Astro Notes

Pierson Lipschultz

September 3, 2025

1 Class overview

Office hours tues and thurs 11-12 astro 237
ta office hours
wed 3:30:530 astro 2367
hw due wed
hw posted week before

- solar system
- steller evo
- compact objects
- galaxy quasi darkmatter
- cosmic web
- big bang

course goals

- apply pys to universe
- understand foundations of modern astro, astrophys, and cosmology
- conceptual understanding of the uni based on physical principles

2 Early Astronomy

2.0.1 Greek

- Aristotle
  - earth is spherical
  - partial lunar eclipses
  - some stars visible from southern locations but not northern and vice versa

    - had ideas regarding perfect geo influenced by Pythagoras and Plato

- Aristarchus (310-230 BC):
    - unpreceded heliocentric framework
    - trig distances earth-moon-sun system
    - angular diameters $\theta_{sun} \approx \theta_{moon} \therefore \frac{A}{C} = \frac{D_{moon}}{D_{moon}}$
    - diameters from lunar eclipses $D_{moon} < D_{earth}$

- Eratoshs (176-195 BC):
    - Determined radius of spherical earth R_E
    - Sun at zenith at noon on summer solstice at Aswan
    - But further north in Alexandria, Egypt, the sun is south of the zenith by angle α

- Hipparchus (190-120 BC):
    - Discover precession of the equinoxes from examination of star catalogs over centuries
    - established the magnitude system

- Copernicus (1473-1543):
    - heliocentric
    - earth rotates
    - still assumed uniform circular celestial motion
    - inferior planets: orbit smaller than earths
    - superior planets: orbits larger than earths