Remove



gammapy-webpage

Docs • Getting started

gammapy-docs

A Python package for gamma-ray astronomy

Gammapy is a community-developed, open-source Python package for gamma-ray astronomy. It is a prototype for the CTA science tools. This page (<http://docs.gammapy.org>) contains the Gammapy documentation. The Gammapy webpage (<http://gammapy.org>) contains information about Gammapy, including news and contact information if you have any questions, want to report an issue or request a feature, or need help with anything Gammapy-related.

Getting started

Gammapy works with Python 2 and 3, on Linux, Mac OS X and Windows. To get started, we recommend you follow the installation and setup instructions in [Getting Started](#) and then learn Gammapy via the Jupyter [Tutorial notebooks](#).

- Getting Started
- Tutorial notebooks
- Installation

Gammapy package

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gamma-cat

gammapy-fermi-lat-data



12MB

gammapy

- Updating astropy-helpers to 2.0.6
- Remove dev/format_crab_sed.py
- Mention light_curve tutorial in docs/tutorials.rst
- examples
- gammapy
- licenses
- tutorials
- .gitignore
- .gitmodules
- .travis.yml
- CHANGES.rst
- Dockerfile
- LONG_DESCRIPTION.rst
- MANIFEST.in
- Makefile
- README.rst
- ah_bootstrap.py
- apveyor.yml
- binder.py
- environment-dev.yml
- ex_setup.py
- lgtn.yml
- setup.cfg
- setup.py



gammapy-docs

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217MB

gammapy-extra

- experiments
- figures
- logo
- posters
- presentations
- test_datasets
- valhalla
- .gitignore
- README.rst



Documentation

- not coupled
- not versioned

- ✗ Rebuild old versions
- ✗ Reproduce notebooks

Notebooks working with old versions of Gammapy hard to recover

Binder not versioned, not accessible for old versions of the documentation



GitHub dependency

- Datasets are used in `gammapy.catalog`

- Datasets used in Tutorials

- Notebooks /Tutorials

```
git clone gammapy-extra
```

```
git clone gammapy-cat
```

```
git clone gammapy-fermi-lat-data
```

The image shows three overlapping screenshots of GitHub repository directories. The top screenshot is for 'gammapy-extra' and lists files like 'figures', 'logo', 'posters', 'presentations', and 'test_datasets'. The bottom-left screenshot is for 'gamma-cat' and lists files like 'checks', 'datasets', 'experiments', 'figures', 'logo', 'posters', 'presentations', 'test_datasets', and 'valhalla'. The bottom-right screenshot is for 'gammapy-fermi-lat-data' and lists files like 'checks', 'datasets', 'experiments', 'figures', 'logo', 'posters', 'presentations', 'test_datasets', and 'valhalla'. The GitHub logo is visible in the background.

Gain control on what to provide to the end user

- How? `gammapy download` access interface + `GAMMAPY_DATA` environment variable
- What? Content declared in index files maintained by ourselves
- Where? Content and index files may be stored anywhere



gammapy	
Remove dev/format_crab_sed.py	helpers to 2.0.6
Mention light_curve tutorial in docs/tutorials.rst	
Run black	
Update downloadclass.py	
Merge remote-tracking branch 'template/master'	
Fix broken link in hess.ipynb	
Various fixes minor to tutorials and get started docs page	
Updating to the actual astropy-helpers	
Update .travis.yml	
Update CHANGES.rst for v0.8	
Update Dockerfile	
Changing all readthedocs.org to readthedocs	
Add conda environment-dev.yml	
Params for docs-building in make-docs	
Update README.rst	
Updating helpers to v2.0.5	
Add CI testing for Python 3.7	
Configure Binder	
Use gammapy.scripts.jupyter.test_notebooks	
Update astropy-helpers to v2.0rc1	
Update lgtm.yml	
Update setup.cfg	
Require regions>=0.3 in setup.py	



RST

0.9.dev/7470

Getting Started

Tutorial notebooks

Installation

data - Data and observations

if - Instrument response functions

maps - Sky maps

image - Map image analysis

cube - Map cube analysis

detect - Source detection

background - Background modeling

spectrum - 1D spectrum analysis

time - Time analysis

stats - Statistics

utils - Utilities

scripts - Command line tools

datasets - Dataset access

catalog - Source catalogs

astro - Astrophysics

Developer documentation

References

Changelog

Docs » Getting started

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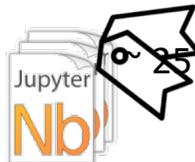
- Getting Started
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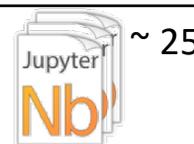
HTML



gammapy-extra	
dr3-with-background	
Add sky image estimator prototype	experiments
clean up code and comments	figures
Add Gammapy logos in PNG format	logo
Adds poster presented at the MSSL/UCL Wavelength conference February ...	posters
Add presentations/2017-01-13_Gammapy.pdf	presentations
Add test_datasets/unbundled/tev_spectra/format_crab_sed.py	test_datasets
Add valhalla/cta_simulation	valhalla
Change notebooks to use the new fitter interface	.gitignore
Remove Binder	README.rst

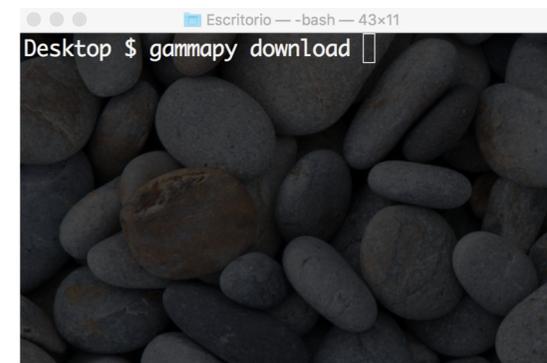


Datasets



YAML

gammapy-webpage	
round.fits.gz	
clean up code and comments	figures
Add Gammapy logos in PNG format	logo
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Add valhalla/cta_simulation	valhalla
Change notebooks to use the new fitter interface	.gitignore
Remove Binder space	README.rst





gammapy download

```
$ gammapy download -h
Usage: gammapy download [OPTIONS] COMMAND [ARGS]...
```

Download datasets and notebooks.

Download **notebooks published as tutorials and the related datasets** needed to execute them. It is also possible to download individual notebooks or datasets. The option ``tutorials`` will download by default the versioned file-structure of the tutorials into a ``gammapy-tutorials`` folder created at the current working directory. The option ``datasets`` will download by default the datasets used by Gammapy into a ``gammapy-datasets`` folder created at the current working directory. The option ``notebooks`` will download by default the jupyter notebook files used in the tutorials into a ``gammapy-notebooks`` folder created at the current working directory.

gammapy download



```
$ gammapy download -h
Usage: gammapy download [OPTIONS] COMMAND [ARGS]...

Download datasets and notebooks.

Options:
-h, --help  Show this message and exit.

Commands:
datasets  Download datasets
notebooks Download notebooks
tutorials Download tutorial notebooks and datasets
```



gammapy download

```
$ gammapy download -h
```

```
Usage: gammapy download [OPTIONS] COMMAND [ARGS]...
```

Download datasets and notebooks.

Examples

```
$ gammapy download notebooks
```

```
$ gammapy download datasets
```

```
$ gammapy download tutorials --release 0.8
```

```
$ gammapy download notebooks --src first_steps
```

```
$ gammapy download datasets --src fermi_3fhl --out localfolder/
```



gammapy download

```
$ gammapy download notebooks --src first_steps
```

  gammapy-notebooks

```
$ gammapy download datasets --src cta-1dc
```

  gammapy-datasets

```
$ gammapy download tutorials --src first_steps --release 0.8
```

    gammapy-tutorials

-  datasets
-  notebooks-0.8
-  environment.yml



working with Jupyter notebooks



Jupyter notebooks are different after every execution
lot of hidden content and results

- diff comparison and code review almost impossible
- git repositories grow in size after every commit

```
$ du -hs gammapy-extra/  
619M gammapy-extra/  
$ du -hs gammapy-extra/.git  
444M gammapy-extra/.git
```

Let's strip the output !

```
3D analysis  
This tutorial shows how to run a 3D map-based analysis using three example observations of the Galactic center region with CTA.  
  
Setup  
In [ ]: !matplotlib inline  
import matplotlib.pyplot as plt  
  
In [ ]: import numpy as np  
import astropy.units as u  
from astropy.coordinates import SkyCoord  
from gammapy.extern.pathlib import Path  
from gammapy.data import DataStore  
from gammapy.irf import EnergyDispersion  
from gammapy.maps import WcsGeom, MapAxis, Map  
from gammapy.cube import MapMaker, PSFKernel, MapFit  
from gammapy.cube.models import SkyModel  
from gammapy.spectrum.models import PowerLaw  
from gammapy.image.models import SkyGaussian, SkyPointSource  
from regions import CircleSkyRegion  
  
In [ ]: !gammapy info --no-envvar --no-dependencies --no-system  
  
Prepare modeling input data  
Prepare input maps  
We first use the DataStore object to access the CTA observations and retrieve a list of observations by passing the observations IDs to the .obs_list() method:  
  
In [ ]: # Define which data to use  
data_store = DataStore.from_dir("$GAMMAPY_DATA/cta-1dc/index/gps/")  
obs_ids = [110380, 111140, 111150]  
obs_list = data_store.obs_list(obs_ids)
```





Jupyter notebooks in the repositories **MUST BE EMPTY**

The output is only visible in the HTML documentation or after local execution

```
gammapy jupyter --src mynotebook.ipynb strip  
gammapy jupyter --src myfolder/ strip
```

Jupyter notebooks should have well formatted code cells

```
gammapy jupyter --src mynotebook.ipynb black  
gammapy jupyter --src myfolder/ black
```

Jupyter notebooks/tutorials should not be broken

```
gammapy jupyter --src mynotebook.ipynb test --tutor  
gammapy jupyter --src myfolder/ test --tutor
```

Jupyter notebooks may be executed from the terminal

```
gammapy jupyter --src mynotebook.ipynb run  
gammapy jupyter --src myfolder/ run
```

```
gammapy jupyter -h
```

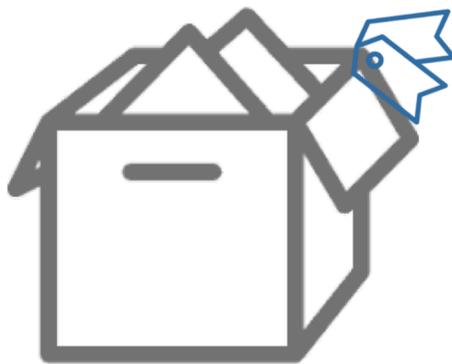
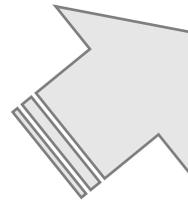
```
usage: gammapy jupyter [-OPTIONS] COMMAND [ARGS]...  
Perform a series of actions on Jupyter notebooks.  
  
The chosen action is applied for every Jupyter notebook present in the  
current working directory. Option --file allows to chose a single file,  
while option --fold allows to choose a different folder to scan. These  
options are mutually exclusive, only one is allowed.  
  
Examples  
-----  
$ gammapy jupyter strip  
$ gammapy jupyter --src mynotebooks.ipynb run  
$ gammapy jupyter --src myfolder/tutorials test  
$ gammapy jupyter black  
  
Options:  
--src TEXT Local folder or Jupyter notebook filename.  
-h, --help Show this message and exit.  
  
Commands:  
black Format code cells with black.  
run Execute Jupyter notebooks.  
strip Strip output cells.  
test Check if Jupyter notebooks are broken.
```



documentation building



Datasets



YAML
conda env file

The screenshot shows the Gammapy documentation page on Binder. The page title is "gammapy 0.9.dev7470". The left sidebar contains a navigation menu with items like "Getting Started", "Tutorial notebooks", "Installation", "data - Data and observations", "if - Instrument response functions", "maps - Sky maps", "image - Map image analysis", "cube - Map cube analysis", "detect - Source detection", "background - Background modeling", "spectrum - 1D spectrum analysis", "time - Time analysis", "stats - Statistics", "utils - Utilities", "scripts - Command line tools", "datasets - Dataset access", "catalog - Source catalogs", "astro - Astrophysics", "Developer documentation", "References", and "Changelog". The main content area shows the "Getting started" section, which includes the Gammapy logo and the text: "Gammapy is a community-developed, open-source astronomy. It is a prototype for the CTA science to (<http://docs.gammapy.org>) contains the Gammapy webpage (<http://gammapy.org>) contains information and contact information if you have any questions, a feature, or need help with anything Gammapy-related." Below this is the "Getting started" section, which states: "Gammapy works with Python 2 and 3, on Linux, Mac OS X and Windows. To get started, we recommend you follow the installation and setup instructions in [Getting Started](#) and then learn Gammapy via the Jupyter [Tutorial notebooks](#)." There are three bullet points: "Getting Started", "Tutorial notebooks", and "Installation". Below that is the "Gammapy package" section, which states: "As mentioned in the [Getting Started](#), the Gammapy package is structured as a series of sub-packages. We recommend that you start to learn Gammapy via the [Tutorial notebooks](#), and then consult the following pages for further information about each sub-package. Those pages also contain very detailed reference documentation for every function and class in Gammapy."



The screenshot shows a file listing for "gammapy-docs". The files and their descriptions are:

File	Description
figures	clean up code and comments
logo	Add Gammapy logos in PNG format
posters	Adds poster presented at the MSSL/UCL Wavelength conference February ...
presentations	Add presentations/2017-01-13_Gammapy.pdf
test_datasets	Add test_datasets/umbundled/tev_spectra/format_crab_sed.py
valhalla	Add valhalla/cta_simulation
.gitignore	Change notebooks to use the new filter interface
README.rst	Remove Binder space



Choose and create a virtual environment for your documentation

```
curl -O http://gammapy.org/download/install/gammapy-0.8-environment.yml
conda env create -f gammapy-0.8-environment.yml
conda activate gammapy-0.8
export GAMMAPY_DATA=/your/local/gammapy/data/folder
```

Check out the version for the RST files and tutorials

```
git checkout v0.8
```

Build the documentation with tutorials

```
make docs-all release=v0.8
```

```
strip output from notebooks
black format code cells in notebooks
test/run notebooks
launch Sphinx
```

Fix notebook

```
make docs-all src=/path/to/notebook.ipynb release=v0.8
```

Fix RST file

```
make docs-all nbs=false
```

Questions



gammapy	
Remove dev/format_crab_sed.py	
Mention light_curve tutorial in docs/tutorials.rst	
Run black	
Update downloadclass.py	
Merge remote-tracking branch 'template/master'	
Fix broken link in hess.ipynb	
Various fixes minor to tutorials and get started docs page	
Updating to the actual astropy-helpers	
Update .travis.yml	
Update CHANGES.rst for v0.8	
Update Dockerfile	
Changing all readthedocs.org to readthedocs	
Add conda environment-dev.yml	
Params for docs-building in make-docs	
Update README.rst	
Updating helpers to v2.0.5	
Add CI testing for Python 3.7	
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Use gammapy.scripts.jupyter.test_notebooks	
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RST

gammapy-docs

0.9 dev (7/17)

Getting started

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irf - Instrument response functions

maps - Sky maps

image - Map image analysis

cube - Map cube analysis

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HTML



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dr3-with-background	
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