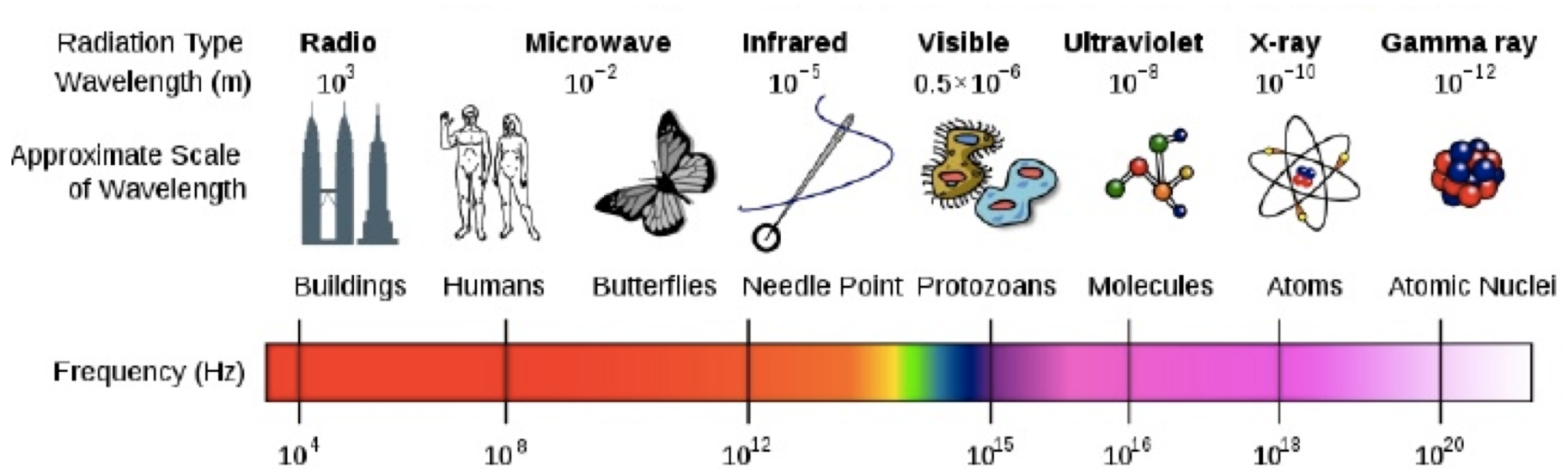


Astronomy Techniques and Methods

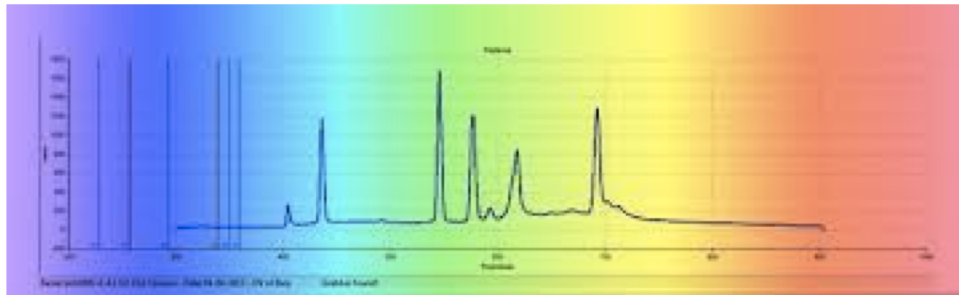
Electromagnetic radiation

Electromagnetic radiation includes light, and other types of radiation not visible to humans



Spectroscopy

Spectroscopy — investigation and measurement of spectra produced when matter interacts with or emits electromagnetic radiation (light!).

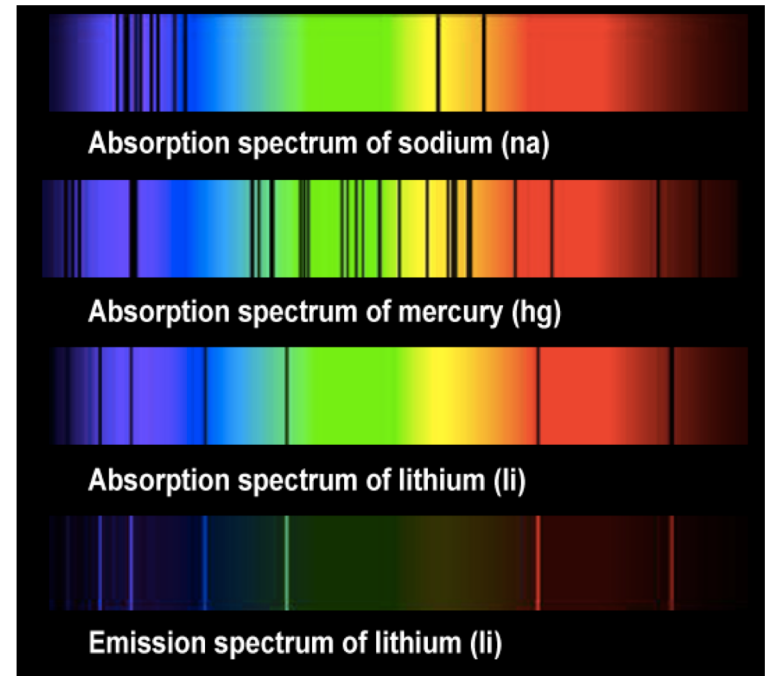


"You take the light from a star, planet or galaxy and pass it through a spectroscope, which is a bit like a prism letting you split the light into its component colors." - Professor Fred Watson from the [Australian Astronomical Observatory](#).

What can spectroscopy tell us?

Composition-

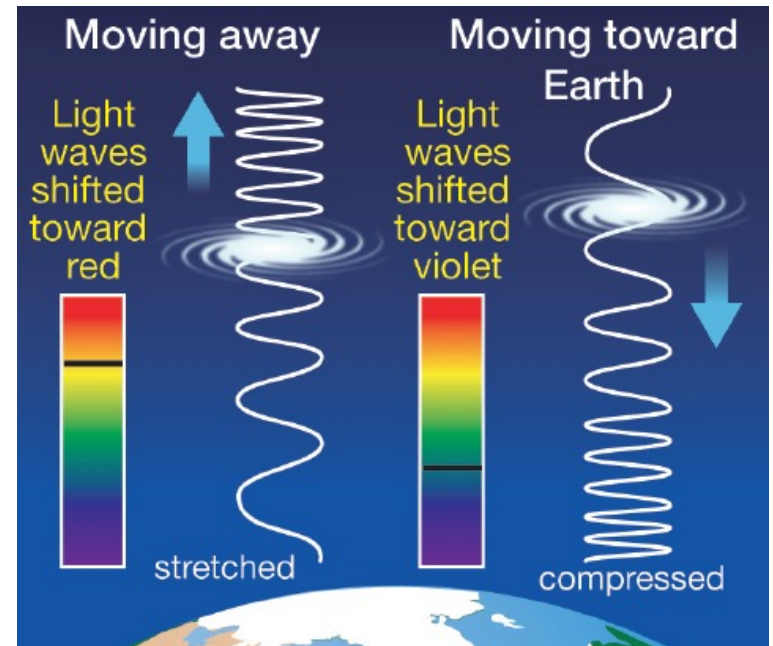
When heated or when electrically charged, certain chemicals emit radiation at very specific colors or wavelengths called emission lines.



What can spectroscopy tell us?

Direction of Movement-

When a wave source is in motion, it changes the wave. This is called **doppler shift** occurs with electromagnetic waves, such as visible light, X-rays, and microwaves.



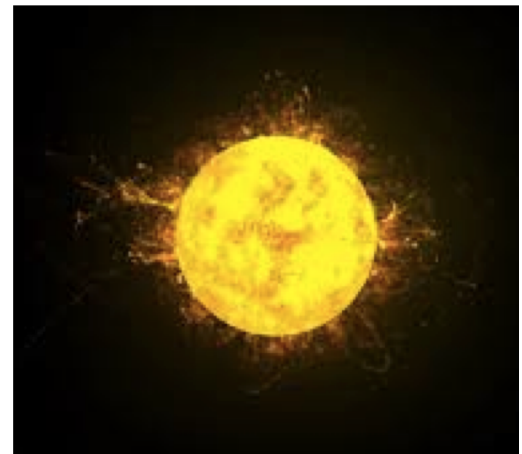
This phenomenon is an important tool used by astronomers to study the motion of objects in space.

What can spectroscopy tell us?

Temperature and mass

A star's mass effects the way atoms in its atmosphere act, giving very narrow spectrum lines. And the same is true with temperature.

"By looking at the thickness and fuzziness of the lines, you can work out the temperature and mass"



Telescopes and electromagnetic waves

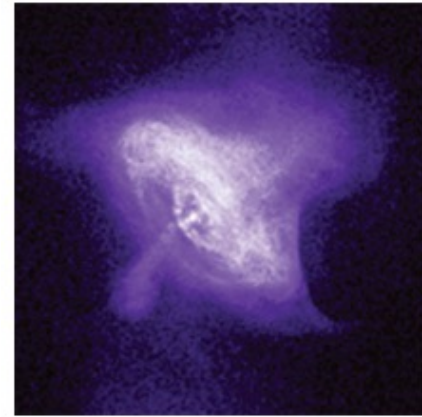
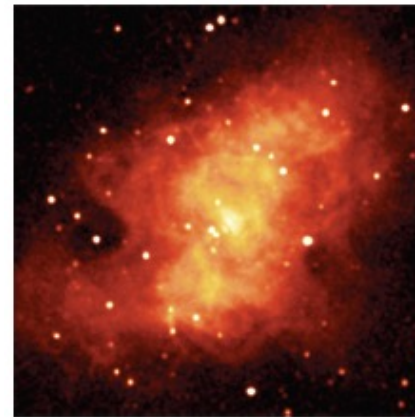
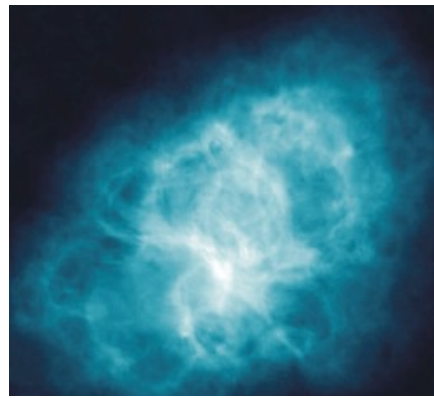
Astronomers use different types of **telescopes** to view the different types of waves emitted by objects in space.

1. A *radio telescope* works like an extremely powerful receiver that picks up radio waves from space.
2. An *Infrared telescope* is often placed on satellites that orbit above Earth.
3. An *X-ray telescope* is designed to detect high-energy radiation (X-rays) from space.



Telescopes and electromagnetic waves

These images of the Crab Nebula were taken with different telescopes.



Each new view gave astronomers more information.