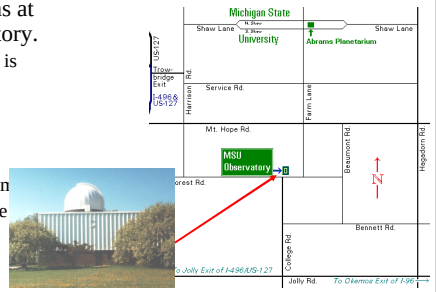
Hertzsprung-Russell Diagram–March 16

- Try new format for some clicker questions
  - More like test questions
    - Do you understand…?
  - Fewer leading questions
- Public viewing sessions at MSU campus observatory.
  - Fri & Sat, 9-11pm, if it is not cloudy.
    - Mar 18 & 19
    - Apr 15 & 16
    - May 13 & 14
  - 24-inch telescope in dom
  - small telescopes outside

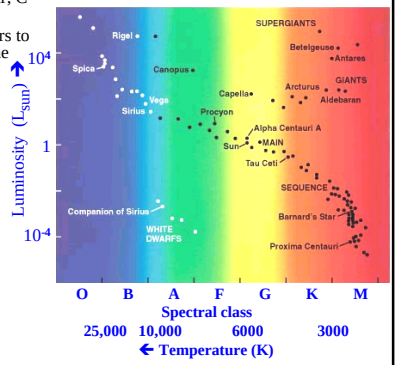
- Do you understand? Reading Hertzsprung-Russell Diagram
- Main sequence is a mass sequence
- Lifetime of stars
- Do you understand? HR Diagram of star cluster



Hertzsprung-Russell (H-R) Diagram

- Stars: A-Aldebaran; B-Barnard's Star; C-Capella; D-Rigel

1. What do you need to know about stars to answer the next 4 questions? Pick one correct ans.
   a. Hot-plate model of star
   b. Model of the solar interior
   c. How to read H-R Diagram
   d. Spectrum of black body
   e. Energy generation in the sun
2. Which is the hottest star?
3. Which is the smallest star?
4. Which is the biggest star?
5. If stars A-D replaced the sun, would people be able to live in Michigan?
   a. YNNN
   b. NYNN
   c. NNYN
   d. NNNY
   e. NNNN

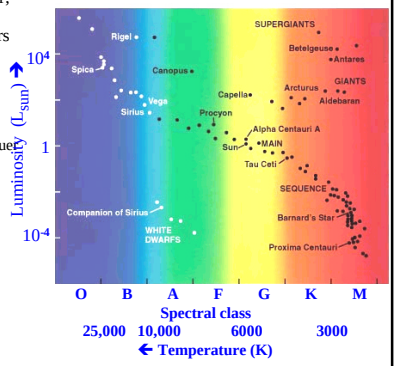


[see Fig. 11.10]

Hertzsprung-Russell (H-R) Diagram

- Stars: A-Aldebaran; B-Barnard's Star; C-Capella; D-Rigel

1. What do you need to know about stars to answer the next 4 questions? Pick one correct ans.
   a. Hot-plate model of star: $L=R^2T^4$
   b. Model of the solar interior X
   c. How to read H-R Diagram
   d. Spectrum of black body: Hotter=>blue
   e. Energy generation in the sun X
2. Which is the hottest star?
3. Which is the smallest star?
4. Which is the biggest star?
5. If stars A-D replaced the sun, would people be able to live in Michigan?
   a. YNNN
   b. NYNN
   c. NNYN
   d. NNNY
   e. NNNN

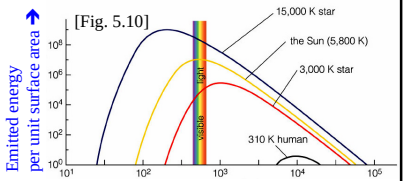


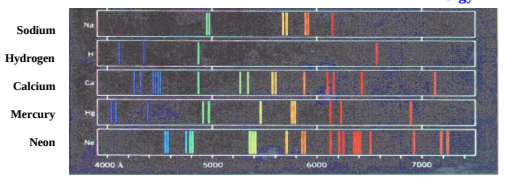
[see Fig. 11.10]

Taking a star's temperature

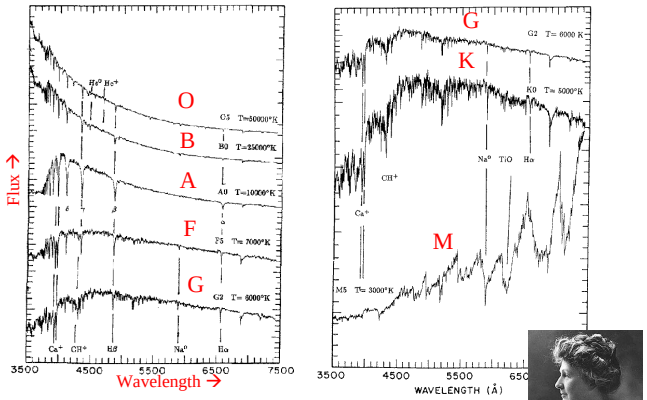
Two Ways:

- Compare amount of light in two colors
  - Blackbody curve
- Spectroscopy





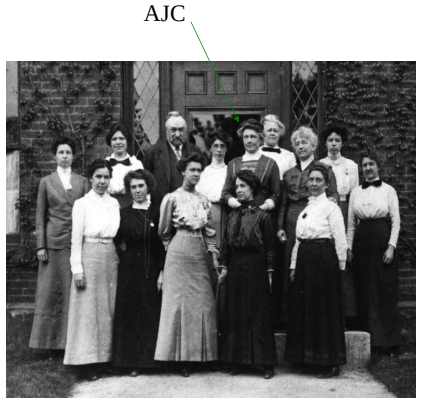
Annie Jump Cannon: Classify stars by their spectra



Very efficient: Draper catalog has 250,000 stars

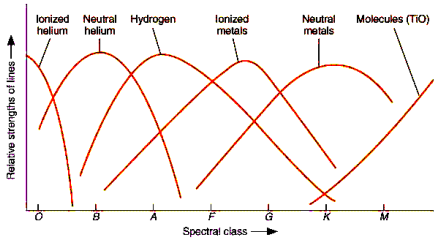
AJC 1863-1941

- Prof. Pickering's Team in 1913, from Barbara L. Welther, 1982, Isis 73, 94.
- AJC
  - BA, Wellesley, 1884
  - Pickering's assistant, 1896
  - Henry Draper catalog of stars, 1918-1924
  - Astronomer 1938



Stellar spectral types

- A Temperature Sequence

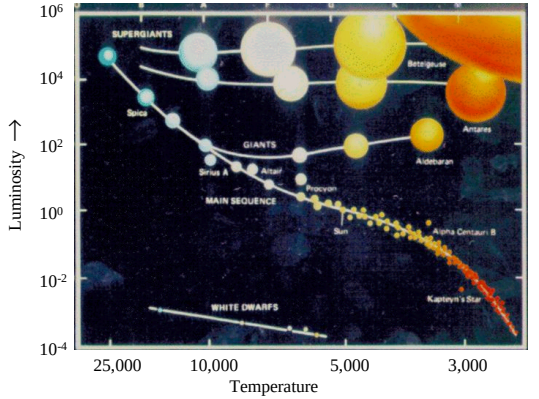


Type	Temperature
O	>30,000
B	10,000-30,000
A	7500-10,000
F	6000-7500
G	5000-6000
K	3500-5000
M	<3500

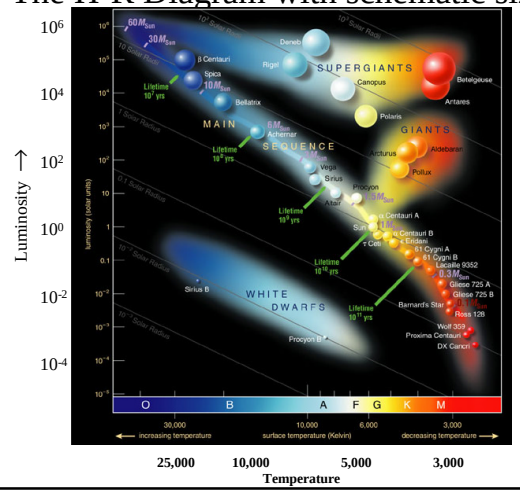
in K

Extra-Credit for best OBAFGKM mnemonic.
- 3 clicker points for entering.
- 3 clicker points for 10 best answers that can be repeated in class.
- Enter in Angel before Test 3.

The H-R Diagram with sizes



The H-R Diagram with schematic sizes



[Fig. 11.10]

Mass determines location on main sequence