

**The Phenomena of Superconductivity, According to the New Axioms and Laws**

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**Abstract**

The article describes the application of brand new field type through New Axioms and Laws. The present study uses Expanded Field Theory. It changes the Classic Field Theory to a much more general theory that consists of 2 new axioms and 8 laws. It was described from previous works of the same author. In this report is used only 2 axioms and 6 laws only.

It is known that Maxwell's laws (1864) are based on a single axiom [1]. It states that the movement in a closed loop leads to evenly movement (with constant speed) of a vector  $E$ :  $\text{div rot } E = 0$ . The author change this axiom with a new one, according which the movement in an open loop or vortex leads to unevenly movement (with variable speed) of a vector  $E$ :  $\text{div rot } E \neq 0$ ,  $\text{div } V$  or  $E \neq 0$  for vortex [2]. The subsequent results are: the evenly movement is replaced with unevenly movement which can be decelerating or accelerating; in 2D it exists a cross vortex and in 3D it exists a longitudinal vortex; the cross vortex in 2D is transformed to a longitudinal vortex in 3D through a transformation  $\Delta 1$ ; the longitudinal vortex in 3D is transformed to a cross vortex in 2D through special transformation  $\Delta 2$ ; decelerating vortex emits free cross vortices to the environment that are called "free energy"; accelerating vortex sucks the same ones free cross vortices and so on.

The vector  $E$  is not a simple. It turns to be a complex vector:  $E=A+iV$ ,  $E=V+iA$  or  $E=-A-iV$ ,  $E=-V-iA$ . It can has or amplitude  $A$  in a real part, or velocity  $V$  as a real part. Cross vortices can form two kinds vortices: a vortex that is generated by amplitude  $A$  and the vortex that is generated by velocity  $V$ . Each of these may be accelerating or decelerating. Both of them are generators. They are prototypes of material particles.

Due to the suction of cross vortices by the accelerating vortex the temperature decreases and due to the emitting of cross vortices by the decelerating field the temperature increases. Inside of the conductor the velocity of Electromagnetic field is constant. On the periphery it decelerates because of resistance to the wall of conductor.

This report offers a specific application of the above theory. In order to understand the nature of superconductivity we have to understand first the nature of conductivity by conductor. Then we can very easily model a superconductor by constructing it orthogonally on the conductor.

**Introduction**

The Classic Axiom in the Theory of the Electromagnetic Field certifies **Maxwell's laws (1864)**. It postulates that the movement of an electric vector  $E$  in a closed loop is evenly:

$$\text{div (rot } E) = 0, \quad 1.$$

where (rot  $E$ ) is the movement of the vector  $E$  in a closed loop;  $\text{div (rot } E)$  is the divergence (the variation in increase or decrease is zero) 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 movement in an open loop or a vortex and movement with a non-

constant or variable velocity  $V$ . Now is the time to break the restriction of Maxwell's axiom (1) and to expand the space of theory.

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 [2].

So the new axiom describes an open loop movement:

$$\text{div (rot } E) \neq 0. \quad 2.$$

For motion of vector  $E$  (rot  $E$ ) along open loop with monotone-decreasing or monotone-increasing velocity is equivalent to vortex (Vor  $E$ ).

## New Axioms

**Axiom 1.** The motion of vector with monotone-decreasing or monotone-increasing velocity becomes along an open vortices:  $\text{div}(\text{Vor}E) \neq 0$  for vector E in 2D or  $\text{div}(\text{Vor}H) \neq 0$  for vector H in 3D.

$$\text{div}(\text{Vor}E) > 0 \text{ or } \text{div}(\text{Vor}E) < 0 \text{ in 2D,} \quad 2a.$$

$$\text{div}(\text{Vor}H) > 0 \text{ or } \text{div}(\text{Vor}H) < 0 \text{ for 3D.} \quad 2b.$$

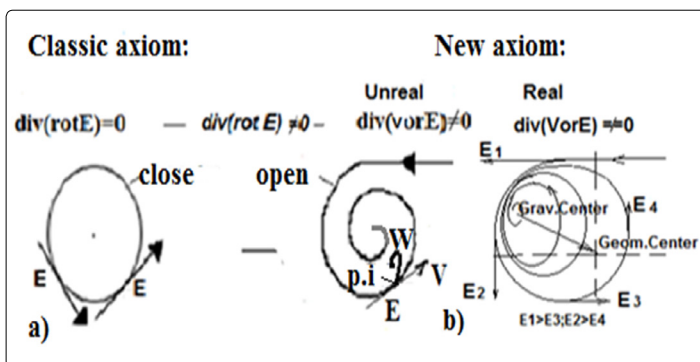
The main result of Axiom 1 is that there have been 4 types of vortices: a cross vortex in 2D ( $E_{2D}$ ) that can be accelerated ( $E_{2D}+$ ) or decelerated ( $E_{2D}-$ ) and a longitudinal vortex in 3D ( $H_{3D}$ ) that can also be accelerated ( $H_{3D}+$ ) or decelerated ( $H_{3D}-$ ), (Figure 1c,d) [3].

We are accustomed to the wrong image of a spiral with a constant distance between the turns. But it is “unreal” spiral (Figure 1, b) because if it is a spiral, it must be accelerated. If there is no acceleration, then it is not a spiral. The reason is in the acceleration of velocity. For example, in “real” decelerating vortex  $E1 > E3$  and the Geometric Center will aim to move to the larger vector E1 (up). In the same vortex  $E2 > E4$  and at the same time the Geometric Center will aim to move to the larger vector E2 (to the left). Therefore, the Geometric Center will move to a second quadrant or to the Gravity Center (Figure 1b) [3].

**Axiom 2: A pair of the complementary vortices forms a system**

**Consequences:** Two pairs of complementary vortices exist simultaneously, at the same time: one pair in one direction in 2D:  $+E1 = +A + iV$ ;  $+E2 = +V + iA$  and the complementary pair in opposite direction in 2D:  $-E1 = -A - iV$ ;  $-E2 = -V - iA$ .

A pair of complementary vortices that exists at the common time, it is connected by links, it exchanges energy and matter.



**Figure 1:** The classical axiom is replaced by a new axiom

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) (Figure 1b). The two simultaneous movements (V and W) also exist at all points of the vortex. The cross vortex ( $E_{2D}-$ ) is transformed into a longitudinal vortex ( $H_{3D}+$ ). This is accomplished through a specific operator ( $\Delta 1$ ) for cross-longitudinal transformation (Figure 2c).

The transformation  $\Delta 1$  connects two spaces with different qualities: space of cross vortex and space of longitudinal vortex.

## New Laws

**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  $\Delta 1$ :**

$$\text{Vor}(E_{2D}) \xRightarrow{\Delta 1} -\text{Vor}(H_{3D}), \quad 3.$$

Where Vor (means an unevenly vortex) replaces of rot (means a closed loop).

The cross vortex in 2D ( $E_{2D}$ ) continues its development in 3D as a longitudinal vortex ( $H_{3D}$ ) (Figure 2a), (Figure 2c).

Maxwell’s law states that rotor of vector E generates in center vector H:  $\text{rot} E = H$  [1].

The present Law 1 postulates that the cross vortex Vor ( $E_{2D}$ ) of E in 2D generates a longitudinal vortex Vor ( $H_{3D}$ ) of H in 3D. The sign (-) for Vor ( $H_{3D}$ ) 3D means that  $E_{2D}$  and  $H_{3D}$  have opposite dynamics. For example when  $\text{div}(\text{Vor} E_{2D}) < 0$  (is decelerated),  $\text{div}(\text{Vor} H_{3D}) > 0$  (is accelerated).

**Definitions:** A decelerating cross vortex ( $E_{2D}-$ ) is a cross open vortex ( $E_{2D}$ ) for which  $\text{div}(\text{Vor} E_{2D}) < 0$  (Figure 2a).

**Definitions:** A decelerating longitudinal vortex ( $H_{3D}-$ ) is a longitudinal open vortex ( $H_{3D}$ ) for which  $\text{div}(\text{Vor} H_{3D}) < 0$  (Figure 2b).

**Definitions:** An accelerating cross vortex ( $E_{2D}+$ ) outside is a cross open vortex ( $E_{2D}$ ) for which  $\text{div}(\text{Vor} E_{2D}) > 0$  (Figure 2c).

**Definitions:** An accelerating longitudinal vortex ( $H_{3D}+$ ) outside is a longitudinal open vortex ( $H_{3D}$ ) for which  $\text{div}(\text{Vor} H_{3D}) > 0$  (Figure 2d).

**Definitions:** The decelerating cross vortex ( $E_{2D}-$ ) inward generates an accelerating longitudinal vortex ( $H_{3D}+$ ) outward in its center through a physical transformation ( $\Delta 1-$ ) (Figure 2a). This transformation ( $\Delta 1-$ ) is achieved through a phenomenon called Full resonance (resonance in amplitude, frequency and phase).

**Consequence:** The open decelerating cross vortex ( $E_{2D}-$ ) generates inward an open accelerating longitudinal vortex ( $H_{3D}+$ ) outward. This action takes place from the center of decelerating cross vortex ( $E_{2D}-$ ) through a particular cross-longitudinal transformation  $\Delta 1-$ :

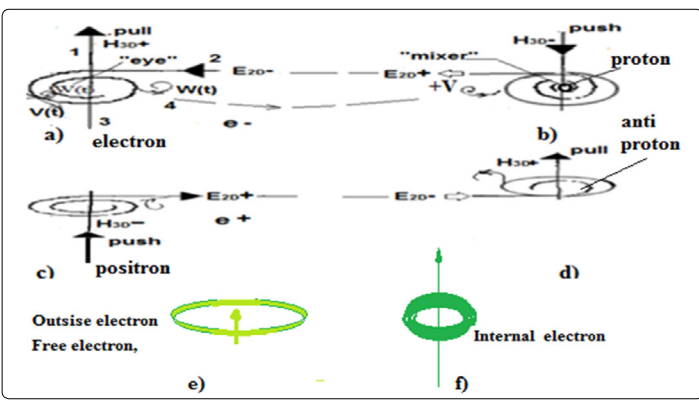
$$\text{Vor}(E_{2D}-) \xRightarrow{\Delta 1-} \text{Vor}(H_{3D}+). \quad 3a.$$

Figure 2a shows this transformation in 3D.

Actually it describes in 2D the model of electron as the decelerating inward vortex (dec (e-)) (Figure 2c) in the chain of proton-electron (Figure 2b - Figure 2a).

Every electron dec (e-) inward is in type: “expanded cross vortex of a thyroid and shortened longitudinal vortex”, (Figure 2e). It pulsates in 3D in two modes of: “in and out”. Surely this type of electron rotates at outside orbits (orbitals).

It is a model of free electron that exists outside of atom.



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

If Law1 generates in 3D a simple and single longitudinal vortex, it would describe the Expanded Maxwell's law for Electromagnetic Field:  $(\text{Vor } E)_{2D} = k (\text{Vor } H)_{3D}$ .

If Law1 generates in 3D a pipe - wrapped vortices from longitudinal vortices inserted into each other, it describes another field with properties inverse to the Electromagnetic Field - Actually it describes the Gravity Field as a Gravity Funnel. Gravity funnel is generated in 3D tube of longitudinal vortices as a longitudinal energy in pulling part outward (Figure2a) of the pair of complementary objects (Figure2b – Figure2a) [4, 5].

**Consequence:** The open accelerating cross vortex ( $E_{2D} +$ ) generates inward an open decelerating longitudinal vortex ( $H_{3D} -$ ) outward. This action takes place from the center of accelerating cross vortex ( $E_{2D} +$ ) through a particular cross-longitudinal transformation  $\Delta 1+$ :

$$\text{Vor } (E_{2D} +) \xRightarrow{\Delta 1+} \text{Vor } (H_{3D} -). \quad 3b.$$

This Consequence describes in 2D the model of electron ( $e^-$ ) as the accelerating inward vortex (acc ( $e^-$ )) (Figure2a) in the chain of proton-electron (Figure 2b - Figure 2a). Every electron ( $e^-$ ) of this type pulsates in 3D in two modes of: “expanded cross vortex and a shortened longitudinal vortex” and “shrunk cross vortex and extended longitudinal vortex”.

Every electron acc ( $e^-$ ) inward is in type: “shrink cross vortex of thyroid and extended longitudinal vortex”, (Figure 2f). It pulsates in 3D in two modes of: “in and out”. Surely this type of electron rotates at inside orbits (orbitals).

We immediately obtain the models of 2 types of electrons ( $e^-$ ) inward: dec ( $e^-$ ) and acc ( $e^-$ ) “electrons, which each of them pulsates in 3D: “in and out”.

The first type of electron (acc ( $e^-$ )): when the electron is inside a proton-electron system (connected in the atom) has accelerating cross vortex ( $E_{2D+}$ ) inward that generates a decelerating longitudinal vortex ( $H_{3D-}$ ) upward.

The second type of electron (dec ( $e^-$ )): when the electron is free (outside of the atom) has decelerating cross vortex ( $E_{2D-}$ ) inward, which generates an accelerating longitudinal vortex upward ( $H_{3D+}$ ).

When electron is free (second type (dec ( $e^-$ )), because of that the distance between electron and the corresponding proton becomes long, the decelerating cross link ( $E_{2D-}$ ) is broken. According to the Axiom 2, the accelerating longitudinal vortex ( $H_{3D+}$ ) radiates a fast ingredient that connects to the decelerating longitudinal vortex ( $H_{3D-}$ ) at input of the proton (Figure 2a- Figure 2b).

There is a significant difference in the states of a bound electron and a free electron. For example the scientists measure the mass of a free electron with a decelerating cross vortex ( $E_{2D-}$ ). The masses of the electrons, bound in atoms are very different and variable.

It exists another two consequences (not described in the article), but they describe decelerating or accelerating cross vortices to outward.

This is the 2 type of positrons: dec ( $e^+$ ) and acc ( $e^+$ ) outward in two modes: “expanded cross vortex of thyroid” and “shrunk cross vortex of thyroid”, that each of them pulsate in 3D: “in and out”, (Figure 2c).

For the opposite transformation a new operator  $\Delta 2$  is introduced to transform a longitudinal ( $H_{3D}$ ) into a cross ( $E_{2D}$ ) vortex. The physical nature of this  $\Delta 2$  transformation is quite different in comparison with  $\Delta 1$ .

The transformations  $\Delta 1$  and  $\Delta 2$  are orthogonal, rather than symmetrical to each other.

**Law 2: The open longitudinal vortex ( $H_{3D}$ ) generates an open cross vortex ( $E_{2D}$ ) in its center through a longitudinal-cross transformation  $\Delta 2$ :**

$$\text{Vor } (H_{3D}) \xRightarrow{\Delta 2} -\text{Vor } (E_{2D}) \quad 4.$$

**Consequence:** The open decelerating longitudinal vortex ( $H_{3D} -$ ) inward generates an open accelerating cross vortex ( $E_{2D} +$ ) outward. This action takes place in the center of accelerating cross vortex ( $E_{2D} +$ ) through a particular longitudinal-cross transformation  $\Delta 2-$ :

$$\text{Vor } (H_{3D} -) \xRightarrow{\Delta 2-} \text{Vor } (E_{2D} +). \quad 4a.$$

It is described in 2D the model of proton ( $p^+$ ) as the accelerating cross vortex outward (acc ( $p^+$ )) (Figure 2b) in the chain of proton-electron (Figure 2b - Figure 2a).

Every proton (acc ( $p^+$ )) is in type: “tight cross vortex of a ball and longer longitudinal vortex” (Figure 2b). Each of protons (acc ( $p^+$ )) of this type pulsates in time in 3D “in-out” (not is shown).

This Consequence refers to the pushing part (Figure2d) of the pair of complementary objects (Figure2c – Figure2d). The transformation  $\Delta 2-$  emphasizes that the movement of the longitudinal vortex ( $H_{3D}$ ) inward is the cause, but the movement of the cross vortex ( $E_{2D}$ ) outward is the result (Figure 2d).

**Consequence:** The open accelerating longitudinal vortex ( $H_{3D} +$ ) inward generates an open decelerating cross vortex ( $E_{2D} -$ ) outward in its center through a special longitudinal-cross transformation  $\Delta 2+$ :

$$\text{Vor } (H_{3D+}) \xRightarrow{\Delta 2+} \text{Vor } (E_{2D-}). \quad 4b.$$

A necessary condition for generating of elementary particle dec (p+) is the presence of free cross vortices called “free energy”, and a sufficient condition is the longitudinal vortex to work (from out to in) as a mixer (Figure 2b).

It is described in 2D the model of proton (p+) as the decelerating cross vortex outward (dec (p+)) (Figure 2b) in the chain of proton-electron (Figure 2b-Figure 2a).

Every proton dec (p+) has this type: “wider cross vortex of a ball and shorter longitudinal vortex” (Figure 2b). Each of protons dec (p+) of this type pulsates in time in 3D “in-out” (not is shown).

We immediately obtain the models of 2 types of proton: (dec (p+)) and (acc (p+)) in two modes: “tight cross vortex of a ball” and “wider cross vortex of a ball”. At the same time they pulsate in time in: “in-out”.

We immediately obtain the models of 2 types of proton: (dec (p+)) and (acc (p+)) in two modes: “tight cross vortex of a ball” and “wider cross vortex of a ball”. At the same time they pulsate in time in: “in-out”.

Similarly, we can describe: 2 types of positrons (outward) that pulse over time (Figure 2c) and 2 types of anti-protons that also pulse over time (Figure 2d).

### Conclusions

A necessary condition for generating of elementary particle (p+) is the presence of free cross vortices called “free energy”, and a sufficient condition is the longitudinal vortex to work (from out to in) as a mixer (Figure 3c, d).

If the Law 1 generates a simple and single longitudinal vortex, it would refer to the Electromagnetic field.

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

The two transformations  $\Delta 1$  (Law1) and  $\Delta 2$  (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 play the role of generators - one push, the other -pulls. Obviously in described above chain there is not the consumer. Therefore this chain has not energy losses (Figure 2).

For comparison: in every Electromagnetic chain has generator and one or more consumer’s. That’s why Electromagnetic chain has energy losses.

### Law 3: Accelerating and decelerating of the main vortex is going by internal logic as a nonparametric process through Positive Feedback.

The Law 3 shows that velocity  $V_i$  increases by redistribution with cross vortices. There is also redistribution of masses.

The mass of the cross vortices is added in portions (quanta) with acceleration to the initial mass of the longitudinal vortex with velocity  $V_i$  and thus accelerates it more and more.

The accelerating longitudinal vortex sucks in more cross vortices(quanta) from outside that accelerate further the longitudinal vortex with velocity  $V_i$  and so on .Thus the longitudinal vortex at output ( $V_i$ ) increases its velocity and acceleration which returns at input .The reason is that it sucks in more cross vortices and increases of the acceleration and mass to the entrance.

This process runs avalanche until it reaches a saturation level where the acceleration becomes maximum ( $a_{max}$ ) for a time slice  $\Delta t$ .

It is an example of the avalanche process. In the next cycle the accelerated longitudinal vortex again sucks in a portion (quantum) of the cross vortex and so on. Through Positive Feedback the level of saturation constantly increases, the time interval needed for saturation becomes longer, etc.

Positive Feedback turns the described above avalanche process from an amplifier to a generator process.

### Conclusions

The Positive Feedback in a longitudinal vortex turns the process of amplification to a process of generation. The Positive Feedback can be a base for constructing an energy generator.

As we saw above there are two qualitatively different movements at each (i) point p (i) of the decelerating vortex E: longitudinal vector velocity ( $V$ ) and cross vortex with amplitude ( $W$ ) (Figure 1b).The reason of that is the vector  $E$  is not a simple vector but it is a complex vector

According of Classic Mecanic, the simultaneous operation of two independent vectors is equal to the sum of these vectors. But according of new Axioms and Laws, simultaneous operation of two mutual dependent vectors is equal to the multiplication of these vectors.

Even more the transforming one vector ( $V$ ) in 1D into a vortex ( $W$ ) in 2D and vice versa is a nonparametric process. Transformation is done by internal laws but not by outside setting .

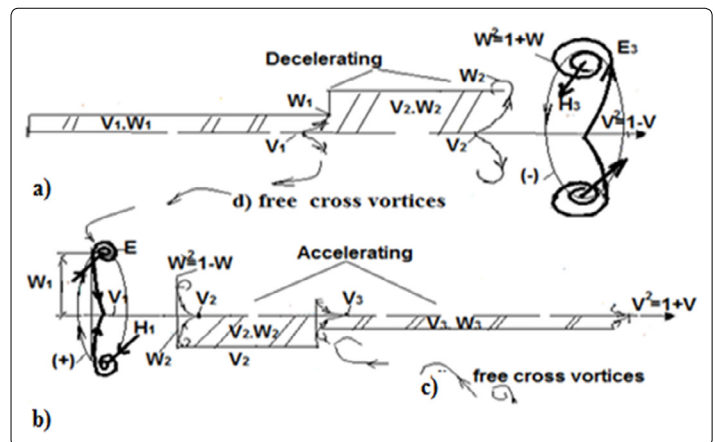


Figure 3: Decelerating-accelerating vortices



The nonparametric transformation of two variables  $V(t)$  and  $W(t)$  is mathematically described by the product  $V(t) \cdot W(t)$  of these variables.

**Law 4: For an uneven (accelerating or decelerating) vortex the product between current velocity ( $V_i$ ) of longitudinal movement on one and the same current line and current amplitude ( $W_i$ ) of its perpendicular cross vortices is a constant in every (i) step:**

$$(V_i) \cdot (W_i) = \text{const.} \quad 5.$$

Where  $i = 0 \div \infty$  is current point from step to step.

The product  $(V_i) \cdot (W_i)$  is proportional to the current power  $(P_i)$  of the uneven vortex in current (i) step. The current power  $(P_i)$  of the uneven vortex is a constant in every (i) step (Figure 3a), (Figure 3b).

**Law 5: The deceleration vortex in 2D is described with a system of 2 equations in which: longitudinal velocity ( $V$ ) decreases in (n) portions ( $\psi^n$ ) times; the amplitude ( $W$ ) increases in (n) portions ( $\psi^n$ ) times:**

$$\begin{aligned} I V^2 &= V_0 (V_0 - V), \\ I W^2 &= W_0 (W_0 + W), \end{aligned} \quad 6.$$

Where  $v_n, w_n$  are periodic roots with period  $n$ ;  $v_n, w_n$  are **mutual orthogonal** that fulfill the requirement for orthogonality:  $v_n \cdot w_n = V_0 \cdot W_0$ ;  $v_n \cdot \omega_n = V_0 \cdot W_0$ ;  $n = 0 \div \infty$ ; the roots  $v_n, w_n$  are expressed as:  $v_n = (1/\psi^n) \cdot V_0$ ,  $\omega_n = \psi^n \cdot W_0$ ; linear velocity  $V_0$  is the starting value of  $V_n$ , amplitude of cross vortex  $W_0$  is the starting value of  $w_n$ ;  $\psi$  is a proportional that fulfills the requirement:  $\psi - 1/\psi = 1$ .

**Consequence:** The deceleration vortex in 3D is described with a system of 4 equations in which: longitudinal velocity ( $V$ ) decreases in (n) portions ( $\psi^n$ ) times; the angular velocity ( $w$ ), the amplitude ( $W$ ) and the number ( $N$ ) of cross vortices increase in (n) portions ( $\psi^n$ ) times:

$$\begin{aligned} I V^2 &= V_0 (V_0 - V), \\ I W^2 &= W_0 (W_0 + W), \\ I w^2 &= w_0 (w_0 + w) \\ I N^2 &= N_0 (N_0 + N) \end{aligned} \quad 6a.$$

Where  $v_n, w_n$  are periodic roots with period  $n$ ;  $v_n, w_n$  are **mutual orthogonal** that fulfill the requirement for orthogonality:  $v_n \cdot w_n = V_0 \cdot W_0$ ;  $v_n \cdot \omega_n = V_0 \cdot W_0$ ;  $n = 0 \div \infty$ ; the roots  $v_n, w_n$  and  $\omega_n$  and  $n_n$  are expressed as:  $v_n = (1/\psi^n) \cdot V_0$ ,  $\omega_n = \psi^n \cdot W_0$ ;  $w_n = \psi^n \cdot W_0$ ;  $[n_n] = \psi^n \cdot N_0$ ; linear velocity  $V_0$  is the starting value of  $V_n$ , amplitude of cross vortex  $W_0$  is the starting value of  $w_n$ , angular velocity  $w_0$  is starting value of  $w_n$ , **number  $N_0$  is starting value of  $n_n$ ,  $[n_n]$  is the closest integer**;  $\psi$  is a proportional that fulfills the requirement:  $\psi - 1/\psi = 1$ .

**It is noteworthy that:** When starting number  $N_0 = 1$  the number  $n_n$  is calculated with the row: 1;1.62; 2.62;4.25; 6.88, 11.15;18.07; 29.28;47.43,...The closest integer  $[n_n]$  form row: 1,2,3,4,7,11,18,29,47,..For comparison, **Fibonacci's order** is: 0,1,1,2,3,5,8,13,18,21,34,... Obviously there is a similarity between the two rows at the beginning. But finally (after 18<sup>th</sup>) the number  $[n_n]$  **rises sharply** (29>21, 47>34...) compared to the **order of Fibonacci**.

A decelerating vortex ( $E_{2D-}$ ) with a velocity vector ( $V$ ) **emits** to the environment decelerating vortices with increasing amplitude ( $W$ ) **(because of sign + in second equation of system 6a.)**

The amplitude ( $W$ ) increases in **perpendicular direction** to the velocity vector ( $V$ ).

In decelerating longitudinal vortex, the amplitude ( $W$ ) increases only if it is directed from the inside to the outside, i.e. If the decelerating vortex emits outward cross vortices with increasing amplitude ( $W$ ) (Figure 3b).

**Conclusions:** The emitting of decelerating cross vortices to environment in perpendicular direction forms so called "quanta" and this process is called "quantum".

According to the Law 1 and Rule of the Right Hand, the decelerating cross vortex ( $E$ ) generates at the center to outside (to left) a longitudinal vortex ( $H$ ). So at every  $n_i$  point forms left rotating wheel perpendicular to the velocity ( $V$ ).

Therefore, the decelerating longitudinal vortex in 3D forms left rotating spiral (left- counterclockwise when observer watches against the movement). Decelerating longitudinal vortices rotate counterclockwise (-), watched against the movement (Figure 3a).

A necessary condition for generating of elementary particle ( $p^+$ ) is the presence of free cross vortices called "free energy", and a sufficient condition is the longitudinal vortex to work (from out to in) as a mixer (Figure 3c, d).

Because of increasing of the amplitude ( $W$ ) the angular velocity ( $w$ ) and the number of cross vortices ( $N$ ) it forms decelerating, **thickening and expanding left rotating Funnel** in which:  $W_{\max}$ ;  $w_{\max}$ ;  $N_{\max}$

Two or more decelerating longitudinal vortices **repel each other**. The reason is due to the emission of cross vortices from center to outside.

**Law 6: The acceleration vortex in 2D is described with a system of 2 equations in which: longitudinal velocity ( $V$ ) increases in (n) portions ( $\psi^n$ ) times; the amplitude ( $W$ ) decreases in (n) portions ( $\psi^n$ ) times:**

$$\begin{aligned} I V^2 &= V_0 (V_0 + V), \\ I W^2 &= W_0 (W_0 - W), \end{aligned} \quad 7.$$

Where  $v_n, w_n$  are  $n$  periodic roots with period  $n$ ;  $v_n, w_n$  are **mutual orthogonal** that fulfill the requirement for orthogonality:  $v_n \cdot w_n = V_0 \cdot W_0$ ;  $v_n \cdot \omega_n = V_0 \cdot W_0$ ;  $n = 0 \div \infty$ ; the roots  $v_n, w_n$  are expressed as:  $v_n = (\psi^n) \cdot V_0$ ,  $\omega_n = (1/\psi^n) \cdot W_0$ ; linear velocity  $V_0$  is the starting value of  $V_n$ , amplitude of cross vortex  $W_0$  is the starting value of  $w_n$ ;  $\psi$  is a proportional that fulfills the requirement:  $\psi - 1/\psi = 1$ .

**Consequence:** The acceleration vortex in 3D is described with a system of 4 equations in which: longitudinal velocity ( $V$ ) increases in (n) portions ( $\psi^n$ ) times, the angular velocity ( $w$ ), the amplitude ( $W$ ) and the number ( $N$ ) of cross vortices decrease in (n) portions ( $\psi^n$ ) times:

$$\begin{aligned} I V^2 &= V_0 (V_0 + V), \\ I W^2 &= W_0 (W_0 - W), \end{aligned} \quad 7a.$$

$$\mathbf{I} \mathbf{w}^2 = \mathbf{w}_0 (\mathbf{w}_0 + \mathbf{w})$$

$$\mathbf{I} \mathbf{N}^2 = \mathbf{N}_0 (\mathbf{N}_0 + \mathbf{N})$$

Where  $v_n, w_n$  are periodic roots with period  $n$ ;  $v_n, w_n$  are **mutual orthogonal** that fulfill the requirement for orthogonality:  $v_n \cdot w_n = V_0 \cdot w_0, v_n \cdot \omega_n = V_0 \cdot \omega_0; n = 0 \div \infty$ ; the roots  $v_n, w_n$  and  $\omega_n$  and  $n_n$  are expressed as:  $v_n = (\psi^n) \cdot V_0, \omega_n = (1/\psi^n) \cdot \omega_0, w_n = (1/\psi^n) \cdot W_0, n_n = (1/\psi^n) \cdot N_0$ ; linear velocity  $V_0$  is the starting value of  $V_n$ , amplitude of cross vortex  $W_0$  is the starting value of  $w_n$ , angular velocity  $\omega_0$  is starting value of  $\omega_n$ , **number  $N_0$  is starting value of  $n_n$** ;  $\psi$  is a proportional that fulfills the requirement:  $\psi - 1/\psi = 1$ .

The first positive root of the first equation (of 6, 7) is:  $v_1 = \psi \cdot V_0 = 1, 62, V_0$ . The periodic roots of the first equation (of 6, 7) are obtained from the expression:  $v^n = V_0 \cdot (v^{n-1} + v^{n-2})$ .

The first positive root of the second equation (of 6, 7) is:  $w_1 = (1/\psi) \cdot W_0 = 0, 62, W_0$ . The periodic roots of the second equation (of 6, 7) are obtained from the expression:  $w^{n-2} = W_0 \cdot (w^n - w^{n-1})$ .

**Conclusions:** An accelerating vortex ( $E_{2D}^+$ ) with a velocity vector ( $V$ ) **sucks in** accelerating vortices with decreasing amplitude ( $W$ ) in perpendicular direction (**because of sign - in second equation of system 7a**).

The sucking of accelerating cross vortices from environment in perpendicular direction forms so called “quanta” and this process is called “quantum”.

According to the Law 1 the accelerated cross vortex ( $E_{2D}^+$ ) generates (sucking) to its center a longitudinal vortex ( $H_{3D}$ ) from the outside to inside (to the right). At each point (i) a right rotating wheel is formed. The spiral vortex in 3D is formed as a right rotating spiral. Therefore, the acceleration vortex will twist to the right – clockwise (+), viewed against the movement (Figure 3b).

Accelerating longitudinal vortices wind clockwise (+), watched against the movement (Figure 3b).

Because of the amplitude ( $W$ ), angular velocity ( $w$ ) and the number of cross vortices ( $N$ ) decreases it forms accelerating, **stretching, narrowing, right rotating Funnel** in which:  $W_{min}, w_{min}, N_{min}$  (Figure 3b).

Two or several accelerating longitudinal vortices, **due to the suction of cross vortices**, attract each other.

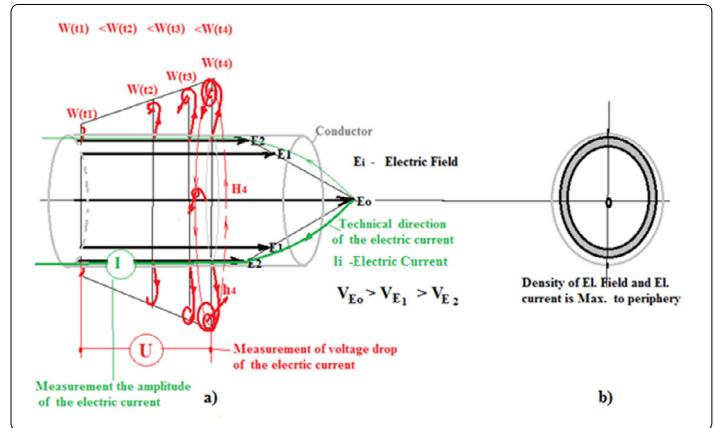
### The Essence of Conductivity Phenomena According to the New Axioms and Laws

As understood by Consequence of Law 1 (3a), the free electrons and electrons from the outer orbits of the atom are represented by a decelerating vortices inward, while the electrons from the inner orbits of the atom are represented by accelerating vortices inward.

According to Law 5, free electrons have an inflated cross vortex and a contracted longitudinal vortex, so they have the form of a very thin and empty pulsating toroid. Those electrons, which are bound in atomic orbits, are more collapsed along the cross component (the toroid is less) and longer in the longitudinal component. The electrons of the outer orbits are more collapsed, than the electrons of the inner orbits, so they have the form of a

very collapsed and pulsating toroid both types of electrons pulsate in time as out – in.

In center of a common conductor, the electric field has maximum speed because it has minimal resistance. In the outer cylinder, the electric field has a lower speed because the resistance is greater. Thus, at the periphery of the conductor, the cylinder of the electric field has a minimum velocity because it has maximum resistance in the cylinder at the boundary surface of the conductor (Figure 4a).



**Figure 4:** The Conductivity in ordinary conductor

In the periphery of the conductor, according to Law 5, cross vortices are emitted from the conductor to environment. They release heat and increase the temperature of the space around the conductor. According to Law 5, these cross vortices increase their amplitude ( $W_i$ ) in the direction of moving of Electric field ( $E_i$ ), so that at the end of the conductor and at the final time point, their amplitude is maximum (Figure 4a).

The difference between the final and start amplitudes is proportional to the voltage drop ( $u$ ). The voltage magnitude difference is measured with a voltmeter ( $U$ ).

The difference in speed causes the center of the Electricity field to appear first in time ( $t_0$ ), then the field from the outer adjacent cylinder ( $t_1$ ), etc., appears, and finally the field from the peripheral cylinder appears ( $t_n$ ) (Figure 4a).

Thus, in time, the so-called Back wave is obtained, which is interpreted by engineers as the Technical Direction of Electricity Current ( $I$ ). If we sequentially place a measuring instrument, such as an ammeter, it will measure the amplitude of electricity current ( $I$ ) in the opposite direction to the electric field ( $E$ ) (Figure 4a).

According to Law 1, every decelerating cross vortex emits an accelerating longitudinal vortex ( $h_i$ ) from its center, such as an electron. For a decelerating electric field, both Law 1 and Law 5 apply. The electric field ( $E$ ), due to the friction and resistance of the boundary surface, according to Law 5, generates decelerating cross vortices ( $W_i$ ), which radiates outward from the conductor in the form of heat (defined by the right hand rule). These longitudinal vortices ( $h_i$ ) form a wheel-closed vortex ( $H_i$ ) in a direction corresponding to the delayed electric field. The closed vortex direction ( $H_i$ ) is to the left when viewed against the direction of

motion of the electric field (E) and to the right if viewed against the direction of the electric current (I) (Figure 4a).

Conductivity over a common conductor (for example, a copper conductor) is characterized by a maximum density of electrical lines to the periphery, where the velocity decreases to a minimum, and a minimum density at the center, where the velocity is maximum (Figure 4b).

## The Essence of Superconductivity Phenomena According the New Axioms and Laws

### The Electric Current (I) is Decelerating

The new approach will be such that the superconductivity design (Figure 5) should be orthogonal to the conductivity design (Figure 4).

We can construct superconductor as we glue, for example, a silver in periphery and cantal alloy in center.

It is possible to achieve superconductivity on normal temperature. The Conductivity in a Superconductor must be characterized by a maximum density of electrical lines to the center, where the velocity decreases to a minimum, and a minimum density in the periphery, where the velocity is maximum (Figure 5).

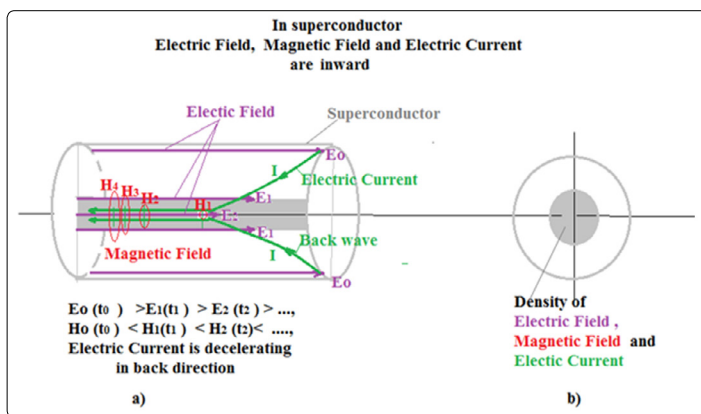


Figure 5: The Electric Current (I) is decelerating

In the case of a superconductor, the electric field (E<sub>0</sub>) in the center, there should be a minimum speed because it must have maximum resistance. In the outer cylinder, the electric field (E<sub>1</sub>) will have a higher speed because the resistance will be less. Thus, at the periphery of the conductor, the electric field cylinder (E<sub>2</sub>) will have maximum velocity because it has minimal resistance (Figure 5a).

This effect can be achieved constructively by constructing the peripheral layer of the cylinder of the conductor from silver (Ag), which has a low specific resistance.

According to Law5, due to the friction and resistance of the material in the center of the superconductor, the Electric Field (E) generates delayed cross vortices, which radiates inward in the form of heat. So in center the temperature will increase (Figure 5a).

According to Law 1, these delayed transverse vortices radiate from the center of the transverse vortex - outward accelerating longitudinal vortices (h<sub>1</sub>) in the direction defined by the right-hand rule (Figure 2a, Figure 4a).

These longitudinal vortices form a wheel-closed vortex (H<sub>1</sub>) with increasing amplitude in a direction coinciding with the direction of the electric field (E<sub>1</sub>). The closed vortex direction is to the left when viewed against the direction of motion of the electric field (E) and to the right if viewed against the direction of the electric current (I) (Figure 5a).

The difference in velocities causes the Electricity field in the periphery to appear first in time (E<sub>0</sub>), then- the Electricity field from the inner adjacent cylinder (E<sub>1</sub>), etc., and finally the field appears in the center itself (Figure 5b).

This effect can be obtained constructively by incorporating a metal cylinder with a higher specific resistance in the center of the superconductor.

Thus, in time, the so-called **decelerating Back wave** is obtained from periphery to center, which is interpreted by engineers as the **Technical Direction of Electricity (I)**.

Unlike the direction of the electric current in a conductor that has a direction from the center to the periphery, the direction of the electric current in the superconductor will have a direction from the periphery to the center.

This is the reason that there will be **no losses of energy in the surrounding space**. At the same time, the magnetic field is located in center of the conductor and there is no radiation outside.

The fact that , the electric field (E) , the magnetic field (H) , and the electric current (I) propagate inside the conductor is the reason for **the absence of energy loss** in the form of radiation (Figure 5a & 5b).

The Conductivity in a common conductor (for example a copper conductor) is characterized by a maximum density of electrical lines to the periphery, where the velocity decreases to a minimum, and a minimum density - in the center, where the velocity is maximum (Figure 4b).

The Conductivity in a Super conductor ( for example a silver in periphery and cantal alloy in center ) is characterized by a maximum density of electrical lines to the center, where the velocity decreases to a minimum, and a minimum density - in the periphery, where the velocity is maximum (Figure 5b).

### The Electric Current (I) is Accelerating

Technological construction of the superconductor is done by gluing minimum of 3 pipes of metal or alloy. They must be incorporated and nested into each into other because they have different resistances R (or specific resistances ρ).

For example, the most peripheral tube will be of silver, the inner one -of copper and the innermost one -of cantal alloy.

Because of cantal alloy in center, the Electric field (E) is very delayed and it emits cross vortices and forms the magnetic field (H). It is concentrated in the center and therefore there is no loss. Electric current (I) is accelerated to the center and it does not release heat and loss.

-In this kind of superconductor, the electric field ( $E_0$ ) in the periphery, there should be a maximum speed because it must have minimum resistance (metal silver). In the inner cylinder, the electric field ( $E_1$ ) will have a lower speed because the resistance of cooper will be bigger (Figure 6).

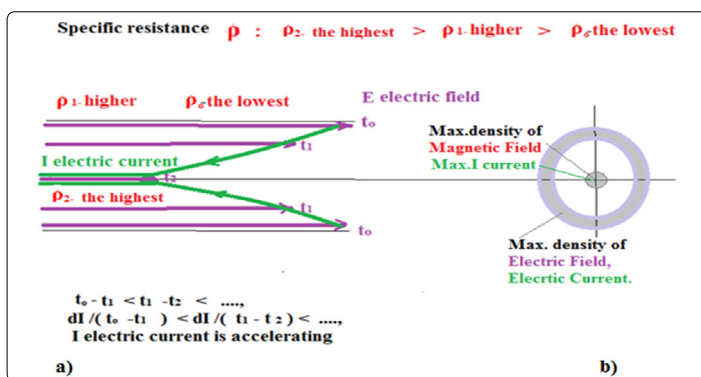
According to Law5, due to height resistance of the material in the center of superconductor, the Electric Field ( $E_1$ ) generates little delayed cross vortices to outside that are radiated in the center. According to Law 1, these delayed cross vortices generate from the center of the cross vortex - outward accelerating longitudinal vortices( $h_1$ ) in the direction defined by the right-hand rule. These longitudinal vortices( $h_1$ ) form a wheel-closed vortex ( $H_1$ )with increasing amplitude in a direction coinciding with the direction of the electric field ( $E_1$ ). The closed vortex direction is to the left when viewed against the direction of motion of the electric field ( $E_1$ ) and to the right if viewed against the direction of the electric current ( $I$ ) (Figure 2a, Figure 4a).

The difference in velocities causes the Electricity field in the periphery to appear first in time ( $E_0$ ), then- the Electricity field from the inner adjacent cylinder ( $E_1$ ), etc., and finally the field appears in the center itself. This effect can be obtained constructively by incorporating a metal cylinder with a higher specific resistance in the center of the superconductor (Figure 6a).

According to Law 6, due to accelerating moving of Electric Current ( $I$ ), it will sucks in the free cross vortices that have been previously emitted.

According to the Law 3 and Law4 this Electric Current ( $I$ ) accelerate itself more and more.

**This is done because the mass and energy of cross vortices will add to the flow of accelerating Electric Current ( $I$ ) and will increase it more and more.**



**Figure 6:** The Electric Current ( $I_1$ ) is accelerating

The **accelerating Back wave** is obtained from periphery to center, which is interpreted by engineers as the Technical Direction of Electricity ( $I$ ).

The direction of the electric current in a conductor has a direction from the center to the periphery. The direction of the **accelerating electric current** in the superconductor will have a direction from the periphery to the center. This is the reason that there will be no losses in the surrounding space. The magnetic field is located in center of the conductor and there is no radiation outside.

The reason for the absence of energy loss in the form of radiation is the fact that, the electric field ( $E$ ), the magnetic field ( $H$ ), and the electric current ( $I$ ) propagate inside the conductor is the reason for the absence of energy loss in the form of radiation (Figure 6a, Figure 6b).

The described Superconductor is characterized by a maximum density of electrical field ( $H$ ) to the periphery, where the velocity is maximum, and by a minimum density - in the center, where the velocity is minimum (Figure 6a) [6-8].

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