# The Informational Conception and the Base of Physics

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## Abstract

In our previous arXiv and viXra/ResearchGate papers ("The Information and the Matter", v1-v5, and versions of the paper "The Informational Conception and Basic Physics" (more systematically the informational conception is presented in the paper "The Information as Absolute", 2017) it was rigorously proven that Matter in our Universe – and Universe as a whole - are some informational systems (structures), which exist as uninterruptedly transforming [practically] infinitesimal sub-Sets of the absolutely infinite and fundamental "Information" Set. Such a conception allows not only to clear essentially a number of metaphysical and epistemological problems in philosophy but, besides, allows to suggest a reasonable physical model. Since Matter in Universe is an informational system where every interaction between Matter's sub-structures, i.e. – particles and systems of the particles – happens always as an exchange by exclusively true information between these structures, the model is based on the conjecture that Matter is some analogue of computer. This conjecture, in turn, allows to introduce in the model the basic logical elements that constitute the material structures and support the informational exchange - i.e. interactions - between the structures. The model is experimentally testable and yet now makes be more clear a number of basic problems in special relativity, quantum mechanics, and, rather probably, in [now – in Newtonian] gravity.

**Key words**: informational physics, Matter, fundamental Nature forces, EM force, Gravity, quantum gravity, Lorentz transformations, spacetime, experimental testing, relativity theories, particles, antiparticles, uncertainty principle, wave – particle duality

**PACS:** 03.50; 12.60.-i; 12.90.+b; 14.60.Cd; 03.70.

## 1 Introduction

In "The Information as Absolute" concept [1] - [3] it was rigorously proven that the phenomenon/notion "Information" is absolutely general and fundamental, when all/anything what exists is/are some "realizations" of some information – all/anything/everything what exists is/are some informational patterns/systems of the patterns that are elements of utmost general and fundamental absolutely infinite "Information" Set. The conception makes more clear a number of metaphysical and epistemological problems in science; first of all, the problem of the cognition - i.e. the problem of adequacy of the human's consciousness inferences (in form of some language statements, including mathematical and algorithmic languages) to the reality - becomes be much more understandable,

since the elements of the Set "Information" are only some informational patterns/systems of the patterns also.

The Set and the phenomenon/notion "Information" have very unusual and interesting properties, including that the phenomenon and the Set are, in certain sense, the same, so both are here entitled identically (more about the informational conception see [3]).

Albeit it is rather probable that Nature sciences, including physics, will eventually explore in future the Set as whole, now physics studies only so called "material phenomena". Because of in philosophy and so – in Nature sciences - there isn't of a consensus in the problem "what is material/ non- material?" in [1] the following criterion was suggested: [in our Universe] a *phenomenon/ entity/ object is material if it exchanges* (interacts) with other process/ phenomenon/entity/object *exclusively by true information – and in complete accordance with the basic set of laws/links/constants, which govern the informational system "Matter"*.

If a process/ phenomenon/ entity/object has a capability to produce/to apprehend an uncertain or even false information, then it isn't material; an example – fundamentally non - material human's consciousness, what reveals at the information processing, religious phenomena evidently. All these examples relate to distinct, only partly overlapping, subsets of the Set, when now just the elements (and, of course, their interactions) that constitute the subset "Matter" are studied by physics. Really, of course, there are much more fundamental differences of the informational systems "Matter" and "Consciousness", nonetheless that doesn't change something in the fact that both systems are made from the same stuff "Information".

The informational systems/sub-Sets "Matter" and "Consciousness(es)" constitute the informational system/ sub-Set "our Universe".

Another important property of the information is that the information can be (any information always is?) "*absolutely exact*".

So in Matter the particles/objects, systems of objects/particles, exchange only by logically true informational "messages", i.e. the informational system "Matter" is something like as a computer. Such an idea isn't, of course, new - hypotheses that our Universe is a large computer appeared practically at once with the appearance of usual computers (see, e.g., [4 – 14], though the list can be much more), but that were only the hypotheses which had not necessary grounds (besides, of course, religious "hypotheses" of Creation of Universe as of a logical structure from nothing by some omnipotent sentient Being, Who "established the laws"). Including a number of papers that appeared last time, e.g., [15, 16], which again contain some seems as not too persuasive groundings only, as, e.g., [16] "*...But now: what is the difference between Reality and its simulation? It's a matter for metaphysics: if Reality is indistinguishable from its simulation, then it is its simulation. The Universe is really a huge quantum computer.*" – such claims seems as something more magic then scientific.

Now this idea becomes be grounded, moreover – the absence of logical structure of Matter (what realizes itself, including, as discovered by humans "Nature laws" in the Universe) would be rather surprising.

Finally, in this section we give utmost common definition of the absolutely fundamental[2] phenomenon/notion "Information":

**"Information is something that is constructed in accordance with the set/system of absolutely fundamental Rules, Possibilities, Quantities, etc. — the set/system "Logos" in the concept**".

Or, by other words, the "Logos" set elements "make something to be information".

A few examples of the "Logos" elements, which will be, since some of them do not have rational definitions in the mainstream science, scientifically defined and used further in this paper are, first of all, "Space", "Time", "Logical Rules", "Energy", "Change", and a few of others.


## 2 Physical model

### 2.1 A few common definitions

### 2.1.1 Space and Time

Space" and "Time" are absolutely fundamental Rules/Possibilities [elements of the "Logos" set] that are absolutely fundamentally necessary for any informational pattern/system could exist:

- "Space" is necessary for any information could exist at all, and

- "Time", additionally to Space, is necessary for some informational pattern/system could be dynamic, i.e. could change.

"*Space*" as the **Possibility** makes be possible placing in concrete "space" concrete informational patterns/systems, which (the space) at that is realized as a concrete set of "space dimensions", which (dimensions) *are necessary to actualize independent degrees of freedom of the concrete patterns/systems at changing of all their possible states*.

Since Space is a logical possibility, the sets of dimensions form so concrete, and principally infinite, "empty space containers" for the concrete one type patterns/systems. For a space it is all the same – how many one type patterns/systems, which are constructed by the same concrete sets of logical rules/links/constants, and so have the same degrees of freedom at construction and changes, are placed in the container.

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[2] Here and further the term "absolutely fundamental" relates to items that are valid/applicable in whole "Information" Set, the term ("only") "fundamental" relates to objects, phenomena, processes, etc., which are fundamental in the systems "Matter" and "consciousness".

And it is all the same – in what places in the container the patterns/systems are placed. The unique requirement, when **Space** acts as the **Rule** is that a non-zero "space interval" must divide the different patterns/systems, and any pattern/system must occupy non-zero "space interval" [a "space volume", if there are more than one intervals in different dimensions] as well. In that Space is the utmost universal grammar rule, which just so exists in all human languages.

Since any information absolutely fundamentally cannot be non-existent, everything had happened/existed in the "Information" Set; and everything is happening/existing, and will happen/exist always;

- the concrete patterns/systems, including Matter and consciousness, simply use the always existent concrete spatial dimensions from the absolutely infinite number of spatial dimensions of the Set's whole spacetime in concrete actualization of current state of concrete pattern/system. As that is, for example for Matter and humans in this concrete actualization of Universe evolution.

"*Time*" as the **Possibility** in main traits is analogue to Space, it is "the space for changing states of changing patterns/systems", and exists/acts in concrete cases forming, including, corresponding "time dimension" for dynamical patterns/systems.

However, Time has the essential difference from Space: for Time it is all the same by what reason/way, by what degree of what freedom, etc., and in what informational pattern/system a change happened.

So in this case it is enough to have *only one absolutely fundamental and universal dimension*, which exists and acts in whole "Information" Set for all changing states of all dynamic the Set's elements, in the concept the corresponding term is the "true time" dimension.

**Time** as the **Rule** also acts as that a non-zero "time interval" must be between different states of changing patterns/systems. However, in this case this Rule, unlike Space, seem as is determined by a couple of two, on first glance different, absolutely fundamental and "external to time" causes. The first one is that any information if appeared can not be non-existent, and so the next changing state can not "erase" previous state. The second is that a continuous changing of states is impossible, because of the logical self-inconsistence of the Change above, and the changes happen only along non-zero time intervals.

At any change of any informational pattern/system this pattern/system moves in the time dimension on corresponding time interval $\Delta t$, in every case, when the changing pattern/system is fixed in space, and at every change of its spatial position on, say, $\Delta x$. At that the changing of a pattern/system spatial position can be in principally arbitrary number of space dimensions, whereas all dynamic elements in the Set move at changes only in one, universal "true time" dimension (including in Matter's spacetime below).

A sequence of passed time intervals at changing states of the same pattern/system is motion of the pattern/system in the true time dimension.

Space and Time thus form concrete "empty containers" - "spacetimes", for concrete dynamical patterns/systems.

Finally, in this section we make a brief remark to existent definition of "Time" in recent physics. This definition was firstly done by Newton [17]

"…Absolute, true and mathematical time, of itself, and from its own nature flows equably without regard to anything external, and by another name is called duration …."

- at that for Newton, correspondingly, clocks show the time flow independently on time and only because of clocks tick equally equably,

- and this definition, however with the two relativistic modifications, remains in physics. According to special relativity postulates time (i) - not only flows equably, this flow depends on motion, and, whereas in stationary inertial reference frame time flows in accordance with Newton's definition, in moving frames its flow becomes be dilated, and (ii) – time governs material bodies, including clocks, and so "time is what clocks read", and clocks show in stationary frames "Newton's" flow, and in moving frames – dilated flow. Besides this time flow is observed as an "arrow of time" [18].

From the correct definition of "Time" above it follows that there cannot be any, "Newton's", "normal", "dilated", etc., time flows, and any "arrows of time" as well. Matter, and every material object/system, simply constantly, because of the energy conservation law, change, and so move in the true time, passing from a given states to mostly more probable states; when a changing is deterministic, that only connotes, that the probability is equal to 1.

Though from the definitions of "Space" and "Time" follows that the spacetimes of stable in the Set informational systems are absolute, in physics there exists the problem "is Matter's spacetime absolute or not"?

This problem did not exist in mechanics till the fundamental EM force was discovered, or even in first years after development of the Maxwell-Lorentz theory, where EM objects, events and processes existed and happened as some disturbances in some "ether", fixed in corresponding absolute Euclidian space. However, in late 1800s it became clear, that seems as the application of very mighty relativity principle to EM processes and events results in some paradoxical consequences, as, say, the "relativity of simultaneity". It also seemed that because of the principle it is impossible really to observe absolute space and corresponding absolute motion of bodies.

H. Poincaré wrote about the absolute motion in "Science and hypothesis" [19]:

"… Again, it would be necessary to have an ether in order that so-called absolute movements should not be their displacements with respect to empty space, but with respect to something concrete. Will this ever be accomplished? I don't think so and I shall explain why; and yet, it is not absurd, for others have entertained this view… I think that such a hope is illusory; it was none the less interesting to show that a success of this kind would, in certain sense, open to us a new world…"

However, from that the absolute space even indeed cannot be observed evidently does not follow that it doesn't exist. Nonetheless that was postulated in the first version of the special relativity theory (SR) in 1905 [20]. It was also postulated that there is no corresponding ("luminiferous") ether, which would be placed in the absolute space, and be a base of some absolute reference frame. So the SR was – and is till now - based on one more postulate that all/every inertial reference frames are absolutely completely equivalent and legitimate.

From the last postulate any number of evidently meaningless physical, logical, biological, etc., consequences directly and unambiguously follow, the simplest one is the well known "Dingle objection to the SR" [21] and its more known and more complex version "twin paradox" [22], etc. As well as the fact that all inertial frames cannot be absolutely completely equivalent really was proven by Zeno yet 2500 years ago. Indeed, in all reference frames, where Achilles and the turtle move with different speeds, Achilles really leaves the turtle behind, in spite of that is logically prohibited, if the motion of both is continuous – because of "illogical" $\Delta p \Delta x \geq \dfrac{\hbar}{2}$. But that is inessential in the unique preferred frame, where the turtle is at rest; in this frame Achilles runs behind the turtle without any logical problems.

From even one meaningless consequence, which directly and unambiguously follows from the postulates above, it completely rigorously follows by the "proof by contradiction" that Matter's spacetime is absolute; and that follows from the definitions of Space and Time in Sec. 2.1 above as well. However, these SR postulates have been stated as true postulates in official physics till now.

Correspondingly observation of the absolute motion, i.e. the motion of a body in the absolute 3D space, is only a technical task, which can be principally solved, as that is shown in the informational model, and the absolute velocity of a pair of clocks can be measured yet now [23], [24].

### 2.1.2 "Energy"

Energy is the "Logos" set element [3], [25], which is absolutely fundamentally necessary for to change, including, of course, to create, of any/every informational pattern/system. That is because of the fundamental logical self-inconsistence of the other absolutely fundamental [also an element of the "Logos" set] phenomenon/notion "Change":

- at every change of something its state is simultaneously former, recent, and future states, when all the states are different by definition. That is logical nonsense.

To overcome this logical prohibition of changes at every change it is necessary to pay by two points:

(i) – to change [including to create] some informational pattern/system it is necessary to spend some non-zero portion of "Energy". However, that is not enough if the portion is finite, and so, besides,

(ii) – really at any change the changing state on some level/scale is uncertain – "illogical".

From the above follows that in any dynamical system, including Matter, states of system's elements always change discretely – are "quantized", and just such objects, effects, processes, quantum mechanics studies.

Note, though, that the fact of impossibility of deterministic continuous changes of anything was proven more 2500 years ago by Zeno in his brilliant aporias, when Zeno, in fact, predicted the quantum mechanics.

Relating to QM, note also here, that the QM really ad hoc postulate, which is introduced aimed at fitting the theory with experiment, that "all given type particles are identical" in the concept obtains rational ground:

- this QM postulate is adequate to the reality because all such particles are copies of the same informational pattern, that is a typical situation in Information.

Energy remains to be a mysterious element of "Logos" set. However, that till now is not too essential in physics. The reason is that Matter is rather simple logical system, which is based on a limited set of fundamental and highly universal basic logical rules/laws, links, and constants (more see below), where the exchange by energy at material objects interactions is, in depth, highly standardized and universal, and  the dependence of the action of Energy on difference of informational content in different material  objects so is inessential, besides that there are,, correspondingly, a few "forms of energy" – "kinetic", "thermal", "nuclear", etc.

### 2.1.3 Inertia

Inertia is absolutely fundamental phenomenon that characterizes the logical resistance to changes because of the self-inconsistence of "Change" above. As energy, the inertia in Matter can be, and is, characterized; according to Newton, by the physical parameter "inertial mass". Note here, that that has no relation to the existent in standard physics explanation of what is the inertial mass as some action of the Higgs field.

On an aside note a tenet, rather popular in official physics, that "energy and mass are two faces of one coin, one of them converts to another". That is fundamentally incorrect. Both absolutely fundamental phenomena "Energy" and "Inertia" indeed co-exist always in every informational pattern/system, including in every material object, but they are fundamentally different, and so, say, at the interactions in Matter first of all energy transforms/is distributed into energy, though with obligatory accompanying by transformation/distribution of inertial mass.

### 2.2. Matter's logical base

  Many authors   [7], [8], [13-15], etc., point out that Matter in our Universe is some rather simple logical system (in the "Matter computer" rather simple program code runs). That follows from the fact that the number of Nature laws

is not large, when laws themselves are rather simple and can be reduced to a number of   groups of high-level symmetry; and that Matter's base are some logical elements – "cellular automata", etc., however all that were/are only some ad hoc premises, which have no rational base, and cannot be tested experimentally.

Rational premises can appear only in framework of the "The Information as Absolute" concept [1] - [3]: according to the concept Matter absolutely for sure is an informational – and so logical, system – an element of the "Information" Set – of informational also patterns and sub-systems, which are particles, fields, bodies, cosmological objects, etc.

The more concrete answer with a large probability must be, and so is, in this informational physical model, in accordance with two indeed fundamental findings in XX century:

- in accordance with the outstanding von Weizsäcker's 1953-54 year "Ur-hypothesis" [26 - 28] that if Matter is based on fundamental depth on a binary logics, then the space should be 3D, and Matter's spacetime indeed has 3 space dimensions. That was, on one hand, the outstanding hypothesis that explains why Matter's space is 3D, and, on the other hand, the fact that the space is indeed 3D is the mighty evidence for that the hypothesis can be correct, and

- in accordance with the outstanding Fredkin-Toffli's finding [29], who showed that if some patterns in a system are based on a reversible logic, the system changes at interactions in it without energy dissipation outside the system. In this case, Matter that would be dissipation somewhere in the Set; thus seems thrifty Matter's Creator used this fact; and so in Matter the energy conservation law acts.

Correspondingly the concrete spacetime of the concrete binary informational system Matter has 3 "purely space" dimensions. Since this system is dynamical system, as that follows from experimental data, the spacetime has the "true time" dimension, $t$, which is absolutely universal and common for all dynamical elements of the Set. Further in this paper, for some reason (see below) instead of "$t$" for the true time dimension is mostly used "$ct$", $c$ is the standard speed of light.

Besides the dimensions above Matter's spacetime has once more dimension, to implement the reverse sequences of changes, which are in a sense "non-legitimate" in the true time, as some "travels backward in time", what is principally prohibited in the true time. The dimension is really a specific space dimension, however it is actualized in many traits in the Matter like the true time. This dimension is called the "coordinate time", "$\tau$", dimension in this informational physical model since that is just the "time what clocks show" [more see below], and mostly further for this dimension the metrics "$c\tau$" is used.

Thus the Matter's spacetime is the absolute [5]4D Euclidian spacetime as an empty container, where Matter exists and constantly changes, with the metrics ($c\tau, X, Y, Z, ct$), where "$c\tau$" is the "coordinate time" dimension, "$ct$" is the "true time" dimension, and $X, Y, Z$ are 3 "ordinary" space dimensions – unlike the "coordinate time" dimension, which really is a specific space dimension as well.

The dimensions, as that is shown in Sec. 2.1.1 above, are principally infinite by definition of Space and Time.

## 2.2.1 Actualization of the Matter's logical base

It seems quite rational to suggest that the dimensions of the spacetime relate to the degrees of freedom at changing states of some analogues of the von Weizsäcker's "Urs", though, of course, not literally: the [5]4D fundamental binary reversible logical elements (FLE). The corresponding introduction of fixed in the absolute spacetime above "ether", i.e. a [5]4D dense lattice of the FLEs, as that is made in the informational model, is rational as well.

Besides, in the model, basing on existent experimental data, it is postulated also that all the [5]4 FLE "sizes" (in the spacetime metrics above) are identical and equal to the Planck length, $l_P$, The changing of the binary FLE states "FLE flip time interval" is equal to the Planck time, $t_P$, therefore motion of material objects in the spacetime happens as "equal footing" in all [5]4 dimensions of the spacetime.

So in the model it is postulated, that at the fundamental elementary changing of state of some material object/system, i.e. at a the binary FLE "flip" the information in Matter changes on one bit, and that is observed as changing of the physical action, $S$, and angular momentum of fundamental particles, on the elementary action, $\hbar$.

This postulate of [5]4D FLE ether allows to postulate a few other assumptions.

## 2.3 Particles

In official physics, particles really are principally transcendent items – since they are some objects of the transcendent "Matter".

Besides from the informational concept above and from experimental data that particles — which absolutely for sure are informational patterns/systems — are some objects that constantly change their states; however, at that, they are stable, it seems to rationally follow [1], [30] that particles are some cyclic close-loop algorithms,

- that cyclically change their internal states with frequency ω[3] so that a particle has energy $E = \hbar\omega = mc^2, m$ is the inertial mass, $\hbar$ is the fundamental elementary physical action, reduced Planck constant, $c$ is the speed of light. This hypothesis appeared as early as in 1920 as the "the Zitterbewegung". de Broglie hypothesis [31], [32].

A few naturally suggested, and postulated in the informational model, rational conjectures follow from that above:

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[3] In earlier papers that is introduced as "informational currents"

(i) – particles are some cyclic disturbances of the FLE lattice, which appear when a 4D momentum impacts on an ether FLE, which, after the impact, "flips" further causing sequential flipping of neighbor FLE, etc.

To cause a flip – and the corresponding sequential flipping of ether FLEs along a straight 4D line is enough infinitesimal momentum when the "FLE flipping point" propagates in the 4D ether and 4D sub-spacetime with metrics $(c\tau,X,Y,Z)$ with the speed of light, $c = l_P / t_P$. However, if the momentum, $P$, is not infinitesimal, the flipping point can not propagate with the speed faster than c.

Thus, the unidirectional "FLE flipping point" motion transforms into a "helical" "FLE flipping point" of so some close-loop algorithm's – a "particle's" (Figs 1, 2 below) motion along some 4D "helix" of cyclic sequentially flipping – and so precessing, FLEs. Note also, that in this case the "flipping point" moves along "helix" with the speed $c\sqrt{2}$ , as the flipping of FLEs happens "diagonally", nonetheless the "helix front" moves along the impacting 4D momentum $\vec{P}$ direction with 4D speed of light, $\vec{c}$ .

However, some "a helix's 4D axis" does not exist as a 4D vector in the 4D sub-spacetime, so the propagation of the disturbance in the ether transforms into propagation of, possibly, propagating in the either bi-vector or a tensor, and so this propagating is essentially not "point-like"- in both, in the spacetime and in the ether. Nonetheless the propagation has the direction – the direction of the impacting momentum's vector. Besides, the "helix" of FLE lattice disturbance experimentally is observed as a pointlike particle interacting with other pointlike particles. It seems rational to suggest that "pointlike interactions" are interactions of the particles' FLEs, i.e. the "size of interaction point" is near Planck length, even though the disturbance "a particle" is not so pointlike, and the positions of the interactions points are randomly distributed in some non-pointlike spatial region.

Besides, the observed projection on the 3D space of 4D helical propagating of the FLE flipping point essentially determines that particles propagate in 3D space as "waves" (but interact as "points"); what is observed as the "wave-particle duality"

(ii) From the existing experimental data it seems rational to suggest (in first approximation, see point (i) above) that the "radius" of the "helix" is equal to the particle's Compton length $\lambda = \dfrac{\hbar}{mc}$, and the corresponding "helical" angular momentum of the particle's "FLE flipping point" is equal so to the Planck constant, $\hbar$ .

(iii) The always moving particles are, thus, some "gyroscopes" which are always oriented relating to the propagating direction, and

(iv) Note also, that it follows from the experimental data that there are two main types of particles in Matter, depending on the parental 4D momentums. In the model that are "S-particles", created by spatial momentums, and "T-particles", created by momentums that were directed in the "coordinate time", i.e. along the $c\tau$-axis.
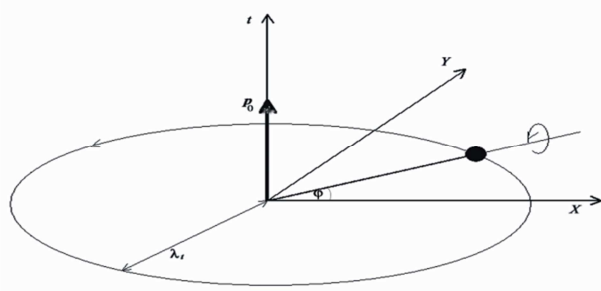
Fig. 1. A T-particle at 3D space absolute rest. Large black point on the circle is flipping FLE. The (projection of helical) movement of a particle as of a singled out specific informational structure along $c\tau$-axis.

So S-particles, e.g., photons, always move in 3D space only with the speed of light, T-particles move in "coordinate time" dimension with the speed of light, if are at rest in the absolute 3D space. If a T-particle moves also in space after a space directed momentum, its speed in the "coordinate time" dimension decreases by the Lorenz factor in accordance with the Pythagoras theorem.

Note, though, that the above in this section relates completely only to fundamental particles. If a particle is composed from some fundamental particles, some points in the above are not valid.

And, besides, note that extreme impacts on FLE can result in many comparatively stable close-loop algorithms, and that is observed experimentally – the observed particles zoo now contains a more than a few hundred items – some chimeras that are composed from some fundamental particles, truncated particles' algorithms, as that, say, rather possibly muon and tau-lepton truncated electron's algorithms are; 2-nd and 3-rd generations of quarks, as well, etc. Most of the algorithms have some defects, and so can break on some algorithm's tick with some probability, so such particles decay exponentially in time.

2.3.1 Antiparticles

In this model antiparticles are introduced by quite natural way – that are the same algorithms as the corresponding particles, however which run in reverse commands order. So the term "antiparticle" is really essentially applied only to T-particles/antiparticles, which are created by oppositely directed $c\tau$-components of 4D momentums, so algorithms run in opposite commands order directions, and antiparticles move along the $c\tau$-axis in opposite directions. S-particles, say, photons, haven't different from the particles antiparticles.

2.3.2 Particle's spin

 "Spin" is ad hoc introduced in QM as "purely QM "quantum number" - physical parameter of particles, aimed at fitting the theory with experiments. However, in the model it obtains rather "classical" sense – that is indeed an angular momentum, which is the observable projection of the "flipping point's" 4D angular momentum above on the 3D space. Thus, quite naturally spin can be – and really is in QM, added/subtracted to/from, say, "more classical" orbital angular momentum.

However, because of the mathematical limitation above, the 3D "angular momentum" "spin" observed in fundamental particles differs from the "real" the momentum's value, which is equal to $\hbar$, and for some T-particles it is observed at interactions in the 3D space as equal to $\frac{1}{2}\hbar$ ; fundamental T-particles are fermions. For S-particles the mathematical limitation above is not essential, and S-particles have the "real" spin, $\hbar$ (these are bosons). Though here is a limitation as well, the S-particles angular momentum can not have projection on the $c\tau$-axis, and so has only two spatial projections.

That the above relates only to the fundamental elementary particles, T- particles that are compositions of fundamental particles can have integer spins.

From the definition of what is the absolutely fundamental phenomenon "Inertia" above follows that all/every S and T particles have some inertia, and so all/every particles have inertial masses. But in this case there is a physically essential difference, though which is not principal: T-particles differ from S-particles in that they have inertial "rest masses", when S-particles quite naturally have not.

2.3.3  Neutrinos rest masses

From experimental data it follows [33] that the neutrinos are fundamental fermions, so are T-particles, and so have non-zero rest masses. Neutrinos, besides, since have extremely small masses, in real experiments move with speeds that practically equal to the speed of light, i.e. with large Lorentz factors. So their "flipping point" angular momentums, because of the rotation in the $(X, c\tau)$ plane (at motion along $X$-axis), are directed practically completely along spatial motion directions, and so are observed as be equal to $\hbar$. That is introduced in physics as that neutrinos have "helicity". This helicity seem as practically for sure doesn't differ from the helicity of, for example, electrons with large Lorenz factors, and, as that is for the electrons, here is no problem with reference frames – as all that must be in accordance with the relativity principle.

**2.4  Lorentz transformations**

If some T-particles constitute a rigid enough T-body (there are, though, no rigid bodies composed from S-particles), then, if the body, say, is a rigid rod, which has a length $L$, and is at rest in the absolute 3D space, the rod occupies a corresponding spatial interval equal to $L$, and all the rod's points move in the $c\tau$-dimension with the speed of light, all the points so have identical $c\tau$ coordinate values.

However, if the body is impacted by some spatially directed momentum, as that always happens in mechanics, if we do not consider the interactions in high energy physics, then, as that was shown above, the rod's speed in coordinate time decreases in the Lorentz factor.
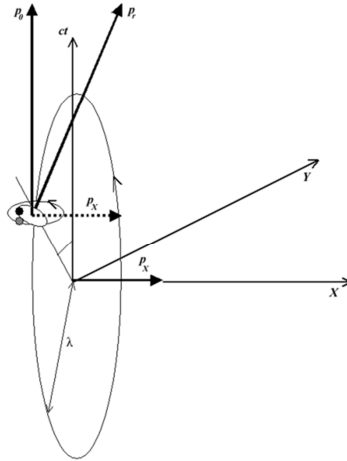
Fig. 2. A T-particle's (projection of helical) movement along *X*-axis as a combination of two circular and one direct motion. Big black points in the lesser circle are flipping t-FLE. Non – relativistic case. Really the motion isn't some sum of independent helixes, that is rather bizarre "helix" of one particle's algorithm, which is "diluted" by "blank" FLE flips in the "helix's" large circle's part.

Since the motion in coordinate time is changing of internal state of particles (what is the running of the close-loop particles' FLE-algorithms), the changing of internal state proceeds at maximal rate when a particle is at absolute rest, but when a particle moves also in the space, its algorithm is "diluted" by "blank" space steps, and so runs slower in the Lorentz factor.

Thus, the decrease of the moving particle's speed along the $c\tau$-axis means that the internal processes in the particle are slowed down in the Lorentz factor as well. That is observed experimentally: moving unstable particles live longer, moving clocks tick slower, etc.; and, besides,

- since moving particles – "gyroscopes"– in the space change their orientation in the 4D sub-spacetime, the particles, if rigidly bound in the body, rotate the body in the sub-spacetime as a whole. So, in this case the rod, if it moves along *X*-axis with a speed *V*, rotates in the $(X, c\tau)$ plane on the angle, when the rod's front end becomes in the coordinate time "younger" than the back end by the "relativity of simultaneity" Voigt [34] decrement $-\dfrac{VL}{c^2}$ (only along the rod and fundamentally nowhere in the space else), again in accordance with the Pythagoras theorem (Fig. 3).
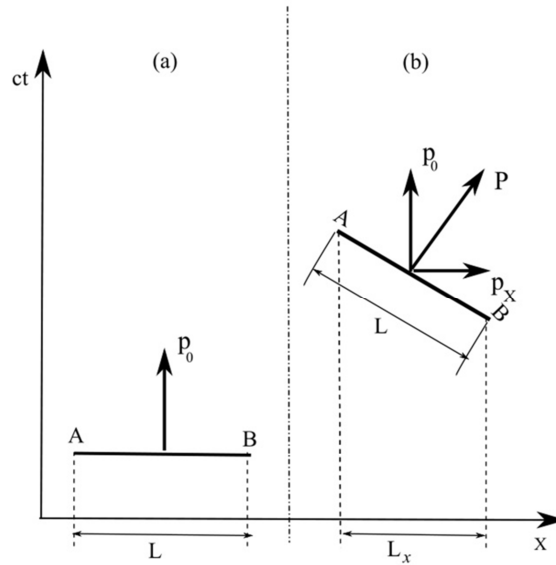
Fig.3. A rod having the length *L* moves in the 4D sub-spacetime: (a) – the rod is at [spatial] rest (moves in the coordinate time only) in the absolute reference frame, (b) the rod moves also along *X*-axis with a speed *V*. *t* is the coordinate time. $P_0=mc$ is the rod's momentum when the rod is at absolute rest, *P* is the rod's momentum after the rod was impacted with transmission 3D space momentum $p_X$, *m* is inertial mass of the rod.

So the rod's projection on the *X*-axis is contracted by the Lorentz factor, as was suggested by FitzGerald yet in late 1800-th [35]. At that the rod really occupies a spatial interval $L_X$ in the space lesser than it occupied at rest, and all other material objects really interact with the "contracted" rod.

However, because the space interval etalons on the rod are contracted as well, the rod's length measured by an observer on the rod is again equal to *L*.

From the Fig. 3 the Lorentz transformations [36], [37] immediately follow (note that till now all is considered in an absolute frame, where all parameters of bodies, in this case *x* and *t*, are real, and so, though clocks in the frame show principally the clocks' position in the coordinate time, $c\tau$, clocks in absolute fame show also the position in true time, *ct*),

- the first equation

$$x = Vt + x'(1 - \frac{V^2}{c^2})^{1/2} , \qquad (1a)$$

- and the second one:

$$ct' = (1 - \frac{V^2}{c^2})^{1/2} ct - \frac{V}{c} x' \qquad (1b)$$

- which (the transformations) thus are indeed adequate to the reality. However, first of all:

- the *Lorentz transformations are equations of motion of only points of moving in the absolute space rigid bodies in the absolute reference frame with using data about coordinates of these points, measured in the inertial reference frame* that is set on (is co-moving) this body - as that the Galileo transformations are.

The letters $"x/x'"$, $"y/y'"$, $"z/z'"$, and $"ct/ct'"$ in the transformations by no means relate to all points in the whole Matter's spacetime, as that is postulated in the Minkowski version of the SRT [22], and to points of some "local space" and "local time" in the Lorentz-Poincaré theory [36]- [38]; besides, of course, the spacetime points that are occupied by the bodies points.

So, of course, there are no "space contraction", "time dilation" or other "relativistic properties of the space, time, and spacetime" and corresponding "relativistic effects".

Note, however, a few additional points in this case:

- first of all, because of the mighty Galileo-Poincaré relativity principle, which exists and acts because of the fundamentally binary reversible logical base of Matter, the Lorentz transformations form the group so that they are applicable not only in an absolute frame, they are symmetrically applicable between any the "Einsteinian" reference frames, i.e. that Einstein quite correctly (see above) used in first version of SRT in the 1905 year paper

"…The theory to be developed is based like all electrodynamics on the kinematics of the rigid body, since the assertions of any such theory have to do with the relationships between rigid bodies (systems of co-ordinates), clocks, and electromagnetic processes…"

- though after Minkowski illusorily postulated the applicability of the transformations to all the spacetime points, Einstein did not support this 1905-year assertion about rigid bodies and frames' coordinate systems, and now the standard version of SRT is the Minkowski version [39].

The Lorentz transformations, as that Poincaré showed in [37] form the group relating velocities in the 4D Euclidian spacetime, and so using of any moving in the absolute space frame indeed allows to describe and to analyze objects, events, and processes in physical systems quite adequately to the reality, even though the measured parameters of material objects and systems are not real in this case – the objects and systems have real parameters only in the absolute frames. However all such frames are thus really equivalent and legitimate in most practical cases, *since they are traceable to the absolute frame.*

Note also, that the notion "rigid" isn't applicable in this case literally, for example Earth gravity makes the system "Earth+satellites" a rigid system, and so using instruments in this system it is impossible to observe this system absolute motion.

However, that is not completely true in any physical system. If a system is composed by free objects, the Lorentz transformations do not work completely. For example, that correctly is shown in the Bell paradox [40], where the space distance between free "Bell ships" doesn't want to contract; so by using such systems it is possible to observe the absolute motion, and to measure the absolute velocity, two the measurements methods are proposed in [23], [24].

And, more importantly, the real non-complete adequacy of SRT postulates to the reality becomes an impediment in physics, when physics addresses the

fundamental problems, i.e. outside the utilitarian applications in elaborations of concrete physical tasks and technology. Thus, new physics is possible in some cases only at violation of SRT.

A couple of examples, when really fundamental new results in physics turned out to be possible only as some violations of SRT, are the discoveries of antiparticles; and the "Feynman–Stueckelberg interpretation" in QED [41], [42], where it is postulated that antiparticles move backward in time, where

- Dirac's prediction of the antiparticles [43] is based on the suggestion that there are some points in "sea of negative energy", when "negative energy" does not exist in SRT (that does not exist at all, though),

- and moving of particles backward in time does not exist in SRT as well.

However, both these fundamental findings in physics remain unexplained, so really corresponding fundamental physical problems also remain. In spite of that the antiparticles predicted by Dirac are observed soon for 100 years already, they remain be some actualizations of rather questionable "sea of negative energy states"; and the Feynman–Stueckelberg interpretation till now remains in physics as a strange mathematical trick, which, however, is essential at application of very effective QED. More in this case see [25].


## 2.5 Dynamics

In sect. 2.3. it was shown that practically everything in Matter, i.e., particles, bodies, etc., is constantly moving in the Matter's "aether" – [5]4D FLE lattice with the 4D speeds of light, $\vec{c}$, having, correspondingly, 4D momentums $\vec{P} = (p_{c\tau}, p_X, p_Y, p_Z) \equiv (p_{c\tau}, \vec{p}_s)$, $p_{c\tau}$ is the $c\tau$-component , $\vec{p}_s$ is 3D space component of the momentum $\vec{P}$. As that is in Newton's mechanics, $\vec{P} \equiv m\vec{V} = m\vec{c}$, $m$ is the inertial mass.

So, because of that all dimensions in Matter's spacetime are mutually orthogonal, $\vec{P} = \vec{p}_{c\tau} + \vec{p}_s$, where $\vec{p}_{c\tau} = m_0 c \vec{i}_{c\tau}$ is the $c\tau$-component, and $\vec{p}_s$ is the 3D space component of 4D momentum, $m_0$ is corresponding inertial mass, $\vec{i}_{c\tau}$ is the basic unit vector in coordinate time dimension, Since all dimensions in the Matter's absolute Euclidian [5]4D spacetime are orthogonal, any impact on a body with only 3D space momentum – as that happens always in classical (outside high energy physics) mechanics –  doesn't change  the $\vec{p}_{c\tau}$ value, and so $P = (p_{c\tau}^{\ 2} + p_s^{\ 2})^{1/2}$, see Fig.4
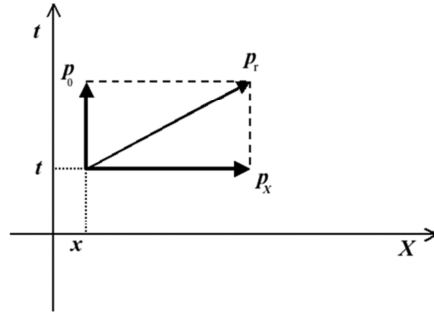
Fig.4. A momentum, $\vec{P}$, of a T-particle after space – directed impact with momentum $\vec{p}_X$. The particle moves along X-axis with the speed $V$

Correspondingly we obtain for the $\vec{P}$ magnitude another equation ($V \equiv \beta c$):

$$P = \frac{p_{c\tau}}{(1-\beta^2)^{1/2}},$$ (2a)

and for $\vec{p}_X$:

$$p_X = P\beta = \frac{m_0 V}{(1-\beta^2)^{1/2}} \equiv \gamma m_0 V.$$ (2 b)

where $\gamma = \dfrac{1}{(1-\beta^2)^{1/2}}$ is the Lorentz factor.

Calculating the work of some force $F$ at a spatial (a $c\tau$ impact results in the creation of new particles) acceleration of a body with a rest mass $m_0$ on a way $S$ (in the Eq. (3) below $p \equiv p_X$ for convenience, in the point $S_1$ the force is equal to zero), obtain:

$$A = \int_{S_1}^{S_2} F(S)dS = \int_{p_0}^{p} \frac{p(1-\beta^2)^{1/2}}{m_0} dp = c\int_{p_0}^{p} \frac{pdp}{(p^2 + m_0^2 c^2)} dp = c\Delta P.$$ (3)

Since at motion of a body the work of the force results in the change of the body's kinetic energy, from (3) we obtain

$$\Delta E = A = E - E_0 = cP - cp_0,$$ (4a)

or

$$E = cP = \frac{m_0 c^2}{(1-\beta^2)^{1/2}},$$ (4b)

and for a body at rest in an ARF

$$E_0 = cp_0 = m_0 c^2.$$ (4c)

Besides, from sect. 2.3 above follows that every particle is some gyroscope, and so, for example, an impact on a particle (and on a body eventually) in some direction results in the particle's (body's) accelerations not along the impacting force direction, as that is in Newton's mechanics, but in two – along and orthogonal to the impact's direction – directions.

## 2.6 Some examples

Let's consider a few examples of the informational model application.

**Example 1.** It seems utmost known example – the Michelson–Morley experiment, where the arms of the interferometer were changing their projections in a (*X,ct*) plain at the absolute motion of this instrument, including the motion around Earth, around Sun, etc. in accordance with the FitzGerald's guess and further with the Lorentz transformation and with this model.

**Example 2**. Since every material object moves in 4D sub-spacetime with metrics ($c\tau$, *X, Y, Z*), and, simultaneously, in 1D *ct*-dimension, always with the speed of light only, all objects in Matter, if Matter appeared at Beginning inside the Planck time interval, are always in the one true time point - just because of this [true time] rule/condition different objects in Matter interact at spatial contact, when they can be at that rather far away from each other in the coordinate time – e.g., photons always are in the different coordinate time points with any T-particle since move in the space only, when T-particles always move in the coordinate time.

Let there are a pulsed light source, **S**, and a mirror, **M**, which are placed on a distance *l* (Fig. 5). After a flash, source's photons move to the mirror and back. Since photons are S-particles and move in the space only, they return to space point, where the source is placed; but now in the spacetime's 4-point there is no source – it (and the mirror) moved for this time on 2*l* distance along [coordinate] $c\tau$-axis. Nonetheless the source (or, e.g., a human) sees itself – because of both, the source and the photons, are in the same absolute time point; though sees as it was at the coordinate – and true, if the system is at rest in the space - times interval $2l/c$ before.
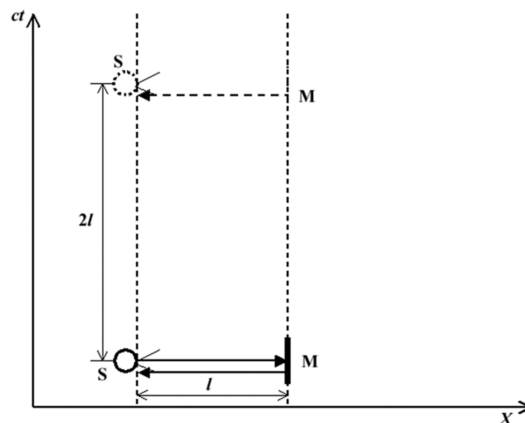


Fig. 5. A system of pulsed light source, **S**, and a mirror, **M**, placed on a distance *l*.

Note, nonetheless, that the assumption above isn't completely grounded. In principle in the FLE lattice can exist some FLEs, which, if at creation of the lattice at Matter's Beginning (more see [25], sect. "Cosmology") they were fixed, and further at Matter evolution reminded be fixed, i.e. weren't used at creation of the lattice disturbance, say, at some particle creation and motion,

then such FLEs are in "zero time points" in both, the coordinate and true times dimensions. However, it seems as quite rational, that such FLEs can be impacted by a momentum now, and take part, say, in a particle existence and motion. Though in this case we have not now some knowledge to clarify this point for sure, since such cases would be travels back in true time, that looks as impossible, whereas here can be, e.g., case that all FLEs are chaotically flipping from Beginning along some direct lines. That doesn't require energy (see sect. 2.3 above), and so in this case all Matter, including whole lattice, is in the same true time point.

**Example 3.** Consider some pair particle + antiparticle. Since antiparticles move in spacetime having negative time direction, they never meet with particles in the spacetime – however, see Example 2, meet in the 3D space. So, for example, if a pair electron+ positron was created at the Big Bang and didn't interact till now, then now these particles in coordinate time are separated by distance near 27 billion of light years. However, since they are always in the one true time point, they can interact at a 3D spatial contact, and – since they have opposite equal momentums – can produce the $\gamma\gamma$ pair with (here, since the $e^+e^-$ pair is at rest in the space) opposite momentums also, but which are directed oppositely in spatial directions only (see Fig. 6), total 4- momentums of the $e^+e^-$ pair and the $\gamma\gamma$ pair are equal, and are equal to zero. If the electron and the positron had non-zero spatial momentums, the number of gammas can be different and their total momentum be not equal to the zero, but the total momentum's $c\tau$ -component will be the same as for the $e^+e^-$ pair, i.e., equal to the zero.
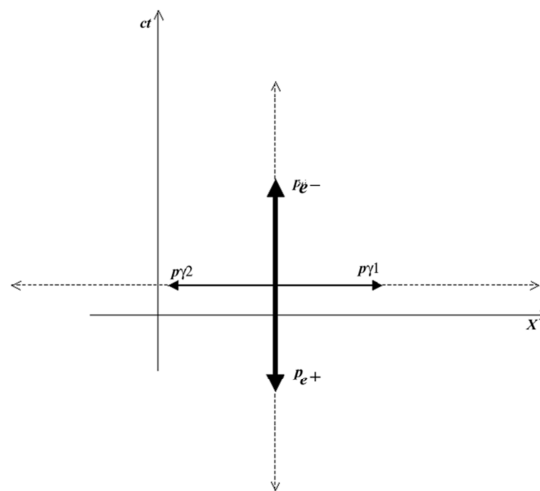


Fig. 6. Annihilation of an electron-positron pair.

Analogously, at a decay of, e.g., $\pi^o$ meson, its quark and antiquark are separated in the spacetime by a distance near $10^{-8}$ m along the $c\tau$ -axis, what is very large distance for the strong force; for the $\pi^\pm$ mesons this distance is near 10m, though, however these particles interact with other particles as pointlike, say, protons and electrons.

## 2.7 The informational model and "Euclidian relativity".

Many of the inferences above, obtained in the informational model, were presented also in a number of papers, where so called "Euclidian relativity" is developed [44-54]: "two face" nature of the time, the introducing of the absolute Euclidian spacetime and the absolute time ("Supertime" in [50]), etc. On another hand, in contrast to the model, the "Euclidian relativity" principles in the Refs above are introduced as some conversion of the SRT, as a rule by using the equation for the SRT invariant interval $ds$ :

$$ds^2 = (cdt)^2 - dr^2 \Rightarrow (cdt)^2 = ds^2 + dr^2 \Rightarrow (cdt)^2 = (cd\tau)^2 + dr^2 ,$$

where $t$ becomes be "Supertime" and $\tau$ - proper time – becomes be 4-th coordinate in Euclidian 4D spacetime. Such an approach seems as not totally rightful – the change "$ds \Rightarrow cd\tau$" is valid for a material point only, in other cases proper time isn't applicable. Therefore, though the majority of the inferences of the approach in these papers are true, there are also others, for example in [42], [54] it is stated that relativistic equation for addition of velocities isn't correct. That isn't true; this equation follows from Lorentz transformations, which were obtained by Lorentz and further by Einstein for Euclidian spacetime, and just because of this equation for addition of velocities Lorentz transformations form the group, and so all inertial reference frames are mostly equivalent;

- and all that was before the introducing by Minkowski (what was found by Poincaré as interesting mathematical fact, that from invariance of this quadratic form ($ds^2$ above) in a mathematical 4D space with imaginary time Lorentz transformations follow [38]) in the standard now SRT of the invariant interval and imaginary time.

Besides, what is more essential – when introducing the absolute spacetime the authors of "Euclidian relativity" apply, nonetheless, the principally erroneous relativistic approach, where the reference frame coordinates are something that directly corresponds to all/every points in the whole spacetime and so they introduce "4 D spacetime metrics", which depends on the reference frame; further – apply the coordinates rotations at transitions between, say, two frames at mutual relative motion. But in this case – analogously to the SR, where the rotations are principally inherent – it turns out to be that the reference frames simultaneously have two different (really $c\tau$) time-axes that have different directions – what is impossible in the reality, in the spacetime only one temporal axis exists. Thus in the reality really a number of the frames' coordinates transformations are possible – translations along any axis; and the rotations, however in 3D space only.

The next principal "relativistic" flaw, which is transmitted from SRT to the "Euclidian relativity" also – in both theories the coordinates of a reference frame (and the validity of Lorentz transformations that relates to the space and the time directly) are infinite, when in the reality the transformations (see above) relate only to corresponding kinematical parameters of motion of rigid material bodies and cannot be applied totally outside the bodies (see above Sec. 2.4).

## 2.8 Informational approach and QM

Above we have noted an important, direct, and trivial consequence of the informational conception, which relates to the quantum mechanics – that one of basic QM postulates about the identity of the same type particles follows from that the particles, as everything in Matter, are some informational patterns, when any information has the property to have absolutely identical copies; and so one type particles are clones of one type algorithm.

Another basic QM point is the principal randomness/uncertainty of physical processes on a micro level.

That is the consequence of the fact, that the absolutely fundamental Logos set element "Change" (see sect. 2.1.2 "Energy") is logically self-inconsistent, and so this logical "past-present problem" in dynamic informational patterns/systems, including in Matter, is solved by using energy and by that dynamic, including QM processes in Matter, are random/uncertain.

However, this uncertainty isn't arbitrary. As is pointed above, Matter's objects change their states basing on binary logics, i.e., "bit by bit". From existent experimental data it seems to follow – at least till now - that there are no any experimental data inconsistent with this conjecture. In this informational model it is quite rationally conjectured, that on utmost fundamental depth all changes proceed as sequences of elementary steps on the Planck scale, when the physical action, $S$, is the number of binary operations, and every operation changes the information in a material object/system by one bit, observed as the change of the action on fundamental universal elementary physical action $\hbar$.

The Heisenberg inequalities in QM mean, essentially just that: $\Delta S = \Delta P \Delta x \geq \hbar / 2$ , $\Delta S = \Delta E \Delta t \geq \hbar / 2$, etc.,

- however it looks as rather probable here is a correction: the inequalities seem with rather large probability really are the equalities.

So, though the QM uncertainty is absolutely fundamental, this uncertainty, nonetheless, is not arbitrarily chaotic, and is actualized as uncertainty in pairs of non-commutative variables provided $\Delta S = \hbar$ in all cases.

Thus the "minimal physical action" principle in macro physics is that the states of interacting bodies proceed to change provided the minimal number of innumerous elementary binary steps with $\Delta S = \hbar$; and by such a way QM directly reveals itself in macro physics.

Note also, that in this case it is necessary to take into account that this point is applicable in concrete informational systems, when some new informational structures, which have relatively self-dependent organization, appear. For example – elementary particles are some structures of FLEs that have properties, which the FLEs don't have (or, if be more correct – which FLEs have only implicitly, potentially); next level of the organization – atoms and nuclei that are some structures of the particles having new properties, etc., and on each next level new structures having new properties again must solve the "Change self-inconsistence problem".

### 2.8.1 Wave-particle duality

From the "helical" motion of particles, the experimental fact that particles move essentially as "waves" looks as quite natural, and so, for example, the diffraction patterns, if a beam of particles passes through an one slit, seems as rather understandable.

However an explanation of two and more slits diffraction, is outside this zero approximation assumption, and will, rather probably, requite to assume that a particle isn't a simple "one FLE line" algorithm, but at a motion the particle acts by some way on neighbour and further – other FLEs in the spacetime lattice, when resulting "volumetric" disturbances of the lattice have properties that are inherent to the moving particle.

In spite of that from experiments it follows that particles propagate in the FLE-lattice as waves, from experiments it follows also that they interact with other particles as points. However, in this case the given model has rather probably rather adequate to the reality explanation – particles interact as points because of really the interaction is interaction of concrete FLEs in particles' algorithms.

More about what problems in QM, which this informational approach essentially clarifies see [25]

### 2.9 Mediation of the forces in complex systems

### 2.9.1 Fundamental Nature forces and charges

Now four "fundamental" kinds of the interactions (four "fundamental Nature forces") are known – Gravity, Weak, Electric (EM), Strong; which differ by the strength, e.g., for the proton as (approximately) $10^{-36}:10^{-11}:1:10^{3}$.

In this informational model the Forces are some logical marks, that can be, and are in Matter, assigned to, or, more correctly activated in, any FLE. If this FLE is a "logical gate" in the algorithm's FLE sequence of some particle, then at constant cyclic running of the algorithm, when this FLE flips, it not only causes flipping of neighbor ether FLEs above (see sect. 2.3) but, besides,

- in these ether FLEs corresponding Force mark becomes be activated as well.

Such marked flipping propagates in the FLE-ether as the Force mediator and when this mediator meets another particle's flipping FLE with this Force mark, the mediator transmits some momentum, $\vec{p}$, to the other particle. This scheme is possibly not unique; for example, in nuclear physics nuclear force is, possibly, and that is postulated in physics now, as an exchange by particles (mesons), however that is not essentially principal and the scheme above seems rather effectively applicable at least for Gravity and EM Forces.

**So** the charge of a Force is, first of all, a set – a part – of Force-marked FLEs in the particle's algorithm. However, that is not complete, the Force strength – and so "charge" also depends on the frequency at which this algorithm runs.

Now only two Forces are considered in this informational model – Gravity and EM, the initial - which are models of these Forces mostly in statics -  2007 year models [1], [30] of these Forces are below.

Note here, that in recent physics mediating of Forces proceeds as exchange by Forces' mediators, which are "virtual" particles, in quantum electrodynamics that are virtual photons.

Nonetheless it looks as completely rational to suggest that in Matter there are no "virtual" particles and interactions, and the "virtual particles" really is a mathematical trick, which, for unknown now reason though, is – in QED extremely – effective at elaboration of physical tasks.

Real interactions in Matter are caused and happen as real interactions of real material objects, and the mediators of the Forces really are not "virtual".

From experimental data it rather convincingly follows at least for Electric force, that the real interactions, at least in statics, are not caused by real "ordinary" photons – just which in QED are introduced as "virtual photons". In this case there is no any experiment, where an exchange by ordinary photon was observed in a static system of charged bodies, nonetheless the charges at statics really do interact.

Thus in the models some non-existent in physics now "circular photons", which are not observed by detectors of ordinary photons, including human eyes, are proposed as real Electric force mediators. Gravity Force doesn't exist in recent physics since the general relativity theory is standard theory of Gravity. However, because of GRT is based on fundamentally wrong postulates, where some fundamentally incorrect (see sect. 2.1.1) properties to space/time/spacetime are postulated, and so Gravity, practically for sure is "fourth" fundamental Nature force, which in a number of traits is similar to the Electric Force, and in the initial Gravity model mediators are analogs of "circular photons" - "circular gravitons".

The studies of the problem – why the QED virtual photons simulate the real interactions of the real circular photons with charges adequately to the reality - will rather probably result in new information about how Matter is constructed on the QM scale.


## 2.9.2 Initial model of Gravity  Force

Remaining in this informational concept it is possible to put forward [1] rather reasonable conjecture: since   the gravity force is universal (regardless to the kind of particles) - then the gravitational potential energy of a system of some bodies is proportional to the *accidental coincidence rat*e of random interactions of Gravity mediators with every  particles of these bodies. Such coincidences always exist since the FLE's flip-time is not equal zero. Secondly suppose, that  in gravity interaction only one FLE in particles' algorithms take part;

- and that happens in the 3D space, by three conditions:

(i) - the frequency at which a particle's algorithm runs if particle is at absolute rest (in statics), is $\omega = E / \hbar = m_0 c^2 / \hbar$, [for photons $mc^2 / \hbar$], where $m_0$ is the inertial rest mass, $c$ is the speed of light, $\hbar$ is the Planck's elementary physical action, and

(ii) - in the model every particle's algorithm has only one fixed gravitationally marked FLE, and so the gravitational charge is proportional to the same algorithm's frequency $\omega$, as the particle's inertial mass above.

(iii) at every cycle, the marked FLE of a particle initiates in the 3D space radial propagating of 2D rim "circular graviton" of flipping ether FLEs that can transmit, at hitting in G-marked FLE of other particle, to this particle the momentum $p \sim -\frac{\hbar \vec{r}}{r^2}$, $r$ is the radius-vector from the radiating to impacted particles.

Since the G-marked FLEs flip independently in both particles, and particles practically are not oriented specifically in the space at gravitational interactions, the elementary interactions above are random. That is not essential in Matter on macro scale, however it allows to observe the quantum nature of Gravity at interactions of lightest particles, first of all photons [1], [56].

A couple of additional important notes: (i) - first of all from the existent experimental data follows that all/every particles have the gravitational charges, and (ii) - that the Gravity mark is completely symmetrical at particles and antiparticles algorithms running, and so everything in Matter attracts everything.

For two bodies at rest having *gravitational* masses $m_1$, $m_2$, that are placed on the distance between the particles, $r$, "Newtonian" potential energy is equal

$$E_{gN} = -G \frac{m_1 m_2}{r}, \tag{5}$$

where $G$ is Newtonian constant of gravitation.

As that was assumed above, the FLE's sizes are equal to Planck's length, $l_P$. Besides assume that:

(i)- at every "tick" of a particle a "rim" ("circular graviton", further "graviton") of FLEs flips starts to expand *in the space* with radial speed that is equal to the speed of light, $c$, so the rim's area is equal $2\pi r l_P$, see Fig.7

(ii) - the time intervals of the "radiating" particle's G-marked[4] FLE's flip, and of the interaction of the graviton's FLE and other particle's G-marked FLE, are the same and are equal to Planck time; and

(iii) – at the interaction of a graviton and a particle's flipping G-marked FLE, the particle is, with a probability, gravitationally impacted.

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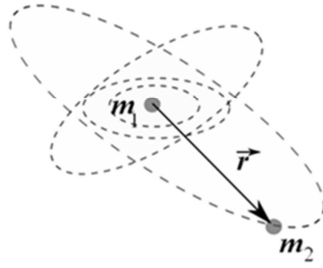[4] In earlier papers with this model "G-marked FLE" is called "us-FLE"

Fig. 7. A sketch of a spreading of the circular gravitons in the space. The directions of the spreadings are random since in reality any particle is impacted by some forces and isn't oriented in the space constantly.

It is evident, that interactions of gravitons and particles' G-marked FLEs are accidental events – coincidences of independent processes of "radiation" and spreading of gravitons of "radiating" particle and of G-marked FLE flipping of other one. In previous papers  ([1], [2], [30]) the coincidence rate in a particle was estimated in suggestion that both – the number of "gravitons" in a point, where a particle's G-marked FLE flips, and the number of these G-marked FLE flips, are random; at that both numbers are distributed under Poisson law with the averages $n_1$ and $n_2$. Then, if both [average] rates of coincidences inside Plank time interval are small, then it is well known that the coincidence rate is equal

$$N_c \approx 2n_1 n_2 \tau \qquad (6)$$

In reality the particle's G-marked FLEs flips very regularly; nonetheless the equation (6) remains be true, if one suggests that the interaction of graviton and particle's G-marked FLE happens in any time moment when the both Plank intervals overlap (Fig. 8).
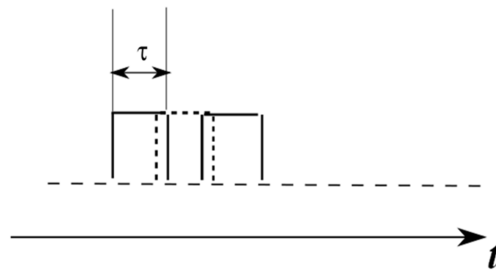


Fig.8  Overlapping of gravitons and G-marked FLE

Thus the coincidence rate in a particle for the time when the particle's G-marked FLE flips again is

$$N_c = \psi_r n_p 2\tau \qquad (7)$$

where $\psi_r$ is the flow [s$^{-1}$] of gravitons through the particle's G-marked FLE; $n_p$ is the G-marked FLE's flip rate (is equal to the particle's algorithm tick rate/ frequency $\omega$ ).

From the suggestions above obtain that the average gravitons flow, which is produced by a body having a mass $m_1$ on a distance $r$ is equal

$$\psi_r = \frac{m_1 c^2}{\hbar} \frac{2\pi l_P r}{4\pi r^2} = \frac{m_1 c^2 l_P}{2\hbar r} \quad,$$

(8)

and the coincidence rate in a "radiated" particle is

$$N_{c12} = \frac{m_1 c^2}{\hbar} \frac{l_P}{2r} \frac{m_p c^2}{\hbar} 2\tau \cdot P_G = \frac{m_1 c_2}{\hbar} \frac{l_P}{2r} \frac{m_p c^2}{\hbar} 2\frac{l_P}{c} \cdot P_G = \frac{m_1 m_p c^3 l_P^{\,2}}{\hbar^2} \cdot P_G \quad.$$

(9)

Since the Plank length is equal $l_P = (\frac{\hbar G}{c^3})^{1/2}$, from Eq.(9) obtain, that if the probability $P_G = 1$ the coincidence rate in the particle is equal

$$N_{c12} = \frac{Gm_1 m_p}{\hbar r}$$

(10)

It is evident, that if a body having mass $m_2$ contains not extreme number of particles (and the "radiating" body as well, of course), then the coincidence rate in the body is equal

$$N_{c12} = \frac{Gm_1 m_2}{\hbar r}$$

(11)

Note that the masses $m_1$, $m_p$, and $m_2$, in the equations (8) - (11) above are the *inertial* masses.

However, since the interaction of the bodies is symmetrical, the coincidence rate in the first body is equal to the rate in the second one: $N_{c12} = N_{c21} = \dfrac{Gm_1 m_2}{\hbar r}$, so total gravitational energy, defined here in the informational model, $E_{gIt}$, seem as

$$E_{gIt} = -\hbar(N_{c12} + N_{c21}) = -2\frac{Gm_1 m_2}{r} \quad.$$

(12)

What, of course, contradicts the Newton gravity law. So we should introduce an additional premise to take into account this point. That can be the trivial case ; $P_G = 1/2$ ; in [30]  ] it was suggested that for the Gravity interaction is necessary 2 G-marked FLE+graviton interactions; thus obtaining that the correct equation for the system's energy is

$$E_{gI} = -\frac{Gm_1 m_2}{r}$$

(13)

It is evident that $E_{gI} = E_{gN}$, when this energy (and corresponding the system mass defect) is equally divided between the bodies:

$$E_{gI1} = E_{gI2} = -\frac{Gm_1 m_2}{2r} \ .\tag{14}$$

Note that from Eqs (5) and (14) follows that *the gravitational and the inertial masses of a body are completely equivalent*, since both "are created" by the same algorithms tick rates, $\omega$, of particles that compose the body.

For the gravitational force by what the bodies attract each other obtain

$$F_{gI12} = \frac{dP}{dt} = -\frac{2\hbar}{r} N_{c12} = -\frac{Gm_1 m_2 \vec{r}}{r^3} = -F_{gI21} \ ,\tag{15}$$

where $P$ is momentum of a body, when suggesting that the transfer of the elementary momentum, $\vec{p}_0 = -\frac{2\hbar\vec{r}}{r^2}$, happens at every interaction of the G-marked FLE and graviton.

Note, however, that to solve this "1/2" problem, i.e. – the condition that to obtain true value of the gravitational mass defect in every body is necessary for the coincidence rate in the body to be twice lesser then for the corresponding gravity force (Eqs. (14) and (15), it is possible also, that the coincidence rates in both cases are equal, at that the current of the impacted particle changes on one flip at the every impact, but $P_G$ =1/2 and the elementary momentum is $\vec{p}_0 = -\frac{2\hbar\vec{r}}{r^2}$ - as that is in (15), however in this case there can be some other explanations. It isn't impossible that such a version corresponds by some way with some other quantum gravity theories, where it is suggested that the spin of the graviton (not "circular", though) is equal to $2\hbar$ [58].

As well as we can again conclude that not the gravity constant, *G*, but Planck length, Planck time, and elementary action, $\hbar$, are indeed fundamental constants in Matter. Note also, that at least for the statics the circular gravitons of a particle transmit at gravity interaction to any another particle all information about the localization of the radiating one in the vector value of elementary momentum $\vec{p}_0 = -2\hbar\vec{r}/r^2$ ; though with practically 100% QM uncertainty of the distance.

From above follows that the intrinsic processes in both bodies become be slowed on the half binding energy/gravitational mass defect (divided by $\hbar$, of course). If the mass, $M$, of one of the bodies is much greater than the other mass, $m$, the relative decrease of the lesser body's informational current is

$$\delta\omega = \frac{GMm}{2\hbar r} \frac{\hbar}{mc^2} = \frac{GM}{2rc^2}\tag{16}$$

Correspondingly, if the body-2 is a clock, the clock becomes be "gravitationally time dilated" on $\frac{GM}{2rc^2}$ times, what *is two times lesser* then that is asserted in the general relativity theory.

If a pair of clocks are placed on different radii from $M$, $r$ and $r + h; h \ll r$ in a gravity field (Fig. 9)
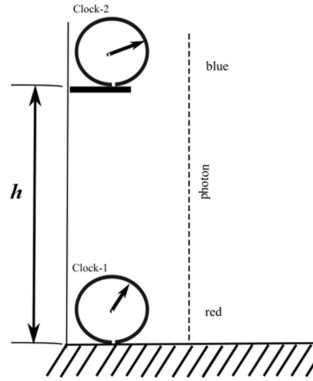


Fig. 9. Two clocks are in a [let – Earth] gravity field. Dotted line – a photon beam.

then their relative tick rates differ as

$$\delta\omega_1 - \delta\omega_2 = \frac{GM}{2c^2}(\frac{1}{r} - \frac{1}{r+h}) \approx \frac{GMh}{2r^2c^2}.$$  (17)

For Earth surface $\delta\omega_1 - \delta\omega_2 \approx \frac{gh}{2c^2}$, where $g$ is the free fall acceleration. In the

GR the clocks' rates difference is two times more [59]: $\delta\omega_1 - \delta\omega_2 \approx \frac{gh}{c^2}$.

Since the photons don't principally differ from T-particles, the gravity force acts on the photons analogously to the T-particles. More about this case – see [55].

Note that the difference of intrinsic processes rates in bodies that are in space points with different Gravity potentials is predicted in GRT as "gravitational time dilation", and, whereas this effect is trivial in this informational model, this GRT prediction was completely new in physics in 1916. It was measured yet in 1960-s in well known Pound-Rebka-Snider experiments, where GRT value of the difference $\delta\omega_1 - \delta\omega_2$ was confirmed [60], [61]. However, that can be only provided that the GRT postulate that photons don't change their energy at propagating between points with different potentials is valid, what looks as rather probably incorrect, and in this informational model it is postulated that all/every particles have both – gravitational and inertial masses, so photons must interact with gravity field, changing energy as that all other particles do.

This problem now can be experimentally solved only in experiments, where is only one of possible impacts on intrinsic processes (intrinsic "informational currents" as that is called in earlier the model papers) in a body, whereas in the Pound-Rebka-Snider experiments the measurement of slowing of intrinsic processes in Fe-57 the sum of two possible effects – real slowing down of processes in Fe-57 in Earth gravity, and changes of photons energy/frequency, was measured. Now such rather easy experiment is possible – for that it is enough to measure elapsed time intervals of preliminary synchronized in one

point clocks, after the clocks were placed on different on 400-500m heights on Earth, for example in a skyscraper [55] (viXra version):

- it is necessary to synchronize two clocks, say on the ground floor;
- to lift slowly or with known speed one clock on a height 400-500 m;
- to wait a few hours;
- to return the upper clock to the other on the ground floor and to compare the clocks' elapsed time showings.

The difference of the showings will be either in accordance with GRT – and this result will be more convincing confirmation of GRT validity than Pound-Rebka-Snider results, or not in accordance with GRT, and rather possibly in accordance with this initial Gravity model.  In [55] some other points that relate to Gravity problem are considered as well.

2.9.2.1 Quantum Gravity

In the model above the quantum Nature of Gravity follows directly, and it looks as rather natural also that after this initial model will be developed at least on the level of classical electrodynamics the QM gravity formalism will be developed as well – as that happened with QM and QED. Though QGD – and "classical" gravitodynamics –  should be developed taking into account the corresponding remarks in [25].

Nonetheless yet now from the above follows principal possibility of observation of quantum gravitational effects, corresponding experiment was proposed yet in 2007 in [1], [3], [57], where it is planned measurement of monochromatic photons beam gravitational distortion using an interferometer with at least two arms, one of which is a vertical relating to Earth surface; arms lengths ~ 300-500 m. For the experiment it is so enough to upgrade some of the first installations that were made aim at observation of gravitational waves, and using photons source that is able to work in 1-2 Hertz stability mode at least during few seconds.

 **2.9.3 Initial model of Electric Force**

The electric force is rather similar to gravity - both potentials are as $1/r$, if some charged bodies interact, then in reality the interactions of separated charged particles happen, etc.; except, of course, that gravity force is much weaker than electric one and that electric force can act as the attraction and as the repulsion. So it is rather reasonable to conjecture that the equations for the potential energy should be similar also, but the probability of electric interaction should be larger

 – because of, as that is assumed in this model,  the widths of "circular photon" rim, $W_1$, and of the "receiving part" of the activated E-marked FLEs in "irradiated" E-charged particle's algorithm, $W_2$ are much more than the size of one G-marked FLE in the gravity case.

   So for the electric coincidence rate we can obtain some analogues to Eqs.  (7) - (9) (for a couple of particles with the elementary charge, e) the equation:

$$N_{cc21} = \frac{m_1 c^2 \cdot 2\pi r W_1}{4\pi r^2 \hbar} P_E \frac{m_2 c^2}{\hbar} 2\tau_E, \qquad (18)$$

where $P_E$ – the probability of the interaction if through particle-2 a radiated by particle-1 circular photon have passed, $\tau_E$ – the "passing" time. Under rather plausible conjectures that:, $\tau_E = W_2 / c$, $W_1 = \alpha^{1/2} \lambda_1$, $W_2 = \alpha^{1/2} \lambda_2$, where $\lambda_1, \lambda_2$ are the Compton lengths of the particles; $P_E = 1/2$; and $\alpha$ is the fine structure constant, we obtain from Eq. (18) that electric potential energy of the two-charge system is

$$U_E = \hbar \cdot N_{cc21} = \frac{\alpha \hbar c}{r} = \frac{e^2}{4\pi\varepsilon_0 r}, \qquad (19a)$$

and for the electrical force in the statics obtain

$$\vec{f}_E = \frac{d\vec{p}}{dt} = N_{cc21}\vec{p}_0 = \frac{e^2 \vec{r}}{4\pi\varepsilon_0 r^3}$$
$$= \frac{q_1 q_2 \vec{r}}{4\pi\varepsilon_0 r^3} \qquad (19b)$$

(The lower term in Eq. (19b) is for arbitrary charges).

Note, that in the Eqs. (19a,b) we suggest, as that was for circular graviton above, i.e. that the elementary momentum, which is transferred at the elementary interaction is $\vec{p}_0 = \pm \frac{2\hbar \vec{r}}{r^2}$.

Note that, as what was obtained above for gravity, if the particles have opposite charges and so the resulting system has negative mass defect, then there should exist the "*electrical time dilation*" in tied electrical structures, e.g., – in the atoms. For example, in the ($\mu^- - muon$ + proton) "Hydrogen atom" $\mu^- - muon$ should live longer then in free state and this dilation should be essential (detectable?) if a muon is on *K*-shell of, e.g., Uranium. Though, of course, since the muon in this case more time is inside the Uranium nucleus and so here some other forces, besides the EM, can act on the muon, it seems as very unlike, that a corresponding experiment would be informative.

Note, that from this E-model follow a couple of important consequences. From the equation for potential energy Eq. (19a) follows the explanation of physical puzzle - Why $\alpha \hbar c = e^2 / 4\pi\varepsilon_0$? – whereas in this equation fundamentally different in physics universal for everything in Matter constants – the fundamental elementary action $\hbar$ and the speed of light, *c*, and the specific for only one fundamental EM Force, the elementary electric charge, *e,* are united by some unknown in the official physics way so, that their ratio is a dimensionless fundamental fine-structure constant, *α*, and

-   that so called magnetic monopole doesn't exist.

From experiment and classical electrodynamics, it is well known that the magnetic force appears only if an electric charge moves in some "*stationary*" frame, and disappears, if the charge is at rest in the frame (for example, see [62])

From the above seems it rationally follows that the magnetic force is not really a fundamental Nature force, which exists, in Newton's words "of itself, and from its own nature", and so has its own charge "magnetic monopole".

However electric and magnetic forces are practically completely symmetrical in the electrodynamics, when, according to SRT, all relatively moving inertial reference frames are completely equivalent, and so the argument above turns out to be inessential if SRT is completely correct.

Correspondingly, after the Dirac's publication [63], presenting a number of QM arguments in support of the existence of a magnetic monopole, the "magnetic monopole" problem from 1931 year and until now remains a popular, and even a fundamental, physical problem [64].

Nonetheless, since the Matter's spacetime is absolute, and so all/every inertial reference frames aren't completely equivalent and legitimate, the argument above is valid, since the absolute, i.e. that are at absolute rest in the absolute 3D space, reference frames are frames that differ from all other "*stationary*" frames first of all by that *only in these frames physical objects, events, and processes, have real values of their physical parameters*.

Thus, since the field of a charged a body that is at absolute rest is purely electric field – from that follows that magnetic monopoles really do not exist.

It also seems quite rational to suggest that the magnetic force is a specific actualization of the electric force, when the ether FLEs in circular photons that are radiated by a moving charge obtain additional momentum proportional to the spatial speed of the charge. And, as was pointed in the Sec. 2.3 for the case when the disturbance in the ether is a close-loop sequence of flips of precessing FLEs - "a particle",

- the flipping FLEs in circular photons become precessing as well. And when they hit an E-marked FLE in another moving charged particle, they transmit to this particle an additional momentum, which is orthogonal to momentum that would be transmitted if both charges are at rest, i.e. along direction of the radius-vector between the charges, which is observed as "magnetic force".

Note also, though, that the radiating of circular photons by charged FLE evidently isn't completely symmetrical because of the circular motion of the flipping point in particle's algorithm; that, seems, can result in that so charged particles have non-zero magnetic momentums.

The next suggestion seems rather rational as well: if a charge is accelerated, then, at least sometimes, the circular photons transform into close-loop algorithms "ordinary photons", when the "electric" and "magnetic" components of transmitted at interaction by ordinary photon's precessing FLEs momentums cyclically change each other.

Another "circular photon" transformation rather probably happens when an "ordinary photon" interacts with some circular photon, say, of a nucleus, and a $e^{\pm}$ pair is created, with "double opposite rotations" of the photon's momentum

from a spatial direction into two momentums of the pair components with opposite directions along the $c\tau$ -axis.

Finally, in this section we note that the QM nature of both Gravity and Electricity directly follows from these similar initial models. However, when the QM nature of Electricity in mainstream physics principally seem natural, the corresponding problem, if Gravity is considered, is the next fundamental problem. In mainstream physics this problem for some reasons mostly is seen as the problem of quantization of GRT. This is fundamentally impossible, and the numerous attempts to develop some "quantum GRT" failed, but that means only that the GRT is a rather questionable physical theory.


### 2.9.4 Magnitudes of Gravity and Electric Forces

From the last sections above it follows, that Gravity is extremely weaker than Electric Force

To illustrate that let consider a system of two electrons. Electron has the reduced Compton wavelength $\lambda$ =3.861x10$^{-13}$m, the number of G-marked FLEs is universal for all fundamental particles , i.e. equal to1; the number $N$ of E-marked FLEs is relative, $N = \alpha^{1/2} N_0$ , $N_0$ is whole "logical" algorithm's length $N_0 = \lambda / l_P$ .

So in this case $N_0$=2.4x10$^{22}$ FLE, gravity charge 1 FLE, electric charge ~ 8% of $N_0$, i.e. near 2x10$^{21}$FLE; the whole electron's algorithm ticks with frequency $\omega$ = 7.763x10$^{20}$ s$^{-1}$; and so intensity of the radiated rings for electron are: 7.763x10$^{20}$s$^{-1}$ of circular gravitons, and ~1,55x10$^{42}$ s$^{-1}$ of circular photons.

The probability of radiated circular photon to hit into flipping electrically marked FLE of other ("irradiated") electron correspondingly is larger than for circular graviton also in ~2x10$^{21}$ times, so the whole intensity of hits at electric interactions is larger than at gravitational interaction in ~4x10$^{42}$ times, and so for a pair of electrons the Gravity force is weaker than Electric force in this value – as this ratio really is.

Note here two important points that follow from the above:

- from that this real ratio of gravitational and electrical forces is obtained without using Newton and Coulomb laws it follows that the initial Gravity and Electric Forces models above are reliable; and

- form this result, which is based on the assumption that the FLE in the algorithms has the size be equal to the Planck length, follows, that this main assumption in the whole physical model is with a rather large probability true.


### 2.10 Planck mass particles

It seems worthwhile to mention here an additional remark, relating to the Beginning. There are, in principle, no objections to suggest [30], [33] that at the Beginning Matter was firstly created as a huge number of so called hypothetical

"Planck mass T-particles", i.e., the particles having masses that are equal to the Planck mass ($m_P = \dfrac{\hbar}{l_P c} \approx 10^{19} BeV$). These particles contain (and their algorithm works by using) only the FLEs, which are absolutely symmetrical, and so these particles' algorithms should be symmetrical also. Further interactions between these particles resulted in the appearance of observed now Matter. Such particles have at least two, possibly rather interesting, properties:

(i)– since these particles interact with anything only by extremely weak Gravity Force, they could be a part of the particles, which have not interacted at the Beginning totally (possibly $\approx 20\%$ have interacted with the creation of observable Matter), and so now can constitute, at least partially, so called "dark matter", and

(ii) – since for absolutely symmetrical algorithms it is impossible to choose a direction in the coordinate time ("left" and "right" gyroscopes cannot be distinguished), *it is logically permissible* to assume, that they all move in the Matter's spacetime *in one* - the positive [*coordinate*] *time direction* only.

Thus in such a case, if at Beginning only Planck mass particles (PM particles) were created, then in Matter there was no antimatter yet at Beginning, and further, when interactions of the primary particles have happened only by using only also completely symmetrical Gravity Force (that follows from the angular momentum conservation law as well, though) practically only some "ordinary" particles were created, in these particles the part of antiparticles was rather small, and after corresponding annihilations and decay of unstable particles practically only stable particles remained – as that is at least in the observed now part of Matter.

Though, of course, the same situation occurs not only for the Planck mass particles, but if there would be some other particles with symmetrical algorithms; such case we cannot exclude now, however that practically nothing change in the consideration above, including in relation to the "dark matter" and the "matter-antimatter asymmetry" problems.

So it isn't impossible that 70-80% of the primary matter exists till now in Matter's space as PM particles with average density of the particles that is lesser then the density of baryons in $10^{18} - 10^{19}$ times. That is an extremely low density, so the probability of interactions of these particles now, say, in interstellar Space should be rather small. On the other hand, it seems natural to suggest that the particles under the gravity action can create some stable compact structures – something like to usual stars, where the particles density (including – the particles' flow density) is large enough to interact, composing so some cosmological objects.

Moreover, that could happen at Beginning, when after the "inflation epoch" in formed dense [5]4D FLE-lattice the energy was pumped in the lattice for creation of the primary particles, the energy was pumped globally uniformly, but non-uniformly locally, and corresponding compact local regions with enhanced primary particles density were some "seeds" of appeared further large cosmological objects; where, for example in centers of galaxies, in galaxies "supermassive black holes" these seeds, which contained only PM particles, till

now constitute essential part of the SMBH matter; more see [25], sect. "Cosmology".

Most of other PM particles can be, and practically for sure are, attracted by "ordinary" massive bodies, first of all cosmological objects. Since usual matter is highly transparent for the PM-particles, they freely should pass through the bodies substance, rotating on individual orbits in halos around massive centers, which are formed by the usual substance, and increased flow density of PM-particles in perihelia of their orbits.

An interaction of two PM particles should result in the appearance of a big number of the particles (including antiparticles) having total energy more than $10^{19}$ BeV, so such events could, at least partly, can be (and rather possibly are now) some sources of the high, including ultrahigh, energy cosmic rays.

To estimate the intensity of the PM-particles interactions is necessary, first of all, to know the corresponding cross section, which, since it depends on only the gravity force, should mostly depend on the "strength" of the PM particle's algorithm; i.e. – what momentum of the graviton is sufficient (so what is maximal distance between particles is necessary) to break the PM-particle?

There is, of course, no answer on this question now; note, though, that in this model the gravitons transfer identical momentums independently of a type of the particle, the momentums depend only on the radius of the point, where the G-marked FLE of any irradiated particle has flipped. So any particle is capable, in principle, to break the PM-particle, though with twice lesser energy release comparing with an interaction of two PM-particles.

So it seems as plausible to suggest that any "ordinary" particle (when the density of the particles in $10^{19}$ times more than the PM-particles' density on average; in material bodies – very much more) can "gravitationally break" any other one if the G-marked FLEs of both particles are on sufficiently short distance, and such a reaction could, probably, be observed; but it is unknown till now. Though this fact can be natural, of course, if one takes into account that "ordinary" particles interact on rather large distances by other "standard" Forces; and "non-standard" ones, for example – when Pauli principle acts, as well; and these distances are, rather probably, essentially more than the distances that are necessary to exceed the gravity reaction threshold.

## 3 Discussions and conclusion

Above the initial informational physical model is presented, nevertheless this model is well grounded. First of all – the model follows completely naturally from the informational "The Information as Absolute" conception [1], [3], whereas the truth, the completeness and the [self -] consistence of this conception are rigorously proven.

Besides, in the conception practically all really fundamental phenomena/notions are scientifically defined – whereas really all such phenomena/notions in the mainstream philosophy and sciences are

fundamentally transcendent, and so essentially uncertain and irrational; including the important in physics, which studies Matter, phenomena/notions "Space", "Time", "Energy", "Change", "Inertia", "Matter" itself, "Information", and, because of known problems at interpretation of QM – "Consciousness".

All these phenomena in the conception cease to be transcendent – in the concept it is rigorously proven, that absolutely for sure there exist nothing besides some informational patterns/systems of the patterns that are elements of the absolutely fundamental and absolutely infinite "Information" Set. Everything is an information, whereas Information, in spite of is absolutely fundamental, isn't transcendent, and any informational pattern/system so principally is study-able and cognizable.

Including Matter and human's consciousness are some informational systems as well – both are made from only one stuff "Information", and so, say, there is nothing surprising that some informational system, "human's consciousness" which is able to obtain some information about other informational system, "Matter", and to analyze this information logically, in some cases finds in this informational system some logical laws/links/constants adequately to objective reality.

However, Matter and Consciousness are fundamentally different dynamical informational systems, and so exist and operate in only partially intersecting spaces with mostly different dimensions, and in one common universal "true time" dimension. Albeit that consciousness evidently interacts with Matter, governing the practically material body, these interactions are weak, and so the consciousness really by no means impact on the material, including QM, objects/events/processes in physical experiments.

Correspondingly the hypothesis that "Matter is some "computer" is quite natural – any dynamical informational system in he Set is a "computer+program" system by definition of the "system": any system is a system of some "hardware", i.e. the system's elements, and program shell, i.e. a set of basic laws/links/constants, the system's elements interact in accordance with which; exchanging by corresponding messages, in which, in turn, understandable by the elements language is used.

From the definition of absolutely fundamental phenomenon "Change" in the conception directly follow: (i) - the quantum nature of Matter structures (objects), as well as of interactions – in reality of informational exchanges - between the material objects; and (ii) – since in Matter any interaction is an exchange by some exclusively true "messages", and since the experimental data show that on the fundamental level the logical structure of messages and material structures are rather simple, then Matter with great probability has logical structure that is similar to a simple computer; or to a huge number of automata that are united in a whole structure by the gravity. From this in turn follows, that Matter's existence and evolution can be reduced on utmost fundamental level/depth to the existence and interactions of some "primary computer's logical gates" – primary fundamental logical elements (FLE), which, in accordance with the outstanding von Weizsäcker's and Fredkin-Toffli's hypotheses are binary reversible logical structures,

- and for existence and changes of FLE states, i.e. for existence and constant evolving Matter, so at first step of Matter creation, i.e. at creation of the "first FLE", the fundamentally absolute, by definitions of "Space" and "Time" infinite, flat, utmost universal, Euclidian [5]4D spacetime with metrics ($c\tau$,X,Y,Z,ct), was immediately "automatically" formed, which is embedded in the Set's whole spacetime that has at least infinite "number" of space dimensions and one, universal for all dynamical the Set's elements, "true time" dimension.

The next postulate in the model, that at Beginning in this spacetime some "Aether" as the [5]4D dense FLE-lattice at Beginning was placed, and that everything in Matter is/are some always constantly changing, because of the energy conservation law, and so constantly moving simultaneously in the 4D sub-spacetime with metrics ($c\tau$,X,Y,Z) with 4D speed of light, what is determined by the FLE lattice parameters – FLE "size" and FLE flip time; and with the speed of light in the 1D true time $ct$-dimension, disturbances in Aether, is quite natural.

That formed the configuration of all material objects in the 4D sub-spacetime by the condition that every object from Beginning up to some true time moment has passed the same way in the spacetime, $S$, so that $S = \int_{0}^{t_{true}} |ds| = ct_{true}$, where $ds = (dx^2 + dy^2 + dz^2 + c^2 d\tau^2)^{1/2}$; the true time changes from the Beginning of Matter to given moment. That is a rather weak limitation, though, since the interval $ds$ for a concrete object – including, of course, the object's predecessors, can have any [$\pm$] signs at the object's evolution/transformations, and its corresponding, sometimes bizarre, travel in the 4D sub-spacetime.

As well as the postulate that most of the disturbances, first of all – particles – are some close-loop algorithms, which constantly run is quite natural as well, – that follows from experimental facts that the algorithms always run, nonetheless the particles properties are stable, from observing wave nature of particles, etc. – as the last was the base of the "the Zitterbewegung". de Broglie hypothesis [26], [27].

.From that quite naturally follows the postulated in the model conjecture that a particle really exists as a "FLE flipping point" which propagates in 4D sub-spacetime along a 4D "helix", having corresponding angular momentum – what is the particle's spin, and so, because of the angular momentum conservation law, is always oriented relating to its 4D motion direction; further so, if particles compose a rigid body, this body at 4D motion with the 4D speed of light is oriented relating its motion direction as well, and from this fact the observable physical effects "length contraction" and "relativity of simultaneity", eventually the Lorentz transformations follow.

Matter is simple system, and to obtain the main equations of fast bodies kinematics and dynamics it is enough to know the Pythagoras theorem — and to know the postulated in the model conjectures, of course, though.

The conjecture that antiparticles are the same algorithms as the corresponding particles, and so T-antiparticles move in opposite direction along the $c\tau$-axis, is quite natural as well, and is in – though indirect till now – accordance with the experimental data, for example the Feynman–Stueckelberg conjecture in QED

[39], [40], where it is postulated that antiparticles move backward in time, is important in QED, whilst including because of this conjecture QED is very effective theory.

That above allowed to develop initial Gravity and Electric Forces, which are consistent with experimental data, and so from the models it follows that one of the main postulates in this whole model that the utmost fundamental and universal base of Matter – FLEs – have "sizes" and "flip times" be equal to the Planck length and time, and so the Planck units' system really is the system of fundamental Matter's parameters.

Etc., more see [25], which is a conclusive review of this informational physical model, and possible points in this section are considered in this paper more in detail, including relating to more than 30 real fundamental physical problems, which are either essentially solved or essentially clarified – with formulation of next level physical development problems, of course.

Here only note, that the 3 experiments, which are proposed in the model,

(1) -  the observation of the absolute motion and measurement of the absolute velocity of the peculiar motion of the Solar system [23], [24]; though the measured absolute velocity will be the same as which follows from the CMB dipole measurement with a rather non-zero probability; because from the model of Matter's creation (see sect. "Cosmology" in [25]) it follows that Sun – as any other object in Matter's space – is in essentially a cold the spacetime region, and so hasn't some exotic absolute speed.

Note, though, that there exist other estimations of this velocity at observations of quasars, distant AGNs or SNe Ia, which results in the velocity values that are essentially larger than the CMB value [65]; and so this experiment's results would be useful at solution of this puzzle.

Note also that this experiment will be real test of SRT, whereas till now all experiments [66] were made in rigid reference fames, and so completely naturally "confirmed" SRT.

(2) -  the observation of the quantum nature of Gravity [56], [57], and

(3) - the important, simple and cheap, though not really fundamental, experiment in a skyscraper in sect. 2.9.2 here (and in [55], viXra file version), which, rather probably, will show that GR postulate that photons at motion do not change their energy in gravitational fields between points that have different potentials, is wrong;

- or, if it will be in accordance with GR, that would be more, than the Pound-Rebka-Snider experiments, convincing confirmation of the GR validity,

- should be made as soon as possible.

## Acknowledgment

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