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THE TECHNOLOGY FOR EXISTENCE OF THE UNIVERSE, TIME, PLATONIC, ARCHIMEDEAN AND SHIKHIRIN SOLIDS BASED ON STRUCTURIZATION ENERGY AND INFOMATION

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"This paper was written "at one go", therefore it may contain minor non-critical errors, easily correctable and described with respective comments in future deliverables of the author".

The Universe has never been conceived, born and perfected or given an evolutionary impetus by anyone.
The Universe has always been and will ever be; it is perfect and not subject to development (evolution), moreover, to death.
There are no indivisible things and quantities in Nature as well as approximations.
Only Arithmetic, Geometry and Topology "work" in it.
The Author

Introduction

For the online contents of this paper please refer to video and animation [1] at **http://youtube.com/user/elastoneering**

Such terms and notions as *formation, perfection and evolution* of the Universe are unacceptable and have been replaced with the term *existence* of the Universe, since *formation, perfection and evolution* mean the process of conception, birth and development of something implying an inevitable end.

The above cannot be attributed to the Universe, since it has never been conceived, given birth to and perfected by anyone.

The Universe and Time have always been and will be for ever; they are perfect and not subject to development, moreover, to death.

It has nothing to do with Man's ambitions, demands or claims.

They (the Universe and Time) would not know him and never would.

Hierarchically, Time is superior to the Universe.

The Universe cannot exist without Time.

1. Time

The Universe has never been created; it existed for infinite time in the past (T_{Past}) and will exist for infinite time in the future (T_{Future}).

Transition from the past time to the future is accomplished through the current time moment ($T_{Right\ Now}$) (Fig. 1), namely:

$$T_{Past} = T_{Future} \text{ or } -\infty = +\infty,$$

$$T_{Past} + T_{Future} = T\infty \text{ or } (-\infty + +\infty) = \infty,$$

$$T_{Past} - T_{Future} = (-\infty - +\infty) = 0 \text{ or } T_{Right\ Now},$$

$$T_{Past}/T_{Future} = 1\ (T_{Right\ Now}) \text{ or } (-\infty/+\infty) = 1,$$

$$T_{Future}/T_{Past} = 1\ (T_{Right\ Now}) \text{ or } (+\infty/-\infty) = 1$$

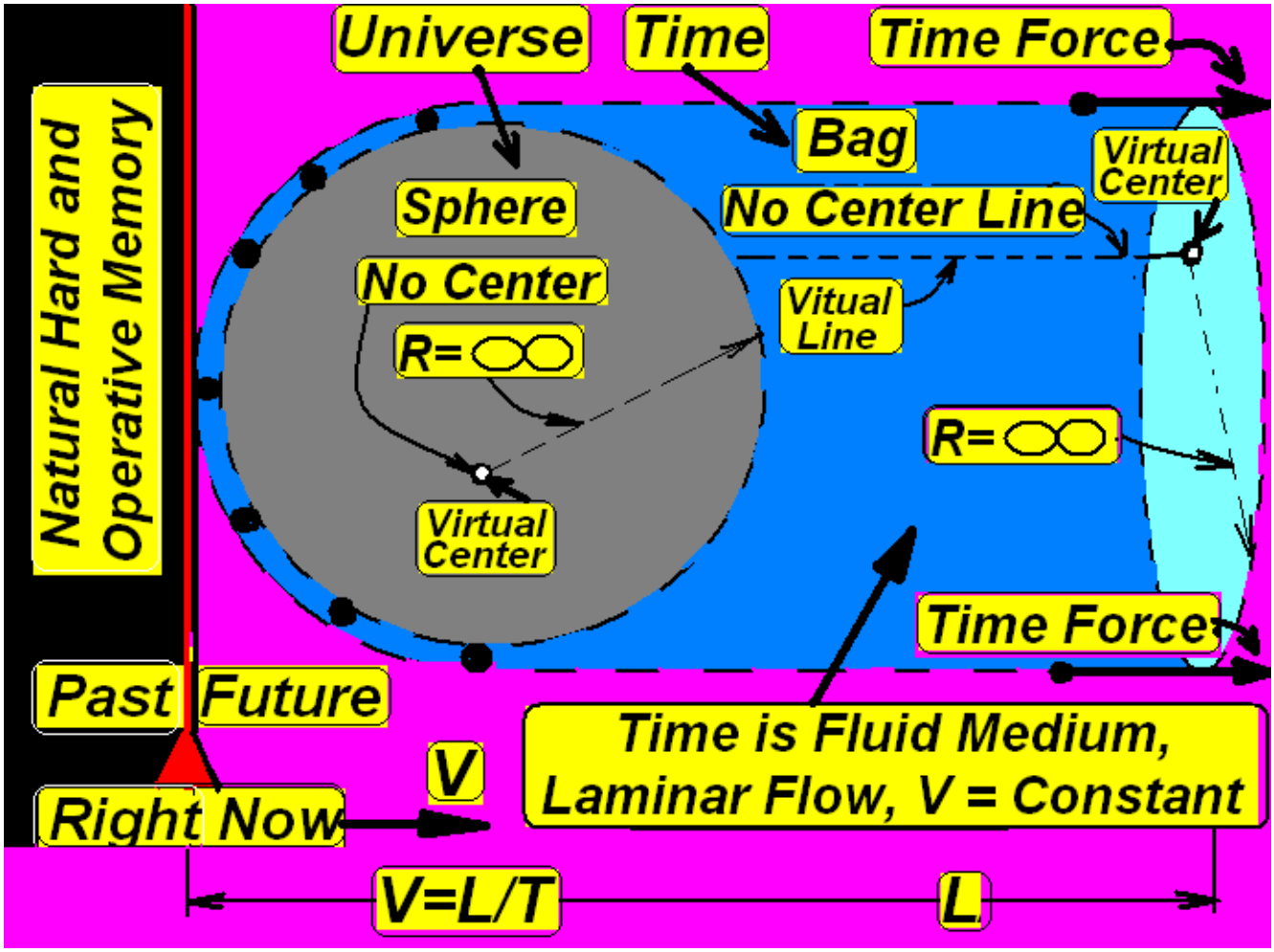


Fig. 1, The structure of the Universe in Time.

Specific features of Time:

- The Shikhirin-Universe space is confined in the Shikhirin-Time space. Hierarchically, Time has the top position.
- Time is a fluid medium encased in a *Time Bag*, or a hose closed at one end.
- The Time Bag has the following dimensions:
  - infinite length (L) – the Future,
  - infinite radius (R) of its cross-section,
  - volume (V), $V = Pi \cdot R^2 \cdot L$;
  - surface area (S), $S = 2Pi \cdot R \cdot L$;

- form complexity = $Pi \cdot R^2 \cdot L / 2Pi \cdot R \cdot L = 0{,}5R$.

- the Time Bag with the Universe inside is pulled into the Future by the Time Force $\boldsymbol{F_{TimeForce}}$ which is the main and the most powerful free energy in Nature;
- the Time Force pulls the Time Bag with a constant speed of the Time flow $\boldsymbol{(V_{Time})}$, equal to any distance covered by Time divided by the time to cover this distance;

$$\boldsymbol{V_{Time} = L/T} \text{ or } \boldsymbol{(\infty/\infty) = 1;}$$

- the bottom of the Time Bag is occupied by the Universe having a mass $\boldsymbol{M_{Universe}}$ (a sphere with an infinite radius); the Universe is rigidly connected with the Time Bag;
- the energy $\boldsymbol{E_{Universe}}$, contained in the Universe, is equal to:

$$\boldsymbol{E_{Universe} = M_{Universe} V^2_{Time};}$$

- **the current moment of time ($\boldsymbol{T_{Right\ Now}}$)** is the bottom of the Time Bag (with the Universe inside);
- $\boldsymbol{T_{Right\ Now}}$ is equal to the minimum or lesser value but > 0;
- hard operating Natural Memory of all events that occurred in the Universe in the past (the Universe Memory) accumulates and stores preceding events after the Universe has passed a **current time moment ($\boldsymbol{T_{Right\ Now}}$),** etc.

2. The Universe as the Shikhirin Space

The Universe (Cosmic Space, Nature), or the ***Shikhirin Space***, is the principal and the only natural form. As a matter of fact, it cannot be even called a "form', it is rather a "**superform**" having the following functional features (Fig. 2):

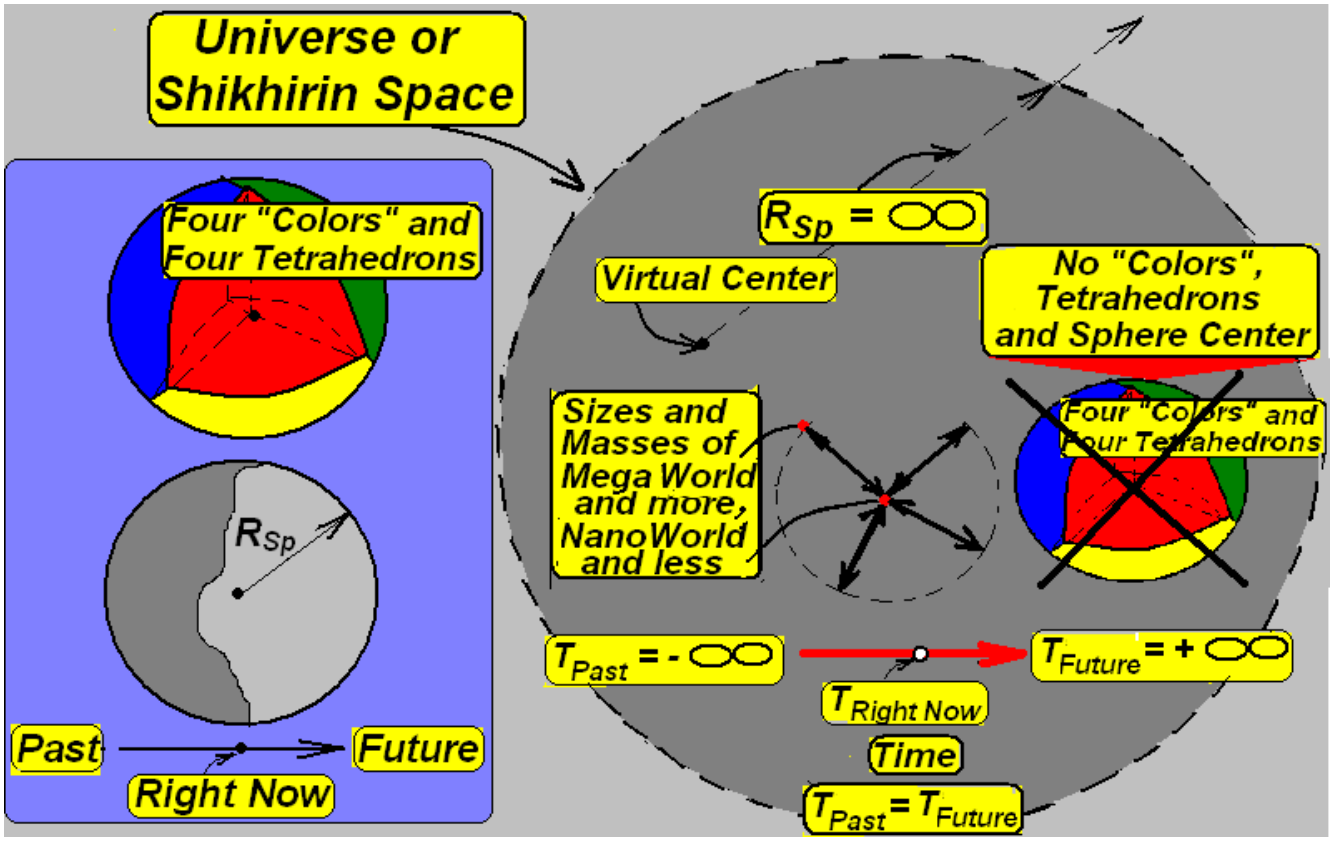


Fig. 2. The Universe, or the Shikhirin Space

- It includes all matter, energy and information.

The quantities of matter (M), information (I), and energy (E) were in -∞ (the ***Past***) and, "renovated", will exist in +∞ (the ***Future***), i.e.:

$$(M,I,E)_{Past} = -\infty,$$

$$(M,I,E)_{Future} = +\infty,$$

$$(M,I,E)_{Past} = (M,I,E)_{Future}, \text{ or } -\infty = +\infty,$$

$$(M,I,E)_{Past} - (M,I,E)_{Future} = (M,I,E)_{Right\ Now} \text{ or } (-\infty - +\infty) = 0,$$

$$(M,I,E)_{Past}/(M,I,E)_{Future} = 1\ (M,I,E)_{Right\ Now} \text{ or } (-\infty/+\infty) = 1,$$

$$(M,I,E)_{Future}/(M,I,E)_{Past} = 1\ (M,I,E)_{Right\ Now} \text{ or } (+\infty/-\infty) = 1$$

- The Universe is a centerless (with a virtual center) sphere with an infinite radius in any point of the Universe.

- The Universe is a spherical and polyhedral Foam[4], i.e. a tight (dense) packing of spheres and convex polyhedra the bases of which are Platonic, Archimedean solids and their versions (Fig. 3).
- Every polyhedron is a thin/soft/elastic spheroidal shell (Shell - Phase 2) containing a fluid medium under overpressure (Pressure Fluid Medium – Phase 3). The space between the polyhedra is composed of Aether (Plato-Shikhirin Skeleton – Phase 1) which contains all stellar matter [1].
- The actual center of the Universe does not exist. The number of virtual Universe centers is infinite.

  It means that it is not the 4-dimensionsional (4D) Fuller Space in which the coordinate system is formed by 4 axes located at an angle ~109^0 30′ respective each other.

  In our case, 4 "colors-bodies", or the bases of 4 tetrahedra that make up a finite radius sphere, are absent, and so are 4 axes and the sphere-making tetrahedra themselves.

  We are omitting here the artificial 3-dimensional space that "exists" in all textbooks and is used in science and engineering since it is not actually a 3-dimensional space but rather an artificial 8-dimensional space that does not explain additional three quadrants of this space which do not exist in Nature.

  The 3-dimensianal space is the surface. Who "invented" it and deceived Mankind?

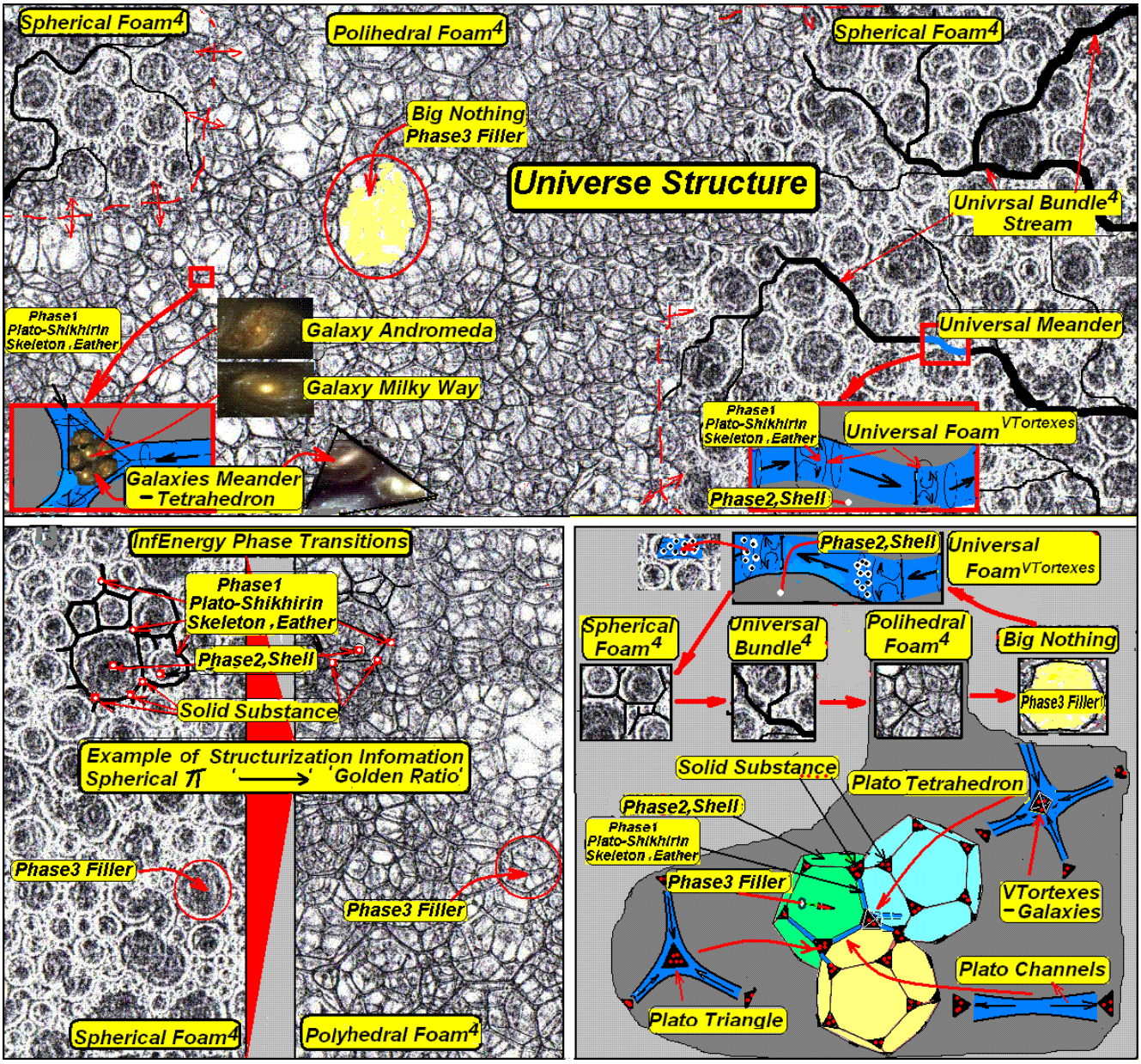


Fig. 3 Universe Structure

- The coordinate system of the Shikhirin Space has an infinite number of positions or degrees of freedom.
- It means that the Universe is infinite-dimensional space, or n-dimensional space, where n= ∞, has an infinite number of positions or degrees of freedom.

- The Universe elements (composed of Shikhirin Cells[1,2,3,4,5,6,7]) can have only 4D (a sphere) and 7D (a torus) forms.

  Such forms as 1D (a point), 2D (line), 3D (surface) and 6D (Moebius band, Klein bottle, projective plane) forms do not have a volume.

  If they acquire a volume we will have 4D forms.

  It is possible that 6D forms exist in Nature as:

  - **transitional short-lived forms in topological transition from a sphere to a torus;**
  - **new torus knots with a number of turns (n+ 180^0), etc.**

  Elements (Shikhirin Cells[4,7]) may exist nested in one another. For instance, the intersection of 4 dodecahedra (4D) is a tetrahedron (4D) inside which VTortex galaxies (7D) are clustered in Nature.

  Every planet or a star (4D), e.g. Earth, includes an atmosphere (7D), tornadoes (7D), vegetable and animal worlds (7D, 4D), atoms (7D), etc.
- Matter has four phase states: gas, liquid, amorphous, solid converting to each other with **unchangeable topological characteristics**;
- The Universe includes all matter and all its elements from the nano-and-less world to the mega-and-greater world;
- All matter and its elements are controlled and totally supported by the structurization energy and information driven by Number Pi and the Golden Ratio that swap over in development of round forms (a sphere, a torus, a Moebius band) and faceted forms (all polyhedra), respectively.

Natural kinds of the structurization energy and information include electrical, magnetic, *pressure*, thermal, torsion, color, audio, *odor*, intelligent (smart) energy-information fields that may exist in liquid, gaseous, amorphous and solid states.

"Whatever word you say in the frost remains frost-bound till the thaw sets in.
In the thaw the word melts, and one can hear what was once said and by who".

A fairy tale "Frosted Songs" by Stepan Pisakhov (1879-1960), a Russian fairy tale writer

- The Universe is a close-packed arrangement (dense packing) of "nested dolls" immersed into the Aether fluid medium. The interconnection between "dolls" is accomplished by "drilling" holes in every doll, the doll sizes ranging within 0 < Min → Max to +∞, i.e from the nano-and-less world to the mega-and-greater world [2];
- Matter has a finite number of regular type forms of its existence:
    1. **Drop/Bubble,**
    2. **Foam[4],**
    3. **Bundle[4],**
    4. **VTortex,**
    5. **Foam^{VTortex},**
    6. **Coutte-Shikhirin Flows;**
- Sizes ***(S),*** volumes ***(V)***, masses ***(M)*** of matter elements of the mega-and-greater worlds (***Max*** explosive process) and nano-and-less worlds (***Min*** implosive process) are in the +∞ area (Fig. 4), i.e.:

$$(S, V, M)_{Max} + (S, V, M)_{Min} = (S,V ,M) \text{ or } = 0 < \text{Min} \rightarrow \text{Max до} + \infty,$$

$$(S, V, M)_{Max} - (S, V, M)_{Min} = (S, V, M)_{Right\ Now} \text{ or } (-\infty - +\infty) = «0»,$$

$$(S, V, M)_{Max} / (S, V, M)_{Min} = 1 \text{ or } (-\infty/+\infty) = 1,$$

$$(S, V, M_{Min}) / (S, V, M)_{Max} = 1 \text{ or } (-\infty/+\infty) = 1,$$

where ("0") is a zero point that can be located at any place $(S, V, M)_{Right\ Now}$ on the "infinities" axis at a current moment $(T_{Right\ Now})$.

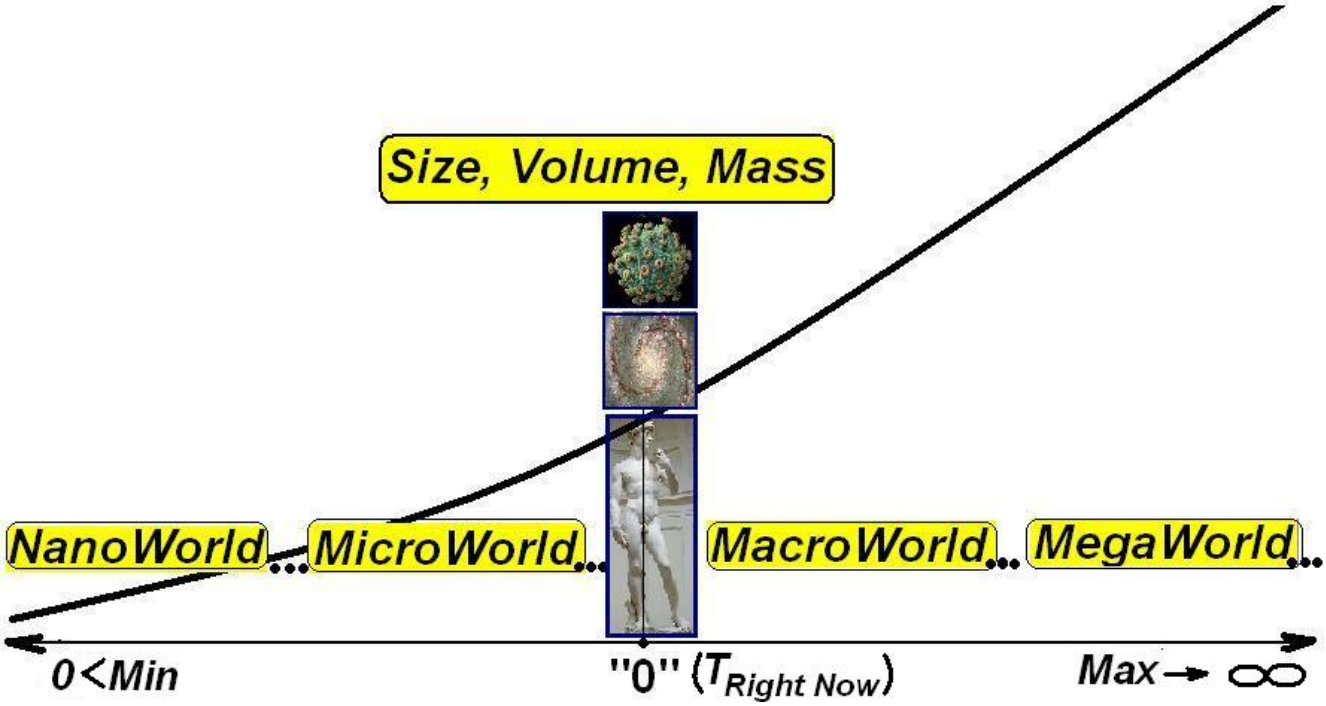


Fig. 4. Sizes, volumes and masses of elements are arbitrary. The zero count point in the $0 < \text{Min} \rightarrow \text{Max}$ to $+\infty$ sequence may be, e.g., the size, volume and mass of an atom, microbe, a human being, a galaxy at a current moment ($T_{Right\ Now}$).

3. Platonic and Archimedean Solids

Platonic solids discovered by Plato (427 – 347 BC) and Archimedean solids discovered by Archimedes (287 — 212 BC) "have lived up to" our time, and their characteristic properties **have remained practically unchanged**, leaving aside creation of heaps of populist books, papers, formulas as derivatives of Plato's and Archimedes's studies, and pictures accompanying these "innovations".

One of the main specific features (maybe, even, the only one) of Platonic solids, including the sphere, is their ability to be inscribed into or circumscribed by one another according to definite laws.

This implies the existence of a Natural structured system observed in Nature and described by Plato (Plato's Cosmology).

There is also its pretty well developed version, e.g. in http://whistleralley.com/polyhedra/platonic.htm.

It should be noted that 13 (14) Archimedean solids, being semi-regular polyhedra, see http://www.sadiethepilot.com/iqweb/diagrams/archimed.gif, are modified versions of five (5) Platonic solids, or regular polyhedra, obtained by their artificial truncation as if built artificially.

What unites them is that all Platonic/Archimedean solids are "structural" spheres and if inflated, they would become spheres, with **the spherical *Pi* being their structuring agent. The structuring agent of the torus and torus knots is the toric, knot and *spherical Pi*** [4].

It is exactly the case in Nature, namely: spherical Foam^4 (densely packed spheres), when effected by suction environment, is transformed into polyhedral Foam^4 (Fig. 4) in which a dense packing of polyhedra is formed representing the whole variety of Platonic, Archimedean solids and their derivatives constantly changing their locations, quantities, dimensions, etc.

The Golden Ratio (Psi) is the structuring agent of polyhedra. In other words, in foam arrangements like nano-and-less and mega-and-greater worlds a tight (dense) packing of regular and irregular polyhedra or "**dodecahedron versions**" exists in which hexagons, pentagons and tetragons serve as prevailing and basic faces.

For instance, polyhedra **(A{B})**, where A is the number of faces, B is the number of angles in a polygon ("B-angle") include the following:

- dodecahedron - 12{5}= (4 "colors"●3),
- icosahedron - 20{3}= (4 "colors"●5),
- cube - 6{4}= 4 "colors"●1.5. If a cube is converted to 12{3} by dividing square faces into two halves, then the cube 12{3}= (4 "colors●3)

- beta-tetrakaidecahedron - 4{6} + 8{5} + 2{4}, (4 “colors”● 3.5). If a b-tetrakaidecahedron is converted to 4{6} + 8{5} + 4{3}, then the b-tetrakaidecahedron 4{6} + 8{5} + 4{3} = (4 “colors”●4),
- truncated icosahedron - 20{6} + 12{5}, (4 “colors”●8), etc.

Why are we speaking about “dodecahedron versions”? The author believes that in the natural system of Platonic and Archimedean solids it is the dodecahedron that is a perfect form in terms of the form stability, energy consumption, complexity ($\sim 0{,}372R_{Sphere}$) [5], etc.

The form complexity (1R) is the ratio of the volume of a body to its surface area. Moreover, if Platonic solids are positioned according to the form complexity criteria (Fig. 6), a real picture of the hierarchy of these bodies is obtained, compared to the sphere as an ideal Platonic solid and the torus as the superior natural form in Nature. The torus ($0{,}5R_{Torus}$) is the supreme form according to the form complexity criterium (Volume/Surface Area).

Even the sphere is only the third ($\sim 0{,}333\ldots R_{Sphere}$) according to this criterium!

R_{Sphere} and R_{Torus} are the radii of spheres circumscribing polyhedra.

One of the principal structurization laws of natural Platonic, Archimedean and Shikhirin solids is that Pi_{Torus}, $Pi_{TorusKnot}$, Pi_{Sphere} and Psi cannot co-exist because **Pi “is responsible” for the “roundness” of a form (sphere, torus, Moebius band, Klein bottle, projective plane), while the golden ratio Psi “is responsible’ for the faceted shape of forms including all**

polyhedra.

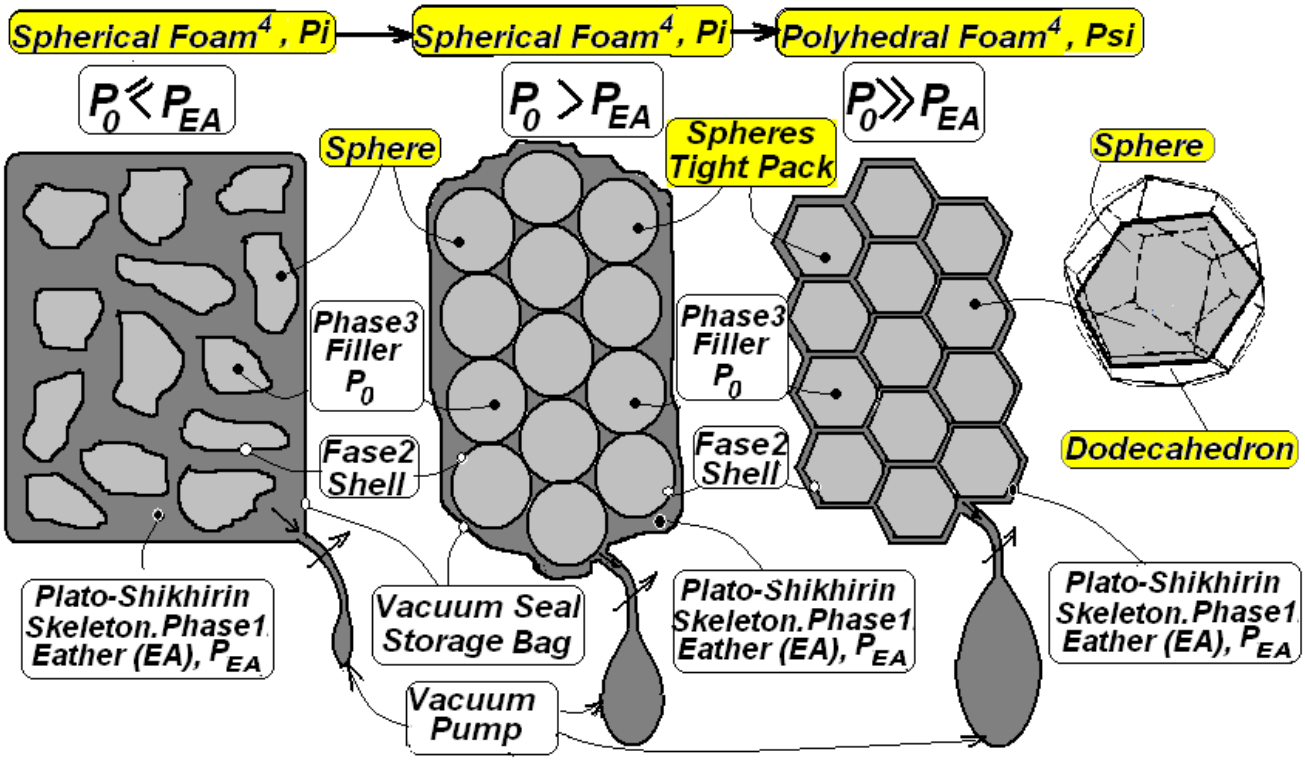


Fig. 5. Structurization processes of foam formation in the nano-and-less and mega-and-greater worlds occurring in Nature.

The figure shows a process of ideal transformation of a dense packing of spherical Foam^4 into polyhedral Foam^4 made of ideal transparent balls-condoms of various sizes (medium, large, extra-large, etc.) modeled by the author.

For easier perception, Fig. 5 shows the conversion of a dense packing of spherical Foam^4 to a dense packing of dodecahedrons-structural spheres[5].

A vacuum pump participates in the experiment as the external natural suction medium.

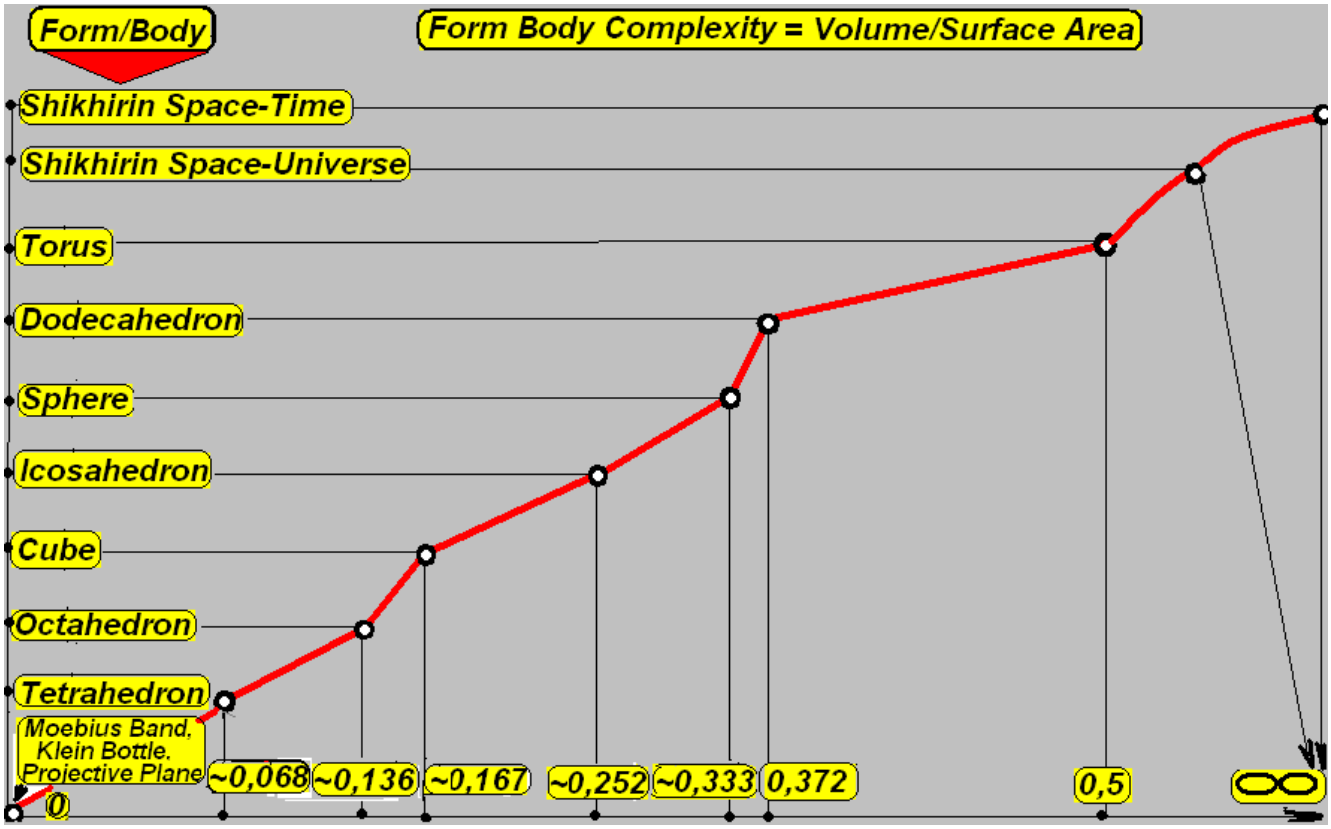


Fig. 6. Distribution of Platonic solids including a sphere, a torus, a Moebius band, the Shikhirin Space-the Universe and the Shikhirin Space-Time according to the Form Complexity criterion.

To obtain a real picture of "invisible" natural structurization processes, i.e. to visualize the structures of polyhedral Foam[4], VTortex, Foam^{VTortex} и and Coutte-Shikhirin flows, a method of targeted fluid medium "coloring" by special additives may be used for:

- visualization of their 3-phase state (the shell, the overpressure fluid medium and the aether as the carcass/skeleton) in:
    i. *gas fluid medium filling the balls (Fig. 4) under overpressure* with subsequent "inflation" of the balls caused by creation of vacuum in the external environment;
    ii. *fluid medium (the Aether) filling the space between the balls*.

- visual exposure of force field structures, e.g. the structures of the pressure field, the electrical, magnetic, torsion fields, etc.

The same processes can be observed in any fluid medium, e.g. in water.

4. "Color-Based"/Shikhirin Structuring of Platonic and Other Solids

Any sphere and "structured" spheres, i.e. all convex regular and irregular polyhedra consist of 4 tetrahedra whose bases are 4 "colors".

Each of the 4 "colors" in a structured sphere may consist of triangles (there are four spherical triangles on the sphere) that form tetragons, pentagons, etc. Such figures are the polyhedra bases representing one "color".

That is, another design feature of Platonic and Archimedean solids as structured spheres, along with their mutual capability of being inscribed into and circumscribing each other, is that they follow the law of 4 colors which law is a natural structurer ensuring their form stability.

Other polyhedra, e.g. star-shaped and non-convex [6], are structured degenerated spheres and, if inflated, or if a suction medium is created outside these polyhedra, they may fail to transform into spheres, hence may not follow the law of 4 colors.

The natural structure of *individual solid and liquid polyhedra* of mega-and-greater to nano-and-less worlds is observable in stars, planets, crystals, viruses, snowflakes, bubbles and alike.

The existence of the four colors is visually proved by a well-known experiment of Nikola Tesla - the glass Plasma (Light, Magic) Ball (Fig. 7). This is a purely visual effect that led to creation of the Tesla Ball game industry or optical laboratory devices for electrical charge demonstration, see, for example, http://www.teslaboys.com.

Lightnings formed by the charger in the center of the glass ball/sphere filled with a special gas seem to close “chaotically” onto the sphere surface. But it only looks like chaos.

Pulling together the 4 colors as the bases of four tetrahedra, hence shrinking the tetrahedra themselves into a point was used by Nikola Tesla for electrical energy concentration and transfer to a distance without conductors.

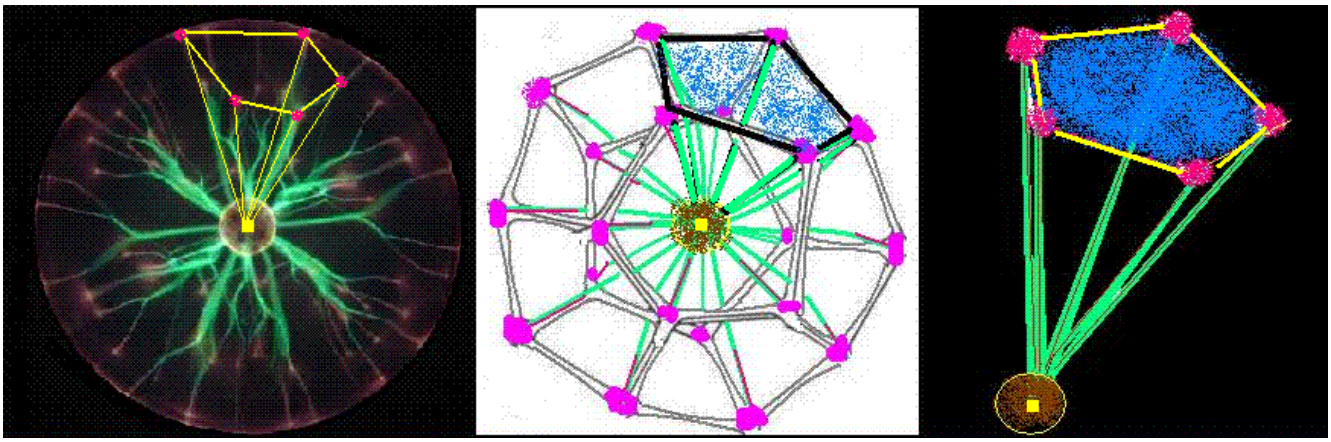


Fig. 7. The structure of the “Plasma Ball” sphere by an example of Platonic/Archimedean solids (dodecahedron modifications) and Shikhirin parachute bodies (right).

Therefore, the author made and attempt to explain this phenomenon as the “visible” process of structurization in Nature.

There is actually no information on the structure of Platonic, Archimedean and other solids (not Shikhirin solids) and their structurization principles; the only prompt is their primitive formation by means of children’s cube toys, Rubik’s Cube, in architecture and construction, etc.

The author “discovered” these solids anew while studying the energy and information structurization processes.

The author came to the conclusion that the prevailing principle of structurization of Platonic, Archimedean solids, their options and all convex polyhedra is the "**color**" principle, namely:

- all of them have 4 "colors" on the surface;
- the "colors' are the bases of pyramids whose vertices abut against the geometrical center of the body;
- all bodies are four-dimensional structures (Fuller space) but not like the Universe space which is a sphere with an infinite radius (R_∞ - Shikhirin Space) and does not have the four "colors";
- all of them are "beaded" on 4 axes located at an angle of ~109^0 30' respective each other;
- Platonic (except the tetrahedron), Archimedean and other convex polyhedra have a single **color** coordinate system in the 4D Fuller space;
- the number of axes corresponds to the number of "colors", i.e. each of the 4 axes ensures formation one "color":
- the four color axes run:
    - from the center via the vertices in the Tetrahedron2 (see the Table below), the cube and the dodecahedron;
    - from the center through the middles of the face in the Tetrahedron, the octahedron and the icosahedron.
- number of faces in a polyhedron is always a multiple of 4 "colors" including half faces as in the cube;
- Euler's formula (E-K+F=2) remains valid;
- "colors" are formed or concentrated on any polyhedron only in one place, etc.

It should be noted that the cube and the square from the point of view of cubic or square form stability are not stable under external and/or internal load, and as such, probably,

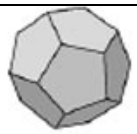
not found in Nature, except for structures constructed by “silly man”. It is a virtual natural form.

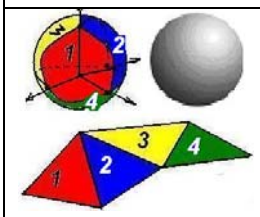
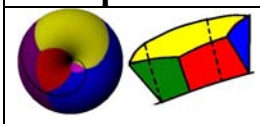
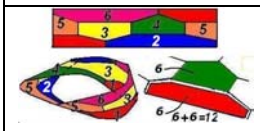
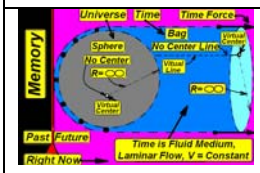
In the author’s opinion, to increase the cube form stability, its faces should be divided into halves, in which case it will consist of 12 pyramids with right-angled triangle bases rather than 6 pyramids with square bases (Table 1, Figs. 8, 9).

In this case, the law of 4 “colors” as the natural structuring agent responsible for the square and cube stability is observed. The same is true for “dodecahedron versions” (Archimedean solids) where part of faces are squares.

Table 1

Color Design Features of Platonic solids, the sphere, the torus and Shikhirin Space (the Universe)

Polyhedron, Color Platonic Solids	Faces (F)	Vertices (E)	Edges (K)	F/4”Colors” = Polygons	Volume/ Surface Area	Form Complexity R
 **Tetrahedron1**	4	4	6	4 Triangles	0,12/1,73	**0,068R_{Sp}**
 **Tetrahedron2**	4	4	6	6X4=24 Triangles	0,12/1,73	**0,068R_{Sp}**
 **Cube**	6	8	12	6X2=12 Triangles	1/6,00	**~0,167R_{Sp}**
 **Octahedron**	8	6	12	8X3=24 Triangles	0,47/3,46	**~0,136R_{Sp}**
	12	20	30	12 Pentagons	7,66/20,64	**~0,371R_{Sp}**

Dodecahedron						
 **Icosahedron**	20	12	30	20X6=120 Triangles	2,18/8,66	**~252R_{Sp}**
 **Sphere**	4	4	6	4 Sphere Triangles 1	$\frac{4/3PiR_{Sp}^3}{4PiR_{Sp}^2}$	**~0,333R_{Sp}**
 **Torus (Closed)**	7	14	21	7Torus Hexagons, Honeycombs	$\frac{2PiR_T^3}{4PiR_{Sp}R_T}$ *E-K+F= 14-21+7=0*	**0,5R_T**
 **Moebius band, Klein bottle, Projective Plane**	6	9	15	**F/6"Colors" = Polygons, 1**	3-Pentagons + 3-Polygons *E-K+F= 9-15+6=-0*	S = 2ab V=0 V/S=0/2ab= 0 **0**
 **Shikhirin Space-Universe**	–	–	–	–	***0***	$V=4/3PiR_{\infty}^3$ $S=4PiR_{\infty}^2$ V/S=0,333 R **$R_{\infty Sp}$**
 **Shikhirin Space-Time**	–	–	–	–	***0***	$V = Pi \cdot R^2 \cdot L$; $S = 2Pi \cdot R \cdot L$; $PiR^2L/2PiR$ $L = 0,5R$ **$R_{\infty Sp}$**

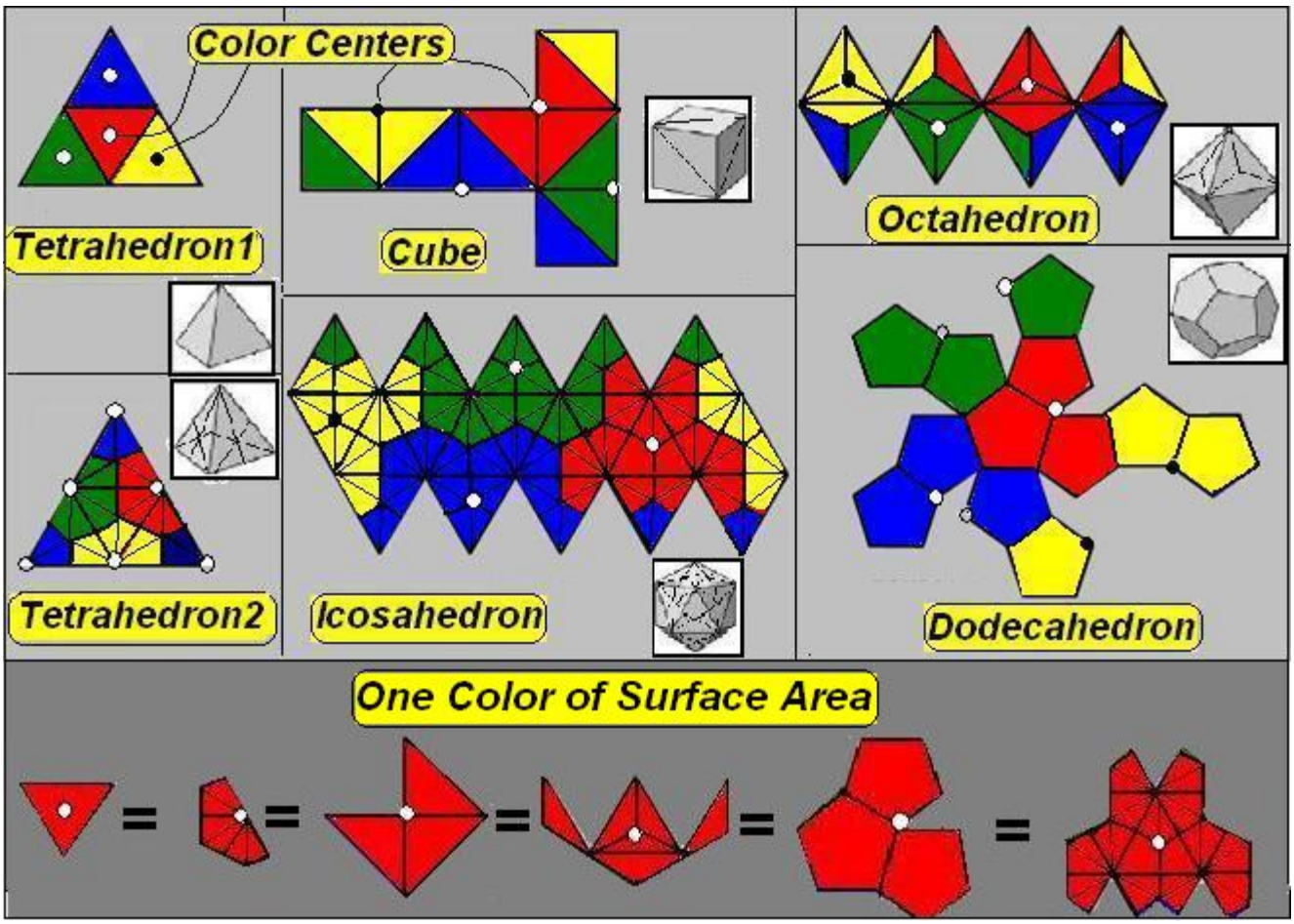


Fig. 8. Unfolded color surfaces of Platonic solids.

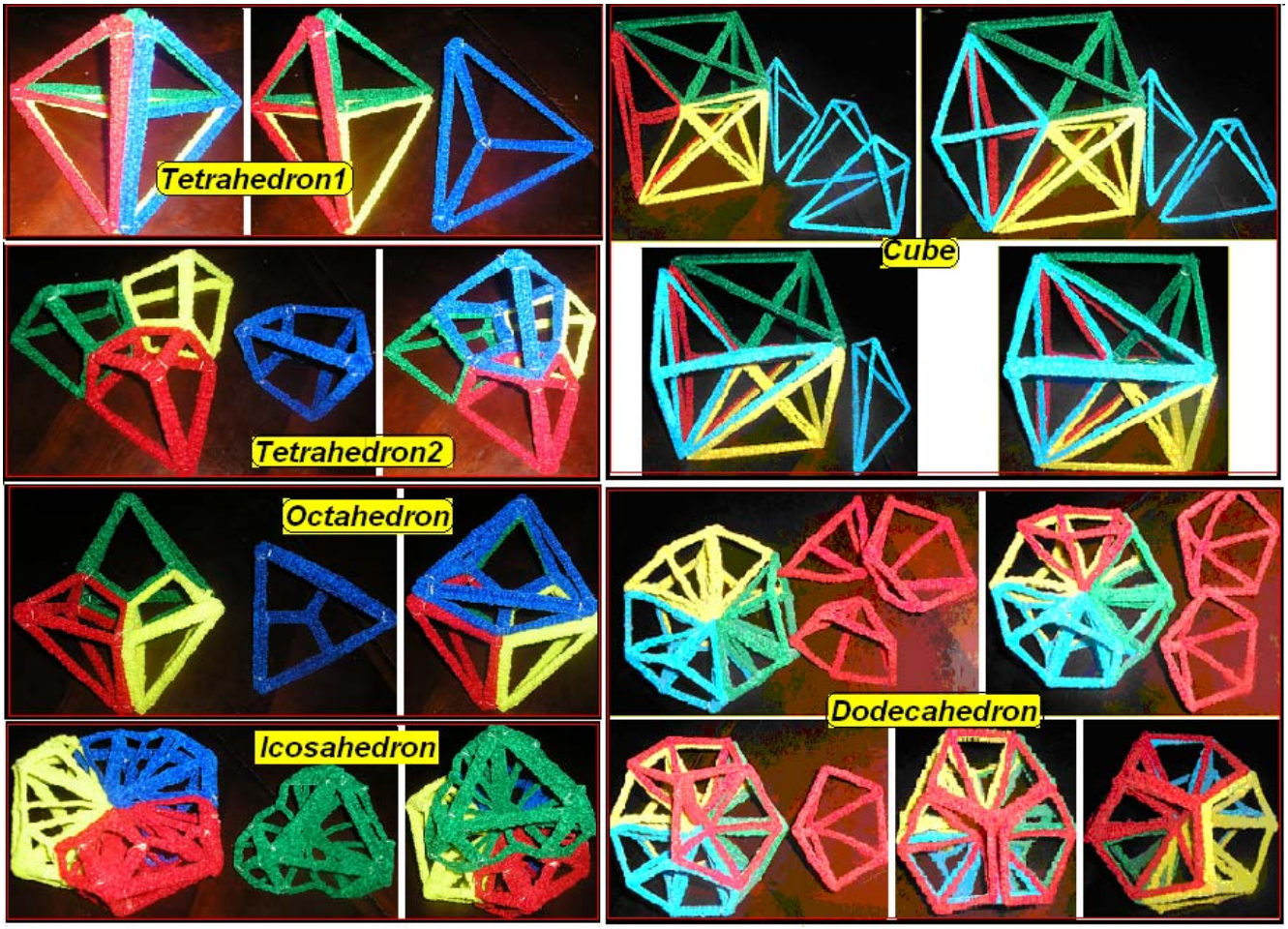


Fig. 9. The natural "color/Shikhirin" structure of Platonic solids.
The models are made by Tatyana Shikhirina

Figs. 8, 9 show the natural "colored" structure of Platonic solids.

The tetrahedron has an interesting color distinction, as compared with the other 4 Platonic solids, namely: it has two color coordinate systems.

5. Dense Packing of Polyhedra

A huge number of studies addressing dense packings, see, for instance, http://www.princeton.edu/main/news/archive/S25/00/22A50/index.xml?section=topstories, are ridiculous and senseless; it is like calculation of digits after the point in the Pi.

The results of these artificial fruitless "investigations" are inconsistent with laws of matter structurization in Nature.

The author asserts that Foam^4 as a dense packing of polyhedra:

- is the densest 100% packing of polyhedra (Platonic, Archimedean, etc. solids);
- natural polyhedra in Foam^4 are formed both in the mega-and-greater worlds and in the nano-and-less worlds;
- is formed through "colors", i.e. through the tightest interfacing of their faces colored with the same color;

  Since triangular faces can be infinitely divided into triangles, and there is no emptiness in Nature, there will be always a triangular face or a system of polyhedron triangular faces connected by one color with other triangular faces or a triangular face system until emptiness "disappears".

  As triangular faces are the bases of pyramids whose tops "abut" against the center of a polyhedron the number of pyramids is also infinite. Such pyramids ard called Fixed Parachute Polyhedrons, or **Shikhirin solids**$^{\textbf{Parachute}}$);
- ideal Platonic and Archimedean solids do not exist in Nature. There exist convex polyhedra with faces shaped as triangles or sets of triangles, like a pentagon consisting of 3 or 5 triangular faces, that "look for" an equivalent number of identically colored triangular faces of other polyhedra to form connection.

A Bundle^4 consists of polyhedra including Platonic, Archimedean solids and their optons stretched and rotating around their longitudinal axes. The interaction in the Bundle occurs through one color connection.

VTortex, Foam$^{\text{VTortex}}$ (a dense VTortex packing) and Coutte-Shikhirin Flows [7, 8] also interact through identical colors;

Structurization information (colors, sizes, quantities and coordinates in the 4-dimensional space of faces, vertices, edges of polyhedra) and energy generate

information parameters by restructuring infinitely a dense polyhedra packing and their accurate connection.

Life is organized in the same way, namely: all bodies from the nano-and- less world to the mega-and-greater world that fill densely all elements of Nature "work" through colors.

6. Shikhirin Solids

"Colors" are not only the bases of pyramids or the surfaces of a sphere, a torus, the Moebius band, polyhedra, etc., structured by them.

"**Colors" are bulk bodies** like, for instance, Fixed Parachute Solids), or **Shikhirin Parachute Solids**[Parachute]**.**

The author was the first in the history of Mankind to discover the torus structure (Fig. 10) (Table 2), namely: a torus consists of seven Shikhirin cells[7] (bodies, heptahedra) and is knotted by a torus knot (3.1), etc. [9].

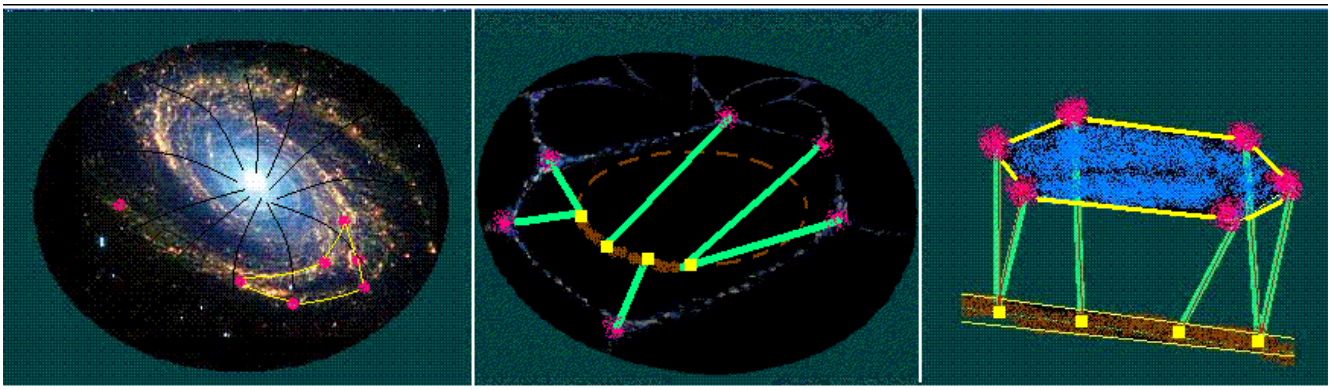
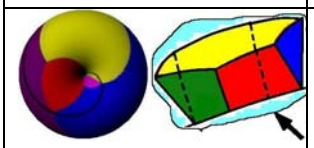
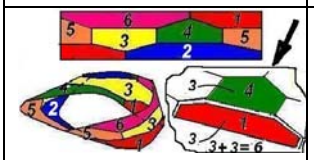


Fig. 10. The structure of a Plasma Torus by an example of Shikhirin solids[7], e.g. a heptahedron (6,4,4,4,4,3,3) having 4 vertices rigidly fixed on the axis, or the torus string. When the torus is "inflated" the vertices remain fixed on the torus string and prevent transformation into a sphere.

6.1 Design Features of Shikhirin solids[7,8] or Shikhirin cells[7,6]

Table 2

Shikhirin Solids	Faces (F)	Vertices (E)	Edges (K)	E-K+F	Polyhedron	Form Complexity, R
 **Shikhirin solid**[7]	7	8	13	8-13+7 =2	**F/7"Colors" = Polygon,** Heptahedron	**0,35R**$_{TORUS}$
 **Shikhirin solid**[6]	6	9	0	9+6 =15	**F/6"Colors" = Flat Polygons** 3Pentahedron+ 3Hexahedron	

Euler's formula ***E-K+F=2*** for polyhedra is **not valid** for the torus, the Moebius band, the Klein bottle and projective plane **as polyhedra.** In such cases, if we follow Euler's formula, the following Shikhirin formula is obtained: ***E-K+F =0.*** It is proved by the author with a geometrical technique using their unfolded surfaces [Fig.11]:

- ***E-K+F=14-21+7= 0*** *for the torus;*
- ***E-K+F= 9-15+6=0*** *for Moebius band, Klein bottle and projective plane.*

On the other hand, though, the torus heptahedron (Table 2) is consistent with Euler's equation, and seven heptahedra, or Shikhirin cells[7], form a torus knotted by a torus knot (3.1).

A set of three flat pentahedra and three flat hexahedra, Shikhirin cells[6], form the Moebius band, the Klein bottle and projective plane.

It should be noted that increasing the number of 7 colors (torus knots) or 6 colors multiplefold, as it is observed in Nature (galaxies, tornado, etc.,), does not affect the structure of these forms (bodies).

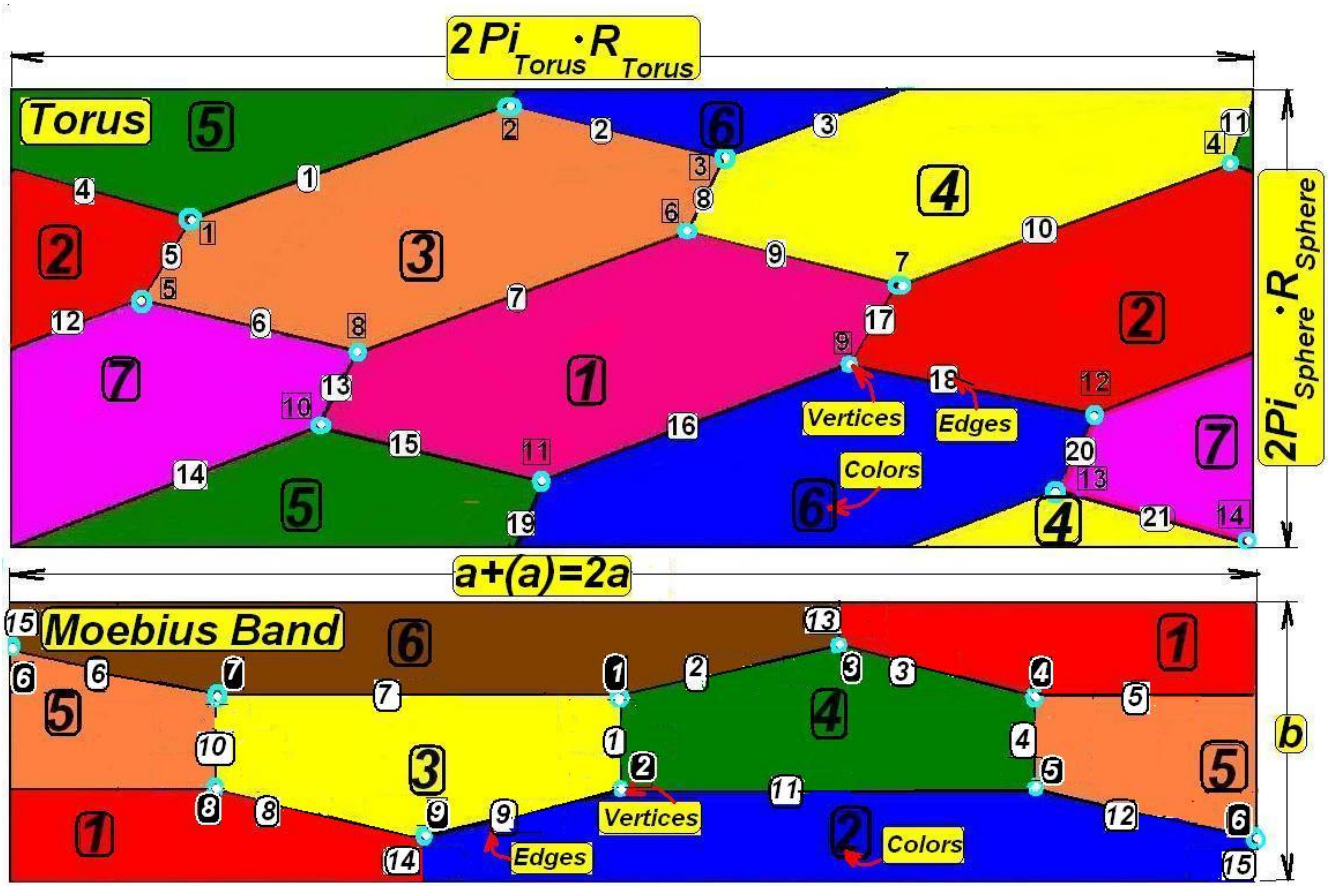


Fig. 11. Unfolded surfaces of a torus, a torus knot (3.1) and a Moebius band.

Fig. 11 shows the unfolded surfaces of a torus and the Moebius band indicating the quantities of their vertices, faces and edges. According to the processed data, the popular Euler's equation for polyhedra is not applicable to the torus and the Moebius band represented by polyhedra (Table 2).

Moreover, Euler's formula is not applicable to flat polyhedra making up the Moebius band, the Klein bottle and projective plane either.

6.2 Fixed Parachute Polyhedral Bodies, or Shikhirin Parachute Solids (Shikhirin Solids^{Parachute})

All known polyhedra – structural spheres, when inflated from inside, are transformed into a sphere consisting of 4 tetrahedra whose bases are 4 colors (spherical triangles). There is, though, a class of polyhedra which, when inflated, cannot be physically transformed into 4 color "free" spheres due to their "bound" position in the structure of, for instance, a torus or a sphere. They include:

- Shikhirin cells[7] making up a torus;
- pyramids making up polyhedra. The vertices of pyramids "abut against" the centers of polyhedra;
- bubbles/drops lying on the surface (plane);
- bubbles/drops attached to an object;
- icicles, etc.;
- Shikhirin cells[6] making up the Moebius band, the Klein bottle, projective plane, etc.

The author has called such polyhedra **fixed (or bound/anchored/tied)** parachute polyhedra (Fig. 12)

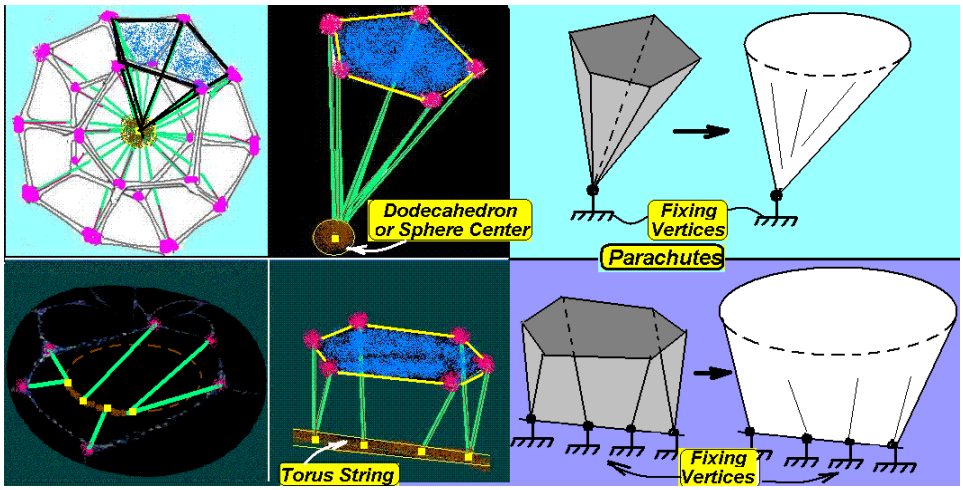


Fig. 12. Parachute polyhedra by an example of a dodecahedron and a torus ***polyhedron***.

6.3 4D, 6D and 7D Spaces

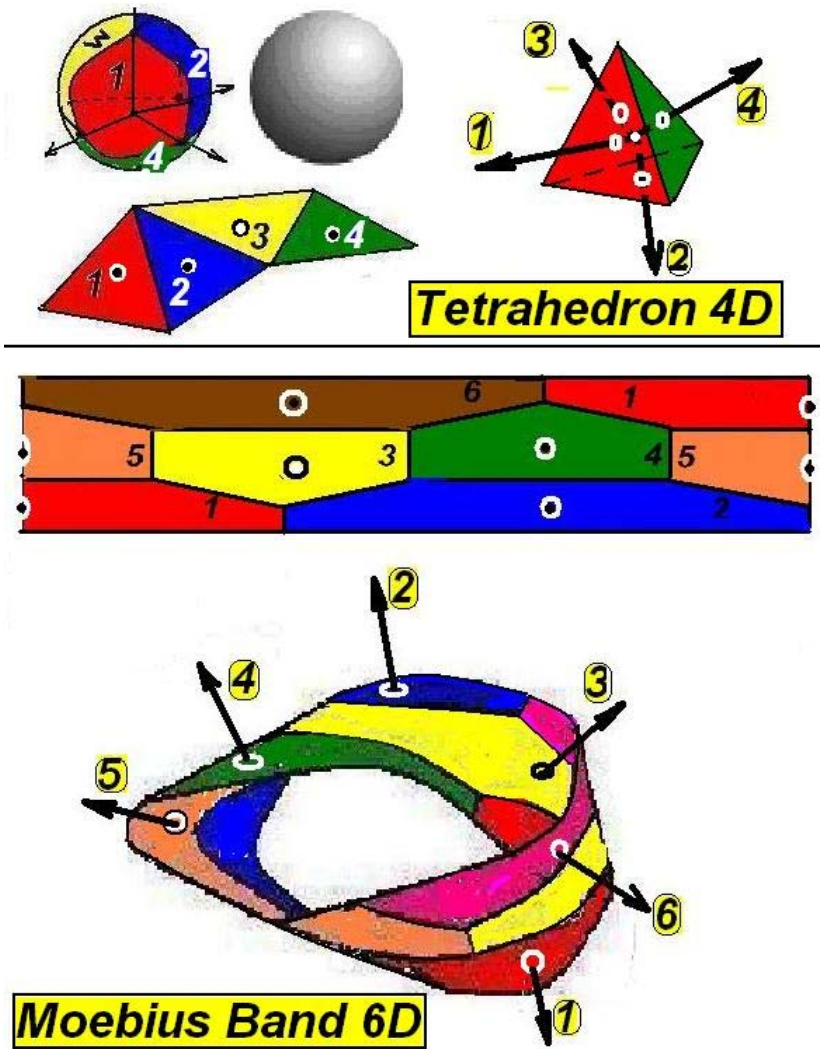


Fig. 13. Top: 4-dimensional Natural space - Foam[4], e.g. the Universe, or Shikhirin Space.

Bottom: 6-dimensional space (not found in Nature thus far): Moebius band, Klein bottle, projective plane.

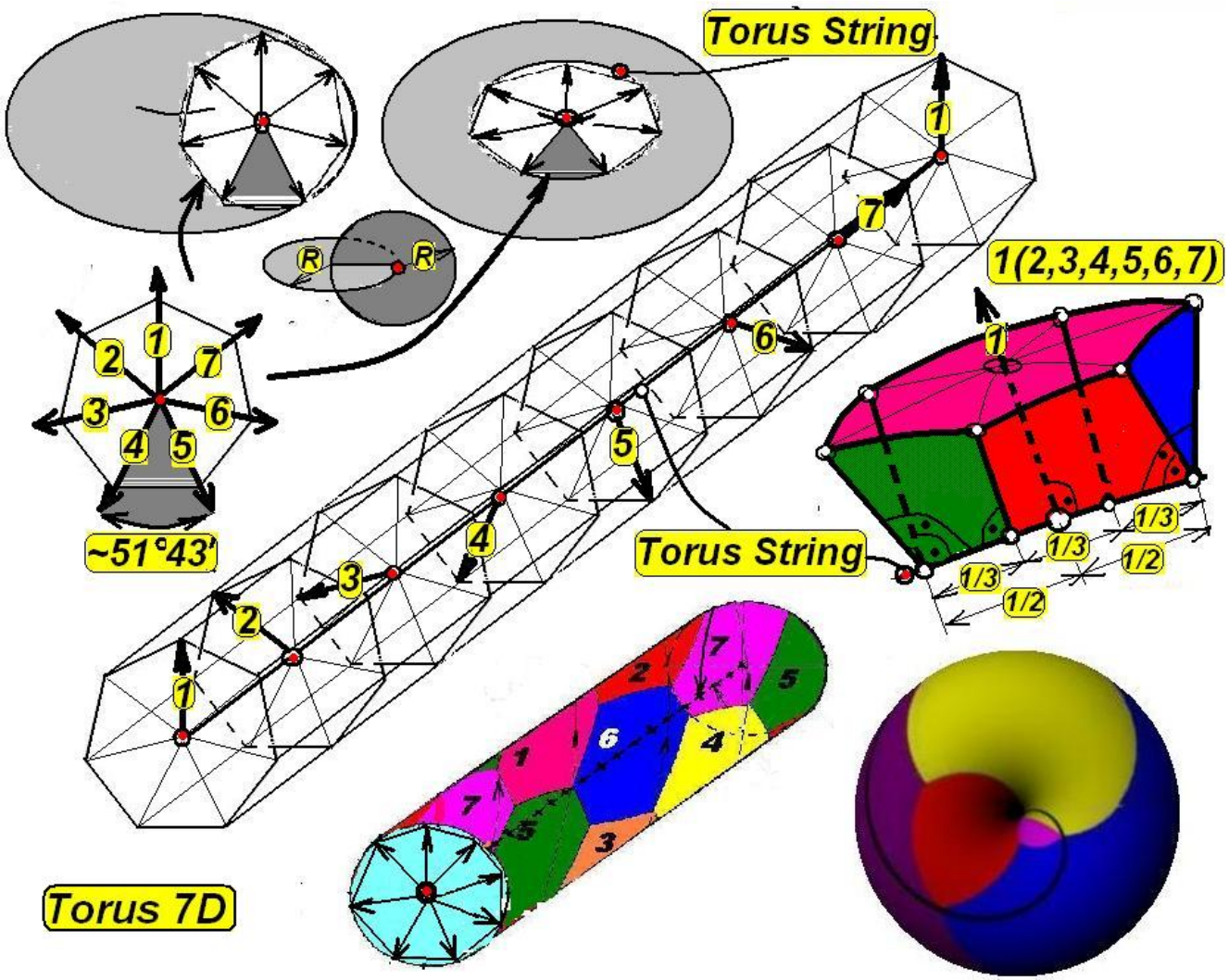


Fig. 14. 7-dimensional natural space, VTortex.

7. Mathematical Shikhirin "Paradoxes"

$$-\infty = +\infty,$$

$$(-\infty + +\infty) = \infty,$$

$$(-\infty - +\infty) = 0,$$

$$(-\infty/+\infty) = 1,$$

$$(+\infty/-\infty) = 1,$$

$$(\infty/\infty) = 1$$

8. Specifics of Nature Learning by Man

The process of Nature learning by Man also follows the way from -∞ (the Past) to +∞ (the Future), provided that without passing the current threshold level of knowledge in the current moment ($T_{Right\ Now}$,) one cannot leap to the next level or skip several levels of knowledge. This process has no end.

Summary

- **The "color"/Shikhirin structurization of Platonic and other solids.** After discovery by Plato of 5 solid bodies (app. 2400 years back) the author, Dr. Valeriy Shikhirin, discovered their structure based on "four colors" acting as the bases of pyramids whose vertices are in the center of the solid.
- The Law of Colors, being a natural structurer, ensures stability of polyhedra.
- **"Colors" are bulk solids.**
- **The tetrahedron, unlike the other 4 Platonic solids, has a color distinction, namely, it has two color coordinate systems: Tetrahedron1 and Tetrahedron2.**
- **Four color axes run at an angle of** ~109^0 30' , Platonic solids reside in 4-dimensional Fuller space.
- **The four color axes run:**
  - **from the center through vertices of solids in the tetrahedron (Tetrahedron2), the cube and the dodecahedron;**
  - **from the center through the face middles of solids (regular triangles) in the tetrahedron, the octahedron and the icosahedron.**
- All natural and man-made convex polyhedra consist of four color bodies each.
- Dense polyhedra packings – $Foam^4$ and $Foam^{Torus/VTortex}$ – originate through connection of polyhedra faces having the same color.
- The spherical Pi is the structurer of the sphere. The toric, knot and *spherical* Pi is the structurer of the torus and torus knots.

- The structure of the Moebius band was discovered, namely: the Moebius Band consists of 3 flat pentahedra and 3 flat hexahedra-Shikhirin cells[6] (solids).
- The torus heptahedron was discovered (6,4,4,4,4,3,3); seven heptahedra make up a torus.
- Euler's formula ***E-K+F=2*** **is not valid** for the torus, the Moebius band, the Klein bottle and projective plane as polyhedra. Shikhirin's formula E-K+F = 0 was suggested for the above solids proved by the author geometrically by means of their unfolded surfaces.
- **One of the principal laws of Natural Platonic, Archimedean and Shikhirin solids is that** Pi_{Torus}, $Pi_{TorusKnot}$, Pi_{Sphere} and Psi cannot co-exist because Pi "is responsible" for the roundness of a body (a sphere, a torus, a Moebius band, a Klein bottle, projective plane), while the "golden ratio" Psi determines the faceted shape, "being responsible" for polyhedra.
- The platonic solids, the sphere, the torus, the Moebius band, the Shikhirin-Universe space and Shikhirin-Time space have been distributed according to the "complexity factor" criterion.
- The natural structure of individual solid and liquid polyhedra of mega-and-more and nano-and-less worlds is observed in forms of stars, planets, crystals, viruses, snowflakes, bubbles, etc.
- The structurization energy and information laws, particularly, the "color law" may serve as the basis for buillding energy and information systems as well as transport vehicles, for instance, "flying saucers" [2].

References:

Valeriy Shikhirin has more than 250 publications (1971 – 2010).

1.Valeriy Shikhirin, http://youtube.com/user/elastoneering, part 1-10 etc.

Working models video and animations. **This is very important for understanding**:

- Part 1: Tore Technologies, Single-component toroids (2008), **video**;
- Part 2: Tore Technologies, Multy-component toroids (2009), **video**;
- Part 3: Torus and VTortex Surface Structurization. VTortex as Free Energy and Information Source. Basic Torus Knots knotted Torus and VTortex (2009), **animation**;
- Part 4: Ideal Natural VTortexes Galaxy and Tornado as Free Energy and Information Source (2009), **animation**;
- Part 5: TorArt. Imaginations (2009), **animation**;
- Part 6: Torus and VTortex Bodies Structurization by Shikhirin Cell[7] or Color Cell[7] (2009), **video**;
- Part 7: Torus Algorithmic Spirals, Angular Toruses, and Global Cooling (2009), **animation**;
- Part 8 Damaged Oil pipe/well sealing and recovery of efficiency under water (July 2010), **video [**24];
- Part 9: Color/Shikhirin Structure of Platonic Solids, **video (pending)**.
- Part 10: Global Natural Toroidal Phyllotaxis Process, **animation (pending);**
- Part 11: Skeleton/Frame/Ether Structure of Regular (Typical) forms of working fluid medium in Nature: Sphere-4D, Torus-5D, Torus-7D, Mobius Band-6D, Klein Bottle-6D and other polyhedrons (Shikhirin Cells[1,2,3,4,5,6,7] or Color Cells[1,2,3,4,5,6,7]), **video (pending);**

2. Shikhirin V. Synergetics of the Universe as a Natural Perfect Self-Supported Mechanism. First Approximation. Proceedings of 5-th International Scientific-Practical Conference "Tore Technologies", 23-34 Oct., 2008, Irkutsk State Technical University, pp.22-54, http://www.evgars.com/new_page_42.htm, http://www.alt-tech.org/files/fizika/shikhirin/SynergeticsUniverseR.pdf.

3. V. Shikhirin. The Torus and The Sphere, or Parents of *PI*, *Phi* and "*7*" as Elements of Matter Structurization in Nature. Proceedings of 3-rd International Scientific-Practical

Conference “Tore Technologies”, 23-24 November, 2006, Irkutsk State Technical University, pp. 131-143, http://www.evgars.com/tis.htm, http://www.alt-tech.org/files/fizika/shikhirin/PHi_R.pdf.

4. V. Shikhirin. VTortex™ as Superior Form of Fluid Medium Structurization in Nature. Proceedings of 3-rd International Scientific-Practical Conference “Tore Technologies”, 23-24 Nov., 2006, Irkutsk State Technical University, pp. 158-179, http://www.evgars.com/vtortex_r.htm, http://www.alt-tech.org/files/fizika/shikhirin/VTORTEX_R.pdf.

5. V. Shikhirin. A Study of Possible Use of Mathematical Methods for Press Mold Distribution in a Model Casting Shop of Izhevsk Mechanical Works. Graduation Thesis. Izhevsk Mechanical Institute, 1971.

6. M. Wenninger. Polyhedron Models. Cambridge, Cambridge University Press 1971.7.

7. V. Shikhirin. Synergetics of Atmosphere and Tornado as Natural Self-Supported Torus Mechanisms. Proceedings of 5-th International Scientific-Practical Conference “Tore Technologies”, 23-34 Oct., 2008, Irkutsk State Technical University, p. 54-87, www.alt-tech.org, www.evgars.com

8. V. Shikhirin. Development Prospects of Tore Technologies, Elastic Mechanics and “Wonders” Created by Them in Nature. Proceedings of 2-nd International Scientific-Practical Conference “Tore Technologies”, 21-24 Sept., 2005, Irkutsk State Technical University, pp.3-41, www.evgars.com/tortechnology.htm

9. V. Shikhirin. Creation of Self-Supported VTortex-Energy Sources and VTortex-Propulsors of Transport Vehicle. Proceedings of 7-th International Scientific-Practical Conference “Tore Technologies”, Irkutsk State University, Russia, October 27, 2010.