ASTR 1020: Stars & Galaxies
February 18, 2008

- *MasteringAstronomy* Homework on The HR Diagram is due Feb. 25th.
- Reading: Chapter 15, section 15.2.
- Exam 1: February 20th (Next Class)

Exam Study Tips

- Study with a friend!
- Check PowerPoints (on class website) against your notes, homeworks- are you comfortable with the relevant concepts?
- Do more quiz and review questions in your text and in *MasteringAstronomy*.
- Check out textbook “Learning Goals” at the beginning of each textbook Chapter and Key Concepts at end of Chapter.
- Review Clicker Questions.
- Exam is closed book but you may bring one sheet of paper (both sides) with notes.

Exam 1 will cover

- All material discussed in class, readings, and tutorial up through today’s class.
- Textbook: Chapters 1 (Sections 1.1-1.2), Chapter 4, Chapter 5, Chapter 14, Chapter 15.

The Day of the Exam

Bring a #2 pencil and eraser

Bring a calculator if you think you’ll need one

Please be prepared to get started right away at 10:00 am
Today's Lecture: What is a Hertzsprung-Russell (H-R) diagram?

An H-R diagram plots the luminosity and temperature of stars.

Most stars fall somewhere on the main sequence of the H-R diagram.

Clicker Question: A star near the top of the main sequence has a luminosity about:

a) Twice the Sun’s luminosity
b) Five times the Sun’s luminosity
c) 20 to 30 times the Sun’s luminosity
d) 10,000 times the Sun’s luminosity

Clicker Question: A star near the top of the main sequence has a luminosity about:

Stars with lower T and higher L than main-sequence stars must have larger radii:

giants and supergiants
Stars with higher \( T \) and lower \( L \) than main-sequence stars must have smaller radii: white dwarfs

A star’s full classification includes spectral type (line identities) and luminosity class (line shapes, related to the size of the star):

- I - supergiant
- II - bright giant
- III - giant
- IV - subgiant
- V - main sequence

Examples:
- Sun - G2 V
- Sirius - A1 V
- Proxima Centauri - M5.5 V
- Betelgeuse - M2 I

H-R diagram depicts:
- Temperature
- Color
- Spectral Type
- Luminosity
- Radius

What is the significance of the main sequence?

Main-sequence stars are fusing hydrogen into helium in their cores like the Sun.

Luminous main-sequence stars are hot (blue).

Less luminous ones are cooler (yellow or red).

Mass measurements of main-sequence stars show that the hot, blue stars are much more massive than the cool, red ones.
The mass of a normal, hydrogen-burning star determines its luminosity and spectral type!