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LECTURE 4 - 4/8/2019

Activity

Observing M31 (spiral Galaxy, Andromeda)

- During what season is this object best observed?
    - During Autumnal Equinox
- On April 16, 2019 how many hours of observing time will you have at APO?
    - You cannot observe M31 on April 16, 2019 at APO
- If you observe this object on Dec 31st, 2019, will the moon interfere with your observations? If so, what is the moon phase?
    - The moon will be 21.6% full so it should be a waxing crescent which should still be okay for observations at night.
- How many hours can you observe this object on Dec 31st?
    - 11 hours?

*This activity was completed through the use of Jupyter Notebook

```
APO = Observer(longitude = 105.8202778 * u.deg,
               latitude = 32.78027778 * u.deg,
               elevation = 2215 * u.m,
               timezone = 'America/Phoenix',
               name = "Apache Point Observatory"
              )
coords = SkyCoord('00h42m44.330s', '+41d16m07.50s', frame='icrs')

m31 = FixedTarget(name='M31', coord=coords)
M31.ra
```

→ $10^{\circ}41'04.95''$

```
date_april = Time("2019-04-16 12:00:00")
midnight_APO_april = APO.midnight(date_april, which='next')

APO.local_sidereal_time(midnight_APO_april)
APO.target_is_up(midnight_APO_april, m31)
```

→ False

Catalog for Planning Observations:
http://simbad.harvard.edu/simbad/sim-ref?querymethod=bib&simbo=on&submit=submit+bibcode&bibcode=1992ESOPN...1....1A

Today, we went through an activity in the beginning where I rediscovered how to use python on Jupyter Notebook and worked a lot with timezones and how to correlate the data of the observatory to the movement of M31 in the sky.
We then moved onto working on "Planning Observations" where we had to figure out how to download a catalogue (and find one in the first place). It was definitely a new experience and a bit difficult to figure out but I'm continuing to learn how it works and how to import it (specifically a tsv file) to Jupyter Notebook with Pandas!

LECTURE 5 - 4/10/2019

Planning Observatory
Cerro Tololo Inter-American Observatory

New skill learned!! One of the problems we encountered while trying to upload a catalog to Jupyter Notebook was splitting the RA and Dec info into their own columns because the catalog put both into only one. So in order to split them, I used this code and it ended up working out!

```
# dropping null value columns to avoid errors
catalog.dropna(inplace = True)
new = catalog["RA Dec"].str.split(" ", n = 1, expand = True)
catalog["RA"]= new[0]
catalog["Dec"]= new[1]
# Dropping old RA Dec columns
catalog.drop(columns =["RA Dec"], inplace = True)
catalog
```

Helpful website for figuring out the location/timezone of CTIO:
http://tdc-www.harvard.edu/iraf/rvsao/bcvcorr/obsdb.html
Link for figuring out the timezone of CTIO:
https://en.wikipedia.org/wiki/List_of_tz_database_time_zones

LECTURE 6 - 4/12/2019

Learned how to do a pull request on GitHub!

```
target_table.query('(RA > 40.10864) & (RA < 53.8043)')
```

this helps us simplify our data even more and look for objects only within that range of RA. We were able to calculate these numbers with this calculation:

1 h x 15 deg = ___ deg
90 deg → 92 days
1 day = 0.97826 deg
March 21 - May 1 = 40.10864 deg
March 21 - May 15 = 53.8043 deg

May 1 to May 15, RA is from 40.1 deg to 53.8 deg
Today, we've been struggling with finding which objects are visible during our observation period from May 1 - May 15. Since our observatory, CTIO, is in the southern hemisphere, we only had a few objects with a negative declination and all the other declinations we had were really large so it wouldn't be possible to see from our location. Therefore, all 100 objects in the catalog read "false" for visibility. So at the moment, we are figuring out if we wrote something wrong in the code or if we need to find an entirely new catalog with a focus on the southern hemisphere.