ASTR 1040 RECITATION 5
MIDTERM 1 REVIEW

10/3/2023

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HOUSEKEEPING

a) Midterm is Thursday – ***study!***

b) Homeworks 1 & 2 are graded – if you have questions / think you were graded wrong come talk to me.

c) Next observing night is Tuesday 10/10

TRUE/FALSE

1. A lightbulb twice as far away will appear 1/4th as dim
2. Blue stars live longer than red stars
3. A star twice as cold will radiate 1/4th as much
4. A 1st magnitude star is ~2.5 times brighter than a 2nd magnitude star
5. Stars range in size from roughly 0.1 – 100 solar masses

CONCEPTUAL

1. What limits the masses of stars?
2. What do you need to observe to determine a star's luminosity? Its temperature? Its mass?
3. Why are red giants so luminous despite being relatively cold?
4. How can you determine the age of a star cluster from its HR diagram?
5. Explain the different regions of the HR diagram. What are the two primary factors that determine where a star is found?

QUANTITATIVE PRACTICE

You observe a nearby eclipsing binary system with a periodicity of 0.71 years. The parallax to the center of mass of the system is 1 arcsecond, while at maximum separation the stars are also separated by 1 arcsecond. You measure the flux of star A to be ~3.17×10^{-8} W/m^2 and its peak wavelength to be ~600 nm.

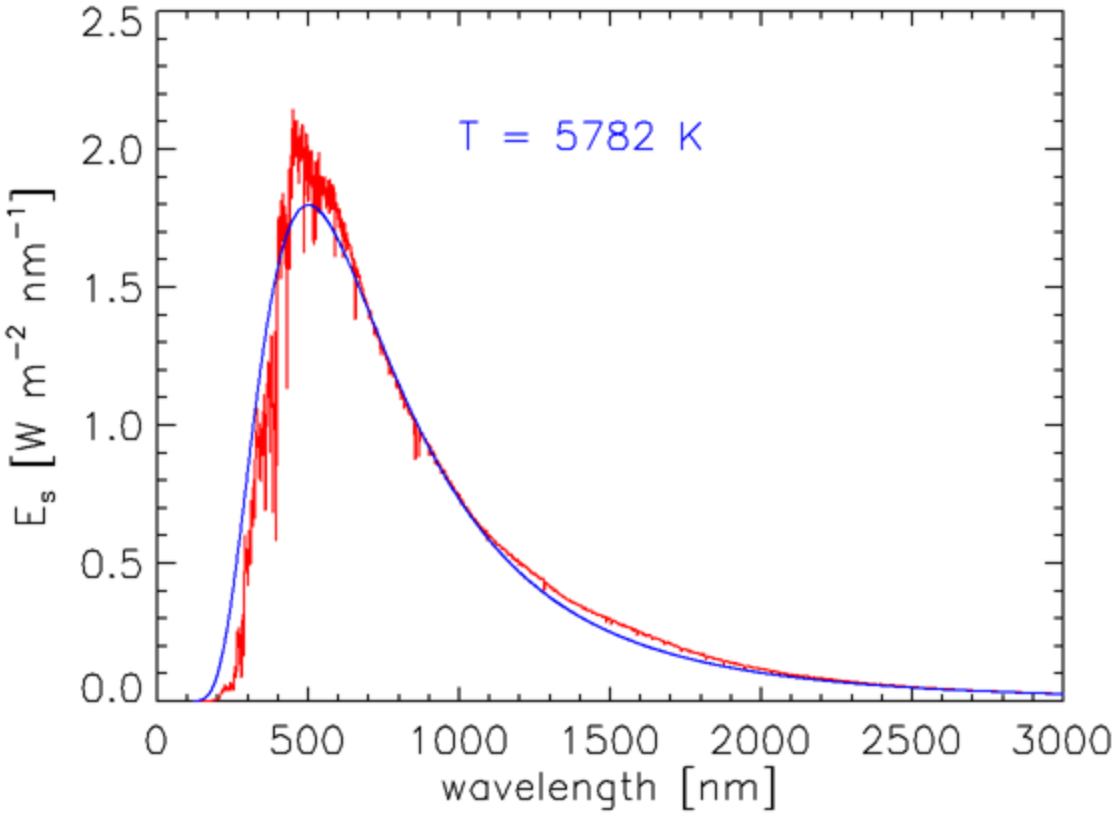
1. What are the luminosity and temperature of star A?
2. What is the semimajor axis of the system, in AU?
3. You measure that the center of mass is directly between both stars – what is the mass of each star?
4. What should the luminosity and temperature of star B be? What can this teach us about the mass range associated with different spectral classes?

QUANTITATIVE PRACTICE

1. Verify that the temperature given on the plot is indeed a reasonable temperature for the Sun.

2. Estimate the total flux received at Earth from the Sun.

3. Estimate the luminosity and radius of the Sun – how close are your answers?



Plot credit: Curtis Mobley