

The Brightness of Stars : Notes/W.S.-190

Luminosity

The **luminosity** of a star is the total amount of energy which the star radiates in one second. In general, the brightness of a star increases with its luminosity.

Also, in general, larger, heavier stars have a higher temperature and are brighter.

The Color of Stars

Stars have different colors. The color of a star depends on its temperature. This is shown in the table below. The temperatures are in thousands of degrees (Celsius).

| Class | Color | Temperature | Example |
|--------------|----------------|--------------------|----------------|
| O | Blue | >25 | Alnitak |
| B | Blue | 11-25 | Rigel |
| A | Blue | 7.5-11 | Sirius |
| F | Blue - White | 6.0-7.5 | Polaris |
| G | White - Yellow | 5.0-6.0 | Sun |
| K | Orange - Red | 3.5-5.0 | Aldebaran |
| M | Red | <3.5 | Betelgeuse |

Questions:

- 1) What is luminosity?
- 2) Which star has a greater luminosity; Alpha Centauri (absolute magnitude +4.7) or Sirius B (absolute magnitude +11.5)?
- 3) What determines the color of a star?
- 4) What is the temperature of the Sun in degrees Celsius?
- 5) What is the color of a star with a temperature of 2300° C.
- 6) What is the color of Sirius?

7) Which is brighter; a class A star or a class B star?

Answers: 1) Luminosity is the total energy radiated by a star each second., 2) Alpha Centauri, 3) The color of a star depends on its temperature., 4) The Sun's temperature is 5000 to 6000 degrees Celsius., 5) Red, 6) Blue, 7) Class B stars are brighter.