International Journal of Advanced Research in Physical Science (IJARPS)
Volume 8, Issue 7, 2021, PP 7-14
ISSN No. (Online) 2349-7882
www.arcjournals.org

Wakefield -The Real Mechanism Overcoming the Warp Barrier in the Forvator of Superluminal Gravitational Waves

S.I. Konstantinov*

Department of Physical Electronics, Herzen State Pedagogical University of Russia, St. Petersburg , RSC "Energy", Russian Federation.

Corresponding Author:** ***S.I. Konstantinov, *Department of Physical Electronics, Herzen State Pedagogical University of Russia, St. Petersburg , RSC "Energy", Russian Federation.*

Abstract: *The article proposes, it is proposed to use the Wakefield accelerator to accelerate spacecraft to superluminal speeds using longitudinal gravitational waves. Within the framework of the new physics, the complete equation of the field, taking into account the polarization medium of the quantum vacuum (dark matter), presented by Professor of the Institute of Mathematics of the Russian Academy of Sciences V. Dyatlov, allows solving the problem of overcoming the Warp barrier by a spacecraft based on gravitational waves, contrary to the prohibitions of Einstein's general theory of relativity.*

Keywords: *Warp Drive, gravitational wave, Wakefield, surfing, dark matter*

PACS: *01.10.Fv, 04.50.-h, 12.10.Kt, 95.36. + X*

1. INTRODUCTION

Today, space researchers are faced with the question of interstellar and intergalactic flights, for the implementation of which warp engines are needed, which will actually allow pilots to move through the space of the Universe at a speed exceeding the speed of light. Since 1994, when the Mexican physicist Miguel Alcubierre published his work "Warp Drive: Ultrafast Travel in the Framework of General Relativity" [1], researchers have proposed dozens of projects for Warp Drives, the latest of which is the article by German physicist Eric Lenz "Overcoming the Warp. Barrier: Ultrafast Solitons in Einstein-Maxwell Plasma Theory "[2] published on August 11, 2020 and the article" Introduction to Physical Warp Engines "by researchers from the New York Laboratory of Applied Physics of Advanced Engines Alexey Bobrick and Gianni Martyr (Gianni Martire) published on April 20, 2021 [3].

However, in the framework of the General Theory of Relativity of Albert Einstein, namely in this framework, all the discussions about the Warp engine and the movement of spacecraft with superluminal speed go, Einstein's postulates have not been canceled. Pointing to this, physicists Alexey Bobrick and Gianni Martire rightly note that "the soliton shell of the Alcubierre type with a radius of 100 m in the article by Eric Lenz is also a material object and for it, like for any other body, are true limitations of general relativity. In addition, it will not be possible to disperse superluminal warp engines by the methods known to physics "[3]. In fact, at the beginning of the 20th century, Einstein declared Minkowski's four-dimensional geometric space to be a mathematical model of the space-time STR, and later, in 1915, he extended it to the entire Universe in General Relativity as the theory of gravity. In 1917, Albert Einstein introduced the cosmological constant, a dimensionless constant, into the equations of general relativity to counter the forces of gravity in the universe [4]. The cosmological constant, a physical constant characterizing the properties of the vacuum, was introduced by Einstein so that the equations of general relativity admit a spatially homogeneous static solution as a counteraction to gravitational attraction, which can lead to the collapse of the Universe, in which all matter will gather at one point. Thus, the cosmological constant should perform the function of antigravity (repulsion). In Newton's universal law of gravity, there are two forces: the forces of gravity and inertia, which control the motion of planets in a heliocentric solar planetary system. The same forces of gravity and antigravity in Einstein's general theory of relativity should

have formed a stationary universe. Researchers of the nature of gravitational forces can be conditionally divided into two groups - those who continue to search in line with the geometric approach underlying the general theory of relativity and those who refuse to connect the gravitational field with the geometry of space-time and develop the field concept of gravity. German physicist Erik Lenz in his article "Overcoming the Warp Barrier: Ultrafast Solitons in the Einstein-Maxwell-Plasma Theory" connects the gravitational field with the geometry of space-time and tries to extend these concepts to construct a class of soliton solutions capable of superluminal motion, while the author believes that solitons can be obtained from the voltage energy of a conducting plasma in classical electromagnetic fields. Einstein himself was dissatisfied with this separation of geometry and matter in the equations of general relativity. Indeed, the shape of the mathematical tensor was the result of subtle geometric considerations, while the stress tensor, which determines the "source" of spacetime curvature, is described in terms of macroscopic concepts of pressure and energy density. In an article published in 1936, Einstein compared his general relativity equations to a building with one wing built of precious marble and the other of cheap wood [5]. Likewise, the theory of the physicist Eric Lenz has two wings: one of which is the result of subtle speculative conclusions, and the second is based on the macroscopic concepts of pressure and energy density. At the same time, the author forgets that today astrophysicists have established that dark energy and dark matter form a galactic and intergalactic environment, which account for 95% of the average density of matter in the universe [6]. Dr. Jamie Farnes from Oxford University in 2018. proposed to combine dark energy and dark matter into a single fluid, which makes up 95% of the observable universe. His model can predict the observed behavior of a dark matter halo - an invisible tissue that keeps galaxies from bursting and forms dark matter halos with properties similar to those inferred from observations of modern radio telescopes [7]. In a superfluid galactic medium of dark matter in new cosmological models, there is a violation of the strong principle of gravity [8]. The macroscopic approach, in which the hydrodynamic attachment of mass to spherical bodies of any nature (including charged clusters) in superfluid dark matter, was outlined by Stokes a century ago, changes the concept of geometric gravity. We are talking about a complex force F (ω), acting from the side of the liquid on a sphere of radius R, performing periodic oscillations with frequency ω. Within small Reynolds numbers, we have [9]:

$$\boldsymbol{F}(\omega)= 6\pi\eta R\left(1+\frac{R}{\delta(\omega)}\right)V(\omega)+3\pi R^2\sqrt{\frac{2\eta\rho}{\omega}}\left(1+\frac{2}{9}\frac{R}{\delta(\omega)}\right)i\omega V(\omega), \quad (1)$$

$\delta(\omega) = (2\eta/\rho\omega)^{1/2}$

where ρ - fluid density, η – viscosity, V - velocity amplitude sphere, δ (ω) - the so-called viscous penetration depth, which increases with an increase in viscosity and a decrease of the oscillation frequency.

The real part of the expression (1) is a known Stokes force derived from the movement of fluid in the sphere. Imaginary component (coefficient of iωV) is naturally identified with the effective mass of the cluster added:

$$Meff\ (\omega R) = \frac{2\pi\rho R^3}{3}\left[1+\frac{9}{2}\frac{\delta(\omega)}{R}\right] \quad (2)$$

Origin added (attached) mass Meff (ωR), depending on the frequency ω and the radius R of the sphere of the cluster associated with the excitation of the field around a moving cluster of hydrodynamic velocity υ_i (r) and the appearance in connection with this additional kinetic energy. In superfluid, additional mass has two components: superfluid and normal [9]. The weight of the body increases and at the same time, there is no question of any change in the radius of curvature.

One may wonder why the authors of recent astrophysical work and discoveries constantly point to the presence of the cosmic fabric of space-time in the Universe? So the last discovery of Dr. Vivek Venkatraman Krishnan, an astrophysicist from the Max Planck Institute for Radio Astronomy in Bonn, (Germany), the rotation of space-time around a white dwarf in the PSR J1141-6545 binary star system (Fig. 1) is interpreted by them as a new proof of the correctness of Einstein's theory [10].

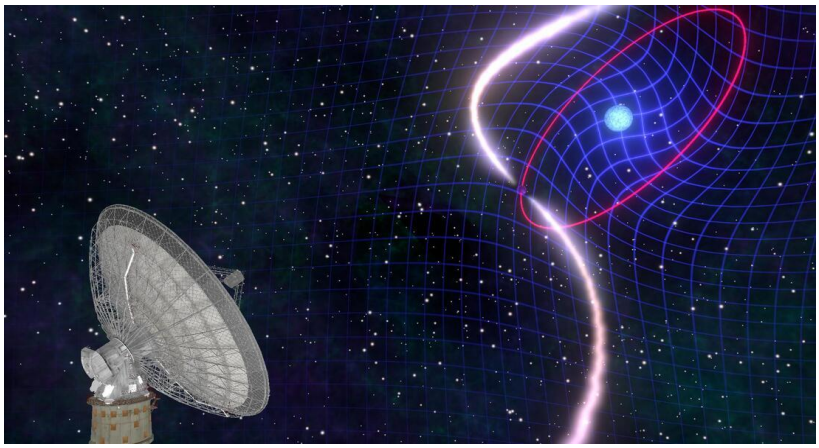

Figure1. *The illustration of Lense-Thirring frame-dragging resulting from a rotating white dwarf in the PSR J1141-6545 binary star system.*

However, astrophysicists have established that a halo of dark matter forms spheres around galaxies, stars and planets that rotate with them (Fig. 2) [11].

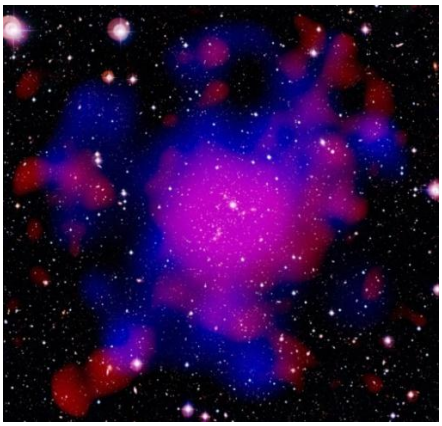

Figure2.*Components of the cluster of galaxies Abell 2744. White color - galaxies, red color - hot gas and blue color - dark matter.*

The observations of astrophysicist Vivek Venkatraman Krishnan on January 30, 2020 buried the results of the Michelson-Morley experiments, and with them Einstein's Special Theory of Relativity, since the presence of a halo of dark matter (ether) rotating with the Earth leads to the absence of a shift of interference fringes in the Michelson-Morley experiments 1881-1887 [nine]. Today we can say with confidence that the cosmic fabric of space-time is made of the same material as the clothes of the naked king in the tale of the Danish writer Hans Christian Andersen "The new costume of the king" [12]. But why do all astrophysicists sense its presence? The outer space of the Universe is 95% filled with dark matter, which does not emit electromagnetic radiation and does not interact with it directly. This property complicates and, perhaps, even makes it impossible to directly observe dark matter. But astrophysicists feel its presence and influence on all processes occurring in the Cosmos with ordinary (baryonic) matter, which is about 5% in the Universe. This is why the cosmic fabric of space-time took root in science at the suggestion of Albert Einstein.

2. WARP DRIVE IN THE FRAMEWORK OF NEW PHYSICS

The latest astrophysical discoveries suggest that a spacecraft will have to fly in the vastness of the galaxy, deforming not the ephemeral fabric of space-time, but the physical environment of dark matter, exciting and polarizing it. According to observations from the Planck Space Observatory, published in March 2013, the observable universe consists of:

- dark energy (68.3%);

- dark matter (26.8%);

- baryonic substance (4.9%).

Dark energy and dark matter form the galactic and intergalactic environment, which account for 95% of the average density of matter in the universe [6].

For dark matter, the generalized Lamé vector wave equation is valid. This equation is equivalent to two simpler wave equations that describe two types of elastic waves: longitudinal waves, which propagate with the phase velocity Vp, and transverse waves with the phase velocity Vs. These can be gravitational, electromagnetic and torsion waves. The propagation speed of longitudinal waves is higher than that of transverse waves [13]. Gravitational waves can be attributed to longitudinal waves, since, according to Laplace's calculations, their speed should exceed transverse electromagnetic waves by at least 7,000,000 times. Otherwise, the slowed gravity of the Sun ceases to be strictly central, and the planetary system collapses very quickly due to the cyclic torque [14]. In the work "Elastic model of physical vacuum" Professor V.A. Dubrovsky in 1985 presented an estimate of the speed of gravitational waves based on the fact that the ratio of the interaction forces according to the Coulomb's law for transverse electromagnetic waves and longitudinal gravitational waves is determined by the ratio of the corresponding elastic moduli, which is equivalent to the ratio of their velocity squared. Hence it follows that the speed of gravitational waves exceeds the speed of electromagnetic waves by a factor of 10 [15]. In 1994, when on July 16, 1994, the great nucleus of comet Shoemaker-Levy collided with the gas sphere of Jupiter, radial oscillations generated surface gravitational waves that instantly caused oscillations in several geodetic satellite command and measurement complexes in Russia. As a rule, geodetic satellites orbit inside a tube with a diameter of about 1 km. And their orbit control is carried out with very high accuracy - the error in the coordinate is up to 1 meter, and the error in speed is up to 1 cm / sec. During the collision, the diameter of the pipe trajectory increased by a factor of 5–8. Unfortunately, the author does not have similar information from the USA from NASA. The speed of gravitational waves, formed during the collision of a comet with Jupiter, significantly exceeded the speed of electromagnetic waves (the propagation of light from Jupiter to the Earth is 43.2 minutes). Here, it should be noted that experiments on the study of longitudinal gravitational waves in plasma-like media both in laboratory conditions and in outer space are carried out using methods and recording equipment developed for receiving transverse electromagnetic waves. Visible space contains more than 90% of matter in a plasma state, in which various types of longitudinal waves arise. The generation of longitudinal waves of huge intensity is especially strong during the collapse of stars or their explosive evolution, for example, the formation of new stars and supernovae, when powerful ejections and streams of plasma are formed. During these processes, charge separation occurs, leading to the generation of longitudinal waves. The same applies to the Sun, especially during cycles of activity. In ground and airborne detectors, waves are usually recorded as transverse electromagnetic waves, even when their longitudinal nature is known. It is believed that longitudinal waves are transformed into transverse ones at various plasma inhomogeneities, its boundaries, or due to various interactions with other waves. For reliable interpretation of gravitational waves in GW detectors, it is necessary to develop and develop specific methods for recording longitudinal gravitational waves.

Consider the famous "Einstein's field equation" that governs the behavior of general relativity. The left side describes the curvature of space-time, while the right side describes the distribution of matter [4]:

$$R\mu\nu - \frac{1}{2} g\mu\nu = \frac{8\pi G}{c^4} T\mu\nu \quad (3)$$

Where $R\mu\nu$ is the Ricci tensor;

$g\mu\nu$ is metric tensor of the event space;

$T\mu\nu$ is the energy-momentum tensor of matter.

Einstein talks about gravitational waves propagating in free space, which means that there is no matter, not even an electromagnetic field, therefore, the right side must be zero. Thus, the equation is simplified to $R\mu\nu - 1/2\ g\mu\nu R = 0$, which is equivalent to the more concise form $R\mu\nu = 0$, which is also known as "Einstein's vacuum field equation". Both EFE and VEFE are nonlinear partial differential equations, whereas in low field conditions they can be approximated by linear equations. The linear EFE is similar to other wave equations such as Maxwell's equations, so Einstein predicted the existence of a transverse gravitational wave and predicted that the speed of gravitational waves is

equal to the speed of light. However, there is no free space in galaxies, there is dark matter, which is five times larger than baryonic matter, and the right-hand side of equation (3) cannot be equated to zero [4]. Therefore, Einstein's predictions regarding the type and speed of gravitational waves in the new cosmology need to be refined. Einstein's prediction of gravitational waves was based on the linearization of his gravitational field equations, and he did not believe that they existed as solutions to the original nonlinear system of equations.

A more complete field equation taking into account the polarization medium of the quantum vacuum (dark matter) was presented in 1998 by V. Dyatlov, professor of the Institute of Mathematics of the Russian Academy of Sciences, in the article "Polarization model of an inhomogeneous physical vacuum" [16]. The new equations include the density of matter and its velocity as independent variables; their closure is possible only with the use of continuum mechanics. The region of quantum vacuum (dark matter), in which energy is accumulated, will be called a domain. The hypothesis of the existence of an inhomogeneous quantum vacuum (dark matter) in the form of vacuum domains allowed Dr. Vyacheslav Dyatlov, Professor of the Siberian Branch of the Russian Academy of Sciences, to combine the theory of Maxwell's electrodynamics and Heaviside's gravidynamics. This made it possible to determine the energy of a quantum vacuum domain (VD) in electric, gravitational, magnetic and spin fields [16]. Based on this, Dr. Vyacheslav Dyatlov suggests calculating the energy of a vacuum dipole (VD) as a four-dipole in four fields (E - electric, M - magnetic, G - gravitational, S - spin) in the following form:

$$W = W_E + W_G + W_M + W_S \tag{4}$$

Where

$W_E = -\mathbf{dE}_0$; $W_G = -\mathbf{d}_G\mathbf{E}_{0G}$;

$W_M = -\mu_0 \mathbf{l}_M \mathbf{H}_0$; $W_S = -\mu_{0G} \mathbf{l}_S \mathbf{H}_{0S}$.

d and $\mathbf{d}_G$ are two VD dipoles is electric **d** and gravitational $\mathbf{d}_G$

$\mathbf{l}_M$ and $\mathbf{l}_S$ are two VD moments is magnetic $\mathbf{l}_M$ and spin $\mathbf{l}_S$.

μ_0,μ_{0G} is magnetic and magnetospin permeability;

$\mu_0 = 1.257 \times 10^{-6}$ m· kg· c^{-2} ·A^{-2} $\mu_{0G} = 0.9329 \times 10^{-26}$ m · kg^{-1}

Generally speaking, the fields $\mathbf{E}_0$, $\mathbf{E}_{0G}$, $\mathbf{H}_0$, $\mathbf{H}_{0S}$ depend on the spatial coordinates, but they can be approximately considered constants within the domain. Consequently, the dipole forces acting on the quantum vacuum region, guided by the work of Academician Tamm [17], can be defined as follows:

$$\mathbf{F}_{DE} = -\nabla W_E; \tag{5}$$

$$\mathbf{F}_{DG} = -\nabla W_G; \tag{6}$$

$$\mathbf{F}_{DM} = -\nabla W_M; \tag{7}$$

$$\mathbf{F}_{DS} = -\nabla W_S; \tag{8}$$

Where

$\mathbf{F}_{DE}$ is the force acting on the high pressure as an electric dipole;

$\mathbf{F}_{DG}$ is the force acting on the VD as on a gravitational dipole;

$\mathbf{F}_{DM}$ is the force acting on the VD as a magnetic dipole (magnetic moment);

$\mathbf{F}_{DS}$ is the force acting on the VD as a spin dipole (spin moment);

∇ is the operator of the gradient [16].

These forces are involved in the fifth fundamental interaction between the quantum vacuum and baryonic matter. Dr. Jonathan Feng of the University of California, Irvine said in a 2017 press release: “For decades, we have known about four fundamental forces: gravity, electromagnetism, and strong

and weak nuclear forces. The discovery of a possible fifth force acting between baryonic and dark matter will completely change our understanding of the Universe, which will entail the unification of the fifth force and dark matter ”[18]. The creation of the theory of quantum electrodynamics of giant energies, many times higher than the energy density in natural fuel, fission materials and raw materials for thermonuclear fusion, lies on the path of research and transformation of quantum vacuum (dark matter) into baryonic matter in the fifth interaction.

In 2019, the Event Horizon telescope captured an image of M87, the world's first photograph of a black hole. This hole is located at the center of the galaxy of the same name, also known as NGC 4486, it is about 6.5 billion times more massive than the Sun, and emits streams of incandescent "semi-digested" stellar matter into space (Figure 3,4). Matter erupts from the black hole at a speed much faster than the speed of light. Although the ejected substance takes the form of an elongated ray, it does not look like a uniform stream - it is rather lumpy, inhomogeneous lumps of incandescent matter flying on the crest of a longitudinal gravitational wave. The results of the latter study are presented in a paper published in the Astrophysical Journal [19].

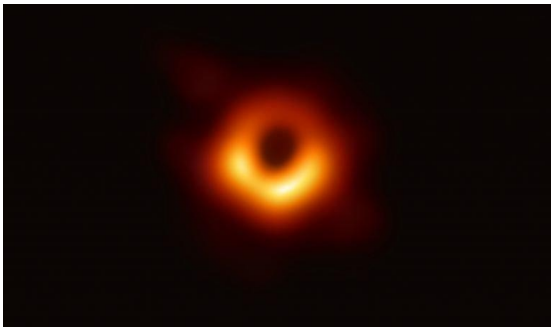

Figure3. *Famous photo of a black hole in the galaxy M87*

Figure 4. *The flow of matter discharged from a black hole NGC 4486 at a speed 6.3 times the speed of light*

In 2020 in the laboratory, for the first time, a substance was obtained that has properties identical to the plasma in the vicinity of a black hole. This is stated in the joint work of Russian, Japanese and French scientists [20]. The uniqueness of the experiment is that the parameters of the obtained plasma do not need to be scaled; they correspond to the actual parameters of the plasma in the vicinity of the black hole of close binary systems of the Cygnus X-1 type. Matter with a temperature of billions of degrees, a density of 10^{18} particles per cm^3 and a frozen-in magnetic field of more than 2,000 Tesla was formed in the volume of the target for several picoseconds. It is these parameters that can be found in plasma in the active region of X-ray sources. The volume of incandescent magnetized matter was sufficient to possess the main characteristics of its cosmic prototype. This was also facilitated by the experimental conditions, in particular, the fact that inside the plasma volume, the magnetic fields were directed towards each other in such a way that in the area of contact of the opposing magnetic lines, the annihilation of the magnetic field occurred, leading to the appearance of gravitational waves and fluxes of electrons and positrons propagating with superluminal and about light speeds [20].

Thus, gravitational waves generated by explosive processes carry enormous energy and can move baryonic bodies of any size from an electron to a star. Of course, they can also move interplanetary ships, but in this case, you need to use Wakefield - a mechanism for accelerating a spacecraft by "surfing" on top of a longitudinal gravitational wave.

3. WAKEFIELD -THE MECHANISM OF SPACECRAFT ACCELERATION BY "SURFING" ON TOP OF A LONGITUDINAL GRAVITATIONAL WAVE

As in AWAKE accelerators, where particles are accelerated when “surfing” at the top of a plasma wave (or Wakefield field), a spaceship can accelerate at the top of gravitational waves in the quantum vacuum (dark matter) which contains similar zones of positive densifications and discharges in the galactic and intergalactic environment. The team behind the Advanced Proton Driven Plasma Wakefield Acceleration Experiment (AWAKE) at CERN in Geneva has been working 5 years after CERN approved the project in 2013. In an interview with the project manager AWAKE Edda Gshwendtner “This is the fantastic: the new method of particle acceleration works " explains the essence of the experiment “In the classical scheme, the electron beam in the collider accelerates under the influence of the electromagnetic field. In our experiment, a beam of protons flies in the plasma it creates a wave and thereby ensures the acceleration of the electron beam that follows. The beam of electrons with the energy of 19 MeV flew in the plasma ten meters and increased energy to 2 GeV, that is, more than 100 times. This means that the average acceleration rate was 200 MeV / m.” [21]. The experiment was carried out by the AWAKE collaboration and scientists from the Budker Institute of Nuclear Physics, Siberian Branch of the RAS (INP SB RAS). Traditional accelerators use what are known as radio-frequency (RF) cavities to kick the particle beams to higher energies. This involves alternating the electrical polarity of positively and negatively charged zones within the RF cavity, with the combination of attraction and repulsion accelerating the particles within the cavity. By contrast, in Wakefield accelerators, the particles get accelerated by “surfing” on top of the plasma wave (or Wakefield) that contains similar zones of positive and negative charges. Allen Caldwell, spokesperson of the AWAKE collaboration said, “Wakefield accelerators have two different beams: the beam of particles that is the target for the acceleration is known as a ‘witness beam’, while the beam that generates the Wakefield itself is known as the ‘drive beam’. AWAKE is the first experiment to use protons for the drive beam, and CERN provides the perfect opportunity to try the concept. Drive beams of protons penetrate deeper into the plasma than drive beams of electrons and lasers. Therefore, Wakefield accelerators relying on protons for their drive beams can accelerate their witness beams for a greater distance, consequently allowing them to attain higher energies.” Like an accelerator AWAKE, the spaceship can get accelerated by “surfing” on top of the longitudinal wave, caused by an explosion similar to the explosion comet Shoemaker-Levy collided with Jupiter (Figure 5).

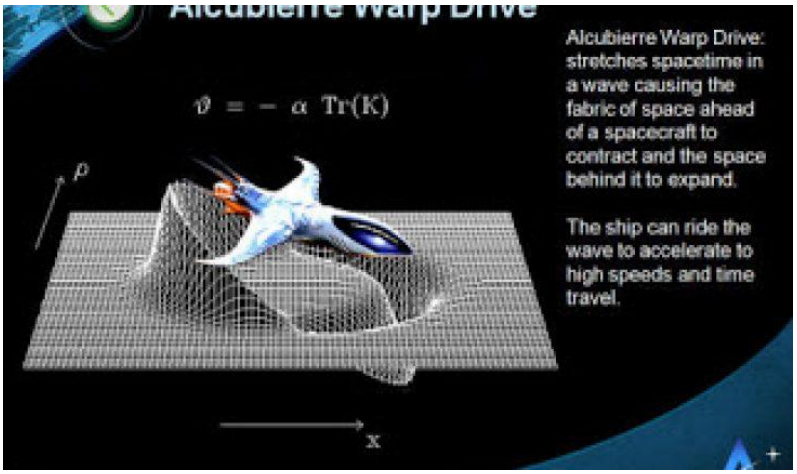

Figure5. *Spaceship on top of a gravitational wave*

In the Wakefield accelerator, the spacecraft is accelerated to superluminal speed, carried away by a longitudinal gravitational wave.

4. CONCLUSION

Within the framework of the new physics, the complete equation of the field, taking into account the polarization medium of the quantum vacuum (dark matter), presented by Professor of the Institute of Mathematics of the Russian Academy of Sciences V. Dyatlov, allows solving the problem of overcoming the Warp barrier by a spacecraft based on gravitational waves, contrary to the prohibitions of Einstein's general theory of relativity.

REFERENCES

[1] Alcubierre, Miguel. "The warp drive: hyper-fast travel within general relativity". Classical and Quantum Gravity, 11 (5): L73–L77 (1994). arXiv: gr-qc/0009013. Bibcode: (1994) CQGra..11L..73A. doi:10.1088/0264-9381/11/5/001.

[2] Erik W. Lentz, Breaking the Warp Barrier: Hyper-Fast Solitons in Einstein-Maxwell-Plasma Theory, arXiv:2006.07125 [gr-qc],(or arXiv:2006.07125v2 [gr-qc] for this version), 10 Aug 2020

[3] Alexey Bobrick and Gianni Martire, Introducing physical warp drives, Classical and Quantum Gravity, Volume 38, Number 10, Published 20 April 2021

[4] A. Einstein, "The Meaning of Relativity: Four Lectures Delivered at Princeton University", Princeton Univ. Press, Princeton, (2004).

[5] Einstein A. Physik und Realitat. Journ. Franklin Institute. (1936), 221, 313-347.

[6] Jean – Loup Puget,"The sight on the relic background" Scientific American, No.9, (2014)

[7] J. S. Farnes. A unifying theory of dark energy and dark matter: Negative masses and matter creation within a modified LambdaCDM framework, Astronomy & Astrophysics (2018). DOI: 10.1051/0004-6361/201832898 , https://arxiv.org/abs/1712.07962

[8] Konstantinov S.I., "Calculation Method the Value of the Gravitational Constant for the Non-Equilibrium System of Mercury-Sun", International Journal of Advanced Research in Physical Science, 5(6),pp 1-5, (2019)

[9] Shikin, V., "Low – frequency anomalies of effective mass of charged clusters in liquid helium", Low Temperature Physics, 39(10), p.837, (2013), DOI: 10.1063/1.4825362

[10] V. Venkatraman Krishnan el al., "Lense–Thirring frame dragging induced by a fast-rotating white dwarf in a binary pulsar system," Science (January 30, 2020). science.sciencemag.org/cgi/doi …1126/science.aax7007

[11] Nadia Drake. "Giant 'thread' of radio emissions found linking galaxy clusters", SCIENCE, JUNE 6, (2019)

[12] Konstantinov S.I., "Halo" of dark matter and gravitational waves", Global Journals Inc. (USA) GJSFR-A, Volume 20, Issue 4, Version 1.0, pp 5-11, (2020)

[13] Stanislav Konstantinov, Conversation about the Nature of Gravitational Forces and the Mechanism of Long-Range Interaction, Open Access Journal of Physics, Volume 2, Issue 2, 2018, PP 24-29

[14] Laplace P.S. "Setting up a system of the world." - L.: Science, (1982).

[15] Dubrovsky V.A. "Elastic model of physical vacuum" DAN SSSR, Vol. 282, No. 1, pp. 83-88, (1985)

[16] Woodpeckers V.L. "Polarization model of an inhomogeneous physical vacuum" -, Novosibirsk, Institute of Mathematics, (1998).

[17] Tamm I.E. "Fundamentals of the theory of electricity." - M .: GITTL, (1954).

[18] Feng Jonathan L., "Protophobic Fifth Force Interpretation of the Observed Anomaly in ^{8}Be Nuclear Transitions", arXiv: 1604.07411v2 [hep-ph], (15 Aug. 2016)

[19] Bradford Snios, Paul E. J. Nulsen, Ralph P. Kraft, C. C. Cheung, Eileen T. Meyer, William R. Forman, Christine Jones, Stephen S. Murray. "Detection of Superluminal Motion in the X-Ray Jet of M87" arXiv:1905.04330 [astro-ph.HE] (2019) DOI: 10.3847/1538-4357/ab2119

[20] K. F. F. Law, Y. Abe, A. Morace, Y. Arikawa, S. Sakata, S. Lee, K. Matsuo, H. Morita, Y. Ochiai, C. Liu, A. Yogo, K. Okamoto, D. Golovin, M. Ehret, T. Ozaki, M. Nakai, Y. Sentoku, J. J. Santos, E. d'Humières, Ph. Korneev, and S. Fujioka "Relativistic magnetic reconnection in laser laboratory for testing an emission mechanism of hard-state black hole system", Phys. Rev. E 102, 033202 – Published 3 September 2020

[21]. Edda Gshwendtner, "This is fantastic: the new method of particle acceleration works". *Naked Science, September, 9,* (2018)

Citation: *S.I. Konstantinov (2021) Wakefield -The Real Mechanism Overcoming the Warp Barrier in the Forvator of Superluminal Gravitational Waves. International Journal of Advanced Research in Physical Science (IJARPS) 8(7), pp.7-14, 2021.*