Vocabulary: Star Spectra

Vocabulary

- Absorption spectrum – a spectrum that contains dark lines superimposed on a bright continuous spectrum. Also called a *dark-line spectrum*.

Absorption spectrum

  - An absorption spectrum is created when light from a star passes through cooler gases surrounding the star. The dark lines correspond to colors of light that are absorbed by the atoms in these gases.

- Binary star – a pair of stars that orbit one another.

- Blueshift – the phenomenon in which light from a source that is moving toward an observer is shifted toward the blue end of the spectrum.
  - Light is blueshifted because light waves in front of the moving source are compressed. This is an example of the *Doppler effect*.
  - The faster a light source moves toward an observer, the greater the blueshift.
  - Light from the Andromeda galaxy is blueshifted because Andromeda is moving toward our galaxy, the Milky Way.

- Cepheid variable – a star that expands and contracts in a regularly repeating cycle.
  - Gas pressure builds up in a Cepheid variable star, causing it to expand rapidly. The expansion relieves the pressure, and the star gradually contracts again.
  - As the Cepheid variable star changes in size, its spectrum changes as well.
  - The brighter the Cepheid variable star is, the longer its period. Because this relationship is well known, Cepheid variables can be used to measure distances:
    - A Cepheid variable star that appears very bright, but has a short period, is relatively close to our solar system.
    - A Cepheid variable star that appears very dim, but has a long period, is very far away from our solar system.

- Emission spectrum – a spectrum of colored lines on a dark background. Also called a *bright line spectrum*.

Emission spectrum

  - An emission spectrum is created when an element or elements emit light at certain wavelengths.
  - In astronomy, emission spectra are usually associated with nebulae.

- Giant star – a bright, very large star with a low density and a relatively low surface temperature.
    - Late in the life of a normal star, the core of the star collapses and grows hotter. This causes the outer layers of the star to expand outward, forming a giant star.

- Nebula – a cloud of gas and dust in interstellar space.
    - Most nebulae form when a star explodes in a *supernova*.
    - New stars and planets are formed inside nebulae as gravity pulls the gas and dust together.

- Redshift – the phenomenon in which light moving rapidly away from an observer appears shifted toward the red end of the spectrum.
    - Objects become redshifted because the light waves behind the moving source are stretched out.
    - The faster a light source is moving away from the observer, the greater the observed redshift.
    - Light from most other galaxies is redshifted because the universe is expanding.

- Spectrum – the band of colors produced when light is passed through a prism or similar device.
    - The sequence of colors in the visible spectrum is *red, orange, yellow, green, blue, violet.* Red light has the longest wavelength, and violet light has the shortest wavelength.
    - The plural of spectrum is *spectra*.

- Star – a massive ball of *plasma* that radiates light.
    - The high temperatures inside stars are produced by nuclear fusion reactions inside the core of the star. These reactions convert hydrogen to helium.