A **Python** package for
gamma-ray astronomy

Versioned executable user documentation for in-development science tools

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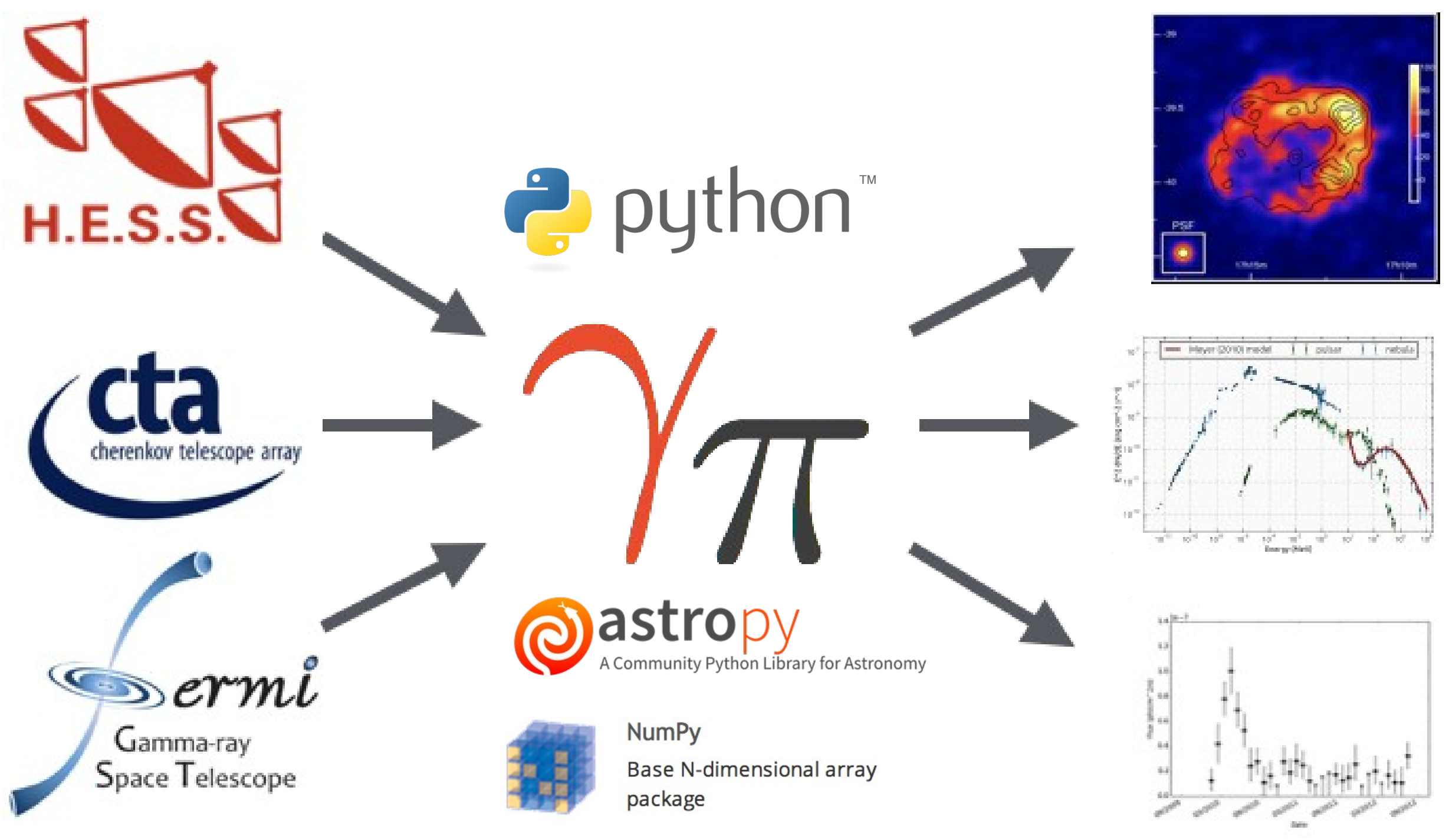
Abstract

One key aspect of software development is **feedback from users.** This community is not always aware of the developments undertaken in the code base, neither they use the tools and practices followed by the developers to deal with a non-stable software in continuous evolution. **Gammapy provides its beta-tester user community with versioned reproducible environments and executable documentation, in the form of tutorials that are versioned coupled with the code base.** We believe this set-up greatly improves the user experience for a software in prototyping phase, as well as provides a good workflow for developers to deliver versioned and up-to-date documentation.

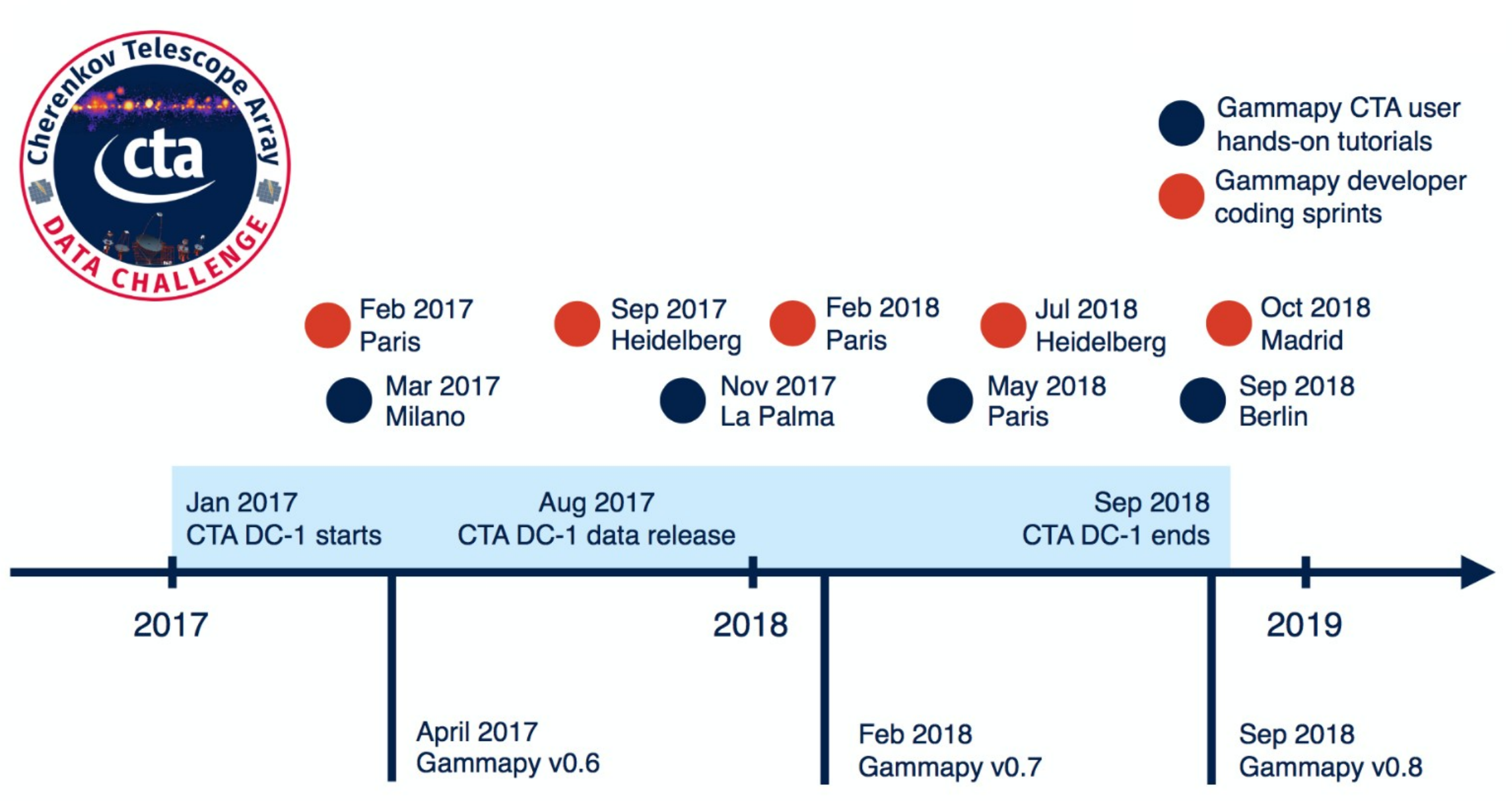
What is Gammapy?

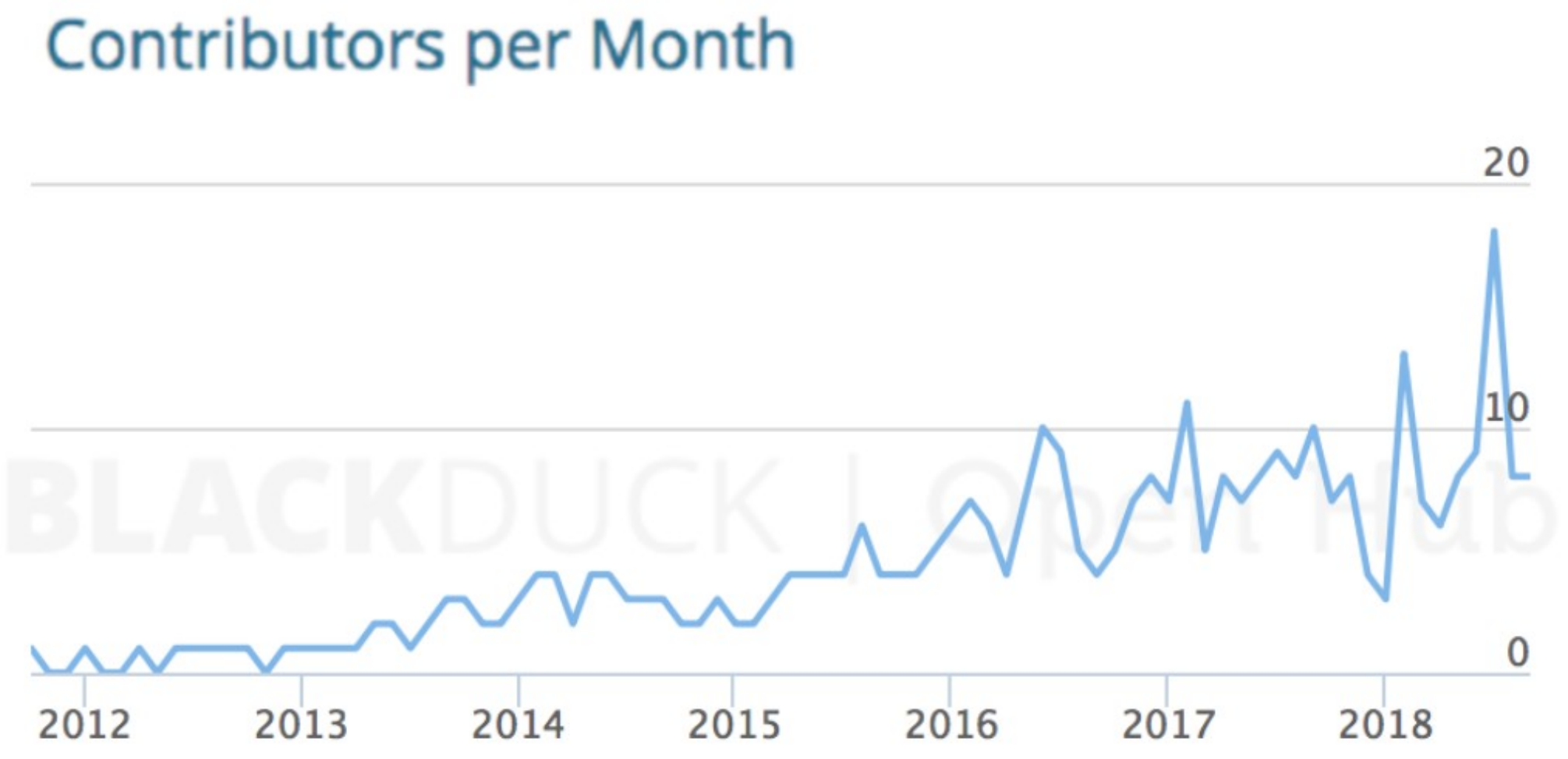
A Python package for gamma-ray astronomy.
A prototype for the Cherenkov Telescope Array (CTA) science tools.


H.E.S.S.
cta
cherenkov telescope array
Fermi
Gamma-ray Space Telescope
python
astropy
A Community Python Library for Astronomy
NumPy
Base N-dimensional array package

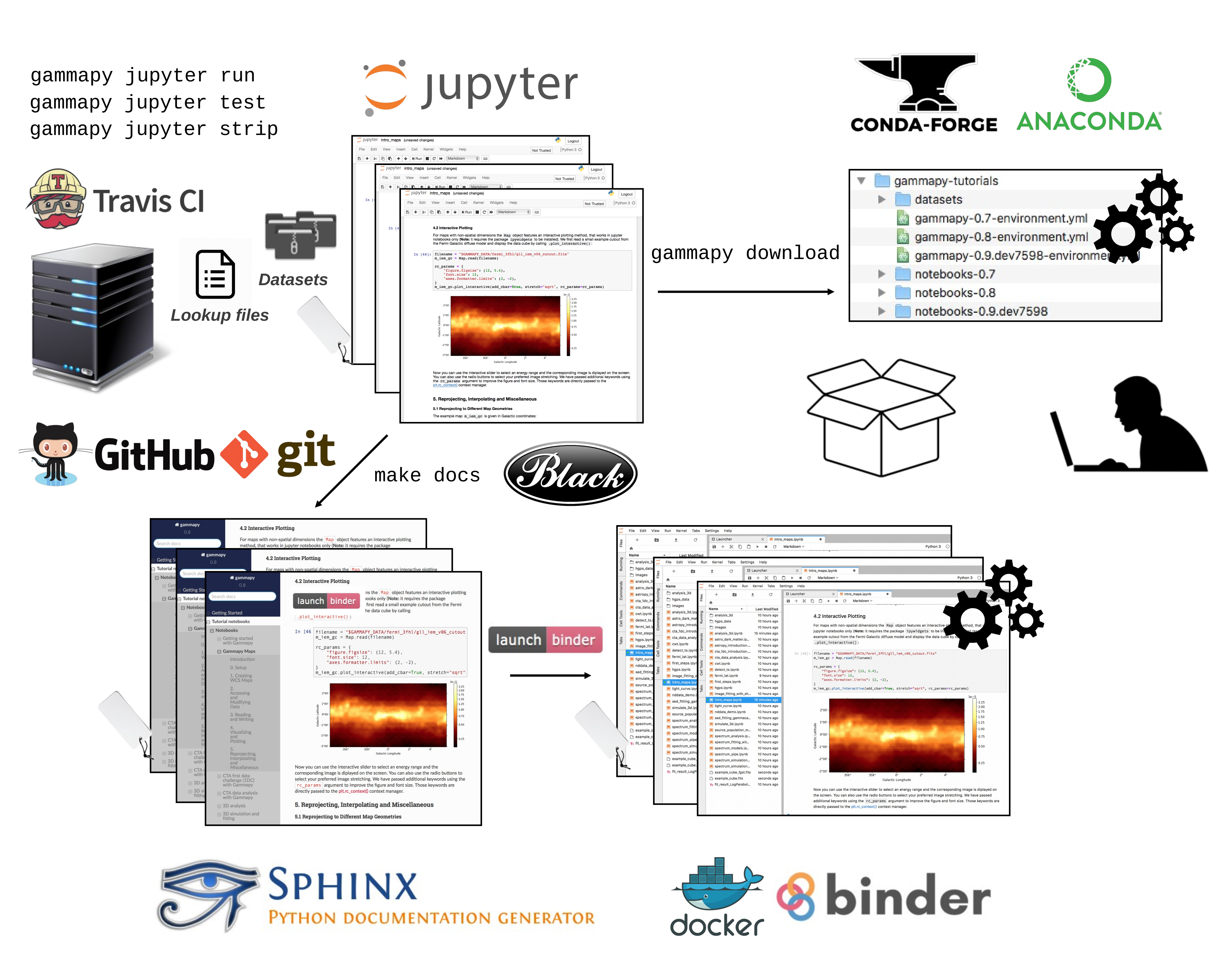
A software in development

The rise in the contributor and user base together with a high development activity, hinders user feedback from not always up-to-date versions. There's a need for reproducible environments versioned coupled with the code base.





https://www.openhub.net/p/gammapy



```
gammapy jupyter run
gammapy jupyter test
gammapy jupyter strip
```

Set-up

- Tutorials integration: tutorials in the form of *Jupyter* notebooks are integrated into the software documentation with *Sphinx* + *nbsphinx* extension.
- Executable on-line: the documentation provides links to *myBinder* platform, where tutorials can be executed in the cloud using a versioned kernel provided by a *Dockerfile*.
- Version-coupling: the base-code, the tutorials and the *Dockerfile* are stored in the same *Github* versioned repository.
- Authoring and review: seamless code review for the tutorials with `gammapy jupyter` using diff comparisons in pull requests is possible, since the notebooks only store markdown and code cells with no outputs.
- Regression tests: tutorials execute in *Travis Continuous Integration* system, checking that their output cells do not throw any errors.
- Reproducibility: deterministic environments are defined for each version of the software in the form of *conda* configuration files, with pinned version numbers for each dependency package.
- Shipping: `gammapy download` command allows to retrieve versioned tutorials, composed of *Jupyter* notebooks, the datasets needed and the *conda* configuration file to build the environment.
- Maintainability: for each versioned environment we define its requirements, which tutorials to provide and where to fetch them with centralized index lookup files.

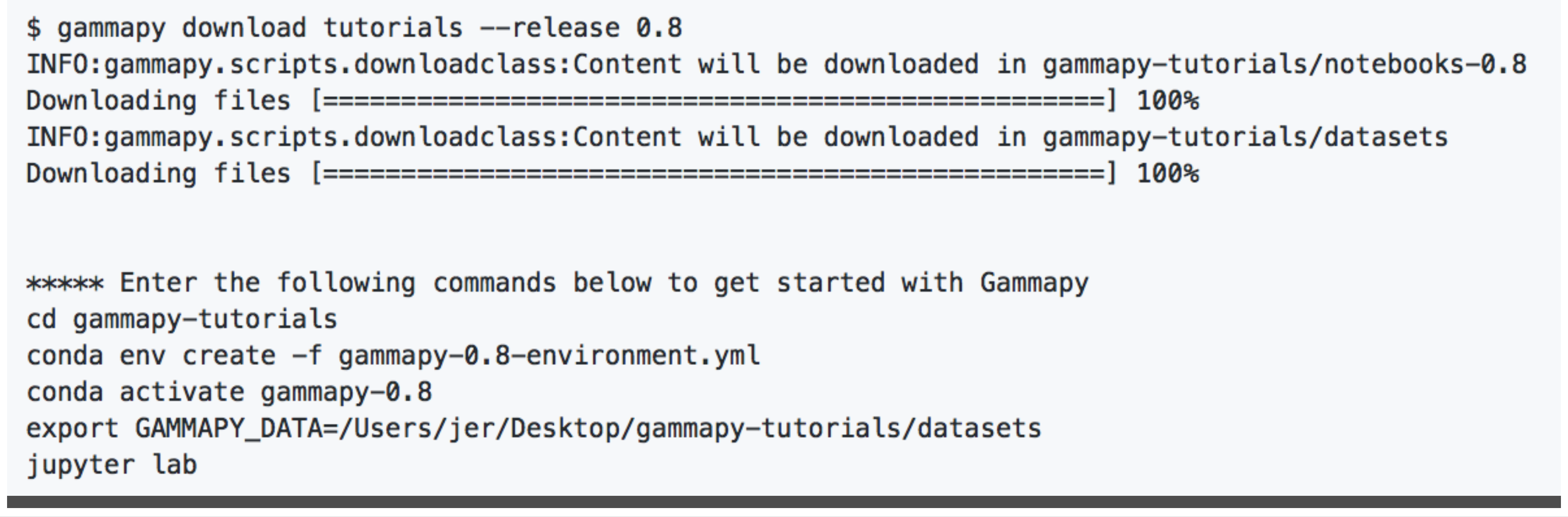
https://github.com/gammapy/gammapy

https://docs.gammapy.org

https://gammapy.org

Command Line Tools

`gammapy download` provides **users** with the means to retrieve any tutorials-related asset for a specific version, whereas `gammapy jupyter` provides **developers** with a tool to work with notebooks in a seamless workflow for the development/review/publish process of the versioned executable tutorials.



```
$ gammapy download tutorials --release 0.8
INFO:gammapy.scripts.downloadclass:Content will be downloaded in gammapy-tutorials/notebooks-0.8
Downloading files [==================================================] 100%
INFO:gammapy.scripts.downloadclass:Content will be downloaded in gammapy-tutorials/datasets
Downloading files [==================================================] 100%


***** Enter the following commands below to get started with Gammapy
cd gammapy-tutorials
conda env create -f gammapy-0.8-environment.yml
conda activate gammapy-0.8
export GAMMAPY_DATA=/Users/jer/Desktop/gammapy-tutorials/datasets
jupyter lab
```

Poster presented at ADASS XXVIII, College Park, MD, 2018 - **contact: jer@iaa.es**