

The Informational Conception and Basic Physics

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Abstract

In our previous arXiv papers (“The Information and the Matter”, v1, v5; more systematically the informational conception is presented in the paper “The Information as Absolute”, 2014) it was rigorously shown 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. the forces - 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.

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1 Introduction

In [1] - [3] it was rigorously proven that the entity/ concept “Information” is absolutely general and fundamental, when all/anything what exists is/are some “realizations” of some

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information – all/anything/everything what exists is/are “the words”, some elements of utmost general and fundamental absolutely infinite “Information” Set. The suggested - “The Information as Absolute”- 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 some [informational] statements also.

The Set /concept/entity has very unusual and interesting properties, including that the entity and the Set are, in certain sense, the same, so both above 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 they study 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 *process/ phenomenon/ entity/ object is material if it exchanges (interacts) with other process/ phenomenon/ entity/ object exclusively by true information.*

If a process/ phenomenon/ entity/ object has a capability to produce/ to apprehend a false information, then it isn’t material; some examples: “quasi- material” - living beings; “non - material” – a human’s consciousness (at least – at the information processing), religious phenomena. 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.

A couple of existent non-material subsets (“Alive” and “Consciousness”) and the subset “Matter” constitute the subset “our Universe”.

Another important property of the information is that the information can be (any information always is?) “*absolutely exact*”. But since (i) - any element in the Set is always connected informatively with *all* absolutely infinite number of other elements of the Set, including with given element “in any times” of its own existence (as well as of its “non- existence”), and (ii) - just because of this exactness a little change in a formal language representation of some information can drastically change the context, there exist such phenomena as the randomness and the bifurcation.

So in Matter the particles/objects/, systems of objects/particles, exchange only by logically true informational “messages”, i.e. the subset “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, 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 than scientific.

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

Note here also next important corollary from the informational conception: since the Information elements can exist only as a number of logical connections and realizes as a choice of some alternatives, the “Information” Set, having absolutely infinite cardinality, is, nonetheless, a “countable” (discrete) set [3]. So the subsets “our Universe” and “Matter” are quite naturally discrete as well, however in this case the discreteness reveals itself yet on next level comparing with the absolutely infinitesimal discreteness in the Set, in Matter – it reveals itself as that all changes and interactions of material objects are quantized and uncertain simultaneously.

2 Physical model

2.1 Space and Time

Any informational system consisting of more than one element must contain also some logical rules/ possibilities to be existent just as a system of elements, i.e. which should realize in these system necessary informational distinctions between the elements. Such *utmost universal* rules/ possibilities, *which act on whole Set*, are “Space” and “Time”, that are members of the set of basic (seems mostly logical) rules/ possibilities – of “Logos”; which, in turn, just “makes the information from non-defined something”. The “Space” as the possibility signifies that any informational pattern occupies something that is called “space [volume]”. The “Space” as the rule signifies that all different fixed informational patterns must be separated by “space intervals”. The “Time” as the possibility signifies that any changing informational pattern occupies something that is called “time [volume]”. The “Time” as rule signifies that all different states of changing informational patterns must be separated by “time intervals”. Both rules in the Set by no means establish concrete values of the intervals, they can be any – infinite or

infinitesimal, *the unique condition – any space/time interval must be non-equal to the zero exactly.*

For the concrete informational system “Matter” Space and Time as the possibilities constitute a “4D (one temporal and 3 spatial possibilities) spacetime container”, where material objects exist and interact and where concrete spatial intervals (“distances”) between the objects and temporal intervals between states of the changing objects are realizing. On the other hand, as that was pointed out earlier, the rules Space and Time act implicitly and don’t establish any concrete values of these intervals, these values in Matter are determined only by properties of concrete material objects and their interactions.

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.

It seems rather evident, that to exist as some stable isolated system/ subset (e.g., - Matter) of the Set under incessant impacts of the other elements of the Set is necessary for this system to be made from strongly stable (“fundamental”) logical elements, i.e. from closed logical systems where inner logical bonds are much stronger than these impacts.

We don’t know now – what are the logical structures of these elements, but some common reasonable suggestions for Matter were made (see, e.g. [5], [8] and Refs. in these articles). First of all, for any subsystem in Matter - and for Matter as a whole – rather probably is necessary to be constituted from the logical elements that are *reversible*. Then the system doesn’t dissipate the energy at transformations and so requires no additional energy to exist and to change/ to evolve.

Besides in physics some values for fundamental quantities in the Universe were obtained – Planck units. And these units don’t change in more than a century already, regardless to the fact that the physics went far ahead for this time; what indicates that these units are indeed fundamental. So for space intervals in Matter the fundamental unity appears – Planck length,

$$l_p, l_p = \left(\frac{\hbar G}{c^3}\right)^{1/2} \approx 1.62 \cdot 10^{-35} m \quad (\hbar \text{ is reduced Planck (Dirac) constant, } G \text{ - gravitational}$$

constant, c - speed of light in the vacuum) - and it seems as rather reasonable to suggest that this length is, very probably, the size of fundamental, at least bi-stable, logical elements (FLEs), which are used to build Matter.

Similarly to its own specific space location, any of the elements in Matter, i.e., - elementary particles, systems of particles, etc. - has own specific (proper) time [location], at that for changing elements, since the elements are eventually constituted from the same FLEs, there is

the fundamental - and universal - unity of the time interval which is the interval need to change the state of the FLE (“to flip” the FLE). The fundamental unity of time intervals in this model is Planck time, $\tau_p = l_p / c \approx 5.4 \cdot 10^{-44} s$. In this formulae Planck time is defined as some derived unit (through the fundamental Planck length and “fundamental” speed of light) but really fundamental units are Planck time and Planck length, when the speed of light should be defined as derived unit.

So both – Time and Space - have analogous features: both are utmost common rules/possibilities for elements and systems of elements to exist and to change in the informational structure “Matter”, both have fundamental (minimal) intervals to separate the elements (including a separation of the same element in different states) in the Matter, both act in Matter (and in the whole Set, though) only implicitly, they don’t, by any means, determine the existence and interactions of the elements directly, including any “world line” of any material object cannot be determined by a “geometry of spacetime”. Both are absolute and independent on material contents of the spacetime container, as well as the geometry is always the same – Euclidian. Perhaps all main distinctions are that (i) - Time “governs” logical sequences of events, when Space governs logically distinct fixed information, and (ii) - a human can observe directly by senses only fixed (i.e. - spatial) information; when, because of (s)he (as a material body with material senses) always moves in the “true” (see below) time simultaneously with other matter and so doesn’t “see the time”. From this follows that rather probably Time and Space as informational systems have analogous structures – in mainstream physics that reveals as a certain equivalence of the spacetime coordinates; when in informational physics that indicates also on some similar specific logical features of the FLEs.

Though there exist principal difference between these rules: any continuous change (*when any change is in depth continuous*) of any object is logically impossible, the changing – and so the rule/possibility “Time” - are logically self-inconsistent, as that was proven by Zeno near 2500 years ago. More on this Met-physical problem see [3], here we note only that in Matter Zeno aporias seems as are solved by using the quantum uncertainty.

Note, also, some important differences of Space and Time notions from their analogues in standard theory – first of all from the special relativity theory.

Firstly – in the informational model the space and the time coordinates that constitute 4D “spacetime” are absolute (“Newtonian”), i.e. – are independent on each other and the container’s material content, they aren’t (as that was claimed by Minkowski [18]) *“Henceforth space by itself, and time by itself, are doomed to fade away into mere shadows, and only a kind of union of the two will preserve an independent reality”*.

Besides, what is very important in this case, the time in Matter is “two-faced”; here two time rules/possibilities act: “true (or “absolute”) time” and “coordinate time”. The true time rule is the realization of the Set’s universal rule “Time” and it establishes that any change – of internal state of a material object or of the object’s position in the space – must be accompanied by a spent “true time interval”. The *coordinate time is specific for the concrete sub-Set “our Matter”* (it allows/governs the reversal processes that logically formally aren’t defined in the true time rule) and establishes that any change *only of internal state* of a material object must be accompanied by a spent “coordinate time interval”. Just the coordinate time with 3 spatial directions constitute, as possibilities, “4D spacetime container”; when corresponding temporal coordinate is similar to the spatial ones and a FLE can flip (flipping point can move – with equal footing relating to spatial flips) in both – positive and negative coordinate time directions.

4D Matter’s spacetime is Euclidian, moreover – “Cartesian”, since all 4 dimensions *are mutually orthogonal*, what, rather probably, is the consequence of that FLEs *logically have 4 independent degrees of freedom*.

Note, also, that in the special relativity theory two times exist also – “the simply time”, i.e. time coordinate in Minkowski space, and the “proper time” – what is a consequence of that the SR is adequate to the reality in some applications, though, of course, real spacetime doesn’t contain imaginary, in fact, either time or space; or imaginary distances between some spacetime points, etc.

We don’t know now – how the sub-Set “Matter” appeared and why the informational structure “Matter” is dynamic one, i.e. – why She constantly changes, for what a [huge] portion of [the physical parameter] “the energy”, which characterizes intensity of changes, was necessary. But that is well observed fact, and it seems quite reasonable to suggest that *every material object uninterruptedly, at least internally, changes*, what realizes, including, as that *all/every material objects always move in the spacetime with identical 4-speeds that are equal to a standard speed; which is equal to the speed of light*. At that the total energy of all objects in Matter is constant or is minimally spent on possible interactions with Set’s elements/ structures outside Matter because of the energy conservation law; which, in turn, acts first of all because of that in depth [at least a vast majority of] every material object is a reversible algorithm – i.e. because of *t*-symmetry of physical laws.

. Since Matter’s code is simple and highly standardized for all particles/ objects in Matter, corresponding spatial and temporal variables (values of spatial and temporal interval that are/can be spent at given physical process) can be measured in a standard manner and used (and are measured/ used) as some global/ universal variables to describe physical processes in the spacetime.

2.2 The “development” (the realization) of the Information in Matter

2.2.1 Elementary (subatomic) particles

So the informational approach means that anything in Matter is/are transformations (under exchange by true information) of some informational structures (IS) and that elementary particles are some primary ISs also. *From that:* (i) – every material object, including every particle, *uninterruptedly changes* and (ii) – practically *all main particles* that constitute material objects *are stable, follows rather reasonable suggestion that every particle is a cyclic algorithm*, which runs with a high operation rate. Correspondingly in [1] (what follows quite naturally *from the Uncertainty principle also*) for a particle two options of “informational currents” (IC) – “time IC” and “space IC”- and two options for fixed information were suggested, using only some common physical parameters and Dirac constant (*the elementary action*), \hbar :

- the time IC (t-IC):

$$j_t = \frac{1}{\hbar} \gamma m_0 c^2, \quad (1)$$

- the space IC (s-IC):

$$j_x = \frac{1}{\hbar} \gamma m_0 c^2 \beta^2, \quad (2)$$

- the fixed information:

$$\Delta I_M = \frac{\Delta M}{\hbar}. \quad (3)$$

(v is the speed of the particle, $\beta = v/c$, $\gamma = 1/(1-\beta^2)^{1/2}$ is the Lorentz – factor of a particle motion, ΔM is the angular momentum, m_0 is particle’s rest mass. The dimensionality of the time and the space currents is [bit/s], the dimensionality of fixed information is [bit]). Besides the fixed information relates, quite naturally, also to the physical action, S .

Though it should be noted that at a motion of a particle the uncertainty of its parameters is defined by the Uncertainty principle and the minimal change of the parameters (at least of the action) that corresponds to changing of information on 1 bit is equal to the half of Dirac constant, for example: $\Delta S = \Delta x \cdot \Delta p = \hbar/2$. That can require of some modifying of the physical model that is presented in next sections of this paper, but at least in first approximation the corrections, rather possible, would be as not too essential and further we adopt the correspondence “the change in action (or angular momentum) – the change on 1 bit of information” to be equal to \hbar .

The premises above comply in general with C. F. Weizsäcker's "theory of UR-alternatives" that was put forward by him in 1950-th [19, 20]. The UR- theory uses well-known mathematical fact that any vector in 3-D space can be represented also by some combination of two-dimensional spinors, from what follows at least two important consequences: (i) – three-dimensionality of the "position space" (i.e. the space here), and (ii) - any object which in quantum theory is represented by a Hilbert space can be described in a state space which is isomorphic to a subspace of tensor products of two dimensional complex spaces; and, further "...We claim to derive from this interpretation of quantum theory both the three-dimensionality of space and the theory of relativity" [21].

However there are essential distinctions between this model and the Ur-theory, first of all – the Ur-theory premises that fundamental "Urs" are, in fact, the elementary particles, when in the informational model the lower level – the FLE-level - is introduced.

An elementary particle in this model can be roughly represented as some closed loop linear structure (algorithm) of FLEs which are sequentially – and uninterruptedly - flip (so – they are closed loop "FLE currents"), when "universally significant" (further – "us-FLE") to external [for given particle] Matter are the FLEs that flip in the end of FLE-line of particle's algorithm

having length that is equal to Compton length of the particle, $\lambda \equiv \frac{\hbar}{\gamma m_0 c}$; the radius of this (circle) loop is equal to the Compton length, $r = \lambda$ also. The rate of us-FLE flips is the time IC in Eq. (1).

For such a conjecture there are a number of reasons, for example as: for static condition in a particle "an active point" of flipping FLE moves through the loop with speed of light. Then the energy of this point is $E = pc$, when momentum is $p = M / \lambda$. For a particle having the "point's angular momentum", M , be equal to particle's spin, e.g., $\frac{1}{2} \hbar$, $p = \frac{m_0 c}{2}$ and the energy of the "point" is $E = m_0 c^2 / 2$ - i.e. the value, which is not too far from the real one (note, though, that it is possible that fermions have the spin equal to 1 along the t-axis and so $E = m_0 c^2$ – see below).

From the fact that the stable particles' time currents never stop (so there is no energy dissipation) follows that the FLEs, as well as the loop cycle algorithms that define specific characteristics of the particles, are reversible codes; besides - it follows that even for a particle's [spatially] stationary loop current, when FLEs flip in a fixed local spatial region, the particle moves, nonetheless, in the coordinate time (along t -axis) and in the true time.

From informational approach follows, besides, a couple of rather trivial but important corollaries: (i) - now becomes be clear one of main QM postulates – the postulate of identity of

the same kind particles: the information is unique thing that can have absolutely identical copies, so the same kind particles are, with great probability, same informational clones; and (ii) it turns out to be reasonable to suggest that particles and corresponding antiparticles differ (at least) since they have different – direct and reversal – commands’ order in their algorithms. At that the antiparticle is seen as it “lives”- and indeed moves - in negative [coordinate] time direction relating to the particle.

Since FLEs in a particle are sequentially flipping, the particle’s FLEs at the [spatial] statics “remain on their space positions” but move in the coordinate time, when through space the flipping point moves circularly – the flips’ trajectory in the spacetime is some 4- helix. If a particle, as a whole, moves in the space also, then additional degree of freedom is used – sometimes particle’s FLEs must execute “space flips” to change particle’s space coordinates.

Here we introduce a next suggestion. For the consideration above follows a possibility for particles to exist and move in the “empty 4D spacetime container”. But when a taking into account interactions of particles, including creation of particles, fields, etc. seems reasonable to suggest that the container isn’t empty, but it “is filled up” by dense lattice of FLEs – some “4D Aether”. Then, for example, particles become be some cyclic disturbances of Aether, when the motion of a particle is the transition of this disturbance in a static medium that constantly runs through the 4- medium with the speed of light.

Algorithmic model for a material particle in statics. So, at least for the statics, a particle in the spacetime is some circular dynamical object that always moves at static [spatial] conditions only in the time direction having some variable that we call “the momentum”, \vec{p}_0 , which, like to the classical momentum, is equal to the product of a mass and a speed - $\vec{p}_0 = m_0 c \vec{i}_t$, and is directed along t -axis; at that FLE flipping point moves in the space through the circle with the radius, $\lambda_0, \lambda_0 = \hbar / p_0$ and m_0 is some coefficient (Fig.1). The magnitude of the flipping point’s momentum is also equal to p_0 ; corresponding angular momentum, \vec{M} is equal to the elementary action, \hbar , and it always is directed along the particle’s motion direction.

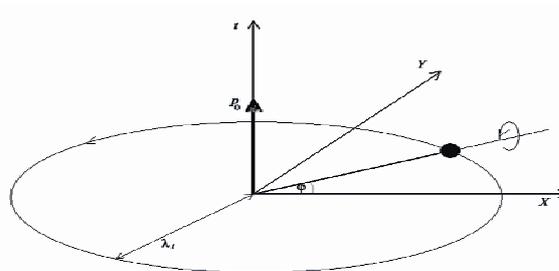


Fig. 1. A material particle at rest. Large black point on the circle is flipping FLE. The movement of a particle as of a singled out specific informational structure along t -axis is step-by step and the step’s length is equal to the circle radius, λ_0 .

Algorithmic model for a material particle at a motion. From above follows a number of rather reasonable conjectures.

(1) So after non-zero impact on a [Aether's] FLE along a space/ time direction this FLE launches a sequence of the FLE-by-FLE flipping .At that it is inessential – this FLE was at 4- rest or it was as flipping point on a *straight* line of sequentially flipping (always with speed of light) FLEs. Indeed, in last case Compton length of corresponding “particle” is infinite, so such a particle has infinitesimal momentum at the motion. On another words the particle with uncertain/ infinite Compton length has zero inertia (zero “rest mass”, m_0) independently on an FLE is at rest or at a flipping motion after infinitesimal impact on an earlier FLE correspondingly. And the alternative flipping after non-zero impact occurs because of the FLE cannot flip in initial direction with a time that is lesser then Planck time and so it is forced to flip in another space / time direction, resulting in appearance of closed loop algorithm. Thus a non – zero [momentum] impact on a FLE results in the occurrence of specific information in spacetime that reveals itself in Matter as a concrete particle, which in every time moment (inside the Plank time) consists of one FLE that is flipping through a helix.

The experiments show that a number of possible different algorithms (i.e., different particles) can be realized in the FLE circle, from what follows that FLEs have more sophisticated structure then simple 4D bi-stable one, for example – that is necessary to signify some charge of some particles. However, the clearing of the FLE's structure is the task of the future, when – as it is shown below - to make more understandable the foundations and flaws of some existent theories – of special relativity, quantum mechanics and (at least for the [spatial] statics) Newtonian gravity - seems be sufficient to take into account only 4D bi-stable FLEs.

So if an impact - and corresponding momentum – is directed along time direction (along t - axis), then “usual material” particle (further – “T-particle”) occurs. An impact in space directions results in occurrence of other sort of particles. Since the transformation of initial FLE flipping straight line into a “helix” doesn't change the motion [of the particle's along the impact's direction], which remains be, in certain sense, uniform and rectilinear, T-particles obtain an inertia (“a mass”) when moving in space, when in time direction they remain be “restmassless”. A particle, which appeared after “space directed” impact (S-particle), obtains a mass in time direction, when in Space it remains be “restmassless”. For example T- particles electrons, protons, etc. appear after “time-directed” impacts, when to produce a “restmassless in space” photon is necessary to act on a fixed or flipping through a straight spatial line FLE in a spatial direction.

Note, however, that all primary T- particles are fermions having the spin $\frac{1}{2}\hbar$ when from the consideration above one could think that the spin of any particle should be equal to $\hbar = \lambda_0 p_0$. Such a situation follows from that results of time- and space- directed impacts aren't totally

identical; because of in the spacetime there are 3 spatial independent directions, when the temporal direction is unique. So the FLE spatial circle that occurs after t -directed impact has two axes – t -axis and some spatial axis, for example – if the circle is in the (X, Y) plain that are t and Z axes; correspondingly T-particle formally must have simultaneously two orthogonally directed angular momentums that both are equal to \hbar . In reality the measured fermions' spin is one and it is *spatial* 3D angular momentum. How and why just this situation occurs? – that requires additional study.

At that T-particles' angular momentums along t -axis are (though aren't measured), rather possibly, “true”, i.e. are equal to \hbar , what seems follows, for example, from the experimental fact that the helicity of neutrinos are equal to \hbar . Neutrinos have spins $1/2$, so they are T-particles and have the rest masses. However besides the spin neutrinos have another vector parameter – the helicity that is equal to 1. It seems possible that, since the neutrinos' masses are very small and usually they move with spatial speeds that are practically equal to the speed of light, the helicity is, rather probably, the spatial projection of the “true temporal” spin, which is always directed along the particle's total 4-momentum; which, in turn, (see below) is practically parallel, say, to the X-axis if the particle moves in the space with practically speed of light along this axis.

But S- particles have “correct” spins, \hbar and so, e.g., the photon, has only two “projections of the spin”.

Another space/ time difference is that T- particle can move in both – space and time directions, when S – particle (at least - the photon) moves only in space, when time-directed impact on such a particle results in appearance of T- particles. More about the space/ time difference see [17].

(2) The model above leads to following natural conjecture: since if a T-particle is at rest in the space it moves in [coordinate] time only with the speed of light, then any additional impact in a space direction results in occurrence of next “helix”. At that (i) – analogously to the cases above, when impacts are directed in certain time or spatial directions only and resulting momentums are proportional to the particles' speed, $c = l_p / \tau_p$, - corresponding momentum is proportional to the spatial speed of the particle, $\vec{p}_x = \mu \vec{V}$, and (ii) - the impact leads to a motion of the particle as a whole in two directions – along the momentum and as a circular movement in the plain, which is perpendicular to the momentum, when the radius of this circle is equal $\lambda_s = \hbar / p_x$ - i.e. is equal to de Broglie wave length value. An example when the momentum is directed along X-axes is shown in Fig.2. At that the particle moves, of course, along t -axis also.

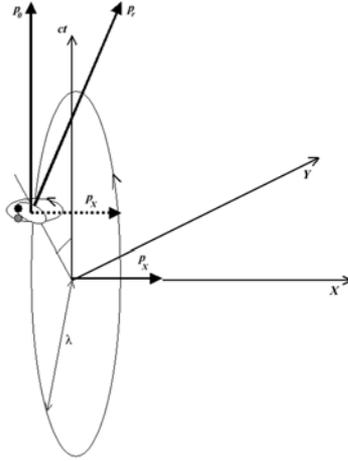


Fig. 2. A material particle's movement along X -axis as a combination of two circular and one direct motion. Big black points in the lesser circle are flipping t-FLE. Non – relativistic case.

Resulting 4-momentum (see Fig. 3) is equal: $\vec{p}_r = \vec{p}_0 + \vec{p}_x$ and, since any space impact is always perpendicular to t -axis and so momentum \vec{p}_0 , (and its magnitude, $p_0 = m_0 c$) doesn't change, magnitude of this momentum is equal

$$p_r = (p_0^2 + p_x^2)^{1/2}, \quad (4)$$

when spacetime step in \vec{p}_r direction is equal to corresponding wave length, $\lambda_r = \hbar / p_r$.

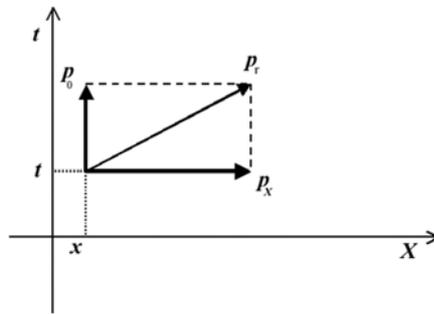


Fig.3. A momentum, \vec{p}_r , of a T-particle after space – directed impact with momentum \vec{p}_x .

Since FLE's flipping time footing and FLE's size length are [equal] constants, in one second the particle moves along \vec{p}_r direction on the distance that is equal to the speed of light, c , when in the X -direction – on the distance $v = \beta c$.

Correspondingly we obtain for the \vec{p}_r magnitude another equation:

$$p_r = \frac{p_0}{(1 - \beta^2)^{1/2}}, \quad (5a)$$

and for \vec{p}_x :

$$p_X = p_r \beta = \frac{m_0 V}{(1 - \beta^2)^{1/2}} \equiv \gamma m_0 V. \quad (5b)$$

So $\mu = \gamma m_0$, $p_X = \gamma m_0 V$ - as it is in the momentum's definition in standard special relativity theory.

From above follows that one “flip” of a FLE corresponds, in certain sense, the rotating of the FLE on angle that is equal to 1 radian. That lets to introduce the variables “rate of rotation” of the FLE, $\vec{\omega}$. The rate of rotation is vector that is perpendicular to momentum and the magnitude of $\vec{\omega}$ is equal to the value of corresponding informational current. On first sight one can expect that $\vec{\omega}_r$ is the vector sum of $\vec{\omega}_0$ and $\vec{\omega}_X$, but it is not so. The projections of $\vec{\omega}_r$ on

t and X axes are $\omega_{rt} = \omega_0$ and $\omega_{rX} = \gamma \beta \omega_0$, when real $\omega_{rX} = \frac{V}{\lambda_X} = \frac{V p_X}{\hbar} = \gamma \beta^2 \omega_0$.

Such a situation arises again owing to the fundamental limitation on the FLE flipping rate (that *always* is equal to $1/\tau_p$) that was pointed out above. At that, since any impact in space doesn't change the momentum in t -direction, the t -step doesn't change also and so actual t -rate value is $\omega_t = \omega_0 (1 - \beta^2)^{1/2} = \omega_r (1 - \beta^2)$.

Since actual flipping rate in [coordinate] t - direction for moving [in space] T-particle becomes to be slowed down, it means that particle's algorithm becomes be slowed down also. If the particle isn't stable and there is a probability of a “particle's algorithm soft failure” on some loop tact (when the particle decays), the slowing of the t -rate leads to that the (half-) life of such particle increases in $(1 - \beta^2)^{-1/2}$ times comparing to the case when the particle is at [spatial] rest. And – if a system consists of a number of particles - all/ any processes in this system become be slowed down on the $(1 - \beta^2)^{1/2}$ factor. For example moving in the *absolute* space clocks – mechanical, electronic, biological – will *show* lesser time then if they are at rest. If a moving in the spacetime particle is impacted, then the result, of course, depend on – is the impact directed along the absolute motion direction or back; in the second case the processes rate grows.

From above follows that every separated particle moves always in the 4D spacetime with constant speed [of light] having, analogously to the classical momentum, the momentum $\vec{P} = m c \vec{k}$, where m is some coefficient (the mass) that characterizes the inertia of the particle, \vec{k} is 4D unit vector, at that particle is always oriented relating to the \vec{k} .

Calculating the work of some force F at a spatial (a temporal 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. (6) below $p \equiv p_x$ for convenience), obtain:

$$A = \int_{S_1}^{S_2} F(S) dS = \int_{p_0}^p \frac{p(1-\beta^2)^{1/2}}{m_0} dp = c \int_{p_0}^p \frac{p dp}{(p^2 + m_0^2 c^2)} dp = c \Delta P. \quad (6)$$

Since at motion of a body the work of the force results in the change of the body's kinetic energy, from (6) we obtain

$$\Delta E = E - E_0 = cP - cp_0, \quad (7a)$$

or

$$E = cP = \frac{m_0 c^2}{(1-\beta^2)^{1/2}}, \quad (7b)$$

and for a body at rest in an ARF

$$E_0 = cp_0 = m_0 c^2. \quad (7c)$$

Besides, from above follows that every particle is some gyroscope, and so, for example, an impact on the particle (and on a body eventually) in some direction results in the particle's (body's) accelerations in two – along and orthogonal to the impact's direction – directions.

2.2.2 Algorithmic model for a material rigid body at a motion.

Above we consider the motion of separated particles. At that, on first sight, since Compton length of moving particle decreases, the particle's dimension should be lesser then when the particle was at rest. But, since “space” impact doesn't affect on the particle's “time Compton length”, the particle's dimensions in spacetime remain be the same as it was when particle was at rest, though trajectory of flipping point in spacetime becomes be mach more complicated comparing with the initial circle. Nonetheless the circle's plain of flipping point is always orthogonal to the particle's 4-momentum direction and so it becomes be rotated in spacetime on the angle $\Delta\phi$ (see Fig. 3), $\text{Cos}(\Delta\phi) = (1-\beta^2)^{1/2}$.

If a system of particles constitute a rigid body, say, a rod, then the body as a whole rotates in the (X, ct) plain (Fig. 4)

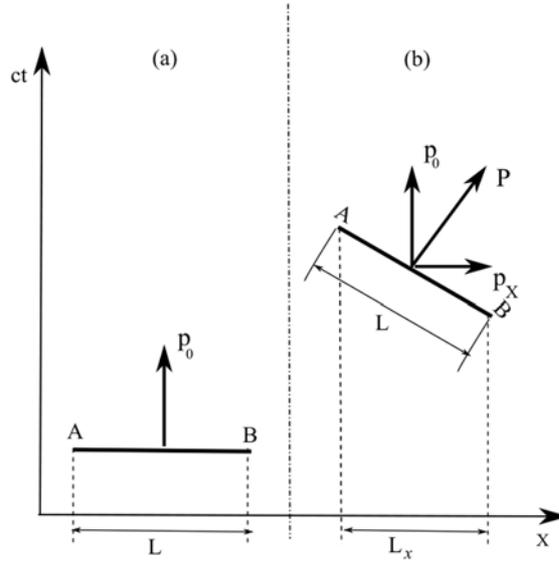


Fig.4. A rod having the length L moves in the spacetime: (a) – the rod is at [spatial] rest (moves in the time only) in the absolute reference frame, (b) the rod moves also along X-axis with a speed V . t is the coordinate time.

So the projection of moving body on a space plain becomes be shorter in the direction along the particle's spatial motion. In standard theory this effect is known as “FitzGerald -Lorentz contraction” [22].

From the Fig. 4 immediately follow the main equations of the special relativity theory (as well as of the Lorentz theory, though), i.e., [if the back end of the rod was in the point $(ct,0,0,0)$ in some absolute reference frame] Lorentz transformations:

- the first equation

$$x = Vt + x'(1 - \beta^2)^{1/2}, \quad (8)$$

- and the second one:

$$t' = (1 - \beta^2)^{1/2} t - \frac{Vx'}{c^2}, \quad (9)$$

(the equations above easily can be reduced to the standard Poincare form) but with essential difference from the SRT – these equations aren't valid in whole [in the SRT - pseudoEuclidian] Matter's spacetime *but are true for concrete rigid mechanical systems* (e.g., a system Earth + a satellite is rigid system also because of the gravity force) *only*. Moreover, the variables x', t' aren't the 4-coordinates of some spacetime points; that are *measured by a reference frame instruments* lengths (here - from the back of the rod) to some (here – the rod's) material body's points, and clocks' readings in these points, if some clocks were placed along the rod and synchronized, for example, before the rod's acceleration up to the speed V : $x' \in (0, L)$, $x \in (x_0, x_1)$; $x_0 = Vt$, $x_1 = Vt + L(1 - \beta^2)^{1/2}$ and $t' \in (t'_0, t'_1)$; $t'_0 = t(1 - \beta^2)^{1/2}$.

From Fig. 4 follows, also, that, say a pair of clocks in different rod's points are in different coordinate time points; and, since the coordinate time is "what clocks show", the clock, say, in front end, becomes, after acceleration "be in the past time" comparing with the back end clock and so "shows the time" that is correspondingly lesser on the Voigt-Lorentz decrement [24],

$$[27] \Delta t' = -\frac{VL}{c^2}, \text{ where } L \text{ is the rod's length.}$$

So some events that are simultaneous in a fixed reference frame aren't simultaneous in a moving reference frame – this effect is introduced in the special relativity as "the relativity of the simultaneity".

But again, this effect takes place only if the "coordinate axes" of a frame are rigid material lines, by any means they cannot be "virtual" and exist in whole Matter's spacetime. For example – if a pair of placed on a distance L synchronized [before the acceleration] clocks are free and are independently and identically accelerated up to a speed V , then the distance between the clocks isn't contracted and remains be equal to L , when both clocks show identical times ("the Bell's paradox").

On other hand if one uses a composition of rigidly coupled and free clocks then it is possible to measure the absolute speed of such a system [25], [26].

2.2.3 Informational model and the SRT.

All equations above well correspond with their analogues in special relativity. But there is rather important difference. The SRT considers *global* "reference frames" moving relatively to each other; which are defined on whole Matter's spacetime. At that coordinates (ct, \vec{r}) of any point in whole spacetime are defined symmetrically and equivalently for both frames, when the relation between coordinates are determined by the Lorentz transformations. This leads sometimes to that in some books, where the SRT is described, one can meet the statements something like as "at a motion of a frame the space transforms into the time and vice versa" ("Zum Raum wird hier die Zeit" – Wagner's Parsifal's words cited in [19]), or "the motion of a reference frame relating to another one is [mutually] equivalent to the rotation of 4-D pseudo-Euclidian spacetime given that the [*spacetime*] interval is invariant" [23], etc.

But that isn't so; first of all since from the SR postulate that all inertial reference frames are totally equivalent follows logically nonsensical implications, for example – the Dingle problem. And this problem, as well as all other "the SR paradoxes", evidently become be solved only by introducing a preferred – eventually absolute – reference frame(s), which are defined as being at [spatial] rest relating to the absolute 4D spacetime. Since any particle (or a system of interacting particles, including a [principally limited] set of synchronized clocks and rules for spatial measurements, i.e. – a reference frame) has its own specific time and space parameters

in Matter's absolute space-[coordinate] time, a motion of the particle affects only upon the parameters of this particle (system of particles) and nothing does with the external Matter, including – with the spacetime, which in reality isn't pseudoEuclidian (pseudoRiemannian in the general relativity theory), it is the 4D Euclidian manifold; with two-face time, though.

As an example let us consider a standard SRT task (see Fig. 5): on a platform, where on a line AB , which is perpendicular to X -axis, there is a source of the light (in point A) and a mirror (in point B). In point A on the platform there is also a clock, which measures the time that is spent for the light's path to the mirror and back (path A_1 - B - A_2 on Fig. 5).

The platform (reference frame K') moves in a reference frame K with speed V along X -axis. Here we have the case that is rather similar to the case when T-particle moves in space after some impact, which was considered above (Fig. 3), but the cases are different. The T-particle moves in (X, ct) plane, when light (the photons) moves in certain direction only in the space – here in (X, Y) - plane; with flipping point moving also there and back along t -axis, though. Since speed of photons in reference frame K is equal to c , from Fig. 5 immediately follows that *real* speed of light in the frame K' , c' , is not equal to the speed of light, c , but it is equal $c' = c(1 - \beta^2)^{1/2}$. But since moving clock shows the time dilated on the same factor, the *measured* speed of light in the frame K' is equal to c also.

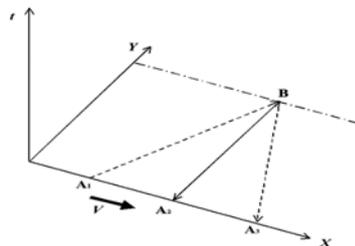


Fig. 5. The light path in space if the light source moves with a speed v along X -axis.

So the speed of light isn't constant in any inertial reference frame, it is an invariant. But if measurements are done inside of some rigid system, where interactions of components aren't too strong, this nuance isn't essential, moreover, in technical applications the special relativity theory turns out to be rather useful. For example – an observer on the platform above can, having data about his absolute speed, and so – the data about real his clock's tick rate, measure the distance h between the source and the mirror. But in this case the measurement can be done also without the acknowledge about the absolute motion, it is enough, in accordance with the SR, simply to measure the time interval Δt for the light two-way pass and calculate the h value: $h = 0.5c\Delta t$, what is evidently – as well in any other situation if the measurements are executed in a rigid system – much more convenient.

Another very important practical application of the ST is the global positioning system that works in the rigid system “Earth +satellites”. The gravitational force is strong enough to support the rigidity of the system after placing the satellites on the orbits, so, for example, there is practically negligible influence of the changes of satellites absolute speeds at orbital motion on the interchanging by information between satellites and the GPS stations/ clients on Earth surface. It is possible that some impacts happen at launching of the satellites, but that is inessential since the clocks are synchronized after they are on the nominal orbits so, as that would be if the synchronized clocks were placed on the orbits in rigid enough conditions and the clocks occupied their places in the 4D spacetime automatically.

2.2.4 Some examples

Let’s consider a few examples of the informational model applications.

So, since every material object moves in spacetime always with the speed of light only, all objects in Matter, if She 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.

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

Example 2. Let there are a pulsed light source, **S**, and a mirror, **M**, which are placed on a distance l (Fig. 6). After a flash, source’s photons move to the mirror and back. Since photons are X-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 $2l$ distance along [coordinate] ct -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.

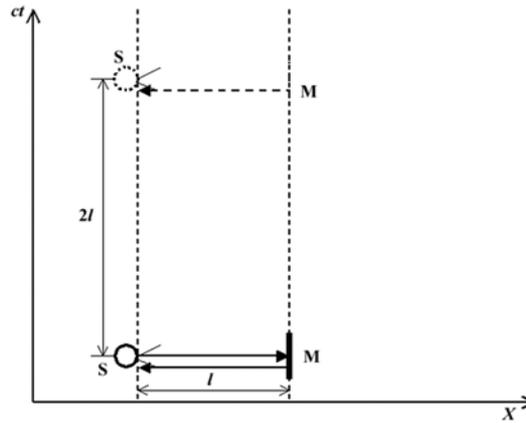


Fig. 6. A system of pulsed light source, **S**, and a mirror, **M**, placed on a distance l .

Example 3. Consider some pair particle + antiparticle. Since antiparticles move in spacetime having negative time direction, they never meet with particles in the spacetime. 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 billions of light years. However, since they are always in the one true time point, they can interact at a 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, but which are directed in spatial directions only (see Fig. 7), 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 temporal total momentum's component will be the same as for the e^+e^- pair, i.e., equal to the zero.

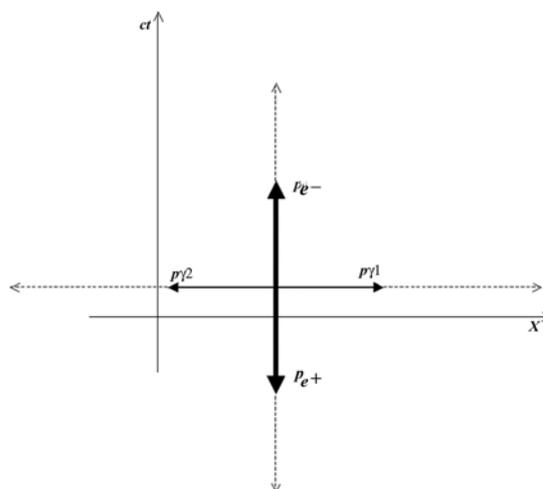


Fig. 7. Annihilation of an electron-positron pair.

Analogously, at the decay of, e.g., π^0 meson, its quark and antiquark are separated in the spacetime by a distance near 10^{-8} m along the $[c]t$ -axis, what is very large distance for the strong force; for the π^\pm mesons this distance is near 10m, though.

2.2.5 Informational approach and the SRT (pseudo-Euclidian) formalism.

So we should conclude that the first – Voigt- FitzGerald-Lorentz's [26] – *local* (in contrast to *global* SRT) version of the [Aether] theory was true in the points of absolute space, time [and, in certain sense, Aether], though in all other aspects standard version of SRT is mighty and convenient mathematical tool, which allows solving seems any practical problems in mechanics and electrodynamics; besides, of course, the cases when some set of material bodies doesn't constitute a rigid system. Note, also, that Einstein's contribution in the theory is, of course, very important – he more thoroughly considered the dynamics of moving material objects and obtained famous formulae $E = mc^2$. Though this relation follows from Lorentz transformations and was known already for the electromagnetic processes, Einstein was the first who obtained it for the general case, when many of other physicists thought that everything in Nature could be reduced to the electromagnetism. Thus it seems more correct to call the theory as “Voigt- FitzGerald- Einstein – Lorentz theory” (VFEL-theory).

As well as Eqs. (1)-(3) can be quite naturally expanded into standard 4-dimensional representation, then the 4-time current is (let here to use symbols without an attention to covariance/ contravariance):

$$j_\mu = \left(\frac{E}{\hbar}, \frac{c\vec{p}}{\hbar} \right) = (j_t, j_t \vec{\beta}). \quad (10)$$

If some point in a reference frame has the coordinate $x_\mu = (t, \frac{\vec{r}}{c})$ then scalar product

$$\Delta I = j_\mu x_\mu = \frac{1}{\hbar} [Et - (\vec{p} \cdot \vec{r})] \quad (11)$$

formally turns out to be the quantity of the information (the number of us-FLEs' time flips) for a particle needed to reach this point, if the particle has coordinates (0,0). Note that the expression in Eq.(11) is in fact the exponent index in the [quantum mechanical] wave function of free particle.

If we use in Eq. (11) the parameters of the particle's actual motion then obtain:

$$\begin{aligned} \Delta I_s &= j_{s\mu} x_{s\mu} = \frac{1}{\hbar} [Et - (\vec{p} \cdot \vec{r})] = [\vec{r} = \vec{v}t] \\ &= j_t (1 - \beta^2)t = (j_t - j_x)t \end{aligned} \quad (12)$$

From Eq. (12) follows that the rate of the information change at a particle's motion is

$$\frac{dI}{dt} = j_t(1 - \beta^2) = \frac{1}{\hbar} m_0 c^2 (1 - \beta^2)^{1/2}. \quad (13)$$

From Eq. (13) follows that $\frac{dI}{dt} = -L$, where L is Lagrangian for free particle.

From Eq. (12) follows that the change of information on some trajectory is, in fact, the physical action. Note here, that on the correspondence “the change of information on some trajectory – physical action”, as it seems, was firstly pointed out in [6].

The informational currents j_t, j_x , correspond to the FLEs rotation when the turning’s angle of the angular momentum of the flipping FLE in the plane that is perpendicular to \bar{p}_r is a sum of the turning’s angles in the in (X, Y) , i.e. – the angle φ (see Fig. 1), and (t, Y) , i.e. - the angle θ , (see Fig. 2) planes. The “time part” phase $\Phi = j_t t - j_x t$ at the particle’s motion corresponds to the particle’s physical action Eq. (12).

2.2.6 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 [28-37], in [38]: “two face” nature of the time, the introducing of the absolute Euclidian spacetime and the absolute time (“Supertime” in [33]), 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 τ - 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 the relativistic invariant ds . Therefore, though the majority of the inferences of the approach in these papers are true, there are also others, for example in [35] (and [37]) 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; before the introducing by Poincare of the invariant interval and imaginary time.

But, what is more essential – when introducing the absolute spacetime the authors of “Euclidian relativity” apply, nonetheless, the erroneous relativistic approach, where the reference frame coordinates are something that directly corresponds to the 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 temporal axes that have different directions – *what is impossible in the reality, since in the spacetime only one temporal axis exists*. Thus in the reality indeed a number of the frames' coordinates are possible – the translations along any axis and the rotations, but spatial only.

The next principal “relativistic flaw”, which is transmitted 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. 2.2.2).

2.2.7 Informational approach and QM

Above we have noted an important, direct, and trivial consequence of the informational model, 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 clones, when the information has the property to have absolutely identical copies.

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

It seems as very probable that this uncertainty is some realization in Matter of the fundamental problem that relates to the rule “Time” that was touched above: the rule “Time” is logically self-inconsistent, since it is applied for changing objects (processes, etc.). At the changes any state of any changing object is simultaneously “past”, “present”, and “future” state (or any corresponding time moment is simultaneously “past”, “present”, and “future” moment), when all these states/ moments are different by definition. A number of situations, which follow from this problem, were considered 2500years ago by Zeno in his aporias and well illustrate the problem.

This (“PPF”) problem is Meta-physical (and Meta-mainstream philosophical, though) and so can be solved in the information conception only; and, rather probably the solution will be based on two points that are well established in this conception: (i) - the fact that all/everything in the Set “Information” happens, is happening, and has happened simultaneously and always, i.e. – “in an absolutely infinite long time, when the Set exists”. So every Set's element, including changing elements, and so, of course, every material object, *exists always simultaneously in all its states* that are/can/will be realized in concrete situation in concrete informational structure, and (2)- the Set “Information” is absolutely infinite set that has the cardinality absolutely infinitely more (if the continuum hypothesis is true) then the cardinality of the continuum, for what, e.g., Zeno's aporias were formulated. These points relax to certain

extent the problem of logical base of the notion “a change” (and so of “Time”). But in this case another problem arises – if all/everything has always happened, then what is the *observed* existence of changing objects? The full answer on the last question requires further development of the conception, nonetheless here we take that this fact, at least as the experimental evidence, exists objectively, i.e. in Matter objectively there exist changing objects and corresponding processes.

However the problem exists and it seems reasonable to suggest that though it can be (is) logically solved in the Set on ultimately fundamental level, it becomes essential on “macro levels”, 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.

On each next level new structures having new properties again “must solve the PPF problem”, when in this case concrete logical structures aren't absolutely infinite and so they don't have “the Set's possibilities”.

In this informational model we take as a reasonable the suggestion that in finite (or, possibly “simply infinite”) structures the PPF problem is solved by introducing of an uncertainty on some level of scales. For example a particle “obtains” a specific position in space relating to external Matter only when its us-FLE flips. Between these moments the position (and possibly some other properties of the particle) are uncertain for the external objects – analogously if in a computer a program code runs, the state of this code becomes be uncertain to another programs at least on the time need for some electronic gate to flip. Moreover, if a code contains some subroutines, the state of this code becomes be uncertain for the external on the time interval need for next subroutine to carry out its calculations.

From the consideration above follows direct correspondence of Quantum Mechanics and this informational model, when, for example, the de Broglie wave is the 3D projection of 4D “ j_X helix” on a space plane. However, in the text above one easily can find, also, something that seems as a trick: when everywhere in the text it is posited that “any object, including any FLE's flipping point, moves in spacetime with the speed of light”, in reality any particles' FLE's flipping point move on a helix, so have speed equal to $c\sqrt{2}$.

Here we have two levels that are above the fundamental the St's one. The first – the FLE's flip time, which evidently isn't even “simply” infinitesimal. The second – the particles that are concrete algorithms constituted from FLEs.

Thus if in the spacetime after some infinitesimal impact a straight line of flipping FLEs appears, the flipping point moves through the FLE lattice having the speed of light. But at that a corresponding “particle” not only has zero “rest mass” (in any direction in the 4D spacetime), it also doesn’t move in the spacetime; at that, since the Compton length of the particle is infinite, its location in the spacetime is infinitely 4D uncertain.

If the impact isn’t infinitesimal, the Compton length is finite and particle’s location uncertainty turns out to be limited. At that the flipping point line becomes be a helix, but the *speed of particle as a whole* turns out to be equal to the speed of light, when the speed of flipping point projection on a plain that is orthogonal to the particle’s motion direction is equal to the speed of light also.

Why that is so? – in this model there is no answer now. As well as, though in the model the particle/wave duality seems as quite natural and so, for example, the diffraction patterns if a beam of particles passes through a slit, seems as rather understandable, an explanation of the result for two and more slits diffraction will, rather probably, require to suggest that a particle isn’t a simple “one FLS 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.

2.2.8 Mediation of the forces in complex systems

Now four “fundamental” kinds of the interactions (four “fundamental forces”) are known – gravitational, weak, electromagnetic (EM), strong; which differ, e.g., for the proton as (approximately) $10^{-36}:10^{-11}:1:10^3$. In this informational model all forces should have the mediators, which act on [another] particles by transmitting some momentums, \vec{p} .

It seems as the reasonable to conjecture that at an interaction of a mediator with a particle those momentums are universal in a small limits (elementary momentum, \vec{p}_0), when *some t-IC step* in the impacted particle becomes “be spent” by interaction, resulting in the particle’s t-IC decrease (if potential energy, $U<0$) and in corresponding [negative] *mass defect*; or “be added” resulting in t-IC increase if $U>0$.

3 Some consequences from the model – gravity, electricity, etc.

3.1 The gravity: static solution. T-particles

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 rate of some equivalent of the t-ICs of the 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 us-FLEs, i. e. the FLEs that are used for localization of particle in space, "take part".

The problem for complex (many particles-) bodies was considered in [1]; here, to simplify the equations, only "bi-particle" case is considered.

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

$$E_{gN} = -G \frac{m_1 m_2}{r}, \quad (14)$$

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 t-IC step 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 $2\pi r l_p$ ($2\pi c t l_p$) see Fig.8

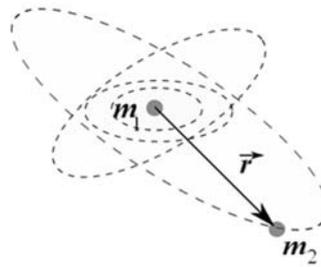


Fig. 8. A sketch of a spreading of the gravitons in the space. The direction of the spreadings is random since in reality any particle is impacted by some forces and isn't oriented in the space constantly.

(ii) - the times of the us-FLE's flip, and of the interaction of the graviton's FLE and particle's us-FLE are the same and are equal to Planck time; and

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

It is evident, that interactions of gravitons and particles' us-FLEs are accidental events – coincidences of independent processes of "radiation" and spreading of gravitons of "radiating" particle and us-FLE flipping of other one. In previous papers ([1], [2], [25]) the coincidence rate in a particle was estimated in suggestion that both – the number of "gravitons" in a point, where a particle's us-FLE flips, and the number of these us-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]

numbers inside Plank time interval are small, then it is well known that the coincidence rate is equal

$$N_c \approx 2n_1n_2\tau \quad (15)$$

In reality the particle's us-FLEs flips very regularly; nonetheless the equation (15) remains be true, if one suggests that the interaction of graviton and particle's us-FLE happens in any time moment when the both Plank intervals overlap (Fig. 9).

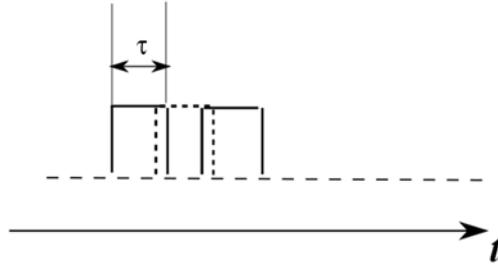


Fig. 9. Overlapping of gravitons and us-FLE

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

$$N_c = \psi_r n_p 2\tau \quad (16)$$

where ψ_r is the flow [s^{-1}] of gravitons through the particle's us-FLE; n_p is the us-FLE's flip rate (the informational current in the particle).

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

$$\psi_r = \frac{m_1 c^2}{\hbar} \frac{2\pi l_p r}{4\pi r^2} = \frac{m_1 c^2 l_p}{2\hbar r}, \quad (17)$$

and the coincidence rate is

$$N_{c12} = \frac{m_1 c^2}{\hbar} \frac{l_p}{2r} \frac{m_p c^2}{\hbar} 2\tau \cdot P_G = \frac{m_1 c^2}{\hbar} \frac{l_p}{2r} \frac{m_p c^2}{\hbar} 2 \frac{l_p}{c} \cdot P_G = \frac{m_1 m_p c^3 l_p^2}{\hbar^2} \cdot P_G. \quad (18)$$

Since the Plank length is equal $l_p = \left(\frac{\hbar G}{c^3}\right)^{1/2}$, from Eq.(18) obtain, that if the probability $P_G = 1$ the coincidence rate in the particle is equal

$$N_{c12} = \frac{G m_1 m_p}{\hbar r} \quad (19)$$

It is evident, that if a body having mass m_2 contains any number of particles, then the coincidence rate in the body is equal

$$N_{c12} = \frac{Gm_1m_2}{\hbar r} \quad (20)$$

Note that the masses m_1 and m_2 in the equations (17) - (20) 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: $N_{c12} = N_{c21} = \frac{Gm_1m_2}{\hbar r}$, so total gravitational energy, defined here in the informational model, E_{gl} , seems as

$$E_{gl} = -\hbar(N_{c12} + N_{c21}) = -2 \frac{Gm_1m_2}{r}.$$

What, of course, contradicts the Newton gravity law. So we should introduce an additional premise to take into account this point. For example in [39] it was suggested that for the changing of j_i is necessary 2 us-FLE+graviton interactions; thus obtaining that the correct equation for this energy is

$$E_{gl} = -\frac{Gm_1m_2}{r} \quad (21)$$

and $E_{gl} = E_{gN}$, when this energy (and corresponding mass defect) is equally divided between the bodies:

$$E_{gl1} = E_{gl2} = -\frac{Gm_1m_2}{2r}. \quad (22)$$

Note that from above follows that *the gravitational and the inertial masses of a body are identical*, since both “are created” by the same informational current of the body.

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

$$F_{gl12} = \frac{dP}{dt} = -\frac{\hbar}{r} N_{c12} = -\frac{Gm_1m_2\vec{r}}{r^3} = F_{gl21}, \quad (23)$$

where P is momentum of a body, when suggesting that the transfer of the elementary momentum, $\vec{p}_0 = -\frac{\hbar\vec{r}}{r^2}$, happens at every interaction of the us-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 than for the corresponding gravity force (Eqs. (22) and (23)), 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

$\vec{p}_0 = -\frac{2\hbar\vec{r}}{r^2}$. It isn't impossible that such a version corresponds by some way – somehow as in

Minkowski formalism there exist two “times” that by some way correspond to the existing really also two, the true and the coordinate times – with some other quantum gravity theories, where it is suggested that the spin of the graviton (not “circular”, though) is equal to $2\hbar$ [42].

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. Note also, that at least for the statics the rims of a particle transmit at gravity interaction to any another particle all information about the localisation of the radiating one in the vector value of elementary momentum $\vec{p}_0 = -\hbar\vec{r}/r^2$; though with practically 100% QM uncertainty of the distance.

From above follows that the informational currents of both bodies becomes be slowed on the half binding energy (divided by \hbar , of course). If the mass, M , of one of the bodies much greater then the other mass, m , the relative decrease of the lesser body’s informational current is

$$\delta j_{r2} = \frac{GMm}{2\hbar r} \frac{\hbar}{mc^2} = \frac{GM}{2rc^2} \quad (24)$$

Correspondingly, if the body-2 is a clock, the clock becomes be “gravitationally time dilated” on $\frac{GM}{2rc^2}$ times, what is twice 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. 10)

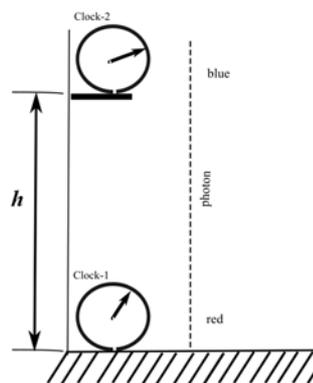


Fig. 10. Two clocks are in [let – Earth] gravity field. Dotted line – a photon beam.

then their relative tick rates differ as

$$\delta\omega_1 - \delta\omega_2 = \frac{GM}{2c^2} \left(\frac{1}{r} - \frac{1}{r+h} \right) \approx \frac{GMh}{2r^2c^2}. \quad (25)$$

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

clocks' rates difference is twice more: $\delta\omega_1 - \delta\omega_2 \approx \frac{gh}{c^2}$.

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 [40], [41].

3.2 The electricity: static solution

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 occur, 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 potentials should be similar also, but the probability of electric interaction should be larger – because of the widths of “circular photon” rim, W_1 , and of the “receiving part” of the particle's FLE chain, W_2 are much more then the size of one [us-] FLE in the gravity case.

So for the electric coincidence rate we can obtain some analogues to Eqs. (15) - (23) (for a couple of particles with the elementary charge, e) the equation:

$$N_{cc21} = \frac{m_1c^2 \cdot 2\pi r W_1}{4\pi r^2 \hbar} P_E \frac{m_2c^2}{\hbar} 2\tau_E, \quad (26)$$

where P_E – the probability of the interaction if through particle 2 a radiated by particle 1 circular photon have passed, τ_E – the “passing” time. Under rather plausible conjectures that: $\tau_E = W_2 / c$, $W_{1,2} = \alpha^{1/2} \lambda_{1,2}$, where λ is the Compton length of a particle; $P_E = 1/2$; and α is the fine structure constant, we obtain from Eq. (26) that electric potential energy of the two-charge system is

$$U_E = \hbar \cdot N_{cc21} = \frac{\alpha \hbar c}{r} = \frac{e^2}{4\pi \epsilon_0 r}, \quad (27a)$$

and for the electrical force in the statics obtain

$$\begin{aligned} \vec{f}_E &= \frac{d\vec{p}}{dt} = N_{cc21} \vec{p}_0 = \frac{e^2 \vec{r}}{4\pi \epsilon_0 r^3} \\ &= \frac{q_1 q_2 \vec{r}}{4\pi \epsilon_0 r^3} \end{aligned} \quad (27b)$$

(The lower term in Eq. (27b) is for arbitrary charges).

Note, that in the Eqs. (27a,b) we suggest, as that was for circular graviton above, 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 ($\mu^- - \text{muon} + \text{proton}$) “atom” $\mu^- - \text{muon}$ 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, beside the EM, can act on the muon, it seems as very unlikely, that a corresponding experiment would be informative.

3.3 Planck mass particles

It seems worthwhile to mention here an additional remark, relating to the Beginning. There are, in principle, no objections to suggest [39] that at the Beginning Matter was firstly created as a huge number of so called hypothetical “Planck T-particles”, i.e., the particles having masses that are equal to the Planck mass ($m_p = \frac{\hbar}{l_p c} \approx 10^{19} \text{ BeV}$). These particles contain (and their algorithm works by using) the us-FLEs only, 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 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, *it is logically permissible* to suggest, that they all move in the Matter’s spacetime *in one* - the positive [coordinate] *temporal 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 – as that is at least in the observed now part of Universe.

Though, of course, the same situation occurs not only for the Planck mass particles, but if there were some other particles with symmetrical algorithms.

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 than 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 is large enough to interact. As well as the PM particles must be attracted by “usual” massive bodies and freely travel to the bodies' centers, since they don't interact with usual matter by other ways than the gravity.

An interaction of two PM particles should result in the appearance of a big number of the *particles only* having total energy more than 10^{19} BeV, so such events could, at least partly, be some source of the high 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 from the point where the us-FLE of any particle has flipped. So any particle (that exists in this model every time moment as a unique flipping FLE) 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 particle can “gravitationally break” any other one if the us-FLEs 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 other particles interact on rather large distances by other - “having fields” forces and “non-having” ones, for example – when Pauli principle works and these distances are, rather probably, essentially more than the distances that are necessary to exceed the gravity reaction threshold.

4 Discussions and conclusion

Above of course only some initial (“draft”) [informational] physical model is presented, nevertheless this model is well grounded. First of all – the model *follows quite naturally from the informational conception* when the truth, the completeness and the [self -] consistence of this conception are rigorously proven. From the conception directly follows: (i) - a discreteness of Matter structures (objects), as well as of interactions – in reality of informational exchanges - between the material objects; and (ii) – since in Matter, by definition, any interaction is an exchange by some exclusively true “message” 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 weakly united in a structure by the gravity. From this in turn follows that Matter can be reduced on fundamental level to the existence and interactions of some primary fundamental logical elements.

As it was pointed out above – the particles’ FLEs (as well as rather possible Aether’s [the lattice’s] FLEs that are identical to the particles’ FLEs) should be more complex than a bi-stable logical element. The particle’s loop code should have a capability to “radiate”, to “detect” and to react on some messages not only on/ by fundamental us-FLE’s flips, which determine the particle’s location in spacetime and gravitational force between particles, but also by the FLEs that are responsible for another – e.g. the electromagnetic (electrostatic are considered above; gravity also, though) - forces. Here are possible of a number of variants, though seems more plausible to conjecture that the FLEs in reality have some [identical] “polygonal” structures, when for particles it is sufficient to have only four “sides” to exist / to move/ in the spacetime.

Another conjecture, which was used in the model, is that there is direct correspondence between logical unity of information, bit, and the elementary action (elementary angular momentum), \hbar . This conjecture follows from fundamental logical self-inconsistence of the Time/the change notions (the discreteness of physical processes and of corresponding parameters of the processes) and from a number of experimental data, first of all – from the Uncertainty principle; besides that is true, quite naturally, for a fixed information – for some spin structures, including the atom’s orbitals, etc, though.

At that the Uncertainty principle is in turn a sequence of the self-inconsistence of the Time/the change notions also; and it realizes itself in given concrete case as that causal processes in Matter cannot be executed instantly and so for the execution of the algorithms that specify concrete traits of particles in spacetime is necessary some finite time – the particle “disappears” for the external objects on some time that is necessary for particle’s algorithm to carry out some inner (inaccessible to other particles) logical operations.

Nonetheless, even changing information can have identical [changing] copies and so from the fact that Matter is an informational system directly follows QM postulate about the identity of the elementary particles as some informational clones.

Yet the set of these simple conjectures is sufficient to explain a number of fundamental problems and postulates in physics:

- first of all the informational conception allows correctly define Meta-physical notions “Space” and “Time” and further – how these notions are realized in the concrete sub-Set “Matter” as 4D “empty container” – the Matter’s 4D spacetime; and what are spatial and temporal intervals (used to the “times” for the temporal intervals - as, in fact a jargon, when for the spatial intervals the word “distance” usually is applied, not “space”) that necessarily accompany processes in Matter and so determine the locations of material objects in the spacetime. At that the spacetime is absolute, it by definition cannot be dependent on any [objective] material “container’s” content, including on the [gravitational] masses; as well as on something subjective structures, including – on observers and/or on their reference frames. As well as both Rules act on material processes in the informational system “Matter” only implicitly, for example the experimental fact that the Matter’s spacetime is “Cartesian”, i.e. in the spacetime all 4 directions are mutually orthogonal, is a consequence of that the *concrete Matter’s* fundamental logical elements have 4 concrete independent (including – on the spacetime) degrees of freedom for some logical transitions, which realize themselves as steps when an object changes its position (including as the changes of internal state) in the spacetime;

- from the requirement to Matter’s codes should be reversible follows the time invariance of physical laws and so the relativity principle in macrophysics; for the T- particles becomes quite natural to have the partners – the antiparticles that move and “live” in negative [coordinate] time direction, i.e. have reversal algorithms codes. At that – from the fact that a particle+antiparticle pair annihilates with creation of S-particles having zero the momentum’s t -components directly follows the equality of the particle’s and antiparticle’s masses.

However, it cannot be excluded the version that at Beginning the primary T-particles were created as totally symmetrical algorithms, so the particles and the antiparticles were identical. From that it is *logical permissible* that all primary particles were “only particles”, i.e. Matter yet at Beginning didn’t contain antimatter practically.

Relating to Beginning note, also, that the informational conception makes clearer, in certain extent, also this “metaphysical” problem in physics, because of the logical singularity of any informational statement, including the negation “there is no given Universe” is always infinite and so, in principle, there aren’t fundamental limitations on the occurrence of cases when an

ultimately large informational current can be started (ultimately large energy can be released) as some “Big logical Bang”.

The problem “why for Matter is necessary “two times”” becomes be more clear, when, on first sight, it’s enough to have only one – the true – time, since all material objects interact in the space and true time only, independently on corresponding values of their proper [coordinate] times. The answer is again in the reversibility of Matter’s codes – on one hand it is necessary for Matter evolution to pass without (or, at least with minimal) energy dissipation, so to work of Matter’s computer is sufficient to get some one portion of energy at Beginning; on other hand the reversibility of something is impossible in absolute time by definition. So the true time hasn’t a coordinate in the Matter’s 4D spacetime, though the true time interval changes always, constantly and uniformly accompanying changing material codes that constantly run with identical and stable operational rate.

Though it is possible to consider the true time as [having] a coordinate in a 5D spacetime, when 4D Matter’s spacetime constantly moves in this spacetime along this coordinate with the speed of light, this Rule first of all, limits, in certain sense, the configuration of all material objects in the 4D spacetime by the condition that every object up to some true time moment has passed the way in the spacetime, S , so that $S = \int_0^{t_{true}} |ds| = ct_{true}$, where $ds = (dx^2 + dy^2 + dz^2 + c^2 d\tau^2)^{1/2}$ and $d\tau$ is a differential interval of the coordinate time; 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 – and, of course, for the object’s predecessors, can have any $[\pm]$ signs at the object’s evolution/ transformations and its corresponding travel in the 4D spacetime.

It isn’t impossible that the reversibility (and the time invariance), as well other invariances, are indeed fundamental and they relate by some way to some fundamental laws that control, sometimes implicitly – as, e.g., the coordinate time acts, physical processes in Matter. But it isn’t impossible also that it isn’t always so, for example the known CP -violation in the K^0 kaon decay [42] can only indicate that some algorithms of some exotic particles isn’t reversible;

Further development of the model is natural also. Since there exist a number of stable particles whose parameters are stable at least up to the time scale of the order of λ/c , when every particle constantly changes, because of the particles constantly move in the true time and in the spacetime – it seems as be quite plausible that the particles’ algorithms are cyclic when the algorithms’ lengths are of order of the particles’ Compton lengths.

The conjectures above lead to definition of the “informational cyclic loop currents” for the particles in the first section of this paper, where it is postulated also that the FLE’s “size” is equal to Planck length when the FLE’s flip time [interval] is equal to Planck time; so – with the elementary action - these three fundamental Planck units constitute complete system for the understanding of fundamental physical properties of Matter – of the inertia and of the gravity. It becomes be clear – what the notion “zero rest mass particle” means.

Cyclic nature of particles’ codes directly leads to observable in experiments wave – particle duality. Moreover, under condition that the FLE’s flip rate always is equal to inverse Planck time, it turns out to be that the quantum mechanics and the VFEL theory (as well as this informational model) are in fact a single theory.

Under rather sound assumption about propagation of the Aether’s FLEs responses to the flips of the particles’ us- FLEs “signals” as a spatial rims in the FLE-lattice it turns out to be possible to obtain the models of gravitostatic and electrostatic forces, where both forces act randomly and – since the gravity force is very weak – it seems possible to detect this randomness if to measure the gravity action on a light particles, first of all – on photons; to show, that the “gravitational time dilation” isn’t, possibly, something unique effect – any force that leads to creation of a system of particles with negative mass defect leads also to a time dilation for these particles. In [39] the model is applied to a number of some another physical problems, for example, a zero approximation of the gravity and EM forces for moving charges and masses is considered.

Since from the informational conception follows proper and contensive definition of the Space and the Time notions, this physical model relates essentially to the special and the general relativity theories, where introduced into the theories properties of the spacetime, for example - as the capability of the spacetime transformations (the “time dilation”, the “space contraction”; the climes as the “spacetime curvature determines bodies worldlines”, etc.) are basic; though neither the SR, nor the GR contents proper definition of these notions. Besides in the relativity theories, rather probably, at least two physical principles are excessively absolutized – the relativity principle and the equivalence principle, when the absolutisation isn’t properly grounded. For example, the relativity principle in classical [Newtonian] physics, where, e.g., any material object can move having any speed, indeed can be applied without some limitations. But in Matter there exist fundamental limitation on a motion in the 4D spacetime – all objects move with the same speeds. Correspondingly the direct consequence of the relativity principle in the SR, i.e., the postulate that all inertial reference frames are equivalent immediately follows to logically senseless implications (the Dingle problem and some other SR paradoxes). The GR predicts the “gravitational time dilation” value that corresponds to the gravitational potential energy of a system of bodies that is twice more then the observed experimental value. Besides –

the fact of identity of the gravitational and inertial masses follows, rather possibly, only from that the gravity and the inertia of a body are produced by the same us-FLE flipping and both forces (inertial and gravitational) act analogously since act on every elementary particle that constitute the body.

But in depth the inertia and the gravity are independent on each other and so the equivalence (and the equivalence principle) is, rather probably, accidental.

The informational model, when conserving all adequate to the reality inferences and applications of the SR, is logically consistent, first of all – because of in the model the absolute Euclidian spacetime is postulated, etc. As well as the model suggests seems reasonable model of the gravity force, where, including, the identity of the gravitational and the inertial masses is quite natural.

The informational model can be tested. To detect a randomness of the gravity [25], [41] is necessary to measure gravity force impact on particles having least masses and so the experiments with photon beams in Earth gravity seem as utmost perspective. Though the experiment with ultracold neutrons seems as be promising also.

To test what – the special relativity or Voigt-FitzGerald-Lorentz theory (and this informational model) is valid? - is necessary to measure “relativistic” effects in non-rigid systems. An example - the measurement of orbital velocity of a couple clocks by using on-board instruments (clocks and pulsed light source) only, which is given in [25], though there can be serious technical problems. Another version, [26] with the orbital clocks seems as more simple and effective and is as follows. If, after synchronization of two clocks, one clock (let – clock 2) is pulled ahead by using a rigid rod having the length L , the clock obtains t - decrement $\Delta t = -vL/c^2$, where v is the orbital speed. If the rod will be pulled down, both clocks' readings again become to be identical. But if clock 2, after pulling out, will be disjoint from the rod and returns to the clock 1 by using, e.g., a self- engine, then two variant are now possible: (1) – if special relativity theory is true, then again the clocks' 1, 2 readings must be equal again since in the experiment slow clock transport was applied; or (2) – if Voigt-FitzGerald-Lorentz theory (and this model) is true, then the decrement above will conserve and comparing the clocks readings one can to measure the clocks' orbital speed.

On an Earth orbit it is possible to measure the orbital speed of a satellite only, because of the constant action of Earth gravity, which can be made small enough at the satellite motion, especially on a circular orbit. But to measure the absolute speed is necessary to compensate all forces that act on the technique. Such a possibility, rather probably, appears if a Space probe with the on-board clocks and rod is placed in a Space point, where the gravity forces (not the gravity potentials) of Sun and planets are mutually compensated. Then after a number of the probe's absolute speed measurements in the 4π it will be possible to choose the direction with maximal speed value. It is not impossible that the value will turn out to be near 700 km/s and

the direction will be along the observed cosmic microwave background [Doppler] dipole direction.

Presented here model can be applied to some other physical problems, for example – at an analysis of the OPERA experiment result [43], where some data on the detection of supposedly superluminal neutrinos were obtained. In a short time a large number of theoretical papers were published, which explained the data or discussed some possible concomitant effects that could be measured to confirm or decline the OPERA collaboration results. As, e.g., in [44], where authors have argued that such superluminal neutrinos should lose energy by producing photons and e^+e^- pairs, through some analogous to Cherenkov radiation. The ICARUS collaboration has made corresponding experiments seeking for such pairs [45] with zero outcome.

In the informational model the situation is seemed as rather simple – anything in Matter moves in spacetime with the speed of light only, so all Matter's objects are always in one absolute time moment (probably inside one Planck time interval). If some particle moves in spacetime with speed that differs from c , e.g., is superluminal, it goes out Matter and cannot interact with any of material objects (if it was created in a material target), including detectors. As well as if such a particle creates somewhere some particles – as the pairs above – such particles will be outside Matter also and cannot be detected too. So the ICARUS experiment zero result would be zero in any case – were the OPERA data true or false.

On the other hand it is possible that the remark above relating to the OPERA experiment is, in certain sense, too categorical. As it was pointed out in Introduction, Matter is only a (infinitesimal comparing to the Set) subset in the Information Set – outside Matter there exists “absolutely forever” absolutely infinite manifold of Set's subsets, some informational structures, and so forth – including, e.g., all states of Matter besides the given one, which exists [probably] one Planck time interval. One of such a separate subset is well known – that is the subset, where a huge number of arranged dynamical informational systems operate – the human's consciousness' subset, or the subset “Consciousness”. This subset evidently differs from Matter – for example it seems there weren't till now experiments where some human's thought was detected by material instruments; in Consciousness subset the rules “Time” and “Space” act in a different way comparing with the subset “Matter” - seems nobody now can suggest, even, for example, - how many dimensions are in a “Consciousness's spacetime”?. And, of course, – when in Matter every objects interact by changing exclusively true information only and aren't capable to produce/ apprehend a false information, consciousnesses are capable - sometimes too capable - to produce/ apprehend such an information.

Nonetheless every human's consciousness evidently interacts with Matter – when, for example, controlling a material chemical compound known as human's body. And on the

contrary – material (for example photons) objects acting on some material body's sensors eventually forms adequate images in the consciousness. So Matter isn't some totally closed independent structure, there exist some another – additional to the four fundamental – forces, which can interact with material particles, molecules, etc; such a force, for example could be responsible for the appearance of the life in Earth. And it is rather probably, which will be studied by physics in future.

That is, as it seems, a distant future, though. What is much more urgent now – as well as, *what is executable now and is rather cheap and simple*, – to make suggested in this model experiments, first of all – the experiment aimed at the detection of the randomness of Earth gravity force when acting on a monochromatic photon beam, and the experiments with a clocks pair in an Earth orbit for the measurement the orbital speed of a satellite and further – the experiment with the measurement of the absolute speed of a probe in a Space point with zero gradient of the gravity potential. The experiments indeed allow the testing of the relativity theory – when the experiments, which were made (for example [47]), in fact have tested the Lorentz theory only. At that, first of all, if the experiments outcomes will be in the agree with this model predictions, that will result in the convincing confirmation of the fact that real spacetime is absolute and Euclidian when the Minkowski and the pseudo Riemannian spacetimes aren't real and are some mathematical models that only allow in some cases to obtain conclusions that are adequate to concrete real physical situations. And further – to resolve some physical problems, for example in the cosmology, with using as real the 4D Euclidian spacetime, when till now the general relativity is the standard base for this science.

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