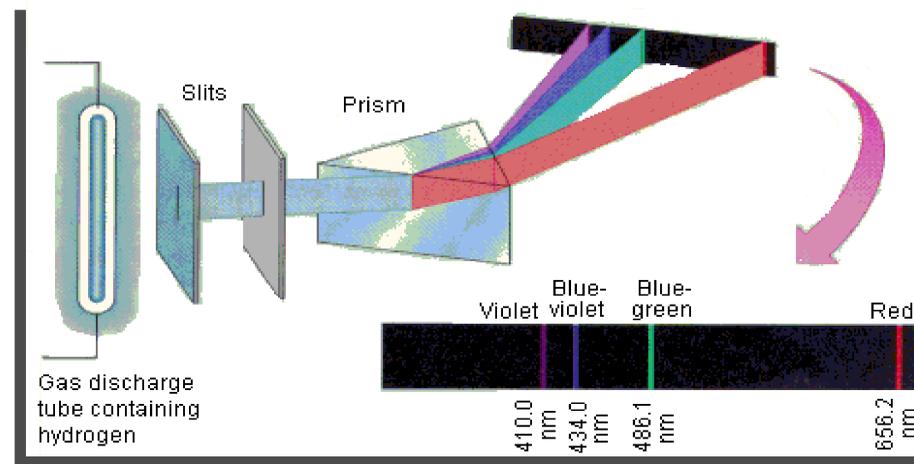


# Spectroscopy of Emission Line Tubes

## Spectroscopy- Spreading out the light:

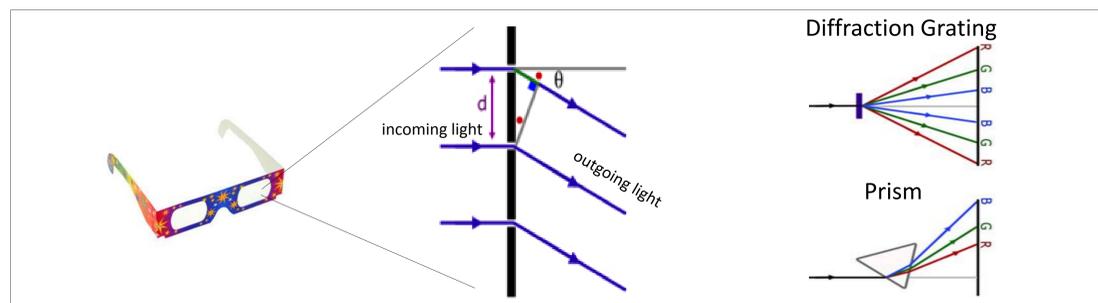
Various tubes are set up, each containing a single element. As we turn each tube on we excite the gas inside with electricity (energy).

So why do we see these lines? The electrons in each atom of the gas are constantly being excited from a lower to a higher energy level- only to immediately drop back to a lower energy (this happens over and over!). As each electron drops to a lower energy, it emits light at *specific wavelengths*, or colors, specific to the element that was excited.



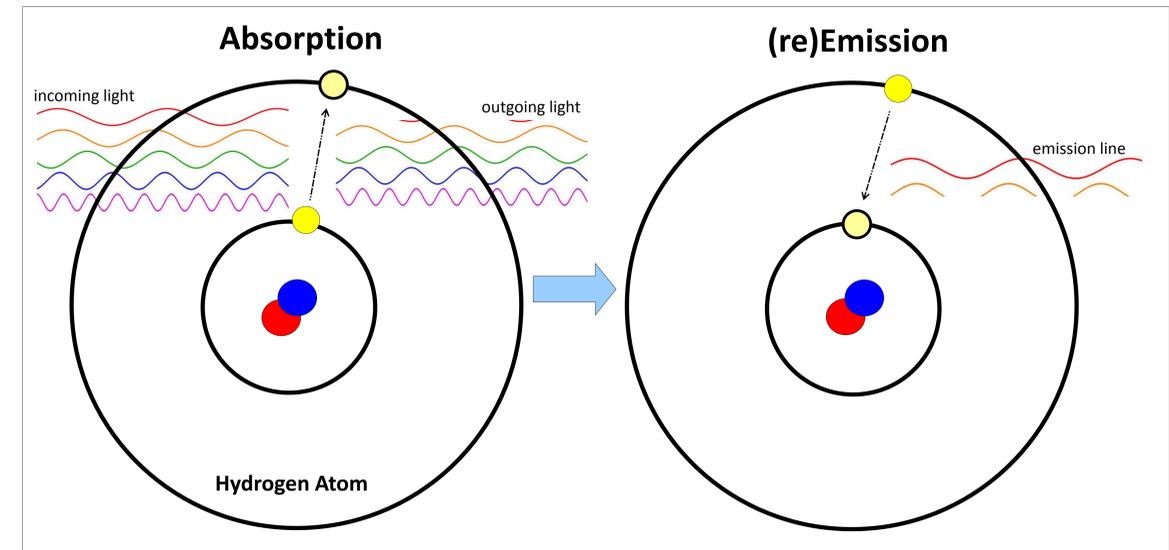
## How the glasses work:

The glasses are made of two **diffraction gratings**. Each diffraction grating has *thousands* of tiny slits per centimeter. These act similar to a prism: taking the full range of light and dispersing, or diffracting, it over a broad range of wavelengths. Now, you can see which wavelengths of light are emitting more or less intense than others.



## What is that stuff in space made out of?

How do astronomers determine the abundances of things like stars, clouds of gas, and galaxies? Astronomers look for features in light called **absorption** and **emission**. Since each element absorbs and emit light at *very specific wavelengths*, we can tell what elements are present in a certain object. For example, we know our Sun is made of Hydrogen and Helium from the absorption lines we observe.



## But where do I see it?

You've probably seen examples of emission all the time! Neon light signs are actually tubes of gas being excited and emitting emission lines in the red.



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