ASTR/PHYS 3070 Midterm 2 Study Guide

Comprehensive, but focused on the sections of chapters 7 through 16 that we covered

Midterm 1 Material (fundamental concepts, chapters 1-6)

Solar System and Exoplanet Detection Methods

- How is mass distributed in the solar system?
- What is the general temperature and density structure of the Sun?
- Explain limb darkening.
- Why do planets form in disks?
- What techniques do we use to find planets around other stars?
- How do they work and what do they tell us about exoplanet systems.
- What selection effects operate for each detection method?

Stars

- What does the spectrum of a star look like?
- How do we identify the elements that make up a star?
- What is flux and luminosity, and how are they related?
- What determines how luminous a star is? How is luminosity related to color and size?
- What is parallax and how does it work?
- What are apparent and absolute magnitudes, and how do they relate to a star's distance?
- How are stellar masses, radii, and temperatures estimated?

Stellar Atmospheres

- What is hydrostatic equilibrium (HSE)?
- What is a star's surface gravity?
- OBAFGKM: what is this a sequence of?
- What are the Balmer H lines, and what do they have to do with stellar classification?
- How do you determine the luminosity class of a star? What does it tell you?
- What is opacity?
- HR or color-magnitude diagrams: know 'em! (e.g., ID the main sequence, horizontal branch, what stars are doing in these phases, etc.)
- How can you get the distance to a star via spectroscopic parallax?

Stellar Interiors

- How can you use HSE to estimate the pressure and temperature in the core of a star?
- Where does the energy in stars come from? How can you calculate it knowing what fusion reaction is occurring?
- What fusion reaction is happening in stars on the main sequence at low and high masses?
- What process makes fusion possible at lower temperatures and densities of the core than we would classically think?

ISM

- What is the interstellar medium made of?
- How does it affect the light from stars we observe?
- How can we correct for its effect?
- How do we detect gas in the ISM?