

MONDAY, 5/13/2019

Checked that I have Photutils installed!

Photometry

- How much energy did the astronomical object I'm measuring release?
- Sub Questions
 - What is the shape of my object/which pixels belong to it?
 - Are there other contributions to the photon count besides my object?

PSF = point spread function

Every pixel we have has skycounts in it

What is the sky background?

- Unresolved astronomical objects still add in photons
- The zodiacal light (is there no matter what!) is caused by sunlight reflecting off the zodiacal interplanetary dust cloud that exists in/near the ecliptic
- Bright objects cause more scattering in the nearby atmosphere. (the moon for example)
- This also varies by airmass and observatory site

Background is everywhere... how should we calculate sky? Does proximity to objects matter?

Different photometric approaches

- Aperture photometry - please tell me how much energy in this aperture
- PSF photometry - use a model (usually based on the instrument/telescope PSF) to determine the ...?

You'll have to pick a tool which is best for your situation.

Things to think about:

- Shape of your aperture
- Identify the "center" of your object
- Exclude nearby objects?
- How far away should sky pixels be from your object? What if your field is crowded?
- How do you deal with large objects (ex. galaxies) that might have foreground stars? Or areas with limited galaxy emission? (clumps of star formation perhaps?)

Helpful links to use on the reducing imaging data assignment:

https://github.com/astropy/ccdproc/blob/master/docs/ccdproc/reduction_toolbox.rst

<https://photutils.readthedocs.io/en/stable/aperture.html>

https://photutils.readthedocs.io/en/stable/getting_started.html

WEDNESDAY, 5/15/2019

Workday! Just worked on the data reduction assignment and figured out how to get the master bias!

FRIDAY, 5/17/2019

Photometry assignment now due next Friday.

Peer review for research draft, print out some copies!

Papers due finished-finished June 7

What makes a scientific paper?

- 5-7 pages for this assignment; she is looking for about ~10 pages though
- Approach
 - Thesis, intro
 - You are trying to answer a question or report a discovery
 - Reporting guided by reproducibility
 - Tie into larger field context (what is the current state of the field, looking at the changes in the field over the years)
 - Talk about what you did, how you got there
- Framework
 - Paper sections:
 - Introduction
 - methods/data
 - results/discussion
 - conclusion/summary
 - You don't EXACTLY need these sections, but this is the flow of information
 - Expectation: most of your paper will be in the methods (here is all the stuff that I did) and a little bit in the results section (take some intellectual risks, it's okay to get stuff wrong; make a plot and guess about what it means, try something weird); conclusion/summary - not expected to be very long (I was testing X and I found Y; X was interesting, I didn't expect to find X because Y)
- Details
 - Abstract not required
 - Overleaf an option on where to write it
 - Format it however you want
 - Single or double columns
 - Paper will be about 10 pages (included graphs)
 - *include/present your data!! This might mean data tables, plots or images
 - In figure captions, just describe things
 - Never use a figure you are not referencing in your text
 - You don't want something to only be mentioned in your caption
 - Describe what you're looking at and don't mention it just once
 - Don't worry about redundant

- *Include the equations and theories you are using for your results
- *Reference, reference, reference!!! Your information comes from somewhere.
Make sure to credit that work appropriately! (introduction must have references!)
- Build upon other references to make your own statements
- Paraphrase one sentence and another and then merge into a way that is organic to yourself
- *Plots/tables should be legible, have labels, have captions, have units, be referred to in the text of the paper, legends
 - Probably don't need 72 columns of work in a table
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