

Ch 30.2: Properties of Stars Notes



I. Distance

a. Describe how astronomers use parallax to find distance.

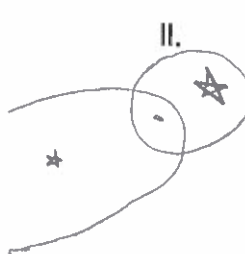
Parallax: apparent shift in a star's position due to the observer's change in position - small angle = far away, large angle = closer

b. What are common units of distance in astronomy?

Light year - dist light travels in 1 yr

Parsec - 3.26 ly

AU - dist. between Earth & Sun (93 million mi)



II. Mass

a. Describe how astronomers determine the mass of stars using binary stars. ^{in the binary} astronomers study the orbits & determine the center of mass. The center of mass will be closer to the more massive star

b. How common are binary stars in the Milky Way galaxy?

~ 85% of stars we see in Milky Way are actually 2 or more stars orbiting together (> 1/2)

III. Temperature/Color

a. Describe two ways a flame is similar to stars.

Blue flame is hotter, Blue stars are hotter

Red flame is cooler, Red stars are cooler

b. What color star has more energy? Less energy?

Think EM Spectrum Blue = ↑ E, Red = ↓ E

IV. Brightness

a. Apparent Magnitude - brightness as it appears from Earth

b. Absolute Magnitude - how bright it really is (from 10 Parsecs / 32.6 ly away) (distance needed)

c. What is a limiting factor of absolute magnitude?

must know how far away the star really is

d. Luminosity - measure of E output from surface per sec.

- depends on diameter & temp

- intrinsic property

(Power - Watts or J/s)

~~Apparent~~ Brightness -

Intensity of a star from Earth

$$I = \frac{P}{A} \text{ (power } \div \text{ area) Units = Watts/m}^2$$

f. Compare and contrast luminosity and brightness. Include units.

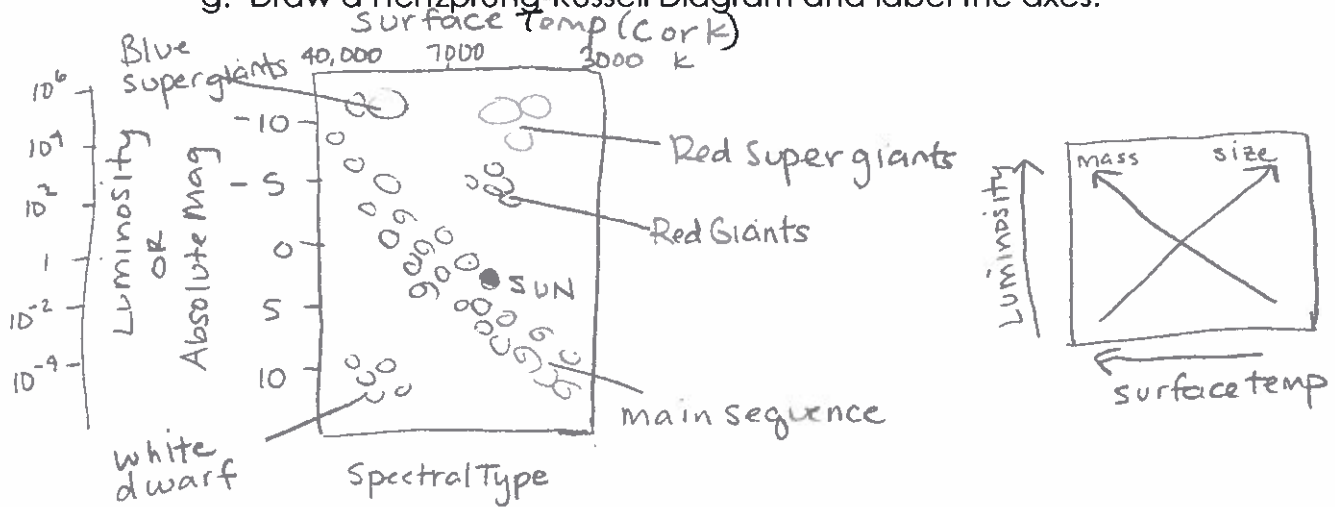
LUMINOSITY	BRIGHTNESS
- intrinsic	- not intrinsic
- cannot measure directly	- can measure directly
- E output per sec	- Intensity (Power/area)
- units = Watts or J/s	- Units = Watts/m ²
- affected by diameter	- Depends on luminosity & distance

$$b = \frac{L}{4\pi d^2}$$

Watts/m² (pointing to b)

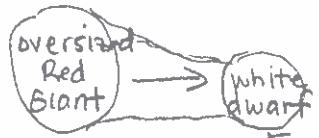
Watts (pointing to L)

g. Draw a Hertzsprung-Russell Diagram and label the axes.



h. Variable Stars - pulsate in brightness bec of expansion & contraction of their outer layers

- i. Cepheid Variables -
 - brighter & fainter in reg pattern
 - longer periods = greater luminosity
 - used to find dist by comparing abs & app mag.
- ii. Nova - sudden brightening of a \star (white dwarf)
 - sm amt of mass lost during surge
 - due to E transfer in binary \star from bigger \rightarrow smaller



• Predict and answer 3 test questions from the notes you took above.

- 1.
- 2.
- 3.