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FROM CONSTRUCTAL THEORY UP TO FUNDAMENTAL PRINCIPLES OF HELICAL GEOMETRODYNAMICS

Cătălina IORDAN[*], Daniel-Georgel PREDA[**]

[*] CCR Logistics Systems RO SRL, Bucharest, Calea Dorobanți no. 53, sector 1, Romania
[**] MG Profesionall Sales SRL, Bucharest, Ticus no. 8A, sector 1, Romania
Corresponding author: Cătălina IORDAN, E-mail: catalina.iordan6@gmail.com

Abstract. In our transport systems, we can observe that the principle of a minimal volume, of the same mass, is a fundamental condition. It can be a car or a commercial ship, size does not matter, the geometric principle is the same in any transport rule. In nature, the geometry is in fact the information. We observe it, understand it and after, extracting the principle. The Kepler conjecture optimizes the spheres arrangement in a minimum volume, the tetrahedron. In a dynamic geometry we can observe several tetrahedrons flows. Much more, we have 2 distinct helical chirality of this chain of tetrahedrons that are flowing. Starting with the observation of nature, extended to entire observable world and, further, to the intuitive flow fields, the most observable common geometry of transport is the helical shape. It appears that everything tends to build up a lot of wormholes, helical flows. For short distances, the local transport has the same behaviour, a local helical motion. Even is a long or short distance, there is a mass transport in helical geometry. We found 4 fundamental rules of helical interactions, named "The Fundamental Code". It became the fundamental principle as a set of rules in nature design, from sub-atomic clusters to galactic clusters. Any theory of natural world, new or old, must to include this "helical key", the geometric shape of all natural self-optimized transports. For this reason was started the Unified Fields Theory – Helical Geometrodynamics, in a new time-space concept.

Key words: Unified fields, Constructal design, Quantum mechanics, General relativity, Helical interactions, Strings theory, Geometrodynamics, Gravity, Electromagnetism, Fluid mechanics.

1. INTRODUCTION

1.1. The principle of three interacting systems

Constructal law started by Adrian Bejan [1] in 1996 as a summary of all design generation and evolution phenomena in nature, bio and non-bio, covers the tendency of nature to generate designs to facilitate flow. The entire design observable in nature means self-organization and self-optimization. Starting from Constructal law and the easier access to the imposed currents that flow through a finite system, we came with our theory of the transport efficiency in the nature by self-assembly of the matter in interaction with the environment (Fig. 1).

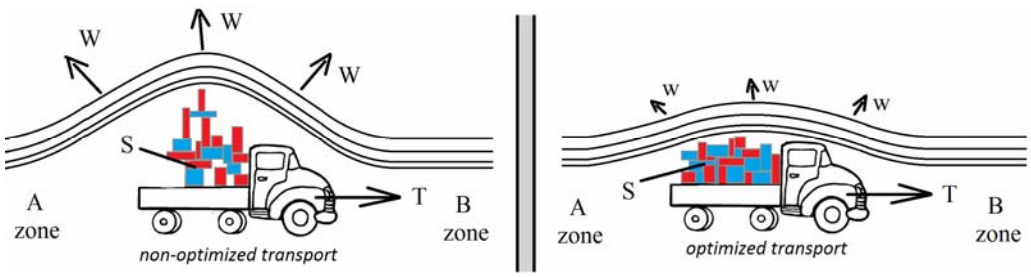

Fig. 1 – Geometric principle of a transport system, optimized and non-optimized (S – our system, matter transport zone, W, w – environmental system, wave zone, our system limits, T – traction system, outside energy).

As a general principle, for any optimal transport research, we have always three different subsystems interacting: luggage, vehicle and environment. The luggage is the matter, our system during its time evolution. The matter flows, from any "A" zone to any "B" zone. That means it is not a static geometry and it have a sense of flow. Any matter transport contains subsystems, forced to construct specific flow geometry, in accord with tractor and environmental systems. That means interactions.

We understood that the environmental interactions, as pressure or any sort of forces, put borders and limits to our self-assembled luggage. We assumed that the smallest particles of universe, our luggage, are like a fluid and tend to be spherical.

1.2. Chirality, the principle of positive or negative flow

The first close packing spheres was made in the 17th century by Johannes Kepler. Further, in 1994 Fejes Tóth mathematically proved that the hexagonal lattice is the densest of all possible bi-dimensional packing, as mentioned by Conway and Sloan. [2].

The Boerdijk-Coxeter helix [3], which is obtained as a linear packing of regular (or not) tetrahedron, could be the most efficient solution to some close-packing problems in matter transport. There are two chiral forms, with either clockwise or counterclockwise windings and they are not rotationally repetitive [3] (Fig. 2).

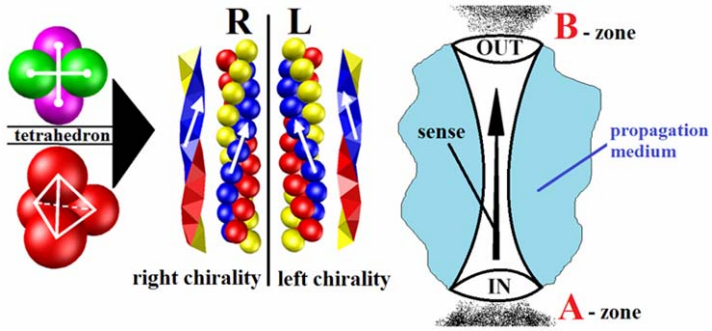

Fig. 2 – Kepler conjecture, in a dynamic packing arrangement, became a tetrahelix, a dynamic geometry with sense and chirality.

We made some predictions:

– Every transport line may be, in fact, a three-dimensional line, a tornado.
– Every line (tornado) has a sense and a chirality of transport.
– Every line may be surrounded by other lines, in opposite chirality, creating layers (any line may be our system, the luggage, and surrounded lines are environmental system).

Langmuir lines [4], Ekman layers [5], Maxwell vortex tubes [6] and many others use the same geometric transport rules. We can extract and predict the first geometric transport rule, an efficient chiral flow is surrounded by anti-chiral flows. The alternating chirality appears to be very important in matter transport, detectable or not detectable (theory). It was an interesting idea to correlate the natural chirality, left and right, with charged particles, positive or negative. We made a new and one of the most important prediction; in all natural world do not exists" charged systems", it exists only chiral systems of transport. Fluids are not charged systems; they are a turbulent "lines", parallel" lines" and "layers"! Planets, from our solar system, are not „charged" systems. They are our luggage in a self-assembled position, with spin motion, with chiral rotations to the galactic center. The solar system planets may be the witnesses of the flow to „B" zone from one of the chiral galactic arms.

2. "THE FUNDAMENTAL CODE"

2.1. Helical interaction rules between transport lines-"The Fundamental Code"

We predict, in nature, a set of fundamental interaction rules between any two neighboring helical flows. As a result of all interactions it is a geometric principle. Even if the flow is heat transport or fluid transport, magnetic or electric transport, gravitational transport or galactic flows, all nature obeys the first constructal rule, a geometric key (Fig. 3).

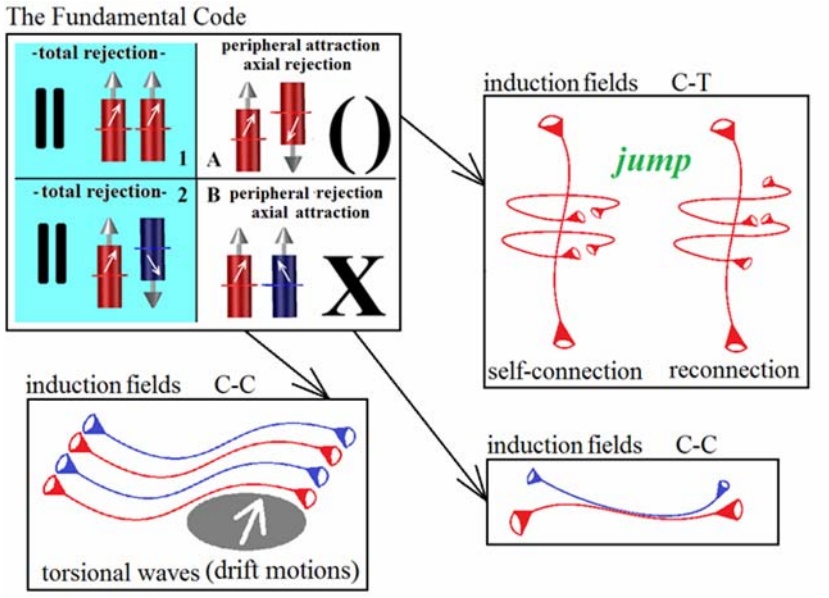

Fig. 3 – "The Fundamental Code", a set of interactions rules between any adjacent helical flows.

We found 4 fundamental rules of helical interactions, named "The Fundamental Code" (Fig. 3). In a general relativity, "The Fundamental Code" has four situations. Two of them are simple, named total rejection. When two adjacent tornadoes have same sense (parallel) and same chirality are repulsive, between their axes and ands. It is a simple and intuitive friction situation. The same for opposite directions (anti-parallel) land opposite chirality means total rejection (Fig. 3). Next case is the same chirality and opposite senses, that means peripheral attraction and axial rejection (A). The forth case is different chirality and same senses that means peripheral rejection and axial attraction (B).

For a better understanding „The Fundamental Code" included three different symbols: **II**, **( )** and **X**. The symbol "**II**" is used to exemplify total rejection. The symbol "**( )**" means axial rejection and peripheral attraction, anti-parallel tornadoes or one after another, in a chain shape, A-case (Fig. 3). The symbol "**X**" is used to exemplify axial attraction and peripheral rejection, B-case (Fig. 3). This is the foundation, the basic principle in any sort of matter transport. The fluidity of universe, as a detectable or not detectable matter transport, is essential for our understanding.

We observe, in natural flows, that a strong flow can induce other local flows, and can disturb the local transport. As wind induces helical motions in ocean water [4] we understood the motion inductive mechanism. Much more, we predicted that inductive mechanism is generalized.

We predicted two inductive principles, cylinder-cylinder (C–C) and cylinder-torus (C–T) (Fig. 3), not detailed in this paper. The principle "C–C" induces parallel flows in opposite chirality and the principle "C–T" induces perpendicular flows in same chirality.

The tornado transport in vertical directions, as helical shape, can move horizontally in the same time. This is a drift motion, the matter as wave. The "C–C" principle can form chains as layers of tornados. It means a geometric mechanism in wave propagation.

The two inductive principles and the local transport (waves as drift motions), for a better understanding need a new space-time concept and are not detailed here. Both of them use "The Fundamental Code". This code and "the two inductions principles" are, in fact, helical interactions rules between any transport lines, localized (waves) or not localized.

The geometry in dynamics, meaning the geometrodynamics [7] acting in the same way for each tractor system and for any medium, flowing from IN-A zone to B-OUT zone.

2.2. The three flow classes in Universe

A dimensional class of particles can have a natural flow rotation in left handed and right handed, this is the fermion class. These motions can be conjugated or not. Both of them are present in nature and play the

glue role, by example gluons. As intuitive example, plasma particles [8] have two natural flow rotations, charged particles in left handed and right handed helical geometrodynamics. The plasma system is neutral [8] but it is hold together by opposite chiralities.

The second dimensional class of particles can be present, in nature, only in a single chirality, by example electrons. There is not a conjugated chirality for it. This is the boson class.

Because humans can change chirality of some tornadoes it appear the third class of flow, these classes of tornadoes we named "predons", by example photons. Bosons, fermions and predons, the three classes, show us a specific behavior in interactions, specific helical geometrodynamics and specific geometries (Fig. 4).

In every flow we must to know what sort of chiralities are involved to predict flow geometry. On the other hand, if we see the geometry we can predict chiralities. In the first direction or the opposite direction we'll use "The Fundamental Code".

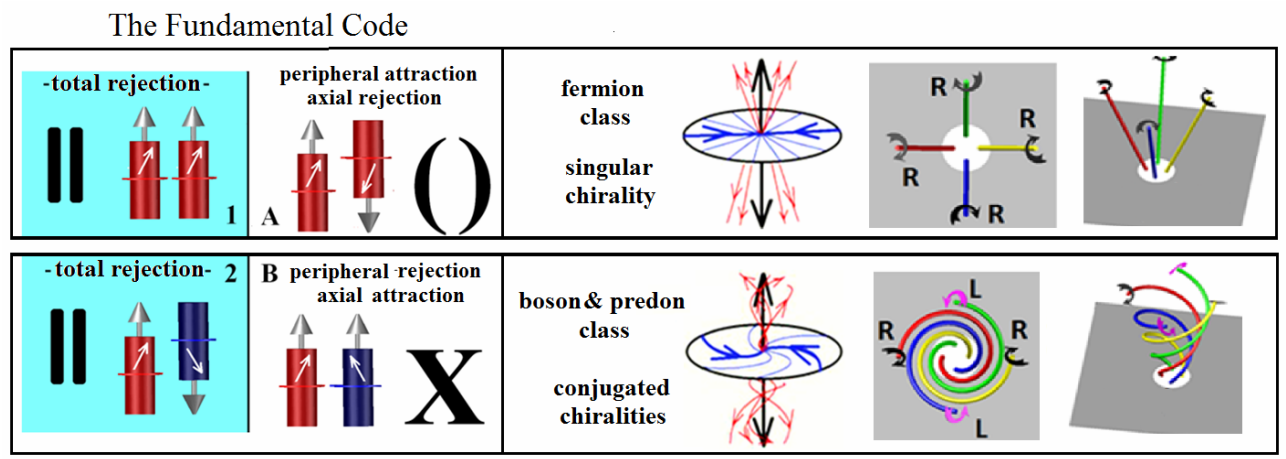

Fig. 4 – Boson, fermion and predons, three types of tornadoes in Universe.

Opposite rotations, bosons are conjugated wheel, can grow and form clusters but they can form chains too. They are friendly to each other, they can embrace one another. Non-conjugated wheel are axial repulsive, fermions cannot form clusters but they can form only long chains. They are not so friendly, one to each other. Bosons can build long and large tornadoes but fermions can build only long tornadoes. For this reason, in particle physics, "The Fundamental Code" can be the fundamental low of all interactions.

The sense and the chirality of helical interactions mean a set of constructal rules. Fundamental particles spin, in our vision, means chirality and (+ spin) or (– spin) means sense of tornadoes.

In fermion class situations there are only peripheral attractions. Here only the ends of tornadoes are in attraction. Along tornadoes axis there is only a repulsive friction force. "**( )**" symbol means axial rejection and peripheral attraction, in fermion class with opposite sense or one after another, chain shape, A-case (Fig. 4).

In boson or predon class, in parallel flows, appear axial attraction and peripheral repulsion. In this situation boson and predon class do not construct only chains using same chirality (parts of a torndo, one after another). They construct bundles of chains using alternating chiralities too, B-case (Fig. 4).

We predict that gravity is a quantum flow, in fermion class, flowing in anti-parallel lines of force, as repulsive tornadoes. The unification of general relativity and quantum mechanics, in our opinion, is possible only using "The Fundamental Code", a geometric set of rules for helical interactions.

„The Code" may explain, from now, all "unusual" natural patterns, in technics or nature. For example, a real fire tornado is a natural self-assembled thermal flow. In this situation arms, in opposite chirality, and central "cylinder" are in helical shape. The hurricane geometry uses the same helical interaction rules, "The Code".

In the nature, plants are living transport systems. Although all fibrils, micro fibrils and cellulose are well known as helical shapes [15, 16], nobody have an answer, why?

2.3. Polarized and not polarized flows in the unseen world

In physics, the fundamental interactions are named the fundamental forces. There are four, in our science: gravitational, electromagnetic and strong nuclear, weak nuclear, described mathematically as fields.

We predict that there are many but totally unknown. The nature of tornadoes, involved in interactions, makes the difference. Magnetic fields, gravitational fields (and so on) are, in fact, flow of helical fields.

We predict that the magnetons flows, in fermion class, are parallel and polarized flows as we predict that the gravitons flows, in fermion class, are not parallel and not polarized flows. Both of them has axial rejections, and can be understand using" the code" (Fig. 5). It means that the gravity may be an anti-parallel transport of fundamental particles, as gravitons.

Even if the flows are polarized or not, in fermion class all force lines are repulsive parallel lines. Both situations are in accord with "The Fundamental Code".

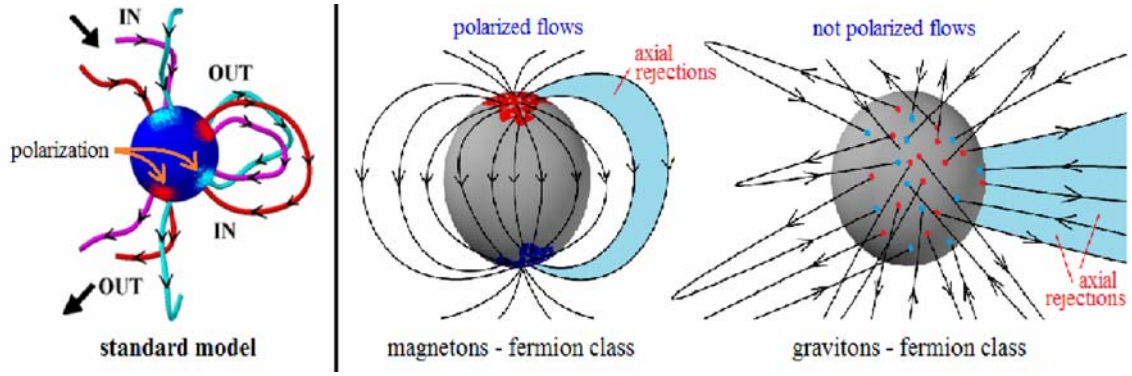

Fig. 5 – Geometric flows in the helical geometrodynamics standard model, polarized and not polarized flows.

In fact to couple (fusion) two tornadoes, or to break (fission) a tornado, are energetic processes. It is a self-assembly transport process too. The geometric transport, our system, can lose some luggage (emission) or can accept other external luggage (absorption). Any of it self-optimizes the transport process, as a result of interactions. Axial attractions, as an entanglement situation of many arms, may explain an unseen world too.

3. RESULTS

Using helical geometrodynamics principles, an unified theory is in progress. This theory is one of the helical field interactions. The most important thing is that this theory will change our perspective, understanding similar geometric phenomena of nature through a unique key (Fig. 6), that efficiency in transport. This is ensured by using a specific flow geometries through perpetual self-assembly in helical flow.

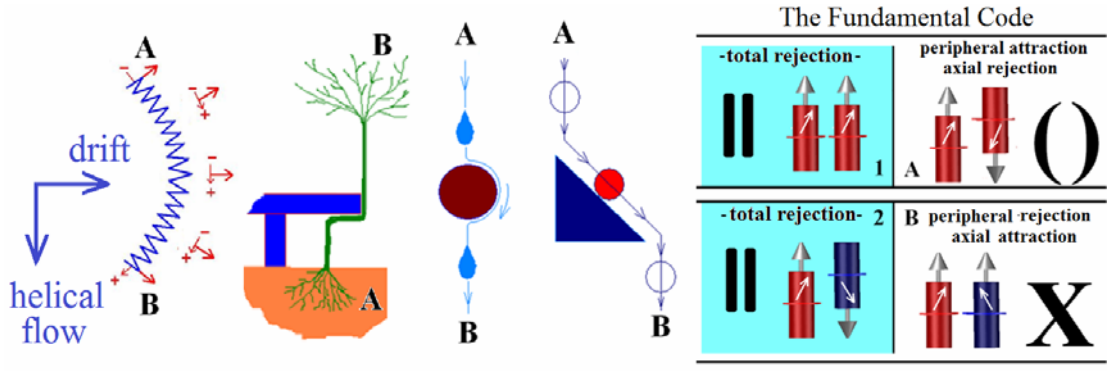

Fig. 6 – Changing perspective Helical flow fields and the Fundamental Code.

Helical Geometrodynamics, as the Unified Fields Theory, describe the fundamental principles of helical flow fields. There are localized or not localized flows. The theory is based on "The Fundamental Code" and the two inductive principles.

Here is only the basic principle, a set of rules that bind Constructal Theory with Helical Geometrodynamics.

4. CONCLUSIONS

All transports mean patterns, means the most efficient geometry in transport. We try to understand principled patterns of natural transport, most common, in many branches of science. As a scientific method, we made many qualitative observations. We supposed that a general and constructal principle must exist and it must refer to this perpetual transport. So we followed a helical geometry key, we searched if helical transport is the most efficient transport and especially why. For this reason, compared to our commercial transport, we brought forth basic principles, fundamental ones.

The interactions of these helical systems of transport, as tornado shape, seem to obey strict rules, which can be identified in the natural environment, at any scale. Furthermore, this interaction strict set of rules, called "The Fundamental Code", can be extrapolated to the undetectable universes, to the minimum or maximum ones.

From now, the laws of the Universe [9] can be explained using "The Fundamental Code". There is a geometric key in any natural fiber for every plant [15, 16]. Hair grow [17, 18], skin grow [19] or any life form growth using the same geometric key, a helical one. The twistor theory [10], quantum gravity [11], string theory [12, 13] or any theory about an intelligent design of Universe are clarified and substantiated by "The Code". More of those issues were presented at the 10th Constructal Law & Second Law Conference (CLC2017), hosted by the Romanian Academy on the 15 and 16 May 2017.

For further research any scientific field can use the helical geometrodynamics to explain the fundamental design of everything. The Universe is hiding indeed the geometric key in a Nutshell [14].

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