



cherenkov
telescope
array



Istituto Nazionale di Fisica Nucleare
Sezione di Padova

Introduction to astropy



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Funded by H2020 Marie Skłodowska
Curie FELLINI - Grant 754496





First: Update your repo every day

- `git remote add upstream https://github.com/rlopezcoto/intro-iact-analysis.git`
- `git pull`

- Slack account? Please send me your e-mail and I can invite you to the ctapipe slack

What is astropy



- Astropy is a common **core** package for Astronomy in Python
- As core package, it also acts as link between different python astronomy packages (e.g. gammapy)
- Current release is v4.2

A screenshot of the Astropy GitHub repository page. The header shows the repository name 'astropy / astropy' and various interaction buttons like 'Sponsor', 'Watch', 'Star', 'Fork', etc. Below the header, there's a navigation bar with links to 'Code', 'Issues', 'Pull requests', 'Actions', 'Projects', 'Wiki', 'Security', and 'Insights'. The main content area displays a list of recent commits, including a merge pull request by 'p11im'. The right sidebar contains an 'About' section describing the repository as the 'Astropy core package' and a 'Releases' section.

astropy / astropy

Sponsor Watch 157 Star 2.6k Fork 1.3k

<> Code Issues 1.1k Pull requests 107 Actions Projects Wiki Security Insights

master 20 branches 113 tags

Go to file Add file Code

p11im Merge pull request #11319 from p11im/tst-geodetic a634738 17 hours ago 30,236 commits

.circleci	TST: Move 32-bit and parallel job to Actions	3 months ago
.github	TST: Skip CI natively [ci skip]	2 days ago
.pyinstaller	TST: Fix pyinstaller cron job.	4 months ago
astropy	TST: Temporarily xfail until #11277 is solved	18 hours ago
cextern	Other redirecting URLs	5 months ago
docs	Update lombscargle.rst	10 days ago

About

Repository for the Astropy core package

www.astropy.org

python science astronomy

Readme

BSD-3-Clause License

Releases

Data structures and transformations

- Constants (**`astropy.constants`**)
- Units and Quantities (**`astropy.units`**)
- N-dimensional datasets (**`astropy.nddata`**)
- Data Tables (**`astropy.table`**)
- Time and Dates (**`astropy.time`**)
- Astronomical Coordinate Systems (**`astropy.coordinates`**)
- World Coordinate System (**`astropy.wcs`**)
- Models and Fitting (**`astropy.modeling`**)
- Uncertainties and Distributions (**`astropy.uncertainty`**)

```
In [1]: from astropy import units as u

In [2]: (3 * u.Jy).to(u.erg / u.cm**2 / u.s / u.Hz)
Out[2]: <Quantity 3e-23 erg / (cm2 Hz s)>

In [3]: (4 * u.km / u.s).to(u.AA,
                             u.doppler_optical(5654 * u.AA))
Out[3]: <Quantity 5654.075438855771 Angstrom>
```

Files, I/O, and Communication

- Unified file read/write interface
- FITS File handling (**`astropy.io.fits`**)
- ASCII Tables (**`astropy.io.ascii`**)
- VOTable XML handling (**`astropy.io.votable`**)
- Miscellaneous: HDF5, YAML, ASDF, pickle (**`astropy.io.misc`**)
- SAMP (Simple Application Messaging Protocol (**`astropy.samp`**))

```
from astropy.io import fits
fits_image_filename = fits.util.get_testdata_filepath('test0.fits')

hdul = fits.open(fits_image_filename)
```

Computations and utilities

- Cosmological Calculations (**`astropy.cosmology`**)
- Convolution and filtering (**`astropy.convolution`**)
- Data Visualization (**`astropy.visualization`**)
- Astrostatistics Tools (**`astropy.stats`**)

```
In [1]: from astropy.cosmology import Planck15

In [2]: Planck15.lookback_time(3)
Out[2]: <Quantity 11.649047657532195 Gyr>

In [3]: Planck15.kpc_proper_per_arcmin(2.2)
Out[3]: <Quantity 508.41661819801976 kpc / arcmin>

In [4]: Planck15.luminosity_distance(1.1)
Out[4]: <Quantity 7638.990927720774 Mpc>
```

Hands on



- Run notebooks in the **notebooks/astropy** folder
 - [astropy_lesson.ipynb](#)

main ▾ [intro-iact-analysis](#) / [notebooks](#) / [astropy](#) /

[Go to file](#) [Add file ▾](#) [...](#)

rlopezcoto add missing files fda2b7b on 6 Jan **History**

..		
data	add astropy	last month
figures	add astropy	last month
README.md	add astropy	last month
astropy_lesson.ipynb	add astropy	last month

README.md

Overview

Hands-on tutorial on [Astropy](#) based on the one given by [Axel Donath](#) and [Christoph Deil](#) in April 2019 at the third ASTERICS-OBELICS school in Annecy.

All example data files are in the [data](#) folder.