

Homework 6: Due **Wednesday, 1 November 2006**, in class (or turn them in before then to my mailbox, 5th floor, Sterling Hall). Show your work (for partial credit if you make an arithmetic error).

1. Two stars, A and B, appear equally bright. Star A has a parallax 100 times as large as star B. Which is the more luminous star? How many times more luminous?

These two stars have about the same color: what does this tell you about their temperatures?

Which star has the larger radius? How many times larger?

Star B is an M0 star: given what you know about both star A and star B, is star B likely to be on the main sequence or not? (Look at Figure 13.15 on page 294.)

2. As observed from Earth, Alpha Centauri, the nearest Sunlike star, has a parallax of 0.74 arc second (Appendix D). How far away is it, in parsecs?

How many times further away is Alpha Centauri than the Sun is?

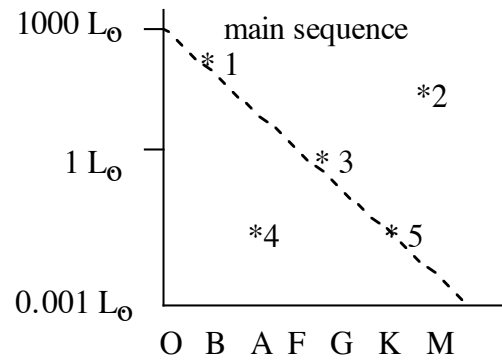
Assuming that they have the same luminosity, how many times brighter does the Sun appear, compared to Alpha Centauri?

If we observed from Mars instead of from Earth, would Alpha Centauri have a larger parallax, or smaller? Explain.

Extra credit: what would Alpha Centauri's parallax be, if seen from Mars?

4. Use the H-R diagram to answer these questions:

- a) Which star is the coolest?
- b) Which star is the most luminous?
- c) Which star is the most like the sun?
- d) Which three stars are most alike in radius?
- e) Which star is a red giant?
- f) Which of stars 1,3,5 is most massive?
- g) Will star 5 have strong Balmer lines of hydrogen in its spectrum?



5. Although hydrogen is the most abundant element in main-sequence stars, we see only weak Balmer absorption lines when we look at an O star. Why?