SOME REASONS about MOTION PHOTONS

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Abstract

In the article the motion of photons is reviewed in connection with miscellaneous properties of light.

At first we shall be determined at sizes of photons more precisely to present, with what we deal. As the mechanical moment of a photon on coils of a screw line makes $\hbar$, and the own mechanical moment in $1/\alpha$=137.0391 times is less, we can take advantage of the formula $S_{ph}=\hbar/137.0391$, and mass of a photon: $m_{ph}=h\nu/C^2=h/C\lambda$. By executing indispensable transformations and substitutions, we shall receive the formula linking radius of the photon *r* to its wavelength λ:

$$r=0.001161\cdot\lambda \quad (1).$$

In spite of the fact that the formula (1) is inexact, since leave outs an electrostatic attraction and attraction at the expense of magnetic interaction driving counter electrically opposite charged neutrino and antineutrino in a photon. That is, the formula (1) gives the overstated values *r*, especially for small λ, nevertheless, for a visible light and of more lengthy waves the error will be insignificant. Thus, radius of a photon, approximately, in one thousand times is less than a step of a screw line, on which one it is gone (radius of a screw line to 2π times less step), therefore that the rays "were immixed", as figured Lomonosov, criticizing the corpuscular theory of light, the huge power of a beam or certain conditions is indispensable, as we have at an interference of light. "The corpuscular theory of light, developed for the first time by the Newton at the end of XVII century, viewed light as a particles flux (corpuscles), released by a light source and spread in homogeneous medium is rectilinear. Reflection and a refraction of light this theory explained mechanically... The corpuscular theory of light could not explain phenomena of diffraction, interference, to polarization of light and in XIX century has succumbed a place of a wave theory. The corpuscular notions about the nature of light have revived again in a start XX century on the basis of the theory of quanta". N.I. Kariakin, Brief manual on physics", "Higher School", M., 1962, page 253.

Let's discover the power characteristics of photons. Kinetic energy of a rotated body:

$$E_{rot}=\frac{Jw^2}{2} \quad (2),$$

where: J – moment of inertia of a body, w – angular rate of rotation. For a photon on a screw trajectory (2) will be converted to a kind:

$$E_{rot}=\frac{m_{ph}\cdot R^2w^2}{2} \quad (3),$$

where: R – radius of a screw trajectory.

The peripheral speed *V* in this case is peer to speed of light:

$$V=C=wr_{ph} \quad (4).$$

Let's substitute (4) in (3):

$$E_{rot}=\frac{m_{ph}\cdot C^2}{2} \quad (5),$$

i.e. the energy of motion of a photon on coils of a screw trajectory makes half of its total energy. Apparently, that the same energy is necessary and for translational motion of a photon, since its translational and tangential speed are peer. An angular momentum of a photon on a screw trajectory:

$$\hbar=m_{ph}\cdot CR \quad (6).$$

Taking into account (6) and $\omega = 2\pi\cdot\nu$ The formula (3) start a kind:

$$E_{rot} = \frac{h\nu}{2} \qquad (7).$$

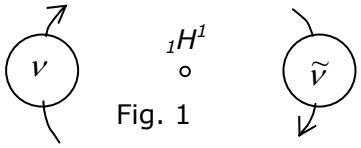


Fig. 1

For an example, on a figure 1 the sizes of a photon of a line H_α in matching dimensioned of atom of hydrogen given.

Utilizing the formula (1) and ratio between frequency of a photon and its wavelength: $\lambda=c/\nu$, they are possible are to substituted in expression for energy of electrostatic interaction with a neutrino and the antineutrino in a photon (earlier was shown, that the charge a neutrino in all photons is identical and is peer to half of elementary charge): $E=0.25e^2/2r$. In result we shall discover, that the common energy of a photon $h\nu$ is equal in 8 times exceeds an electrostatic energy the neutrino. Thus, the energy of a photon in main is connected to its kinetic energy, therefore photon cannot be stopped, by keeping its wholeness, i.e. it has not "rest mass". For comprehension of properties of photons the very large value has that circumstance, that the photons with large energy have such small size same electric charge components, that a neutrino and antineutrino physically exhibit itself, as "solid" bodies. It is clear, that the pressure of light is connected to its corpuscular substance. The explanation of pressure of light from a point of view of the electromagnetic theory is not logical: "Pressure of light according to the electromagnetic theory. If on a surface of a body normally to it the electromagnetic wave drops, the presence of an electric vector *E* results in displacement of charged particles of matter. On moving charges from the direction of a magnetic vector *H* of a coming wave are affected by forces of the Lorentz... This force determines a light face pressure of bodies". N.I. Kariakin etc., Brief manual on physics, "Higher School ", M., 1962, page 297. From this explanation it is visible, that the pressure of light depends as well on an electron concentration in matter that contradicts experiment.

"Corpuscularness" the neutrino is incremented with increase of energy at the expense of sharp decreasing of its sizes. Thus the electrostatic interaction with a surrounding medium becomes rather stronger. In process of transition to photons possessing the lesser energy, and, therefore, mass components, the size them becomes so large, that rather feeble electrical, magnetic, gravitational and a gravidynamic field them are not capable to not call any more not considerable interaction with a surrounding medium, i.e. the neutrino becomes capable freely to dive into medium, itself becoming more and more pervious, specially in a long-wave region of photons. For these reasons we the gradual transition from γ-quanta more similar to a particles apparent, than on a wave, to long-wave photons, for which one the wave properties are expressed brightly, and the properties of particles practically are lost.

"A wave theory of light, for the first time advanced Dutch physicist by the Christian Huygens (1629-1695) in his activity "Treatise about light" (is written in 1678, is published in 1690), viewed light as an elastic impulse spread in special medium - an ether, filling all space and penetrate through matter. Thus, the wave theory assimilated light, as waves in ether, sound waves in air. When the polarization of light has pointed the fact transverseness of light waves, the notions about mechanical ether have revealed the insufficiency (1817). Really, the transverse waves of elasticity are possible only in a solid body. However attempt to allot an ether by properties of a solid body could not be successful, as the ether does not render noticeable effect on bodies, moving in it". N.I. Kariakin, Brief manual on physics, "Higher School", M., 1962, page 253.

Nevertheless, the essence of those and other photons remains same. That circumstance does not suffice for maintenance of an electro neutrality of a photon that it consists from opposite a charged neutrino and antineutrino. Allowing large intensity of a gravidynamic field created an antineutrino; it should be moves so that permanently to have smaller energy, than neutrino. An alone capability to satisfy this requirement is, that the photon at

motion on a screw line should be gyrated about the axis so that the positive charge (antineutrino) all time was closer to an axis of a screw line, than negative charge (neutrino). Therefore photon, passing one step of a screw line, makes precisely one revolution about the axis. At such motion the electric vector of a moving photon oscillates precisely how it follows from the theory of the Maxwell for an electromagnetic wave therefore many conclusions coincide with known concerning motion of photons and their properties.

"The electromagnetic theory of light. In 1865 English physicist the James Clerk Maxwell has shown, that the variable electromagnetic fields are spread in space with speed of light. Thus was established, that light represents an electromagnetic wave. The electromagnetic wave theory of light has allowed explaining phenomena of an interference, diffraction, polarization, light dispersion. However this theory could not explain a phenomenon of a photo effect, Compton scattering etc., in which one the corpuscular features of light acted. The synthesis of corpuscular and wave notions implements in a modern quantum theory of light, which one views light as a particles flux (photons), spread on the laws, of electromagnetic waves". N.I. Kariakin, Brief manual on physics, "Higher School", M., 1962, page 254. I shall remind to the reader, that the quantum theory does not uncover the essence of a wave-corpuscle dualism, applying corpuscular or wave notions depending on circumstances. Besides exchanging an electromagnetic wave by a flow of photons, it as a matter of fact disclaims the theory of the Maxwell in which one existence of photons is not stipulated.

The experimental definition of light pressure confirms, that photons moving on a screw line. It is visible from following reasons. Number of corpuscles (photons) dropping on unit of a surface, in unit of time we shall designate N $cm^{-2} \cdot sec^{-1}$. The pressure, which one is created by these corpuscles:

$$P = NmV \tag{8}.$$

In particular, for photons:

$$P = Nmc \tag{9},$$

where: m - mass of a photon, c - speed of light.

The common energy of these photons is piled from kinetic energy of translational and tangential motion on coils of a screw line:

$$E = N\left(\frac{mc^2}{2} + \frac{mc^2}{2}\right) = Nmc^2 \tag{10}.$$

By substituting (10) in (9), we shall discover:

$$P = \frac{E}{c} \tag{11},$$

that corresponds to experimental data on light pressure. Official physics does not know, that all free bodies moving on a screw line, therefore formula (10) records as: $E = N\frac{mc^2}{2}$. After a substitution in (9) light pressure is received twice more experimentally found. To get out of this inconvenient situation, attract the formulas of a relativity theory (see, for example, Technical encyclopedia, v.20, page 288, M., 1933). On a relativity theory common energy of particles:

$$E = \frac{Nm_0c^2}{\sqrt{1 - \frac{V^2}{c^2}}} \tag{12},$$

and momentum them:

$$P = \frac{Nm_0V}{\sqrt{1 - \frac{V^2}{c^2}}} \tag{13}.$$

By substituting (12) in (13) we shall receive (11) at $V \to c$. But in this context $E \to \infty$ and $P \to \infty$, i.e. the light pressure makes indefinitely large value. Thus, official physics getting rid from one nonsense falls in the even greater nonsense.

Now we shall pass to particular aspects of motion of photons, paying attention on key differences from known notions.

BIRTH and DEATH of a PHOTON

The most widespread way of birth and death of photons is a radiation and absorption their by atoms. These processes are accompanied also by intensive exchange of energy of one photon on set (by immersing one photon, the atom can radiate unlimited number of photons with smaller energy). In section dedicated "elementary" particles and, in particular, photon, we have found out, that the photon is capable completely to transmit the energy, fading thus, and also to be disintegrated on component its neutrino and antineutrino escaping a place of event. In the latter case energy balance at absorption and radiation of photons can not be full and differs on energy of formation the neutrino and antineutrino. Thus, in radiation spectrums lines should be displace in long-wave area in matching with absorption spectrums. This displacement for short-wave photons should be rather more. At the same time, the absolute value of displacement is insignificant, since a free neutrino mass practically have not. "In 1905 the A. Einstein has explained regularities of a photoeffect, by showing, that the photoeffect is called by absorption by electrons of matter of photons with energy: $\varepsilon=h\nu$". N.I. Kariakin etc., Brief manual on physics, "Higher School", M., 1962, page 296.

If to take into account and some other sources a free neutrino, it is possible to draw a conclusion that our world should be literally farced a free neutrino in the broad diapason of their energies (and sizes). As the penetrability a neutrino is very great the same as also velocity of their motion, the neutrino is an ideal means of information exchange provided that we shall learn to arrest passage a neutrino through the detector. It is quite possible, that the alive entities have ability to arrest flows a neutrino, since they bear the very relevant information, the hindrances to passage by which one do not exist. Detection such the neutrino would have large value for comprehension of a picture of a world. Here it is possible to formulate one more interesting guess. At drop of light on an opaque screen it is quite possible, that some photons do not fade, and are disintegrated on a neutrino, which one already easily penetrates through any barriers.

Calls doubts that circumstance, that a neutrino in long-wave photons, for example, in radio waves, are capable to keep the wholeness, since diameter them should, in this case to reach several meters for range of lengthy radio waves. Earlier we have found out, that the interaction magnetic and of a gravidynamic field can exist. If this circumstance we shall take into account in Maxwell equations, they will become symmetrical, and will describe not electromagnetic, and a magnetogravidynamic wave, in which one the properties a neutrino and antineutrino will be in the condition, "spread" in space. Such wave is represented by more actual existence of long-wave photons, though this judgement can be and error. There is a natural problem on boundary, on which one the photons as two neutrinos are converted in a magnetogravidynamic wave. Allowing our epoch of transmutation of energy of Big Bang in matter, on the one hand, and the capability of "aging" of photons at the expense of Compton recoil, with another, is represented to natural accumulation of photons on this boundary.

"The effect of the Compton or Compton scattering of radiation terms a phenomenon of a veering rather short-wave radiations at its propagation in matter accompanied by appearance in a structure of a scattered radiation more of lengthy waves. This last circumstance basically distinguishes a phenomenon of the Compton from classic (Rayleigh) light scattering in matter. The phenomenon was learnt in 1922 - 1923 by the Arthur Compton also is explained on the basis of corpuscular notions about the nature of light as elastic collision γ-photon with free or feebly by bound electron in disseminating matter, as a result of which the γ-photon changes direction propagation and donates a part of energy to an electron, which one is exhibited as "a recoil electron". To effect the energy conservation laws and momentums usable, i.e. the dissipation, on figurative matching of the Compton, happens like the game on billiard by photons and electrons… The phenomenon of the Compton belongs to processes which are not finding explanations from a point of view of a wave theory of light, and testifies for the benefit of corpuscular (photon) notions". N.I. Kariakin etc., Brief manual on physics, "Higher School", M., 1962, page 298 - 299. Pay attention that the Compton recoil contradicts an indeterminacy relation of the Heisenberg.

Now we can guess, that so-called "the relict radiation of space", relevant to a maximum of a black-body radiation at 2.7 ^0K, really, is that boundary, when the photon terminates the existence as "particle" and is converted in a magnetogravidynamic wave. Let's not forget, what even the short-wave photons too represent a magnetogravidynamic field, since the material form of a substance does not exist, therefore converting a neutrino is a selection between two steady geometrical forms of a field, which one is determined by value of mass and electric charge.

By substituting in the law Wien (T=2.7 ^0K):

$$\lambda_{\max} = \frac{C_W}{T} \qquad (1),$$

where: C_w – constant of the Wien (0.2896 cm·deg), T - Kelvin temperature, λ - wavelength of a photon, we shall discover λ=0.107 cm, that corresponds to energy of a photon $1.159 \cdot 10^{-3}$ eV, and on the electronic neutrino is necessary mass, equivalent $0.58 \cdot 10^{-3}$ eV. This mass conditionally is possible is to considered as mass of "rest" by a neutrino in a photon with minimum energy. Thus, at length of magnetogravidynamic waves than 1 mm there is less, they are transformed into photons and on the contrary.

From this point of view, it is interesting to consider relations of a spectral density of a radiant exitance of an ideal black body to temperature received Rayleigh–Jeans:

$$r(\nu, T) = \frac{2\pi}{C^2} \nu^2 kT \qquad (2)$$

and Planck:

$$r(\nu, T) = \frac{2\pi h \nu^3}{C^2} \cdot \frac{1}{e^{\frac{h\nu}{kT}} - 1} \qquad (3),$$

where: C - speed of light, k - Boltzmann constant, ν - radiated frequency, h - Planck constant.

Apparently, that the law of radiation Rayleigh at decreasing $1/\nu$ more and more "overtakes" the law of the Planck (so-called, ultra-violet catastrophe"). The formula of the Planck coincide the law Rayleigh–Jeans at $h\nu << kT$. The value kT for a considered case $3.7273 \cdot 10^{-16}$ ergs, and value $h\nu$ is equal $18.5629 \cdot 10^{-16}$ ergs. Therefore law of the Planck will be correct to describe black-body radiation only at:

$$h\nu \geq 5\ kT \qquad (4).$$

At this value both laws enough differ to make experimental check. Thus, the least energy 5 kT is indispensable for existence of a photon as a particle.

Under the law of a uniform distribution of energy on degrees of freedom (see, for example, B.M. Javorsky and A.A. Detlaph, Manual on physics, "Science", M., 1964, page 211), each degree of freedom gives the contribution to mean energy equal $kT/2$, therefore (4) displays, that on formation of a photon 10 degrees of freedom are necessary. It confirms the described constitution and motion of photons on a screw line with equal tangential and progressive speed. At motion on one coordinate 3 degrees of freedom are necessary at once. On three coordinates is necessary 9 plus one degree of freedom on proper rotation of a photon.

Thus, the Planck formula acts up to lengths of waves 0.1 cm. More lengthy waves have not quantum properties and the radiation in this range describes correctly equation Rayleigh–Jeans.

Electrical and gravitational field have a zero degree of freedom, instead of as infinite number of degrees of freedom, as official physics considers.

"The number of physical quantities indispensable for the description of all possible independent movements of a system, is termed as number of degrees of freedom. So, the free dot particle is capable to be moves in three independent directions. Accordingly such particle has three degrees of freedom. The field has indefinitely large number of degrees of freedom: at evolution of a field the field function can vary at once in infinite number of points". Physics of a microcosm, "Soviet encyclopedia", M., 1980, page 314.

The question is that all parameters of fields in any point of space uniquely determinate only by charge - source of a field, and the value of a charge can not self-maintained vary. On the other hand, at indefinitely large number of degrees of freedom for existence of a field the indefinitely large energy also it is necessary (on one degree of freedom is necessary 1/2 kT). At the same time, and at absolute zero of temperature electrical and the

gravitational field does not fade, that confirms a conclusion about absence of degrees of freedom for these fields.

MOTION of PHOTONS in MEDIUM

In the beginning some critical remarks of rather present now notions about a pass of light in medium. There are notions that the photon is immersed and again is radiated by matter. "The light dispersion in medium is explained by interaction of an electromagnetic wave with electrons of matter. Under activity of a wave, dropping on matter, of charged particles come in forced oscillations (velocity of their thermal random motion in metal makes some kilometers per one second, but they do not radiate, though owe, on modern views - V.K.) with frequency of an incident wave ω. Thus the particles release electromagnetic waves combined with a primary wave what result in a phase change and amplitude of a resultant wave in matching with primary". N.I. Kariakin etc., Brief manual on physics, "Higher School", M., 1962, page 285 - 286. Thus it is possible to speak about a length of free path of photon in matter. Considering, that the time of a reradiating makes 10^{-8} sec, it is uneasy to count up, that the length of free path in water will make 9 m, and in air of 10240 m. These numerals clean sweep aside a hypothesis of a reradiating of photons, as contradicting to the experimental facts. On these calculations is received, that the pass of light in medium should change as contrasted to by pass of light in vacuum only for very thick layers of matter, and we arrest a difference on as much as fine layers. The settled notion about a pass of light in medium is, that the electromagnetic wave results in forced oscillations electrons of matter (their inertia should be always zero, differently again nonsense). They is instantaneous (?) radiate electromagnetic waves in all sides, but these waves, ostensibly, interfere among themselves so, that there is a wave only in a direction of propagation of an initial wave, waves of other directions is mutual are quenched. We here shall not address to mathematics, which one always gives desirable result, if there is a capability of allowances, and we are converted to common sense. The observation of propagation of other kinds of waves (sound, wave on a water) does not confirm the fact of a wave propagation as a sharply delineated beam with a small divergence angle, as it is watched for light. For example, the light beam a diameter 1 cm spread in a water apart 20 cm will be formed, on criticized notions, as a minimum, 10^{23} secondary sources, therefore, the accuracy of damping of interfering beams in a direction not conterminous with initial should make no more than 10^{-23} degrees, that is represented completely improbable, allowing, that any light ray has a rather noticeable natural divergence, on many orders superior indicated numeral. And if to take into account, that each secondary source radiation has large own moving speed, on the average, in the most different directions, it will cause to full "blooming" of a beam on frequencies (and directions), that directly contradicts experiment. Besides differently frequency of a wave at all can not interfere with full put out. Such discordances of the settled notions about an pass of light in medium with the experimental facts it is possible many more to result, therefore in the literature dedicated these problems, they are simply ignored. Generally, as twist, as a matter of fact, the modern physics does not know the reasons of a pass of light in medium, as this fact uniquely asserts not wave, and corpuscular nature of light as particles moving on a screw trajectory, which one determines their "wave" properties.

"The experimental validation of the photon theory of light. Experiment of the Bothe. The selection between the wave and corpuscular theories can be executed depending on the answer to a problem, as the energy of light is distributed. According to wave notions, it is dispersed on all wave surface (on it the quantum theory insists also - V.K.), according to photon, - it is localized in photons. In experiment of the Bothe the thin iron or copper foil was hanged between two by Geiger counters counters. The irradiation of a foil rigid by *X*-ray called characteristic radiation of a fluorescence of a foil. In a case if the energy of this radiation was spread by means of spherical waves, it was necessary to expect concurrence of activity of counters. The experiment has shown that the counters react completely separately one from another, i.e. the radiation consists of directionally spread photons falling in experiment or in one, or in other counter". N.I. Kariakin etc., Brief manual on physics, "Higher School", M., 1962, page 299. After that experiment, I did not reason more on wave properties of microparticles and did not recall a quantum mechanics.

Now we have accumulated enough information on photons to imagine a clear picture of their motion in any medium.

In an isotropic medium the moving photon creates a wave of polarization, in which one participate in basic electrons of atoms and which one is gone after a photon (because of an sluggishness of electrons) and represents as though double thread with polarization of opposite signs of a charge (mirror charges a neutrino and antineutrino), as is figured on a figure 1 (following to a photon).

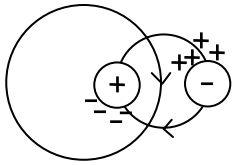


Fig. 1

Thus the electrons nothing radiate both at deviation from an equilibrium position, and at returning in it after flown of a photon. At ideal reversible polarization (electrons in a deep potential well) the energy losses of a photon do not happen, but if the electrons are feebly connected polarization is nonreversible, the photon fast loses energy and is immersed (for example, metals). Therefore most optically transparent will be matters with a most strength bond of electrons with a nucleus. The same principles are fair and at passage of particular mediums, in which one "whole" of atoms can and be not. The lagging wave of polarization proportionally brakes motion of a photon both in a translational direction, and in circumferential, on coils of a screw line. Naturally, that the frequency of a photon thus remains same. The forward speed of a photon will be inversely proportional electron concentrations which is capable of polarization (than and is determined the factor of a refractive of medium). It is clearly, that the photons with large energy (frequency) in the greater degree polarize medium, accordingly, their velocity will be less, than for low-energy of photons. Naturally to figure, that the electric charge for a neutrino (equal *e*/2) is focused on its surface. Allowing interosculation of particles and rather large sizes a neutrino (see of fig. 23.1), particles, which one in the given moment are "inside" a neutrino, in any way with it do not interact, and the force of interaction arranged outside is inversely proportional to a square of radius a neutrino. Therefore with decreasing of its size (increase of energy) the interaction with matter will increase sharply. As in any medium there will be a mobile electron on each of which a photon "grows old", i.e. becomes more long-wave because of nonreversible polarization, at a rather lengthy way there should be a disproportionate displacement of all frequencies of a light ray in long-wave area (as against effect of the Habble) - "reddening" of far stars. It we also apparent in space, remember that space not so is empty, as can be shown.

In anisotropic mediums the apparent effects are very manifold, therefore there is no sense to consider all this variety here, and we shall be massed on main phenomena. At a density gradient of matter (Earth's atmosphere, for example) the part of a screw trajectory of a photon is necessary on area with a smaller electron concentration, and opposite will be arranged in area with the greater polarizability. In the latter case moving speed of a photon is less; therefore photon is compelled to deviate in area of the greater electron concentration in medium.

Here it is necessary to point out, that new physics does not recognize existences of electromagnetic radiation and electromagnetic field substituting their motion of photons (corpuscles). The light intensity is connected not to amplitude of a light wave, and with fluence rate of photons.

REFRACTION of LIGHT

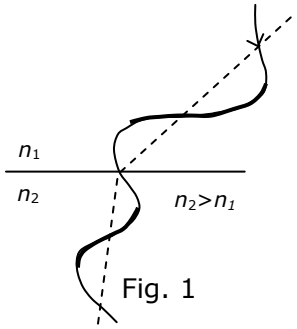
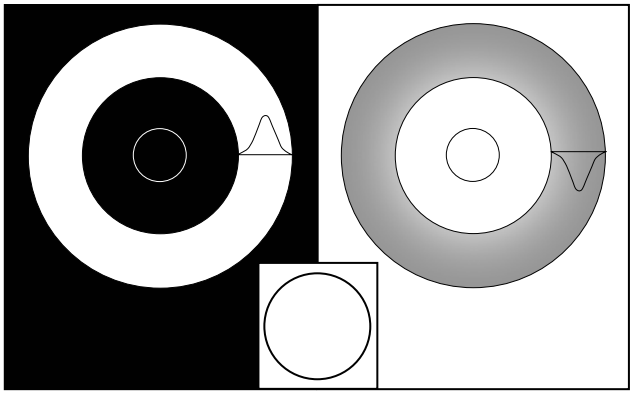


Fig. 1

This effect is figured on a figure 1. The mechanism its same, as surveyed at a light transmission through a Earth's atmosphere (refraction). The phase of a refracted wave always coincides a phase dropping, however at a refraction and reflection of photons the effect of a coherence of photons is watched, about what more in detail will be said at arguing reflection of light. It is needless to remind that when we speak about "wave", it means always screw motion of a particle, instead of the wave process is true. The picture of a figure 1 will not change, if the photon at the motion multiply will pass from medium 2 in 1 and back (at large angles of incidence).

DIFFRACTION OF LIGHT

Happens on that to the mechanism of unilateral polarization of medium, thus, naturally, that the closer photon flies by to a polarizing surface, the greater deviation from rectilinear propagation it experiences. At diffraction happens both frequent, and phase separation of


A Fig. 1 B

photons in space.

As towards motion of photons the diffraction is figured on a figure 1. The cross section of a screw trajectory of a photon matched with the size of a diffraction picture is shown inside a white square. At diffraction on a round hole (fig. 1.A) of the hole we shall not see (is shown a white circle), and instead of it we shall see a light diffraction ring, width which one is peer to diameter of a hole. The distribution of light intensity across a ring is shown by the graph. At diffraction on an opaque circle (fig. 1.B) a circle we too shall not see, and instead of it we shall see a dark diffraction ring.

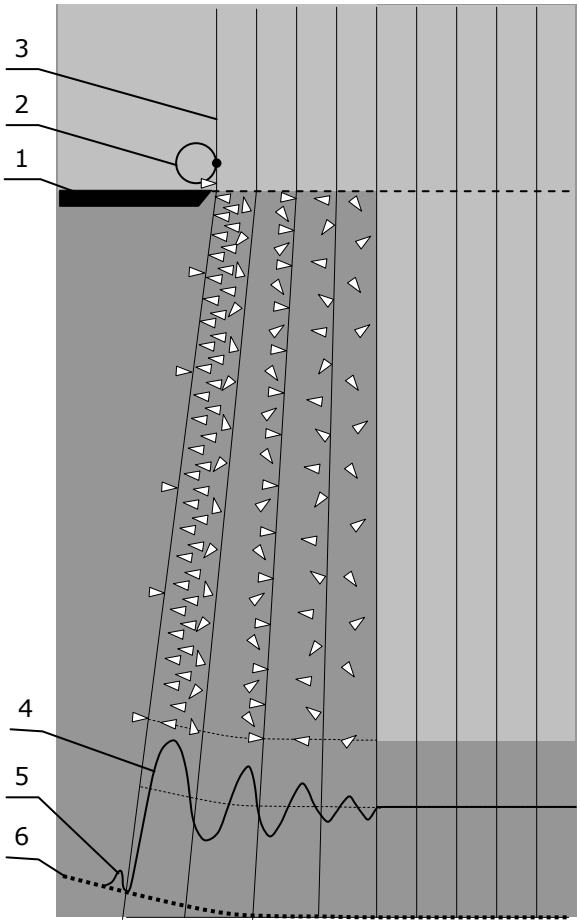


Fig. 2

The picture of diffraction of non-coherent particles is those, the phase which one on a screw trajectory has a random value. The actual picture will be considerably more complex, than is shown on a figure 1, that will be clear from further.

I shall remind to the reader, that the solution of diffraction problems on the basis of a wave equation for an electromagnetic wave is extremely difficult. From myself I shall add, that the theory of the Maxwell will not utilize notion about photons, therefore even if the solution will be received, it is certainly insecure. Therefore for diffraction problems will utilize approximate methods of the solution: a Huygens- Fresnel principle, diffraction of the Fresnel for spherical waves and diffraction of the Fraunhofer for plane waves.

We shall consider the mechanism of diffraction on the basis of a quantum corpuscular mechanics component the basis of new physics. The particulars of the mechanism of diffraction are convenient for considering on an example of diffraction on edge of a screen. Then all cases of diffraction on other objects will become clear. On a figure 2 the trajectories (3) photons near to edge of a screen (1) are shown. The physical reason of diffraction is the attraction of a microparticle or macrobody to that body, near to which one it flies by. The reasons of attraction can be miscellaneous, but for microparticles the main reason is the mutual polarization of the partners. In immediate proximity from edge will pass only such photons, for which one photon is arranged on a screw trajectory so that to not touch an edge of a screen. It is conditionally shown a position (2). A against figures a white triangle, the spearhead which one is directed to a position of a photon on a coil of a screw trajectory in a point of a refraction of a trajectory. Conditionally we shall consider that the angle of phase vector of such photons is peer to zero point. It is clearly, that this direction all time varies, therefore all white triangles display not a direction on a position of a photon in a given place, and phase of a photon in a point of a refraction of a trajectory, apparently, that it will be repeated apart wave of de Broglie. Thus, the white triangles of one direction display trajectories of photons with an identical phase of motion, i.e. coherent photons. Thus the photons are attracted to each other during motion. The photons with a miscellaneous phase of motion are repelled from each other. The dark grey color figures space, in which one the photons are moves predominantly separated on a angle of phase vector. Light grey color is shown space, in which one are moves not separated on angle of phase vector photons, for which one this angle has random value from 0 up to $\pm \pi$.

Numeral (4) on a figure 2 shown the graph of distribution of light intensity of a screen (6) on which one the photons in the same phase fall, which one they had on a line of a refraction of a trajectory, if on this interspaces the integer of waves de Broglie (steps of a screw trajectory) is stacked. On a curve (4) the feeble light stria (5) is watched, stipulated by hit of coherent photons with a phase angle about zero point, fly in immediate proximity from an edge of a screen and consequently tested the greatest refraction. Further there is a broad bright stripe of coherent photons with a phase angle about π, moved in phase opposition with the first stripe. Between the first feeble stripe and bright second stripe there is a small interval, in which one the photons practically miss. Sufficient width of a bright stripe is still stipulated by that the photons with a phase angle $< \pm\pi/2$ are not repelled from photons with a phase angle $\sim\pi$, and at the expense of increased distance from an edge of a screen are refracted to a lesser degree and place in a right part of a bright stripe. Further there is a dark stripe with smaller concentration of photons, then again light stripe etc. Gradually distance up to an edge of a screen is incremented, the refraction of trajectories of photons decreases and together with it the separation of photons on a phase angle decreases. At last, distance from an edge becomes such, that the influence of an edge to motion of photons ceases also separation of photons fades, they are moves, having a random direction of a phase angle, i.e. the photons again become not coherent, what were up to a screen.

Thus, there is clear a reason, on which one on the basis of a Huygens' principle diffraction of the Fresnel and diffraction of the Fraunhofer with usage of a method of zones, the wave surface is broken into which one, give results not strongly distinguished from experiment. It appears that the zones arise at interaction separated in space of coherent photons moved in phase or antiphase after diffraction, instead of up to it. Thus the inconvenient problems fade, on which one the Huygens Principle does not give the answer. The interference at diffraction misses, since the photons are moves by an almost parallel course, and in official notion the origin of maxima and minimums is stipulated only at the expense of an interference of photons moved pursuant to a Huygens ` Principle, on which one any point of a wave front is a source of secondary waves. One more key difference is, that at superposition of any present waves, if they oscillate in phase opposition, the oscillations fade, but at motion of microparticles on screw lines in phase opposition these particles to vanish can not, they are repelled from each other and take miscellaneous dimensional position. The common energy and quantity of all photons before diffraction or interference is always peer to common energy and quantity of all photons after diffraction or interference. Otherwise we shall conflict to an energy conservation law.

In case of repeated diffraction the spectrum of coherent photons can considerably be stretched as a whole or any interesting segment on edges of screens arranged counter on some distance from each other.

POLARIZATION of LIGHT

Up to this moment we viewed a trajectory of a photon as an exact screw line, which one as lengthwise axis represents a circle (fig.1a).

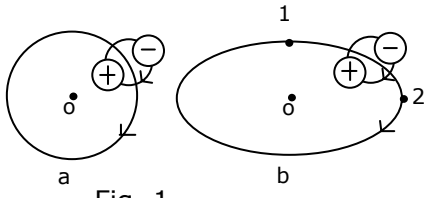


Fig. 1

However in many cases, for example, at motion in an anisotropic medium, for which one index of refraction n_1 in a direction tangent in a point 1 (fig. 1b) is less than index of refraction n_2 in a direction tangent in a point 2, the circle is transformed into an ellipse. Thus on a principle of conservation of moment of momentum in a point 1 photon is gone on large radius, therefore its mass decreases, and in a point 2 photons are gone with smaller radius, therefore its mass is incremented so, that product $mVr = \hbar$. In result, in a point 1 gravidynamic force which is operational on a photon in a direction of an axis of a trajectory *O* significant less, than in a point 2. Therefore motion relevant to a figure 1b will be steady,

since it automatically self-sustaining at the expense of vibratory process of transition of mass of a photon in a kinetic energy and back.

The stable motion of a photon pursuant to a figure 1b does not mean, that the elliptical section of a trajectory can not be turned in this or that side, at motion of a photon in medium. For example, if the external magnetic field will be directed lengthwise axis trajectory of a photon (figure 2), in points 1 and 2 positions the neutrino will be opposite, therefore, will be opposite and force which is operational on charges a neutrino, moving in a magnetic field,.

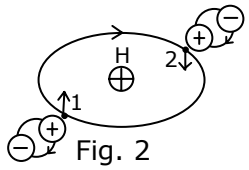


Fig. 2

It will cause to a turning of an ellipse (polarization plane of light) in this or that side depending on a field direction and from that, the laevogyrate or dextrogyrate photon is gone (in case of a figure 2 - clockwise). It is effect of a rotation of the plane of polarization in optically active matters widely used in practice. At a veering of motion of a photon, for example, at reflection and refraction of a light beam, completely diverse mechanism of polarization acts contained therein, that the photon aims to keep rotation axis in space, which one is parallel an axis of a screw trajectory. Therefore at a veering of motion, the rotation axis of a photon starts to precess around of a recent trend. Thus in those instants, when the gravidynamic force is directed to an axis of a trajectory, perpendicularly to it, the photon is gone on a minimum radius of curvature. If during passage by a photon of one wavelength, the rotation axis of a photon as a result of precession commits one revolution, we shall see a trajectory figured on the figure 1b. If concurrence will not be, the ellipse, as a whole, will be gyrated in this or that side or even will be formed multilobed, symmetrical concerning an axis of a trajectory, figures. Thus, the precessional mechanism of polarization gives the greater variety of effects, than polarization in an anisotropic medium.

Now we can mark one of key deficiencies of the electromagnetic theory of light. Under this theory separately taken "photon" is always polarized, since the vectors of intensity electrical and magnetic field oscillate mutual orthogonally in the same planes (by the way, the common magnetic vector for "ours" of a photon does not oscillate and is directed against motion, though is perpendicular to an electric vector, as for the Maxwell). Unpolarized light is represented under this theory by a bundle of "photons" with a different direction of a polarization plane. The experiment displays, that at passage of unpolarized light through a polarizer, its intensity remains almost former, that confirms enunciated above notions. However under the electromagnetic theory follows, that after passage of a polarizer, the light intensity should decrease in tens time, since the polarizer passes photons, polarized only in one plane, and remaining detains, instead of their polarization plane deploys.

COHERENCE of LIGHT, INTERFERENCE

Photons we shall term coherent, if the difference in phase them at motion on a screw line remains to constant. The most coherent radiation in optical range we apparent by activity of lasers, when the photon, radiated an excited atom, induces radiation from other excited atoms. The ordinary light sources radiate series of coherent photons precisely by the same principle, but not as a whole on all volume of a source, and micro segments, each of which practically irrespective of others accumulates an exited state. Then the exuberant energy is radiated as induced emitting of a series of coherent photons, the truth by a strong handicap thus is that the photons are released of miscellaneous frequencies. Here it is necessary to mark, that photons coheres also during refraction both reflection of light and diffraction.

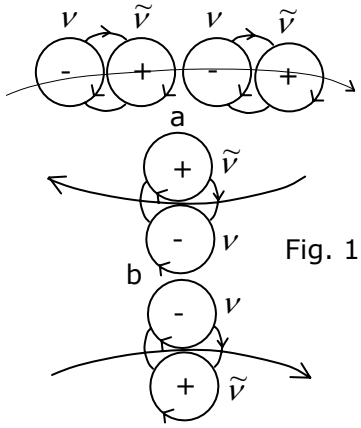


Fig. 1

The photons not only actively interact with medium, but also among themselves. Let's consider two photons moving on a screw trajectory in one phase (the figure 1a) and in opposite phases (the figure 1b). We see, that at interaction of magnetic fields of "currents" ν and $\tilde{\nu}$ two photons in a condition "a" should be attracted (this promotes also the electrostatic interaction), and in a condition "b" - to be repelled, i.e. the photons in one phase aim to each other, and the photons in opposite phases avoid each other. Therefore, proximate to each other photons in a bundle are coherent at the expense of interaction with each other. Simultaneously, we gain a requirement of a maximum of an interference figure in case of fig. 1a: $\Delta=N\lambda$ and minimum in a case 1b: $\Delta=(N+1/2)\lambda$.

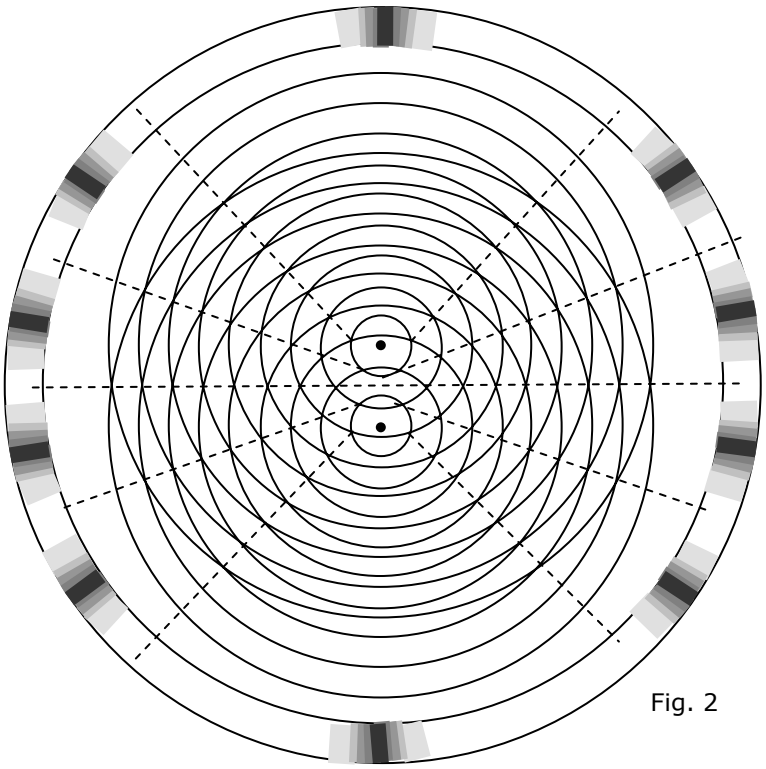


Fig. 2

On a figure 2 the picture of an interference of coherent photons which are radiated two sources, marked by black points is figured. The crests of a screw trajectory of photons are shown concentric circles; therefore distance between two adjacent circles is equal to a wavelength of a photon. There where the circles are intercrossed photons moves in one phase and are attracted (dotted straight lines), and where the circle of one source falls in an interspaces between circles of other source, the photons moves in opposite phases and are repelled. As the requirements of motion in one phase and in opposite phases are saved during all way of rectilinear motion, even the weak interaction of photons among themselves results in an appreciable separation them in space, therefore on a screen the interference figure from light and dark stripes will be formed. On an energy conservation law, the interference of photons in an opposite phase can not result in full "to damping of an

electromagnetic wave". How many photons were released by a source, as much falls on a screen. On a way any photon does not disappear.

At rotation of sources rather each other, the stripes are gyrated in that a direction.

Quantity of dark stripes on a screen *N* depends on distance between sources expressed in lengths of waves:

$$N = 4n\frac{\lambda}{2} \quad (1),$$

where n=1,2,3…

If a step of a screw trajectory of photons for sources miscellaneous, the lines of inphase motion of photons are bent in the side of a source releasing more a short waves, as shown in a figure 3. Allowing, that the trajectory of photons is rectilinear, the interference in this case disappears.

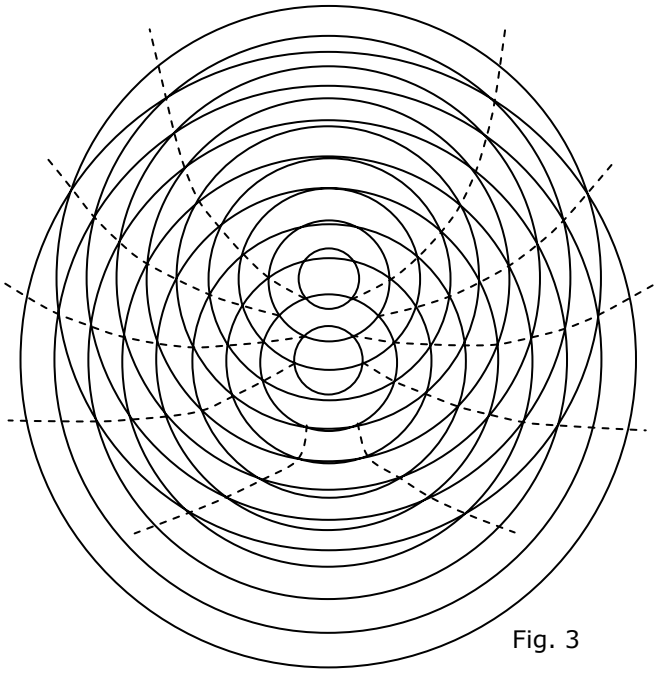


Fig. 3

The above-stated reasoning concerns to all bodies and any particles since all of them have a screw trajectory. However, the requirement of single-phase motion will cause to a maximum or to a minimum of a interference picture will depend on that whether the attraction or repulsion predominates in interaction of particles at single-phase motion. For photons attraction, as shown in a figure 23.6.1 provided that predominates. For electrons the outcome of a competition between magnetic and electrostatic interaction depends on moving speed of an electron and at a high speed attraction of electric charges moving in one side, predominates above a coulomb repulsion. For macrobodies the gravitational attraction acts. If to allow for gravidynamic interaction, which one is exhibited at high speeds of motion, the in parallel moving particles in one phase should be repelled and oncoming traffic in opposite phases - to be attracted. Therefore picture of interference for miscellaneous objects and miscellaneous requirements can be opposite. This fact is distinguished new physics from official in which one an interference figure does not depend on interaction of particles, and particles are considered not interacting.

Official physics considers, that at an interference of light the principle of superposition of fields is upset. This error opinion is a consequent of the error statement, that the electrostatic field is a particular case of an electromagnetic field. We imply an electromagnetic field none field, and particles (photons) consisting from opposite charged neutrino and an antineutrino. The photons of γ-radiation, x-ray, optical and radio waves concern to them. Last have a changed constitution as against short-wave photons and other motion because of absence of gravidynamic interplay between a neutrino and antineutrino. With increase of energy of photons their corpuscular properties are exhibited stronger, the interplay of photons is augmented also, which one upsets all in the greater degree a principle of superposition, collecting particles in one place it is more than in another.

Therefore principle of superposition to photons and other particles is not applicable. The fields (electrostatic, magnetic, gravitational and gravidynamic) have not weight and energy and do not interact with each other, therefore for them the principle of superposition is applicable to the full.

Comments of the author : Double-slotted experiment of the Jung.

The given monography is invoked to not multiply a problem of physics, and to reduce their quantity. Therefore one new problem (gravidynamic interplay) new physics compensates by removal of set of other fundamental problems, which one are a substratum for uncountable gamble, both for alternativers, and for orthodoxes. The notion about motion of photons, electrons and other microparticles on a screw trajectory easily explains double-slotted experiment of the Jung and removes this problem from the agenda. Even if we shall route on a slots photons or electrons one by one, the hit of a particle in this or that slot will depend on a phase of motion of particle on a screw trajectory. An initial phase we, while, we can not set arbitrary and it has a random value. If the particle for a slot has a phase 90^0, falls in (left-hand) slot on a current of traffic. And if the phase 180^0 (counter party of a screw trajectory), will get in (right) slot. Naturally, that at spacing interval between slots there is more diameter of a screw trajectory, effect of the Jung to be watched more will not be, therefore slots should be rather close to each other, if experiment make not with bunchs, and with separate particles. I shall remind, that «wavelength» of a particle is peer to a circumference of cross section of a screw trajectory it.

LIGHT DISPERSION

With increase of energy of a photon mass a neutrino its components is incremented. Thus the polarization of medium will increase, accordingly, the moving speed of photons drops, i.e. with increase of frequency of light the index of refraction of medium is incremented. As is known, the abnormal dispersion (decreasing of index of refraction of medium with increase of frequency of light) is watched only near to absorption bands. Thus the polarization of medium sharply is eased, since the sluggishness resonant, in relation to a photon, electrons is peer to zero point. Allowing, that four kinds of a field are spread in medium much faster than speed of light, as will be shown later, the electric polarization becomes symmetrical, both ahead, and behind neutrino and ceases to brake a photon, both in a direction of a headway and in a tangential direction on coils of a screw trajectory. The index of refraction of medium drops and reaches unit. Further, with increase of energy of photons, there is most interesting in an abnormal dispersion. The electrical field in matter was not as though fast spread, all the same, the velocity of its propagation in matter can be terminating. Therefore ahead neutrino density of an electrical field always is more a little, than behind. Therefore, within the limits of an absorption band of matter, while the sluggishness of resonant electrons is peer to zero point, with increase of mass a neutrino (energy of a photon), the polarization of medium ahead of a photon appears more, than behind and it speed up a photon up to velocities superior speed of light in vacuum. Naturally, that the common energy of a photon remains to a constant both increase tangential and forward speed on a trajectory happens at the expense of decreasing mass of a photon, decreases thus and polarization, that hinders with unlimited increase of velocity of a photon. The index of refraction of medium becomes less 1. Outside of limits of absorption band of matter the light dispersion again becomes normal, since the electrons again start to exhibit the sluggishness. Thus, the abnormal dispersion is one of instruments of study of rate of propagation of the field form of a matter in space.

At the beginning of chapter 23 is shown, that radius of a photon approximately in 1000 times is less than its wavelength. The wavelength of x-ray photons is about peer to radius of atom of Hydrogen ($0.5 \cdot 10^{-8}$ cm), therefore radius of these photons exceeds all in 18 times classic radius of an electron. The atom for such photons represents practically blank space (as against photons of optical range). In outcome the photon is capable to move near to atomic electrons located in a ground state, and to distort electronic orbits, that is exhibited in polarization of environment. The difference of a X-radiation from a visible light is, that the index of refraction of a visible light becomes less unit only near to absorption bands, when the atomic electrons practically have not inertia and the polarization ahead of a photon appears slightly more than behind. The index of refraction of X-rays always hardly is less than unit, i.e. for them the vacuum appears more by dense medium, than matter.

This fact finds simple explanation in new physics. As the x-ray photon is capable to pass by an electron located in a ground state, it can expend minor energy to remove an electron from this condition, since on notions of new physics the energy levels are inspissated near to a ground state. The fact of polarization (and even of ionization) environment by neutral photons is confirmed structure of a photon from opposite by a charged neutrino and antineutrino.

Apparently, that in vacuum the dispersion will miss, though on notions of official physics it should be watched and in vacuum. "In the guess, that the phase velocities of light waves for different lengths of waves in vacuum are various, it was necessary to expect a discoloration of one of stars in a system of a binary star at its eclipse. When the light source (star) obscures of other sidereal pair, the color it for the earth spectator should vary from customary to cyan, as at presence of a normal dispersion of a wave of a violet (short-wave) portion of the spectrum should considerably lag behind waves of a red portion of the spectrum on a vast trajectory from a star up to the Earth. The observation Arago above a eclipsing variable star Algol in constellation of Perseus have shown absence of such effect. Therefore, the dispersion of electromagnetic waves in vacuum misses". N.I. Kariakin etc., Brief manual on physics, "Higher School", M., 1962, page 285. This observation confirms also, that the notion of orthodox physics about "boiling by virtual particles" empty space is erroneous.

REFLECTION of LIGHT

Though from a corpuscular point of view the reflection of light seems very similar to reflection balls from a wall, nevertheless, this problem not so is simple, as it in due time was introduced to the Newton and requires more in-depth arguing. For satisfaction of a law of conservation of impulse is completely apparent, that the angle of reflection of a photon should be peer to a hade without dependence from, whether it is gone rectilinearly or on a screw line and has the form of a ball or any another. The photons of a visible light, approximately, in 10 times are larger than atoms. On the one hand, it speaks that the atomic plane for photons introduces a rather slick surface, and, on the other hand, indicates that atoms of matter and neutrino of photons of a visible light interpenetrative because of small electric charge the neutrino and its large radius. At the same time, this charge is sufficient that the electrostatic interaction of photons as with each other, and with matter was exhibited. On a figure 1 the different positions of a photon on its screw trajectory are shown if to look lengthwise axis trajectory, and also form of a trajectory polarized *S* and *P* of waves.

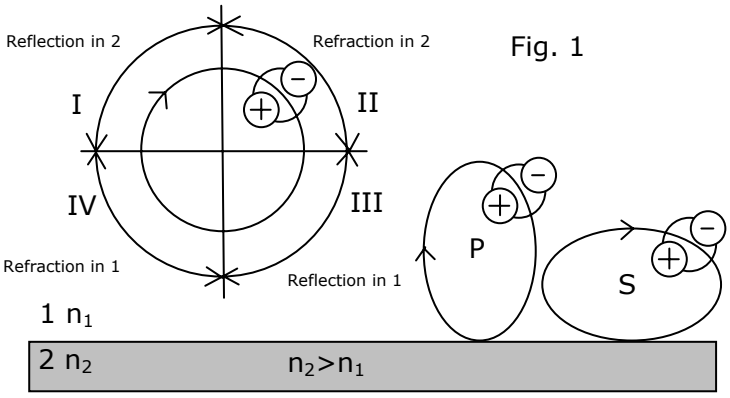


Fig. 1

The destiny dropping on a interface of phases of a photon, apart from relative index of refraction, in a large degree depends on a phase of a photon, that is well visible from a figure 1. If the photon drops on a interface of medium 1 and 2, being in the first quarter of a trajectory (for this purpose it should be moves from medium 2 on medium 1), the probability of a retro reflection on medium 2 is great. If the photon will be in the second quarter of a trajectory (that is gone from medium 1 to medium 2), most likely, there will be a refraction on medium 2. If the photon at hit on an interface of phases is in the third quarter of a trajectory, there will be a reflection on medium 1 (thus a photon is moves from medium 1 on medium 2). The division of a light ray on reflected and refracted on an

interface of phases serves the convincing proof that "latent parameters" the light ray bears in it. If photons to send on a interface of phases is strict in one phase of motion, the determinism will exhibit itself that we shall watch only reflected or only refracted beam, instead of their bifurcation. Thus reflection or the refraction will depend on distance up to a reflective surface.

Here is necessary to make a quotation from the book modern English physicist G. Lipson «Great experiments in physics», M., 1972, page 73: «However exists an even more simple phenomenon, which one a hypothesis of a Newton (about corpuscular light - V.K.) can not explain - simultaneous reflection and refraction of light by a surface of a glass. The Newton has put forward rather fog idea about slight reflection and slight refraction: he has supposed, that the ray consisting of a set of corpuscles, can in definite time be able, when it is easily mirrored, and then - in a condition, when it easily refracts, etc. With the help of phenomena of an interference, which one we later shall consider, a Newton may to estimate spacing interval between these conditions, which one has appeared equal 1/89000 inchs for red light. It makes $2.7 \cdot 10^{-5}$ cm - not so far from half of wavelength of red light, as we now know». Now again look at a figure 23.8.1 to estimate genious intuition of a Newton, which one as a matter of fact has demonstrated not only corpuscular of light, but also motion of its corpuscles on a screw line. It is a pity, that this guess was mislaid in a history of science and has remained dead neither Newton, nor other scientists. Differently we now had absolutely other science. Apparently, that the experiments on this subject with usage of the modern equipment will become historical, and name of the scientist, which one will do them, remain for ever in a history of science.

In the fourth quarter of a trajectory, the photon, being moving from medium 2 on medium 1, experiences refraction on medium 1. Thus, photons on a interface of phases separates depending on the position on a trajectory, therefore, after refraction or reflections their coherence considerably will increase. Paying attention on the form of a trajectory of a photon in a polarized *P*-wave (the electric vector oscillates in a plane of incidence) and *S*-wave (the electric vector oscillates in a plane, perpendicular to a plane of incidence), it is possible to conclude, that the reflection of these waves will be practically identical only at angles of indicence, close to 0^0 and 90^0. In intermediate angles the *S*-wave will be always reflected better than *P*-wave. It also is confirmed experimentally.

As any microparticles moves on a screw trajectory, if a bundle of these particles with a wavelength de Broglie λ to direct at angle of θ on reflecting planes (for example, crystal) with interplanar distance *d*, the maxima of reflection will be watched pursuant to the formula Wolff-Bragg: $n\lambda=2d\cdot\sin\theta$, where *n* - integer. In a bunch of particles always there will be such, the phase which one is optimal for reflection (фиг.23.8.1). If a step of a screw trajectory (wavelength de Broglie) appropriate, the particles, mirrored from the first plane, will be mirrored and from the second plane. At a multiple reflection from of the same type planes the self-phasing of particles will be increased and in a given maximum of a Bragg reflection we shall receive particles moving practically in one phase. Further usage of a given maximum will allow experimentally once again confirming motion of particles on a screw trajectory. The modern physics in explanation of a Bragg reflection is in a bewilderment that is visible from the following quotation (R. Sproul. A modern physics, M., 1974, page 121): "The electron is very small, but the wave packet, accompanying it, (so is "mated" with corpuscular and wave properties of microparticles - V.K.) can extend many angstrom. If the sizes of an electron were so great, that it would extend from one atom up to another, the electrons did not dive at all through solid bodies. On the other hand, the wave accompanying an electron should extend distances, equal, at least, several interatomic intervals; otherwise it would be impossible to receive a constitutive interference of reflections from separate atoms, result by which one is the Bragg reflection".

In connection with notions, enunciated in this section, it is necessary to clear up the whole class of "interference" phenomena, which one as a matter of fact by those are not. The speech goes about interference in thin films, Newton's rings, coated optics etc. This problem is more comfortable all to consider on an example of coated optics. In many optical instruments and, first of all, in cine-photographic apparatus there is a necessity through a lens to pass light pursuant to spectral sensitivity of a human eye for an exact color transfer and exact of a chiaroscuro ratio. For this purpose it is necessary to condition for preferred passage of yellow rays, the eye is most responsive to which one in matching with cyan and red rays. Such requirements form at coatication of coating on a surface of a glass of a thin

film of particular thickness and with a particular factor of a refraction. The known theory of an interference on thin films recognizes that a luminous flux, past through a forward surface of a film is partially reflected from a back surface, thus yellow rays, reflected from forward and the back surfaces interfere and are quenched, and the cyan and red rays, because of improper requirements for damping, give optics in reflected light lilac color. It is represented apparent, that reflected back rays are lost irrevocably and has not any value; they interfere in further whether or not. Therefore, from a point of view of the settled views, the coated optics is completely useless. At the same time, from a point of view of enunciated here notions, the coated optics has apparent positive effect. Dropping on a forward surface of a film the rays are partially reflected and are lost irrevocably (reflection coefficient it is possible to correct by many independent ways). The rays, past inside of a film, become coherent, therefore requirements of their reflection on a back surface will depend from a factor of a refraction of a film and its thickness, i.e. from number of waves stowed in this thickness. If all these conditions are executed, the yellow rays in a minimum degree are reflected from a back surface of a film and, in basic, pass through it, but for passage of cyan and red rays of a conditions it appear unsuitable and they, in basic, are reflected from a back surface of a film. Thus are conditioned for preferred penetration into a lens of yellow rays.

We see that the effects on thin films of any relation to a true interference have not.

The enunciated notions are easy for testing. If we shall guide a very thin ray of coherent photons on a reflective surface and we shall slowly pull together a source with to surface, we shall note effect of an alternation of intensity of a reflected ray with a period relevant to movement on a wavelength of a photon. Enunciated here critic is put under doubt not only such "small", as the theory of an interference on thin films, but also, generally, capability of a pass of light in the electromagnetic theory. If, following to modern notions to consider, that the secondary radiation is quenched at the expense of interference in all directions, except for a direction of propagation of light, necessity for interference does not arise at all, since the radiation in all remaining directions is all the same irrevocably lost. Apparently, that in such circumstances light generally to be spread can not because of huge power losses. In it the feeblest place of the electromagnetic theory of light consists.

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