Physics and Alternate Cosmology of the New Model

Proposed by

Ratikanta Das, rkdas56@rediffmail.com

Author's previous article 'A New Model of Physics', appeared in the section 'History and Philosophy of Physics' of viXra.org open e-print archive, seems to be a controversial one as it opposes some established theories of traditional physics. But simultaneously it also supports some established theories and gives simple explanations for many puzzles of physics which must not be regarded as matter of coincidence or chance. Again author's speculation is not final; some points of the model may require modification. But author strongly believes that this model, when developed into a full-fledged one, will be able to unveil the beauty of absolute truth of nature. In this article author compares the physics of this new model with that of traditional models, elaborating some points discussed in the previous article.

Traditional Physics	Physics of Author's New Model
(**1**) Physics is a disciplined branch of science, well developed after hundreds of years of research and embodies vast amount of knowledge accepted by physics community.	(**1**) This new model is at its beginning stage dealing with topics limited to a very small portion of physics. Its findings are yet to be accepted by physics community.
(**2**) Standard model accepts the hypothesis of expanding universe with big bang origin where all the mass of our universe is compressed. Some cosmologists do not accept big bang model because of singularity at origin and uneasy impracticable time scale of the order 10^{-43} at initial phase.	(**2**) It provides an alternate cosmology free from singularity.[1] This cosmology may satisfy Hubble's condition of expanding universe if inner 4D hyper sphere expands due to large scale increase of the number of its constituent 4D particles i.e. inons.
(**3**) As per Einstein's model, our universe is a grand three dimensional hyper surface of a four dimensional hyper sphere [1].So universe is finite and unbounded with no beginning and no end.	(**3**) As per the new model, our universe is a grand three dimensional hyper surface sandwiched between two concentric four dimensional hyper spheres. So universe is finite and unbounded with no beginning and no end.[2]

[1, 2.] Section 2 of author's previous article 'A New Model of Physics' (vixra: 1607.0144) may be referred.

Traditional Physics	Physics of Author's New Model
(**4**) As per standard model, shape of fundamental particles are spherical and three dimensional. Some particles like electrons have no internal structure.	(**4**) As per the new model shape and size of fundamental particles satisfy the equation $$w = \pm a e^{-b(x^2+y^2+z^2)} \ldots \ldots \ldots \ldots (1)$$ which represents a four dimensional (4D) Gaussian structure with 'w' as displacement along the axis of 4th dimension. Here '*b*' determines shape and '*a*' determines size.
(**5**) Standard model explains the origin of mass by the help of a very complex theory called Higgs mechanism.	(**5**) The net energy of the 4D Gaussian structure (that is formed satisfying some equilibrium conditions) determines the mass of a fundamental particle.[3]
(**6**) Traditional physics has no clear concept for charges of fundamental particles. It fails to answer: (a) Why there are two kinds of charge? (b) How nature dopes exactly equal amount of charges into particles of different masses? (c) How charge of a fundamental particle is forced to concentrate near a point where there are forces of repulsion between its constituent parts? (d) How to deal with infinite coulomb force and infinite energy when the distance between two charged particles approaches zero?	(**6**) New model answers all these questions simply by assuming that shape (and not size) of the Gaussian structure represented by equation (1) determines the property of charge. Thus magnitude of coulomb force between any two fundamental particles (with charges ±e) irrespective of their masses is same because it depends on the value '*b*' (and not on '*a*') which is constant as all particles have similar shape. Negative charge ('*a*' is +ve) and positive charge ('*a*' is -ve) are formed on upper and lower sides [4] of our universe respectively. The force between two Gaussian structures is free from singularity as '*w*' in equation (1) is differentiable at all points including origin.
(**7**) Nature of light is very confusing because of its dual character. Some experiments can only be described by photon model whereas others are described only by wave model. We must accept both models and admit that there is no single classical picture to describe nature of light.	(**7**) New model resolves the puzzle behind dual nature of radiation by assuming photon as a 4D progressive hyper surface wave of finite length.[5] However this speculation may be correct when we show that such type of waves can be created due to hyper surface tension property of our universe.

3, 4/ 5. Section 3/ 5 of author's previous article 'A New Model of Physics' (vixra: 1607.0144) may be referred.

Traditional Physics	Physics of Author's New Model
8) Top standard mathematical and physical theories of standard model reveal large number of information to explain phenomena like emission and annihilation and their reverse processes of absorption and pair-production. But this model does not give us a clear picture of internal mechanism to show how photons enter or emerge from the system. A photon entering an atom centrally should produce different result than entering along peripheral direction. Then how reversibility of the process is maintained?	**(8)** Spiral transformation process [6] of the new model gives a clear classical picture of these phenomena. Let us consider the simplest example of hydrogen atom. Electron and proton of the atom are two 4D Gaussian structures lying on opposite sides of our universe with their 3D bases coinciding with a part of our 3D universe. A photon is a progressive hyper surface wave of definite length with amplitude small in comparison to height of Gaussian structures. Obviously the photon moving along the 3D hyper surface (our universe) will enter the atom along the intersecting 3D bases of electron and proton. The photon will transfer almost all its energy to electron and in the spiral transformation process the radius of its 3D base increases. This increases the separation between electron and proton. In this manner a sufficiently high energetic photon may ionize the atom. Reversibility of the process is maintained because energy transformation takes place along a spiral path.
(9) In order to account for stability of nucleus, concept of strong short range attractive forces between nucleons was introduced. Then why two protons or two neutrons do not form a stable combination?	**(9)** In our previous article it has been discussed [7] how coulomb force is converted into strong force at the point of inflexion of 4D Gaussian structure and how this theory could explain five observed facts of atomic and nuclear physics. It is possible to find an equation that may represent these two forces at their respective ranges.[8]

6 and 7. Section 4 and 8 (respectively) of author's previous article 'A New Model of Physics' (vixra: 1607.0144) may be referred.

[8] Let Gaussian structures of two fundamental particles are given by equations

$$w = ae^{-b(x^2+y^2+z^2)} \text{ and } w' = a'e^{-b(x'^2+y'^2+z'^2)}$$

If center of their bases lie on common *x-x'* axis, then force between them will depends on derivatives with respect to *x* or *x'*. The force on the particle with height '*a*' is given as(suppressing *y, y'*, *z* and *z'* coordinates)

$$F_a = K \frac{\frac{d^2w}{dx^2} \cdot \frac{d^2w'}{dx'^2}}{\frac{dw}{dx} \cdot \frac{dw'}{dx'}} \frac{(a-w)}{a} = K \frac{[2abe^{-bx^2}(2bx^2-1)][2a'be^{-bx'^2}(2bx'^2-1)]}{x^4(-2abxe^{-bx^2})(-2a'bx'e^{-bx'^2})} (1 - e^{-bx^2})$$

If particles are two protons then *a =a'*, *x=-x'*, so we get $\quad$ $F = -K \frac{(2bx^2-1)^2}{x^6} (1 - e^{-bx^2})$

For Coulomb range ($x \gg 10^{-15}$), e^{-bx^2} is neglected as $b=10^{30}$ and -1 in the bracket is neglected.

So we get $\quad$ $\boldsymbol{F_{coul}} = \boldsymbol{- K} \frac{4b^2}{x^2}$. This equation shows that Coulomb force is inverse squire and depends only on shape (*b*) not on size (*a*). This has neither been derived nor verified rigorously and obtained on trial basis.

References: [1]. J.V. Narlikar, G.Burbidge. *Fact and speculation in Cosmology, 2008.* p.97.