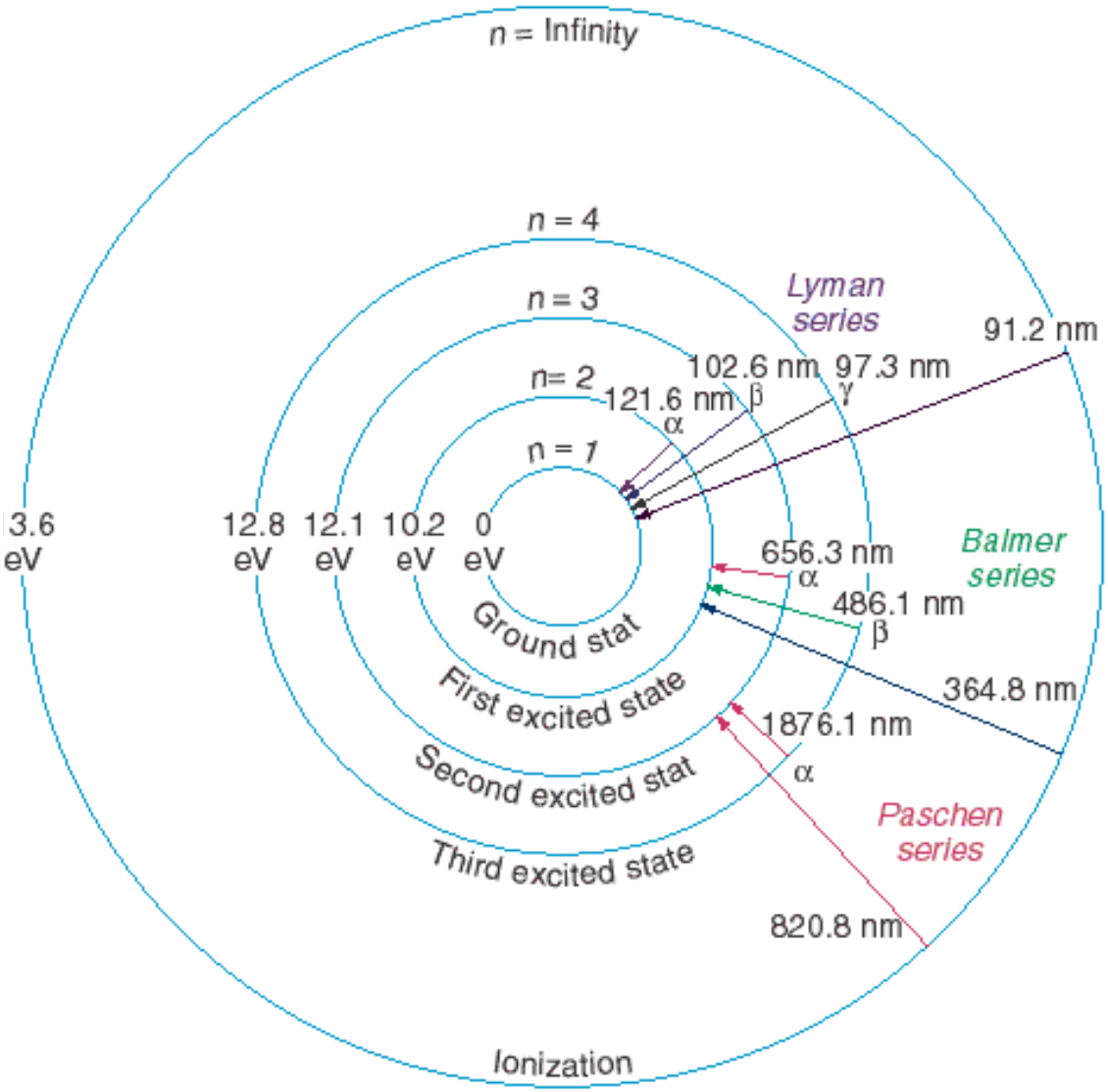
Understanding the planetary model



Understanding the planetary model

We can apply the same model to the electron. This is the Bohr model. The difference is that in the Bohr model we do not know how rapidly the electron rotates are the nucleus. Therefore, we must calculate that based on all of the other given data in the model.

$$F_{attract} = \frac{q_e q_p}{4\pi\varepsilon_0 R^2}$$

This force should be offset by the centripedal force given by

$$F_{centripedal} = m_e \omega^2 R$$

Understanding the planetary model

What the value of ω that satisfies the Bohr model given the following data.

$$\varepsilon_0 = 8.85\ x\ 10^{-12} N^{-1} C^2/m^2$$

$$\mathrm{m_e} = 9.11\ x\ 10^{-31}\ kg$$

$$\mathrm{q_e} = -\mathrm{q_p} = 1.602\ x\ 10^{-19}\ C$$

$$\mathrm{R} = 5.29\ \mathrm{x}\ 10^{-11}\ m$$

Given the balance of forces that must exist according to the Bohr model.

$$\mathrm{F_{attract}} = \mathrm{F_{centripedal}}$$