ISSN: 2639-0108

Review Article

Advances in Theoretical & Computational Physics

New Axioms and Laws

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Submitted: 15 Nov 2020; **Accepted**: 06 Nov 2020; **Published**: 21 Nov 2020

Abstract

This report contains 2 new axioms and 8 laws. It predicts to include except the Electromagnetic Field and other unknown and unexplored fields, for example the Gravity Field.

As it is well known the Classic Field Theory is described mostly by Theory of Electromagnetic Field. The Electromagnetic Field is described by Maxwell's laws (1864). The Maxwell's laws are certified by a single axiom which claims that the movement of a vector E in a closed loop (div rot E = 0) is evenly.

The author replaces this axiom with a new one, according to which the movement of a vector E in an open loop (div rot E ≠ 0) or an open vortex (div Vor E ≠ 0) is unevenly. If the vortex is in plane (2D), it is named a cross vortex. If the vortex is in volume (3D), it is named a longitudinal vortex. Something more- each vortex can be decelerating (div (VorE) <0) or accelerating (div (VorE)> 0).

After the first axiom are obtained immediately 4 types of movements – cross vortex, which can be accelerating or decelerating and longitudinal vortex, which can also be accelerating or decelerating.

The following results are obtained : evenly movement is replaced with unevenly movement (decelerating or accelerating); movement in a closed loop is replaced with movement in an open loop or vortex ; a cross vortex in 2D generates a longitudinal vortex in 3D through a special transformation and vice versa- the longitudinal vortex in 3D through another special transformation generates a cross vortex in 2D ; the decelerating vortex emits primary vortices to environment, but the accelerating vortex sucks into the same primary vortices from environment; the accelerating longitudinal vortices are attracted to one another, as the faster vortex is inserted into the slower and thus form a funnel, which is the model of gravity funnel.

It should be noted, in particular, the results of the second axiom. It claims that two complex (cross-longitudinal) vortex objects in 3D that work in one direction as one complementary pair, are existed simultaneously. This way they are obtained 2 pairs of complementary objects in both directions.

As a final result are received many models with similar shapes and content. For example, the pair in one direction of complex complementary vortex objects is a model of the electron-proton chain, and in the opposite direction is an antiproton-positron chain model.

Introduction
The Essence of Axiom 1
The Classic Axiom

The classic axiom in the Theory of the Electromagnetic Field certifies and verifies Maxwell's laws (1864). It postulates that the movement of an electric vector E in a closed loop is evenly:

div (rotE) = 0, or Δ. (ΔxE) =0, 1.

where (rot E **or ΔxE**) is the movement of the vector E in a closed loop; div (rot E) is the divergence (the variation in increase or decrease) of the vector E during its movement in a closed loop (rot E); the movement of the vector E in a closed loop (rot E) with zero divergence (variation) of the vector E is equivalent to evenly movement or to movement with constant velocity V [1].

The defect of the classic axiom (1) is that it does not describe movements in an open loop or a vortex, or movements with a non-constant or variable velocity V[2].

The New Axiom for Rotor

For the purpose of describing a larger range of movements, it is obviously necessary to expand the foundation of service theory. This means that such an axiom must be used which can certify wider set of movements.

The main motivation for altering the classic axiom (1) follows after the need to describe the *causative relationships* in uneven movements in open systems. It turns out that open vortices are the cause of closed vortices, which means that open vortices are more fundamental than closed ones [2].

So it is the necessity to change the existing axiom of the Classic Field Theory for close loop to axioms of Expanded Field Theory for open loops [3].

In order to expand the concepts, the notion (1) of movement of vector E in a closed loop (div (rot E) = 0) in 2D (Figure1A, a) is replaced by the notion (2) of movement in an open loop (div (rot E) ≠ 0 in 2D (Figure 1A, b).

The new axiom describes an open loop movement:

$$\mathbf{div\ (rot\ E) \neq 0,} \qquad \mathbf{2}$$

The New Axiom for Vortex

It exists a vortex div (VotE) ≠ 0 as an open loop (div (rotE) ≠ 0) in 2D and 3D or:

$$\mathbf{div\ (VotE) \neq 0} \qquad \mathbf{3}$$

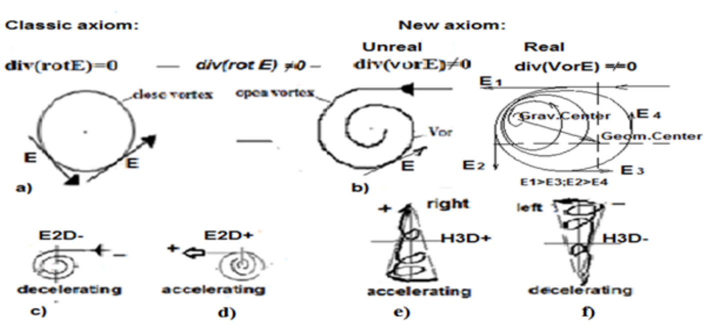

Figure 1A. The classical axiom is replaced by a new axiom

The existence of an open loop means that it can exists as a decelerating or an accelerating vortex:

$$\mathbf{div\ (VorE) < 0;\ div\ (VorE) > 0;} \qquad \mathbf{4}$$

Axiom 1. The motion of vector E along the open loop (div (rot E) ≠ 0) or in a vortex (div (VotE) ≠ 0) is with monotone-decreasing or monotone-increasing velocity in 2D or 3D for which :

$$\mathbf{div\ (VorE) < 0;\ div\ (VorE) > 0;} \qquad \mathbf{5}$$

We immediately received 4 types of movements - cross, which can be accelerated or decelerating and longitudinal , which can also be accelerated or decelerating.

The Essence of Axiom 2

Two Directions of Pair of Complementary Objects

Definition: A pair of object for which actions are complementary, are called pair of complementary objects.

If one object pushes (Figure1B, c), but other pulls (Figure1B, b), they form a pair of complementary objects. Because of one object pushes (Figure1B, c), the other- pulls (Figure1B, b), the both of them are active generators or they form a pair of active generators in complementary work.

A pair of active generators

Because of that one object pushes (Figure1B, c), the other- pulls (Figure1B, b), the both of them are active generators or they form a pair of active generators in complementary mode.
It turns out that the vector E is not an ordinary vector but a complex vector. It has a real and a complex part.

In left direction

In the first vortex the real part is amplitude A and imaginary part is velocity V: E =+A + iV, (Figure 1B, c). In the second vortex the real part is velocity V and imaginary part is amplitude A: E =+V+ iA (Figure 1B, b)

In right direction

In the first vortex the real part is amplitude (- A) and imaginary part is velocity (- V): E = -A - iV, (Figure 2c).

In the second vortex the real part is velocity (-V) and imaginary part is amplitude (-A): (Figure 2d) E = -V – iA.

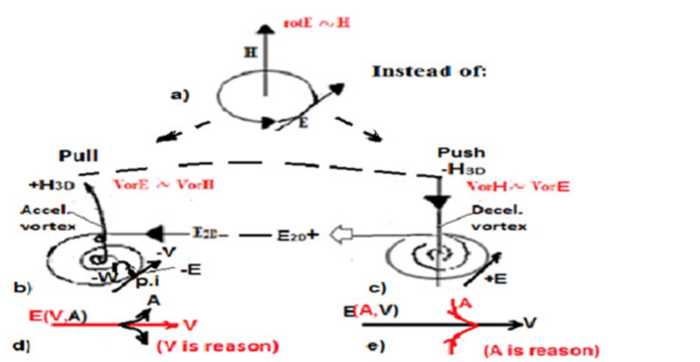

Figure 1B: One pair (in one direction) of complex vortices in 3D

Axiom 2. Two vortices of one complementary pair in one direction in 2D: E =+A + iV; E =+V+ iA or two vortices of complementary pair in opposite direction in 2D: E =-A - iV; E = -V – iA, exist simultaneously in the same time in 3D. 6

Expanded Law of Maxwell

According to the new axiom (2) (div (rotE) ≠ 0) and the new definition of vortex (3)(div (VorE) ≠ 0),the Expanded Maxwell's Law is modified like this: a cross vortex in 2D(Vor E) of vector (E) continues in the center as an one single and simple longitudinal vortex in 3D (VorH) of (H) in the center of the vortex (Vor E), (Figure 1Ba):

$$(\text{VorE})_{2D} = k\,(\text{VorH})_{3D} \quad 7$$

where (Vor E) is a cross vortex in 2D of vector (E); (VorH) is a *one single and simple* longitudinal vortex in 3D of vector (H), (k) is an estimator of medium viscosity.

The direction of the resulting vector (H) is determined by the well known *Right-hand Rule* .If the right hand is facing down and the fingers indicate the direction of the velosity (V)(right), and the thumb indicates the amplitude direction (W)(left), the piercing through the palm will shows the upward direction of the vector (H) (Figure 1B,b).

It expands the content of the meanings of movement of vector (E) and vector (H) in the development of laws later. Their main philosophy is affirmed: if (E) is the cause vortex, then (H) is the result vortex. So in particular the cross vortex (VorE) generates in center a longitudinal vortex (VorH) (7).

Laws of Transformation (transformations Δ1, Δ2)

Laws of the Transformation of a Cross Vortex (E_{2D}) into a Longitudinal Vortex (H_{3D}).

At every (i) point p(i) of a decelerating cross vortex E there are two simultaneous movements: velocity vector (V) and amplitude of the cross vortex(W). The two simultaneous movements (V and W) also exist at all points of longitudinal vortices. The cross vortex (E_{2D-}) is transformed into a longitudinal vortex (H_{3D+}). This is accomplished through a specific operator (Δ1) for cross-longitudinal transformation (Figure 1B, b).

The cross (E_{2D}) and the longitudinal (H_{3D}) vortex are not an original and an image by analogy with the well-known transformations of *Laplace or Fourier*. They are representatives of spaces with qualitatively different structures. Therefore, the introduced operator (Δ1) connects the original in one type (transverse) of space with its image in another type (longitudinal) of space, i.e. the transformation Δ1 connects two spaces with different qualities.

Law 1: The open cross vortex (E_{2D}) generates (inward or outward) an open longitudinal vortex (H_{3D}) in its center through a cross-longitudinal transformation Δ1:

$$\text{Vor}\,(E_{2D}) \overset{\Delta 1}{\Rightarrow} \text{-- Vor}\,(H_{3D}), \quad 8$$

where Vor (for Vortex, meaning an unevenly vortex) replaces rot (for rotor, meaning closed loop); the cross vortex in 2D (E_{2D}) continues its development in 3D as a longitudinal vortex (H_{3D}) (Figure1Bb).

Definition: A decelerating cross vortex ($E2_{D-}$) is a cross open vortex (E_{2D}) for which div (Vor E_{2D}) < 0.

Figure 2a, d show decelerating cross vortices (E_{2D-}) inward.

Definition: A decelerating longitudinal vortex (H_{3D-}) is a longitudinal open vortex (H_{3D}) for which div (Vor H_{3D}) < 0.

Figure 2b, c show decelerating longitudinal vortices (H_{3D-}) inward.

Definition: An accelerating cross vortex (E_{2D+}) is a cross open vortex (E_{2D}) for which div (Vor E_{2D}) > 0.

Figure 2b, c shows an accelerating cross vortices (E_{2D+}) outward.

Definition: An accelerating longitudinal vortex (H_{3D+}) is a longitudinal open vortex (H_{3D}) for which div (Vor H_{3D}) > 0.

Figure 2a, d show an accelerating longitudinal vortices (H_{3D+}) outward.

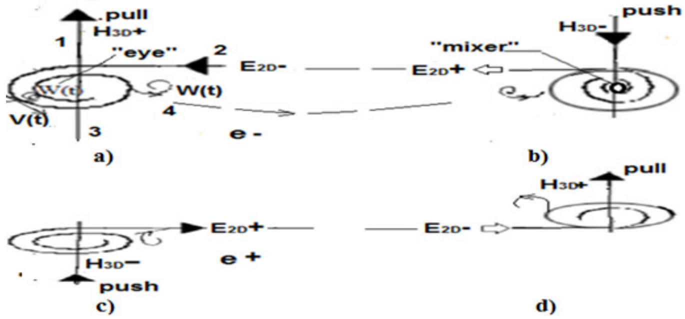

Figure 2: Two Transformation Laws. Options in two complementary complex objects

Laws of the transformation of a longitudinal vortex (H_{3D}) into a cross vortex (E_{2D})

For the opposite transformation a new operator Δ2 is introduced to transform a longitudinal (H_{3D}) into a cross (E_{2D}) vortex. The physical nature of this Δ2 transformation is *quite different* in comparison with Δ1.

Generally speaking, the transformations Δ1 and Δ2 are orthogonal rather than symmetrical to each other.

Law 2: The open longitudinal vortex (H_{3D}) generates (inward or outward) an open cross vortex (E_{2D}) in its center through a longitudinal-cross transformation Δ2:

$$\text{Vor}\,(H_{3D}) \overset{\Delta 2}{\Rightarrow} \text{-- Vor}\,(E_{2D}) \quad 9$$

Law of nonparametric movement of the vortex

Let us consider a decelerating longitudinal vortex with decreasing acceleration of velocity: V_1, V_2,…, V_n, decreasing acceleration of cross vortices and increasing amplitude of the cross vortices W_1, W_2,…W_n. Let us consider also an accelerating longitudinal vortex with increasing acceleration of velocity: V_1, V_2…, V_n, increasing acceleration of cross vortices and decreasing amplitude of the cross vortices W_1, W_2…W_n (Figure 3).

Law 3: Accelerating longitudinal vortex is accelerated and decelerating longitudinal vortices is decelerated by internal logic as a nonparametric process through Positive Feedback

When, for example, an accelerating longitudinal vortex sucks in with acceleration the cross vortex, then *in start moment (t=0)* its first derivative is minimum: a=0. However the accelerated absorption of the cross vortex increase and when *in the end moment ($t=t_n$)* the positive acceleration of the cross vortex becomes maximum: amax >>0.After the process limits to the saturation where a=0.

The energy of this cross vortex is added to the longitudinal vortex and it is accelerating it further. The mass of this sucking vortices is added to the longitudinal vortex as well and it becomes denser and more powerful. During the suction of transverse vortices from the surrounding space the energy and the temperature (T^0) of the environment decrease (Figure 3).

The essence of Positive Feedback:

As much increase a positive acceleration of longitudinal velocity V, as much increase a positive acceleration of cross vortices W and their sucking increase as well.

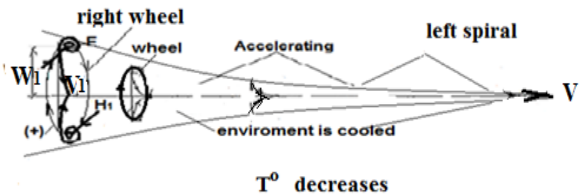

Figure 3: Positive Feedback

Law of the constant Power of the vortex

As we saw above there are two ***qualitatively different*** movements at each (i) point p (i) of the decleating vortex E: longitudinal vector velocity (V) and cross vortex with amplitude (W) (Figure 1B, a).

It is known that in Classic Mechanic the simultaneous operation of two homogeneous vectors ***is equal to the sum*** of these vectors.

According to Law 3, the transforming one vector (V) into a vortex (W) and vice versa is a *nonparametric process*. Transformation is done by internal laws but not by setting parameters from outside. The nonparametric transformation of two variables V (t) and W (t) is mathematically described by the product V (t), W (t) of these variables.

Therefore, as a result of the new axioms it turns out that the simultaneous action of two movements is evaluated as a product and not as a sum of their components (Law 3).

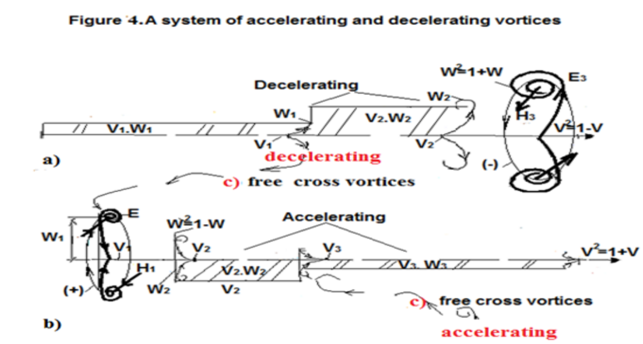

Figure 4: A System of accelerating and decelerating Vortices

Law 4: For an uneven (accelerating or decelerating) longitudinal vortex with current velocity (V_i) and current amplitude of the cross vortices (W_i), the product of kinetic $Ek(V_i)$ depends on velocity (V_i) and potential $Ep(W_i)$ depends on amplitude of cross vortex (W_I) is a constant:

$$Ek(V_i) \,.\, Ep(W_i) = \text{const.}, \qquad 10$$

where $i = 0 \div \infty$; $Ek(V_i)$ is kinetic energy that depends on velocity (V_i) and $Ep(W_i)$ is potential energy that depends on amplitude of cross vortices ; the product $Ek(V_i) \,.Ep(W_i)$ is proportional to the power of the uneven longitudinal vortex (P).

Laws of the Velocity of the Longitudinal Vortex (V) and the Amplitude of the Cross Vortices (W)

Law 4 claims that in the decelerating vortex vector velocity (V) is transformed according to *internal law* into the amplitude of the cross vortex (W) (Figure 4a) and in the accelerating vortex the amplitude of the cross vortex (W) is transformed according to *internal law* into a vector velocity (V) (Figure 4b).

Law 5: The velocity of a decelerating longitudinal vortex decreases in (n) portions $(1/\psi)^n$ times, while the amplitude (W) of cross vortices increases reciprocally in (n) portions $(\psi)^n$ times:

$$\mathbf{I\ V^2 = V_0\,(V_0 - V),} \qquad \mathbf{11a}$$
$$\mathbf{I\ W^2 = W_0(W_0 + W),} \qquad \mathbf{11b}$$

where v_n and w_n are periodic roots with period n that fulfill the requirement for orthogonality: $\mathbf{v_n.w_n = V_0.W_0;\ n = 0 \div \infty;}$ the roots vn and ωn are expressed as: $\mathbf{v_n = \psi^n.V_0,\ w_n = (1/\psi)^n.W_0}$; V_0 is the starting value of V_n, W_0 is the starting value of w_n and ψ is a number that fulfills the requirement: $\mathbf{\psi - 1/\psi = 1,\ \psi}$ is so called golden proportion

Law 6: The velocity (V) of an accelerating longitudinal vortex increases in (n) portions (ψ)n times while the amplitude (W) of cross vortices decreases reciprocally in (n) portions $(1/\psi)^n$ times;

$$\mathbf{I\ V^2 = V_0(V_0 + V),} \qquad \mathbf{12a}$$
$$\mathbf{I\ W^2 = W_0(W_0 - W),} \qquad \mathbf{12b}$$

where v_n and ω_n are periodic roots with period n that fulfill the requirement for orthogonality: $\mathbf{v_n.\omega_n = V_0.W_0;\ n = 0 \div \infty;}$ the roots v_n and ω_n are expressed as: $v_n = \psi_n.V_0$, $w_n = (1/\psi)^n.W_0$; V_0 is the starting value of v_n, W_0 is the starting value of wn and ψ is a number that fulfills the requirement: $\psi - 1/\psi = 1$.

The first positive root of the first equation (12a) is

$v_1 = \psi.\ V_0 = 1{,}62.\ V_0$., the second positive root is $v_2 = \psi^2.\ V_0 = 1{,}622.V_0 = 1{,}32\ .V_0$ and so on.. The first positive root of the second equation (12b) is: $w_1 = 1/\psi.\ W_0 = 0{,}62.\ W_0$. the second positive root is $w_2 = \psi^2.\ W_0 = 1{,}62^2.\ W_0 = 1{,}32.\ W_0$ and so on. The periodic roots of the first equation (11a) are obtained from the expression: $v^n = V_0.\ (v^{n-1} + v^{n-2})$. The periodic roots of the second equation (12b) are obtained from the expression: $w^{n-2} = W_0.\ (w^n - w^{n-1})$.

Laws of Continuity

In Euclidean geometry has an axiom that postulates that only one straight line passes through two points. The Axiom 2 for two complementary objects resemble an axiom in Euclidean geometry. But in essence Axiom1 and Axiom 2 are physical, rather than geometrical. Instead of points as geometric objects there is a pair of vortices with different dynamics as physical objects: the both of them are generators-one pulls, the other pushes (Figure 2a, b).

Provisionally vortices can be classified as *primary or micro (W)* and secondary or macro (E) uneven vortices. The primary uneven vortices are micro cross vortices (W) (Figure 4c). The secondary uneven vortices are macro cross vortices (E) (Figure 4a,b).The primary cross vortices exist as a free form or free cross vortices *.They are also called as " free energy"* (Figure 4c).

Definition: Primary vortices are emitted to the environment or sucked in from environment by the secondary (main) vortex.

Law of Continuity in a Closed Loop in 2D

According Law 5 (11a, 11b) decelerating cross vortex (E_{2D-}) emits decelerating primary cross vortices(W_{2D-}) in perpendicular direction (Figure 4a).

In general, the primary micro vortices are derivatives of the main secondary macro vortices.
Since cross vortex objects are physical, they must fulfill the main Physical Law of continuity cycle of movement. The Axiom2 considers the question of the link in the opposite direction which closes the full circle (loop) of cross vortices in 2D.

In order to fulfill the fundamental law of continuity, the feedback must pass through empty space (feedback 2D). It must contain elementary primary cross vortices generated and emitted by the secondary decelerating cross vortex (Figure 4a) and consumed and sucked in by the secondary accelerating cross vortex (Figure 4b). This feedback is closed through the so called "empty space ".

The feedback has link in inverse direction in comparison to link of the main cross vortices.
Therefore, in order to satisfy this fundamental law in physics, apparently this space cannot be "empty", as we often call it. The imaginary space is filled with primary cross vortices: copies of the secondary cross vortices but at a much smaller scale.

Law 7: A pair of open cross objects in 2D forms a closed loop in 2D by feedback in 2D of primary cross vortices.
This pair conducts energy through the real connection: (Figure 5b - Figure 5a), (E_{2D^+} - E_{2D^-}) and conducts matter through a feedback (back link) in 2D: (Figure 5a -Figure 5b), (E_{2D^-} - E_{2D^+}).

The reason for the emission of primary elementary cross vortices is the deceleration of the main longitudinal vortex (E_{2D-}) (Figure 4a, Figure 5a). But their movement in the space between the two vortex objects in 2D is due to the sucking action of the accelerating main longitudinal vortex (E_{2D}+) (the second vortex in the pair) (Figure 4b, Figure 5b).

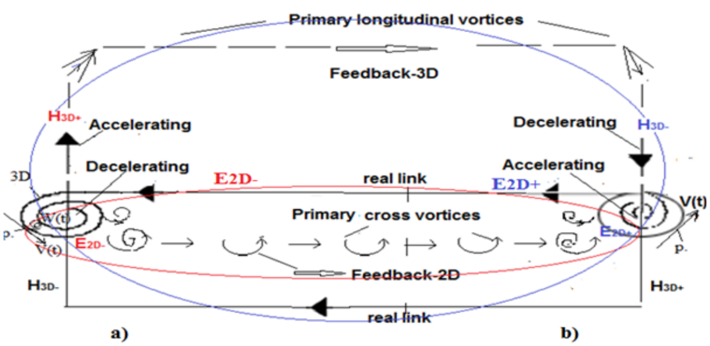

Figure 5: System of one pair of complementary vortices

Law of continuity in a closed loop in 3D

Let us consider the nature of the link in the opposite direction that closes the full circle (loop) of main longitudinal vortices in 3D, perpendicular to the circle (loop) in 2D.

In order to fulfill the fundamental law of physics the feedback of the main longitudinal vortices in 3D must close through the space (feedback 3D). It must contain elementary primary longitudinal vortices, generated and consumed by the main secondary longitudinal vortices.

This imaginary space is filled with primary longitudinal vortices resembling copies of the secondary longitudinal vortices but at a much smaller scale. All longitudinal vortices (primary and secondary) create a new type of field that contributes to our knowledge of the field as a form of matter.

The real link (Figure 5b - Figure 5a) of the chain in 3D conducts real pulsating energy (H_{3D+}) ÷ (H_{3D-}) .The back link (Figure 5a- Figure 5b) of the 3D chain conducts pulsating matter.

The reason for this is that the pulsating accelerated longitudinal vortex (H_{3D+}) is made to dashes in the form of primary longitudinal vortices. As these longitudinal vortices are highly accelerated they attract, suck and form longitudinal packet as a funnel [6]. They will move in the opposite direction as a feedback in 3D.

Law 8: A pair of open complex objects in 3D forms a closed loop in 3D by feedback of primary longitudinal vortices.
This pair conducts energy through the real connection (Figure 5b- Figure 5a) and conducts matter through the imaginary link (Figure 5a- Figure 5b) through the imaginary space.

It is well realized that the chain (Figure 5a -Figure 5b) of Law7 and the chain (Figure 5a- Figure 5b) of Law 8, are mutual perpendicular.

Conclusions

The Result of New Axioms

As a result of Axiom1 decelerated and accelerated longitudinal vortices were obtained. Their acceleration realizes forces as in the direction of the plain of a cross vortex and as in the perpendicular direction of the plain (in volume) in longitudinal vortex.

The introduction of Axiom 2 certifies the presence of complementary pairs of complex objects. Both objects in a pair are complex cross-longitudinal vortices in 3D that operate in generator mode.

Two types of chains

We receive prototype of one chain: proton (p+) (Figure 2b) - electron (e-) (Figure 2a) and the second chain: antiproton (p-) (Figure 2d) positron (e+)(Figure 2c)

Two Types of Generators

The new extended meaning of the term" Complementarity" is when the two parts are generators and they act anti-phase - one push and the other pulls.

The two transformations Δ1 (Law1) and Δ2 (Law2) are not symmetrical but rather form pairs of objects that complement each other in their action. So they form a pairs of complementary objects or they are mutually orthogonal.

The two vortices in the described above vortex pairs (Figure 2b - Figure 2a) play the role of generators - one push (Figure 2b), the other –pulls (Figure 2a). Obviously in described above chain has not a consumer. Therefore, this chain has not energy losses. It is well known that in every Electromagnetic chain has generator and one or more consumers. That's why in Electromagnetic chain has energy losses.

Nonparametric Processes

Both transformations, Δ1 (Law1) and Δ2 (Law2), are not regulated by external regulator or external parameters. The processes are regulated only by internal laws and are not determined by outside parameters. The regulation becomes through Positive feedback.

Both elements of each chain: (p+) (Figure 2b) - electron (e-) (Figure 2a) and the second chain of antiproton (p-) (Figure 2d) positron (e+) (Figure 2c) work in resonance mode [1-8].

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