

# The Colors of Visible Light

Expanding Your Horizons

April 29, 2006



# The electromagnetic spectrum

Wavelength Dimensions

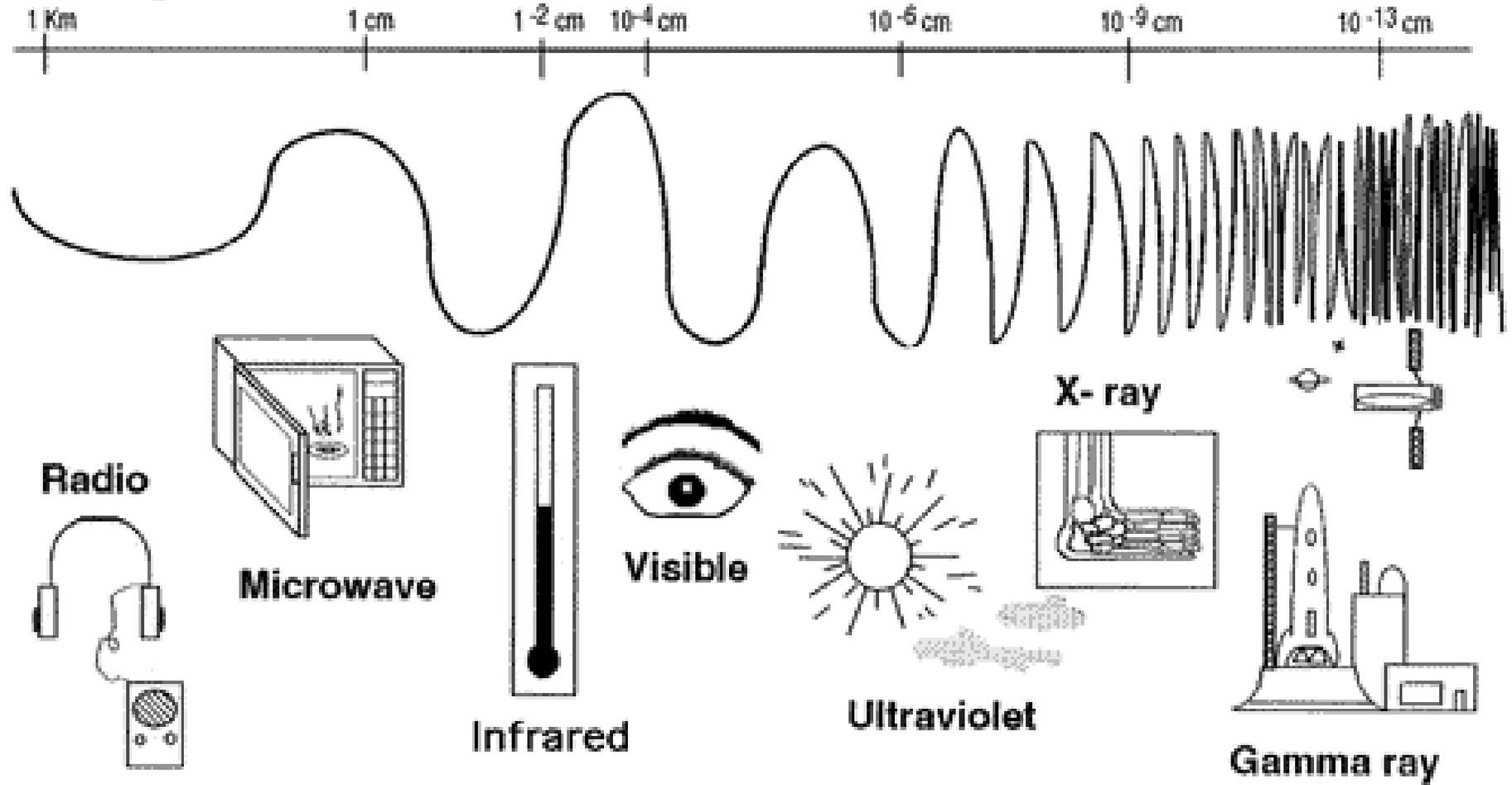
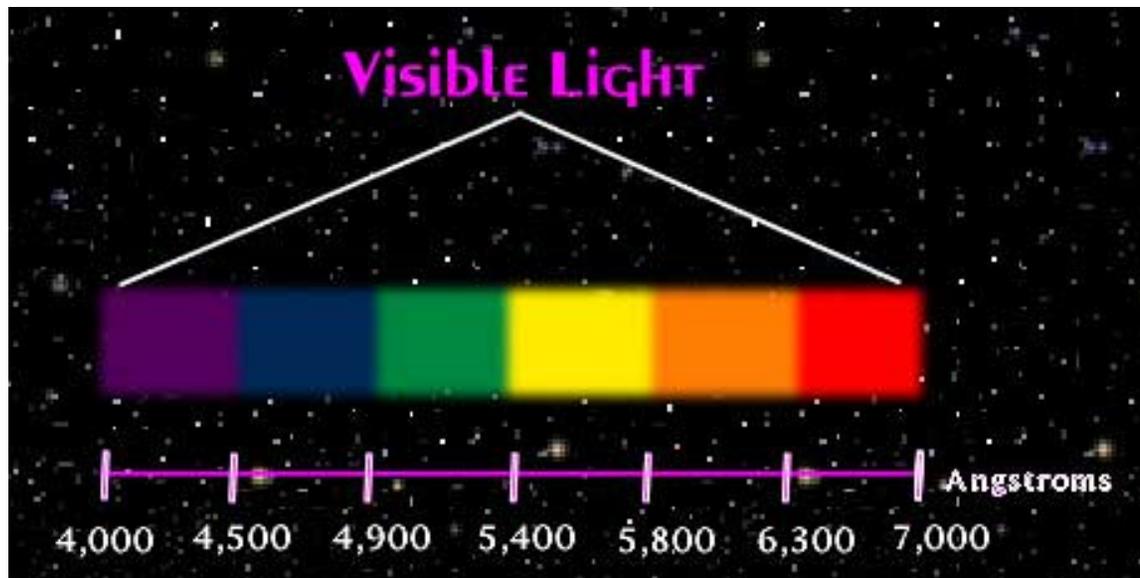
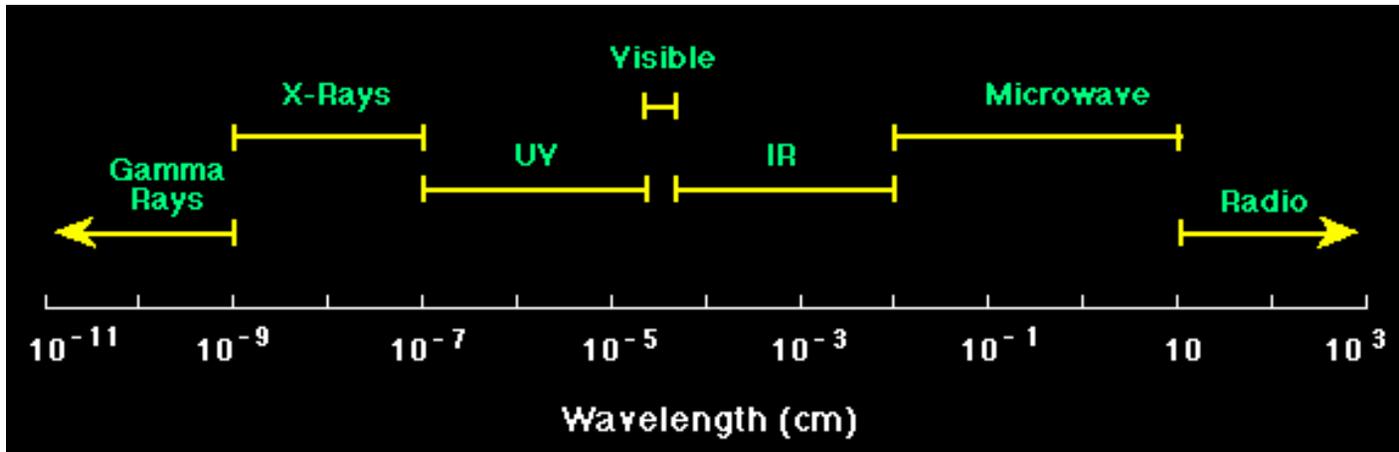


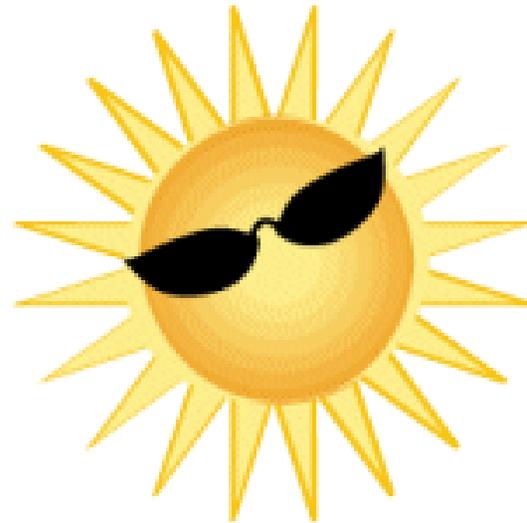
figure by Ursula Sexton

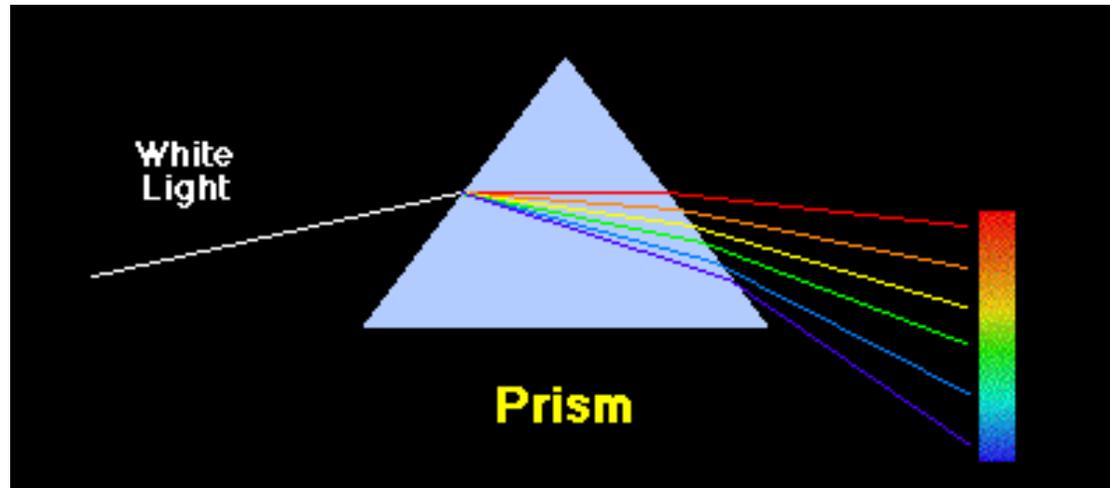


## Question:

How can we separate out the individual colors of visible (white) light so we see the full spectrum of colors?

- Prism
- Water
- Oil
- Bubbles
- Diffraction Grating

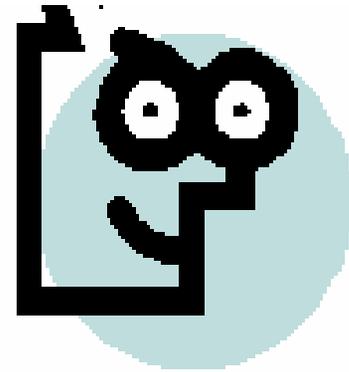
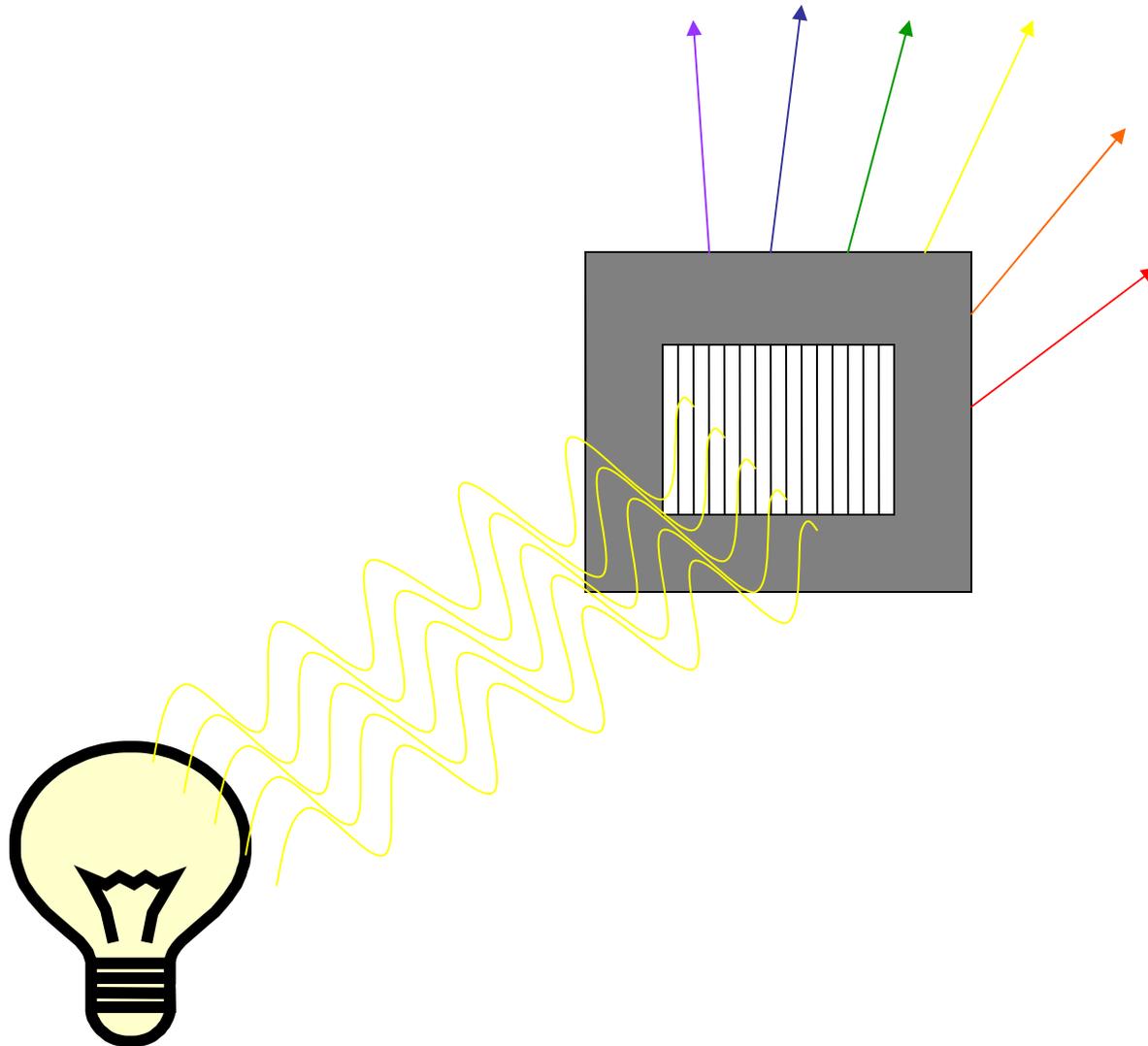




- A prism bends different wavelengths of light at different angles, separating out the different colors.

<http://csep10.phys.utk.edu/astr162/lect/light/absorption.html>

# Diffraction Grating

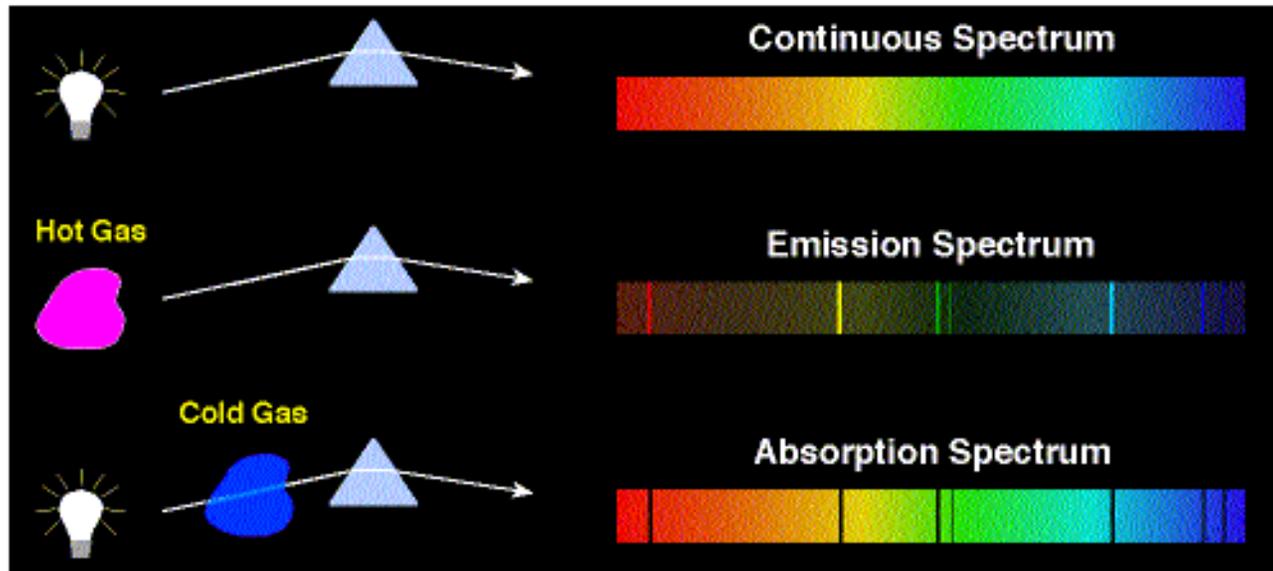


# Spectroscope

- A spectroscope spreads out these wavelengths of light into a spectrum
- When light from an unknown source is analyzed, the different patterns of bright lines in the spectrum reveal which elements emitted the light. Such a pattern is called an emission spectrum.
- **Activity - Build Your Own Spectroscope!!**

# Three Types of Visible Spectra

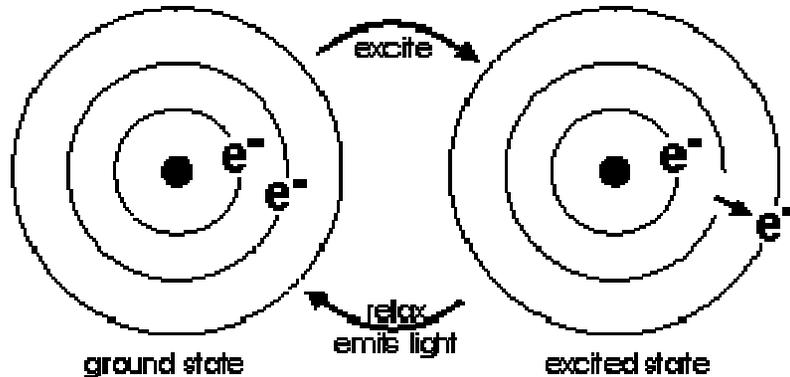
(Band or series of colors produced by the dispersion of light.)



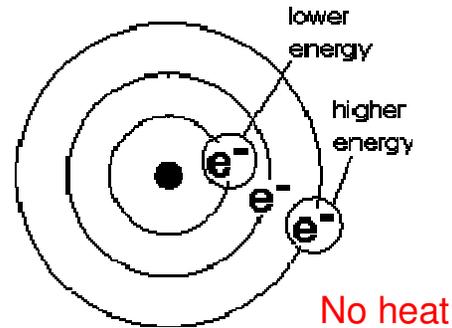
<http://csep10.phys.utk.edu/astr162/lect/light/absorption.html>

# What's Going On?

Let's discuss this diagram.



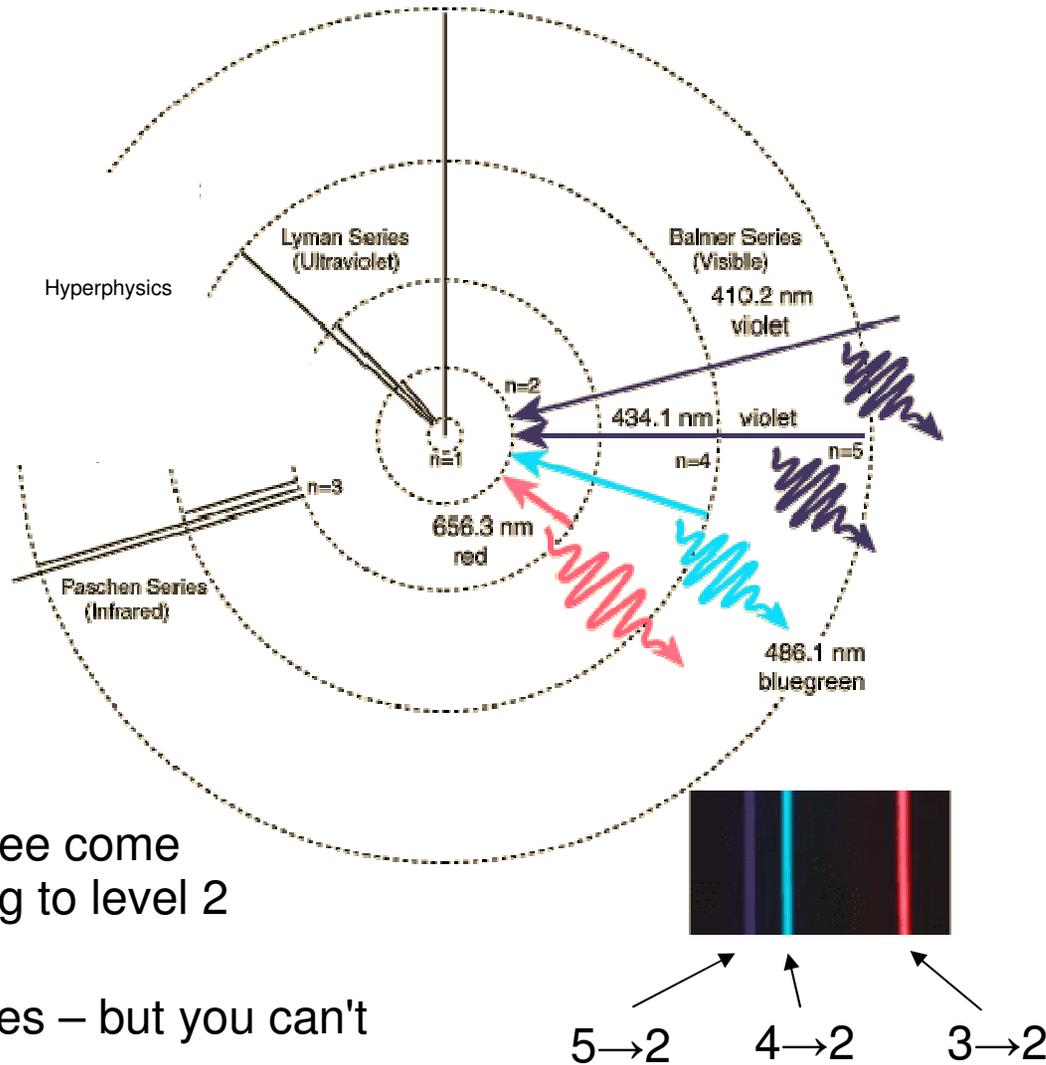
With heat



Now discuss this diagram.

When an electron drops to a lower energy, it will emit a particular color of light.

Hydrogen is the simplest: you can label the electron orbits as 1, 2, 3, ...



The lines that you see come from electrons falling to level 2

There are other lines – but you can't see them ...

**Activity:**  
**Identifying Metallic Elements Using a Flame Test**

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- Review Activity Sheet – procedure
- Use colored pencils and record your data.

**Let's Share Our Results!!!**



# Thank you!!!

