

ASTR/PHYS 2500 Midterm 1 Study Guide

Comprehensive, but focused on Chapters 14 and above that we covered

Midterm 1 Material (fundamental concepts)

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?

Stellar Evolution

- What is the free-fall time?
- What is the Jeans length / mass? What does it mean?
- Be able to explain how stars of different masses move on the HR diagram, and why.
- How can we use Cepheid variable stars to estimate distances?

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?

Stellar Remnants

- What is degeneracy pressure? How does it differ from normal pressure?
- What are white dwarfs, and how are they supported?
- What are neutron stars, and how are they supported?
- What are black holes, and how are they supported?
- What are pulsars?
- Where does the energy come from that causes a star to explode in a supernova?
- What is the Schwarzschild radius?