Answer on Question #45364, Physics, Atomic Physics

Task:

lithium . 2,1

if the electron orbit the atom have a frequency of vibration.

do the electron from different shell's level have different frequency?

how is the frequency of electrons defined from a 3 dimensional geographical point of view, or how is it define in modern physics ?

its kind of difficult to imagine election going back to the same coordinate after one cycle of orbit.

Answer:

Electrons fill orbits whose size and shape are defined by the solutions to Schoinger's Wave equation, ψ . It is not at all true that electrons "return" to their original position with each "orbit" - about all we can say is that there is probability associated with the position of an electron.

You ask about frequencies of electrons, but it's more accurate to talk about energy levels. The first two electrons oocupy the lowest level S-type orbital, and the third occupies the S-type orbital in the second level, which is a higher energy level. Whenever an electron changes orbitals, it must do so in a quantum way (i.e. only discrete changes in orbits are allowed), and in the process either absorbs or emits a photon whose frequency is consistent with the change in energy level for the elctron's jump.

$$f = \frac{z^2 e^2 2\pi^2 m}{h^3}\left(\frac{1}{n_1^2} - \frac{1}{n_2^2}\right)$$

Where:

z= Atomic number

e= Charge on Proton

m= mass of electron

h= Plank's constant

n= Orbit number