

## Can Standard Model ever find a ‘Theory of Everything’?

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*Standard Model is a three dimensional (3D) space model. It can never find a ‘Theory of Everything’ because our space is not three dimensional, rather it is four dimensional. Our aim is to convince readers that space is actually four dimensional and the 4D space model proposed by the author is the true (or nearly true) model for Nature.*

Author’s previous article ‘**New four-dimensional model and its application for interpreting fundamentals of Modern Physics**’ ([vixra.org/abs/1803.0004](https://vixra.org/abs/1803.0004), category-relativity and cosmology) describes an alternate four dimensional cosmology from which it is possible to design a simple 4D model for physics. Even at the beginning stage this new 4D model is able to explain or interpret successfully a good number of fundamental laws, puzzles or phenomena of modern physics. A wrong model, by chance, may explain or interpret a limited few number of physical laws or phenomena, but a valid model can do this in large number of cases. On the basis of this argument it is not improper to say that explanations or interpretations of large number of laws, puzzles or phenomena of modern physics by the new 4D model actually justify its validity. *Brief accounts of these explanations or interpretations which have been discussed in the above mentioned article are given below.*

1. Our new model asserts that fundamental particles have 4D structures given by the equation (1) of the article that is  $w = \pm a \exp[-b(x^2 + y^2 + z^2)]$

where  $w$  is the displacement along fourth dimension perpendicular to  $x$ ,  $y$  and  $z$  directions. The projection of this structure on its 3D base (that coincides with our conventional 3D universe) is a sphere which justifies spherical shape of fundamental particles in 3D space.

2. Fundamental particles as described by above equation have special 4D structures with infinite extent which justifies electromagnetic and gravitational influence of one fundamental particle on another at very large distance from it (there is no such device in our 3D model to justify mechanism of action at a distance)

3. In section ‘6’ it is mentioned why 4D wave pulse described by equation

$$w = a \exp[-b(x - vt)^2]$$

is more appropriate to resolve wave-particle duality of matter than that done by a wave packet of 3D model.

4. The above equation of 4D wave pulse is used for a short derivation of de Broglie hypothesis (our traditional physics does not derive this).

5. Section '7' of the article shows how Schrödinger equation is related to structure of fundamental particle. Perhaps this is the reason behind successful applications of Schrödinger equation in physics.

6. Section '8' of the article shows how Coulomb force becomes strong force as  $\frac{d^2w}{dx^2}$  changes sign at the point of inflexion.

7. Why electron-positron pair annihilates?

8. What prevents electron in falling into nucleus?

9. Why n-n or p-p combination is unstable in spite of strong attractive force?

10. Why n-p combination (deuteron) is stable?

(Above four observed facts are explained by the point of inflexion theory in section '8' and '9' of the article.)

11. The same point of inflexion theory also explains why the attractive binding force between proton and neutron in deuteron becomes repulsive as their separation decreases further.

12. Why there are two kinds of charge? As per our new model our 3D universe is a 3D hyper surface separating two 4D worlds on its two sides (upper and lower). As per assumption (iii) of section (1) negative charge ('a' is +ve) and positive charge ('a' is -ve) are formed on upper and lower sides of our universe respectively.

13. How Nature dopes exactly equal amount of charges into particles of different masses?

14. How charge of an electron concentrates near a point in spite of repulsion among its constituent parts?

(Above two questions are answered in section '10' of the article. As per our new model charge is not a quantity that can be distributed over a fundamental particle. Concept of charge arises from the Coulomb force on the fundamental particle which is found to be independent of its size and dependent on its shape. This new concept is responsible for equal magnitude of charges ( $\pm e$ ) of fundamental particles of different masses shape being similar for all)

15. How to deal with infinite Coulomb force when the distance between two fundamental particles approaches zero? As per our new 4D model Coulomb force is a special case of the unified force described by the equation

$$F = K \frac{(2bx^2-1)^2}{x^6} [1 - \exp(-bx^2)] , \text{ which is not infinite at } x = 0 \text{ due to its indeterminate form } (0/0).$$

16. The net energy of the 4D structure of a fundamental particle that is formed satisfying some equilibrium conditions determines its mass. This is described in section '4'. (Explanation of origin of mass by Higgs mechanism is too complex.)

17. A 4D classical technique (named as *spiral transformation*) of converting energy into matter and vice versa is described in section '5'. Standard model does not give us a classical picture of this phenomenon.

18. Addition and removal of matter-energy along a 4D spiral path ensures reversibility of spiral transformation process which explains reversible nature of emission with absorption and pair production with annihilation.

19. Standard model does not give us a classical picture of internal mechanism to show how photons enter or emerge from atoms. A photon entering an atom centrally should produce different result than entering along peripheral direction. In all these directions are equivalent as they coincide with 3D base of 4D structure of atom.

20. Wave model of traditional physics cannot explain instantaneous nature of photo-electric emission. In our 4D model, the rapid process of spiral transformation explains instantaneous nature of photo-electric emission.

21. New model resolves the puzzle (section '6') behind dual nature of radiation by assuming photon as a 4D hyper surface wave of finite length (There is no single classical picture in traditional physics to describe nature of light, we have to accept both photon model and wave model)

22. New model also hints how neutron is created from electron and proton.

23. Existence of spin quantum number is consistent with extra space dimension.

*A lot more outcomes will emerge from this new 4D model when more people take interest in developing or modifying this baby model. Future research on this model will confirm its validity simultaneously confirming the four dimensional nature of space.*

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