

# From Microcosm to Macrocosm: the Structure of the Physical World at a glance

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## Abstract:

It is proposed that the physical world is infinite in space, and contains a finite number of universes - may be 'just a few' or 'billions' because the limit is arbitrary; in its entirety, we can call it 'the Ensemble' because it is not a 'system of universes'. Each universe is a system made up of fundamental particles moving at speed 'c'. How these particles integrate into a universe, and what intermediate structures the universe has, are explained in this paper, using classical concepts.

Key words: Fundamental particles, Centre-filled and centre-vacant structures, Electron-positron pairs, Neutrons, Orbiting systems, Pulsating systems, The Ensemble

## 1. Introduction:

The classical Newtonian concept is that bodies made up of matter move in absolute space and interact with each other using the forces of nature. The above concept agrees with our common sense, and in the normal world, which we can observe directly, it agrees with our observations. However, physicists argue that Newtonian concepts are inept to explain the phenomena at particle and cosmic levels. But in this paper, the classical concept is extended to these levels also, and the probable structures are put forth.

## 2. Integration of fundamental particles:

Matter is made up of fundamental particles moving at speed 'c' <sup>[1]</sup>. These have finite mass, finite volume, finite energy and finite force. Force exists as reaction to motion, and so the natural energy/force of any system formed by these is  $mc^2/2$  (in energy units). The linear integration of these particles gives particle pairs which constitute electromagnetic radiations, the planar integration gives rings which constitute the neutrino radiations, and the spatial integration gives spherical shells which integrate into heavier particles. The force of gravity of a fundamental particle is directed towards its axis, and not towards its centre. In the case of pairs and rings, gravity is directed towards the centre of gravity, which lies on the axis. In the case of a shell, gravity is directed towards the centre of the particle; here, the centre of the particle and the centre of gravity coincide on the axis.

E-m radiations and neutrinos are systems having no internal energy, and so these move at the speed of light. Heavier particles and their systems invariantly have internal energies, and there is a limit to the excess energy these can acquire, and so, nothing can move faster than light. During integration, force is used up; the integration ends when the whole force is used up to form a stable system which has no fields.

### 3. Structure, symmetry and stability:

If a body is surrounded uniformly on all sides by other bodies, by using Gauss's theorem, we can say that there is no net force on the central body, and so it does not exert any force on the rest. Or the force of the central body will remain unused. So all *centre-filled* structures are open systems that can integrate further. Independent systems will not have any fields <sup>[2]</sup>, and so should have *centre-vacant* structures. Translational motion creates a force towards the centre of the body, and so if a centre-vacant system is to be stable, it should have no motion.

In heavier particles, the constituents are closely-packed; it is a process of small spheres integrating into a large sphere. Any number of constituents can be arranged in this way, resulting in different particles. But symmetry plays a crucial role, and the particle with least imperfection (in shape) will be the natural choice; and so the mathematical constant  $\pi$  determines the number of constituents in heavier particles <sup>[3]</sup>. In such a structure, the force of the central body remains unused and the rest form a closed chain using their whole force. So, if the centre is vacant, the particle will not have any field. However, as it would be moving, the structure is unstable, and the particle changes to a centre-filled form.

Systems having large empty space, in between constituents, will be orbiting-systems, or pulsating-systems, or closely-packed systems of orbiting-systems (their orbits overlapping). In such systems, the stability depends on the balance between attractive and repulsive forces; here, energy acts as repulsive force (antigravity). Orbiting systems act as if the whole mass is concentrated at the centre around which the bodies revolve. So all orbiting systems behave as centre-filled structures, and are open systems that can integrate further.

### 4. Electron-positron pairs, neutrons, atoms and molecules:

Electrons/positrons are the smallest particles (of natural-choice) having internal energy, and contain 150 shells each <sup>[3]</sup>. They are created as a pair; both acquire the same amount of energy, but the shells in the positron acquire some extra particles at the cost of electrons. So a positron is slightly heavier, and its energy is slightly less than the natural energy; and the electron has slight excess energy. As in the case of fundamental particle <sup>[1]</sup>, the variation from the natural energy creates charges. Electron having excess energy has a negative charge, and positron, a positive charge.

Internal energy and external energy (speed) are equal in the case of electrons and positrons (both equal to  $mc^2/4$ , where 'm' is their average mass). The internal energy remains as vibrations, and so half the force manifests as electrostatic force <sup>[4]</sup> and the remaining half, as gravity. Thus gravitational and electrostatic forces are equal to  $mc^2/4$  (in energy units) in the case of electrons and positrons <sup>[5]</sup>.

In an electron-positron pair, the particles touch each other, and the electrostatic force is completely used. The whole gravity remains unused, and the pairs integrate into neutrons using the whole of the gravity. So neutrons are closed systems having no fields and cannot

integrate further. A neutron contains 919 electron-positron pairs, and has a centre-vacant structure <sup>[3]</sup>. So neutrons are unstable, and change into atoms. The nucleus of hydrogen (proton) contains an unpaired positron at its centre, surrounded by electron-positron pairs. Proton has a centre-filled structure, and so is an open system; a proton- electron system has the force of one electron-positron pair available for interaction.

Heavier atoms are formed from the required number of neutrons. The unpaired positrons remain distributed among the electron-positron pairs in the nucleus, and their partners, the electrons, revolve around the nucleus. The distribution of electrons in various static orbits has the same pattern as the distribution of positrons inside the nucleus. In atoms, the antigravities of the electrons are exactly balanced by the attractive forces <sup>[5]</sup>, thus giving stability.

Inside atoms, the lone positrons and their pair-electrons remain at a greater distance, and so only a portion of the available force is used, and so atoms are open systems having gravitational and electrostatic forces – the positive and negative electrostatic fields exist simultaneously and atoms appear to be neutral. Magnetic force is created due to the motion of the electrons in the orbits. However, in the case of orbits containing two electrons, the magnetic force created is completely used for their attractive interaction <sup>[5]</sup>, and so atoms containing unpaired electrons alone have magnetic fields. The formation of molecules is solely due to magnetic interaction between unpaired electrons in different atoms.

#### **5. Masses and orbiting-systems of masses:**

Atoms being open systems integrate into large ‘masses’. In that process, the whole electrostatic force and part of gravity are used. So the ‘masses’ have no electrostatic fields – here, unlike in atoms, the absence of field is due to the non-availability of force and not due to cancellation of fields. The ‘masses’ further integrate into orbiting-systems, in which each member attaches itself to the central mass using the whole of its available gravity, and the gravity of the central mass remains unused; if there is no central mass, the force used by each is half, and the rest remains unused. So orbiting-systems of ‘masses’ are open systems. In this proposed structure, the average distance of the members from the centre is not arbitrary.

#### **6. The universe:**

Simple orbiting systems integrate into very large and complex orbiting systems, the galaxy-clusters. The clusters integrate into a pulsating system, the universe, using the whole available gravity. The universe is thus closed and isolated, or is an independent system <sup>[2]</sup>. It has no energy or force; the force and energy remains with the clusters. It has a centre-vacant structure; but unlike neutron, universe has no motion, and this makes it stable. The galaxy-clusters remain distributed uniformly around the vacant centre to form a nearly spherical structure; they remain in motion at high speeds, moving directly away from the centre and returning back alternately, along spiral paths <sup>[3]</sup>. The universe thus remains pulsating; it is an independent unit of matter, and matter cannot remain in any other form.

## 7. Quantization and infinity:

Space and time are non-quantized and are infinite. Matter is quantized and so the universe made up of matter is finite. The only possible way in which the finite universe can remain in the infinite space is to settle in an infinite loop <sup>[6]</sup>. Here, the universe completes its pulsation in a finite interval of time, and the space occupied by it is always finite, and the maximum and minimum sizes of the universe are fixed. Thus the pulsation is a finite process both in terms of space and time. The process repeats again and again infinitely. The space-frame allows the reversal of direction, and so expansion is followed by contraction, and vice-versa, and the universe is thus confined to a certain region in space. The time-frame does not allow reversal of direction, and so the infinite loop moves forward in time.

## 8. The Ensemble:

The infinite space may contain billions of universes; there cannot be any theoretical limit to the number of universes possible, and any limit is set arbitrarily. Each universe is a single grain of matter, which remains pulsating at its own place. As there is no interaction between universes, it is not a system <sup>[2]</sup>; it is just a collection of finite universes in the infinite space-frame; we can call it '*the Ensemble*'. It is static and remains forever without any change. To any outside observer, there will be just eternal darkness as no information will be coming out of the multitude of universes.

## 9. Conclusion:

How the proposed fundamental particles integrate into a universe has been explained logically in this paper; the details of the structures of the intermediate units will be presented in separate papers subsequently. The proposed integrations at the particle level and the cosmic level follow the same classical rules applicable at the normal level; the physically meaningless concepts like 'particle- wave duality' and 'space-time' have been completely ignored; and that is the uniqueness of this proposed model.

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