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CLIFFORD`S PARALLELS. GRAVITATION. ATOM.

ABSTRACT.

Over the past hundred years, the mathematical apparatus of algebra has been successfully and rapidly developed, to some extent bypassing the methodology of natural-philosophical thought and creating a certain imbalance in physics as a science of the nature of things. The observed imbalance is expressed primarily in the fact that the proposed theories, developed on the basis of the apparatus of algebra, lose their ontological content. They are slender and beautiful in themselves, but often they have no real application to reality and cannot offer a solution to a number of intractable questions of physics, among which the question of gravitation in general and its presence in the micro-world remains unresolved.

The geometric approach covered in this article offers a new look at the issues of gravitation interconnection and quantum entanglement, as well as a rather general schematic simple solution in explaining their nature based on the geometry of Clifford's parallels. The result of the successive geometric transformations covered is also the proposal of a new atomic model, which is in accordance with the line atomic emission-absorption spectra and is devoid of the contradictions that the existing model, established in the theoretical views of physics, has.

The proposed geometric approach can be a key aspect for answering many intractable questions in creating an ontological foundation for building a Unified Theory of Everything.

Keywords: Clifford`s program, spatial curvature geometry, Clifford`s parallels, Möbius Pattern, monopole, dipole, Pauli bifurcation, Clifford-Hopf fibration, phases of fibration, “unified theory for the “proton-electron” together”, gravitational interconnection – lever balance with moving axis, quantum entanglement, polarization orientation in the radial direction, center-periphery, atom based on Möbius dipoles, four-point function, ontology of the principle of complementarity, geometrization of physics, Unified Theory of Everything, moral aspects.

“Clifford was a man of the deepest insight and in many ways extraordinarily resourceful. But there is no way to estimate the contribution that this outstanding scientist would have made if he had lived a long enough life. Therefore, one has to be content with what he actually achieved. His scientific legacy is truly amazing, and we are all his heirs.”

Nobel Laureate Roger Penrose.

1. Some questions of the Standard Model.

The December 2020 article “Determining the fine structure constant to within 81 parts per trillion” (authors Leo Morel, Zhibin Yao, and Saida Jelati) noted in Nature:

“The Standard Model of particle physics is surprisingly successful because it agrees with (almost) all experimental results. However, it cannot explain dark matter, dark energy, and the imbalance between matter and antimatter in the universe. Given that discrepancies between the predictions of the Standard Model and experimental observations can provide evidence for new

physics, an accurate assessment of these predictions requires very precise values of fundamental physical constants." [1]

Once the Nobel laureate Max Planck was asked the question: "In short, what do physicists do?" Answer: "In short, they clarify the constants!"

As far as the Standard Model (SM) is concerned, the main success of the SM is based on carefully **described fundamental "forces", the nature of which remains unknown**. The SM model describes **three of the four fundamental interactions** – electromagnetic, weak and strong nuclear forces, i.e. everything is believed to be the forces of nature, **excluding gravitation**.

All theories of the Standard Model describe the interactions between particles within the framework of a single picture, where the "particles" of matter (fermions) do not come into direct contact with each other, but exchange "particles"-intermediaries (bosons), called carriers of interactions. These are the theoretical representations of the SM today. How close they are to reality or far from it, no one knows yet. But the theory exists and attempts are being made to confirm it with the help of experiments conducted at colliders.

At the same time, no one sees the Standard Model as the final theory, since it is good only as an intermediate auxiliary tool and is not able to give scientists answers to many very serious questions regarding the number and properties of the fundamental "particles" of nature. And still within the framework of the SM no one has managed to squeeze gravity into the micro-world, which is proposed to be neglected there. The main success of the SM is most likely due to significant achievements in the development of the mathematical apparatus of algebra and the demonstration of its harmony and capabilities.

If we talk about the fact that discrepancies between theory and experimental data may indicate a new physics, then it is worth paying attention to some scientific prophecies that were made by the great physicists-mathematicians of the recent past.

2. Clifford's program.

The English mathematician and thinker William Kingdon Clifford clearly indicated that in the "***hydrodynamic***" picture of the world that he intends to build, literally everything that seems to us to be reality and its physics of variously interacting objects, ultimately turns out to be "**curvature in the geometry of space and their movements like waves."**

In 2000, on the pages of a specialized scientific journal, entirely devoted to applied aspects of Clifford mathematics, a note of purely historical value was published – "***Scientific Prophecy of W.C. Clifford***" [2]

This short article contains a note by Clifford with theses compiled by a scientist in an unknown year and for what purpose. But if we evaluate the document from the standpoint of scientific achievements of the late XX century, we can see that in the scientific plans of Clifford (1845-1879) the ideas of creating a **common platform** for combining all research from different fields of science are clearly visible, and in particular, the scientist focuses on **gravity**, which in his opinion, **connects very different phenomena together, and the ether provides a bridge between these phenomena**.

"This explains the laws of electric and magnetic attraction/repulsion, the action of electric currents on magnets and on each other, the laws of induction, the derivation of the speed of charges and the polarization of light, the rotation of the plane of polarization by a magnetic field. All these things must be deduced from the knowledge of the **geometrical forms of the atoms**

and their relationship with the ether, thus indicating the relationship between the kinetic theory [of particles] and the wave theory [of ether].”[2]

In February 1870, a young and brilliantly gifted English mathematician, William Kingdon Clifford, gave an astonishing report to colleagues in the academic community at the University of Cambridge. The title of the report was as follows: "On the Spatial Theory of Matter".

The content of Clifford's speech and the ideas he voiced about the structure of nature sounded extremely unusual not only for the enlightened public of that time, but even today are perceived by many scientists as "bright dreams of the coming Theory of Everything based on the **geometrization of physics**."

In its full form, the text of W. Clifford's report for the history of science has not been preserved. But there are author's theses of this speech, published in the "Reports of the Cambridge Philosophical Society" and giving a very clear idea of the innovative ideas of the scientist. [3]

Clifford highly appreciated the results and discoveries of Bernhard Riemann in the field of non-Euclidean geometry of curved spaces and compared them with natural phenomena already known to science in the field of physics of light, electricity and magnetism. As a result of his analytical comparisons, the mathematician came to the conclusion that the geometry of curved spaces could naturally explain these phenomena.

In Clifford's report summarizing these primary studies, the new theory was succinctly formulated in 4 idea points, something like this:

1). [Every smooth sheet of paper, upon closer examination, has local irregularities, scars and grooves. Similarly,] There are local areas of **curvature in space**, similar to small hills or pits on the surface. In these areas, the usual laws of plane geometry are inapplicable.

2). The pattern of local curvature is not static, but essentially **dynamic**. Any deformation or curvature of space is like a wave of perturbation, freely moving from one part of space to another.

3). This kind of change in the **local curvature of space** is the real nature of the phenomena that we perceive as the movement of matter. Moreover, this idea equally concerns both weighty matter and ethereal matter that forms space.

4). In reality, nothing else happens in the physical world, except for such **changes in the geometry of space**, possibly obeying the law of continuity.

This program of Clifford to some extent anticipated the emergence of science's views on gravity almost half a century before the advent of Einstein's general relativity. But in the picture of the world presented by Clifford, one can see not only the gravitational force of gravity generated by curvature. According to the above theses, in fact EVERYTHING that happens in nature comes down to dynamic changes in the geometry of space.

Therefore, it is natural and convenient to study and describe this dynamics, relying on the **geometric methods of mathematics**.

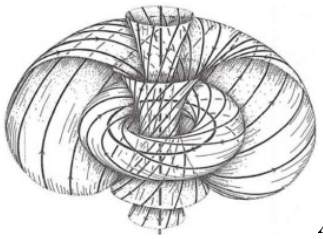
In the Afterword to Chisholm's book on Silver Streams, Nobel Laureate Roger Penrose writes about the personal contribution of the mathematician William Kingdon Clifford to scientific thought:

“Clifford's writings have strongly influenced the direction of my own research, not to mention the research of many other mathematicians and physicists. The main mathematical contribution of William Clifford is considered to be the introduction to science of what is now known as the "Clifford algebra". [5]

Clifford's remarkable property of the three-dimensional sphere (i.e., a spherical three-dimensional "surface" in four-dimensional space) has a particularly deep mathematical significance. This is the concept of what is now called Clifford's parallels.

Such "parallels" are actually circles that are parallel in the sense that they never get closer to each other or further away from each other as we move along these circles. And the circles are linked to each other. Clifford discovered that the entire 3D sphere could be filled with these sort of non-intersecting "parallel" circles, each of which was linked to each of the others.

Now we would say that a three-dimensional sphere is a fibration (bundle) of Clifford's parallels, and in general, such a Clifford construction provides a paradigm for what is now known as a fiber bundle.



A projection of the Clifford configuration showing an unusual arrangement of circles twisting and interlocking.

Conventional mathematical terminology is often unfair to the true discoverers of mathematical results, and this case is no exception. The fibration of the 3-sphere discovered by Clifford is usually called by the now well-known term "*Hopf fibration*". (Heinz Hopf himself, in fact, gave Clifford quite careful credit, but this recognition of the discoverer's merits was somehow quickly lost afterwards).

The geometric importance of so-called fiber bundles was recognized in the second half of the 20th century, and this construction now underlies both much of the geometry of curved spaces and modern theories of particle interactions.

The early example of Clifford illustrates the essential subtlety of the whole idea, many years ahead of its time.

In addition, the Clifford configuration, when projected onto ordinary 3-dimensional space, as shown in the illustration, provides a picture of a very unusual arrangement of swirling and interlocking circles.

This configuration, which as it turned out, among other things, reflects the structure of the angular momentum of a rotating massless particle, such as a photon (a quantum particle of light), had a great impact on me personally.

This is what provided the geometric realization of what I was looking for in my research for several years. And it is precisely this that has thus laid the foundation for the subject of "twister theory", which has been the subject of my deepest interests for over 37 years.

William Clifford introduced this fundamentally important type of algebra. The key role of the Clifford algebra was also revealed in the quantum relativistic equation discovered by the great physicist Paul Dirac in 1928. In fact, Dirac knew nothing of Clifford's much earlier work, and in fact he had to rediscover a necessary part of Clifford's theory for himself.

Dirac's equation was hailed as a remarkable scientific breakthrough, a turning point in the development of mathematics for particle physics. And it also testifies to the truly extraordinary foresight of Clifford, who developed one of the most important components of this revolution, which was more than 50 years ahead of its time.

About ten years ago I came across Clifford's posthumously published "*Mathematical Fragments*". And there I was simply amazed when I discovered that in the theory of invariants he used schematic notations extremely similar to those that I thought I invented myself, although about three-quarters of a century later". [5]

The main results of Clifford's work in the period from 1870 to 1878 can be defined briefly as follows:

- At the ideological level of the fundamental foundations – a systematic reduction into a single picture of all natural phenomena through a geometric description of movements and interactions between local "perturbations" in the matter of space. The ethereal matter of space is like a bridge for a holistic understanding of the unity of all phenomena of both Matter and Consciousness in the universe.

- At the level of specific implementation of these ideas in relation to the macroscales of the universe - combining the theories of non-Euclidean geometry of Lobachevsky and Riemann to develop their common "practical applications". Achievements along this path are parallel Clifford and Clifford torus, which received these names later.

- The most important contribution to the geometrization of physics at all scales of the universe – from the micro-world of particles to the cosmos as a whole – is the creation of the apparatus of Clifford's geometric algebras. By combining the mathematical tools of Hamilton's quaternions and Grassmann's algebras, William Clifford was able to create a very powerful apparatus for operating the movements of objects as if they were numbers. In other words, for translations, reflections, rotations and rotations of objects, operations of addition-subtraction, multiplication-division, extraction of roots, and even calculation of derivatives became possible. In the same, in fact, manner, as it can be done with numbers or functions. Moreover, this new apparatus works uniformly in spaces with an arbitrary number of dimensions. Ignored for almost half a century, Clifford's geometric algebras were "rediscovered" along with the creation of quantum mechanics and since then have received the widest distribution in various fields of science and technology, but so far with the exception of the physics of Consciousness.

- Simultaneously with the publication of the work on the new apparatus of geometric algebras in the same 1878, William Clifford published a significantly different innovative article with a hypothesis about the structure of the nature of Consciousness, in which for the first time appeared Clifford's well-known concept called "*Mind-Stuff*", that is, "*the matter of the mind* " [4]

Wolfgang Pauli at one time himself reinvented that part of William Clifford's forgotten mathematics that was needed for the development of quantum mechanics.

Roger Penrose, being a mathematician by training, earlier than other physicists managed to grasp the full depth and importance of the construction, called by him the Clifford-Hopf fibration, and productively built it in as the basis for his theory of twisters.

Dirac's monopole and Hopf's fibration based on Clifford's parallels were actually discovered in science at the same time, in 1931, but it took physicists almost half a century to comprehend the same mathematical structure of these two seemingly different objects.

At the turn of the 1980-90s, A. Rañada discovered a completely new solution in Maxwell's equations known for over a century – with the topology of fields in the form of a Clifford-Hopf fibration. That is, the lines of force of two orthogonal scalar fields – electric and magnetic – turn out to be closed in circles, which are collected in Clifford torus, forming Hopf fibration. This seems to be the most spectacular link, bringing together the tachyon crystal and the Maldacena torus into a single whole.

Summarizing the essence of all these particular examples, it is quite possible to say this. Up to the present day, the Clifford-Hopf fibration remains a well-known but still greatly underestimated construct in the foundations of fundamental physics. Although signs of the fundamental presence of a structure called Clifford-Hopf fibration at all scales of the universe – from the nature of elementary particles to the geometry of the cosmos as a whole – have not been news in science for a long time, this most important fact is not mentioned at all among the discoveries of mathematical physics.

The unsolvable grand problems facing modern science are to a very large extent connected precisely with the fact that at one time the “Clifford path” was ignored.

3. Geometry of space.

One of Clifford's fundamental theses is the following: “EVERYTHING that happens in nature comes down to dynamic changes in the geometry of space”.

Therefore, it is natural and convenient to study and describe this dynamics, relying on the geometric methods of mathematics.

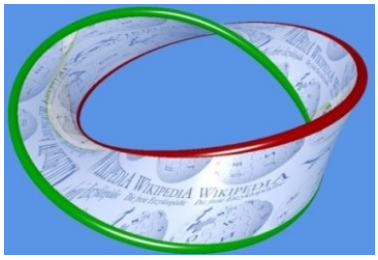
“Geometry is that field of knowledge that is, as it were, between abstract (“pure”) mathematics and reality. It is the mediator who resolves the contradiction between knowledge and error”. But if it is completely algebraic, then “such a geometry takes a person beyond the spatial perception of concrete reality and immerses him in an abstract virtual reality in which literally everything is possible, including what is actually impossible.” [16]

This article proposes to consider the simplest version of Clifford's parallels and dwell on its initial properties in more detail.

Investigating the geometric properties of surfaces in curved spaces, Clifford discovered and described a very specific kind of parallel lines, later called "*Clifford's parallels*". These lines connect pairs of points along the shortest paths and are constantly at an equal distance from each other, but under the conditions of surface curvature they do not lie on the same Euclidean plane.

Clifford's geometric constructions were based on the idea of closed form for the space of the universe. If we mathematically develop this idea for locally flat, but globally closed spaces, then straight lines with such a geometry also turn out to be closed lines, and "Clifford's parallels" in curved space are displaced relative to each other in such a way that they twist the surface tape between them into the shape of a helical spiral.

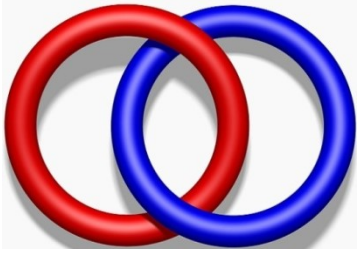
A clear example of the "Clifford Parallels" can be considered the edges of the Möbius strip. Another example of parallel Clifford in the field of cell biology is the structure of DNA strands.



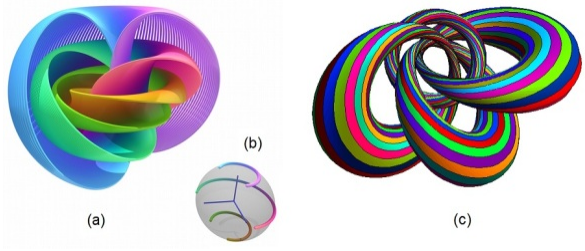
1. ***Closed Clifford`s parallels (Möbius strip).***

When Heinz Hopf, half a century after Clifford, took up an in-depth analysis and classification of spatial forms of this kind, the result of his research was a construction that eventually received the name "*Hopf link*" in topology and is a special case of Clifford's parallels.

When displaying a three-dimensional figure on a plane, it is clear that in this particular case, closed lines are circles. "Hopf link" is an elementary non-trivial node. Based on the Hopf link, a geometric construction was obtained – "*Hopf fibration*".



2. Hopf link



3. Hopf fibration

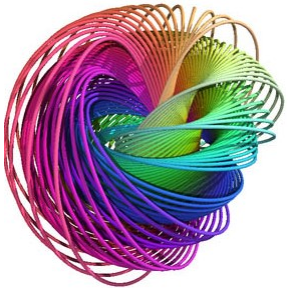
2 - *Hopf's engagement; 3 - Hopf fibration: (a) general structure of nested tori; (b) mapping onto the surface of a 2D sphere; (c) the structure of one of the torus.*

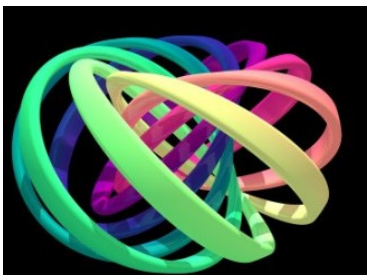
To understand how these non-trivial things appear in the Hopf fibration, it is worth referring to the fundamentally important work of the scientist, which was published in 1931 under the title "*On mappings of a three-dimensional sphere onto a spherical surface*" and in which this object was first discovered for mathematicians. [10]

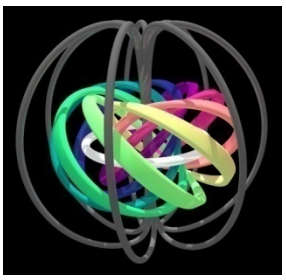
The fact of the existence of this construction became known to the community of physicists much later, approximately in the mid-1970s, when direct mathematical relationships between the Hopf fibration and the equations of quantum gauge fields were discovered. From that moment on, the presence of the Hopf fibration structure was gradually revealed in reality on all scales of nature.

A. Rañada developed his own model of "topological electromagnetism", first proposed to the scientific community in three of his articles published from 1989 to 1992. A. Rañada's model is based on a substantially new solution for Maxwell's equations, thanks to which explicit analogies between the Hopf fibration structure and the physics of classical electromagnetism were discovered.

A. Rañada discovered essentially different solutions for Maxwell's equations, characterized by the property that all lines of two orthogonal scalar fields – electric and magnetic – are closed loops here, which are collected in Clifford torus, forming the Hopf fibration. Moreover, in the aggregate node formed by all these loops, any two rings of electric or magnetic lines are linked to each other. [15]







By the beginning of the 21st century, the characteristic topological features of this structure were clearly established in such areas of physics as, in particular, classical electrodynamics (Maxwell's equations) and general relativity (Taub-NUT spaces), Yang-Mills

gauge interactions, and the relativistic Dirac equation in the quantum physics, the theory of quantum gravity (AdS / CFT in string theory, Penrose twisters) and the theory of quantum computing (Bloch sphere for the qubit device).

Two more decades later, by 2020, Hopf fibration was most often mentioned in connection with the theory of solitons, where for stable wave phenomena with the properties of a quasiparticle and a specific topology of a three-dimensional knot, a separate class of objects appeared under the general name "Hopfions". That is, topological solitons having the Hopf fibration structure.

If we objectively evaluate the entire flow of such discoveries in physics of recent decades, then – in the words of the famous mathematical physicist Roger Penrose – Hopf fibration can already be considered as an "***element of the architecture of our world***" or a **universal element**, quite clearly detected on all scales of the universe – from the cosmological arrangement of space as a whole and up to the structure of elementary particles.

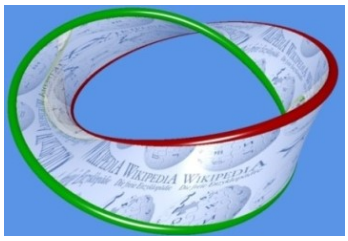
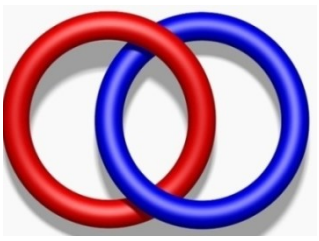
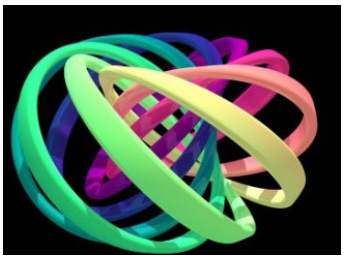
If this is so, then the essential question remains, why is the Hopf fibration, which can be given the status of the Universal Element of the World Order according to the authoritative opinion of R. Penrose, missing the most important element associated with spatial curvature – **Gravitational interconnection**? The concepts of space curvature and gravitation are at the forefront of Einstein's creation of general relativity. And the same aspect was initially designated in W. Clifford's program as **a fundamental element**.

"...the scientist puts emphasis on **gravity**, which, in his opinion, **connects very different phenomena together** ..." (see above) and the issue related to gravity is a key to creating a Unified Theory of Everything.

4. Sequences of geometric transformations. Two phases of fibration.

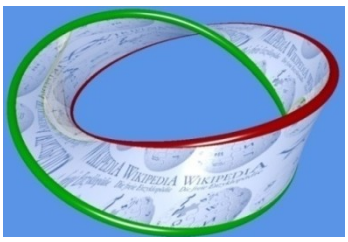
Let us turn to a set of well-known illustrations and analyze the sequence of geometric transformations A:

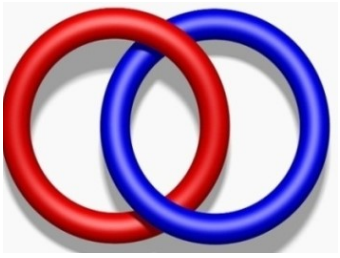
A sequence of geometric transformations A.

1.  2.  3. 

1). closed Clifford`s parallels in the form of a Möbius strip + 2). Hopf link in the form of a non-trivial knot + 3). Clifford-Hopf fibration.

If we look at the sequence of these transformations from the point of view of geometry, then a natural question arises: “How is the transition from configuration 1) geometrically carried out to configuration 2)?”

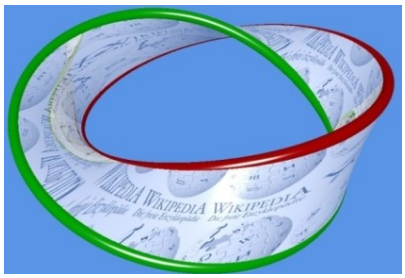


1). **2).**

To get an answer, possible to perform certain actions with the original geometry of Clifford's parallels closed in the form of a Möbius strip, namely, fibrate the strip, in which it is divided into conditional fibers and pay attention to the **characteristics of these natural properties**.

This process is fractally identical to the process of DNA replication, in which DNA is split into two strands to carry out the copying process and obtain an identical copy. According to the principle of fractal-holographic similarity, in other words, according to the Universal Laws of Analogy and Unity, DNA is a biological projection of Clifford's parallels into the cellular structure.




Clifford`s parallels in the Möbius strip and in DNA.

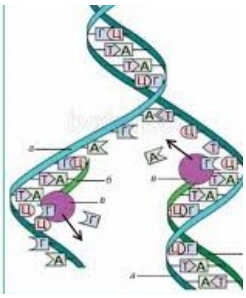
A geometrically curved surface, closed through one turn by 180 degrees, is a complementary ratio of two sides of one whole (plane), opposite, but complementary to each other, is an analogy of the complementary elements of binary logic "0" and "1" and represents the minimum Initial Universal Informational Gene expressed geometrically through a mirror-asymmetric inversion, which contains **symmetry and asymmetry** at the same time.

Thus, Clifford's parallels geometrically reflect the principle of ***complementary ratio***, embedded as a ***substantial pattern*** in the structure of space. And the Möbius strip is a **geometric analogue** of this initial ratio, and by considering its properties, it is possible get answers to a number of intractable theoretical questions.

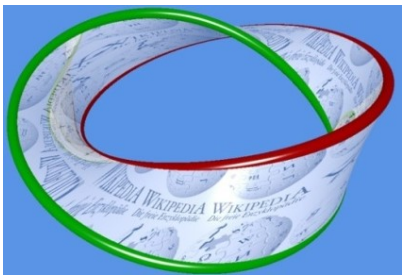
The principle of fractal similarity indicates that the Unity of the World Order is based on a foundation, which implies the existence of its equivalent in EVERYTHING. The principle of complementarity is comprehensive and this fact is stated by science and can be considered fundamental. Based on this indicated fact and the logic of its application to the issue under consideration, we can conclude that Clifford's parallels geometrically reflect the Unified Fundamental Principle of Complementarity, which determines both the spatial geometry and the way of **implicating the existence of its equivalent** in EVERYTHING. It is the position on the interconnection of everything that is the basis of the program of W. Clifford.

The initial Information Genetics (InfoGen) of the universal pattern (“0” and “1”) is transmitted to everything by the method of copying through generation from within and by the method of doubling the InfoGenome in the process of fibration. And this initial InfoGen remains the initial basis of universal constructions.

According to the principle of the hologram and fractal similarity, the process of fibration occurs according to the same Image and Likeness, namely, the general scheme of fibration at all levels of beingness will be the same. Let's call the initial stage of copying the InfoGenome with the transfer of the Source Gene to the resulting copy – the **first phase of fibration**. By analogy with the process of DNA replication through fibration into fibers, it is necessary to make a cut in the curved plane in the middle and along the Line of Curvature.



DNA

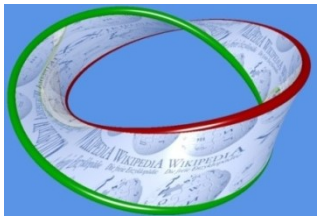


Clifford`s surface (Mobius strip)

Fibration

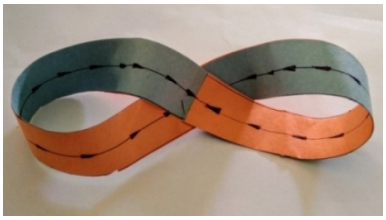
What is the result of the implementation of the first phase of fibration of the vortex Möbius pattern of spatial curvature, formed by the curvature of the surface (turn of the plane) by 180 degrees? The process of doubling the original Info-Genome takes place and a ring-shaped configuration is obtained in which the spatial curvature is already formed by two 180-degree turns (double inversion).

FIRST PHASE OF FIBRATION.



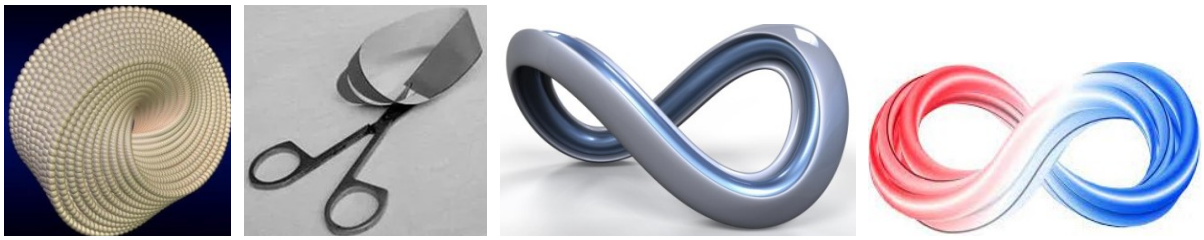
Mobius Monopole.

1st phase of fibration.



Two-loop Möbius Dipole.

The configurability of the resulting ring, due to the presence of a double 180-degree turn, **will not be a circle**, but will naturally be laid out in the configurability of the **Lemniscate,** in which the line of curvature has a point of intersection. In the case of the torus-like variant, the result **will also not be a circle**, but will be a **lemniscate**, while remaining a closed ring, but twisted into the figure-eight configurability.



This geometry, obtained during the first phase of fibration, is so global and its meaning is so deep that it is difficult to overestimate the importance of a detailed consideration of this fibration stage and its result. It truly reveals to physicists the secrets of the World order and its regularities.

Assuming the original structure of Clifford's parallels, closed in the Mobius Pattern, as the Mobius Monopole, which is a vortex dynamic unit of the fabric of space, we see that as a result of the **first phase of fibration** of the Mobius Monopole, after doubling its initial InfoGenome, a lemniscate-like Mobius Dipole is obtained. The Möbius Dipole is a bipolar magnetoelectric structure similar to a bar magnet.

If translated into the language of magnetoelectric phenomena, then at the point of intersection of the curvature line, a kind of **tensor** of tension and balancing of the two mirror-asymmetric «shoulders» of the Möbius Dipole is formed. These "shoulders" are a kind of **pulsating spheres** or, in other words, energy antinodes. According to the current paradigm of physics, they are called "***charges***" and they are conventionally assigned the "***plus***" and "***minus***" signs. The synchronized pulsation of these magnetoelectric spheres is the "***bias current***" without charge movement that was designated by J. Maxwell.

Crossing the line of curvature as a magnetoelectric tension and balancing tensor acts on the principle of **feedback** on any change that occurs in the «shoulders», i.e. according to the principle of operation of lever scales, in which the **axis is movable**, the shift of which ensures the observance of the proportion of "***masses***" and the **distance between them**.

LEVER WITH MOVING AXLE.

It is precisely because of the Möbius curvature (inversion) and the resulting crossing that the principle of mutual gravitational support of two shoulders of Möbius Dipole is carried out due to the **dynamic of displacement** of the Center of Balance and Tension (CBT).

It is important to note exactly the fact that the Möbius Dipole illustrates, that "***charges***" ("proton-electron") are components of **one system formation** and cannot be in a free state independently of each other. They are interconnected by a magnetoelectric vortex rotational process of continuous mutual torsion, which causes them to belong to the same dipole "***entity***". This balancing is done due to the fact that as a result of just such a crossing, the effect of creating a feedback on any change that occurs in this way of connection occurs. In other words, a back reaction occurs in the form of a restoring force directed against any displacement, due to which a stable equilibrium is formed.

The crossed interconnected tensor (CBT) is that way of interaction of two loops as opposite charges, in which the opposite charges "do not stick together", and also "do not fly apart", but are balanced in one bundle and interact in a balanced way. When the parameters of the arms of the Möbius Dipole change, the CBT shifts in one direction or another.

The Möbius Dipole is a magnetoelectric balanced structure, in which conditional "***pluses***" and "***minuses***" always belong to one structural formation as one physical entity. Based on this, the number of "***pluses***" is always equal to the number of "***minuses***", which is equivalent to the fact that the number of "***electrons***" is always equal to the number of "***protons***". Based on this, the **total electric charge of the universe invariably remains equal to zero**.

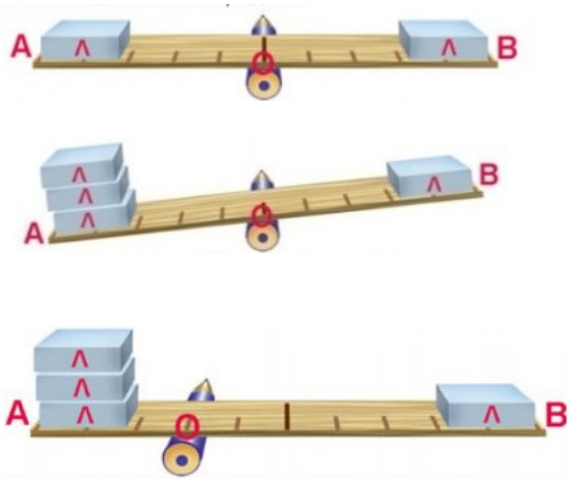
In the language of the current paradigm of physics, if we explain this phenomenon through a "**particle**" and its "**antiparticle**", then in the Möbius Dipole as one essential object they are able to coexist peacefully without of mutual annihilation, i.e. two opposite "**charges**" can be constantly present in the same essential unit in the form of **different phases of its oscillations**. Due to the original wave mechanics, the electric charge in this format has the nature of **a harmonic oscillator** of **pulsating spheres** in the arms of the Möbius dipole. Such an essential interconnection is due to the magnetoelectric Möbius tensor. In this regard, the Möbius Dipole gives a clear and intelligible **explanation of the "peaceful coexistence" of two opposite charges in the structure of an atom, consisting of a set of Möbius Dipoles**.

Based on the foregoing, the dipole "shoulders" can represent that "unified theory for the" proton-electron "together", about which Nobel laureate W. Heisenberg expressed an insightful thought in his time, discussing with P. Dirac his equation and conclusions, as well as H. Weyl was sure that it was in this equation of Dirac that there should be a **key to the unity of physics**. Since there is mass in the Dirac equation, the mathematician reasoned, and mass as an effect of gravity is of a geometric nature, this means that deep interrelations and important clues for unifying quantum mechanics and general relativity must be hidden in this formula.

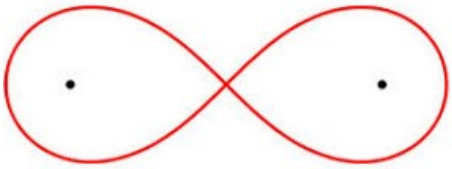
In the same period W. Pauli, as he believed, discovered the **basic element of nature**. The essence of this physics, according to Pauli's conjectures, is a **coupled asymmetric pair of proton and electron** on the bifurcated membrane of the space of the universe. "**The bifurcation and reduction of symmetry!**" – this was the **key idea** of the main, but immediately classified discovery in 1958 by Wolfgang Pauli. [33]

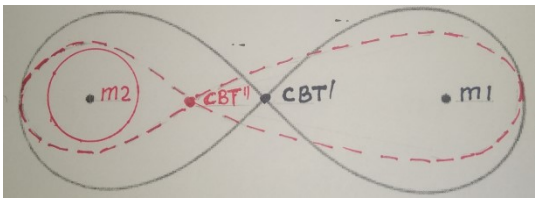
Considering the conjectures and mathematical findings of a number of predecessors, it can be assumed with sufficient clarity that behind the Pauli "***bifurcation***" is the doubling of the InfoGenome of the original **Möbius monopole** (Dirac monopole), which in the first phase of fibration (bifurcation) passes into a **bipolar state** – the **Möbius dipole**. In this case, the "***reduction of symmetry***" consists in the fact that one arm of the dipole begins to play the role of a "***proton***", and another – an "***electron***", means different ***charges***, and the CUN shifts towards "weighting", thereby reducing the length of the "***proton***" arm and lengthening the arm of "***electron***", balancing the shoulders according to the principle of operation of a balance scale

with a movable axis. It should be kept in focus that the considered Möbius Pattern is the energy formation of the Quantum Medium, and in it the magnetic property and the circulation of sub-micro-currents are mediated by the Fundamental Principle of Complementarity (FPC).



Lever balance with movable axis.





“Proton (m2)–electron (m1)” dipole coupling.

Neither the classical nor the quantum theory of electromagnetism explain why in the hydrogen atom the "***electron***" never falls on the "***proton***", despite the constant mutual attraction of the "***particles***". The explanation of this phenomenon of "non-confluence" lies precisely in the asymmetric way of connecting the two loops of the Möbius Dipole, which has a closed cofigurative lemniscate and provides a **dynamically stable gravitational interconnection**.

5. Gravitation.

The balancing interconnection of two mirror asymmetric pulsating arms of the Möbius dipole, actualized in the first phase of fibration (bifurcation), is a **Bipolar Gravitational Interconnection.** Gravity regulates the balancing "attraction-repulsion" between the energy "***masses***" and "***charges***" of the Möbius Dipole's shoulders, providing "mutual support" to its shoulders. This is the exact meaning of the root of the word "gravity". Having a gravitational balancing mechanism within itself, such a dipole structural formation of two asymmetrically connected emitters as a whole has an **anti-gravitational** property and hangs unsupported in space, as evidenced by the entire cosmos.

So far physicists-mathematicians have not been able to "squeeze" gravity into the micro-world with the help of the apparatus of algebra. But, as it is shown geometrically, gravity is illustrated graphically with the help of the Möbius Dipole, which is the basis of both atomic structure and cosmological structures, as well as the Observer himself.

The Principle of Gravitational Balancing operates according to the One Unified General Scheme and similarly in all planes of beingness, regardless of the Fractal Level, and manifests itself not only in those areas where it is traditionally customary to use the concept of “gravity” historically, but also everywhere. When we talk about wisdom and correlate the search for a wise decision with the heart center, then we apply the same principle of Balancing Gravity, but only on the mental-thought plane. On this plane of being, our gravitational weighing consists in

finding the point of application of the axis of Gravitation between the "weight" of the intuitive feeling and the "weight" of the logic of the mind. These are the boundaries between which the process of oscillation of our thinking takes place. Gravitation acts everywhere and on all planes. It is this aspect that is reflected in the theses of Clifford's program. It seems that it is on this basis and with this approach to the issue of gravity it could be possible the creation of the Theory of Everything.

The Möbius Dipole in the Lemniscate configurability illustrates the geometry of the Bipolar Gravitational Crossed Interconnection of two wave "energy bundles" having the opposite direction of the torsion movement and conditional opposite "charges". These wave energy antinodes are both interconnected conditional "masses" due to the nature of their energy content, and opposite "charges" due to their asymmetric opposition, while they are enclosed in the same geometry of the Lemniscate of the Möbius Dipole and belong to the same dynamic structure.

Proceeding from this, the formula for describing the interaction of these "energy-beams" both as "charges" in the **Coulomb's Law**, and as "masses" in the **Newton's Law** of Universal Gravitation, will be the same in the nature of the dependencies, since both laws describe the same entity as **one geometric object**.

At one time, the Nobel laureate R. Feynman pointed out the fact that "no one has yet managed to present gravity and electricity as two different manifestations of the same essence", and he was also looking for an answer why the formulas of Newton's Law of Universal Gravitation and Coulomb's Law in their own way expression are the same.

$FN = G\, m1\, m2 / r2$, (1)
$FK = (4\, \pi\, \varepsilon 0)\, –1 q1\, q2 / r2$, (2)
where: *FN, FK* are the interaction forces of Newton and Coulomb,
G, ε0 are gravitational and electric constants,
m1, m2 and *q1, q2* are masses and charges of interacting bodies 1, 2,
r is the distance between them.

As is obvious, in the language of Clifford`s geometry and in the format of the Möbius Dipole, an exhaustive answer to this question can be obtained.

The Möbius Dipole can transform from the lemniscate geometry, which is the basis for the "***proton-electron***" state, into the geometry of the double Möbius pseudoring, which is the basis for understanding the "***neutron***" state, and also back with the emission and absorption of energy, respectively. This transformation, illustrated below, is the basis for understanding the phenomenon of atomic transmutation, as well as the concept of **two-brane** in a number of modern theoretical views.

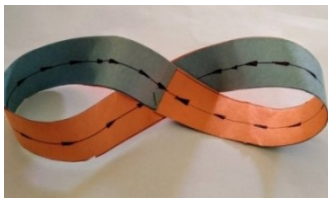
GEOMETRIC TRANSFORMATION OF THE MÖBIUS DIPOLE.

Lemniscate dipole and transformation to Möbius pseudoring.

6. Quantum entanglement.

Let's move on to illustrating the **second phase of fibration**, which we will carry out according to the same scheme as the first one, by cutting (bifurcating) the Möbius Dipole along the line of curvature.

SECOND PHASE OF FIBRATION OF A CLOSED MOBIUS PATTERN



Möbius Dipole. ***2nd phase of fibration.*** ***Two coupled Möbius Dipoles***.

In the second phase of fibration, the next doubling of the InfoGenome takes place. Two Möbius Dipoles are formed, interconnected by the type of chain links into a topological knot. In the current paradigm of physics, this interconnection is called **Quantum entanglement.** Quantum entanglement can be obtained in another way, but when a stable and dynamic structure is formed in the process of generation from within (atom, star-planetary system), the actualization of Quantum entanglement occurs in the second phase of fibration.

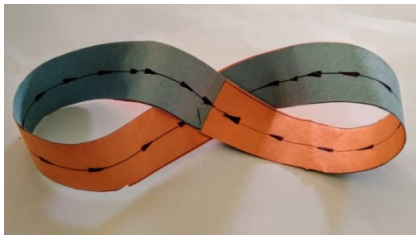
The article "Creating space-time using quantum entanglement" published in 2010 by Mark Van Raamsdonk, who explores the interconnection between quantum mechanics and gravity, develops the idea that quantum entanglement is a fundamental ingredient of nature, underlying that Geometry, which the space of the Universe possesses. [17]

The phenomenon of quantum entanglement of particles, as it turned out, keeps the entire geometric fabric of space from breaking and disintegrating. That is, matter and space are different projections of the same whole. From the same scheme, a very important idea is naturally derived that space, time, and the memory of the universe have the **same universal material basis**. Moreover, this basis is characterized by the same essentially discrete structure, which has long been established for the granular structure of matter.

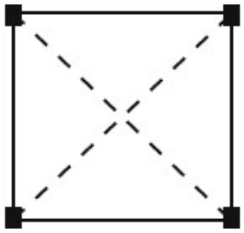
So, the actualization of the Gravitational Interconnection in the first phase of the fibration of the Möbius Pattern and the actualization of the Quantum entanglement in the second phase ensures a balanced and interconnected state of system formation growing from within (atom, star-planetary system, cell, bio-organism). Gravitation and Quantum entanglement are system-forming interconnections that are designed to hold the growing system formation together in the One Whole. They hold the system from the inside, preserve its structure and exist as a response to the development process. The picture of the World in such a DIPOLE performance demonstrates very powerful dynamics and amazing stability.

At one time, Nobel laureate W. Pauli was looking for this correlation between stability and dynamism of the world. When the scientist was thinking about the riddle of the phenomenon of bifurcation that he had already found and how nature manages to keep this highly dynamic system in a stable state, then as a clue he was shown in a dream a "***dance pattern***" – a square in which the vertices change each other diagonally. As it can be seen now, such a square is nothing but a schematic representation of the movement of a vortex energy flow along the Mobius Pattern at the stage of development – a DIPOLE.

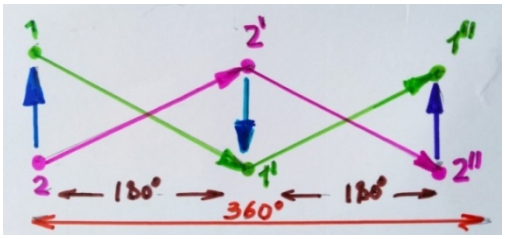
Diagonal crossing in the Pauli square points to Geometry, with the help of which, on the one hand, stability is organized, and on the other hand, dynamism with a constant change in places of pairs of opposite vertices (change of polarity), which forms the basis of a non-stop process of continuous oscillations. In addition, the principle of self-copying is based on this, carried out through the method of fibration, substantially embedded in a closed structure based on Clifford's parallels.



Möbius Dipole



Pauli Square



Self-Copying Scheme

The fulfillment of such a condition ensures the preservation of a stable configuration of any material objects at all scale levels, from atoms to giant clusters of galaxies. Gravity is driven by magnetism, which operates through displacement and rhythm, as well as through the phenomenon of symmetry supported by the dynamics of mirror asymmetry, which are mediated by Möbius Geometry.

Gravitational interconnection is a **substantial property** inherent in everything. Gravity permeates everything and is a consequence of the nature of the curvature of space, which is due to inversion (complementary ratio), mediating the dynamics of torsion and the phenomenon of magnetoelectric properties, respectively polarity.

In fact, in the Möbius Pattern, a symmetrical balance exists due to the asymmetric opposition of the components of one cyclic process, which are in balanced antiphases relative to each other. This is the fundamental compatibility of the Universe Principle of Complementarity, which contains a unique harmonious combination of symmetry and mirror asymmetry. The geometric analog of the complementary relation is the Clifford`s parallels, closed in the Möbius Pattern.

The subject of mirror reflections was the focus of attention of the Nobel Laureate W. Pauli, who was in search of the main symmetries of Nature. In 1954, Wolfgang Pauli prepared an article on the role of mirror symmetry in physics and, in general, on those properties of symmetry that should be discovered in nature. In scientific circles, this work is called CPT-theorem. Pauli acknowledged that the topic of mirror symmetry is very important. In 1957, regarding this issue, Pauli has a specific expressive image – a **one-sided Möbius strip**, which he voiced in a letter to Carl Jung. Jung in his response to Pauli emphasizes asymmetry, which mediates movement and is associated with the dynamic elements of nature, setting the direction of the movement process.

In fact, Pauli was very close to the foundations of natural symmetries and asymmetries of mirror reflections, the combination of which in the composition of closed Clifford`s parallels (Möbius strips) mediate virtually all the main ways of movement in natural formations.

When the concept of particle spin appeared in physics in 1925-26, Wolfgang Pauli introduced a new mathematical formalism into the equations, which in essence turned out to be the same as that of Clifford. Pauli matrices were in the form of 2x2 tables and proved to be

convenient for handling dual wave functions (with spins "up" and "down") as pairs of complex numbers.

As for Dirac, who worked independently of Pauli, when deriving his famous relativistic equation, ideas began to come to him from the same mathematics of Clifford, but only with an emphasis on a 4 × 4 matrix. Subsequently, he could not explain how, for the problem of the behavior of one particle, it dawned on him to use as many as four wave functions. But after the arrival of this idea, mathematics itself led him to a number of completely unexpected, but necessary solutions, and in particular, the particle spin appeared as a natural geometric consequence of a correctly chosen algebra. This ratio has every right to be called one of the most outstanding theoretical achievements in the history of science. But at the same time in the scientific community the "***mechanics of nature***", hidden behind these ratios of quantities in this equation, remains undiscovered and not fully understood.

If we continue to reveal this mechanics basув от the proposed new format of the logic of reasoning, then Clifford's closed parallels in the Möbius strip version are a kind of **four-point function** of two complementary crossed colons: there will always be an inverted C against A, and an inverted D against B. **Each pair plays the role of an element of binary logic «0» и «1»**. And as shown through the process of fibration, from these oscillating topologically "connected colons", as it will be shown below, a particle of matter – ***atom*** whose structure is based on topologically coupled dipoles. Each dipole is a two-arm oscillator, the arms of which are mirror asymmetric (with different chirality), doubling of which occurred in the process of development with the growth of the system from the inside.

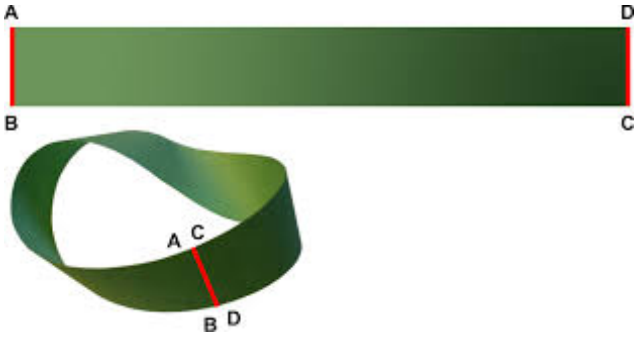
It should be remembered that in 1929, one of the most insightful mathematicians and physicists, **Hermann Weyl**, after analyzing the Dirac equation, showed that the mathematical structure of a particle is decomposed into two massless components - one with right-handed chirality, the other with left-handed chirality. The mass of a particle, according to Weyl, arises in some obscure way when it constantly changes from one state of chirality to another. [28]

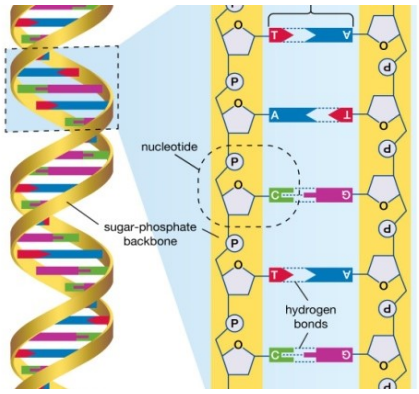
According to the proposed new format of the atomic structure [30] (and watch below), it is precisely when the chirality changes in the dipole oscillator that the process of energy conversion takes place. And mass as an effect of gravitation has a geometric nature precisely in the Möbius dipole structure.

In 1928, P. Dirac discovered a truly correct equation, mathematically elegant, taking into account all the effects known at that time and giving correct predictions.

In P. Dirac's equation, two components of a particle – with positive and negative energy – exist absolutely on an equal footing. **Werner Heisenberg**, solving the problem in P. Dirac's equation for the positive-negative electron, astutely noted that this problem would not be solved until there was **a unified theory** for the "***proton***" and "***electron***" **together.** Then, if we solve this problem based on the Möbius dipole, as described above, then the only fact becomes obvious that the "***proton-electron***" atomic bond is nothing more than unified together asymmetric arms of one geometric construction, and this is only a conditional agreement, which of the shoulders to attribute a "minus" to, and to which a "plus".

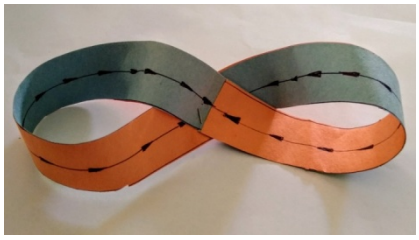
The principle of "linked colons" is embodied in the way genetic material is transferred during DNA replication: there will always be an inverted T against A, and an inverted G against C. Each **linked pair** will be an element of **binary coding system** that is sewn into DNA. [30]

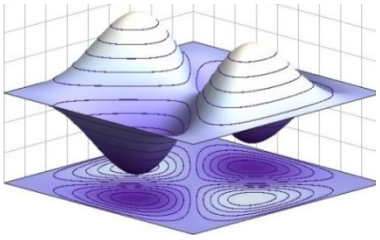


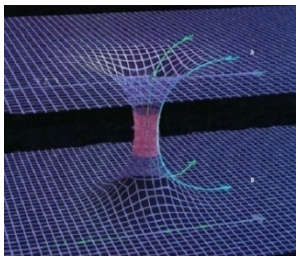


This is the answer to the question about the mysterious structure of DNA in biology, where the answer is not received, for what reason nature uses four basic nucleotides to encode all information in the double helix of the “memory molecule”. [29]

At one time, the concept of a particle of matter as an oscillating "connected colon" appeared in quantum physics along with the birth of the first wave equations. This principle can be seen both in the structure of the fermion particle, which follows from the **Dirac** equation, and in the **Majorana** fermion with its physics of oscillons and the essence of its nature as a dipole, which reflects exactly a bifurcated object.

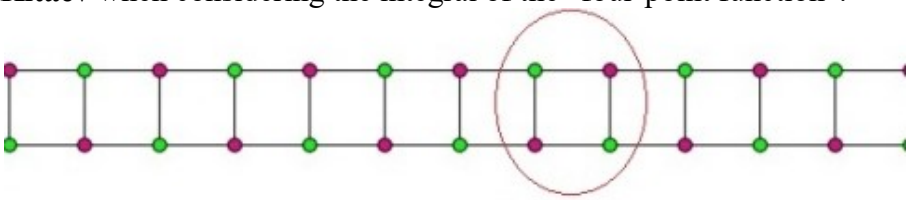






If two oscillons pulsate in the same phase, then they repel each other, but if they are in opposite phases, they attract each other. For this reason, oscillon physics clearly demonstrates the essence of the fundamental ideas of Maxwell and Clifford about the structure of nature at its deepest level. James C. Maxwell believed that electric charges are essentially special points of tension in the fabric of space.

And also this principle is seen in the analytical solution for the SYK system, found by **Kitaev** when considering the integral of the “four-point function”.



Kitaev Staircase and Pauli Square

The basis of the construction of this ladder is formed by four particles in a specific way - "two pairs of antipodes", regularly repeated over and over again. When Aleksey Kitaev found a

solution for SYK based on quadruples of particles, it soon became clear that they themselves fit like "ladder diagrams".

A somewhat more illustrative explanation of the same idea can be found in the article "Comments on the SYK Model" by **Juan Maldacena and Douglas Stanford** [21]

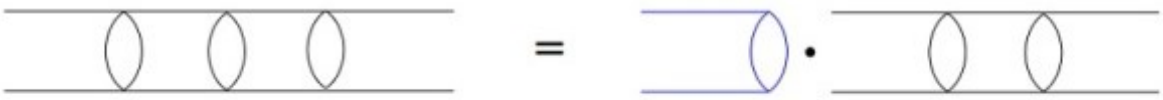
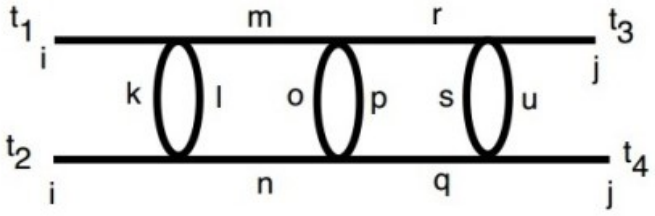


Figure 4: The $(n+1)$-rung ladder $\mathcal{F}_{n+1}$ can be generated from the n-rung ladder by "multiplication" with the kernel K, shown in blue. We call the vertical propagators a "rung" and the horizontal ones a "rail".

The same schematic element noted above is also illustrated by the scheme from the article by **Polchinski - Rosenhaus** with the corresponding explanation: "A four-point function is given by the sum of ladder diagrams ..." [20].



(a)

Figure 2. (a) The four-point function is given by a sum of ladder diagrams, such as the one shown. (b) These ladder diagrams are generated by iterating the Schwinger-Dyson equation

The Möbius Pattern, spinning as a whole, has its own "***internal clock***" mechanism. This fact was reflected in the earlier ideas of Louis de Broglie in 1924 [23] and later in the works of the American mathematical physicist David Hestenes, most famous for his many years of efforts on the introduction of the Clifford geometric algebra apparatus for solving applied and theoretical problems of physics. [25], [26].

D. Hestenes's research revealed such a construction, in which the particle spin phenomenon is inextricably linked with the particle's orbital rotation around the time axis, as a result of which the particle's trajectory in space-time looks like a cylindrical periodic spiral. The parameters of this spiral set the physical properties of the particle: natural oscillation frequency, mass, and so on, which exactly corresponds to the properties of the Möbius Pattern as a magnetoelectric structure, which lays the concept of the basis of a particle of matter as a topologically unified oscillating system that simultaneously performs two cycles of revolutions – rotation around the internal center and rotation around the conditional external one.

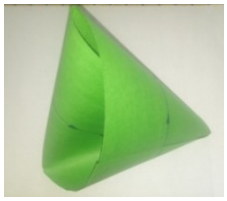
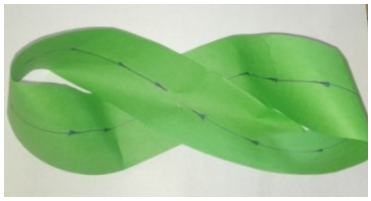
And also, as it was revealed and noted in [30], the process of spinning a magnetoelectric Möbius annularly closed circuit is accompanied by the generation of Planck energy quanta. At one time, a similar assumption was made by Oscar Klein. [24].

The work of Hestenes [25] was published almost simultaneously with the English-language publication of the Guaner group, in 2008. In 2012, a consonant series of articles about "crystals in time" appeared – from the famous theorist and Nobel laureate Frank Wilczek. In these articles, on the basis of completely different considerations and without interconnections

with the studies of Hestenes and Guaner, essentially the same configuration arises – the trajectory of a particle in space-time in the form of a one-dimensional crystal rolled into a periodic cylindrical spiral. [27].

As it can be seen in the studies of the chain of authors, all of them, in one way or another, come to geometric structures that are based on **Möbius Geometry** (Clifford's geometry of closed parallels), or come to its ***universal properties***.

TWO PHASES OF FIBRATION.


1). Monopole ***2.) First phase of fibration.*** ***3). Second phase of fibration.***

1). The Möbius Monopole is a one-sided non-orientable surface.

2). The Möbius Dipole is a one-sided orientable surface, an analogue of the “proton-electron” interconnection in the atom, “planet-star” in cosmology as well as another analogues. The gravitational interconnection is being actualized.

3). Möbius topological knot of two coupled Möbius Dipoles. The quantum entanglement is being actualized.

In each phase of fibration, the informational genome is doubled. The property of closed Clifford’s parallels (Möbius strip) lies in the fact that in the phases of fibrations the fundamental interconnections are progressively actualized – gravity and quantum entanglement – which hold and preserve the structure from the inside.

Here it is necessary to understand that the manifestation and growth of matter occurs from the inside out in the act of generation and the forces that determine the interconnectedness of the components of system formation do not originate outside the elements, but inside them. This applies to both – the space of the atom and the space of the biological cell, as well as the Universal space.

“The latest research in related fields of knowledge only confirms this idea – the fundamental identity of division for the purpose of reproduction of both atoms and biological cells. In space, everything is subject to generation, reproduction in an exact copy. [34]

In 2015, D. Lin, M. Marcolli, H. Ooguri and B. Stoica, using the mathematics of holographic duality, obtained a result that was interpreted as proof of a certain connection between Quantum Entanglement and Gravity. [18].

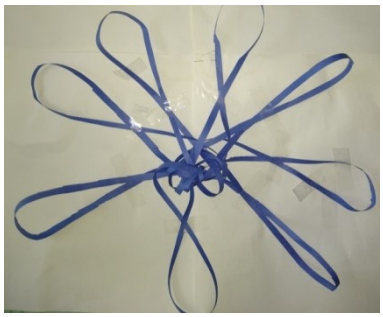
The author of the article "Philosophical interpretation of modern approaches to the creation of a quantum theory of gravity" Karpenko I.A. gives the following interpretation of these results, which is that quantum entanglement and gravity turn out to be dually related, namely: what appears as quantum entanglement in a space of low dimension becomes a gravitational interaction in a space of higher dimension. Then, based on the holographic principle, it becomes possible to show that gravity and entanglement are dually connected, that is, they are, as it were, an expression of the same thing, but in different-scale worlds. [19]

My comments. Regardless of the calculations and conclusions made using the mathematics of holographic duality, as well as the subsequent interpretation of the data obtained, the author of the new proposed approach in the format of the developed methodology of Fractal Synthesis makes a firm statement that Gravitation and Quantum Entanglement are separate Fundamental Interconnections that equally belong to all worlds: micro-, macro- and mega-, as well as to all levels and spheres of Existence. As shown above, they are actualized in different phases of Möbius Monopole fibrations, perform different functions and are not interchangeable. They are equally present at different scale levels and interact with each other within each of them, causing a polarization orientation in the radial direction between coupled wave Möbius Dipoles and forming together the Fundamental Center-Periphery Interconnection. [30]

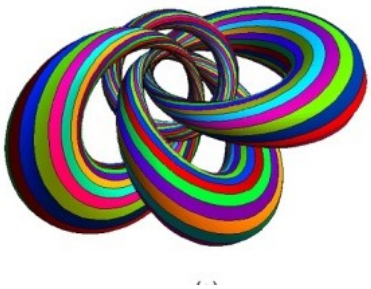
Both interconnections are progressively actualized in the phases of development (fibration) of the Möbius Monopole and doubling of its Information Genome, appear and interact according to the same General Unified Scheme both in large and small dimensions of Cosmos. Just as there is a quantum physics of micro-objects, we can talk about quantum physics of macro-objects. [30]

7. The third phase of fibration. Center-Periphery. Atomic Model.

If we consider the third and subsequent stages of the fibration process during the stratification of each of the coupled Möbius Dipoles, then further series of Möbius Dipoles are formed, connected by Quantum entanglement into a **topological knot**. The further growth of the system formation causes the **polarization orientation** of the Möbius Dipoles **in the radial direction and the formation of the structure – Center-Periphery.** At the same time, some arms of the wave dipoles form the Center, and asymmetric mirror arms form the Periphery. In the application to the atomic structure, these are the "***nucleus***" and "***electrons***", in the application to the star-planetary system, this is the star and planets.



Topological knot of 4 and 8 Möbius Dipoles.



Hopf knot

As is clearly illustrated above, in the process of fibration of a structure based on closed Clifford parallels, the resulting interlocking annular structures are not circles, but are lemniscate-shaped twisted formations with curvature due to **initially inverse turns**.

In the process of formation of such structures, there is a progressive actualization of two fundamental interconnections – Gravity and Quantum entanglement to streamline the dynamic magnetoelectric vortex structure and keep its components in one whole.

The illustrations below help to more clearly show the relationship of the complementary components of the atom in the form of the arms of the Möbius dipole, which are given the names

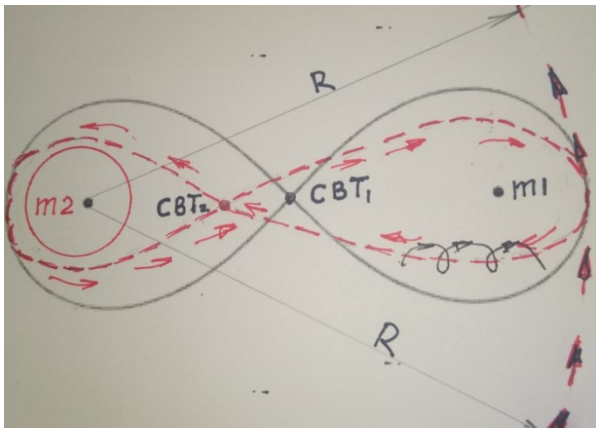
"electron" and "proton" in the current paradigm of physics. Both arms are like pulsating spheres or sub-micro quantum generators. At the level of the macro-world, each planet is connected with a star by such a dipole connection.

As it can be seen, the structures of micro- and macro-worlds are fractally similar and have the same set of fundamental relationships – complementary, gravity and quantum entanglement – as well as a fractal-like general scheme of Center-Periphery. Therefore, the original idea of E. Rutherford about the planetary model of the atom was correct. However, in that period of time, the knowledge that would allow us to give the correct detailing of this model was not yet acquired. [30], [38].

As applied to the atomic structure, the "***nucleus"*** of an atom is a topological knot that connects some arms of the Dipoles, and "***electrons"*** are the arms of the same Dipoles that are asymmetric to them, but they play the role of a peripheral shell or a kind of membrane, through which both interaction with the Quantum Ethereal Medium and with dipoles of other atoms by the type of "***engagement of gears***" in accordance with the multiplicity of vibration levels. On this basis, chemical compounds are obtained.

The energy dynamics of the motion of the loop energy antinode of a dipole (electron), in other words, the process of its spinning, is a type of motion around three axes: rotation around the internal axis along the center of the line of curvature, a lemniscate-like trajectory through the CBT (center of tension and balancing) and orbital rotation around the "core" on a conditional gravitational "leash".

This is consistent with what the Nobel Laureate R. Feynman once suggested: "An elementary particle must simultaneously rotate about two or three of its own internal rotation axes."



Interconnection "proton-electron" ***Topological knot of 4 Möbius dipoles***

R is the radius of the atom.
M1, M2 are the centers of mass of the arms ("electron" and "proton").
CBT1 – Center of Balance and Tension in symmetry,
CBT2 – displacement of the Center of Balance and Tension with decreasing symmetry
- Red arrows indicate **lemniscate-like spinning** of dipole inversions turning as ONE.
- Red-black arrows indicate the **orbital motion** of M1 ("electron") around the center of mass of M2 ("proton"-nucleus).
- Spiral black arrows indicate the **eddy rotation** of the inversions.

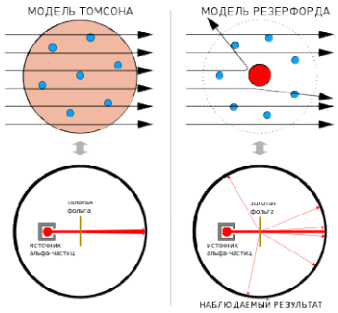
And also it should be remembered that at one time the Nobel laureate Paul Dirac proposed an explanation for the strange feature of the electron spin, which becomes a completely natural geometric consequence if the orbit of an electron is represented by a Möbius strip. Paul Dirac showed that such an evolution of an electron in an orbit corresponds to the following motion of a particle along the Möbius strip: one round of the strip leads to a change in the direction of the spin to anti-parallel, and for a complete return, two turns must be made.

And it should also be remembered that at one time Nobel laureate Paul Dirac proposed an explanation for the strange feature of the electron spin, which becomes a completely natural geometric consequence if the orbit of an electron is represented as a belt twisted by half a turn, in other words, in the form of a Möbius strip.

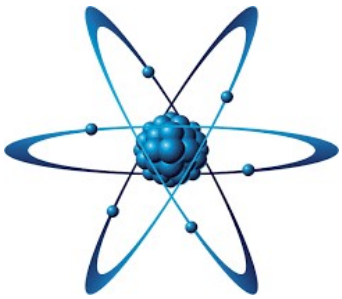
The formation of the Möbius Dipole and its properties are determined by the ontology of the initial fundamental principle of complementarity, which mediates the configurability of the components of the atomic structure.

Thus, the **atomic structure in the format of Möbius Geometry** based on Clifford`s parallels is represented as an interconnection into a topological knot of vortex dynamic constantly spinning Möbius Dipoles, which carry out the process of "radiation-absorption" of energy quanta in the dynamics of magnetoelectric interaction with the Quantum ethereal Medium, being with it in a kind of **quantum** " ***symbiosis***".

And, as noted above: "All these things must be derived from the knowledge of the **geometric shapes of atoms and their interrelations with the ether**". W. Clifford [2]



[from Wikipedia]

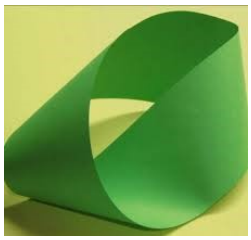
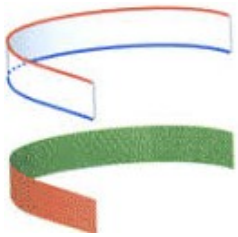


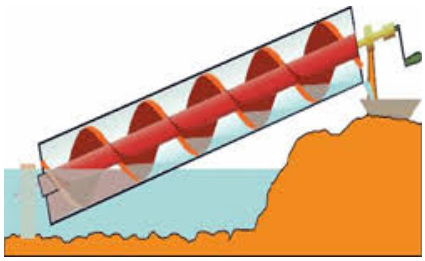
E. Rutherford's model.

Wave Möbius model.

Such a "**hydrodynamic" wave model** of the atom illustrates the principle of a kind of **quantum "symbiosis" of the atom with the Quantum Medium**.

The cyclic rotation of the “ribbon” of the Möbius dipole lemniscate as a whole is the process of the Dipole spinning. The presence of inverse turns determines the presence of the intrinsic angular momentum of the constituents of the atom and creates the effect of synchronous rotations. As quantum mechanics shows, the presence of an inherent angular momentum in the constituents of an atom, which in the current paradigm of physics is called "spin", determines the magnetic moment and the rotation of the integral bladed structure of the Möbius Dipole, like a corkscrew or **Archimed`s' screw**.



The essence of this magnetoelectric internal helical spinning process is the energy source of the atom and causes the continuity of **oscillations** with the release and absorption of **Planck energy quanta**.

This is exactly the phenomenon that, in the terminology of the current paradigm of physics, is described and called the absorption or emission of a real photon by a real electron with an amplitude e = 0.08542455, a coupling constant, or the reciprocal of its square – the fine structure constant $1/\alpha = 137.035999206$ (FSC – fine-structure constant).

The method of interrelation of complementary components through the inverse turn mediates the twisting vortex mode of movement, respectively, electromagnetism and polarity, which determines the internal process of spinning and the continuity of oscillations of the units of the Quantum Medium and its energy content.

8. Final conclusions.

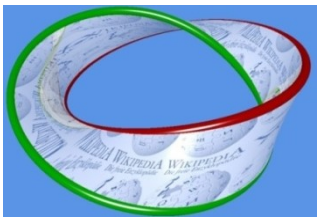
It should be remembered that in mathematics in general and in mathematical physics in particular, it has long been established that many problems that are considered difficult to solve or even unsolvable can actually be solved quite easily if one finds an equivalent description for them in another system. The same patterns and phenomena can be described using different tools. The same problem can be solved algebraically and geometrically.

Geometry is the basis of figurative and model representation, and Möbius Geometry of Clifford's parallels is the **thread of Ariadne** in matters of the World Order.

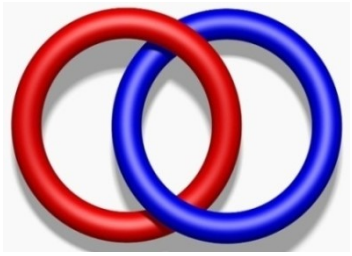
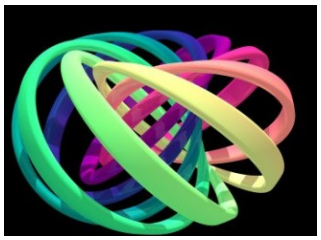
At their core, Clifford's closed parallels in the form of the Möbius Pattern are a geometric analogue of the fundamental Principle of Complementarity, which, as it is scientifically established, implies the existence of its equivalent in all planes of beingness at all levels: micro-, macro- and mega-. It is the Initial Fundamental Principle underlying the fundamental properties of matter at all levels, and its Möbius Geometry throughout the history of science unconditionally and with a certain periodicity appears in theoretical mental constructions.

In conclusion, as a visual summation, sequences of geometric transformations A and B are given below.

A. "HOPF LINK" and "HOPF FIBRATION".

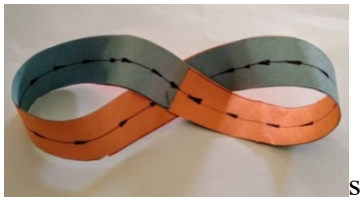




B. PHASES OF FIBRATION OF THE MOBIUS PATTERN.

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As it is clearly illustrated, the interlocked links in the fibration process are obtained precisely because of the presence of an inverse turn in the closed annular formation of Clifford`s parallels. Inversion mediates both gravitational coupling and quantum entanglement. Due to the presence of inversion, the resulting closed structures will have a **flexural curvature** in the lemniscate configuration.

The minimal complementary geometric structure of the Möbius Pattern, whose analogue in binary logic is the complementary relation "0" and "1", is the original substantial spatial unit in the form of a magnetoelectric oscillating vortex of the spatial fabric of the Quantum Medium, which, as a ***generator of reality***, can be taken as the basis for bringing the theoretical views towards a **common denominator**.

The apparent simplicity of this initial unit corresponds to the principle of Occam's razor and excludes the multiplication of entities. Entities in the form of so-called “particles”, mathematically modified using the apparatus of algebra, are phenomena of ethereal plasma and a kind of plasma portions emitted by the atomic structure, which have certain characteristics depending on the type of matter and the individual vibrational characteristics of the atoms that form the basis of this matter.

“Following research at large particle accelerators has now led us to understand that space is a medium that looks more like a piece of window glass than a perfect Newtonian void. The space is filled with "material" that normally looks transparent, but it can be made visible – if you hit harder and knock out part of it”. [35]

The complementary structure, which can be illustrated by the geometry of Clifford's parallels in **mathematics** or the magnetoelectric Möbius Pattern in the **physics** of spatial fabric, as well as it`s aquivalent – Yin-Yang symbol known from ancient times in **philosophy**, is the **ontological starting point** for both philosophical speculative reasoning, and for geometric and algebraic constructions connected with reality. All these aspects are reflections of one essence and description of the Universal element of the World Order as the substantive basis of Everything in different planes of beingness. Such a complementary structure is one and the same basic element that works as a universal "***generator of reality***" that generates everything: the fabric of space, particles of matter, fibers of the material time reference, and structures of consciousness based on them.

The connection of Möbius Geometry (MG) with the ontology of the Fundamental Principle of Complementarity (FPC) and the application of MG to intractable issues of theoretical physics is the missing **ontological link** for a common platform in the creation of the Unified Theory of Everything, the inclusion of which can bring the fulfillment of the cherished "bright dream of the coming Theory of Everything" based on the geometrization of physics.

It is especially worth emphasizing that in the language of Clifford algebras, the system of four Maxwell equations acquires a particularly compact and natural notation in the form of just one short formula. This fact brings physicists back to their cherished dream – to express the entire world order "in the form of an inch-long formula", as A. Einstein pointed out in his time, and to build a Unified Theory of Everything.

Returning to the legacy of W. Clifford and the analysis of the insights of W. Pauli and P. Dirac, the insight of the thoughts of W. Heisenberg, H. Weyl and Schrödinger, as well as their predecessors and followers, it should be especially emphasized that success in penetrating the secrets of nature depends on a harmonious and the synchronic development of the apparatus of algebra together with a geometric representation that sifts the fruits of formalism: everything must be expressed geometrically, and the geometric construction is described and proved with the help of algebraic calculations. To this it should be added that the moral aspect and the aspect of the level of development of consciousness are of decisive importance in revealing natural laws while delving into the secrets of nature constructions.

On the one hand, that bunch of scientific insights that began **in the thirties of the 20th century** and gave a strong surge to the development of the apparatus of algebra, could lead to a new paradigm of physics, however, **on the other hand**, at that period some discoveries had not yet come into life such as the structure and geometry of DNA and the fractal mathematics of B. Mandelbrot with its geometric visual illustrations of natural structures, the theory of the holographic structure of the world order was not yet proposed by D. Bohm and computer technologies did not come into life, with the help of which all these and subsequent achievements could be calculated and visualized.

And **the third** is that quantum aspect of the superposition of the development of morality, which **unites the above two sides** in the cognition of reality and is decisive for Nature itself to discover and entrust its Laws and Dimensions to Mankind and at the same time be sure that it gives them into reliable hands.

"Penetration into the innermost secrets of nature must be inextricably linked with moral progress. Having taken a step to a new level of knowledge, it is necessary to put the other foot on a new moral level. I wanted to prove with my painting that the problem of moral stability, moral purity permeates our entire existence, manifesting itself even in areas that at first glance are not related to morality, such as penetration into space, the study of the objective world, and so on".

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PS. In the process of preparing this article, I found several published sources on the Internet, in particular:

1. "Solving The Schrodinger Equation On A Mobius Strip" [36]
2. "A SPINNING PARTICLE IN A MOBIUS STRIP ¨ [37]

Both of these sources offer solutions to the questions, indicated in the title, based on the apparatus of algebra. Since the format of the Fractal Synthesis methodology, I propose, does not use algebraic calculations, these links are made by me for those who develop their scientific thought with the help of mathematical calculations.

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