

# Lecture 24

## The Hydrogen Atom

Chapter 28.4 - 28.9

### Outline

- Atomic Spectra
- The Bohr Model
- Modifications to the Bohr Model

# Summary of Early Atomic Models

## The Thomson Model

**Description:** Electrons are embedded in a wide positively charged area, like raisins in a cookie.

**Problem:** Does not agree with the Rutherford  $\alpha$ -particles experiment.

## The Rutherford Model

**Description:** Miniature Solar system with electrons orbiting the nucleus at any distance.

**Problem:** Electrons experience acceleration and should lose energy by radiating photons and eventually fall onto the nucleus.

# Three Types of Spectra

When a material object is heated, electrons in the atoms absorb energy from the current and emit colored light, which can be dispersed into a spectrum.

At high densities, the emission is continuous with no peaks within a short wavelength range.

At lower densities, we will see series of bright lines, some of which are more intense.

The color of the most intense lines gives the excited gas its color (red to **neon**) - emission spectrum.