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THE POSSIBILITY OF ACHIEVING A SUPERLUMINAL VELOCITY IN THE PHYSICAL VACUUM.

Abstract.
Currently, most research suggests that the physical vacuum is not empty, and the medium is composed of dark matter and dark energy and this allows hope that the speed of light in the physical vacuum can be transcended.

By the end of October 2015 Voyager1 automatic station was located at a distance of 130 astronomical units from Earth. This is the Length of the distance reached by the spacecraft at this time. To overcome this distance, the spacecraft spent 38 years. The distance to the nearest star is 270,000 astronomical units. It is easy to calculate that for the conquest of the distance that the spacecraft will need almost 79,000 years.
It is obvious that there is an unacceptable technology overcome such distances. This fact was well known to one of the founders of the practical cosmonautics Sergei Pavlovich Korolev. He always answered a similar question like this: "I hope that the next generation will come up with something." However, much earlier than the practical implementation of such flights to future researchers will be a question about the theoretical possibility of motion faster than light.
At the present time, despite the fact that it took more than 110 years since the advent of the special theory of relativity, the great majority of physicists completely deny the possibility of reaching such speeds. One of their arguments is the following: that in any of the over priced and over modern particle accelerators could not reach the speed of light, not to mention the more of its overcoming. The movement of charged particles in the accelerator system obeys the well-known Maxwell equations. In the absence of free charges and currents $\rho = 0, j = 0$. In an isotropic and homogeneous physical vacuum Maxwell's equations take the following form

$$\vec{\nabla} \cdot \vec{E} = 0. \qquad \vec{\nabla} \cdot \vec{B} = 0.$$

$$\vec{\nabla} \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}. \qquad \vec{\nabla} \times \vec{B} = \frac{1}{c^2}\frac{\partial \vec{E}}{\partial t}.$$

In the derivation of these relations is taken, $\vec{H} = 0$, $\vec{D} = 0$, $\varepsilon_0 = \mu_0 = 1$.
All used the expression has long been well known. And further known
that they can be reduced to the following form (it is easy to find in the literature otherwise it is easy to do on their own)

$$\Delta \vec{E} - \frac{1}{c^2}\frac{\partial^2 \vec{E}}{\partial t^2} = 0. \qquad \Delta \vec{B} - \frac{1}{c^2}\frac{\partial^2 \vec{B}}{\partial t^2} = 0.$$

Here $\Delta = \frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2} + \frac{\partial^2}{\partial z^2} -$ three-dimensional Laplace operator.

The above two unrelated equations are called hyperbolic equation or wave equation and each of them represents three independent scalar equations. We give one of them

$$\frac{\partial^2 E_x}{\partial x^2}+\frac{\partial^2 E_x}{\partial y^2}+\frac{\partial^2 E_x}{\partial z^2}-\frac{1}{c^2}\frac{\partial^2 E_x}{\partial t^2}=0. \qquad (1)$$

Obviously, the other two equations are different from it only in instead of the subscript index x respectively E at will y or z. All of the above applies to the equation in $\vec{B}$. Now imagine that the other inertial system (x', y', z') moving relative to the first (x, y, z) along an axis x at a constant speed u. The question arises, what should be the coordinate transformation to equation (1) it is invariant under this transformation?
We will seek this transformation as follows

$$x' = \eta x - u\delta t,\ t' = \gamma t - u\xi x,\ y' = y,\ z' = z. \qquad (2)$$

Here $\eta, \delta, \gamma, \xi -$ unknown to us until the real constants. Without resorting to physics and, using only the math, we can show that the $\delta = \gamma = \eta = \frac{1}{\beta}; \xi = \frac{1}{\beta c^2}$, where $\beta = \sqrt{1-\frac{u^2}{c^2}}$ equation (1) is invariant under the transformations:

$$x' = \frac{x-ut}{\sqrt{1-\frac{u^2}{c^2}}},\ t' = \frac{t-\frac{u}{c^2}x}{\sqrt{1-\frac{u^2}{c^2}}},\ y' = y,\ z' = z. \qquad (3)$$

This is the so-called Lorentz transformations, obtained without the assumption of the existence of essentially a maximum speed of propagation of interactions, it is well known, the speed of light in the physical vacuum. Did we mention the so-called expression, because these transformations and almost exactly the same way to get a W. Vogt [1] More in 1887. That is, we essentially went back to basics. Then the same transformation in 1900 was Larmore [3], and only in 1904 Lorenz [2]. At the same time, none of these authors did not invest in the transformation of any physical sense, except maybe Lorenz, do it later influenced by the works of Poincare [2] Einstein [2].
I think that investing in the physical meaning of these transformations was then ill and why. The fact that the wave equation (1) satisfy not only the components of the electric field intensity vector, as is well known, but also the speed of propagation of elastic waves in a continuous medium, that is the speed of sound. In this case, instead E_x of a scalar quantity W, will also characterizes the deviation of the continuous medium particle from its equilibrium position and will have the speed of sound, instead of the speed of light in this environment is a homogeneous liquid or gas C_f, is calculated according to the formula: $C_f = \sqrt{\frac{1}{\beta_c \rho}}$; $[C_f] = \frac{meter}{\sec}$; $[\beta_c] = \frac{meter \times \sec^2}{kg}$; $[\rho] = \frac{kg}{meter^3}$, where $\beta_c -$ adiabatic compressibility of the medium and its $\rho -$ density. Instead of equation (1) we have the equation:

$$\frac{\partial^2 W}{\partial x^2}+\frac{\partial^2 W}{\partial y^2}+\frac{\partial^2 W}{\partial z^2}-\frac{1}{C_f^2}\frac{\partial^2 W}{\partial t^2}=0, \qquad (4)$$

and instead of the Lorentz transformation virtually the same conversion,

$$x' = \frac{x - ut}{\sqrt{1-\frac{u^2}{C_f^2}}},\ t' = \frac{t-\frac{u}{C_f^2}x}{\sqrt{1-\frac{u^2}{C_f^2}}},\ y' = y,\ z' = z, \qquad (5)$$

which differ by only one Lorentz instead the speed of light in a vacuum is used in sound velocity continuous medium. But these changes no one considered otherwise than analytic expressions, devoid of any physical meaning [4]. Obviously, you may have the following question: particle accelerators exist, and whether similar devices exist for the "particles" of sound? First in theory, such a "particle" has long been known, they are called quasi-particles and for sound and for conductive heat transfer such particles called phonons. In 2015 the Internet was reported that you can adjust the speed of the motion of phonons. The message is so called "Quasi-ballistic thermal conductivity called threat microelectronics." In this report, in particular, it said that scientists from several US institutions experimentally observed transition between the diffuse and quasi-ballistic proliferation of thermal phonons in micro- and nano-crystals. Recent results indicate that in the devices smaller than one micron conduction regime may vary discontinuously. There are specified and related links. Here there is a question not only of speeding up the phonons, and their regulation, but the phonon speed does not exceed the speed of sound in the medium. Then, in this and only in this case, the expression (5) can be given a physical meaning. But it does not follow that the velocity of sound in any environment can not be beat. Indeed, at the moment, when the rocket, many airplanes, cars, and even an Austrian skydiver Baumgartner moving at a speed greater than the speed of sound in the air, and when approaching this speed no one was watching the phenomenon of time dilation and the related phenomenon repeatedly described twin paradox . Moreover, at speeds faster than the speed of sound in the medium in the transformation (5) obtained in the denominator of an imaginary number, the more it indicative of the fact that these conversions are devoid of any physical washed in general.

Reasoning by analogy, it is logical to assume that one of those facts that the particle accelerators speed of these particles will never exceed the speed of light in the so-called physical vacuum does not mean that this rate can not be beat. Thereby one of the arguments proponents claim that the speed of light in the physical vacuum can never be surpassed, should be questioned. This raises the following question. Is there any idea that in the foreseeable future will allow hoped that the speed of light in the physical vacuum is reached or even surpassed? Such an idea in our opinion there and we venture to express it. Referring to the Casimir effect. This effect reminds the effect of wing lift aircraft (formula of Zhukovsky), this effect is used in a liquid (russian engineer Viktor Alexeyev, designer ships with underwater wings) and, finally, the Casimir effect exists in space in an environment, which physicists are now called physical vacuum, and which is different from Einstein emptiness.

These wings can be put on the left and right side of the spacecraft, starting out in deep space, and installed parallel to the movement of the ship. Let the spaceship moves with forward speed $\bar{V}$. Then, on the surfaces of the wings of the Casimir force $\bar{F}$ will arise that are vectors, forming an acute angle α with the vector $\bar{V}$, and each other an acute angle 2α . But if there is a force, that is, and the acceleration vector $\bar{a} = \frac{2\bar{F}}{m}$, where $m-$ the mass of the spacecraft. At constant acceleration there is another vector that is continuously increasing with time $\bar{W} = \bar{a}t$, where $t-$time. In result two vectors $\bar{V}$ and $\bar{W}$ form a new vector $\bar{U} = \bar{V} + \bar{W}$, which will be directed in the same direction in which the moving spaceship. Since the velocity $\bar{U}$ continuously growing with time, nothing prevents it from time to beat C - speed of light in the so-called physical vacuum as cosmic cue ship is electrically neutral. Thus, you can probably surpass the speed of light without any additional energy input. We know nothing about the magnitude of the forces $\bar{F}$ which, according to formula of Zhukovsky proportional to the density of the medium, the magnitude of which, in spite of the numerous publications on the Internet, it is unknown, since these publications appear in different and even not commensurate with each other values. And so the flight of the spacecraft with these wings will determine this value significantly. Of course, the idea presented here many seem crude and very distant from its technical realization, but nothing I do can not offer.
Internet recently, it was reported that in Egypt, patented the idea of using the Casimir effect for space travel.

Reference

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