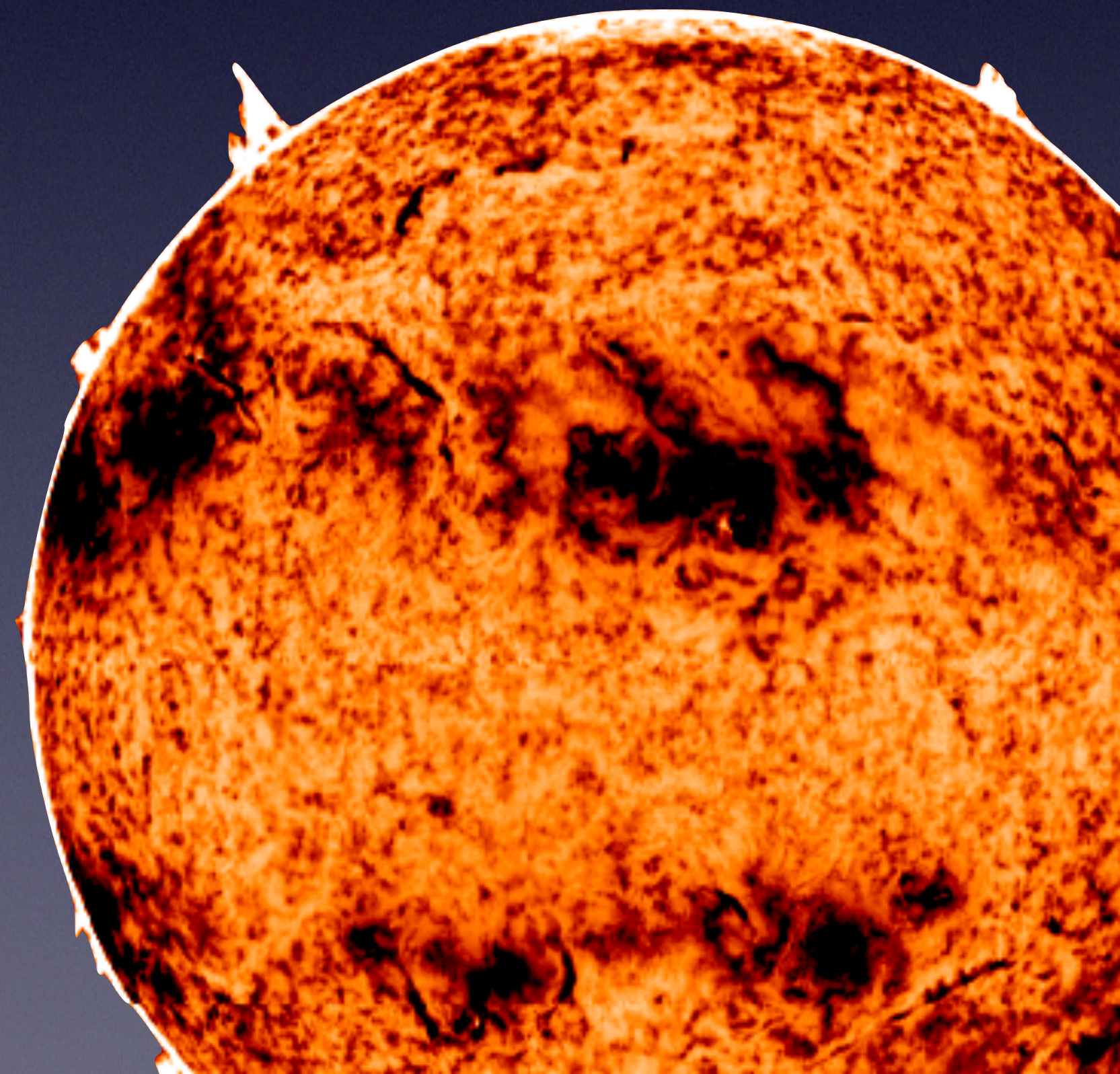


# Stars and Stellar Evolution

How do we classify the billions of stars that exist in our galaxy and Universe?

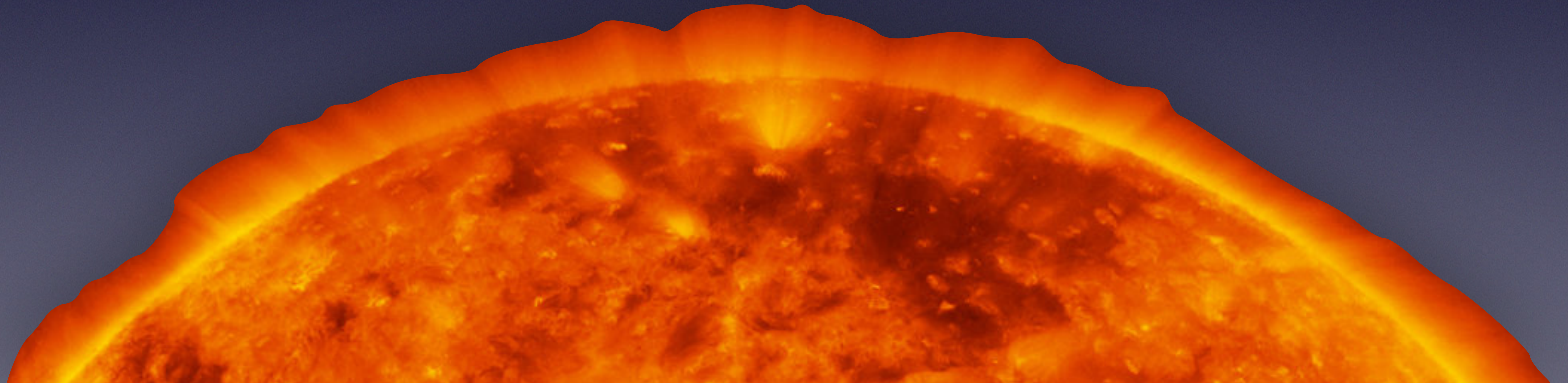
# Stars and Stellar Evolution

- Star - sphere of gas held together by gravity that produces tremendous amounts of energy and shines
  - Majority of known matter in the galaxy



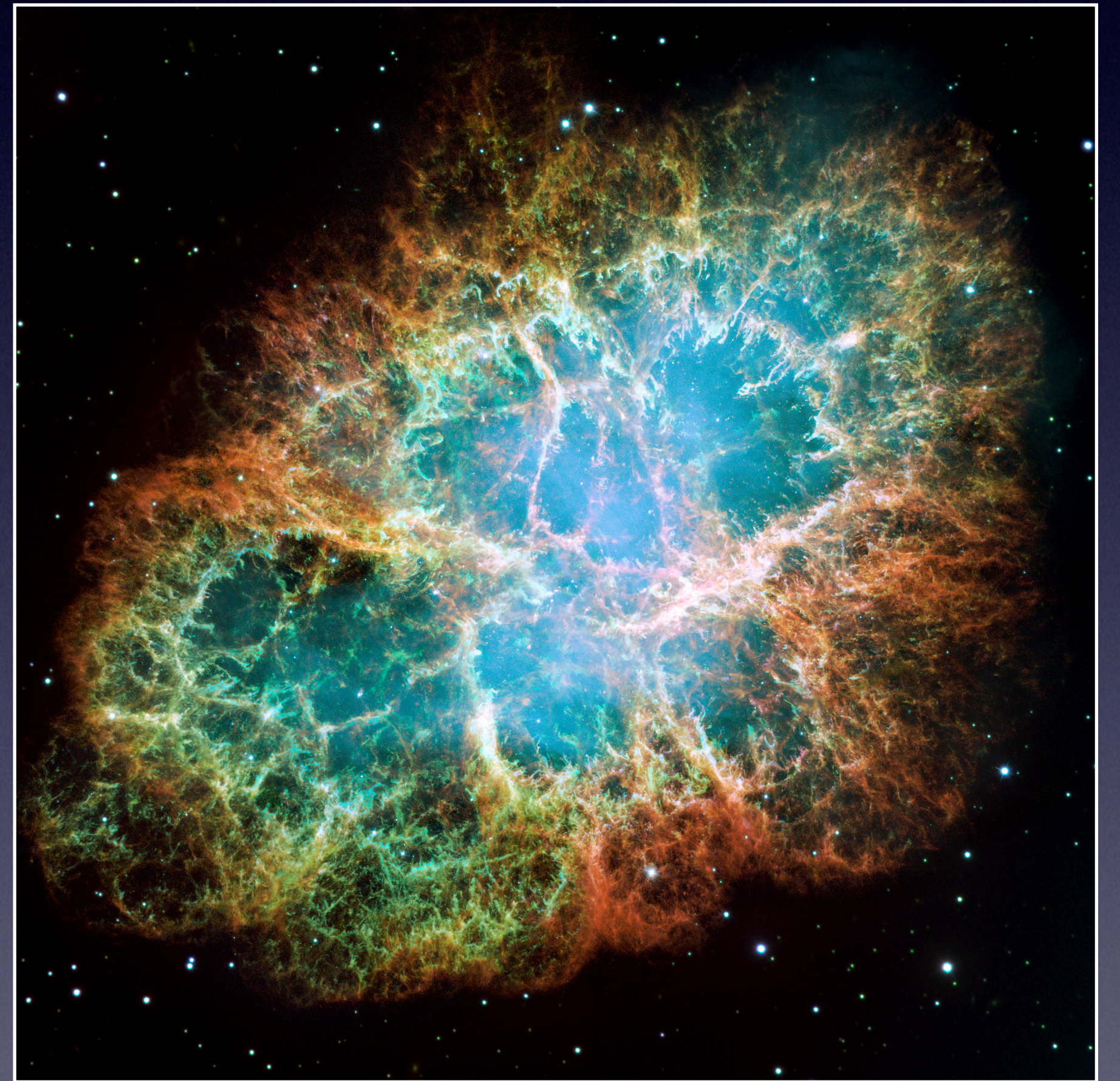
# Stars and Stellar Evolution

- Thermonuclear Fusion - a way to achieve nuclear fusion by using extremely high temperatures
  - Manner in which stars create energy



# Stars and Stellar Evolution

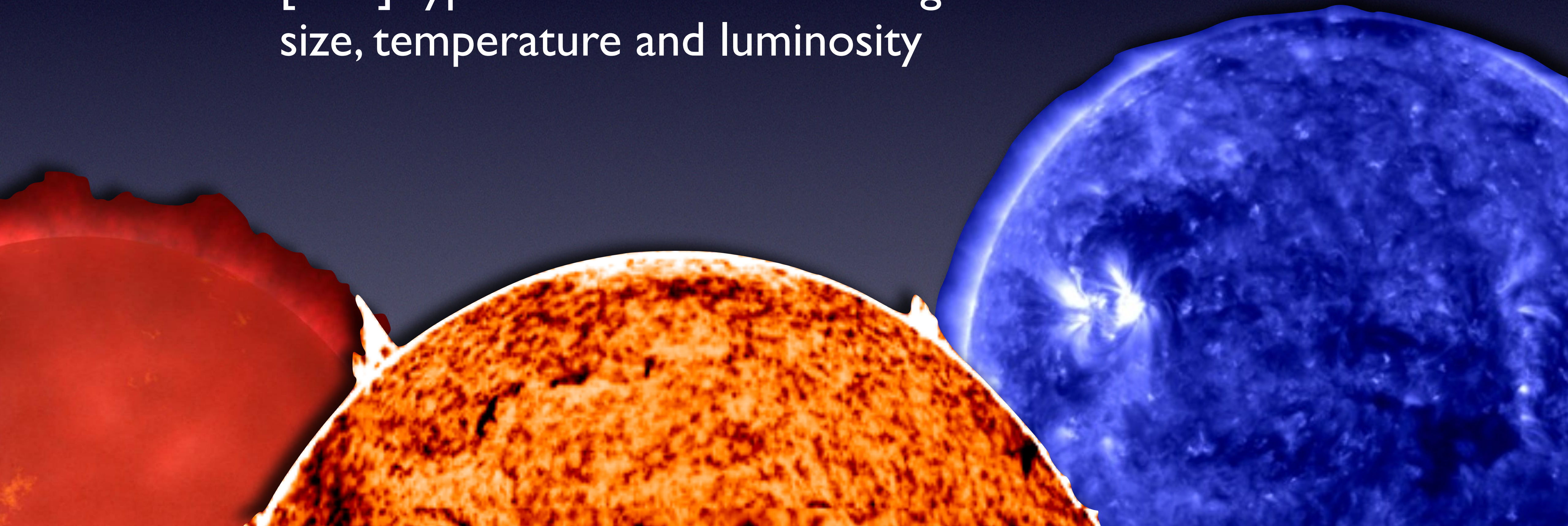
- Types and Parts of Stars:
  - Nebula - a cloud of gas and dust in outer space



Crab Nebula

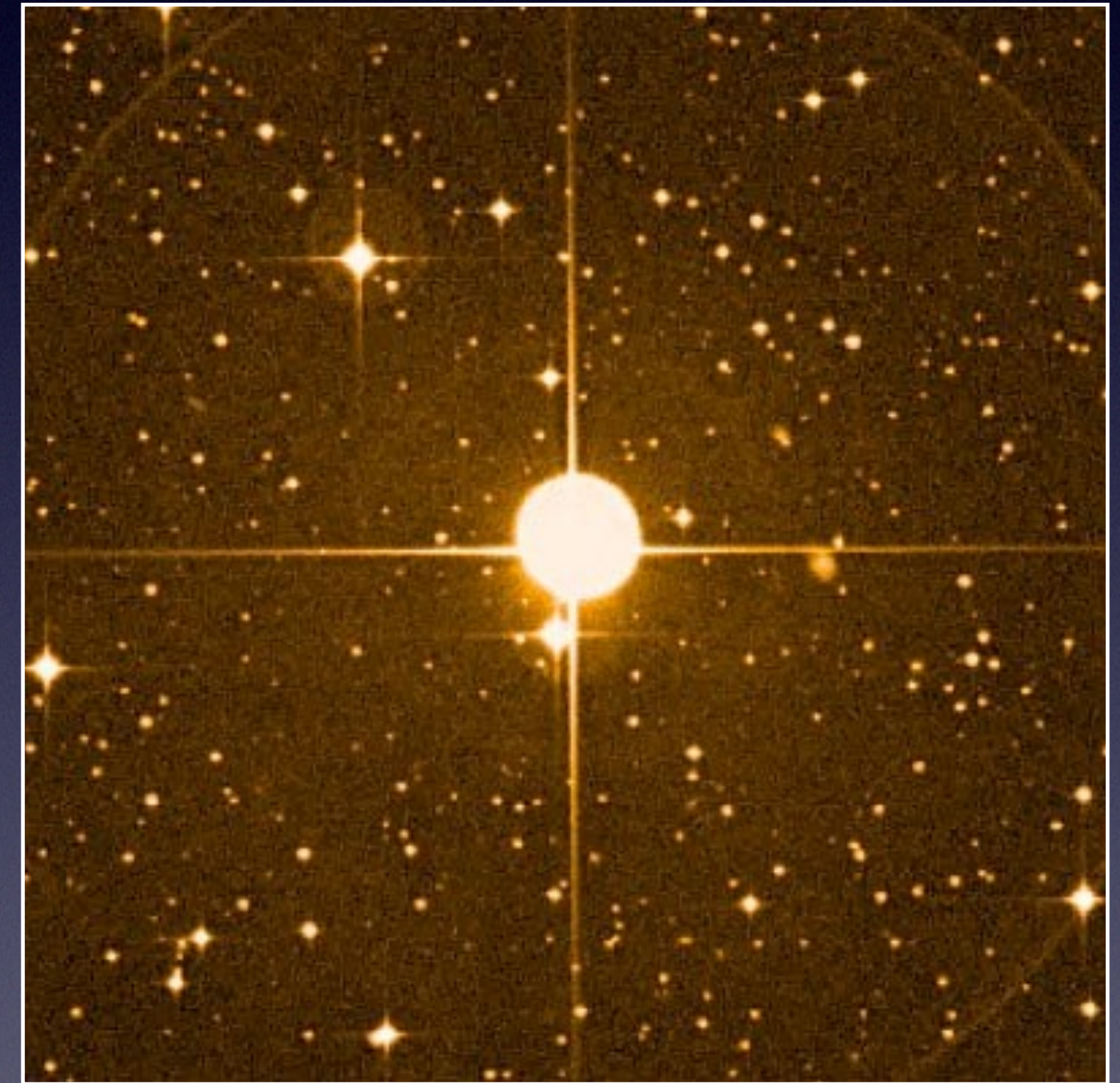
# Stars and Stellar Evolution

- Main Sequence Star - most common [90%] type of star that are average size, temperature and luminosity



# Stars and Stellar Evolution

- Red Giant Star - a luminous easily seen star that is in a late phase of stellar evolution



# Stars and Stellar Evolution

- Super Giant Star - star with an extremely high temperatures in the late stages of its stellar evolution



# Stars and Stellar Evolution

- Red Dwarf Star - a small and cool star located on the main sequence

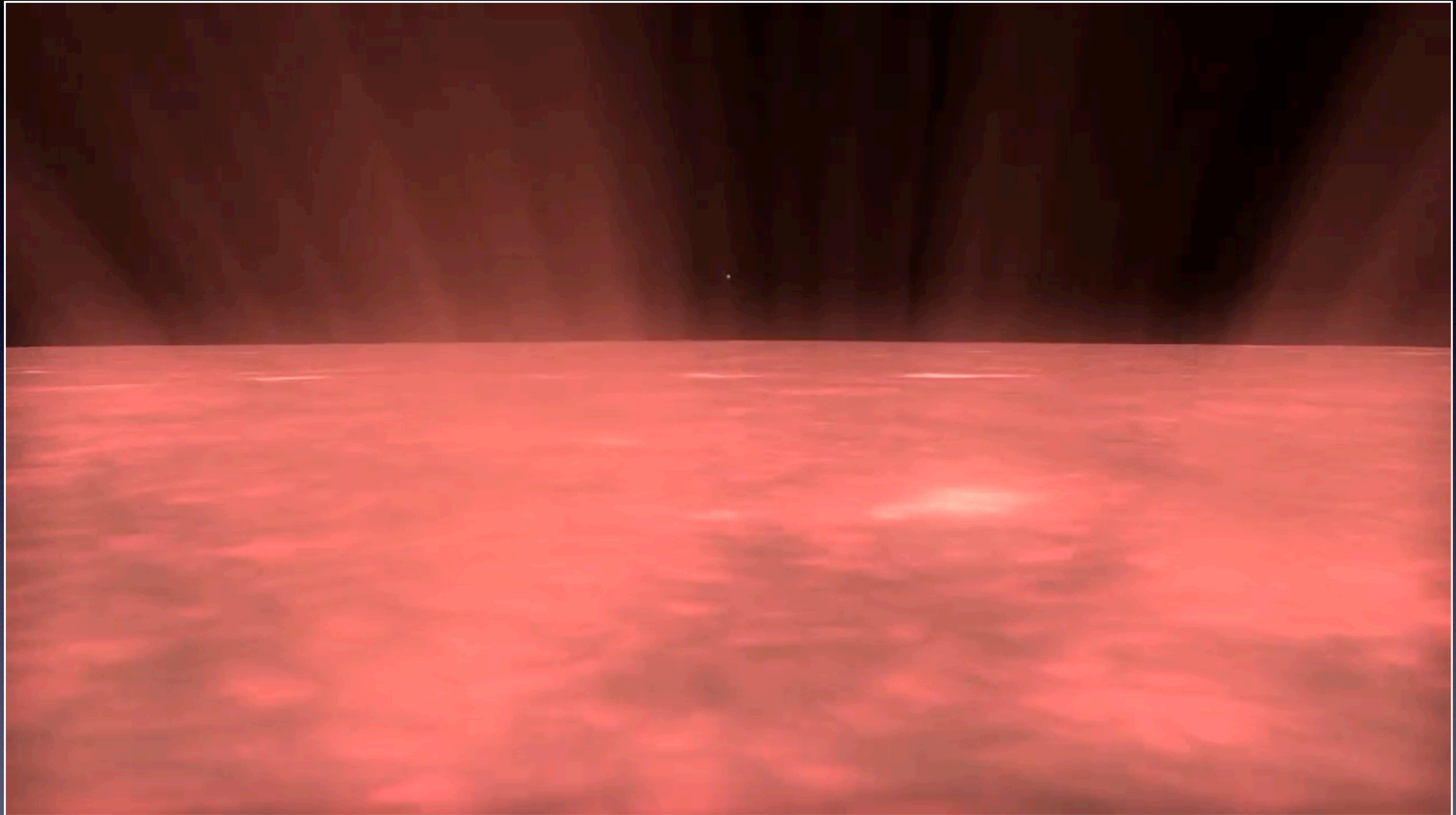




# Stars and Stellar Evolution

- White Dwarf Star - Earth sized star with a low luminosity and a hot surface





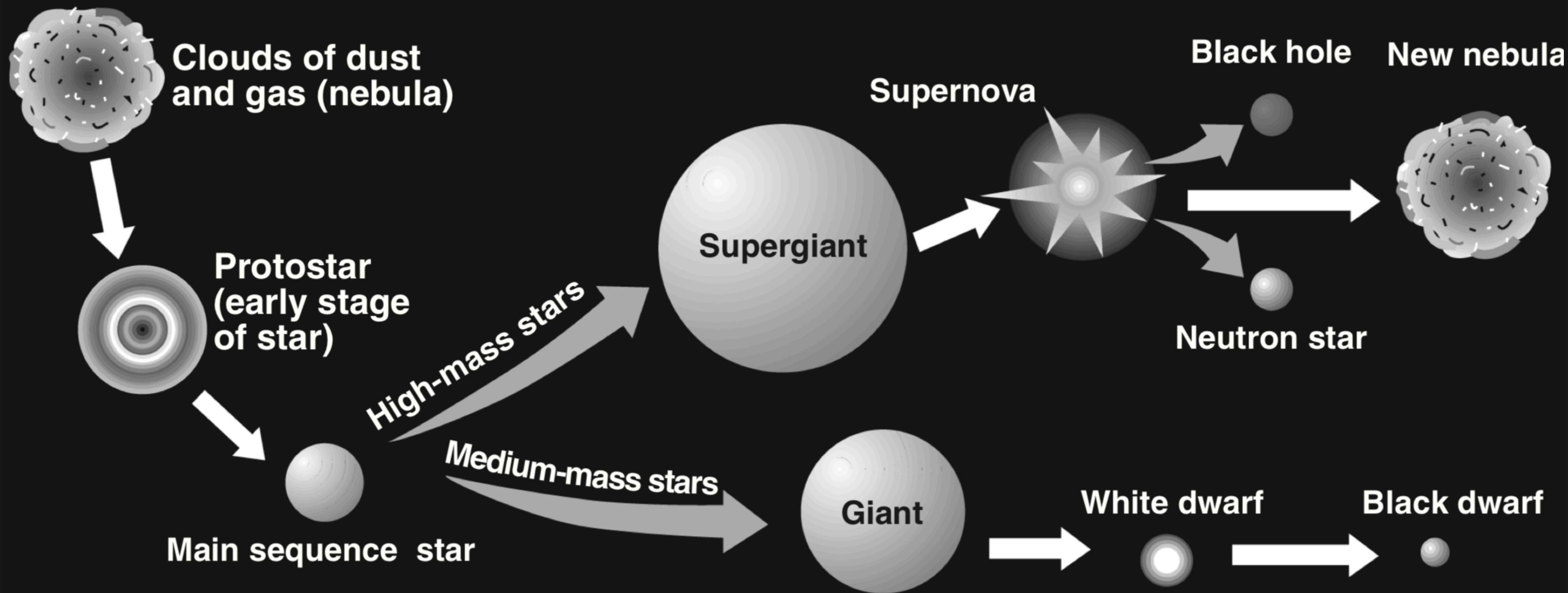
How Big?



# Stars and Stellar Evolution

- Stellar Evolution - process by which a star changes over the course of time
  - More massive stars have a lifespan of a few million years
  - Less massive stars have and lifespan of trillions of years





Stellar Evolution

# Stars and Stellar Evolution

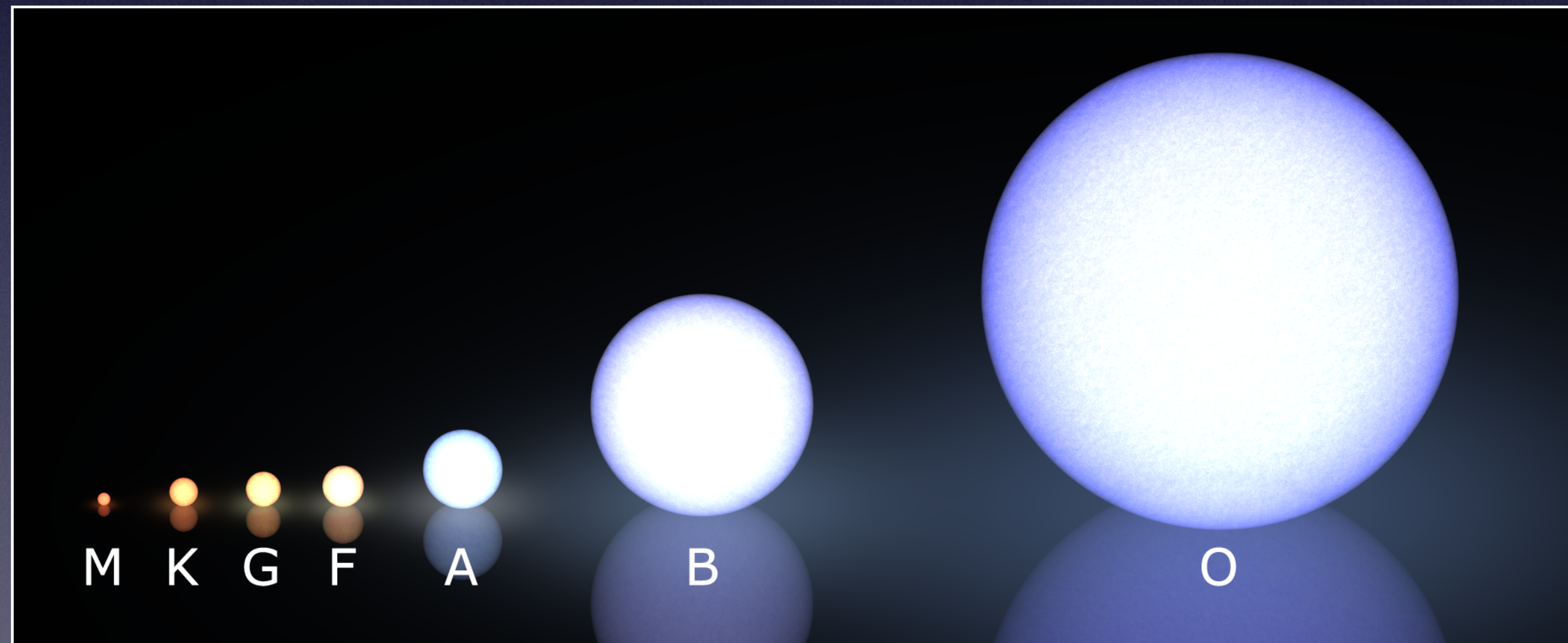
- Absolute Magnitude - how bright a star appears to an observer on Earth
  - Factors that Affect Absolute Magnitude:
    - Temperature
    - Size
    - Distance

# Stars and Stellar Evolution

- Absolute Brightness - the actual brightness of stars compared at a distance of 32.6 light years
  - Factors that Affect Absolute Brightness:
    - Temperature
    - Size

# Stars and Stellar Evolution

- Spectral Class - classification of stars based on analyzing the electromagnetic radiation emitted





Spectral Class O  
28,000 K - 50,000 K

Spectral Class B  
10,000 K - 28,000 K

Spectral Class A  
7,500 K - 10,000 K

Spectral Class F  
6,000 K - 7,500 K



Spectral Class G  
5,000 K - 6,000 K

Spectral Class K  
3,500 K - 5,000 K

Spectral Class M  
2,500 - 3,500 K

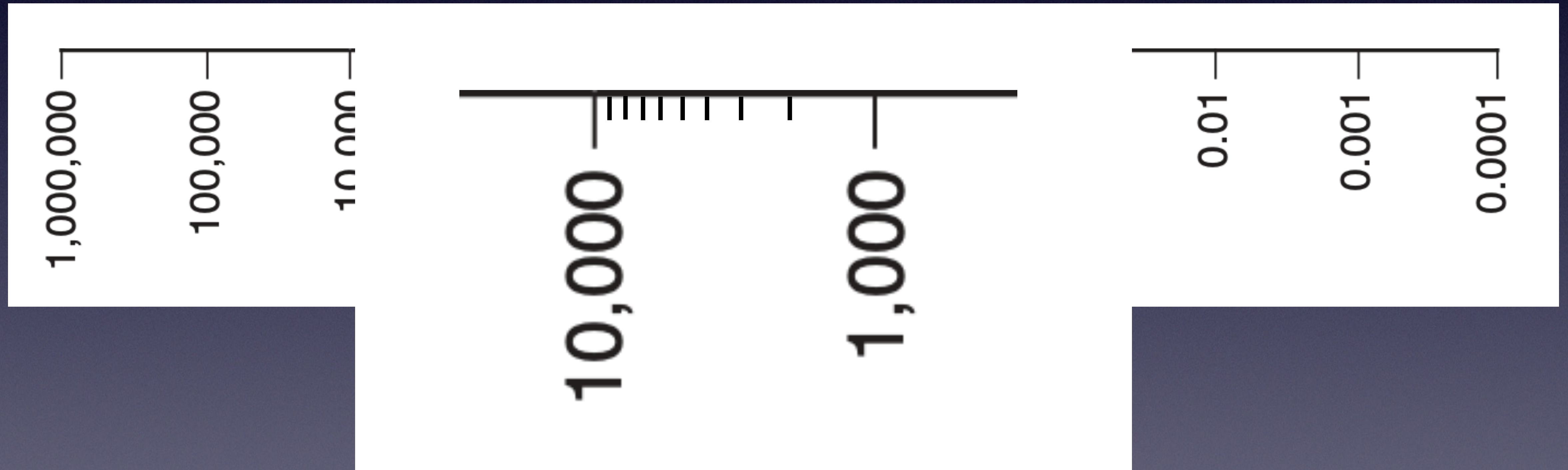


# Stars and Stellar Evolution

- Luminosity - a measure of the rate of energy output
  - Our Sun is the baseline with 1 energy unit
  - Graphed on a logarithmic [non-linear] scale

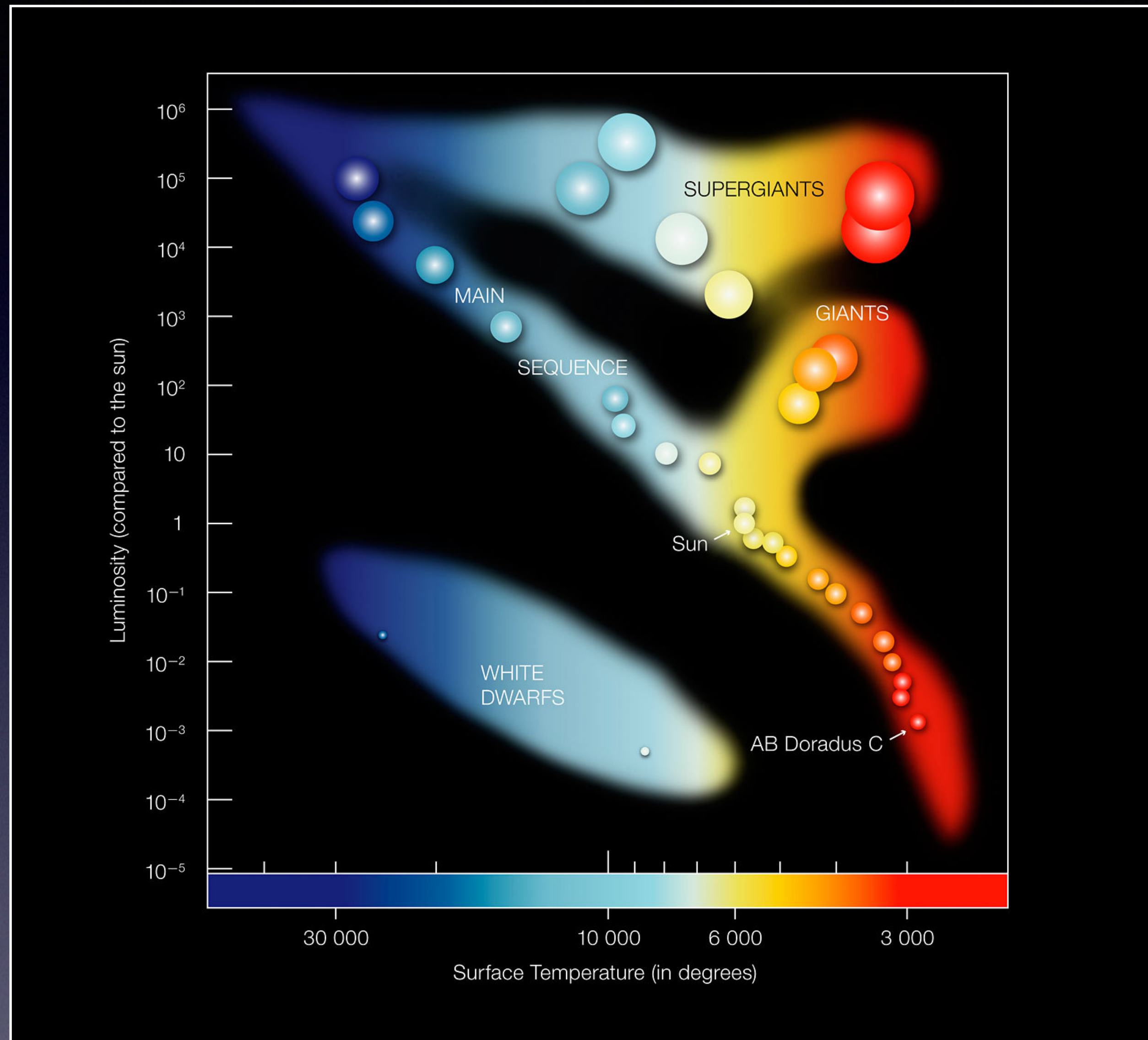
# Stars and Stellar Evolution

- Logarithmic [non-linear] Scale:

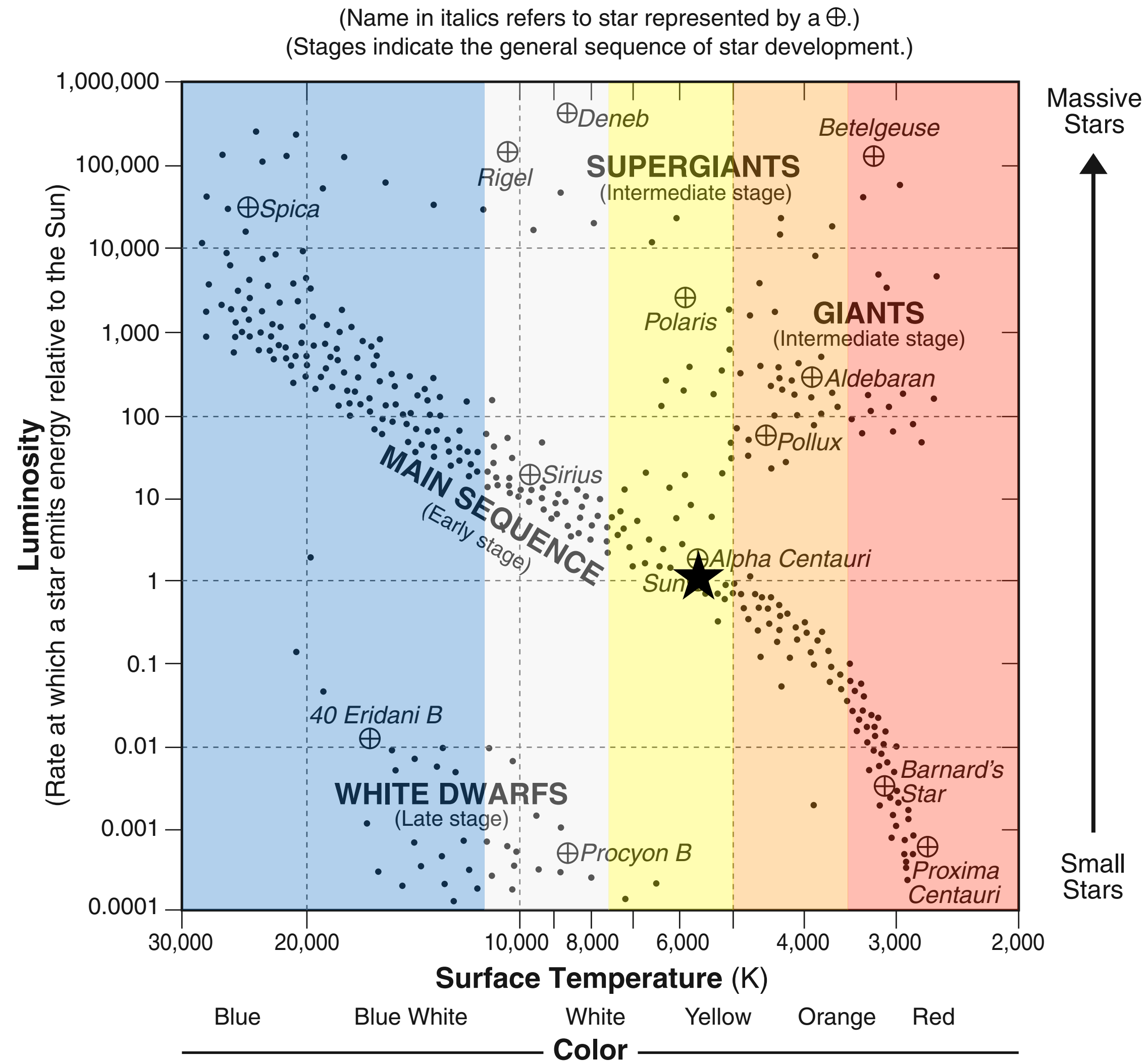


# Stars and Stellar Evolution

- H-R Diagram - chart used to describe the relationship between a star's surface temperature and luminosity
  - Developed by Ejner Hertzsprung of Denmark and Henry N. Russell of the United States



H-R Diagram



# Earth Science Reference Tables

[earthtoleigh.com](http://earthtoleigh.com)