

# Generating the Nucleus of the Atom by an Accelerating Longitudinal Funnel Based on the New Axioms and Laws

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Submitted: 2024, Dec 11; Accepted: 2025, Jan 27; Published: 2025, Feb 05

**Citation:** Markova, V. (2025). Generating the Nucleus of the Atom by an Accelerating Longitudinal Funnel Based on the New Axioms and Laws. *Adv Theo Comp Phy*, 8(1), 01-11.

## Abstract

*The Theory of new Axioms and Laws is created by the same author. It claims that elementary particles includes simultaneously 2 different vortices: transverse vortex and longitudinal vortex. They transform one into another, when the one vortex increases, the second vortex decreases and vice versa.*

*The transverse vortex is open, transversely coiled in 2D and pulsates in time  $T$ . Thus it forms pulsating transverse vortex that spread in space as transverse concentric waves. Every points on this transverse wave move with a constant time. In this real time- space time is constant:  $T = \text{const}$ . This is the time-space of light waves and Electromagnetic waves.*

*The longitudinal vortex is also open, but is wound longitudinally in 3D and pulsates in time  $T$ . The both vortices can move with positive or negative acceleration.*

*According the Theory of new Axioms and Laws the proton is created by a decelerating longitudinal funnel. The nucleus is created by an accelerating longitudinal funnel. If longitudinal vortex is accelerating (or it has positive acceleration) it suck in all free vortices toward itself. Thus the spirals of longitudinal vortices are attracted, they pack and tighten themselves. They inserted each inside other and thus they form an accelerating longitudinal funnel. All parameters of vortices are changing depending the row of the spirals inserted inwards. Only the length of all spiral remains a constant. Thus the length of the central spiral, the length of adjacent more outer spiral and so on to the peripheral spiral is always one and the same:  $S = \text{const}$ . Thus the longitudinal accelerating funnel generate an unique Gravitational time-space with the constant  $S$ .*

*The protons in nucleus of atom is gathered, tightened and compacted by accelerating longitudinal funnel in time -space  $S = \text{const}$ . The central longitudinal spiral has maximal longitudinal velocity (to direction of the movement) and minimal angular speed (along radius of rotation). That is why the central protons have minimal transverse radius, they look like to invisible points. The more outer spiral of accelerating funnel has less longitudinal velocity but bigger angular speed. These protons have bigger transverse radius and they look like to weakly visible points and so on. The peripheral spiral has minimal longitudinal velocity and maximal angular speed. Thus the protons in peripheral shell of nucleus have maximal transverse radius and look like to visible expanded spheres with maximal radius. As a result of properties of peripheral spiral of accelerating longitudinal Funnel, only the protons that are in periphery shell of nucleus are inflated, visible and are perceived as particles.*

## 1. According the Theory of new Axioms and Laws

According the Axiom of Classical Field Theory:  $\text{div}(\text{rot } E) = 0$ , (Figure 1, Ia) [1].

**According new Axiom1:** A field in which the vector E moves with a monotonically non-uniform speed (decelerating or accelerating) becomes an open vortex field structure:  $\text{div}(\text{rot } E)$  is not equal to zero (0) (Figure 1, Ib) [2-4].

The Axiom 1 claims that there are 2 type open vortices - transverse (in plane 2D) (Figure 1, Ic) and longitudinal (in volume 3D) (Figure 1Id). Each of them can be accelerating or decelerating. Therefore, we receive 4 type of open vortices.

**According Axiom2:** There are mutually orthogonal field structures that form a resonant system by exchanging energy and matter with each other, (Figure 1, II a,b). [2-4].

Axiom2 claims that orthogonal pairs form 6 pairs of particles (connected in the right direction) and 6 pairs of antiparticles (connected in the opposite direction) (Not pictures). The main pair of particles is electron – proton (Figure1,IIc,d). Their generating direction is from proton to electron. There are pair and inverse direction that form positron and antiproton.

**According Law1:** A decelerating transverse vortex in plane 2D generates in its center perpendicular in volume 3 D accelerating longitudinal vortex (Figure 1,IIc: electron) [3,4].

**According Law2:** A decelerating longitudinal vortex in volume 3D generates in center of perpendicular plane in 2D an accelerating transverse vortex (Figure 1,IIId: proton) [4,5].

**Law 5 for 2D:** The main decelerating vortex (in 2D) decreases in (n) portions ( $\psi^n$ ) times; the emitted primary transverse vortices increases in (n) portions ( $\psi^n$ ) times, where  $\psi$  is equal to the Golden proportion (Figure 1e) [5,6].

**Law 5 for 3D:** The *decelerating* 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:

$$I \quad V^2 = V_0 (1 - V), \quad 1$$

$$I \quad W^2 = W_0 (1 + W),$$

$$I \quad w^2 = w_0 (1 + w),$$

$$I \quad N^2 = N_0 (1 + N).$$

where  $v_n, w_n$  are periodic roots with period n;  $v_n, w_n$  are **mutual orthogonal** that fulfill the requirement for orthogonality:  $v_n \cdot w_n = V_0 \cdot W_0, v_n \cdot \omega_n = V_0 \cdot W_0; n = 0 \div \infty$ ; 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  $\omega_n$ , 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:  $\psi - 1/\psi = 1$ ,  $\psi$  is known as Golden ratio (Figure1,IIIa) [4-6].

In Space where we live the most movements are decelerating. The reason is that the transverse vortices have density and their some kind of mass. The result is that this Space is full of transverse vortices and they exerts resistance. The corresponding Space-Time is described by constant of Time (as a proportion).

According Law 5 for pulsating in Time (T), the transverse vortex coiled in electron and proton pulsates in time (T) as well.

- In the initial phase, when the electron shrinks it decreases in volume. The reason is that the velocity at the entrance of the transverse vortex is high because the acceleration is positive. This means, in short, that the velocity of the entrance of the transverse vortex of the electron, is accelerated.

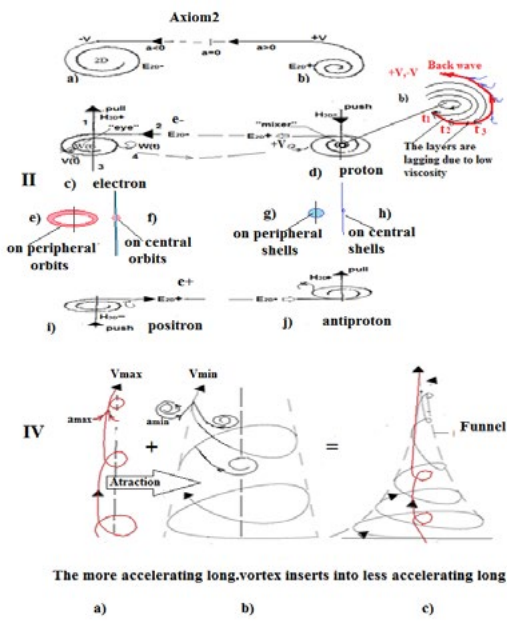
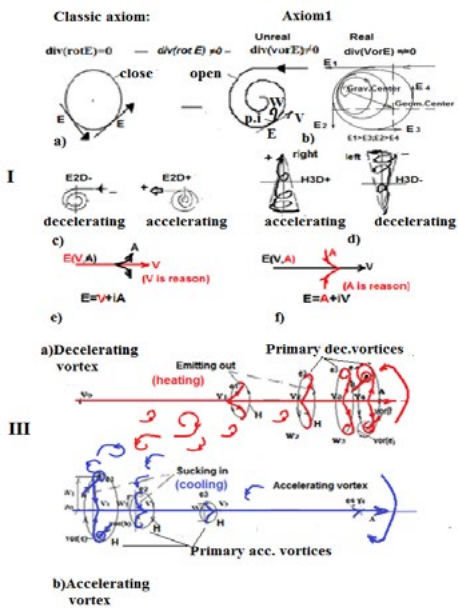
**Law 6 for 2D:** The main accelerating vortex (in 2D) has increasing longitudinal velocity (V) and sucks inward many primary accelerating vortices with decreasing amplitudes (W), where at every i-th step the variable is changed by a degree (i) of the parameter  $\psi$  or ( $\psi^i$ ), where  $\psi$  is equal to the Golden proportion (Figure 1f) [5,6].

I a) Classic Axiom :closed vortex, b) New Axiom1:open eccentric vortex, c) Transverse decelerating and accelerating vortices, d) Longitudinal accelerating and decelerating vortices, e) Decelerating vortex emits dec. primary vortices: Law5,f) Accelerating vortex suck in acc. primary vortices: Law6.

II New Axiom2: a) Model of first orthogonal object, b) Model of second orthogonal object, c) Model of electron: Law1 in pull passive, d) Model of proton: Law2 in push active, e) Model of positron: Law1 in push passive, f) Model of antiproton; Law2 in pull active

III a) Decelerating vortex with decreasing velocity emits dec. primary vortices with increasing amplitudes: Law5, b) Accelerating vortex with increasing velocity sucks in acc. Primary vortices with decreasing amplitudes: Law6.

IV a) Longitudinal vortex with max. velocity, max acceleration, min amplitude and min. number of loops, b) Longitudinal vortex with min. velocity, min acceleration, max. amplitude and max. number of loops, c) Longitudinal vortex with max. velocity attracts long. vortex with min. velocity and inserts himself in center of slowest one.



The more accelerating long.vortex inserts into less accelerating long.vortex

**Law 6 for 3D:** The *accelerating* 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 ( $N_n$ ) of cross vortices decrease to zero in (n) portions ( $\psi^n$ ) times:

$$\begin{aligned}
 \mathbf{I} \quad V(t)^2 &= V_0 (V_0 + V(t)), \\
 \mathbf{I} \quad W(t)^2 &= W_0 (W_0 - W(t)), \\
 \mathbf{I} \quad w(t)^2 &= w_0 (w_0 - w(t)), \\
 \mathbf{I} \quad N^2 &= N_0 (N_0 - N_n),
 \end{aligned}
 \tag{2}$$

where the roots  $v_n$ ,  $w_n$  and  $\omega_n$  and  $n_n$  are expressed as:  $v_n = (\psi^n) \cdot V_0$ ,  $\omega_n = (1/\psi^n) \cdot W_0$ ,  $w_n = (1/\psi^n) \cdot W_0$ ,  $n_n = (1/\psi^n) \cdot N_0$ ; linear velocity  $V_0$  is the starting value of  $V_n$ , amplitude of cross vortex  $W_0$  is the starting value of  $\omega_n$ , angular velocity  $w_0$  is starting value of  $w_n$ , number  $N_0$  is starting value of  $n_n$ ;  $\psi$  is a Golden proportion that fulfills the requirement:  $\psi - 1/\psi = 1$ ;  $v_n, w_n, n_n$  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:  $v_n = (\psi^n) \cdot V_0$ ,  $\omega_n = (1/\psi^n) \cdot W_0$ ,  $w_n = (1/\psi^n) \cdot W_0$ ,  $n_n = (1/\psi^n) \cdot N_0$ .

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

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

Therefore when velocity (V) increases, the amplitude (W) decreases so that at each step ( $n_i$ ) (according to Consequence of Law 4 and the Law of movement Conservation) the product ( $V_i \cdot W_i$ ) is a constant (Figure 4a). For an accelerating longitudinal vortex, the amplitude (W) decreases **only** if it is directed from the outside to inside, ie. if the accelerating vortex sucks in cross

vortices with decreasing amplitude (W) (Figure 1,IIb) [4-6].

## 2. The Nucleus of the Atom According the Theory of new Axioms and Laws

According Law 6(2) of the Theory of new Axioms and Laws accelerating longitudinal vortices have property to suck each other. Because they insert one into another they form accelerating longitudinal Funnel. The fastest vortex inserts in center, the slower rolls up outside it, and so on, and the slowest vortex rolls up at periphery.

According the Theory of new Axioms and Laws the nucleus of the atom have to be compacted by an Accelerating Gravitational Funnel. The special thing is that this kind of Funnel exists in a completely new time-space with constant length:  $S = \text{const}$ . This space is built by many longitudinal vortices. If longitudinal vortices are decelerating vortices they form decelerating Funnel. The whole complex system is self-regulating and self-adjusting so that they work in one direction – **to repel each other**.

In our case the longitudinal vortices are accelerating. The whole complex system is self-regulating and self-adjusting so that they work in one direction - **to attract each other**. The accelerating vortices work in cooperation according to the size and qualities of their parameters. For example they act cooperatively depending on the longitudinal velocity (V), the angular speed (w) and the orbital velocity (v). The whole complex system is self-regulating and self-adjusting so that they work in one direction: to suck in each other.

The special thing is that all vortices (that are wound into each other) have the same length S. The length of the central vortex, the length of the adjacent outer vortex and of the more outer vortex and so on to the periphery vortex are equal to a constant. Thus the vortices organize a Space of Funnel with a unique constant:  $S = \text{const}$ .

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## 2.1. The Gravity Funnel

According to Axiom 2, the electron is orthogonal to the proton and is paired with the proton (Figure1, II a,b). That is why the both of them work in a resonant system, exchanging energy and matter. According to Law 1, the electron is generated by a decelerating transverse vortex (Figure1, II c).

According to Law 2, the proton is generated by a decelerating longitudinal vortex (Figure1, II d). Indeed the proton is generated by decelerating part of decelerating Funnel while in center of Funnel pass accelerating vortex and it goes out of the proton. The result of this longitudinal Funnel is that the decelerating part of it generates transverse accelerating vortex from inside to outward.

This transverse vortex of the proton has positive acceleration outwards. This is the reason the charge of the is perceived as positive.

**Result:** The positive acceleration of transverse vortex (in-out) of the proton is the reason for positive charge of the proton.

Thus it will be impossible to collect nucleus by many positive protons because they will repel each other

In order to construct the nucleus of atom it is need the accelerating longitudinal Funnel constructed in the new time space (S const.), It will collect and tighten the protons to minimal distance between them where will not work forces of repelling .

**Result:** The accelerating longitudinal Funnel collect and tighten the protons to minimal distance and construct the nucleus of atom.

Thus the accelerating Funnel will collect protons and create the nucleus of atom.

### a) Accelerating of the Longitudinal Gravitational Funnel.

Thus the nucleus of the atom is generated by an Accelerating Longitudinal Gravitational Funnel as whole named accelerating Gravity Funnel (Figure1, IV c). According to Law 6(2) the accelerating Gravity Funnel has the following construction and operation (Figure1, III b). The fastest longitudinal vortex sucks from the outside - inward .Its primary accelerating vortices have the minimum length and the highest acceleration (Figure1, IVa). This means that the radius of the fastest longitudinal vortex is minimal. Because of sucking in it will insert itself inside in the slower vortex (Figure1, IVb) and they form an acceleration Funnel (Figure1, IV c).

### b) The Construction of Accelerating Gravitational Funnel.

It is known already the common construction of accelerating Funnel: The fastest longitudinal vortex with maximal longitudinal velocity (V max) is located in the center (Figure1, IV a). The longitudinal vortex with a lower longitudinal speed twists around it (Figure1, IV b). etc. While at the periphery of the Funnel is rolled up a longitudinal vortex with the least longitudinal speed (V min.) (Figure1,IVc).

And the more precisely: According to Law 6 for 3D (2), in the center the longitudinal vortex has a maximum longitudinal velocity (V max.) a minimum angular velocity ( $w$  min) of the vortex with a minimum radius (R min.) and a minimum number of loops (N min) of the vortex. (Figure1, IVa). In the periphery, the longitudinal vortex has a minimum longitudinal velocity (V min) a maximum angular velocity ( $w$  min) of the vortex with a maximum radius (R max) and a maximum number cross loops (N max) (Figure1, IVb).

-According Law6 when there is a maximum longitudinal velocity (V max), the primary vortices are sucked in with a maximum speed and acceleration. Therefore the Gravitational attraction to the center of accelerating Funnel is obtained to maximal (Figure1, IVa). Thus the central vortex will has a maximal longitudinal velocity (V max) but a minimal angular velocity ( $w$  min) as well as a minimal number of windings (N min) and minimal radius (R). It will suck in the all the free primary vortices from internal Space plus all the free vortices from the adjacent more external vortex, etc. The peripheral vortex will has a minimum longitudinal velocity (V min) but a maximum angular velocity ( $w$  max) as well as a maximum number of windings (N max) and maximal radius(R) (Figure1, IV b).

**Result:** The accelerating Funnel consists accelerating longitudinal vortices inserted into each other according to the magnitude of the longitudinal velocity (V), angular velocity ( $w$ ) and radius (R).

Therefore, the accelerating Funnel has many accelerating longitudinal vortices inserted into each other according to the magnitude of the longitudinal velocity (V), angular velocity ( $w$ ) and radius (R).

**Result:** The any cross section of the accelerating Gravitational Funnel sucks in the space from the outside-in.

Therefore the accelerating Gravitational Funnel in any cross section perpendicular to direction of Funnel sucks in the space from the outside-in.

**Result:** The accelerating Gravitational Funnel sucks longitudinally in the space from down to up in direction opposite to Gravitation or *act antigravity*.

Therefore in the accelerating Gravitational Funnel in direction to positive acceleration is appeared force in direction opposite to Gravitation that is known as *antigravity force*.

## 2.2. New Time-Space: S=const.

### a) The Well Known Time-Space of Transverse Vortices has Constant Time: T= const.

The time-space of transverse vortices pulsates in time T. The transverse (accelerating and decelerating) vortices form concentric transverse waves. Every point of them spread in a constant time  $T=const.$  (Figure1, I c).

The example for these kind of pulsing transverse vortices are

Light waves and Electromagnetic waves. The light waves and Electromagnetic waves spread in space S like concentric transverse waves. All points of one wave moves with the same time:  $T=const.$  This time-space fully and quite perfectly describes electromagnetic and light phenomena.

**b) The longitudinal vortices inserted in longitudinal Funnel in time space:  $S=const.$**

Unlike the first time -space ( $T=const.$ ) the time -space by the longitudinal vortices that construct Gravitational Funnel has another constant:  $S=const.$

The Gravitational Funnel is consisted by the multiple inserted a one into other longitudinal vortices. This is a unique time-space unknown till now. It is based on a new constant S and describes completely the Gravitational forces and Gravity interactions. This time-space is built by many longitudinal vortices in a precisely defined relationship between them: Law5 (1) for decelerating vortices and Law6 (2) for accelerating vortices. They all work in cooperation and together depending to the size and qualities of their parameters. The whole complex system is self-regulating and self-adjusting so that they work in one direction: to repel for decelerating vortices and to suck in for accelerating vortices.

The unique is that all vortices (spirals) have the same length S and wound into each other. Thus the vortices organize a space in Funnel with a unique constant ( $S const.$ ) [12, 13].

**c) Construction of Accelerating Gravitational Funnel is in Time Space  $S=const.$**

The main characteristic of Gravitational Funnel is that the length of all spirals S (from the most central spiral to the most peripheral spiral) is the same  $S=const.$  [14, 16].

According Law6 (2) in accelerating vortex the amplitude of primary transverse vortices decreases to minimum, where  $W_0$  is the starting value of  $\omega_n$ :  $\omega_n = (1/\psi^n) \cdot W_0$ .

Therefore the radius R decreases to minimum as well:  $R_n = (1/\psi^n) \cdot R_0$ .

This means that the peripheral vortex ( $n=0$ ) has a maximal radius:  $R_0=R_{max} = (1/\psi^0) \cdot R_{max}$  The peripheral vortex has a minimum longitudinal velocity ( $V min$ ) and a minimum geometric height ( $H min$ ), a maximal angular velocity ( $w max$ ), maximal number of loops ( $N max$ ) and maximal radius ( $R min$ ) as well (Figure1,III b, Figure1,IV b). If we depict the peripheral longitudinal vortex as a geometric figure in 3D it will be an inflated cylinder with minimal height ( $H min$ ) and maximal radius( $R max$ ) [7-9].

**According to Law 6 (2) in accelerating vortex** the amplitude of primary transverse vortices decreases to minimum, where  $W_0$  is the starting value of  $\omega_n$ :  $\omega_n = (1/\psi^n) \cdot W_0$ .

Therefore the radius R decreases to minimum as well:  $R_n = (1/\psi^n) \cdot R_0$ .

This means that the radius of central vortex ( $n=max$ ) is minimal:  $R_{min} = (1/\psi^{max}) \cdot R_{max}$ . The depict central vortex has a maximum longitudinal velocity ( $V max$ ) and maximal geometric height ( $H max$ ). It has a minimum (almost zero) angular velocity ( $w min$ ) and a minimum number of loops ( $N min$ ) and minimal radius as well ( $R min$ ) (Figure1, III b, Figure, IVa). If we depict the central longitudinal vortex as a geometric figure in 3D, it will be a narrow cylinder with a maximal height ( $H max$ ) and minimal radius ( $R min$ ).

According Law6 (2) if we denote the parameters of the peripheral spiral as:

**(V min), (H min), (w max), (N max) and (R max)**. The parameters of the first inner vortex

(spiral) will calculate as:

$$V_1=V_{min} \cdot (\psi^1), H_1=H_{min}(\psi^1), w_1= w_{max} \cdot (1/\psi^1), N_1=N_{max} \cdot (1/\psi^1), R_1=R_{max} \cdot (1/\psi).$$

Then the parameters of the second outermost spiral will calculate as:

$$V_2=V_{min} \cdot (\psi^2), H_2=H_{min}(\psi^2), w_2= w_{max} \cdot (1/\psi^2), N_2=N_{max} \cdot (1/\psi^2), R_2=R_{max} \cdot (1/\psi^2).$$

And so on until the parameters of the outermost ( $n$ ) peripheral spiral that will calculate as:

$$V_n=V_{min} \cdot (\psi^n), H_n=H_{min}(\psi^n), w_n= w_{max} \cdot (1/\psi^n), N_n=N_{max} \cdot (1/\psi^n), R_n=R_{max} \cdot (1/\psi^n).$$

According to Law3, Law4 and the Law of Conservation, the volumes of these cylinders will be the same. This means that these longitudinal vortices contain one the same amount of energy. But the kinetic energy is transformed into potential energy and inverse. Thus the ratio of kinetic to potential energy changes such that the total energy remains the constant.

**d) Relations and Equations of New Time Space in  $S=const.$**

For example :Let we describe a central spiral (Scen.) from the Funnel in the form of a spring with a maximum height of the cylinder  $H max$ , a minimum radius  $R min$  and maximum length of the central spring:  $Scen.=So=S max$ . Now let's start shrinking the spring, then we will get a cylinder with a smaller height  $H_{-1}$  and a larger radius  $R_{+1}$ . Because it is one and the same spring, the length of the spiral  $S_1$  will be the same as length of central spiral  $S max$ .

To get the most peripheral spiral, we compress the spring to the maximum and then we will get a maximally inflated cylinder with a minimum height  $H min$  and a maximum radius  $R max$ . Because we shrink one and the same spring the length of the peripheral spiral (in form of spring)  $S_n$  will be the same as the length of the central spring ( $Sc.=Smax$ ) [8, 9].

The central spiral forms central cylinder with volume:  $V_c=V_0$ , proportional to  **$R min \cdot H max$** . The first outer spiral forms first cylinder with volume:  $V_1$ , proportional to  **$R_{min+1} \cdot H_{max-1}$**  and so on the peripheral  $n$ -th spiral forms cylinder with volume:  $V_n$ , proportional to  **$R_{min+n} \cdot H_{max-n}$** . Therefore, for a second time is

proved that the volume of all spirals are equals.

**Result:** The volume of the inserted one into another cylinders is constant:  $V_0=V_1=...V_n = \text{const.}$

The reason is that the spiral is one and the same with constant length:  $S_{\text{center}}= S_{\text{max}} = S_0=S_1=... = S_n = S \text{ const.}$  In order to construct the Funnel we must shrink the spiral lengthwise.

**Result:** The length of the spiral in inserted cylinders  $S_i$  is constant:  $S_0=S_1=...S_n.$

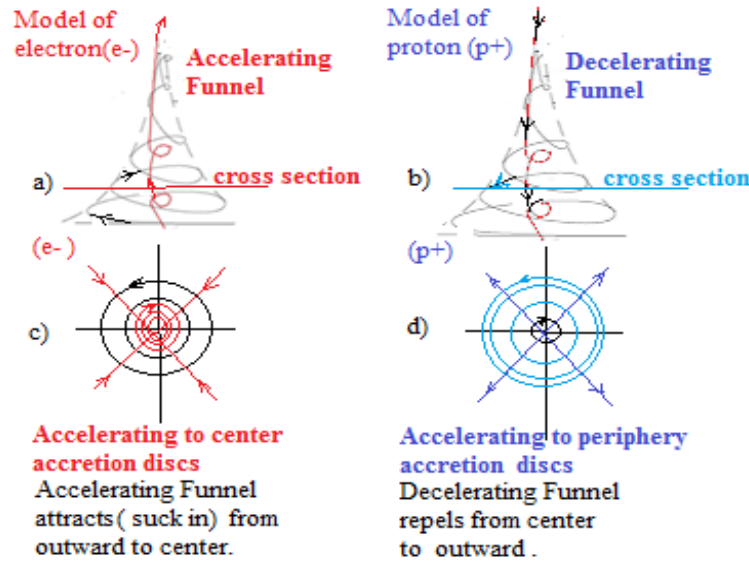
Therefore the length of the central spiral is equal to the length of all outer spirals, including the peripheral spiral.

### 3. Accretion Disks, New Design of Gravitational Forces and Waves

If we make a perpendicular cut of the accelerating Gravitational Funnel (Figure1, IVc) we will get concentric circles known as Accretion Circles or Disks. (Figure 2c,d).

#### Figure 2 Design of Accretion discs,

a) Accelerating Funnel, b) Decelerating Funnel, c) Accelerating to center accretion discs, d) Accelerating to periphery accretion discs



#### a) Constructions

**According to Law 6 (2) for accelerating vortex** in 3D, the longitudinal velocity ( $V$ ) increases in every  $n$ -th step with  $(V \cdot \psi^n)$  and the angular velocity ( $w$ ) decreases in every  $n$ -th step nonlinear with  $(w \cdot 1/\psi^n)$ . This means that the radius ( $R$ ) of the transverse circles will decrease also non-linearly with  $(R \cdot 1/\psi^n)$  (Figure1, IV, a, b) (Figure2c).

**According to Law 5 (1) for decelerating vortex** in 3D, the longitudinal velocity ( $V$ ) decreases in every  $n$ -th step with  $(V \cdot 1/\psi^n)$  and the angular velocity ( $w$ ) increases in every  $n$ -th step nonlinear with  $(w \cdot \psi^n)$ . This means that the radius ( $R$ ) of the transverse circles will increase also non-linearly with  $(R \cdot \psi^n)$  (Figure2d).

If we make a cross section of a longitudinal funnel we will get a sum of accretion disks. The accretion disks are concentric circles with non-linear increasing radius. This non-linearity depends on sign of acceleration.

**Result:** The Accretion concentric circles are with non-linear increasing radius  $R$  depends on the sign  $(-, +)$  of acceleration.

Therefore the cross-section of the accelerating Gravitational Funnel, generating the nucleus, represents Accretion concentric

circles with decreasing radius  $R$  at a parameter  $(1/\psi^n)$  in every  $n$ -th next circle. But the cross-section of the decelerating Gravitational Funnel is Accretion concentric circles with increasing radius  $R$  at a growth parameter  $(\psi^n)$  in every  $n$ -th next circle.

In cross-section of accelerating Funnel this leads to unevenly spaced concentric circles. The reason is that the distance between the accretion circles decreases nonlinear in the direction from the periphery to the center. In center accretion disks are much more closer each other and to periphery disks are more and more spaced apart.

**For example:** If in the periphery the radius of starting disk is  $(R_0 \cdot 1/\psi^0)$ , then on the first inner disk radius will be less  $(R_0 \cdot 1/\psi^1)$  on second disk radius will be much less  $(R_0 \cdot 1/\psi^2)$ , on the third disk radius will decrease to  $(R_0 \cdot 1/\psi^3)$  and so on, to  $n$ -th disk the radius is minimal  $(R_0 \cdot 1/\psi^n)$  (Figure 2c).

**Result:** The Accretion disks of the *accelerating* Gravitational Funnel are concentric circles with constant parameter  $(1/\psi^n)$ .

Therefore, the circles are concentrated in the center and spaced apart at the periphery.

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**Result:** The Accretion disks of the *decelerating* Gravitational Funnel are concentric circles with constant parameter ( $\psi^n$ ).

Therefore, the circles are concentrated at the periphery and spaced apart in the center.

#### **b) The distortion of Space around the Gravitational Funnel**

The Classical Theory of Gravity and gravitational waves is well known. It claims that the reason for Gravity around a body are accretion disks. They are located around this body in non-linearly distances between them. These non-linearly located accretion discs distort the space. Alternatively, the reason is distortion of space and the result is appearance of Gravitation.

The Theory of new Axioms and Laws claims that the reason is acceleration of longitudinal vortices and result is appearance of Gravitation [9].

**The necessary condition for Gravitation:** the positive or negative acceleration of longitudinal vortices. The longitudinal vortices during longitudinal pulsation radiate transverse vortices perpendicularly. Each point of the transverse vortex moves with the same time in the known time-space T const.

**The sufficient condition for Gravitation:** the fact that these longitudinal vortices are packed in a funnel with the unique time-space S const.

**Result:** The cause of space distortion is the acceleration of longitudinal vortices in time-space T const., packed in a Gravitational Funnel in space-time S const.

As a result, accretion disks are obtained around the object. If the longitudinal funnel is accelerating, then it attracts space to itself and the accretion discs are concentrated nonlinearly towards its center.

**Result:** The Accretion disks are observed only around the Gravity body with positive or negative acceleration inside.

This means that not every body has Gravity and this is the reason they do not have Accretion discs that distort the space around them.

**Result:** There are bodies without Gravity or without acceleration inside.

If the longitudinal Funnel is decelerating, it repels space away from itself and the accretion disks are concentrated nonlinearly towards its periphery (Figure 2d).

**Result:** Accretion disks around *decelerating* Funnel are concentric circles and distance between them *decreases to zero in direction of periphery*.

If the longitudinal Funnel is accelerating, it attracts space to itself and the accretion disks are concentrated nonlinearly towards its

center (Figure 2c).

**Result:** Accretion disks around accelerating Funnel are concentric circles and distance between them *decreases to zero in direction of center*.

**Conclusion:** The reason for Gravity is the *acceleration* and the result is the *distortion of space around the Gravity Funnel*.

Therefore the reason for Gravity attraction or repulsion is positive or negative acceleration of longitudinal vortices with time-space T const. that are inserted in accelerating Funnel with time-space S const. The result of Gravity is the distortion of space around the Gravity Funnel [9,12].

### **3. The Design of the Proton in First Type of Contact (Sconst-Tconst) and the Electron in Second Type of Contact (Tconst-Sconst)**

According to Law 2 the proton is generated by the decelerating part of longitudinal Funnel. And the Sun is generated as a proton -by the decelerating longitudinal Funnel. This longitudinal Funnel is named a Gravitational funnel and it comes from time-space with Sconst. and it is unidirectional.

#### **3.1. The First Type of Contact: Sconst—T const. That Generates the Proton and the Sun**

Because of that the Sun is generated by the decelerating longitudinal Funnel, the sphere of Sun inside must be constructed by many cylinders. They are inserted into each other in one direction and form the sphere of Sun.

**Result:** The sphere of Sun and proton is formed by inserting one into another a few cylinders with different sizes.

Thus the longitudinal Gravitational Funnel in Sconst has 1 direction and it forms 1 contact with real time-space of transverse vortex with Tconst. Therefore Sun is generated by contact of longitudinal Funnel in time-space Sconst. and of transverse vortex in time-space Tconst.

**Result:** The longitudinal Funnel generating the proton forms a few cylinders inserted one into another depending on their width and length.

**For example:** In center is the fastest longitudinal vortex pierces the proton body and goes beyond it. Outside of the central vortex the longitudinal vortex is slower and it forms the longest and narrowest cylinder. The much more outer longitudinal vortex is even more slower and it forms the more wider and shorter cylinder and so on. The most peripheral vortex is the slowest and it forms the cylinder, which has minimal height and maximal width.

Therefore the second type of contact (Sconst-Tconst) generates the Sun and proton by inserting cylinders into each other.

**Result:** The proton and the Sun are generated in contact Sconst—

Tconst.

Therefore according Law2 the Sun and the proton are generated at the boundary between a decelerating longitudinal Funnel in volume 3D in time-space Sconst. and an accelerating transverse vortex in plane 2D, with time space T const. That is why there are cylinders inserted into each other with different heights and widths, (radii) [13,16].

But the transverse vortices of the protons are accelerating from the inside-out, and therefore they repel each other. This behavior of the proton is interpreted as a manifestation of a positive charge. Therefore, the reason for the so-called positive charge of the electron is the accelerating transverse vortex with a positive acceleration from the inside-out.

**Result:** The charge of proton is caused by positive acceleration of the transverse inside-out vortex generating the proton in the plane 2D and space-time Tconst.

Therefore, the attempt to assemble the nucleus of the atom from only protons will prove unsuccessful. The reason is that they will repel each other and fly away.

Therefore it is need of particles that will stick protons to each other and will overcome the forces of repelling. The neutrons play a major role in overcoming the internal nuclear forces of repulsion.

**Result:** Neutrons overcome the internal nuclear forces of repulsion due to the positive accelerations of the transverse vortices of neighboring protons.

They quantitatively tighten and attract the protons in the general body of the nucleus. And in addition, they qualitatively arrange and direct active vortices of the protons outward and beyond the core so that they act outwards without interfere with each other.

**Result:** The neutrons stick and tighten the protons in the general body of the nucleus and arrange and direct active vortices of the protons outward and beyond the sphere of nucleus.

Neutrons absorb each decelerating vortex from the longitudinal Funnel that generates each proton.

**Result:** The neutron sucks the decelerating part of the longitudinal Funnel towards itself and passes it through its center making a short circuit.

Therefore the neutron sucks the decelerating part of the longitudinal Funnel towards itself and passes it through its center.

**Result:** The neutron buckles the decelerating vortex of longitudinal Funnel by short connection.

Therefore the neutron making a short circuit.

**Result:** The neutron short-circuits and clips the surrounding protons to itself like a paper clip.

Therefore neutron transform decelerating part of Generating longitudinal Funnel to accelerating, makes her pass through its center making short connection and buckles all surrounding protons to itself like a paper clip.

### 3.2. The Second Type of Contact: Tconst–Sconst That Generates Electron and Planet Earth (including all internal planets).

The planet Earth is generated as electron. According Law1 the electron is generated by the decelerating transverse vortex in time-space Tconst. of plane 2D. Then in center of plane 2D is generated accelerating Funnel perpendicular in time-space Sconst. in volume 3D.

**Result:** The electron and planet Earth are generated in contact Tconst—Sconst.

So far is described the direct action of Law 2 at the Sconst.-T const. at transition in the construction of the proton. Also is described the direct action of Law 1 at the transition Tconst-Sconst in the construction of the electron.

But for the nucleus of the atom, it will be necessary to multiply Law2 for all N directions of the 3D volume of sphere of nucleus or for all N number of protons. This can be done as raising to the power N time-space of proton in the Sconst.: (Sconst.)<sup>N</sup>.

### 4. The Design of Nucleus in Third Type of Contact (Sconst)<sup>N</sup> as Many Inserted One Into Another Spheres.

The third type of contact generates the nucleus of atom.

#### 4.1. Review

According Law2 the transverse vortices of the each protons are accelerating from the inside-out. Thus the protons will repel each other. This behavior of the proton is interpreted as a manifestation of a positive charge.

Therefore, the reason for the so-called positive charge of the electron is not some positive charge by positive particle. But it is act the accelerating transverse vortex with a positive acceleration from the inside-out. It is already described (from paragraph 4a) that according Law2 the charge of proton is caused by positive acceleration of the transverse inside-out vortex generating the proton in the plane 2D and space-time T const.

Therefore, the attempt to assemble the nucleus of the atom from only protons will prove unsuccessful. The reason is that they will repel each other and fly away into space.

#### 4.2. The Role of Neutrons in Nucleus

The neutrons play a major role in overcoming the internal nuclear forces of repulsion. They tighten and attract the protons in the general body of the nucleus. The neutrons arrange and direct protons active vortices (tails) outward and beyond the core so that they do not interfere between each other. Thus absorbing the decelerating part of the longitudinal Funnel the neutron plays the role of an ultra-small capacity.

**Result:** The neutron plays the role of an ultra-small capacity



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that absorbs (to get shorten) the decelerating part of each the longitudinal Funnel that generates each proton.

Therefore, the neutron is semi- passive element-it is closed in transverse vortex but it is open only in longitudinal vortex.

**Result:** The neutron consumes the decelerating longitudinal vortex from the generating Funnel of each neighboring proton and adds it (by stabbing) to its own central longitudinal vortex that passes through its center.

This is the reason the neutron shrinks even more and becomes a passive point with no active outlet. Probably the transverse wave at this point forms an in-out-in standing wave.

**Result:** The neutron shrinks, becomes “point” and the transverse wave forms by pulsing an (in-out-in) standing wave.

The neutrons must tighten and attract the protons in the general body of the nucleus. They must arrange and direct active vortices (active tails) of protons outward and beyond the sphere of nucleus.

**Result:** The nucleus of atom is composed by a multitude of protons and neutrons that arrange, lace up and tighten them in one body.

Let us accept the generally accepted hypothesis in atomic physics about the construction of the nucleus. The hypothesis is that the nucleus of the atom is composed of a multitude of protons tightly bound by the neutrons and arranged in shells inserted one into another.

**Result:** Here is accept hypothesis that the nucleus of the atom is composed by spheres (shells) inserted one into another.

This means that the nucleus is a sum of time-spaces of the protons in S const.

**Result:** The nucleus is constructed by time-space S const. of every proton multiplied N times, where N is number of protons and directions of their axes in 3D.

The proton is generated (Law2) by the decelerating part of longitudinal Funnel in time space S const. in 1 direction as cylinders inserted one into another . That is why in nucleus will contain time-space in S const. for N protons or in N directions in volume 3D.

**Result:** The nucleus is described as:  $(S \text{ const. } )^N$

#### 4.3. The Only Way for Construction the Sphere of Nucleus by Nested N Cylinders in 3D.

The construction of the sphere of nucleus makes by nested cylinders in S const. time- space, but with different (N) axes pointing in all (N) directions in its volume 3D.

**Result:** The nucleus sphere is obtained by inserted one into another cylinders in N different axes pointing in all N direction of

volume 3D.

Therefore we can obtain the sphere of nucleus by inserting one into another many cylinders in 1 time- space S const. in 1 direction and we can multiply this act but along all axes pointing to all (N) directions in 3D in same time -space S const.

**Result:** The sphere of nucleus of the atom is therefore obtained in a 1 time-space S const. on N-th degree.

But the transverse vortices of the protons are accelerating from the inside-out, and therefore they repel each other. This behavior of the proton is interpreted as a manifestation of a positive charge. Therefore, the reason for the so-called positive charge of the electron is the accelerating transverse vortex with a positive acceleration from the inside-out.

**Result:** The positive charge of proton is caused by the positive acceleration of the transverse inside-out vortex generating in the plane 2D and in time-space T const.

Therefore, the attempt to assemble the nucleus of the atom from only protons will prove unsuccessful. The reason is that they will repel each other and fly away into space.

Neutrons play a major role in overcoming the internal nuclear forces of repulsion. They quantitatively tighten and attract the protons in the general body of the nucleus. And in addition, they qualitatively arrange and direct their active vortices outward and beyond the core so that they do not interfere with each other.

**Result:** Neutrons quantitatively tighten and attract the protons in the general body and qualitatively arrange and direct the each active vortices of the protons outward and beyond the core so that they do not interfere with each other.

#### 4. How Work the Neutrons

We already know that the proton is generated by a longitudinal Funnel. More precisely, the proton is generated by the decelerating peripheral part of the longitudinal Funnel. The central vortex of the Funnel is accelerating and transits through the sphere of the proton. It exits the proton and connects it along a longitudinal component with own electron.

The neutrons absorb the decelerating peripheral part of the longitudinal Funnel of each of the protons and leave only the accelerating central part of this Funnel.

**Result:** Neutron swallows the decelerating (peripheral) vortex generating the proton and allows to pass only the accelerating (central) vortex to pass through the nucleus.

**Result:** Neutron transforms decelerating vortex generating the proton to accelerating vortex passes through the nucleus.

**Result:** We can obtain the sphere of nucleus by inserting one into

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another many cylinders in 1 time- space S const. in 1 direction and we can multiply this act but along all axes pointing to all (N) directions in 3D in same time -space S const.

The nucleus of the atom is therefore obtained in a time -space S const. in N degree. Therefore the nucleus is generated by time-space S const. multiplied N times.

**Result:** In this time-space (S const.)N there are not Cartesian parameters except one: in - out.

In this complex multiplied time-space, there is only 1 space parameter: inward -outward, because Cartesian coordinates are concentrated into point.

**Result:** Body of nucleus exists in only 1 parameter: to inward – to outward.

Therefore if in nucleus there are inserted each in other cylinders in time-space S const. and with different axes point to all (N) directions in 3D in the same time-space S const., then they form spheres with different radius inserted each in other.

**Result:** The nucleus is constructed by spheres with different radius inserted each other.

The fact that the core must consist of spheres inserted into each other confirms the hypothesis of the shell structure of the nucleus of the atom.

**Result:** It is confirmed the current hypothesis of the shell structure of the nucleus of the atom by nucleus structure by spheres with different radius inserted each other.

Therefore the proton is generated by decelerating Funnel but the nucleus of atom is generated by Accelerating longitudinal Funnel.

**For example:** It is well known that the nucleus is generated by decelerating Gravitational Funnels (generating all N proton) coming from all (N) directions of 3D which is in space-time with S const. that are multiplied in N different directions .The neutrons tighten the protons so that they do not repel each other.

Thus the decelerating Funnel changes to the accelerating Funnel. In this unique kind of contact x and y and z coordinates no longer exist. .Because there are only 2 coordinates: (angular coordinates) radius and angle, then instead cylinders stay spheres. Instead of a third coordinate, we have only 1 coordinate to outside, to inside.

If inserted each in other cylinders with different axes point to all directions in 3D, then they will form spheres with different radius inserted each in other. Therefore, in the nucleus of the atom, instead of cylinders, we have spheres with different radii included in each other.

## 5. The Properties of Protons in Innermost Shells and in Outermost Shells of Nucleus

Each cylinder corresponds to a proton with the corresponding qualities. The innermost cylinder is the narrowest with the minimum radius and the longest with the maximum height. When we rotate it in all N directions in 3D we will get the innermost sphere of protons. This inner protons generates the electrons from the innermost orbits .The reason is that the transverse vortex from the inner proton to the inner electron has a minimum length with a minimum positive acceleration.

This is the reason (according to Law 1) the inner electrons to shrink along a transverse vortex to minimal radius and elongated along a longitudinal vortex to maximal length.

**Result:** Protons in a innermost shells of sphere of nucleus are arranged with the minimal radius and the longest longitudinal component.

Thus in the innermost sphere are arranged the protons with the smallest radius and the longest longitudinal component.

When we rotate it in all N directions in 3D we will get the outermost sphere of protons. The outer protons generates the electrons from the outermost orbits .The reason is that the transverse vortex from the outer proton to the electron has a maximum length with a maximum positive acceleration .According to Law 1 when transverse vortex is maximal then the central longitudinal vortex will be minimal.

Therefore, the outer electrons expand in a transverse vortex to maximal radius and to shortest longitudinal vortex.

**Result:** Protons in a periphery shell of sphere of nucleus are arranged with the maximal radius and the shortest longitudinal component.

Therefore the protons with the largest radius and shortest longitudinal component are arranged as a shell at the periphery of the peripheral sphere.

## 6. The Third Type of Time- Space of Standing Waves: $V=const.$ (only for information)

We live in time space **T const.** of transverse vortices.

The proton and Sun exists in time-space of longitudinal vortices in a Funnel with S const.

But there is a third time- space with **Vconst.**

This kind of time –space is quite unknown to scientists. The time-space can be micro or macro and consists of standing longitudinal waves with a constant maximum speed:  $V= const.$  It exists in virtual tubes (pipes) by standing waves that are pulsating in time T and in space S.

**Result:** There is time-space by the standing longitudinal waves

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pulsating in virtual tubes with  $V=\text{const.}$

This time-space is closed within itself (in tube) by standing wave. In this time-space there are not geometric coordinates ( $x, y, z$ ). There is not even time  $T$ . There is only 1 parameter- the speed  $V=\text{const.}$

The process of formation of this time-space is unknown and unstudied so far. According Theory of new Axioms and Laws the accelerating longitudinal Funnel is generated by the electron (Law1). Similarly the accelerating longitudinal Funnel is generated by the planet Earth, including all internal planets. The central spiral in accelerating Funnel and is chopped and teared. The reason is that central vortex reaches to the maximal positive acceleration and then it tears. This chopped into pieces, teared vortex forms standing wave in time-space with  $V \text{ const.}$  that exists in something like a tube. According Law 6 (2) the velocity of central spiral by central vortex  $V_{\text{max}}$  is  $\psi n$  times more than light speed ( $c$ ), where  $n$  is number of spirals forming and packing the accelerating Funnel. It is known that the central vortex exists in Funnel with time-space  $S_{\text{const}}$ . But chopped into pieces central vortex exists as standing wave in tube with time-space  $V_{\text{const}}$ . The reason is that the central vortex in accelerating longitudinal Funnel has a velocity size that is more than the light speed ( $c$ )  $\psi n$  times more/. Thus the chopped into pieces central vortex exists as standing wave in virtual tube with time-space  $V=\text{const.}$ , where  $V$  tends to maximum,  $T$  is limited to minimum and  $S$  has no dimensions. These virtual tubes from standing waves form network that represents the inverse connection between electron cloud and nucleus [14, 16].

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