The informational physical model and fundamental problems in physics

This reported paper, and the paper "*The Informational Conception and Basic Physics*" [5a], in which the kinematics and dynamics in, including fast, bodies mechanics are considered, it is clarified what are Lorentz transformations, etc., are two main papers where the informational physical model is presented.

This informational physical model is based on the **“The Information as Absolute” philosophical concept**, recent version see paper “*The Information as Absolute*" - *2022 ed.*” e-print https://hal.archives-ouvertes.fr/hal-03812066

In the concept **it is rigorously proven that there exist nothing else than some informational patterns/systems of the patterns that are elements of the absolutely fundamental and absolutely infinite “Information” Set**.

Which - the Set - exists absolutely objectively, because of it fundamentally – logically - cannot be non-existent, and so exists absolutely eternally, having no Beginning and no End.

Including in the conception the utmost fundamental in mainstream philosophy and sciences phenomena/notions **“Matter” and "Consciousness”, which are principally transcendent/irrational in mainstream philosophy and sciences, including physics, become be scientifically generally rationally defined – they both are absolutely for sure nothing else than some informational systems that are elements of the Set, while the phenomenon “Information”, despite its absolute fundamentality, isn’t transcendent, and so any informational patterns/systems are, in principle, cognizable.**

So - “What is “Information”

“(Philosophical encyclopedia) “Information (lat. “informatio” – an examination, a notion, a concept): 1) a report, a notification about a state of affairs or about something else that is transmitted by a person; 2) decreased, removed uncertainty as a result of the communication obtained; 3) a notation inherently relating to a control; signals and their syntactic, semantic and pragmatic parameters; 4) transmission, reflection of the variety of any objects and processes (of alive and non-alive nature)”;

- i.e. briefly **“information is some data”.**

It is evident that that isn’t a definition – that is a tautology, and all other existent in the mainstream, rather numerous, definitions are also some tautologies as well – because of that the phenomenon “Information” is absolutely fundamental and general , it is impossible to define it through something that is more general. So correct definition of “Information” is

“Information is something that is constructed in accordance with the set of absolutely fundamental Rules, Possibilities, Quantities, etc. — the “Logos” set in the concept”.

Or, by other words, **the “Logos” set’s elements “make something to be an information”.**

A few examples of the “Logos” elements: ***“Energy”*** , ***“Inertia” “Space” , “Time”, “Logical Rules”, “Change”, etc.***

The proof above principally clarifies everything what sciences, including physics, study: since everything is some informational structures, in that humans do at researches [and at everyday practice, though], observing some informational links in/between some, say, material objects/systems – and quite similarly between themselves, what humans do **now completely irrationally/instinctively**,

- in this there is nothing surprising – simply one informational system "a human" [more correctly "human's consciousness"] exchange by some informational messages with other informational patterns/systems, say, a particle – or, really equally, with other human, and at that sometimes understands something in what informational system "a particle"/ other human tells.

Matter is rather simple informational system, which is based on a small number of fundamental and universal laws/links/constants, and where the patterns/systems exchange only by absolutely true and complete information. **Just so the informational system "mathematics" is extremely effective tool at decoding information that is originating and processing in Matter**.

That above is utmost common explanation why and how humans cognize external and internal World, to understand that more concretely and specifically it is necessary to understand also what is the concrete infosystem “Consciousness”, and so corresponding section is in this reported paper. Besides the paper contains the section “What is Life”, when this problem is a standard fundamental one in physics, and which would be useful in astrobiology;

- while **the section “Consciousness” quite directly relates to cosmology** – it looks as utmost rational to conjecture [and that is postulated in the model] that Matter was created by some extremely mighty and smart the “Information” Set’s element “conscious Creator”, which isn’t in this case transcendent, in fundamental contrast to fundamentally transcendent Creators in religions – but that is simply some “Consciousness”/element in the Set; which doesn’t principally differ from, say, human’s consciousness/element in the Set.

More see the reported paper, section “Cosmology”

In the model more 30 really fundamental physical problems are either solved or clarified on a level when possible rational ways of solutions become to be essentially clear, so an attempt to report what is in the model would occupy well more time that the organization committee assigned for this report, and besides, for this report the special **topic** "**Gravitational phyics**" is determined, so further we consider only this topic in detail, as the developed version of the 2007 initial models of fundamental Nature Gravity and Electric forces.

However for that it is necessary to make some introductive general notes.

First of all, that:

- the whole model, including the Gravity and Electric Forces models, is based, first of all, on **the really two of utmost outstanding in XX century C. F. von Weizsäcker's 1950-54 years "UR" hypothesis and Fredkin-Toffoli finding** [references see the paper's reference list],

- and, in complete accordance with the findings above and with all existent reliable experimental data, in the model it is postulated that the ultimate and utmost universal base of informational system "Matter" is the Matter's "ether" – the [5]4D dense lattice of [5]4D "elementary logical gates" – "fundamental logical elements" (FLE), which are some (essentially distinct, though) analogs of C. F. von Weizsäcker's 1950-54 years 3D binary "Urs".

Correspondingly [why? – see paper] Matter's utmost fundamental and universal "kinematical" spacetime is the fundamentally absolute, fundamentally flat, and at least [5]4D, Cartesian spacetime with the metrics $(c\tau, X, Y, Z, ct)$, where the FLE-ether is placed, and everything in Matter is/are some specific disturbances in the ether.

In this case we consider, first of all, a specific disturbances in the ether "Particles", which are created when some ether's FLE is impacted by some 4D momentum, $\vec{P}$.

If the momentum is practically infinitesimal, than in the lattice some **straight line** of sequentially "this-next" flipping ether FLEs appears, when the "flipping point" moves in the ether [and so in the 4D space with metrics ($c\tau$, X, Y, Z)] with 4D speed of light, and corresponding "particle" has zero inertial mass and zero energy– as for the case when FLE doesn't flip at all.

.

But after some impact with non-zero momentum $\vec{P}$ in this direction (or in any direction for non-flipping FLE), since the flipping cannot be with a speed that is larger than c, that results in precessing of the flipping FLEs, the flipping trajectory transforms into some 4D "helix"; and so the flipping transforms in some **close-loop algorithm – which is just a created particle**,

FLE "sizes" are equal to Planck length, l_P, and FLE "flip time" is equal to Planck time, $t_P, t_P = \frac{l_P}{c}$ So particles always move in the ether and the 4D space with the 4D speed of light, having momentums $\vec{P} = m\vec{c}$, energies $E = Pc$, inertial mass, m , and the "radius" of the "helix" , which is the particle's Compton length $\lambda = \frac{\hbar}{mc}$. The frequency of the algorithm ticks with which is $\omega = E/\hbar = m_0c^2/\hbar$ In parallel particles, and practically everything in Matter, move in the "true time" – *ct*-dimension of Matter's spacetime.

There exist two main types of particles: "T-particles", which are created by momentum that are directed along the $c\tau$-axis, which, if are at rest in 3D space move in $c\tau$-dimension with the speed of light, and so have "rest masses", and "S-particles" that are created by space-directed momentums, and so move only in space with the speed of light, say, that are photons.

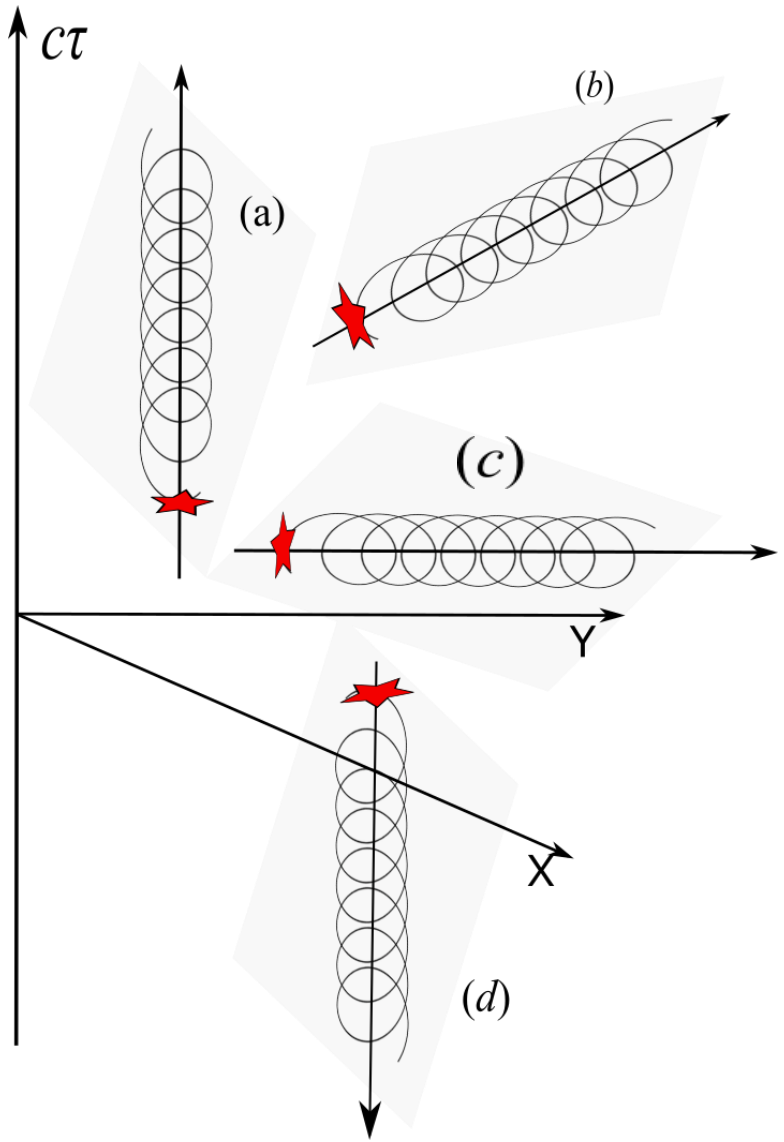


Figure 1. A few examples of particles creation
(a) – a T-particle at 3D absolute rest moves along cτ-axis
(b)) – a T-particle at 3D absolute rest moves also in 3D space
(c) – a photon moves only in 3D space
(d) – a T-antiparticle at 3D absolute rest moves along cτ-axis in negative direction.

Stars point events when an ether FLE is impacted.

Note that that is only some illustrative picture, in 4D space a 4D "helices" on Figure don't exist, so that can be quite equally painted relatively to (*X*,*Z*) and (*Y*,*Z*) planes as well. Just therefore neutrinos have non-zero rest masses

The initial model of Gravity Force

Model is based on a few assumptions:

(i) – the fundamental Nature forces, at least Gravity and Electric Forces, act as exchange between Forces charges – "gravitational mass" and electric charge – by Forces' mediators, which are radiated by "radiating" charge and impact on "irradiated" charge so, that the last obtains some momentum. **The flows of mediators are real "Forces' fields".**
Mediators are specific disturbances in the ether, which move in the 3D space with the 3D speed of light.

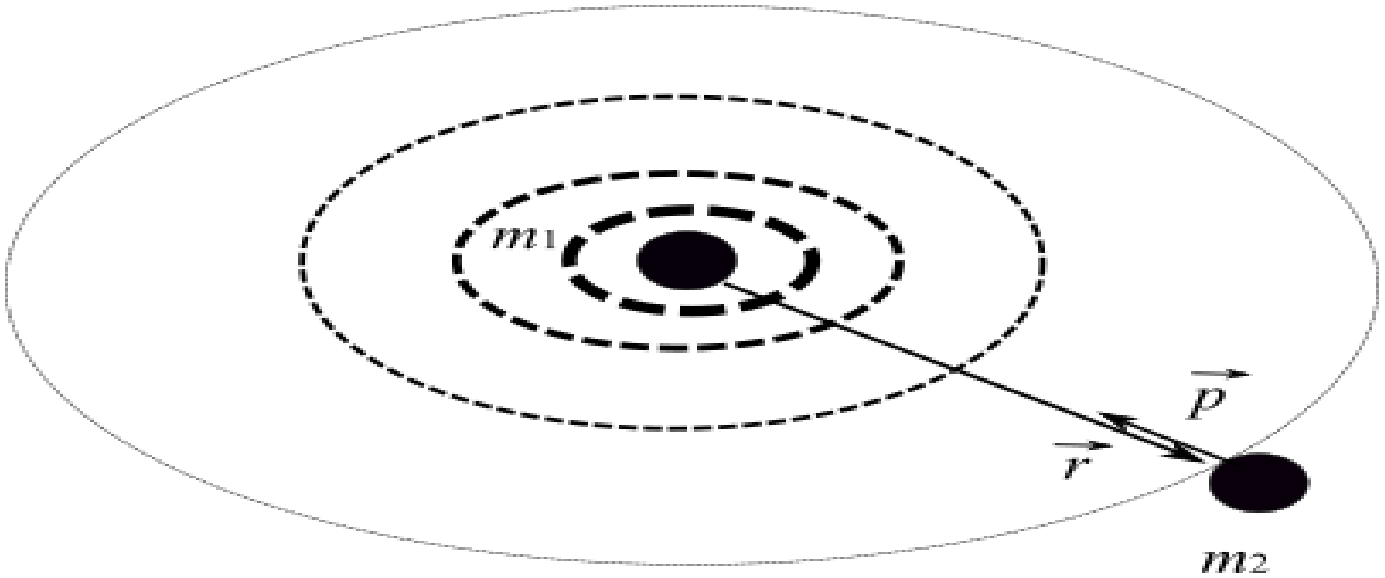
(ii) – besides the 4 utmost fundamental and universal "kinematical" 4 degreases of freedom of FLE at its flips, FLE has also additional degreases of freedom, which are "Forces' marks", and only marked FLEs in particles algorithms interact with corresponding mediators, i.e. propagating ether FLEs , in which corresponding mark is actualized at flips of corresponding marked FLE in algorithm of "radiating" particle

(iii) - in the model every particle's algorithm has only one fixed gravitationally marked FLE, (which, rather probably, is the "start FLE" in a particle algorithm) and so the gravitational charge is proportional to the same algorithm's frequency ω, as is in the corresponding particle's energy above;

(iv) - at every algorithm cycle, the G-marked FLE of a particle initiates in the 3D space radial propagating of 2D rim "**circular graviton**" of flipping the FLE-lattice FLEs, which are G-marked also, and at hitting in flipping G-marked FLE

of other particle, that transmits to this particle the elementary momentum, $p = -\frac{\hbar \bar{r}}{r^2}$

r is the radius-vector from the radiating to the impacted particle, the rim's area is $2\pi r l_p$, see Fig. 2



$$\vec{p} = -\frac{\hbar\vec{r}}{r^2}$$

Figure 2.

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

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

(continue basic assumptions)

- from what [the symmetry] follows, including, *that Matter at Beginning and further didn't contain antimatter,*

(v) - the time intervals of the "radiating" particle's G-marked FLE's, of the graviton's ether's FLE and other particle's G-marked FLE, flips are the same and are equal to Planck time; and

(vi) – at the interaction of an FLE of circular graviton and an irradiated particle's **flipping** G-marked FLE, this particle is gravitationally impacted.

It is evident, that interactions of gravitons and particles' G-marked FLEs are accidental events, which, well probably have Poisson distribution, and so the interactions rate, *N*, is $N_c \approx 2n_1 n_2 \tau$, "τ" here and further is Planck time

Thus the coincidence rate in an "irradiated" particle for the time when this particle's G-marked FLE flips again is $N_c = \psi_r n_p 2\tau$, where ψ_r is the flow [s^{-1}] of

gravitons through the particle's G-marked FLE; n_p is the particle's G-marked FLE's flip rate (is equal to the particle's algorithm tick rate/ frequency ω

So $\psi_r = \frac{m_1 c^2}{\hbar} \frac{2\pi l_P r}{4\pi r^2} = \frac{m_1 c^2 l_P}{2\hbar r}$, and the coincidence rate in a "irradiated" particle

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

P_G is some probability of interactions. if some other physical effects act. Since the

Plank length is equal $l_P = (\frac{\hbar G}{c^3})^{1/2}$, for P_G =1 we have $N_{c12} = \frac{G m_1 m_p}{\hbar r}$

That is evidently true for arbitrary non-extreme masses, i.e. $N_{c12} = \frac{Gm_1 m_2}{\hbar r}$

Note that the masses m_i , m_p and m_2, in the equations above are the **inertial masses**. From above it is evident also that Gravity action is in this case symmetrical, and so $N_{c12} = N_{c21}$

The number of elementary momentums that are transmitted to the "radiated" masses in 1s is $\frac{dP}{dt}$ i.e. the force that acts to the masses, absolute value of which so is equal $F_g = N_{c12}\frac{\hbar}{r} = N_{c21}\frac{\hbar}{r} = \frac{Gm_1 m_2}{r^2};$ $\vec{F}_{g12} = -\frac{Gm_1 m_2 \vec{r}}{r^3} = -\vec{F}_{g21}$

- i.e. the force in Newton Gravity law, where the masses are **gravitational masses**

The potential gravitational energy of the system of two bodies, defined here

in the informational model, E_{gs}, is as $E_{gs} = -\frac{1}{2}\hbar(N_{c12} + N_{c21}) = -\frac{Gm_1m_2}{r}$

- i.e. the energy is the gravitational mass defect, which in the statics is

equally divided between the bodies: $\Delta E_{gs1} = \Delta E_{gs2} = -\frac{Gm_1m_2}{2r}$

From Eqs. above it follows that **at statics** ***the gravitational and the inertial masses of a body are completely equivalent,*** since both "are created" by the same algorithms tick rates, ω, of particles that compose the body.

Note, however, that in this case some "1/2" problem appears, i.e. – the condition that to obtain true value of the gravitational mass defect in every body is necessary for the coincidence rate in the body to be twice lesser then for the corresponding gravity force

however in this – the statics – case this problem really doesn't exist, since in statics the gravitationally coupled bodies are impacted also by other forces, which fix the bodies in their static positions.

From above follows that the intrinsic processes in both bodies become be slowed on the half binding energy/gravitational mass defect (divided by $\hbar$, of course).
If the mass, *M*, of one of the bodies is much greater than the other mass, *m* , the relative decrease of the lesser body's algorithm frequency is $\delta\omega = \frac{GMm}{2\hbar r}\frac{\hbar}{mc^2} = \frac{GM}{2rc^2}$

Correspondingly, if the body-2 is a clock, the clock's showing becomes be slowed down in $\frac{GM}{2rc^2}$ times, what is two times lesser then that is predicted in the general relativity theory.

If a pair of clocks are placed on different radii from M , r , and $r + h; h << r$ in a gravity field (left Figure below)

Two experiments that specifically test this Gravity model

Clocks on different heights in Earth gravity in Pound-Snyder-Rebka experiment with Fe-57 gamma-photons, where sum of two fundamentally different physical effects is measured. This scheme can be used in the easy experiment when the upper clock, after synchronization with the lower clock, is slowly transported on the height *h*, and back, when only slowing of the clock tick rate in gravity is measured

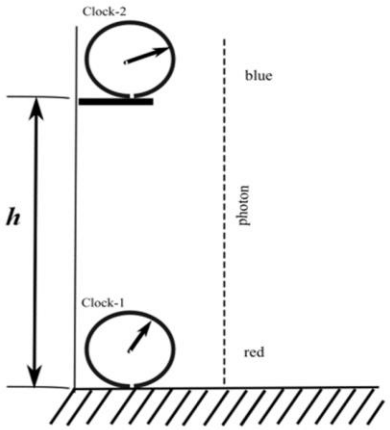


Figure 3

Measurement of monochromatic light beam disturbance at interactions of photons with circular gravitons of Earth Gravity field, when so the quantum nature of Gravity Force can so be observed.

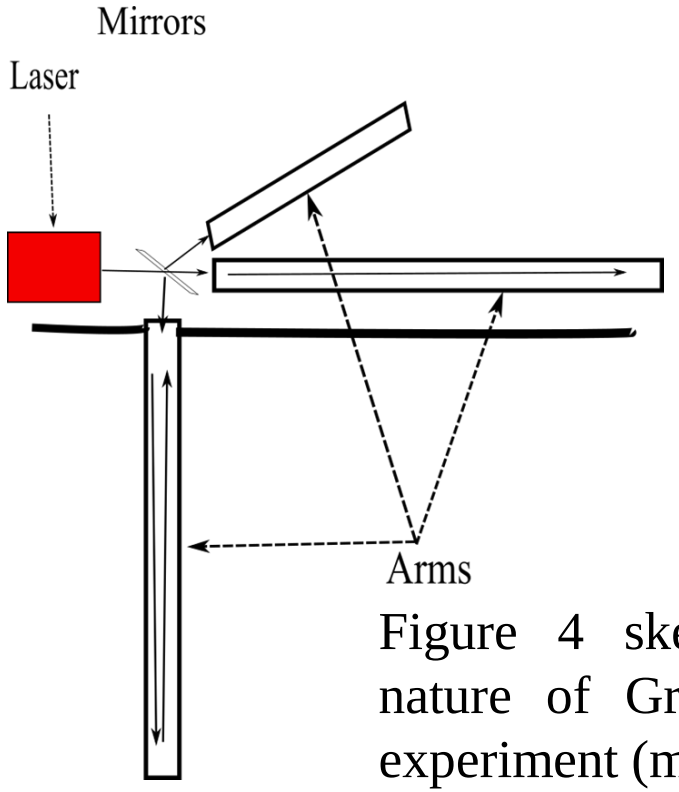


Figure 4 sketch of quantum nature of Gravity observation experiment (more below

then their relative tick rates differ as $\delta\omega_1 - \delta\omega_2 = \frac{GM}{2c^2}(\frac{1}{r} - \frac{1}{r+h}) \approx \frac{GMh}{2r^2c^2}$

For Earth surface $\delta\omega_1 - \delta\omega_2 \approx \frac{gh}{2c^2}$, where g is the free fall acceleration. In GR the clocks' rates difference is two times more $\delta\omega_1 - \delta\omega_2 \approx \frac{gh}{c^2}$

This difference was measured yet in 1960-s in well known Pound-Rebka-Snider experiments, and was in full accordance with GR; whereas in this model it is postulated that all/every particles, including photons, have gravitational masses, and so in the **PRS experiments really sum of two fundamentally different physical effects – real red/blue shifts of photons, and real different slowing down of Fe-57 nuclei tick rates were measured.**

In GR it is postulated that photons don't change energy/frequency at propagating in Gravity, and so PRS experiments results are in full accordance with GR

The problem – what is correct, GR or this model - can be experimentally solved only in experiments, where only one of possible impacts on intrinsic processes is measured. Now such rather easy experiment is possible – for that it is enough to measure elapsed time intervals of preliminary synchronized in one point clocks, after the clocks were placed on different on 400-500m heights on Earth, for example in a skyscraper:

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

On the tick rates two effects impact:

-“kinematical" slowing down because Earth rotation that is proportional reverse Lorentz factor $(1-v^2/c^2)^{1/2}$, v is the speed of the clocks ~ 400m/s near equator, the difference of the frequencies for different heights, H, is ~ $1.5\text{x}10^{-27}$ $2\pi RH$, and so near equator and for H=500 m ~$3\text{x}10^{-17}$,

- and the gravitational impact, in this case the difference because of the gravitational impact is ~$5\text{x}10^{-14}$, i.e. on 3 orders by magnitude larger, and so the kinematical contribution above is negligible.

Thus after 1-hour duration the difference of the clocks elapsed time showings will be ~$3.6\text{x}10^{-10}$, if GR is correct, or two times lesser, if this model is correct, the measurement of such time intervals isn’t a too hard problem now. The experiment can be made in a week.

Quantum Gravity

In the model above the quantum nature of Gravity follows directly, and it looks as rather natural also that after this initial model will be developed at least on the level of classical electrodynamics, the QM gravity formalism will be developed as well – as that happened with classical electrodynamics, when "QM electrodynamics", i.e. as the Dirac equation, and QED were developed.

Nonetheless yet now from the above it follows the principal possibility of observation of quantum gravitational effects, corresponding experiment was proposed yet in 2007, where it is proposed the measurement of monochromatic photons beam gravitational distortion using an interferometer with at least two arms, one of which is parallel, and other is vertical relating to Earth surface; arms lengths ~ 300-500 m, the sketch was sown on Figure 4 earlier.

Initial model of Gravity Force, stationary field, free fall

Here we consider (in the absolute frame that is at 3D space rest in the absolute Matter's spacetime, where [in the frame] all parameters of everything in Matter have real values) utmost simple, however important, free fall motion of bodies in a free closed system, where the bodies have rest masses M_0 and ("test mass") , m_0 $M_0 >>> m_0$; say, m_0 is mass of proton, and, besides, the consideration will be based on, first of all, two propositions that were formulated by Ronald R. Hatch in his "modified Lorentz ether theory (MLET)" of Gravity. The first position is that

"….the source of gravitational energy is the rest mass energy of the particle – not the curvature of spacetime…..Gravitational force converts gravitational potential energy (rest mass energy or structural energy) into kinetic energy when a particle falls and vice versa when a particle rises…",

- and the second one is that at a particle motion gravitational and inertial masses aren't equivalent, and gravitational mass, $m_{g,}$ is lesser than the inertial mass, m_i, in inverse Lorentz factor,

$$m_g = m_i(1 - v^2 / c^2)^{1/2}$$

These, well rational, and so rather probably really correct and really foundational, propositions have rather questionable base in MLET, however are in full accordance with this initial Gravity model. Indeed, as that is pointed above, a circular graviton is radiated by the G-marked FLE of a particle as the ether FLE that has kinematical angular momentum be equal $\hbar$, and the "precessing momentum in g-dimension" be equal to

$$\vec{p} = \frac{\hbar \vec{l}_p}{l_p^2}$$

Further this “point” transforms into the rim of flipping ether FLEs, where the “precessing momentums in *g*-dimension” angle decreases

so that $\vec{p} = \frac{\hbar \vec{r}}{r^2}$ in the 6D spacetime, and are orthogonal in all 3D space directions to the rim’s circle, i.e. the corresponding ether FLE flipping points propagate in the 3D space **along strait lines relatively to the starting point, and so have zero energy (i.e. the circular gravitons aren’t particles**).

However, if such flipping ether FLE hits the irradiated particle's flipping G-marked FLE, the particle's FLE obtains the momentum above, at that its "kinematical" precession angle decreases, so the particle's algorithm becomes be longer and so runs slower, i.e. the inertial mass of the particle in the Gravity field decreases – what is observed as the gravitational mass defect, which is in statics also inertial mass defect.

By another word the irradiated particle in a Gravity field – which is the flow of circular gravitons – moves in the ether like a human swims in water, spending for that his own energy.

As well as the relation between inertial and gravitational masses above becomes to be quite natural – if a having rest mass (T-particle, all material objects are made from which) particle, the algorithm of which ticks with maximal rate when the particle is at absolute 3D space rest, and so moves only along the $c\tau$-axis with the speed of light,

moves also in the 3D space with a speed V, the algorithm's FLE sequence is "diluted" by "blank space" ether FLEs, becomes be longer, and the algorithm's tick rate ω decreases in the Lorentz factor. So the moving particle lives longer, and, besides, so the rate of radiating by the particle circular gravitons decreases in Lorentz factor as well.

In the considered here closed system the system's whole energy, *W*, is equal

$$W = E_M + E_p - U$$

Where E_M is energy of the having inertial mass *M* body, further "energy of M", E_p

is energy of particle, U is the potential energy of the system. Here we consider the case, when firstly the masses are on infinite distance and so

$$W = M_0 c^2 + m_0 c^2$$

since gravitational potential energy U=0, but if the mass *m* after some negligible impact starts to move to *M* under gravitational force, the mass *M* practically remains at rest, its energy changing is negligible.

So the particle's energy, because of the energy conservation law, remains at the motion to be equal always to m_0c^2 and W becomes to be as

$$W = M_0c^2 + E_p - E_{diss}$$

Where E_{diss} is an energy that, in principle. can be dissipated from the system at the motion, say, when the mass m radiates "ordinary" gravitons at its acceleration, the energy of mass m is

$$E_p = \frac{m_i c^2}{(1-\beta^2)^{1/2}} \ , \ \beta \equiv \frac{V}{c}$$

V is the 3D the particle's speed.

if, as that is suggested here, E_{dis} is negligible, at least in first approximation so we have

$$\frac{m_i c^2}{(1-\beta^2)^{1/2}} = m_0 c^2$$

$$m_i = m_0 (1-\beta^2)^{1/2}$$

$$m_g = m_0 (1-\beta^2)$$

The "own" particles energy is spending, since circular gravitons act only in 3D space direction, as converting it into increasing the particle's kinetic energy

$$E_k = E_p - m_i c^2 = \frac{m_i c^2 [1-(1-\beta^2)^{1/2})}{(1-\beta^2)^{1/2}} = \frac{GMm_i}{r}(1-\beta^2)^{1/2}$$

For the force that acts on the *m* we have $F_g = -\frac{GM\vec{r}}{r^3} m_0(1-\beta^2)$

And for $(1-\beta^2)$ obtain ($a = \frac{GM}{rc^2}$)

$$(1-\beta^2) = \frac{1+2a-(1+4a)^{1/2}}{2a^2} \quad ;$$

For $\frac{GM}{rc^2} << 1$

$$(1-\beta^2) = \frac{1+2a-(1+4a)^{1/2}}{2a^2} = \frac{1+2a-(1+2a-2a^2+4a^3\ldots)}{2a^2}$$

$$\approx (1-2a)$$

and so $\beta \approx (\frac{2GM}{rc^2})^{1/2}$

From this it follows that particle on Schwarzschild radius $R_g = \frac{2GM}{c^2}$

distance is as has speed that is equal to the speed of light, and so the approach above for distances r near and lesser than R_g isn't applicable, including gravitational and inertial masses aren't in accordance with the simple relation above.

The case of small r. All that above so is valid only in rather weak fields, when the equations above are valid *for sure* only till the Newton Gravity law is valid, whereas if *r* decreases, and in statics, say if $r = R_g$ the relative coincidence rate N_{c12} in a "irradiated" particle in Eq. (2.13) is 0.5 of the particle algorithm's frequency, at $r = \frac{GM}{c^2} \equiv R_N$ R_N is the Newtonian analogue of R_g, i.e. that is the radius of a surface, where the escape velocity is equal to the speed of light in the Newton's Gravity, the number of circular gravitons impacts is equal to the particle algorithm's ticks rate, i.e. the particle's mass defect is equal to m_0 at all, what looks as is too strange.

At that, though, if the radiated circular gravitons impacts have Poisson distribution, then rather essential part of the impacts happens as multiple, k, events at the same the irradiated particle's algorithm's FLE tick, though the average N_{c12} remains as in Eqs. above $N_{c12} = (\sum_{k} \frac{k(2n_1\tau)^k e^{-2n_1\tau}}{k!}) n_2 = 2n_1 n_2 \tau$

What happens at multiple events, when same flipping G-marked FLE in irradiated particle is more than 1 time impacted at this FLE's flip? - isn't known now – though application of the couple of last Eqs. rather probably will clarify this point to some extent.

So, for example, if we define the radius r as measured in "R_N units", as, let,

$r = \alpha R_N$ than, though for α ~2 and lesser the consideration above looks as rather uncertain, especially in statics, however we can hope that even this application will result in at least a zero approximation picture,

including, say, about what happens below the event horizon of Sagittarius A*, where, even if the central compact object would be a big neutron star, α is ~10^{-4}. Besides note, that though any falling particle in statics for sure adds to any M-object only whole energy $E = m_0 c^2$ after the particle stops in

the object on the radius α <1, when N_{c12} becomes too essentially large, some particles, nonetheless, can, in principle, exist – having at that their "sizes" – Compton lengths $\lambda = \frac{\hbar}{mc}$ be $\lambda \sim \alpha \frac{GM}{c^2}$ i.e. rather macro lengths

[that is essentially a joke, tough, nobody now knows what happens if α <1].

For α well more 1, say, more 5 – in the neutron stars, this effect isn't too essential, and particles remain be ordinary ones, including rather probably protons indeed transform into neutrons, etc.

Initial model of Electric Force, statics

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

In this model it is assumed that that happens because of the widths of "circular

photon" rims, which are radiated by "radiating" electric charge, W_1 , and of the "receiving part" of the activated E-marked FLEs in "irradiated" E-charged

particle's algorithm, W_2 , are much more than the Planck length "widths" of only one fixed G-marked FLE in particles' algorithms in the gravity case.

In the rest the model is the same as that is above in relation to Gravity statics model, and so we show here the analogue equation for the coincidence rate of events when circular photons hit flipping E-marked FLEs in irradiated particle

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

Under rather plausible conjectures that: $\tau_E = W_2 / c$, $W_1 = \alpha^{1/2} \lambda_1$, $W_2 = \alpha^{1/2} \lambda_2$

Where λ_1, λ_2 are the Compton lengths of the particles; P_E =1; and

α is the fine structure constant,

we obtain from Equation above that electric potential energy of the two-charge system is

$$U_E = \hbar \cdot N_{cc21} = \frac{\alpha \hbar c}{r} = \frac{e^2}{4\pi\varepsilon_0 r}$$

and for the electrical force in the statics obtain (the lower term in the Equation is for arbitrary charges).

$$\vec{f}_E = \frac{d\vec{p}}{dt} = N_{cc21}\vec{p}_0 = \frac{e^2\vec{r}}{4\pi\varepsilon_0 r^3}$$

$$= \frac{q_1 q_2 \vec{r}}{4\pi\varepsilon_0 r^3}$$

Note, that in the equations above we suggest, as that was for circular graviton above, i.e. that the elementary momentum, which is transferred

at the elementary interaction is $$\vec{p} = \pm\frac{\hbar\vec{r}}{r^2}$$

Note that, as what was obtained above for gravity, all what is true in Gravity model, first of all that circular photons aren't particles, and so don't carry some energy, is true in the Electric Force case. However, unlike Gravity, in this case we cannot for sure suggest that at slowing down of the internal processes in electrically charged particles motion the charge decreases in the Lorentz factor, moreover, in classical electrodynamics it is postulated that the electric charge is invariant at motion.

Note, also, that from this E-model follow a couple of important consequences:

From the equation for potential energy equation it follows the explanation of physical puzzle

"Why $\alpha\hbar c = e^2 / 4\pi\varepsilon_0$?",

-– whereas in this equation fundamentally different in physics fundamental and universal for everything in Matter constants – the fundamental elementary action, the speed of light, and the specific for only one fundamental EM Force, the elementary electric charge are united,

and , in the model (more see the reported paper) it is proved that

– magnetic monopole doesn't exist.

It also seems quite rational to suggest that the magnetic force is a specific actualization of the electric force, when the ether FLEs in circular photons that are radiated by a moving charge obtain additional momentum proportional to the spatial speed of the charge, including because that FLEs in radiating particles are additionally precessing in the 4D kinematical space at motion along, say, *X*-axis, and rotated in the $(X, c\tau)$ plane (more see sections 2.3., 2.4. in [5a])

- so the flipping ether FLEs in circular photons, though aren't transformed into a particle at inertial motion, nonetheless become additional precessing in the "kinematical" 4D space as well.

And when they hit an E-marked FLE in another charged particle, they transmit to this particle an additional momentum, which, if the "irradiated" particle is at spatial rest, is orthogonal to momentum that would be transmitted if both charges are at rest, i.e. to direction of the radius-vector between the charges,

what is observed as "magnetic force".

If both (all in other cases) charges move with the same velocity, their FLEs are "kinematically" precessing identically, and so in such systems only electric Coulomb interactions are observed.

Strengths of Gravity and Electric Forces

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

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

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

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

From this example **it follows also that the postulate in the model that main FLE parameters are Planck length and Planck time is correct.**

Finally point the main inferences that follow from the presented model of Gravity and Electric Forces, besides a number of others that are underlined earlier:

(i) there is no any fields' energy flows, correspondingly there is no any energy densities, no some "electromagnetic masses", no QED energetic "virtual photons flows" etc.;

(ii) – both, Gravity and Electric, *fields* have no specific gravitational and electric charges and so *don't interact specifically* – really **only the charges, i.e. gravitational masses and electric charges in concrete systems interact**;

(iii) – real physical theories must be based on the postulate that really all fundamental Nature forces are mediated only by real mediators, and practically for sure the really non-mystic Gravity and Electric Forces theories should be based on these models above, and

(iv) – the developed here model of Gravity Force at free fall motion of comparatively small masses in gravity fields of material objects that have extremely large masses, first of all cosmological objects, allows to obtain a zero approximation description of what happens at small distances to the objects, including what happens below event horizons of SMBH.

Thanks for your attention.

- and, besides, since now in Kyiv electricity constantly and randomly disappear, including that can happen at the report, I would like to ask those participants, who have some questions to the reported model, to write the questions in the conference chat, so that I could to read and answer in the chat as well.