



## Computational Thinking and Programming using Data-Driven Astronomy

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### Introduction

Programming language is used in astronomy to process data and develop simulations. The focus of this project will be on the former.

### Purpose

The field of computation and programming plays an essential role in further advancement and research in science. Astronomers detect signals in noise. They then take the captured signals and use image stacking to study and graph the data.

### Method

This project uses the python programming language to process big data quickly and accurately. Being able to process big data allows researchers to easily visualize large sets of data.

We used FITS (Flexible Image Transport System) files which stores the images data as a numerical array. NumPy arrays are designed for larger sets of data. We can then use the FITS file to plot a 2D graph.

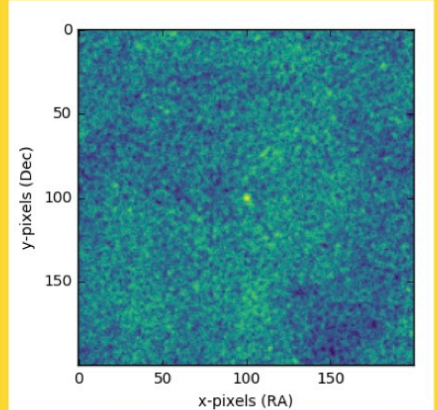
The image file is on to the computer, the following code is used to plot the FITS file.

```
from astropy.io import fits          necessary packages to access FITS
import matplotlib.pyplot as plt

hdulist = fits.open('image0.fits')  identified image
data = hdulist[0].data

plt.imshow(data, cmap=plt.cm.viridis)
plt.xlabel('x-pixels (RA)')
plt.ylabel('y-pixels (Dec)')
```

directions to label x and y axis



### References and image:

Coursera x The University of Sydney, "Data-driven Astronomy" taught by Tara Murphy and Simon Murphy

coursera

