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In Search of A Theory of Everything: «What If The Universe Was an Elastic and Massive Lattice and We Were its Topological Singularities?»

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Abstract

In this brief communication, we summarize an original and new approach of the Universe, which considers that the Universe could be a finite, elastic and massive solid that would move and deform in an infinite absolute vacuum. In this a priori strange concept, it is supposed that the Universe is a lattice of simple cubic crystalline structure, whose basic cells have a mass of inertia that satisfies Newtonian dynamics in absolute space, and whose elasticity is controlled by the existence of an internal energy of deformation. One also supposes that this lattice is likely to contain topological singularities, i.e. structural defects such as dislocations, disclinations and dispirations, which would be the constituent elements of Ordinary Matter. The complete development of this theory can be accessed freely in a downloadable book [1].

Keywords: Theory of Everything, Lattice Universe, Lattice Topological Singularities

Introduction

On the basis of this original concept, we can develop a very complete description of the spatio-temporal evolution of this cubic solid lattice, which is called the «cosmological lattice», by introducing into an infinite absolute space a purely imaginary observer called the Great Observer ***GO***. If this observer is equipped with a reference system composed of an orthonormal absolute Euclidean reference frame to locate the points of the solid lattice and an absolute clock to measure the temporal evolution of the solid lattice in the absolute space, a very detailed description of the spatio-temporal evolution of the lattice can be worked out on the basis of the Euler coordinate system [2].

In this coordinate system, the Great Observer ***GO*** can describe in a very detailed way the distortions (rotations and deformations) and contortions (bending and torsion) of the lattice. By introducing the basic physical principles of Newtonian dynamics and of the two principles of thermodynamics, he is able to describe the spatio-temporal evolution of the cosmological lattice, by assigning to it a mass of inertia per basic cells and a specific internal energy of distortion per volume unit of the lattice. And he can also introduce topological singularities (dislocations, disclinations and dispirations) in the form of closed loops [3] into this cosmological lattice, as the constituent elements of Ordinary Matter.

The idea of the theory

If this original idea is developped in detail, it can be shown, by a purely logical and deductive mathematical path, that, for an elastic isotropic lattice satisfying Newton's law, with specific hypotheses on its elastic properties, the behaviour of this lattice and its topological singularities satisfy "all" of the physics currently known [4], by spontaneously bringing out very strong and often perfect analogies with all the great current physical theories of the Macrocosm and the Microcosm, such as Maxwell's Equations [5], Special Relativity, Newtonian Gravitation, General Relativity, Modern Cosmology and Quantum Physics.

But this theory does not only find analogies with the other theories of physics, it also proposes quite original, new and simple explanations to many physical phenomena that are still quite obscure and poorly understood

at the present time by physics, such as the deep meaning and the physical interpretation of cosmological expansion, electromagnetism, special relativity, general relativity, quantum physics, and particle spin. It also offers explanations of what dark energy, dark matter, black holes, and many other phenomena really are.

The detailed development of this theory also leads to some very innovative ideas and predictions, among which the most important is the appearance of *the curvature charge,* which is an unavoidable consequence of the treatment of a solid lattice and its topological singularities in Euler coordinates. This concept does not appear at all in all modern theories of physics, such as general relativity, quantum physics or Standard Model, whereas in our theory this concept provides explanations for many obscure points of these theories, such as weak force, matter-antimatter asymmetry, formation of galaxies, segregation between matter and antimatter within galaxies, formation of gigantic black holes in the heart of galaxies, apparent disappearance of antimatter in the Universe, formation of neutron stars, concept of dark matter, bosonic or fermionic nature of particles, etc.

Finally, by studying lattices with special symmetries called axial symmetries, symbolically represented by "coloured" 3D cubic lattices, we are able to identify an amazing lattice structure whose looped topological singularities coincide perfectly with the complex zoology of all the elementary particles of the Standard Model, and which also allows us to find simple physical explanations for the weak and strong forces of the Standard Model, including the phenomena of confinement and asymptotic freedom of the strong force.

In search of a theory of everything

The search for a Theory of Everything able to explain the nature of space-time, what matter is and how matter interacts, is one of the fundamental problems of modern physics. Since the 19th century, physicists have sought to develop unified field theories, which should consist of a coherent theoretical framework able to take into account the various fundamental forces of nature. Recent attempts to search for a unified theory include the following ones: the «Great Unification» which brings together electromagnetic, weak and strong interaction forces, the «Quantum Gravity» and the «Looped Quantum Gravitation» which seek to describe the quantum properties of gravity, the «Supersymmetry» which proposes an extension of space-time symmetry linking the two classes of elementary particles, bosons and fermions, the «String and Superstring Theories», which are theoretical structures integrating gravity, in which point particles are replaced by one-dimensional strings whose quantum states describe all types of observed elementary particles, and finally the «M-Theory», which is supposed to unify five different versions of string theories, with the surprising property that extra-dimensions are required to ensure its coherence.

However, none of these approaches is currently able to consistently explain at the same time electromagnetism, relativity, gravitation, quantum physics and observed elementary particles. Many physicists believe that the 11-dimensional M-Theory is the Theory of Everything. However, there is no broad consensus on this and there is currently no candidate theory able to calculate known experimental quantities such as for example the mass of the particles. Particle physicists hope that future results from current experiments - the search for new particles in large accelerators and the search for dark matter - will still be needed to define a Theory of Everything.

But these researches seem to have really stagnated for about 40 years, and many physicists now have serious doubts about the suitability of these theories [6]. Since the 1980s, thousands of theoretical physicists have published thousands of scientific articles that are generally accepted in peer-reviewed journals, even if these papers have contributed absolutely nothing new to the explanation of the Universe and solve none of the current mysteries of physics. An enormous amount of energy has been mobilized to develop these theories, which are becoming very remote from the physical reality of our world. It is a race to publish more and more esoteric articles and to search for a form of "mathematical beauty" at the expense of "physical reality". Moreover, huge amounts of money have been invested in this research, to the detriment of fundamental research in other areas of physics, in the form of building increasingly complex machines. And, to the despair of experimental physicists, the results obtained have brought almost nothing new to high-energy

Conclusion

In the theory of «cosmological lattice» that is introduced here [4], the problem of the unification of physical theories is treated in a radically different way. Instead of trying to build a unified theory by tinkering with an assembly of existing theories, making them more and more complex and esoteric, even adding strange symmetries and additional dimensions for their «mathematical beauty» , one starts exclusively from the most fundamental classical concepts of physics, which are Newton's equation and the first two principles of thermodynamics. And with the help of these fundamental principles, and by developing an original geometry based on Euler's coordinates, we come, by a purely logical and deductive path, to suggest that the Universe could be a crystal, an elastic and massive three-dimensional cubic lattice, and that the constituent elements of Ordinary Matter could be topological singularities of this crystalline lattice.

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