

Recombination Lines

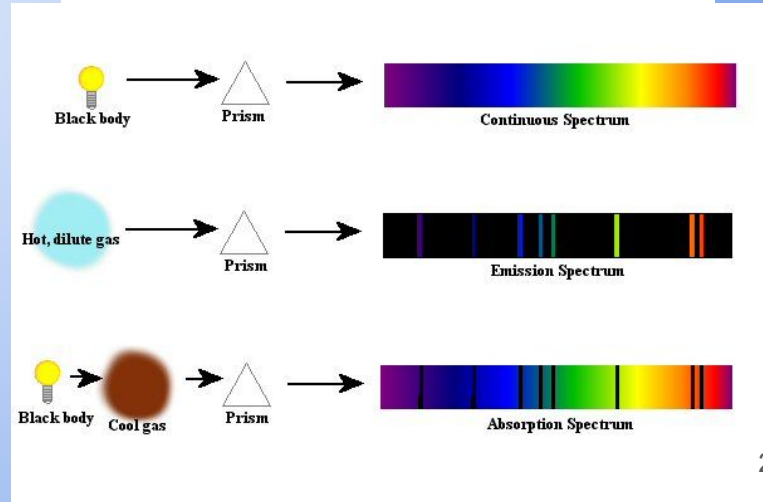
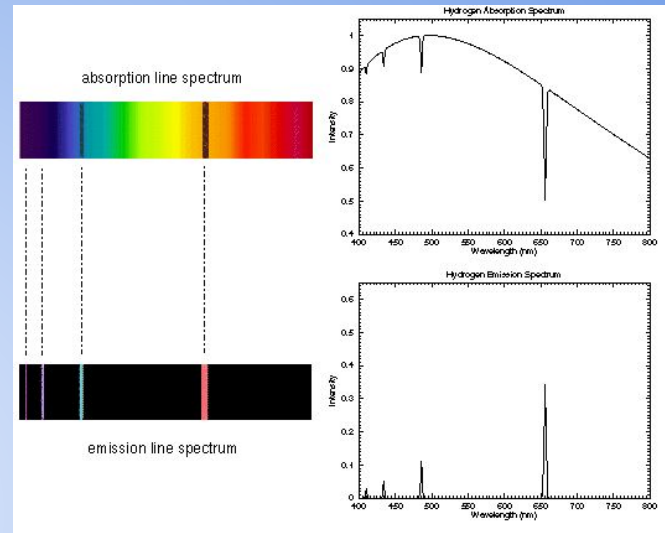
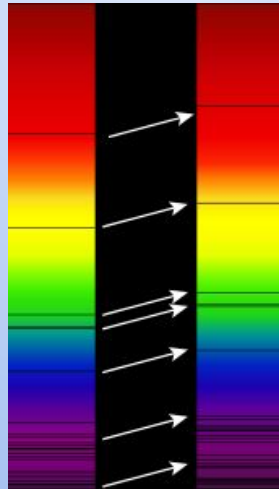
What are Spectral Lines?

- Emission or absorption features in spectra
- Actually quantum phenomena
- Can be used to determine physical and chemical conditions in astronomical objects
 - Doppler shifting:

$$\nu_{obs} \sim (1 - \beta)\nu_{emitted}$$

- Cosmological Redshift:

$$z = \frac{\nu_{emitted}}{\nu_{obs}} - 1$$



Characteristics of Radio Spectral Lines

- Small changes in radial velocity can be measured
 - https://commons.wikimedia.org/wiki/File:Radial_velocity_doppler_spectroscopy.gif#/media/File:Radial_velocity_doppler_spectroscopy.gif
- Detection of line emission from sources in dusty regions of space
- Helps with sensitive searches from small changes in fundamental physical constants

- Higher frequency spectral lines don't allow us to do these things!

What are recombination lines specifically?

https://www.visionlearning.com/library/animations/Bohrs_Atom/Bohrs_Atom.html