

Structure of Nucleus

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Atom have stationary orbits. Our present understanding regarding the structure of atom is mostly dependent upon the Rutherford's gold foil alpha particle scattering experiment. presently, we know that nucleus made of proton and neutron and it occupies only very small fraction of volume of atom, while electron revolves around it in their stationary orbit. Also, scientific community believe (quantum field theory and standard model derivation are purely based on this premises only) that proton and neutrons are bind together and stay like lump ball in very small volume at the center of the atom. In this paper we will show that our understanding about nucleus are incomplete. We will show that nucleons are not only revolves anti-clockwise around the *singular*-point in their well define stationary orbit but also rotates anti-clockwise (proton) and clockwise (neutron) about their axis. Also, nucleons make transition as electron does after absorbing energy from external agency. We will also show that distribution of nucleons in nuclear stationary orbit follow the *Aufbau* principle.

PACS numbers:

I. INTRODUCTION

Atom has stationary orbit. Neil Bohr in 1913¹ uses stationary orbit concept and explain the various quantum mechanical phenomenon that arises in hydrogen atom. In this paper we will discuss about the origin of stationary orbit using Max Planck black-body idea. Max Planck uses black body vibrations along the three principal directions (X , Y , Z) and explained the experimental data of solar spectrum. His idea revolves around the different mode of vibrations of a black body along the three principal directions (X , Y , Z) in real space or k_x , k_y , k_z direction in inverse k -space. We will use his idea in our stationary orbit discussion. We will use one statement that *emptiness (space) is everywhere. It is connected (in mathematical sense) and infinitely elastic*. Now lets focus on nucleus. Our present understanding about nucleus is that it compose of protons and neutrons. Since proton has positive charge and very densely packed in very small fraction of volume of atom, there must be a very strong attractive force which bind these nucleons together. Scientific community name this force as

nuclear force. Presently scientific community also think that protons and neutrons are bind together like lump ball. In this paper we will show that our present understanding about nucleus is *incomplete*. We will show that nucleons are not bind together like lump ball but they revolves around the singular point in their well defined stationary orbits. We will also show that both proton and neutron revolves anti-clockwise around the singular points. Proton rotates anticlockwise while neutron rotates clockwise around it axis. For visualization purpose we can take our solar system. We may call Mercury as *proton* (because it rotate anti-clockwise around it axis) and Venus as *neutron* because it rotates clockwise around it axis. In our next paper we will show that there is no "charge" exist in nature, and the magnitude of electron charge that experimental scientific community has measured is as *fundamental-constant* as *Planck-constant*. We will also show that fundamental constant of electric charge can *Never* be divisible further. If fundamental electric charge will be divided, so as Planck constant. In this paper we will only focus the structure of nucleus.

II. ORIGIN OF STATIONARY ORBIT IN ATOM

Before discussing this topic, we will use one statement that *emptiness (space) is everywhere. It is connected (in mathematical sense) and infinitely elastic.*

Now take a space of length L . Vibrates it with different modes of vibrations as shown in figure 1. If one see 2^{nd} mode, 4^{th} mode, and 6^{th} mode of vibrations then one notice that node point of second mode of vibration overlap with one node point of 4^{th} and 6^{th} mode vibrations (except the end point). One will further notice that the node point of 2^{nd} mode of vibration (middle-one) always overlap with the $2 \times n$ mode of vibrations. Where n is a positive integer greater than or equal to one. Since space is *isotropic* and *homogeneous*, therefore, one can rotates this linear vibration (assume this vibration in $z - x$ -plane) around the z -axis. Now the middle node-point (N) of the 2^{nd} mode of vibration form the locus around the z -axis. The locus of N (N from the 2^{nd} mode of vibration, see in figure 1) form the stationary orbit. Similarly, the right end point (denoted by “*Nodes*”) will also form the stationary orbit. The left end “*Nodes*” point fall on the z -axis itself and we call it *singular-point*. Thus, two stationary orbit generated. Stationary orbit has the property that “*node*” should always remain stationary even in the higher mode of vibration. This put further restriction on mode of space vibrations. Space can only vibrates with $2n$ loop, where n is a positive integer greater than or equal to one. And thus stationary orbit originate in nature. In our previous paper “*origin of mass and a unified theory of four fundamental forces in nature*”⁴, we have discussed that mass only appear at the nodal point (lattice-point) in space-vibration (more than one Bragg’s plane will intersect at this point), therefore, mass can also appear in these stationary orbit. Now lets take the hydrogen atom example. Hydrogen have one proton and one electron. Now put one proton in a stationary orbit

generated by the nodal point “ N ” (see in Figure 1 2^{nd} mode of vibration). Put electron in another stationary orbit which generated by extreme right point denoted by “*Nodes*” in figure 1. Proton and electron revolves around the left z -axis in their respective stationary orbits and generates net angular momentum. Since hydrogen system has net angular momentum and it point along the z -axis, therefore, hydrogen shall be reactive. The net angular momentum in any system is the cause of reactivity.

Now take space of total length $3L$. Take extra length $2L$ is in the left side of figure 1. Vibrates left space in a same fashion as the right space (as shown in figure 1). Now focus on the second mode of vibration in individual left and right space. There will be seven nodal points in space. One nodal point will fall on the extreme left space (we call it *singular-point*), three in the left space, one is common between left and right space and two in the right space. Now take the extreme left z -axis as a rotation axis and rotate the complete space-vibration (left and right both space) around this z -axis. There will be six stationary orbit appears (one “*nodal*” point will fall on the extreme left z -axis itself (singular-point)) in which the six particle can revolves around this z -axis. Now lets take the helium atom. Helium has two electron, two neutron and two proton. Put one proton in a first stationary orbit generated in the left space denoted by “ N ”. Revolves this particle around the extreme z -axis as anticlockwise. Put one neutron in a stationary orbit generated by the another nodal point “ N ”. Revolves this neutron clockwise around the extreme left z -axis. Now put second proton in a third stationary orbit generated in the left space by “ N ” in figure 1. Revolves this proton in anticlockwise around the extreme left z -axis. Put second neutron in the stationary orbit generated between the left and right space. Revolves this neutron in clockwise around the extreme left z -axis. Now put first electron into the 5^{th} stationary orbit generated in right space by nodal point “ N ”. Revolves this electron

in anti-clockwise around the extreme left z -axis. Put second electron in the 6th stationary orbit generated in right space by the nodal point “N”. Revolves this electron in clockwise around the extreme left z -axis. Thus helium nucleons and electrons configuration completed. What we see that both protons and electrons revolves in their respective stationary orbits around the extreme left z -axis (*singular-point*). Always, *proton revolves anticlockwise whereas neutron revolves clockwise in their stationary orbit*. If both proton and neutron revolves anti-clockwise around the extreme left z -axis (*singular point*), then neutron must rotate clock-wise around it axis to accommodate the orbital clockwise effects. This helium system is very stable with minimum angular momentum along the left extreme z -axis (*singular-point*). This is the precise reason that why helium is non-reactive in normal conditions while hydrogen is very reactive. This also suggest that proton and neutrons are also revolving around the extreme left z -axis. Filling of the stationary orbit in left panel by the protons and neutrons follows the *Aufbau* principle. Similarly, the right panel stationary orbit which fills by the electrons also follows *Aufbau* principle. This also give the reason that why the atomic size of an atom increases as the atomic number increases. This also give the reason that why the first ionization energy of helium is smaller than the second ionization energy, because both the electrons revolves in different stationary orbits and not in same orbit. This also suggest that the reactivity and non-reactivity of any atom is purely depends on the net angular momentum that it preserve in ground state about any axis (lets say z -axis). If system has net angular momentum then it will be reactive. The similar procedure can be used for other atom as well. The bottom line is that the nucleons and electrons are revolving around the common z -axis (*singular-point*). They revolves anti-clockwise in their respective stationary orbits. They (nucleons and electrons) also rotate about their axis either anti-clockwise or clockwise depends

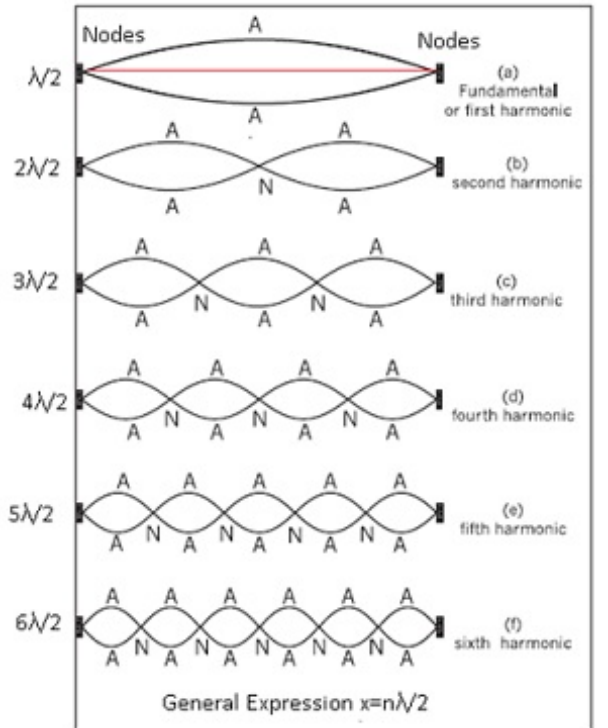


FIG. 1: Different mode of vibrations of space of length L . The end point of length L always remains stationary and represented as a “Nodes”. N stands for node and A stands for anti-node².

that whether they revolves anticlockwise or clockwise around the extreme left- z axis(*singular-point*) during the *ideal formation* as discussed above. If they revolves anticlockwise around the extreme-left z -axis, then they also rotate anti-clockwise. If they revolves clockwise then they rotate clockwise.

III. CONCLUSION

In this paper we have explained that why atom must have stationary orbit and how it arises due to the different length of space vibrations. We have explained that how the nucleons are distributed into the different stationary orbits and revolving around the extreme z -axis which pass through the extreme-left “Nodes” point (also called singular point). Now we can conclude

nature with this statement : space (emptiness) is every where. It is perfectly connected (in mathematical sense), infinitely elastic and expanded all over the place (infinite). It is stationary! Mass come from the close mode vibration of space. Everything that is happening in nature have the quantum mechanical origin. Nature only follows quantum mechanical rule both at microscopic as

well as macroscopic level.

We hope that this paper will put the scientific community in right direction and they will start looking the physical observations using the quantum mechanical effects rather than the various models.

¹ A. Lakhtakia and E.E. Salpeter, American Journal of Physics, **65**, 933 (1997)

² [http://www.examfear.com/notes/Class-11/Physics/Waves/2090/Nodes-and-Antinodes:](http://www.examfear.com/notes/Class-11/Physics/Waves/2090/Nodes-and-Antinodes)

[-system-closed-at-both-ends.htm](#)

³ <http://vixra.org/abs/1803.0288>

⁴ <http://vixra.org/abs/1803.0378>