MaNGA Data Analysis with Marvin

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Create Maps, Cube, ModelCube, or Image Object

```
from marvin.tools import Maps
maps = Maps('8485-1901')

from marvin.tools import Cube
cube = Cube('1-209232')

from marvin.tools import ModelCube
modelcube = ModelCube('manga-8485-1901-LOGCUBE-HYB10-GAU-MILESHC.fits.gz')

from marvin.tools import Image
image = Image('8553-12702')
```
Specify plateifu, mangaid, or path to file.

Downloading

```
from marvin import config
config.download = True
```
Global switch to download Maps, Cube, and ModelCube files.

```
cube = Cube('8485-1901', download=True)
```
Download single object (also works for Maps and ModelCube).

```
from marvin.utils.general import downloadList
galaxies = ['8485-1901', '7443-12701']
downloadList(galaxies, dltype='cube')
```
Batch download cubes, images, maps, or RSS files.

Maps & Map

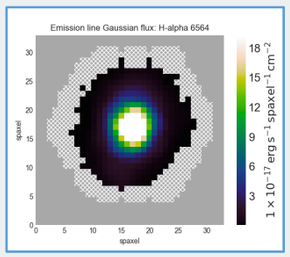
```
maps.datamodel
```
List all properties (+ channels) in a Maps.

```
ha = maps.emline_gflux_ha_6564
nii = maps['emline_gflux_nii_6585']
```
Get a Map with dotted or key syntax.

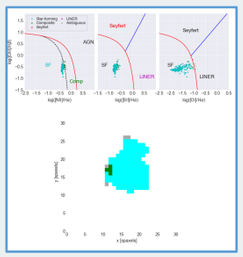
```
ha.value
ha.ivar
```
Get map values or inverse variances.

```
np.log10(nii) / ha**2
```
Do map arithmetic (`+`, `-`, `*`, `/`, or `**`) or logs.

```
maps.getCube()
maps.getModelCube()
```
Get Cube or ModelCube from a Maps.



`ha.plot()`



`maps.get_bpt()`

Maskbits

```
ha.pixmask.schema
ha.pixmask.get_mask('NOCOV')
ha.pixmask.values_to_labels()[1][2]
```
Flags for spaxel (y=1, x=2).

```
ha.target_flags
```
Show targeting masks.

Cube and ModelCube also have **pixmask** and **target_flags**.

Cube & ModelCube

```
cube.flux.value
cube.flux.ivar
```
Flux and inverse variance of spectral cube.

```
modelcube.binned_flux.value
modelcube.binned_flux.ivar
```
Binned flux and inverse variance of spectra fit by DAP.

```
modelcube.full_fit.value
```
Get model fit.

```
cube.getMaps()
modelcube.getMaps()
modelcube.getCube()
```
Get a Maps or Cube.

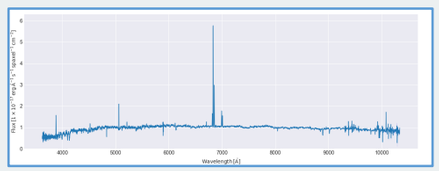
Spaxel

```
maps[1, 2]
```
Get spaxel (y=1, x=2). Also works for Cube and ModelCube.

```
sp = maps.getSpaxel(y=1, x=2, xyorig='lower', models=True)
```
Get spaxel (y=1, x=2) with model fits.

```
sp.flux.value
sp.flux.ivar
```
Spectrum flux and inverse variance arrays.

```
sp.full_fit.value
```
Get model fits.

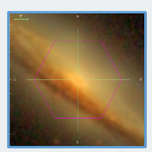


`sp.flux.plot()`

Image

```
images = Image.from_list(['8485-1901', '7443-12701'])
```
Download list of images.

```
image.show()
image.plot()
```
Show an image or plot with Matplotlib.



Query & Results

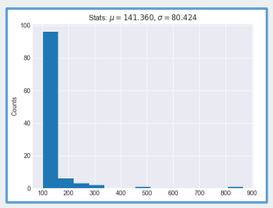
```
from marvin.tools.query import Query
sf = 'nsa.z < 0.1 and stellar_vel > 100'
rp = ['stellar_sigma']
q = Query(searchfilter=sf, return_params=rp)
r = q.run()
```
Build and run query.

```
r.extendSet()
r.loop()
r.getAll()
```
Extend results set.

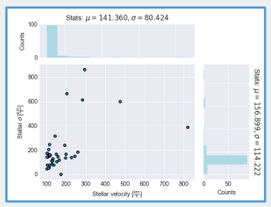
```
r.getNext()
r.getPrevious()
```
Cycle through results.

```
r.download()
```
Download query results.

```
r.toTable()
r.toDF()
r.convertToTool()
```
Convert to astropy Table, pandas DataFrame, or Marvin objects.



`r.hist('stellar_vel')`



`r.plot('stellar_vel', 'stellar_sigma')`