



sloancone Documentation

Release v0.4.3

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2023

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DOI 10.5281/zenodo.8038193

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downloads 119/month

coverage 80%

docs failing

SDSS conesearching tools via the CL or Python API. Return conesearch results, or simply check whether or not a location in the sky has been covered by SDSS..

Documentation for sloancone is hosted by [Read the Docs](#) ([development version](#) and [master version](#)). The code lives on [github](#). Please report any issues you find [here](#).

FEATURES

-

HOW TO CITE SLOANCONCONE

If you use `sloancone` in your work, please cite using the following BibTeX entry:

```
@software{Young_sloancone,  
  author = {Young, David R.},  
  doi = {10.5281/zenodo.8038193},  
  license = {GPL-3.0-only},  
  title = ,  
  url = {https://github.com/thespacedoctor/sloancone}  
}
```

2.1 Installation

The easiest way to install `sloancone` is to use `pip` (here we show the install inside of a conda environment):

```
conda create -n sloancone python=3.7 pip  
conda activate sloancone  
pip install sloancone
```

Or you can clone the [github repo](#) and install from a local version of the code:

```
git clone git@github.com:thespacedoctor/sloancone.git  
cd sloancone  
python setup.py install
```

To upgrade to the latest version of `sloancone` use the command:

```
pip install sloancone --upgrade
```

To check installation was successful run `sloancone -v`. This should return the version number of the install.

2.1.1 Development

If you want to tinker with the code, then install in development mode. This means you can modify the code from your cloned repo:

```
git clone git@github.com:thespacedoctor/sloancone.git  
cd sloancone  
python setup.py develop
```

[Pull requests](#) are welcomed!

2.2 Initialisation

Before using sloancone you need to use the `init` command to generate a user settings file. Running the following creates a `yaml` settings file in your home folder under `~/.config/sloancone/sloancone.yaml`:

```
sloancone init
```

The file is initially populated with sloancone's default settings which can be adjusted to your preference.

If at any point the user settings file becomes corrupted or you just want to start afresh, simply trash the `sloancone.yaml` file and rerun `sloancone init`.

2.2.1 Modifying the Settings

Once created, open the settings file in any text editor and make any modifications needed.

2.2.2 Basic Python Setup

If you plan to use `sloancone` in your own scripts you will first need to parse your settings file and set up logging etc. One quick way to do this is to use the `fundamentals` package to give you a logger, a settings dictionary and a database connection (if connection details given in settings file):

```
## SOME BASIC SETUP FOR LOGGING, SETTINGS ETC
from fundamentals import tools
from os.path import expanduser
home = expanduser("~")
settingsFile = home + "/.config/sloancone/sloancone.yaml"
su = tools(
    arguments={"settingsFile": settingsFile},
    docString=__doc__,
)
arguments, settings, log, dbConn = su.setup()
```

2.3 Todo List

Todo:

- nice!
-

(The *original entry* is located in `/home/docs/checkouts/readthedocs.org/user_builds/sloancone/checkouts/develop/docs/source/_template` line 1.)

2.4 Release Notes

v0.4.3 - August 16, 2023

- **FIXED:** Docs now building again on readthedocs

v0.4.2 - July 3, 2023

- **FIXED:** Sloan URL endpoints changed again. Now updated.

v0.4.1 - May 20, 2022

- **FIXED:** Sloan URL endpoints changed. Now updated.

v0.4.0 - May 6, 2020

- **enhancement:** upgraded code to python 3

API REFERENCE

3.1 Modules

<i>sloancone.commonutils</i>	<i>common tools used throughout package</i>
<i>sloancone.utKit</i>	<i>Unit testing tools</i>

3.1.1 commonutils (module)

common tools used throughout package

Sub-modules

<i>getpackagepath</i>	<i>Get common file and folder paths for the host package</i>
-----------------------	--

3.1.2 utKit (module)

Unit testing tools

Classes

<i>utKit(moduleDirectory[, dbConn])</i>	<i>Override dryx utKit</i>
---	----------------------------

Sub-modules

<i>utKit(moduleDirectory[, dbConn])</i>	<i>Override dryx utKit</i>
---	----------------------------

class **utKit** (*moduleDirectory*, *dbConn=False*)

Bases: `fundamentals.utKit.utKit`

Override dryx utKit

get_project_root ()

Get the root of the ``python`` package - useful for getting files in the root directory of a project

Return

- `rootPath` – the root path of a project

refresh_database()
Refresh the unit test database

setupModule()
The setupModule method

Return

- `log` – a logger
- `dbConn` – a database connection to a test database (details from yaml settings file)
- `pathToInputDir` – path to modules own test input directory
- `pathToOutputDir` – path to modules own test output directory

tearDownModule()
The tearDownModule method

3.2 Classes

<code>sloancone.check_coverage</code>	<i>The worker class for the check_coverage module</i>
<code>sloancone.cone_search</code>	<i>The worker class for the cone_search module</i>
<code>sloancone.image</code>	<i>The worker class for the image module</i>
<code>sloancone.sdss_square_search</code>	<i>The worker class for the sdss_square_search module</i>

3.2.1 check_coverage (class)

class check_coverage (`log`, `ra`, `dec`, `url='http://skyserver.sdss.org/dr12/en/tools/search/x_sql.aspx'`)

Bases: `object`

The worker class for the check_coverage module

Key Arguments

- `log` – python logger
- `raDeg` – ra in decimal degrees
- `decDeg` – dec in decimal degrees
- `url` – the SDSS URL to ping (DR12 is the default)

Usage

To test whether or not a location in the sky has been covered by the SDSS survey:

```
from sloancone import check_coverage
# covered = True | False | 999 (i.e. not sure)
covered = check_coverage(
    log=log,
    ra=122.3343,
    dec=45.34343
).get()

print(covered)
```

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```
# OUTPUT: True
```

Coordinates can also be given in sexagesimal format:

```
from sloancone import check_coverage
covered = check_coverage(
    log=log,
    ra="12:45:4.45466",
    dec="-25:22:34.3434"
).get()

print(covered)

# OUTPUT: False
```

Methods

get()	<i>get the check_coverage object</i>
-------	--------------------------------------

get()
get the check_coverage object

Return

- check_coverage

3.2.2 cone_search (class)

class cone_search(log, ra, dec, searchRadius, nearest, outputFormat='table', galaxyType=False)

Bases: object

The worker class for the cone_search module

Key Arguments

- log – logger
- ra – ra in sexagesimal or decimal degrees
- dec – dec in sexagesimal or decimal degrees
- searchRadius – search radius in arcsecs
- nearest – show closest match only
- outputFormat – output format (table or csv)

Usage

```
from sloancone.cone_search import cone_search
csResults = cone_search(
    log=log,
    ra="12:45:23.2323",
    dec="30.343122",
    searchRadius=60.,
```

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```

nearest=False,
outputFormat="table",
galaxyType="all"
).get()

print(csResults )

```

This code outputs the following:

```

+-----+-----+-----+-----+-----+-----+
| sdss_name | type | ra | dec | specz | specz_err |
| photoz | photoz_err | separation_arcsec | separation_north_arcsec |
| separation_east_arcsec |
+-----+-----+-----+-----+-----+
| SDSS J124521.85+302046.0 | galaxy | 191.3410 | 30.3461 | None | None |
| 0.3443 | 0.1007 | 20.8856 | 10.8005 | -17.
8762
| SDSS J124522.39+302100.4 | galaxy | 191.3433 | 30.3501 | None | None |
| 0.3172 | 0.0901 | 27.4400 | 25.2212 | -10.
8094
| SDSS J124522.08+302007.4 | galaxy | 191.3420 | 30.3354 | None | None |
| 0.3672 | 0.1133 | 31.4720 | -27.7701 | -14.
8090
| SDSS J124524.95+302105.7 | galaxy | 191.3540 | 30.3516 | None | None |
| 0.2721 | 0.0311 | 37.8154 | 30.5314 | 22.
3124
| SDSS J124524.57+302000.2 | galaxy | 191.3524 | 30.3334 | None | None |
| 0.4181 | 0.0965 | 39.1194 | -35.0377 | 17.
3979
| SDSS J124519.23+302042.5 | galaxy | 191.3302 | 30.3452 | None | None |
| 0.2347 | 0.0749 | 52.2402 | 7.3538 | -51.
7200
| SDSS J124521.36+301943.9 | galaxy | 191.3390 | 30.3289 | None | None |
| 0.1978 | 0.0699 | 56.7372 | -51.3133 | -24.
2086
| SDSS J124519.89+302115.9 | galaxy | 191.3329 | 30.3544 | None | None |
| 0.9105 | 0.0821 | 59.3096 | 40.6688 | -43.
1703
+-----+-----+-----+-----+-----+

```

To return results in a traditional CSV format:

```

from sloancone.cone_search import cone_search
csResults = cone_search(
    log=log,
    ra="112.233432",
    dec="15:34:31.22",
    searchRadius=60.,
    nearest=True,
    outputFormat="csv",
    galaxyType="all"
)

```

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```

).get()

print(csResults)

```

This code outputs the following:

```

sdss_name,type,ra,dec,specz,specz_err,photoz,photoz_err,separation_arcsec,
↪separation_north_arcsec,separation_east_arcsec
SDSS J072855.31+153454.6,galaxy,112.2305,15.5818,,,0.7211,0.0719,25.5528,23.4273,-
↪10.2034

```

To filter the result be a redshift type (specz or photoz)

```

from sloancone.cone_search import cone_search
csResults = cone_search(

    log=log,
    ra="12:45:23.2323",
    dec="30.343122",
    searchRadius=600.,
    nearest=False,
    outputFormat="table",
    galaxyType="specz"
).get()

print(csResults )

```

This code outputs the following:

```

```plain
+-----+-----+-----+-----+-----+-----+
↪+-----+-----+-----+-----+-----+-----+
...

| sdss_name | type | ra | dec | specz | specz_
↪err | separation_arcsec | separation_north_arcsec | separation_east_arcsec |
+-----+-----+-----+-----+-----+-----+
↪+-----+-----+-----+-----+-----+-----+
| SDSS J124540.06+301923.0 | galaxy | 191.4169 | 30.3231 | 0.3629 | 0.
↪0002 | 229.5373 | -72.2170 | | 217.8809 |
↪|
| SDSS J124534.33+301624.6 | galaxy | 191.3931 | 30.2735 | 0.2609 | 0.
↪0000 | 288.8809 | -250.5509 | | 143.7929 |
↪|
| SDSS J124512.46+301502.3 | galaxy | 191.3019 | 30.2506 | 0.5810 | 0.
↪0002 | 360.9520 | -332.9018 | | -139.5091 |
↪|
| SDSS J124512.46+301502.3 | galaxy | 191.3019 | 30.2506 | 0.5809 | 0.
↪0002 | 360.9520 | -332.9018 | | -139.5091 |
↪|
| SDSS J124544.87+302435.6 | galaxy | 191.4370 | 30.4099 | 0.2254 | 0.
↪0000 | 369.1276 | 240.3704 | | 280.1380 |
↪|
| SDSS J124547.42+302532.8 | galaxy | 191.4476 | 30.4258 | 0.4473 | 0.
↪0001 | 431.9371 | 297.5669 | | 313.0872 |
↪|

```

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	SDSS J124454.28+301700.6	galaxy	191.2262	30.2835	0.2599	0.
→0000	431.9447	-214.5446		-374.8959		
→						
	SDSS J124558.38+301904.7	galaxy	191.4933	30.3180	0.1767	0.
→0000	463.9608	-90.4407		455.0606		
→						
	SDSS J124544.31+301417.7	galaxy	191.4347	30.2383	0.3632	0.
→0000	465.9112	-377.4610		273.1236		
→						
	SDSS J124543.24+301319.2	galaxy	191.4302	30.2220	0.0669	0.
→0000	507.2387	-436.0132		259.1979		
→						
	SDSS J124557.99+302437.8	galaxy	191.4916	30.4105	0.4469	0.
→0002	511.0694	242.6379		449.7987		
→						
	SDSS J124602.33+302241.3	galaxy	191.5097	30.3782	0.4365	0.
→0001	521.5570	126.1410		506.0733		
→						
	SDSS J124602.33+302241.3	galaxy	191.5097	30.3782	0.4365	0.
→0001	521.5570	126.1410		506.0733		
→						
	SDSS J124605.96+301913.6	galaxy	191.5248	30.3205	0.1761	0.
→0000	559.2108	-81.5693		553.2298		
→						
	SDSS J124439.37+301949.6	galaxy	191.1640	30.3305	0.2219	0.
→0000	569.6536	-45.5571		-567.8291		
→						
	SDSS J124439.37+301949.6	galaxy	191.1640	30.3305	0.2220	0.
→0000	569.6536	-45.5571		-567.8291		
→						
	SDSS J124538.93+302945.0	galaxy	191.4122	30.4958	0.2252	0.
→0000	586.1380	549.8198		203.1158		
→						
	SDSS J124450.57+301333.8	galaxy	191.2107	30.2261	0.4373	0.
→0001	597.1297	-421.4088		-423.0586		
→						
	SDSS J124450.57+301333.8	galaxy	191.2107	30.2261	0.4377	0.
→0001	597.1297	-421.4088		-423.0586		
→						
	+-----+-----+-----+-----+-----+-----+-----					
→	+-----+-----+-----+-----+-----+-----+-----					

Finally, we can also search for stars and galaxies by selecting

```
→ ``galaxyType=False``:
```

```
```python
from sloancone.cone_search import cone_search
csResults = cone_search(
    log=log,
    ra="12:45:23.2323",
    dec="30.343122",
    searchRadius=60.,
    nearest=False,
    outputFormat="table",
    galaxyType=False
).get()
```

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```

print(csResults)
'''
'''plain
+-----+-----+-----+-----+-----+-----+
| sdss_name | type | ra | dec | specz | specz_ |
| err | photoz | photoz_err | separation_arcsec | separation_north_arcsec | separation_east_arcsec |
+-----+-----+-----+-----+-----+-----+
| SDSS J124521.85+302046.0 | galaxy | 191.3410 | 30.3461 | None | None |
| 0.3443 | 0.1007 | 20.8856 | 10.8005 | - |
| 17.8762 |
| SDSS J124524.92+302042.7 | star | 191.3539 | 30.3452 | None | None |
| None | None | 23.2234 | 7.5490 | 21. |
| 9622 |
| SDSS J124521.68+302016.9 | star | 191.3403 | 30.3380 | -0.0001 | 0.0000 |
| None | None | 27.1558 | -18.2960 | - |
| 20.0672 |
| SDSS J124522.39+302100.4 | galaxy | 191.3433 | 30.3501 | None | None |
| 0.3172 | 0.0901 | 27.4400 | 25.2212 | - |
| 10.8094 |
| SDSS J124522.08+302007.4 | galaxy | 191.3420 | 30.3354 | None | None |
| 0.3672 | 0.1133 | 31.4720 | -27.7701 | - |
| 14.8090 |
| SDSS J124524.95+302105.7 | galaxy | 191.3540 | 30.3516 | None | None |
| 0.2721 | 0.0311 | 37.8154 | 30.5314 | 22. |
| 3124 |
| SDSS J124524.57+302000.2 | galaxy | 191.3524 | 30.3334 | None | None |
| 0.4181 | 0.0965 | 39.1194 | -35.0377 | 17. |
| 3979 |
| SDSS J124521.67+301955.1 | star | 191.3403 | 30.3320 | None | None |
| None | None | 44.8763 | -40.0699 | - |
| 20.2060 |
| SDSS J124526.25+302103.7 | star | 191.3594 | 30.3511 | None | None |
| None | None | 48.4191 | 28.5417 | 39. |
| 1124 |
| SDSS J124519.23+302042.5 | galaxy | 191.3302 | 30.3452 | None | None |
| 0.2347 | 0.0749 | 52.2402 | 7.3538 | - |
| 51.7200 |
| SDSS J124521.36+301943.9 | galaxy | 191.3390 | 30.3289 | None | None |
| 0.1978 | 0.0699 | 56.7372 | -51.3133 | - |
| 24.2086 |
| SDSS J124522.15+301937.9 | star | 191.3423 | 30.3272 | None | None |
| None | None | 58.9703 | -57.2852 | - |
| 13.9962 |
| SDSS J124519.89+302115.9 | galaxy | 191.3329 | 30.3544 | None | None |
| 0.9105 | 0.0821 | 59.3096 | 40.6688 | - |
| 43.1703 |
| SDSS J124526.04+301947.9 | star | 191.3585 | 30.3300 | None | None |
| None | None | 59.6986 | -47.3115 | 36. |
| 4080 |
| SDSS J124524.95+302130.6 | star | 191.3540 | 30.3585 | None | None |
| None | None | 59.7431 | 55.4049 | 22. |
| 3502 |

```

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Methods

get()	<i>get the cone_search object</i>
-------	-----------------------------------

get ()
get the cone_search object

Return

- `results` – the results of the `conesearch`

3.2.3 image (class)

```
class image (log, ra, dec, downloadDirectory='./', filename='sdss_stamp.jpeg', settings=False, grid=True,
              label=False, photocat=False, speccat=False, invertColors=False, arcminWidth=5, pixel-
              Width=500)
```

Bases: object

The worker class for the image module

Key Arguments

- `log` – logger
- `settings` – the settings dictionary
- `ra` – right-ascension of the sky-location
- `dec` – declination of the sky-location
- `downloadDirectory` – directory to download the image stamp to. Default `./`
- `filename` – path to download the image stamp to. Default `“sdss_stamp.jpeg”`
- `grid` – include grid and scale in stamp. Default `True`
- `label` – label. Default `False`
- `photocat` – mark photometrical catalogued sources. Default `False`
- `speccat` – mark spectroscopical catalogued objects. Default `False`
 - `invertColors` – invert the image stamp colors. Default `False`
 - `arcminWidth` – the width of the image stamp in arcmin. Default 5
 - `pixelWidth` – the width of the image stamp in pixels. Default 500

Return

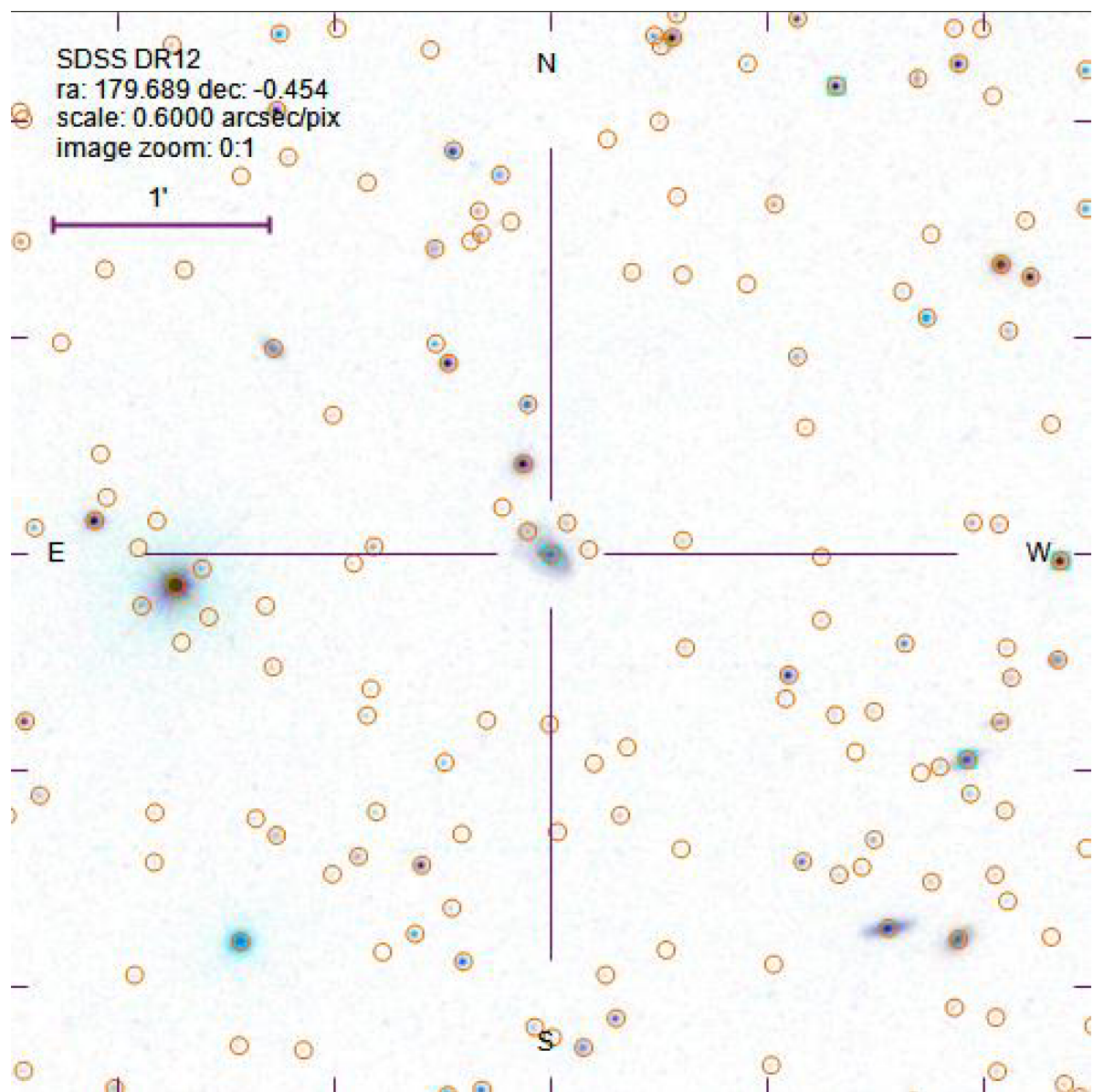
- covered – the coverage result. True | False | 999 (i.e. not sure)

Usage

Here's an example where we turn on all options before we download the image:

```
from sloancone import image
imagestamp = image(
    log=log,
    settings=settings,
    ra="179.689293428354",
    dec="-0.454379056007667",
    downloadDirectory="/tmp",
    filename="sdss_stamp.jpeg",
    grid=True,
    label=True,
    photocat=True,
    speccat=True,
    invertColors=True,
    arcminWidth=5,
    pixelWidth=500
)
# covered = True | False | 999 (i.e. not sure)
covered = imagestamp.get()
```

This produces a stamp at `/tmp/sdss_stamp.jpeg` that looks like this:



```
:width: 800px  
:alt: SDSS image stamp with all options turned on
```

Methods

<code>get()</code>	<i>download the image</i>
--------------------	---------------------------

`get()`
download the image

3.2.4 sdss_square_search (class)

class `sdss_square_search` (*log, ra, dec, searchRadius, galaxyType=False*)

Bases: `object`

The worker class for the sdss_square_search module

Key Arguments

`log` – logger

- `ra` – ra in sexagesimal or decimal degrees
- `dec` – dec in sexagesimal or decimal degrees
- `searchRadius` – search radius in arcsecs

Methods

`close()`

`get()` *get the results from the the sdss square search*

get ()

get the results from the the sdss square search

Return

- `sdss_square_search`

3.3 A-Z Index

Modules

<code>sloancone.commonutils</code>	<i>common tools used throughout package</i>
<code>sloancone.utKit</code>	<i>Unit testing tools</i>

Classes

<code>sloancone.check_coverage</code>	<i>The worker class for the check_coverage module</i>
<code>sloancone.cone_search</code>	<i>The worker class for the cone_search module</i>
<code>sloancone.image</code>	<i>The worker class for the image module</i>
<code>sloancone.sdss_square_search</code>	<i>The worker class for the sdss_square_search module</i>

Functions

RELEASE NOTES

v0.4.3 - August 16, 2023

- **FIXED:** Docs now building again on readthedocs

v0.4.2 - July 3, 2023

- **FIXED:** Sloan URL endpoints changed again. Now updated.

v0.4.1 - May 20, 2022

- **FIXED:** Sloan URL endpoints changed. Now updated.

v0.4.0 - May 6, 2020

- **enhancement:** upgraded code to python 3

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