

Calculate the energy of a photon from its wavelength and its wavelength from its energy

The energy of a photon is calculated by the equation $E = \frac{hc}{\lambda}$ where λ is used to represent the wavelength, h is Planck's constant and c is the speed of light. The wavelength can be found by changing the subject of the equation.

Calculate the momentum of particle from its wavelength and wavelength of the particle from its momentum

De Broglie's equation stated that $\lambda = \frac{h}{p}$ where λ is wavelength, h is Planck's constant and p is the momentum. By rearrangement, the momentum can be found when given the wavelength.

Calculate energy levels for one-electron (hydrogen-like) atom

The energy for hydrogen like atoms is given by the equation $E_n = -E_R \frac{1}{n^2}$ where n is 1,2,3..., E_n is the energy level and E_R is the Rydberg constant.

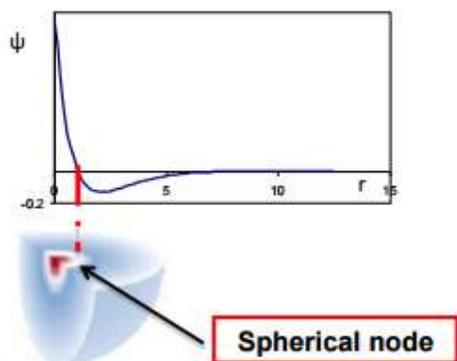
Relate absorption and emission of photons to changes in energy levels

When light of a certain frequency such that it provides the energy difference between the gaps is absorbed by the atom, it excites electrons such that it is able to jump energy levels. Then in the case when photons are emitted, it must lose energy and as such, it jumps down an energy level.

Recall the Born interpretation of the electron wave

The Born interpretation states that the square of the modulus of the amplitude of the wave at any point is proportional to the probability of finding the electron at the given point. As such, at nodes, there is no probability of finding an electron (electron density).

Understand the representation of waves as cross-sectional graphs, contour plots and lobe representations



The diagram above shows both a contour plot and a cross-sectional graph representation of the 2s orbital. The initial diagram shows the presence of a node at the point where the graph cuts the horizontal line. It also shows that as the distance of the orbital increases, it generally begins to decrease until it approaches 0. The following diagram shows the spherical node through the white sphere between the smaller red and larger blue spheres.