

## NEW AXIOMS AND STRUCTURES

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### Abstract

This is the first of a series of three articles. In the present work, an attempt has been made to extend the theory of electromagnetic field into a more general field theory. It is known that Maxwell's laws are based on an axiom, which states that the even movement of vector  $E$  leads to movement in a closed loop ( $\text{div rot } E = 0$ ). The author replaces this axiom with a new one, which states that the uneven movement of vector  $E$  results in an open loop ( $\text{div rot } E \neq 0$ ) or open vortex. In the subsequent two axioms and four laws the following results are obtained: the even movement is replaced by an uneven one (decelerating or accelerating) and movement in 3D is received (from movement in 2D); pairs of objects are constructed as transformations of uneven vortex (decelerating into accelerating and vice versa) and movement in two resultant mutually perpendicular loops in 3D. Thus, in the expansion of the base, defined by the new axioms, the number and complexity of the structures that are built on top is increased. As a result of the unevenness of open vortex a number of very interesting effects appear, that will be the subject in the next article.

### 1. Introduction

It appears that all the discoveries of science we have made over time get

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involved now as discrete, unrelated elements or as elements of a puzzle, absolutely scattered in space and time. Moreover, these discrete elements come from different hierarchical levels - from fundamental natural level of elementary particles through the next, higher level of technology artificially created by human activity and into the highest natural levels of planetary and solar systems.

We, therefore, have to start with an assessment and an attempt to propose a common divisor of complex natural structures.

**1.1.** Maxwell's laws apply only to electromagnetic fields. They shall be covered by the axiom:  $\text{div rot } E = 0$ , which describes an even movement in a closed loop [1; p. 95].

**1.2.** It is known that even movement exists nowhere in nature as a cause - neither curved nor straight. Moreover, it is known that the presence of acceleration causes movement in nature. If an even movement appears somewhere, then this movement is supposed to be secondarily and resultant (as perhaps is the case with the electromagnetic field).

**1.3.** It is not appropriate to mechanically transfer axioms and laws created by man in a technological level into another natural level.

For example incorrect conclusions are made when the laws of electromagnetic field are applied (which refer only to artificial and technological systems) to the behavior of electrons and protons in the atom (which refers to the foundation of natural systems) or the behavior of planets and stars (which refers to the top of the natural systems).

**1.4.** The phenomenological approach describing the phenomenon (outside) and not the nature or the cause of this phenomenon has no future now.

For example, the phenomenon of divergence of movement of the electric field and the electron; the phenomenon of Lorentz force; the phenomenon of electromagnetic induction; Electric charge phenomenon, etc., is caused by an unknown internal structure of the electron.

**1.5.** It is not logical to use laws relating to the interior of a system in order to explain phenomena and objects outside that system.

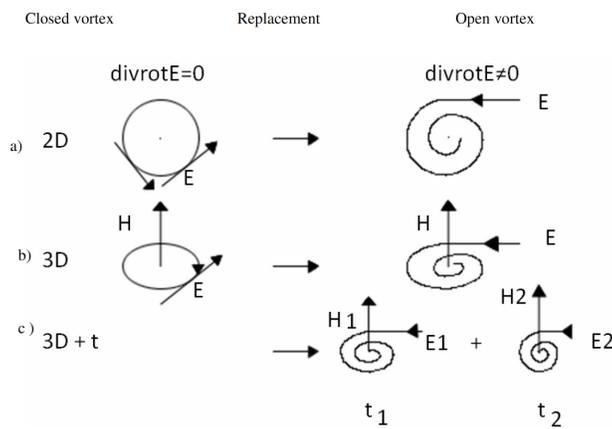
For example, the behavior of the free electron (outside the atom) has nothing to do with the behavior of electrons inside the atom (within the system electron-proton).

The behavior of an external, freely falling body to the Earth has nothing to do with the behavior of the moon to the Earth (within the system Moon-Earth and within the system Earth-Sun). In both cases: within the system certain laws exist and outside - the subject is within another system with other laws.

**2. Mainpoints**

The theory of electromagnetic field does not specify the causal link between the electric vector  $E$  describing an even movement in a closed loop ( $\text{div rot } E = 0$ ) and the magnetic vector  $H$  appearing in the center of the loop, as reflected in Maxwell's law of electromagnetic induction  $\{\text{rot } E = -d(\mu H)/dt\}$ .

So instead of the term movement in a closed loop the term movement in an open loop or vortex or just open vortex is introduced (Figure 1a) [2, p. 233-241].



**Figure 1.**

**Definition 1.** An open vortex ( $E$ ) in 2D is uneven movement in an open loop (vortex).

**Axiom 1.** The movement of any open vortex ( $E$ ) in 2D is uneven and is subject to the requirement:

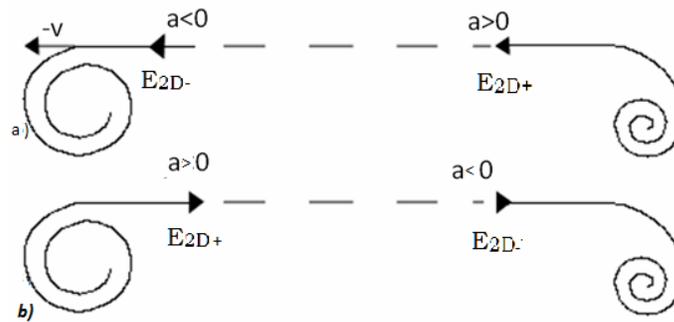
$$\operatorname{div} \operatorname{rot} E \neq 0.$$

Thus instead of an even movement we are going to use an uneven movement and the closed loop (rotor) is changed into an open vortex.

**Definition 2.** An open vortex ( $E$ ) which is wound in one plane 2D is a transverse open vortex or just a transverse vortex ( $E_{2D}$ ).

The transverse open vortex in 2D will be marked as vortex  $E_{2D}$  or just  $\operatorname{vor}(E_{2D})$  (Figure 2).

Transverse spinning- decelerating; ( $\operatorname{vor} E_{2D}$ ); Transverse spinning-accelerating



**Figure 2.**

**Definition 3.** An open vortex ( $H$ ), which is drawn in 3D volume is an open longitudinal vortex or simply longitudinal vortex ( $H_{3D}$ ).

The longitudinal open vortex in 3D will be marked as a vortex  $H_{3D}$  or just  $\operatorname{vor}(H_{3D})$  (Figure 3).

The transverse vortex transfers into a longitudinal one through longitudinal transverse transformation  $\Delta I$ . The transverse and the longitudinal vortex are not just an original and an image-by analogy with the well-known transformations of Laplace or Fourier. They are representatives of spaces, different in structure. Therefore the introduced  $\Delta I$  transformation connects the original of one type (transverse) space with the image of another type (longitudinal) space, i.e., the  $\Delta I$  transformation connects two different qualities of space.

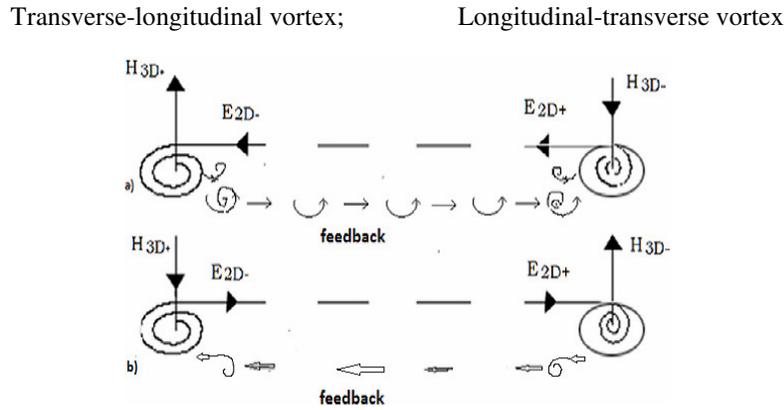
**Law 1.** The transverse open vortex ( $E_{2D}$ ) creates at its center a longitudinal

open vortex (H3D) by transverse-longitudinal transformation  $\Delta 1$  in opposite sign:

$$\Delta 1$$

$$\text{vor} (E2D) \Rightarrow -\text{vor} (H3D),$$

where vor (or vortex) replaces rot (from rotor, equal to the closed loop) and the transverse vortex in 2D (E2D) continues its development in 3D as longitudinal vortex (H3D) (Figure 3).



**Figure 3.**

**Definition 4.** A transverse open vortex (E2D) for which  $\text{div vor } E2D > 0$  is called a transverse accelerating vortex (E2D +).

In this case, the accelerating transverse vortex is depicted on the right side of Figure 2.

**Definition 5.** A longitudinal open vortex (H3D), for which  $\text{div vor } H3D > 0$ , is called an accelerating longitudinal vortex (H3D +).

Such a longitudinal accelerating vortex is depicted on the left side of Figure 3.

**Definition 6.** A transverse open vortex (E2D), for which  $\text{div vor } E2D < 0$ , is called a decelerating transverse vortex (E2D -).

A decelerating transverse vortex is depicted on the left side in Figure 2.

**Definition 7.** A longitudinal open vortex (H3D), for which  $\text{div } [\text{vor } H3D] < 0$ ,

is called a decelerating longitudinal vortex (H3D -).

A decelerating longitudinal vortex is depicted on the right side of Figure 3.

**Consequence 1.** An open transverse decelerating vortex (E2D -) creates at its center an open longitudinal accelerating vortex (H3D +) through a transverse-longitudinal transformation  $\Delta 1-$  :

$$\begin{aligned} & \Delta 1 - \\ \text{vor (E2D - )} & \Rightarrow \text{vor (H3D + )}. \end{aligned}$$

Such a transformation in 3D corresponds to the right part of Figure 3.

**Consequence 2.** An open transverse accelerating vortex (E2D +) creates at its center an open longitudinal decelerating vortex (H3D -) through a transverse-longitudinal transformation  $\Delta 1+$  :

$$\begin{aligned} & \Delta 1 + \\ \text{vor (E2D + )} & \Rightarrow \text{vor (H3D - )}. \end{aligned}$$

This transformation in 3D is shown in the left part of Figure 3.

Law 1 refers to transformation  $\Delta 1$ , where the movement of the transverse vortex (E2D) is the cause, and the movement of the longitudinal vortex (H3D) is the result. This law refers to the electromagnetic field in a greater degree. However, the opposite direction is equally possible and logical: when the longitudinal vortex (H3D) is the cause, and the transverse vortex (E2D) is the result.

We introduce a transverse-longitudinal transformation  $\Delta 2$  which connects the original of one type (longitudinal) space with the image of another type (transverse) space.

**Law 2.** The open longitudinal vortex (H3D) creates at its center an open transverse vortex (E2D) by longitudinal-transverse transformation  $\Delta 2$  in opposite sign:

$$\begin{aligned} & \Delta 2 \\ \text{vor (H3D)} & \Rightarrow -\text{vor (E2D)}. \end{aligned}$$

**Consequence 1.** An open longitudinal decelerating vortex (H3D -) creates at its center an open transverse accelerating vortex (E2D +) through a longitudinal-transverse transformation  $\Delta 2^-$  :

$$\begin{aligned} & \Delta 2^- \\ \text{vor (H3D -)} & \Rightarrow \text{vor (E2D +)}. \end{aligned}$$

**Consequence 2.** An open longitudinal accelerating vortex (H3D +) creates at its center an open transverse decelerating vortex (E2D -) through a longitudinal-transverse transformation  $\Delta 2^+$  :

$$\begin{aligned} & \Delta 2^+ \\ \text{vor (H3D +)} & \Rightarrow \text{vor (E2D -)}. \end{aligned}$$

Law 2 refers to transformations  $\Delta 2 \{(\Delta 2^-) \text{ and } (\Delta 2^+)\}$ , when the movement of the longitudinal vortex (H3D) is the reason, and the movement of the transverse vortex (E2D) is the result.

Both of the transformations  $\Delta 1$  (from Law 1) and  $\Delta 2$  (from Law 2) are obviously neither identical nor symmetrical, but they form pairs of objects which make up and combine their actions.

This way the following pairs of real vortex objects are naturally formed: one pair of 2D from an accelerating and a decelerating transverse vortex (Figures 2), and a second pair of 3D from a longitudinal-transverse vortex and a transverse-longitudinal vortex (Figure 3). In these pairs, one of the vortexes is a generator, and the other a consumer: In vortex objects in 2D the generator is the accelerating vortex, and the consumer is the decelerating vortex, while in vortex objects in 3D the generator is the longitudinal-transverse object, and the consumer is the transverse-longitudinal object.

**Axiom 2.** Through two objects of open transverse vortex in 2D, respectively, with an accelerating  $\{\text{div vor (E2D)}\} > 0$  and a decelerating  $\{\text{div vor (E2D)}\} < 0$  vortex, only one transverse connection passes.

**Axiom 3.** Through two objects of open transverse vortex in 3D, respectively,

with an accelerating  $\{\text{div vor (E3D)}\} > 0$  and a decelerating  $\{\text{div vor (E3D)}\} < 0$  vortex, only one transverse connection in 2D (E2D) and one longitudinal connection in 3D (H3D) pass, which are located in mutually perpendicular planes.

Thus two objects of open transverse vortex in 2D will be called just a couple of vortex objects in 2D, and two objects of open transverse vortex in 3D will be called just a couple of vortex objects in 3D.

Axiom 2 is similar in shape to an axiom in geometry by Euclid, but in its essence it is no longer geometric, but physical.

The reason for this is that instead of geometric objects there is a couple of dynamically different vortex as physical objects: one of them is a generator (an accelerating vortex) and the other one is a consumer (decelerating vortex). As they are physical objects, they must obey the basic law of physics for continuity and circulation.

Axiom 2 opens the question of what is the relationship in the opposite direction which makes a full circle (loop) of transverse vortex in 2D. The only answer is that in order not to break this fundamental law, the feedback should be made through the empty space containing elementary transverse vortex, generated and emitted by the decelerating transverse vortex, and consumed and sucked by the accelerating transverse vortex (Figure 3). Obviously, this space is not “empty” as we used to call it. This space is full of elementary transverse vortex, which are copies of the main transverse vortex, but in much smaller scale.

Axiom 3 opens the question of the relationship in the opposite direction to close the full circle (loop) of the main longitudinal vortex in 3D, perpendicular to the circle (outline) of the transverse vortex in 2D. The only answer is that in order not to break the basic laws of physics, the feedback of the main longitudinal vortex in 3D (not shown in Figure 3) must close in space containing elementary longitudinal vortex, generated and consumed by the main longitudinal vortex. This space is full of simple longitudinal vortexes, which are copies of the main longitudinal vortex, but in a much smaller scale. All longitudinal vortexes (simple and basic) form a new type of field, extending our notions of it as a form of matter.

So, based on Axiom 2 we can say:

**Law 3.** A pair of vortex objects in 2D conducts energy in a closed loop in one direction through their main transverse link, and in the opposite direction in the space between these objects, filled by simple transverse vortex.

On the basis of Axiom 3 we can write:

**Law 4.** A pair of vortex objects in 3D conduct energy in two closed loops perpendicular to each other: first-energy is conducted through their main transverse link (E2D) and is sent back through space between these vortex objects, filled with simple transverse vortex, and second-energy is conducted through their main longitudinal link (H3D) (perpendicular to the circle of 2D) and is sent back through the space between the objects filled with elementary longitudinal vortex.

So far we know nothing about the main longitudinal vortex (H3D), between the pair of vortex objects in 3D, as well as the space between them, filled with elementary longitudinal vortex. Perhaps the reason for emitting these simple longitudinal vortexes is the deceleration of the main longitudinal vortex (H3D -), and the reason for their movement in space between the pair of vortex objects in 3D, is the sucking of these simple longitudinal vortexes by the acceleratory movement of the other pair - a main accelerating longitudinal vortex (H3D +) (Figure 3).

### 3. Conclusion

(i) The transition from an even to uneven movement immediately created a couple of objects of uneven transverse vortex: an accelerating vortex as a generator and a decelerating vortex as a consumer.

(ii) A closed loop connection was formed: in one of the directions the link is physical, but in the opposite direction (the reverse link) it is in the space between the transverse vortex objects, filled with elementary transverse vortex.

(iii) The space between the transverse vortex objects is not an “empty” space; it is filled with elementary vortex and is a building block for the formation of pair of vortex objects in 2D.

(iv) The open uneven transverse objects in 2D create in their center a new vortex, but this time an open longitudinal vortex in 3D, perpendicular to the plane of the transverse vortex.

(v) These longitudinal vortices in 3D, also create a closed loop, but in a plane perpendicular to the plane of the transverse vortex 2D objects: In the one direction the link must also be physical, but in the opposite direction (the reverse link), it must be in the space between the vortex objects filled probably with simple longitudinal vortex.

(vi) The space between the two vortex objects in 3D is not “empty” as well, and must be filled with simple longitudinal vortex, which must be the building blocks for the formation of pair of vortex objects in 3D.

### References

- [1] L .D. Landau and E. M. Lifshitz, Theory of Fields, M. Science, 1988.
- [2] V. Markova, The other axioms (first part), Sofia, Nautilus, 2003.