Ultra-high frequency gravitational waves.

Vladimir Pastushenko

http://viXra.org/abs/2311.0014

Abstract : There is a goal of the Ultra-High Frequency Gravitational Wave Research Initiative: “Gravitational waves at frequencies above 10 kHz inevitably arise from something outside the physics of the Standard Model, such as exotic astrophysical objects or cosmological events in the early Universe.” A very interesting goal, but with vague ideas about the causes of the appearance and properties of gravitational waves.

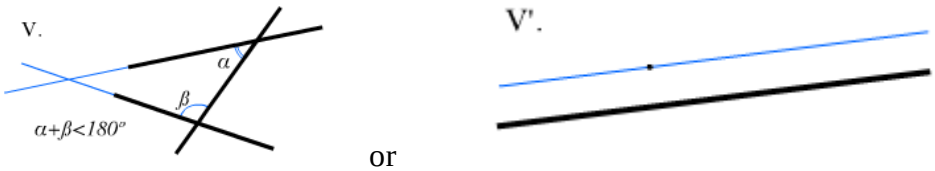
Yes, there is a fact and experiments in detecting gravitational waves, in this case, astrophysical objects. But what is a gravitational wave in this case? There is an understanding that this is a periodic superimposition of “gaps” in space, in the direction of the source of such gravitational waves, that is, the rotation of two connected massive astrophysical objects, neutron stars, “black holes”. It is even possible to build mathematical models of the rotation of massive spheres with a certain frequency, within the framework of certain equations. But mathematics answers the question HOW? And physics answers the question WHY? In the framework of Einstein's General Theory of Relativity, we are talking about the curvature of space-time near a source of energy-momentum, massive spheres in this case. And here many questions arise.

gravitational waves.

Einstein's equations describe fixed gravitational potentials at a given point in space-time, which correlates well with the fixation of the facts of gravity in experiment. But there is no answer why the gravitational potential arises. From the equation of Einstein's General Theory of Relativity, as a mathematical truth in dynamic space-matter, the equations of quantum gravity directly follow. And already in the direction of the source of gravity, we are talking about quasi- potential quantum gravitational fields of acceleration of mass trajectories. Their superposition from many (quantum) protons in a massive sphere forms the general gravitational field of accelerations, of the massive sphere in this case. The attentive reader has already noticed the words gravitational field of acceleration and mass trajectories in these fields. It is by the mass trajectories of the detector elements that we determine gravitational fields.

This is what can be done, and is being done, within the framework of the Euclidean axiomatics of space-time.

1. “A point is something of which nothing is a part”) (“Principles” by Euclid) . and is a Point something that has no parts,
2. Line - length without width.
3. And the 5th postulate about parallel straight lines that do not intersect. If a straight line intersecting two straight lines forms interior one-sided angles less than two right angles, then, extended indefinitely, these two straight lines will meet on the side where the angles are less than two right angles.



or

rice. 1 Euclidean axiomatics

That is, through a point outside a line, only one straight, parallel line can be drawn.

In the axioms of dynamic space-matter, we talk about a set of straight lines parallel to the original straight line within the always dynamic angle of parallelism.

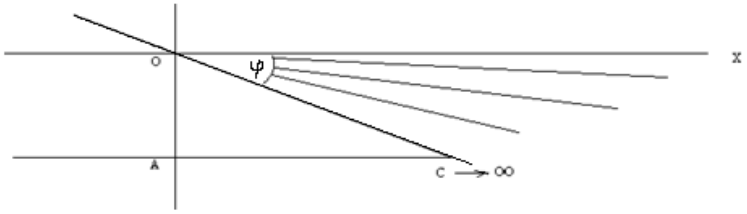


Fig.2 dynamic space of a bunch of parallel straight lines.

Parallel , which means isotropic, with the same properties in relation to the outside world (AC→ ∞). Within the dynamic angle of parallelism, we are talking about dynamic space as a form of matter, the main property of which is movement. There is no matter outside space and vice versa, there is no space without matter. From these facts = axioms, space-matter is one and the same . And a special case of a fixed state of dynamic space-matter is the space-time of all theories. The main property of dynamic space-matter is dynamic ($\varphi \neq const$) angle of parallelism. In this case, Euclidean space in the XYZ axes loses its meaning.

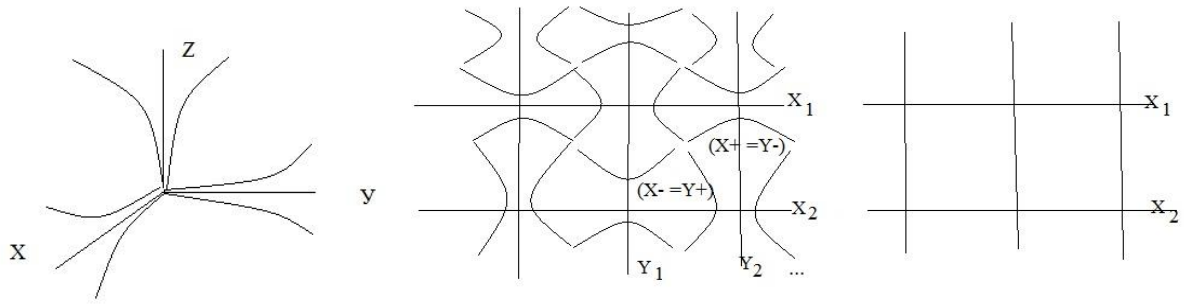


Fig.3 dynamic space-matter

Within the framework of the grid of Euclidean ($\varphi = 0$)axes, we do not see dynamic ($X+= Y-$)space ($X-= Y+$)-matter, and we will not be able to imagine it. Therefore, the axioms of dynamic space-matter are introduced as facts that do not require proof. The equations of Einstein's General Theory of Relativity describe fixed gravitational potentials. In quantum fields, such fixation is accompanied by one or another probability of manifestation of any Criteria for the Evolution of a quantum field, within the framework of the wave function of the quantum field. In classical ideas we talk about electro (Y + = X -) magnetic fields in Maxwell's equations, with corresponding electromagnetic waves, within the framework of space-time, a special case of space-matter. Within the framework of the axioms of dynamic space-matter, the equations of electric dynamics are derived in a single mathematical truth o (Y + = X -) magnetic and gravitational (X + = Y -) mass fields.

$c * rot_Y B(X-) = rot_Y H(X-) = \varepsilon_1 \frac{\partial E(Y+)}{\partial T} + \lambda E(Y+)$ $rot_X E(Y+) = -\mu_1 \frac{\partial H(X-)}{\partial T} = -\frac{\partial B(X-)}{\partial T}$;	$c * rot_Y M(Y-) = rot_Y N(Y-) = \varepsilon_2 * \frac{\partial G(X+)}{\partial T} + \lambda * G(X+)$ M(Y-) = $\mu_2 * N(Y-)$; $rot_y G(X+) = -\mu_2 * \frac{\partial N(Y-)}{\partial T} = -\frac{\partial M(Y-)}{\partial T}$;

Therefore, based on the properties of dynamic space-matter, like the fixation of electromagnetic waves in the field of the Universe, we must talk about the fixation of gravitational mass waves, in any form, depending on their source. The fact that gravitational waves have already been recorded in experiments is, figuratively speaking, “waves on water” in space-matter. There are no properties of “water”, and there are no properties of “water molecules”. There is no answer to the question of why any classical or quantum gravitational fields arise. And by answering these questions, we can answer the questions of what we are looking for and how we will look.

Judging by the focus of the search for high-frequency gravitational waves on astrophysical objects as sources of such waves, we can talk about the dynamics of rapidly rotating objects, which is logical. Model such objects, their dynamics, calculate the properties of high-frequency gravitational waves, detector elements, and the principles of recording such waves. This is like a new source of information about the Universe. And it is doubly interesting to test this or that theory, with access to such realities. And this is like the moment of truth of this or that theory, say, how it works in dynamic space-matter.

The source of the gravitational field, in all cases, is its potential, that is, acceleration along the length. And the carrier of such gravitational potentials is energy-momentum in Einstein’s equation. This interpretation allows for zero mass ($m^2c^4 = E^2 - p^2c^2$) at the center of the “Black Hole”, in the presence of its energy and momentum equivalent to the mass of the “Black Hole”, like the zero mass of a photon quantum. These are very confusing concepts of the Euclidean axiomatics of space-time, and they do not answer the question of why this is so. There is inertial mass, gravitational mass, mass of particles from vacuum energy, rest mass... multivariate mass. And the question of gravitational, and also high-frequency waves from such masses, is very uncertain.

Within the framework of dynamic space-matter, instead of the “Black Hole”, in which Einstein’s theory simply does not work, we are talking about “Black Spheres”, into whose space-matter we cannot get. Such “Black Holes” attract and stretch masses, but do not absorb matter, even photons. Photons circle around such “Black Holes” without penetrating inside, just as a photon flying in the Universe does not penetrate deep into the physical vacuum, with non-zero energy.

If we are talking about ultra-high-frequency gravitational waves, without delving into “Black Holes” and into the nuclei of galaxies, into the “black spheres” wandering in galaxies, then we can check their presence in simple experiments on Earth . Within the framework of the properties of dynamic space-matter, it is possible to check the presence of quantum gravitational acceleration fields (Fig. 4).

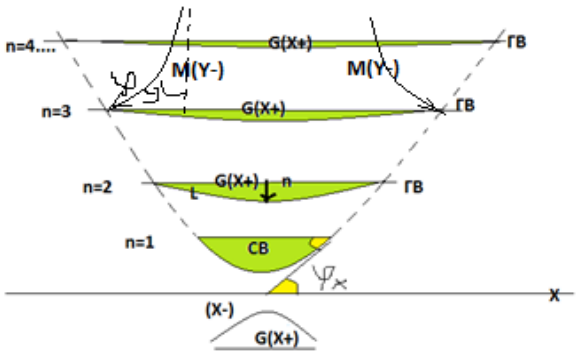


Fig. 4 . Quantum gravitational fields.

The essence of the experiment is to pass a photon through quasi -potential quantum gravitational fields of acceleration, for example $^{4}_{2}\propto$- particles, helium nuclei, or deuterium, or tritium simple nuclear structures. These are the levels of mass G (X + = Y -) trajectories of electronic (Y - = e^{-}) orbits of the atom . But these are precisely high-frequency (up to 10^{22} Hz) quantum gravitational fields, which correspond to the goals of the experiment.

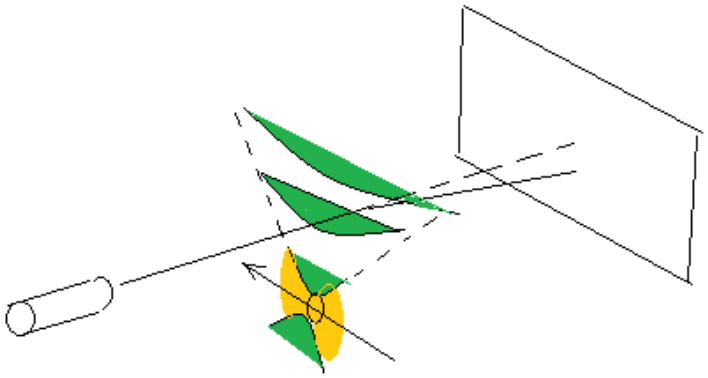


Fig. 4.1 Quantum gravitational fields.

By passing $^{4}_{2}\propto$particle nuclei through a beam of photons, on the screen we will see the curvature of photon trajectories around the nucleus, similar to the curvature of light rays around the Sun. But here we can take the characteristics of the curvature of the trajectories of individual photons, in the parameters of the quantum gravitational field.