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Dualism of newton's elementary particle

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Abstract
To describe Light, Newton used a Particle, which, on the one hand, is an element, invariant in space and time, but, on the other hand, whose properties depend on the Color of Light. This dependence of the property of this element is similar to the dependence of the kinetic energy of a material point on speed. But this abstract point does not have the Rest Mass invariant for all speeds. This initial contradiction was simply taken for the specificity of a given particle called a photon, which Einstein linked with the Planck's quantum of energy.
Newton's corpuscular theory of light initially encountered difficulties in describing the interference and diffraction of light. But the description of coherent light will raise the question of the size-geometry of this elementary particle. Taking into account the geometry of a photon allows us to really, and not abstractly, show its invariant specificity, which ensures the stitching not only of individual photons into a coherent wave, but also stitching of the corpuscular and wave theory. In this case, the postulated Heisenberg Uncertainty Principle is translated into the mathematical property of the Fourier transform, which determines measurability.
Moreover, Newton's Elementary Particle shows how to determine the real specificity of a material particle that has lost its Mass invariance due to its Einstein dependence on velocity and, taking into account the principle of Logarithmic Relativity, allows us to correctly systematize Elementary (Fundamental) Particles.

Keywords: Dualism, invariant, fundamental particle, quantum, photon, space and temporary waves, coherence, principle of uncertainty, measurability

Introduction
Emergence of Quantum Mechanics was connected with attempt to EXPLAIN some experimentally observed effects which are not keeping within (inexplicable) within classical representations and with elimination of singularity in classical theories. And the question of duality of the nature of the particles showing wave properties was on the first place. However the constructed modern Quantum Mechanics described "inexplicable" effects actually having hidden them behind the Theory which should not be understood, and prinimati is necessary. Whereas dualizml is just elementary duality of the description of properties of the object - it is possible to set strictly consistently two we will tell two pairs of Orthogonal (independent) parameters. Each couple completely describes and is physically unambiguously connected with other similar couple, for example, in relation to the photon, by means of Fourier transformation. Strictly mathematically the dualism was advanced by Pontryagin as the General Communication of Two Functional Sets. It also demanded allocation from the book "Bases of the Principles of Quantization" of this separate article in which the answer not only to the first question is given, but also the understanding from which also the Principle of Uncertainty of Heisenberg directly follows is given.
The development of precision devices, their elements and new materials, such as quantum - photonic crystals, is associated with measurements in areas previously inaccessible [1, 2]. At the same time, as long-term practice has shown, the maximum effect, improvement of operating parameters, improvements by orders of magnitude, and not by percent, is observed when you find where technical progress has turned off the path determined by the Fundamental Laws of Nature. But for this it is necessary not only to strictly control the operation of the instruments, but also to control the severity of the interpretation of the measurement results. And on this path you come to the level when you discover the incomplete description of even elementary models [3], going beyond which provides a cardinal improvement of devices [4].
An in-depth analysis of quantum Mechanics has shown that the Schrödinger equation describes the Basic Physical Models in a very contradictory manner [5, 6].

And the canonization of the solutions of the Schrödinger equation, giving a catastrophic divergence of the energy of electronic levels with an increase in the mass of an atom, in principle, stalled the development of physics, and related sciences, and nanotechnology [7]. They only allowed, albeit roughly, qualitatively to systematize and describe many phenomena of the micro-world, primarily the hydrogen atom.
And approximate descriptions of many "quantum" effects were obtained, but with the use of numerous adjustable parameters. So the bottom line from the century of development of Quantum Theory (QT) is actually the development of some quantum-mechanical methods, the use of which, without understanding the BASICS, often leads simply to fantasies.
So the methods in QT have found regularities, but not Physical Laws, so these regularities are only Local, and applicable only in a limited area of describing the effects.
And these quantum regularities were perceived as some General, "Basic Quantum Representations". But their discrepancy with Reality [8] is actually determined by their non-invariance. While the fundamental contradictions arising within their framework, they are trying to eliminate with the help of amendments, fearing to touch the foundations, not so much of science itself, as scientific and bureaucratic ones. But with the help of corrections it is possible to describe, in principle, just the corrections, i.e. small deviations from the Basic Model - it is the fundamentally correct model that makes the main contribution to the calculated values of the parameters [9].
And the fantasies hiding behind a fundamental Misuncipation, within which even the “strictly calculated” fundamental values can differ by 10 orders of magnitude, and for the experimental verification of which “Mankind lacks 42 orders of magnitude in energy”, have actually degenerated into a decoration and props that have no place in the Foundations of Science.
While strict adherence, actually pushed into the background, Planck's Quantization of photons, supplemented by Einstein's Quantum Concepts of phonons, allows one to look deeper into the microcosm and solve some cosmological problems. It is the strict adherence to the Planck-Einstein Quantization that makes it possible to identify and systematize and eliminate phenomenological errors in the canonized Schrödinger equation. But we had to start his analysis from the very Elementary [10, 11, 12]. And to continue the Analysis of the "Dualism" of the Quantum Theory, if strictly, then it is necessary with Newton's Particles, which, in fact, was done within the framework of the presented work, which is the first part of the completed more general work "Foundations of Planck-Einstein Quantization".

Light element

Even the ancient Greeks, in their logical constructions, differentiated to ELEMENTS both matter - to indivisible atoms, and light - to particles-photons (from ancient Greek φῶς, genitive φωτός, "light"). And Newton, also striving to decompose everything into mathematical points obeying the Laws of his Mechanics - The Differential Calculus of Mathematical Points [13], continued the development of this Idea. Analysis of Newton's law of inertia for particles (matter) with nonzero rest mass is the subject of a separate work. In the same work, an Analysis of Newton particles used by Planck for the introduction of quantization is carried out
Newton showed that not only the atoms of different substances are different, but the Color of Light is not just a different combination of light and darkness, but different Particles of Light. Moreover, since then physics was not divided into theory and experiment, and physicists were not divided into theoreticians and experimenters, then Newton's proof was not only theoretical - in the mathematical differential analysis of infinitely small "mathematical particles" he created, but also experimental. By contradiction method. He designed and manufactured a telescope without chromatic aberration - a mirror. And, thereby, he showed that chromatic aberration occurs in media (in lenses) because multi-colored particles move at different speeds.

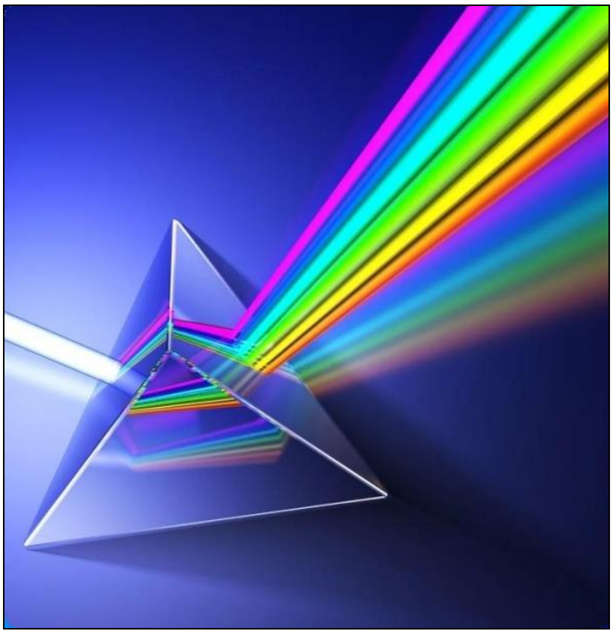

Рис 1: Разложение света по скоростям частиц Ньютона в среде.

These Elementary Particles were laid in the foundation of Newton's corpuscular theory of light [14, 15], in which light is considered as a stream of different Particles, which Einstein, when describing the photo effect, associated with different Planck Quantums of Light Energy, originally by Planck himself, introduced for resonances waves of Light. In favor of Newton's theory of light, the straightforwardness of the propagation of light, on which all geometric optics is based, spoke. However, diffraction and interference of light by a stream of particles was difficult to describe (at that time), while Huygens' wave theory of Light [16] already gave for Light a direct connection between temporal waves and spatial waves determining diffraction and interference [17]:

$$E = A \cdot Sin\left(2\pi \cdot \frac{t}{T} - 2\pi \cdot \frac{x}{\lambda}\right) = A \cdot Sin(\omega \cdot t - k \cdot x) \qquad (1)$$

Moreover, the connection of spatial and temporal waves is carried out through their phase velocity v_{Ph}, a complete analogue of the speed of Newton's particle:

$$E_{/\varphi=0} = A \cdot Sin(\omega \cdot t - k \cdot x)_{/\varphi=0} \Rightarrow k = \frac{\omega}{\frac{x}{t}} = \frac{\omega}{v_{Ph}} \qquad (2)$$

Wavenumber k - the number of waves per unit length determines the frequency of the wave in space. In this case, of course, the wavelength is also determined by the phase velocityv_{Ph}, which is equal $c$for electromagnetic waves in vacuum, and in a medium the observed phase velocity decreases due to the refractive index n, which in the transparency region is practically a real number greater than one:

$$\lambda_0 = c \cdot T, \qquad \lambda = \frac{c}{n} \cdot T \tag{3}$$

So the chromatic dependence described by Newton in the language of particles with their different velocities, which determines their kinetic energy, fully corresponds to the phase velocity of a space wave. A wave that does not have rest mass, but has mass at the speed of wave propagation, which determines both the kinetic energy of a particle of Light and its momentum-pressure:

$$E_v = \frac{m(v_{Ph})^2}{2}, \quad p_v = m \cdot v_{Ph} \tag{4}$$

In the absence of a rest mass, the waves have nothing unusual, because it corresponds to the passage to the limit to infinitely long waves. In this regard, the difference in the behavior of electromagnetic waves from waves, say, on the surface of the water is only in their phase velocity. This "mass" of the wave completely satisfies the law of conservation of momentum both when the wave is reflected by a screen perpendicular to its velocity, and by a screen at an indirect angle. It also satisfies the law of inertia, say, with a smooth turn of the wave by a mane by the surface or some additional, say, gravitational force.

Running a little ahead, it should be noted right away that it is not uncommon for an erroneous statement to slip that the phase velocity is immedible, and only the group velocity is measurable. Such a statement contradicts both the very definition of these velocities, which in the absence of dispersion simply coincide, and experiments and practice, say, in range measurements. And this erroneous statement simply demonstrates a lack of understanding of the properties of the photon, which will be discussed in the following paragraphs.

As Planck showed, the frequency of oscillations in time is directly related to the phonon energy, i.e. with the kinetic energy of Newton's particles. So, multiplying the wavenumber by Planck's constant, we obtain, in accordance with formula (2), the momentum of the particle, equal to the kinetic energy of the photon, divided by its speed:

$$hk = \frac{h\omega}{v_{Ph}} = \frac{m(v_{Ph})^2}{2} / v_{Ph} = \frac{p}{2} \tag{1}$$

Thus, the spatial frequency k is directly related to the momentum and is often called the quasimomentum.

With another characteristic of Newton's particles - the linearity of their propagation, there is also a complete correspondence for a plane electromagnetic wave.

The apparent discrepancy, which did not fit into consciousness, and was hidden behind the word "dualism", was in the geometry of the particle and the wave. But dualism generalized by Pontryagin is nothing but a semblance of function spaces [18]. And Fourier analysis, and for the geometry of the particle, and for its measurable characteristics, allows you to remove this uncertainty, strictly defining like spaces of different characteristics of the particle.

And so k it is analogous to the frequency of oscillations, but in space, not in time. But the Fourier transform, usually used exclusively for analyzing the amplitude and phase of temporal harmonics, is strictly mathematically developed, in principle, for any variables and, naturally, allows one to determine spatial harmonics as well. But the Fourier transform has historically been viewed exclusively as a tool for linear decomposition of time dependences into harmonics.

But they did not pay attention to this Elementary connection of the properties of Newton's particles with the properties of spatial waves. All attention was paid to the fact that, as Planck showed (1900), in contrast to the classical ideas about the possibility of a wave having any length and any amplitude, the length and amplitude of a light wave have a discrete set of values. To describe the photoelectric effect, Einstein compared a particle of Newton's light with a particle of Planck's energy - Quantum of light (das Lichtquant). And with the filing of chemist Gilbert N. Lewis in 1926, the photon began to be called the Quantum of light energy. But, direct comparison of a particle of energy to a piece of space, without specifying its geometry and volume, is not correct. And the fact that the Light behaves like a particle, like a wave, was hidden behind the “smart” word dualism under a veil - immedible. So, not only in popular articles, but also in scientific works, the idea of the Quantum of Light - the photon - remained primitive, at the level of sharply spatially limited mechanical particles of Newton. Although electromagnetic waves have long been used and a kilometer length. But even for infinitely extended waves, the photoelectric effect at small levels indicates the spatial limitation of the photon. On the other hand, ultrashort pulses have been studied for a long time, without violating the "integrity" of the photon.

Whereas the very strict setting of the speed of light, in accordance with the Heisenberg Uncertainty Principle, gives a complete (infinite) uncertainty of the coordinates and time of the photon.

On the other hand, Pontryagin's dualism [19] directly indicated the connection between function spaces. And the canonical isomorphism connecting them is the Fourier transform.

With regard to the photon, such "dual" (dual) spaces are connected by a linear Fourier transform, which works due to the additive linear addition of waves.

And one last general comment. Although the laws of Newtonian mechanics are observed for solitons arising from nonlinear interaction of waves, we will not consider them in detail here, since this work is aimed at analyzing the Fundamentals of Quantum Mechanics, which are built on a linear approximation. We will postpone the consideration of solitons until the next work.

Volume of Uncertainty of an "empty" particle

Let us analyze the ELEMENTARY relationship between the corpuscular and wave theory, taking into account spatial waves, which are well known to everyone in the form of surface waves on water, but which can be compared to any parameter, say, the average mass density inside a particle. Let's start the analysis initially with an “empty” particle, empty in the sense that its internal properties are set by some average value of a certain parameter. So, in fact, from the analysis of the framework of the particle, whereas initially it was represented as a mathematical point.

The ideal point cannot be measured. Therefore, we took the path of striving towards zero of the final segments, into which any section of the line is divided. And the Differential Analysis constructed by Newton-Leibniz allows, in principle, to obtain for a point corresponding to the center of a particle at any moment of time the value of the coordinate of the particle and its velocity "simultaneously". But this does not remove the question of either the size of the actually observed particle, or the time, or rather the time interval of its observation.

The Fourier transform corresponds, as noted in the previous paragraph, to the additive, linear contribution of various harmonics to the pulse generated by them. Both in time - frequency harmonics, and in space - impulse harmonics [20]. In the linear case, the distribution along the coordinate, the Fourier transform gives the distribution of conjugate spatial harmonics along the momentum, i.e. dependences of the amplitude and phase of spatial harmonics on the wave number or quasimomentum. And the abstract choice of an ideal particle with an ideal Heaviside boundary in space (Fig. 1), as the analysis has shown, is not correct.

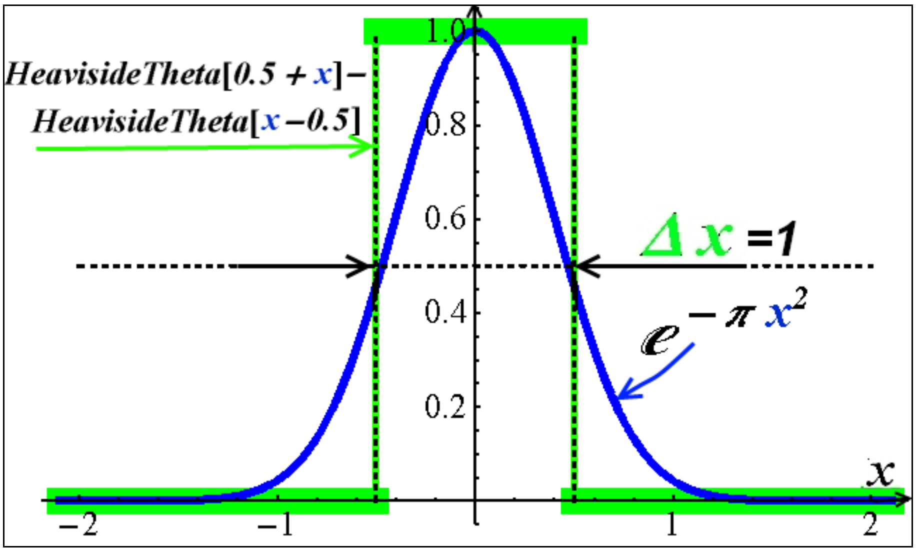

Fig 1: Heaviside's ideal unit impulse - green lines and blurry equivalent area impulse - blue curve.

Although strictly mathematically, the Fourier transform is applicable for smooth functions. Therefore, the Fourier analysis of the Heaviside pulse should be perceived only as an analysis of the tendency with an increase in the sharpness of the pulse boundary, while neglecting nonlinear processes. But taking into account these simplifying assumptions, the Fourier transform of an impulse with a sharp ideal Heaviside boundary gives, in principle, an infinite set of spatial waves coupled with an ideal impulse - an additive addition of these waves gives the initial ideal impulse (Fig. 2).

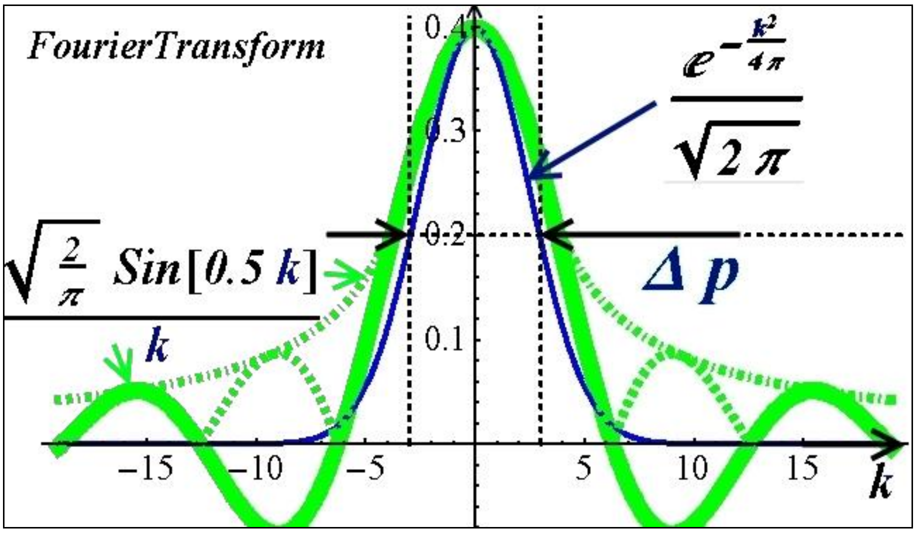

Fig 2: Infinite Fourier blurring in the momentum of an ideal particle sharply limited in space - the green curve (the dash-dotted curve shows the envelope of its modulus) and sharply limited Fourier blurring in the momentum of a model spatially blurred particle of equivalent area - the blue curve.

Shown in Fig. 2 The Fourier transform of the ideal Heaviside momentum shows the amplitudes of the spatial harmonics, from which it is added and which, with an increase in their quasimomentum (green curve in Fig. 2), slowly decay. These spatial harmonics, shown for a fixed time point, have a spectrum in terms of quasimomentum or space wavelength, completely analogous to the frequency spectrum of temporal harmonics for a fixed spatial point of the ideal Heaviside time pulse (Fig. 3).

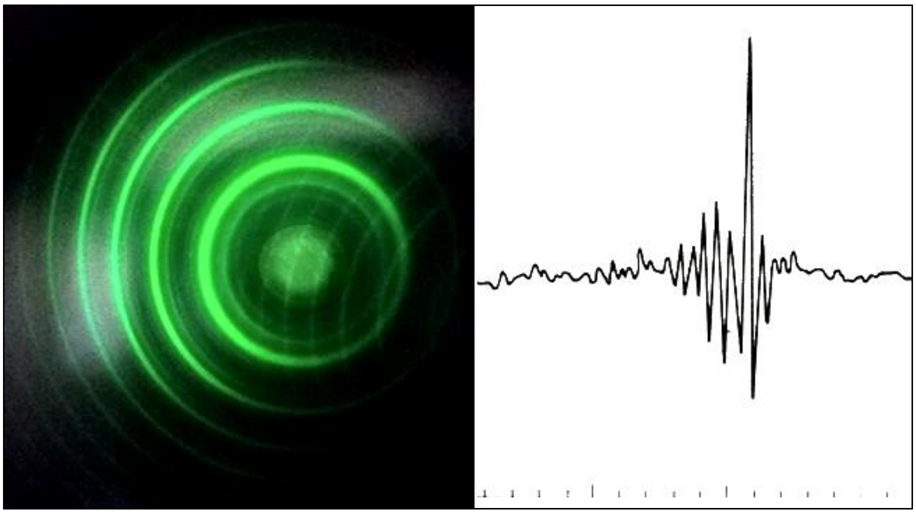

Fig 3: Spatial interference pattern of a finite set of wavelengths (left) and its one-dimensional cross section - spatial interferogram (right).

In fact, these spatial harmonics are the waves of de Broglie matter [21] from which the particle is added, but none of these harmonics in itself is identical to the particle.

This is, strictly mathematically following from the Fourier transform of the difference of the Heaviside functions, impulse blurring and reflects the Heisenberg Uncertainty of the "Unmeasurable" internal parameters of the IDEAL Newton particle. The concept of this Elementary particle was extended to Elementary particles of the electron type. Although the Heisenberg Uncertainty Principle itself is more applicable for a Non-Ideal particle with blurred spatial boundaries (Fig. 1 - blue curve), for which the set of spatial harmonics and their corresponding momenta, as will be shown in Fig. 2, is compressed.

Those. The very introduction of the Uncertainty Principle, as can be seen from Fig. 2, is associated with looking with the help of Planck's constant into the internal structure of a particle, i.e. with violation of Un-imensibility.

$$\Delta\varphi_x = \Delta x \cdot \Delta p \geq \frac{h}{2} \qquad (6)$$

And for correct measurability, the correct choice of the model of spatial blurring of the Elementary Particle is simply required, which gives a minimum in the space obtained by combining the conjugate spaces - coordinate and impulse.

But for the photons used by Planck for the introduction of the Quantization of particles of light, it is accepted to distinguish a unit time interval, not a spatial one. The time interval, for electromagnetic waves, is naturally related to the space interval through the speed of light. And for the complete characteristic of a photon, as will be shown below, it is required to combine not only the time space with the space conjugated to it, the frequency space and the coordinate space with the space associated with it, impulse, but their complete, phase consideration:

$$\varphi = \omega \cdot t - k \cdot x \Rightarrow d\varphi = \frac{\partial\varphi}{\partial t}dt + \frac{\partial\varphi}{\partial x}dx = \omega \cdot dt - k \cdot dx \qquad (7)$$

Taking into account that the phase velocity determines only a zero-phase increment (f.2) with an Elementary Coupling through the speed of light in a vacuum of frequency and impulse spaces, the Extended Coupling and the resulting Law of Dispersion requires taking into account the structure of space, which will be done in the work “Foundations of the Planck-Einstein Quantization ".

Wave packet analysis

Similarly to the consideration of an "empty" single spatial impulse, one can take a time impulse filled with waves. First, consider the Fourier transform of such a time pulse. And it can be filled, like Planck, not with supposed waves of matter, but with well-known and quite measurable real electromagnetic waves of different frequencies, the phase velocity of which determines the corresponding spatial impulses.

For the Heaviside impulse, we have the filling of the time interval with the number of electromagnetic oscillations. With the first filling method, we will change the pulse duration while maintaining the unit vibration frequency. When filling the pulse with a different number of oscillation periods, we get:

$$\left(HeavisideTheta[t+\Delta t] - HeavisideTheta[t-\Delta t]\right)\cos[t] \qquad (8)$$

In this case, the Fourier transform demonstrates an increase in the amplitude at the fundamental (unit) frequency of the oscillation packet and a compression of the spectrum of lateral harmonics with an increase in the pulse duration and, thereby, the number of oscillation periods in the pulse (Fig. 4).

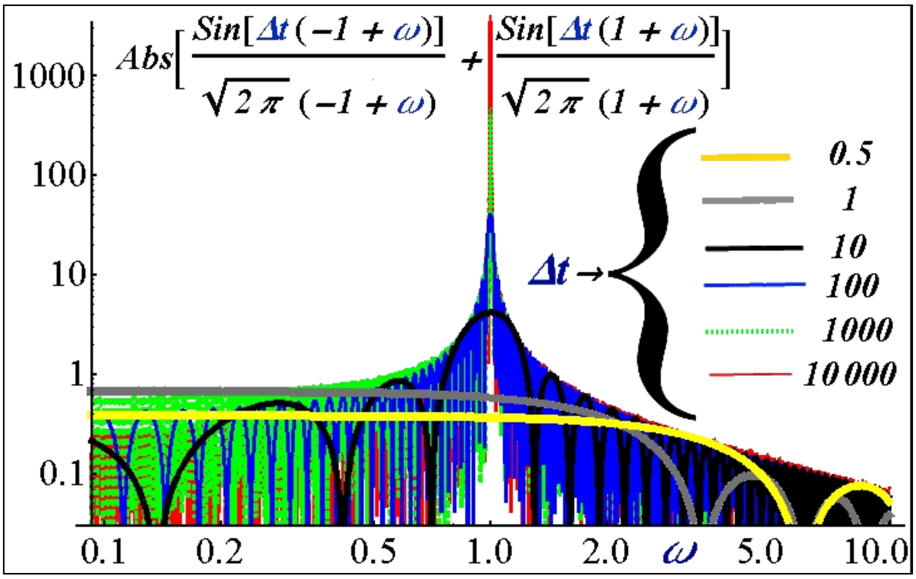

Fig 4: Fourier transform module of Heaviside pulses of different duration, filled with electromagnetic oscillations of a single frequency (the pulse duration is compared to the number of periods).

With an alternative approach, a unit time interval of the Heaviside pulse is fixed, and the frequency of electromagnetic oscillations filling this interval changes:

$$\left(HeavisideTheta\left[t+0.5\right]-HeavisideTheta\left[t-0.5\right]\right)\ Cos[\Omega t] \quad (9)$$

The Fourier transform of expression (9) has the form:

$$\frac{2.\omega Cos[0.5\Omega]Sin[0.5\omega]-2.\Omega Cos[0.5\omega]Sin[0.5\Omega]}{\sqrt{2\pi}(\omega^2-1.\Omega^2)} \quad (10)$$

This expression for a set of multiple frequencies is shown in Fig. 5

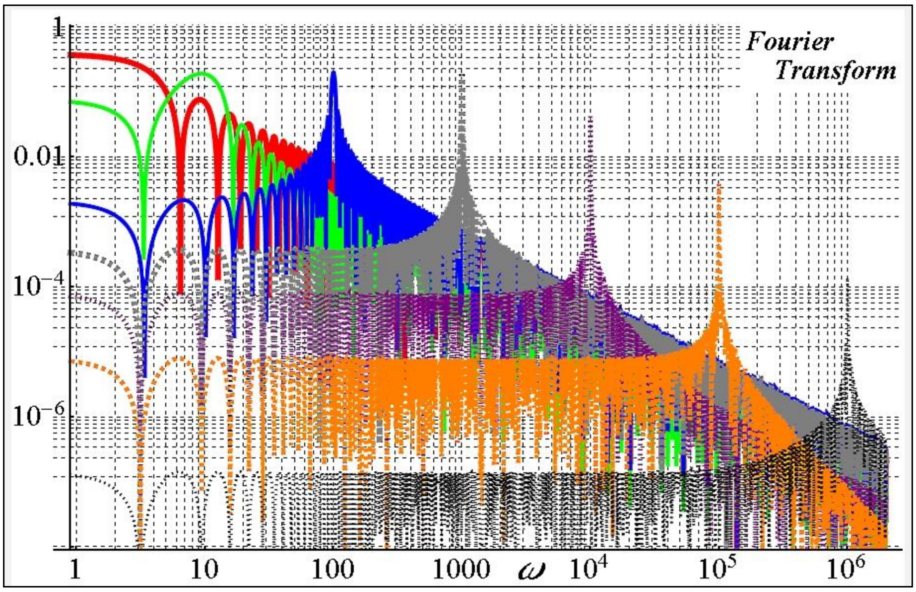

Fig 5: Packets of harmonics of the fundamental frequency of oscillations in a single Heaviside pulse when the fundamental frequency is changed by orders of magnitude.

As can be seen from Fig. 5, the broadening band of the fundamental frequency by ideal boundaries of the Heaviside pulse decreases with increasing vibration frequency. But it drastically decreases if we fill with electromagnetic oscillations an equivalent in area time-blurred pulse, similar to the blurred spatial pulse shown in Fig. 1. The Fourier transform of this imperfect pulse filled with electromagnetic oscillations gives the following expression:

$$\mathrm{FourierTransform}\left(\mathrm{Cos}(\Omega t)e^{-\pi t^2}\right) \Rightarrow \frac{e^{-\frac{(\omega+\Omega)^2}{4\pi}}\left(1+e^{\frac{\omega\Omega}{\pi}}\right)}{2\sqrt{2\pi}} \quad (11)$$

For a smeared pulse of modulation of harmonic oscillations, the frequency band of harmonics accompanying the fundamental frequency is cut off dramatically (by hundreds of orders of magnitude) (Fig. 6).

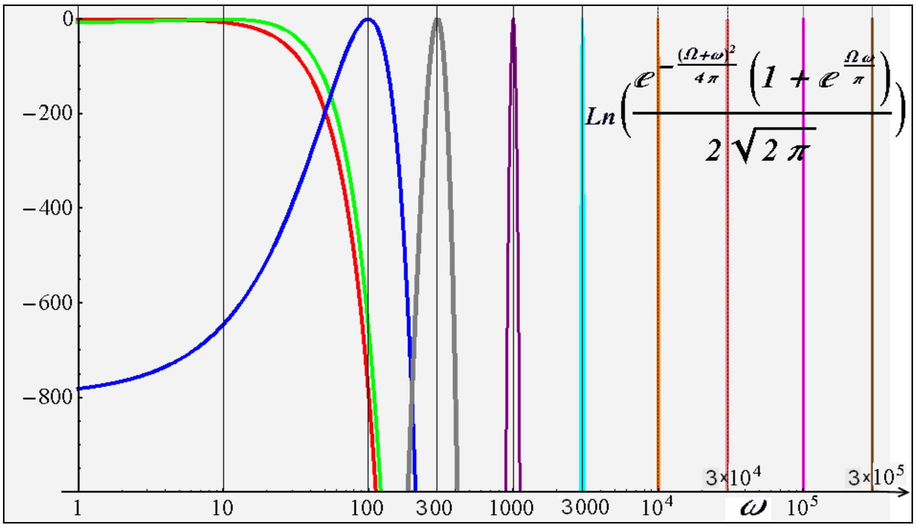

Fig 6: Cardinal compression (by hundreds of orders of magnitude) of the harmonic band of the fundamental oscillation frequency for an area-equivalent single smeared modulation pulse compared to the harmonic band for an ideal Heaviside modulation pulse (Fig. 5) for a series of oscillation frequencies filling the modulation pulse.

In this case, as the logarithmic frequency scale demonstrates, the relative compression of the cardinally cut frequency band increases with an increase in the fundamental pulse filling frequency. But for clarity, we use for additional analysis a relatively low circular filling frequency equal to 100 (Fig. 7), for which the cutoff of the frequency band is already clearly manifested in Fig. 6.

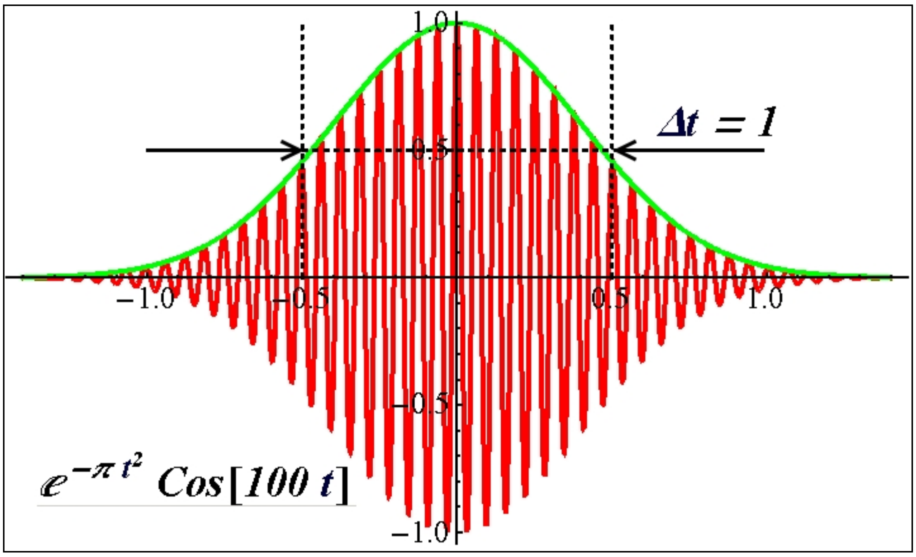

Fig 7: Filling a blurred single impulse with oscillations with an angular frequency of 100.

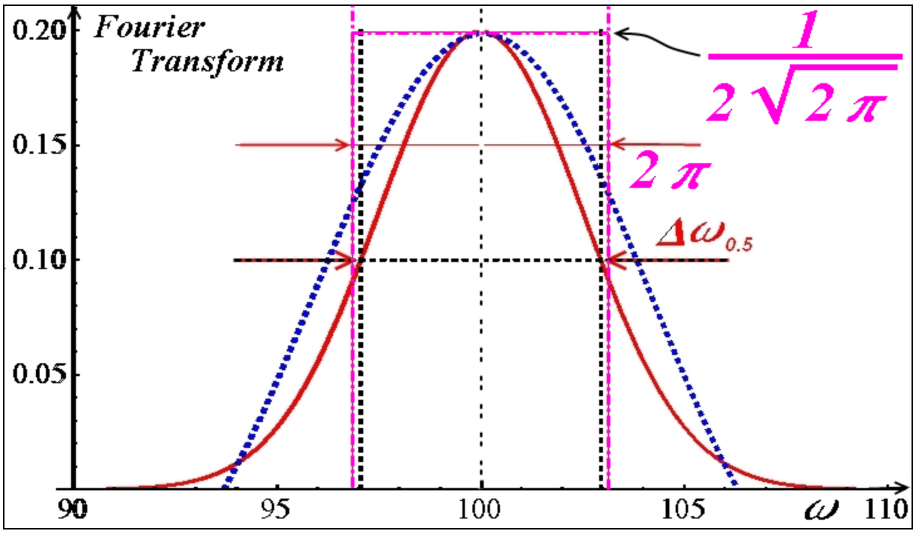

Fig 8: A package of harmonics of the fundamental pulse filling frequency equal to 100: a - for a smeared pulse (red curve), b - for an ideal Heaviside pulse (one band from an infinite series is a blue dashed curve).

The packets of harmonics of different modulation pulses with the same filling frequency shown in Fig. 8 have slightly different half-widths. But the ideal boundary of the Heaviside pulse is conjugated, as shown in Fig. 5, with an infinite series of harmonics slowly decaying with frequency, which, as shown in Fig. 6, are cardinally (by 800 orders of magnitude) cut off at the smeared pulse (additionally, near the given filling frequency, it is shown in fig. 9).

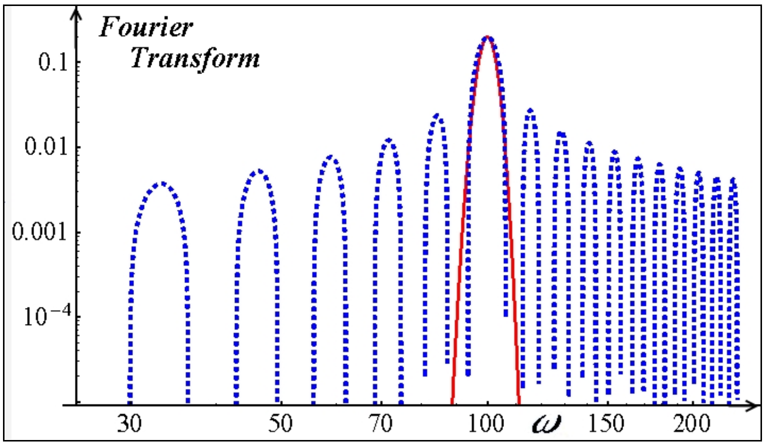

Fig 9: Harmonic packets of the fundamental pulse filling frequency: for the Heaviside pulse - the blue dashed curve, for the pulse smeared in time - the red curve.

The weight of the frequency band of the pulse spread over time is

$$\int_0^\infty \frac{e^{-\frac{(100+\omega)^2}{4\pi}}\left(1+e^{\frac{100\omega}{\pi}}\right)}{2\sqrt{2\pi}}\,d\omega = \sqrt{\frac{\pi}{2}} \tag{12}$$

So its effective frequency band (pink lines in Figure 8) is only slightly wider than the 0.5 band. Whereas the weight of the side harmonics is so great that the integral diverges. That is, in principle, we have an infinite bandwidth for the Heaviside pulse. Thus, the frequency uncertainty determined by the width of the effective frequency band depends not only on the pulse duration relative to the period of the oscillations filling it, but also on the blurring of the pulse boundary. In this case, the frequency dependence of the amplitudes of the harmonics of the smeared time pulse, which is actually similar to the frequency response of the radiation detector, corresponds to the intrinsic "noise" of the photon and its "radio technical" measurability is determined by a formula similar to Heisenberg, the minimum value of which is achieved for the considered single smeared pulse and is equal to

$$\Delta\omega \cdot \Delta t = 2\pi \tag{13}$$

So the particle of Newton's light that was absorbed by Einstein's electron is a smeared pulse filled with an electromagnetic wave.

And so, multiplying by Planck's constant, we get the Heisenberg Uncertainty Principle, which, in accordance with the strict Fourier transform, reflects the localization of a particle in a two-dimensional (in the simplest case, which corresponds to a photon) volume: in the coordinate-momentum space or in the time-space frequency.

But some questions about the “strictness” of the correspondence of the Fourier image to the actually observed physical processes remain, the analysis of which makes it possible to clarify / supplement the Principle of Uncertainty.

The Fourier transform of both the ideal Heaviside impulse and the smeared one gives both spatial harmonics with impulses and negative ones (which is not very annoying), and temporal harmonics with negative frequencies. This circumstance is especially emphasized by the Fourier transform of a pulse filled with oscillations (Fig. 9), from which we analyzed only positive frequencies, including when calculating the weight of the strip.

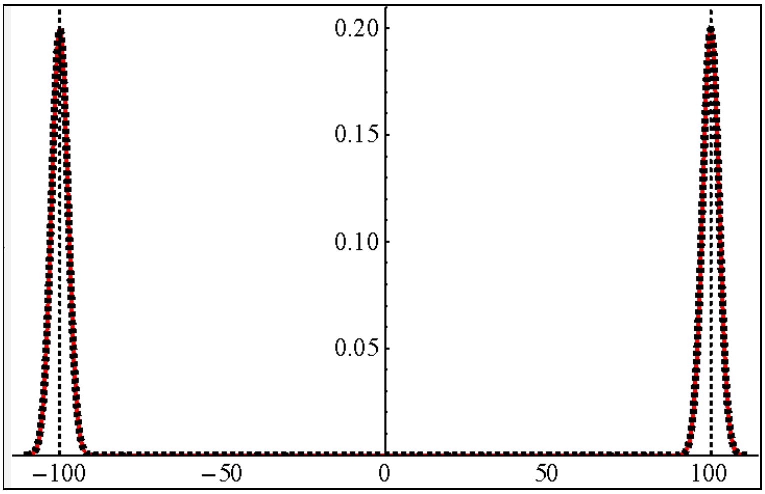

Fig 10: Full Fourier transform of a non-ideal single pulse filled with oscillations with an angular frequency of 100.

But the Fourier transform itself mathematically described only the observed positive harmonics. In the very mathematical notation of the Fourier transform of the spatial impulse at a given moment in time, the direction of the flow of time is not reflected, and for the temporal impulse - the spatial direction, the direction of velocity. In fact, strictly mathematically, the Principle of Causality is not taken into account, but only implied. And this mathematical not rigor and leads to the fact that retroactively come up with "quantum mechanical causality."

And in practice, the Fourier transform was used, long before computerized Fourier spectrometers, in spectrometers based on dispersing elements (crystal prisms), which allowed an instant flash to be decomposed into a streaky spectrum. And if the reverse order of the "colors of the rainbow" is not difficult to obtain in the frequency range of the inverse dispersion of the crystal, then negative angles of light deflection are not observed.

Conclusion

In science it is most visually shown, as "winners" at any cost should be judged as they, as a rule – razvivatel (developing). But for the sake of the victory of "own" theories with the stolen ideas pushed those who gave rise to these ideas. And, as result, razvivatel (developing) bathed in beams of glory and in honors, but the science since they did not understand often stolen idea suffered, and imitated its application. The modern Quantum Theory as result of the competition of "clever men", the aspiration to the Truth for which was for the second time, was so created. And it led to methodological crisis when as the base of science the unproved, but canonized provisions/assumption are used. And at the same time there was the substitution of the concept - fundamental. Carried elementary particle physics, Estimated many of which only to fundamental physics. And the whole pyramid which creation is logically not right is constructed of Estimated.

Initially, the geometry of Newton's "point" - a photon, was built on the idea of an ideal particle with a sharp Heaviside spatial boundary. This led to contradictions with the wave theory. These contradictions were not eliminated by Quantum Mechanics either. She only hid them behind the Immesable and "smart word" dualism, because precise setting of the speed of light is associated with complete uncertainty of the photon coordinate. But the specificity of a photon is determined by the fact that it is filled with electromagnetic waves. The Fourier analysis carried out has shown that both for a properly "empty" particle and for a particle filled with waves, in particular, quite measurable electromagnetic waves, it is precisely its ideality that is associated with its complete Uncertainty and Immeasurability. Whereas the model is a smeared particle and has a minimum Uncertainty, which determines the limit of the Measurement accuracy. This boundary of certainty reflects the Heisenberg Uncertainty Principle, the quantitative assessment of which was made using Planck's constant. In this "smeared" form, Newton's Particle has a certain, measurable coordinate and momentum, and provides both the stitching of incoherent photons into a coherent wave, and the "stitching" of the wave theory with the corpuscular one.

But more detailed consideration of the phonon in the space frequency time or coordinate momentum requires analysis of the structure of space, which will be done in the completed work "Foundations of planck-Einstein quantization".

An example of "indeterminacy" of the current conceptions of the photon can be, for example, not strictness of interpretation of the Doppler effect. The usual comparison with acoustics is clear, but does not correspond to the relativistic description of electromagnetic waves.

Relativistic Proposition - longitudinal velocity relative to the photon does not depend on the speed of the observer and gives a smaller value of the Doppler shift than in acoustic or surface waves when they are observed by an observer moving relative to the wave. But a significant difference arises only at observer's velocities comparable with the phase velocity of the wave.

The relativistic assumption looks wild, but it strictly corresponds to the fact that the speed of light is a constant. Although directly from the Galileo-Einstein Principle of Relativity it follows that it is only constant - not infinite, but determined by the Coulomb field propagation velocity [22]. But again I will postpone continuation of this analysis until the next work "Foundations of the Theory of Relativity".

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