



Modelling atomic system

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Abstract

The unique vision of similarity between Pinda (human body) and Brahmandah (universe) is a vital doctrine of Vedic science. Pindanda (Microcosm) is a reflection of Brahmanda (Macrocosm) as explained in **Uttara Geeta**, a conversation between Krishna and Arjuna. We also notice structural similarity among different centrally organized systems (galactic systems, solar system, planet-system, asteroid-system) having a central nucleus and orbital bodies. When Rutherford discovered the nucleus of atom, he was motivated to think that atoms have structures similar to that of solar system and proposed the planetary atomic model. This model however faced the problem of stability of electron and it failed to justify the spectra of atom. Electron being charge-particle would emit photon in circular orbit due to radial acceleration hence cannot remain stable in its orbit. Subsequently mathematical atomic models were developed deviating away from the uniformity of nature. The present atomic model does not bear similarity with solar system. This author gives importance to consistency and uniformity of nature and argues that atomic structure has complete similarity with the structure of solar system. The stability of orbiting electron and explanation to spectra of atom can be addressed by incorporating other features of solar system in the model.

Discussion

Atom is a structural body and the properties of atom are revealed from its featured structure. We however cannot observe the structure of an atom directly as we do for solar system. An atom can be modelled in two different ways. 1) Atom can be modelled as miniature solar system considering uniformity of nature and the properties of atom such as the spectra can be justified from the prevailing natural structure. 2) Developing a mathematical model of atom from backward integration of the spectra. If the mathematical atomic model ignores the uniformity of nature, cause-to-effect analogy, common sense knowledge then the so developed atomic model is a deviation from reality of nature.

A logical thought experiment recommends for structural similarity between solar system and atomic system. Consider two basically dissimilar systems. All attempts to find similarity between the systems would fail to find any similarity between them, just because similarity does not exist between them by precondition. On the other hand, consider two similar systems having complete similarity. While examining the systems some of the similar features may appear dissimilar due to improper comparison. In other words some similar features may be erroneously concluded as dissimilar due to



defective study. The very fact that both solar system and atomic system have nucleus and orbital body, exhibit the primary similarity of structure. If the planetary atomic model faces the problem of stability and experiences limitation in explaining the spectra of atom then, quite likely, some of the structural features of solar system might not have reflected in the atomic model. Hence the incomplete atomic model is expected to fail in providing structural stability as well as fail to render the spectral property of atom.

We find the solar system is much more than the sun-planet system. Similarly, the terrestrial system is much more than the earth-moon system. The earth has different levels atmosphere, ionosphere, magnetosphere, Van Allen Belt etc. This author has identified the charge polarized shell features with variation of electric potential [1] in the extra-nuclear space structure (atmosphere) of the earth and further identified the unnoticed correlation of the distances of the shell features [2]. Further this correlation extends to the shell locations those houses the orbital bodies. There are also sub-shell features within shell structure [2]. The extra-nuclear space structure of a celestial body, say the earth contains molecular, atomic and sub-atomic space matter particles. Many of these details were not known when Rutherford proposed his planetary atomic model. Therefore, the space structure with shell features of solar system could not be incorporated in the planetary atomic model. When the solar system was scaled down to atomic dimension, the nucleus celestial body (sun) was reduced to the size of the atomic nucleus; the planet was rightly reduced to the size of electron. But the atoms and molecules housed as space matter particles in solar system were not scaled down to particles of lower domain (micro-micro domain) to visualize the placement of light particles in the atomic model. This may be due to lack of perception to matter value of light particle (photon). This author has argued, though light particles have zero mass in atomic mass unit (AMU) but they have mass in photonic mass unit [3]. The photonic mass scale has not been explored to grant material status to photons. In reality the light particles are particle of matter and rightfully they have placement in the extra-nuclear space structure of atom [4] and in inter-atomic space. The planetary atomic model without the placement of light particles in extra-nuclear structure becomes an incomplete atomic model. Thus, it is natural for the incomplete planetary atomic model to fail in justifying the stability of atom and the spectra of atom. Instead of attempting to perfect the planetary atomic model, the natural model was unfortunately discarded. Subsequently, the result oriented mathematical atomic model was proposed with nucleus and electron which explained the spectra. One may wonder how the mathematical atomic model without the consideration of light particle is able to explain the spectra. We are aware how one artist with change of dress and dialog plays roles of two artists. Here in the atomic model, scientists have blessed many unrealistic boons (Empowerment by hypotheses) to electrons including the ability to play the wave-particle duality, access in responding the uncertainty-principle, supernatural power for creation and annihilation of light particles (photons) and to perform the magic of



tunnelling etc. A real electron is expected to perform in a natural manner but the electron in mathematical atomic model is made to perform in an unnatural manner when it proxies the less known functional role of the fine structure composed of photons. The electron in mathematical atomic model represents its self-existence and unknowingly photons therefore hypothetical.

When a person comes out of a house, we take it for granted that the person was very well present within the house from where he came out. This logic is also valid in the ionization of a neutral atom where the in-house electron is knocked out from atomic structure. Such type of explanation is not acceptable when photons are released from an excited atom because photons do not have rest existence in atomic model. The modelled extra-nuclear structure of atom is composed of electrons only. Thus, the cause of release of photons can only be attributed to electrons as nothing other than electron exists there. It was conceptualized that when electron jumps from higher energy state to a lower energy state, the difference of energy is released in the form of photons. Understanding the mechanism by which electron creates photon is beyond the scope of modern science. On the other hand, a real atomic structure contains photon in its extra-nuclear structure as space-matter particles from where they are released. The space matter particles organize fine structure with shell features. Photons at discrete energy levels are released from peaks of shells [7] [8] when the atom is excited to ionization potential.

The author has discussed elsewhere [5] the cause of electric charge electric charge and how non-electric charge exists in matters of other domains (photonic charge in micro-micro domain particles and celestial charge exists in macro celestial bodies) due to the same cause. This author has also discussed how charge is state property of matter. The charge state is revealed through charge potential difference between system and surrounding. If the space charge potential of a shell is same as that of the orbital body/particle, then the orbital body/particle remains in charge neutral state [5]. When the electron comes out of atom and becomes free then it exhibits its charge state in the inter-atomic space. Hence the orbital electron in circular orbit though executes radial acceleration do not radiate energy (photon) being a neutral particle with reference to its shell. A natural orbital body can have its orbital motion due to spinning motion of the associated extra-nuclear space structure. The extra-nuclear space structure remains associated to the nucleus due to mass-space attraction and rotate with the rotating nucleus [4]. A non-rotating or slowly rotation celestial body will have a non-spinning or slowly spinning extra-nuclear space structure. Orbital bodies floating in extra-nuclear space structure cannot acquire its desired tangential velocity and will be gravitated towards the nucleus. Mercury, Venus and all satellites of all planets do not have an orbital body which makes clear the role of space structure in the orbital motion of bodies (orbital bodies). Hence an electron in circular orbit does not radiate energy



(photon) and remain stable in its orbit. Now Rutherford-Bohr atomic model appears feasible and the model assumes similarity among systems in different domains of nature. The sub-orbits of principal orbit have scope to explain the fine spectra of atom. The polarized space structure has also the scope of explaining the splitting of spectra by electric and magnetic field. The centrally organized structure of solar system and atomic system can be made universal to understand the structure of light particles in finer domain.

If an atomic system is a miniature version of solar system then all features of solar system should find a place in the atomic system and all component matters of solar system has to be scaled down by the same scale for realizing their existence in atomic system. For example, the nucleus of atom is one domain down version of the sun; the electron is one domain down version of planet; the light particle (the space matter particle of atomic system) is required to be one domain down version of atom, the space matter particle in solar system. The radiation phenomenon of the sun is required to be featured in atomic system and for that photon, the radiation particle of sun, need to be scaled down by one domain change of scale to realize the new micro-photon radiation from atomic nucleus. At present we are ignorant about micro-photon and the radiation from atomic nucleus. Thus, it is accepted that atomic nuclei do not radiate energy. Such a concept makes an undesirable presumption that energy radiation takes place through photons only. Again, the doctrine of Lord Buddha that birth, decay and death is a universal truth of nature and there is no escape to these phenomena. How can the non-radioactive atoms and molecules escape from decaying? The decay of human body takes place due to decay of its constituent cells but we fail to understand how the cells decay without decay of atoms and molecules. One may wonder how atom would be stable if its nucleus decays! The rate of decay of atomic nucleus is comparable to the rate of decay of the sun, the nucleus of solar system. Hence like the solar system the atom remains stable for a pretty long period. The decay of a coordinated structure built up by atoms slows down by replacement of fresh atoms and molecules like the formation of new cells replacing the dead cells in human body. The mechanism of decay of a system is linked to the transformation taking place in finer and finer domains. The subject of decay can be addressed properly only after understanding the natural structure of atom with coexisting structures in finer domains.

The emission of discrete spectra from extra-nuclear space structure of atom cannot be compared with the continuous-spectra of solar radiation, while examine similarity. Again, the sun radiates in its natural state whereas the atom emits its discrete spectra when excited. How can these diverse phenomena be compared in finding similarity? The natural radiation of sun can only be compared with less known natural radiation of micro-photons from atomic nucleus. The emission of discrete spectra of solar system can be examined by external excitation of the extra-nuclear structure of



the solar system. This is a tough experiment. However, this author has shown elsewhere [6] the discrete emissions from the shell structure of solar system while the Haley's comet crosses and interacts with the shells and sub-shells of solar system. Thus, both continuous-spectra natural-radiation from nucleus and discrete spectral emissions from extra-nuclear structure under excitation are common phenomena in all centrally organized systems. Different centrally organized systems say the solar system and the atomic system would be found similar if the comparison is made properly. On the other hand, a defective comparison would conclude the above systems are dissimilar.

We carry the concept that electrons are identical thus the orbital electrons in atomic model have same size. On the other hand, we find the orbital planets have different sizes. Hence one would argue the solar system and atomic model cannot be similar. The unit charge of electron has been established experimentally from Millikan oil drop experiment. Experimental finding cannot go wrong. However, interpretation of experimental result may go wrong. This author argues that there is enough scope in Millikan experiment to show that charge and mass of electron can vary simultaneously for a constant ratio of charge to mass (e/m). Variation of mass and charge of electron is more likely from following observation. We find galaxies are of different sizes; the stars are of different sizes; planets are of different sizes; satellites are of different sizes; asteroids are of different sizes, the pebbles are of different sizes; sand-grains are of different sizes; atoms are of different sizes, even one type of atom has many isotopes. Therefore, the electrons also have a range of sizes which erroneously is considered invariant. The so-called fundamental particle of one time becomes a structural body with advancement of knowledge. It may not be proper to grant the fundamental particle status to electron having unit charge with fixed mass. One can assume identical nature of electrons for mathematical analysis event and get the quantitative result but the reality differs. To realize this, consider a packet of sand particles. On counting the sand particles in a packet, we may find the number of sand grains is n . If the mass of sand particles in the packet is M then the average mass of the sand particle is M/n . If one assumes that the sand particles are identical and each has a mass M/n then one would calculate the mass of sand packet as $(M/n) n=M$, the other person by computing the actual masses of individual sand particles also get the same mass M . By taking another volume of sand, the average mass of sand grain remains unchanged. This erroneously establishes the mass of every sand grains is same and having its mass as M/n . We find there is a difference between the assumed value and the reality. Even though mathematical concept gives quantitative result but the reality is different.



Conclusion

Finding similarity between solar system and atomic system has far reaching consequence. The similarity of structure can be conceptualized from similarity of dynamics. Again, force is the cause of any dynamics. Therefore, similarity of dynamics of centrally organized systems of different domains helps to find the unique cause of all fundamental forces of nature. Thus, the fundamental forces can be unified from a common cause. This author has already proposed the possible cause of electric charge in fundamental particles and suggested the existence of non-electric charge in matters of other domains. It is further expected that many unrealistic hypotheses made exclusive for micro domain may disappear and the vital cause-to-effect analogy can be established in all domain of nature. This new approach will bring uniformity of nature in all its domains.

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