



# Exploring large catalogues with HiPS & MOCs

*“I have a set of images, I would like to select regions in my observations that are above a given threshold in another survey (e.g. at low extinction), retrieve objects from very large catalogues (e.g. Gaia + WISE) in these non-trivial shapes and not-necessarily-connected regions and combine them to visualise some quantities (e.g. colour-colour diagram).”*



# Exploring large catalogues with HiPS & MOCs

1. Required packages
2. Find images associated with the MASH catalogue of planetary nebulae
3. Create a MOC of the MASH images
4. Create a MOC of low extinction regions from an archival extinction map
5. Find which regions are covered by the MASH images and in the low extinction regions
6. Query MOC maps for the 2MASS and Gaia Catalogue
7. Cross-match Gaia and WISE sources in all fields
8. Build a colour-colour diagram



# Exploring large catalogues with HiPS & MOCs

Find the notebook on Binder (no installation required):

<https://mybinder.org/v2/gh/cds-astro/tutorials/master?filepath=Notebooks>

wait a moment for everything to load, then click on the link to [HiPS\\_and\\_MOC.ipynb](#)

Or download the CDS tutorials repository Github <https://github.com/cds-astro/tutorials>  
and run the notebook in [HiPS\\_and\\_MOC.ipynb](#) on your machine:

More on Python and Notebooks:

Enrique Garcia, LAPP/CNRS

<https://escape2020.github.io/school2021/posts/clase03/>



# Tips for Jupyter Notebooks



```
In [ ]: Simbad.  
        add_votable_fields  
In [ ]: cache_location  
        get_field_description  
In [ ]: get_votable_fields  
        list_votable_fields  
In [ ]: list_wildcards  
        query_bibcode  
In [ ]: query_bibcode_async  
        query_bibobj  
In [ ]: query_bibobj_async
```

Type the name of a module followed by a dot in a code cell; then press 'tab' to see and select the available functions for that module.

```
In [ ]: Simbad.query_region()  
In [ ]: Signature: Simbad.query_region(self, *args, **kwargs)  
Docstring:  
In [ ]: Queries the service and returns a table object.  
In [ ]: Serves the same function as `query_region`, but  
        only collects the response from the Simbad server and returns.  
In [ ]: Parameters  
        -----  
In [ ]: coordinates : str or `astropy.coordinates` object
```

Once selected a function, click inside the parenthesis and press 'shift' + 'tab' to see the related documentation, the required/optional input parameters, what the function returns etc.

More on Python and Notebooks:

Enrique Garcia, LAPP/CNRS

<https://escape2020.github.io/school2021/posts/clase03/>