Photon. Shape, internal arrangement and physical properties.

Abstract. An attempt has been made to explain theoretically the properties of a photon from the position of the theory of the Elastic Universe.

Alexander I.Dubinyansky and Pavel Churlyaev.

We see photons, know photons, know the action of photons, know the properties of photons, we know the dual, corpuscular-wave character of photons. We do not know only one thing: what a photon looks like under a strong microscope. Now we will try to do it.

First an example of acoustics. Imagine that we are inside the sound wave and move with it. Modern technology allows you to depict a sound wave on an equalizer:

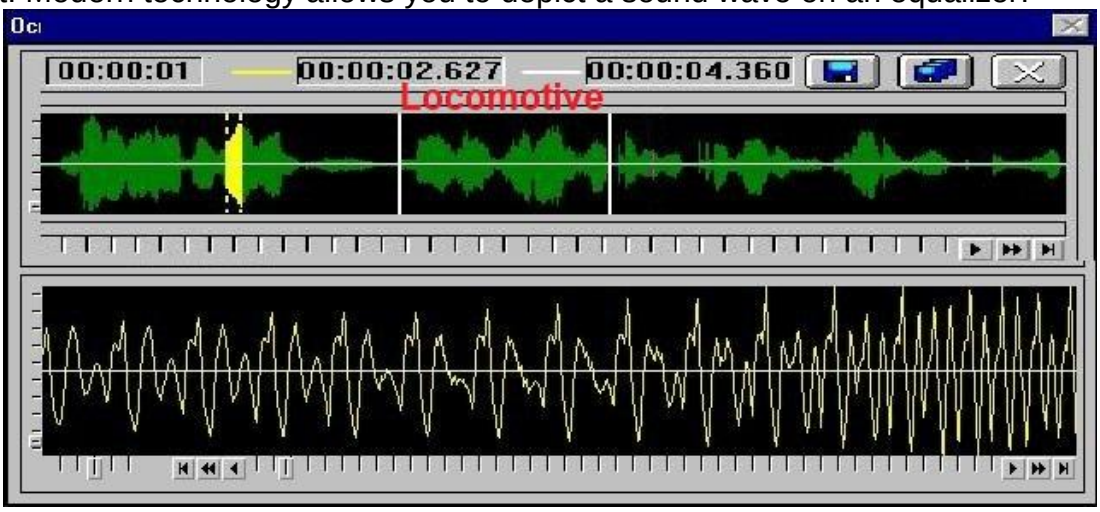

Fig.1.

Imagine that we can see the differences in the density of air in the sound. And so we fly along with the sound wave, with the speed of sound and see this sound wave, all its oscillations, approximately as in the figure above. Let from this place each reader imagines to itself a picture how he understands all process. To the best of my scientific training.

What do we see in the process of flying with sound? - We see a stationary picture of sound. We fly with the sound over forests, fields, houses, cities, bridges. Landscapes change around. But the picture of the sound wave that surrounds us does not change. Well, except that the sound fades with time, that is, the colors of the sound landscape become faded and gradually fade. But the picture of the sound around us is stable and unchanging. We do not see around us any fluctuations in the density of air. We see air seals, permits, see their wavy character. All as in the picture above. But we do not see around ourselves no hesitation. The whole sound is distributed as a whole.

From a domestic point of view, if we shouted, for example, the word "Locomotive" (Fig.1, red), then it appeared on the equalizer as some oscillatory region. And then, whenever and wherever we listen to this sound, in 1 second or 30 seconds, it will be the same word "Locomotive". Although over time, the volume will decrease.

The theory of wave propagation in the three-dimensional elastic medium, which textbooks offer us, reports that if the initial state was a localized perturbation, then it spreads like a spherical wave. And with a sharply marked beginning and end, without "aftereffect" (that is, without damping, in contrast to plane waves).

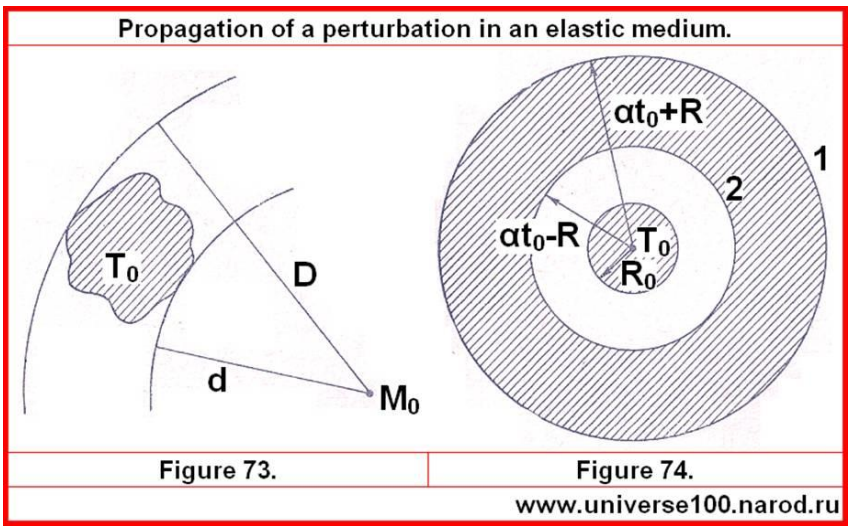

Fig.2.

Classical presentation of the propagation of the initial perturbation T_0 illustrated in Figures 73 and 74 (textbook Tikhonov-Samarsky). Do not go into too many of these terms. I.e:

1) First, the initial perturbation T_0 (Fig.73) does not reach the point M_0 , and there is no disturbance at this point.

2) Then the initial perturbation reaches the point M_0 , and at this point a disturbance appears.

3) After some time to the point M_0 the back boundary of the initial perturbation already reaches and at this point the point M_0 the disturbance completely ceases. This part of the presentation is quite convincing.

Further, it is concluded that the initial perturbation located in the region T_0 , will necessarily spread in a spherical manner (Fig.74), decreasing in intensity, and as if in the course of time, in the future crosses every point of space.

The theory about the one-dimensional wave equation tells us about the same thing. Instead of the three-dimensional model of perturbation propagation depicted in Fig. 74, we have a one-dimensional model. This model is described by a one-dimensional wave equation.

$$W_{tt} - c^2 W = 0 \tag{1-1}$$

Where $W = W(x,t)$ - displacement at the point of the medium, c is the speed of light.

As is known, the solution of a one-dimensional wave equation retains its original shape during motion. The solution of the one-dimensional wave equation has the form:

$$W(x,t) = f_1(x-ct) + f_2(x+ct) \tag{1-2}$$

Where f_1 and f_2 are determined by the initial conditions, and f_1 refers to one object of two flying away, and f_2 refers to the second object.

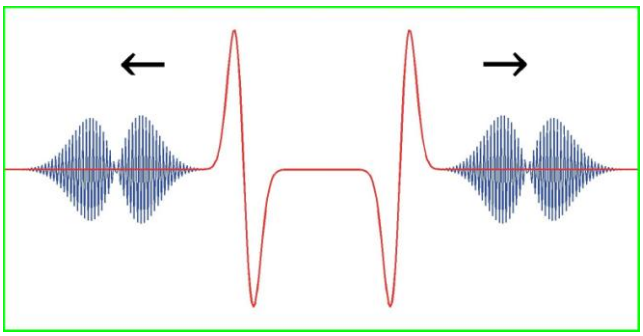

Fig.3.

As the solution of the one-dimensional wave equation suggests, objects are born in pairs. This is also observed in three-dimensional physics. Often photons are born in pairs. In this the roots of such a legend as the entanglement of photons. There is no confusion. But there are pairs of photons flying in different directions.

What is the conclusion from all the arguments that have been made? The conclusion is this: if we are in the reference frame of a moving wave object, whether it is one-dimensional or three-dimensional, we see around us a stationary picture of the deformations (or stresses) of the environment. No hesitation in time! Here falling drops of water from a tap with water can fluctuate during the flight. And if we sit in such a drop, and if the drop is flying for a long time, then we will see how our drop changes its shape during the flight. The drop vibrates its shape. But if we are sitting inside a sound wave, or inside a one-dimensional wave, or inside an electromagnetic disturbance propagating in a gukuum (= in space), then we will not see any oscillations around ourselves.

Now we are theoretically prepared to understand what a photon is. A photon is a disturbance in the gukuum, which propagates at a rate determined by the properties of the gukuum. That is, with the speed of light. In the process of moving, the photon keeps its shape exactly. But what is this form? Here again the analogy from the world of sound (Fig.1). If we shouted the word "Locomotive" in an electromagnetic way, then this word will be distributed in space. That is, the oscillogram Fig.1 will be saved. Similarly, photons!

PHOTON FORM DETERMINED BY THE PROCESS OF ITS BIRTH.

Photons are like sound words in the gukuum, flying in space. They can be depicted on a spatial equalizer. They fly from a distant or near past and carry information about the process of their creation.

How is the photon created? There are a lot of processes.

1. The most common. The transition of an electron inside the molecule to a lower level with the emission of an energy quantum (= photon).
2. Collision of particles with a change in energy. The laws of conservation of momentum and energy require one more particle, and this particle turns out to be a photon.
3. Nuclear reactions.
4. Process of particle annihilation. Gif:

http://i.yapx.ru/BDq5J.gif
http://universe100.narod.ru/u270/b15.gif
http://universe100.narod.ru/u210/image017.gif

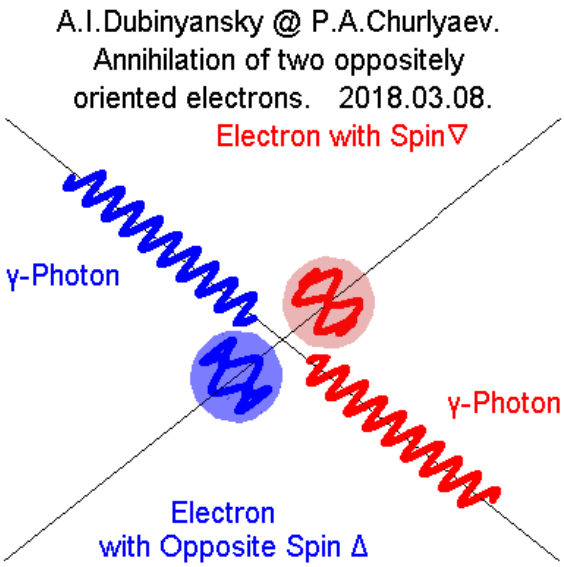

Fig.4.

As can be seen from the listed processes, they are all fast, they all have a beginning and an end, they all have a clear limitation in time and energy. For this reason, all photons have a clear energy and shape.

We have not yet gone into a rigorous exposition of the essence of antimatter in the theory of the elastic universe. The working model is as follows: two elementary particles collide "forehead", one of which, according to the rule of the drill, is twisted in one direction, and the second one in the other. What is this collision process? This process consists in the fact that the vortex, swirling localized waves of each of these two wave vortices, rotating towards each other, suddenly interact, "straighten out" and all their motion from the circular turns into a linear one. Almost instantly. Two photons are formed, which are scattered strictly one line in different directions. And practically each of these photons has a polarization in one direction, presumably along the axis of rotation of the former particle.

In accordance with the annihilation process, the shape of the photons produced in this process is approximately the same if we consider only the electric or only the magnetic component of the photon wave:

Gif-image: http://i.yapx.ru/BJWTe.gif
http://universe100.narod.ru/u210/Photon-01.gif

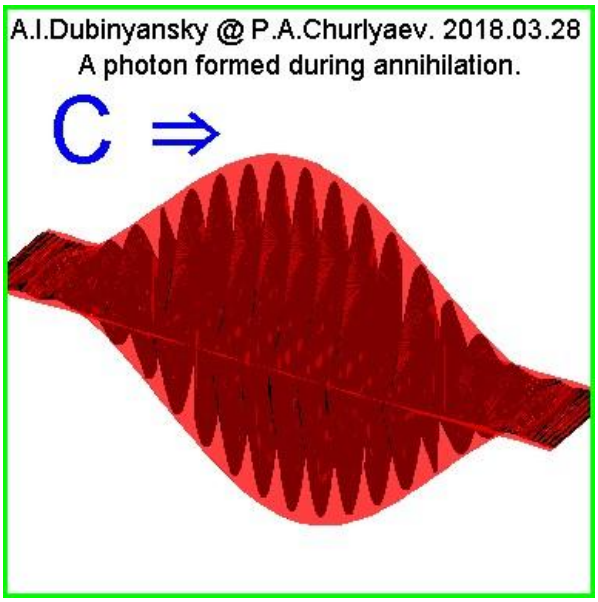

Fig.5.

That is, there is a growth region and an attenuation region of the amplitude of the electric or magnetic component. In its thickness, such photons, formed as a result of annihilation of electrons, are apparently just of the order of the electron diameters. All other parameters are also quite specific.

With the image of both the magnetic and electrical components, the photon looks like this:

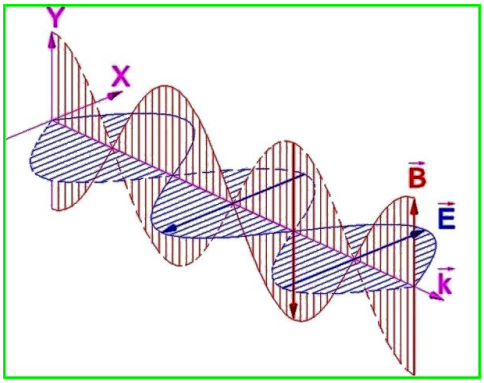

Fig.6.

You can not consider photons as flat as in Fig.4 or as consisting of two planes as in Fig.5. A photon is a figure that is smooth and voluminous throughout the space. However, there are directions in which the maximum values of the electric or magnetic component are realized, and the directions perpendicular to them, where these quantities are minimal.

Depending on the process of its creation, or the external influence on the photon during its flight through some medium, it is possible to obtain such photons:

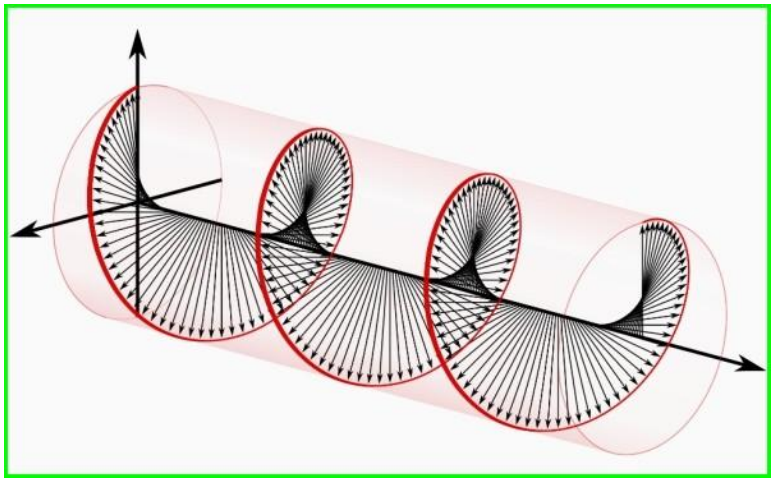

Fig.7.

But this again does not mean that such a photon is flying and spiraling. No. He flies without changing form and orientation. But at the moment of its registration, at the moment of its passage through some medium, through the detector, it shows similar twisted properties.

FORM PHOTON DOES NOT CHANGE IN THE MOVEMENT PROCESS.

About the speed of a photon. All fragments of the photon fly in one direction, do not have any transverse vibrations and movements. For this reason, the speed of the whole object = photon is the same and equal to the speed of light.

About the mass of the photon. From a comparison of the photon described here with wave vortices, it can be seen that photons do not have points of singularity in density. That is, they do not have mass formation centers. Therefore, they have no rest mass. They do not have a strict and uniform spatial form. Each photon is individual, has its own form, energy, has its date and place of birth, has the parent process in which it was

born. It is possible to introduce a classification of the processes of photon formation and call this classification the "nationality" of the photon. This will facilitate memorization.

You should remember about the "Dubinyansky field". The electric and magnetic fields of a photon do not exhaust all fields in space, including a photon. After all, the displacement of the gukuum has three dimensions. Therefore, it is quite possible that a photon has a third component of the field, in the direction of its motion. Apparently this field is longitudinal, rapidly decaying with distance. Since longitudinal waves have a higher speed than transverse waves, and since it decays with distance, the Dubinyansky field in the photon quietly flies along with the photon. However, this field can detect itself in some experiments. For example, in the experiments of Aaronov-Bohm.

Concerning the formulas we previously proposed for a photon or neutrino, they turned out to be of little relevance to reality. There are no single-valued photon formulas. However, there is some classification of the processes in which photons are formed. And this classification creates a certain number of types of photon forms.

In occasion of wave or corpuscular properties of a photon. It depends on the process in which the photon participates. If this is a process of energy exchange, then the photon manifests itself as a particle. But if a photon passes through narrow slots whose width is comparable with the photon size, then the photon form begins to appear, which has the form of a wave (Fig.5). Accordingly, the properties of the photon become wave.

About the neutrino. In fact, this is one of the varieties of photons, specific forms and energies, allowing to penetrate through material objects. Emerging in specific processes. Since neutrinos occur in specific processes, they may have a rather specific form. For each process, the neutrino shape must be set separately.

Russian: http://universe100.narod.ru/
English: http://universe100.narod.ru/E100-Oglavlenie.html
http://universe100.narod.ru/E210-Photon.html
dubinyansky@mail.ru