Article

Some Aspects of Wave Gene Transmission

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ABSTRACT

This work introduces and describes the process in one type of helium-neon laser with two orthogonal optical modes. These modes can record polarized modulations of scanned biological structures in the recording regime of the traveling intensity waves (TIW) holograms. This process is used to model recording and distant transmission of wave genetic information.

Keywords: Laser, polarization, traveling intensity waves, hologram, wave genetic, biosystem.

Let us have a look at the experimental system *(Figure 1)*, that we use to obtain spectral characteristics and wave transmission of the working genetic information [1, 3-10]. This system consists of helium-neon laser model *HeNe-303*, wattage of 2 mW and 632.8nm wavelength. It has two combined single-frequency radiation modes. There is an adjustment bench for placement and orientation of the biological object along three spatial axes.

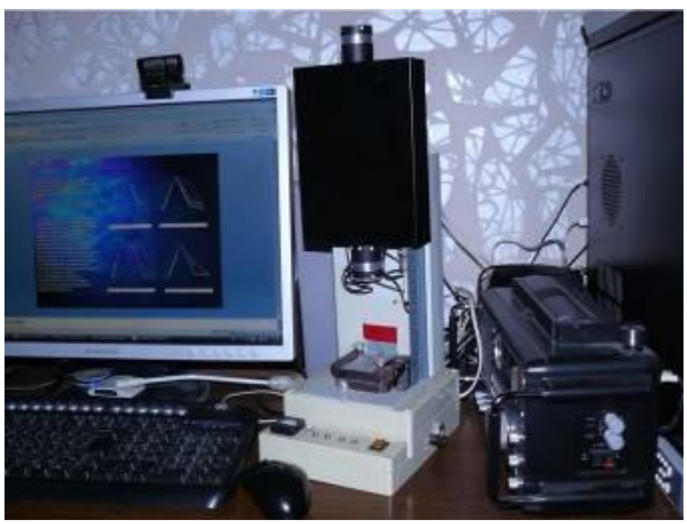

Fig. 1

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In each of the two modes this laser has orthogonal and linearly-polarized radiation planes. The functioning of the system during biological object scanning with laser light generates a series of interconnected optic-physical and biological phenomena.

The first phenomenon is generation of primary laser radiation under the influence of a light source - the pump lamp. The setting generates frequency-stable two-mode laser radiation with orthogonal linear polarizations.

The second phenomenon – projection of the primary, non-modulated beam on the bio-sample, resulting in formation of an optical reflection of complex Fresnel (in the near-field) "scattering spectrum" and the secondary Modulated Broadband Electromagnetic Radiation (MBER) [1, 3].

As already emphasized, the biological object is a purely nonlinear medium and all its elements directly react to external laser radiation. The maximum size of the bio-object element, capable of rough reflection equals to ¼ of the wavelength of the laser, i.e. ~150 nm in size. It is known that laser light, at each local point has a penetration capability that depends on the specific properties of the bio-object. Similarly, the angles of reflection, refraction and absorption also depend on the specific properties of the laser beam target.

Changes in amplitudes, phases, and polarization angles at each point, and the overall picture of cross-interference of all secondary sources of the bio-samples re-radiation generates integral reflection. It is formed in the vicinity of the biological object (near-field of Fresnel diffraction [24]) and creates a light image (glow), which should be called the reflection spectrum *(Figure 2)*. A very important feature of the reflection spectrum (compared to the illuminating beam) is the appearance of many new frequencies (both temporal and spatial), due to the responses of nonlinear optical sub-elements of the bio-object.

But apart from that, in its integral response the living substrate is capable of producing a particular feedback response, an essential and distinctive feature of which is a meaningful adaptation, which is typical, for example, to the structures of the human brain on algorithms of multi-layer (integral) perceptron's [40].

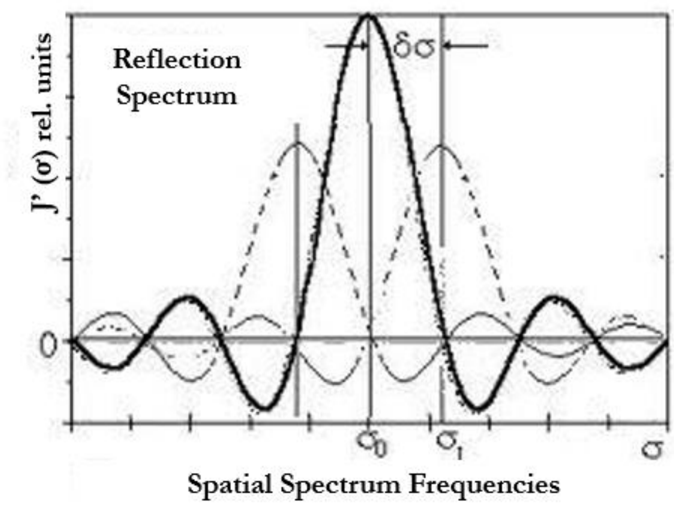

Fig. 2

The reflection spectrum has a "bell" shape, the tip of which is directed from the biological object back into the laser resonator.

A specific feature of the process using scattering spectrum, obtained in the experiment, with the help of the adjustment bench where the reflecting bio-sample rests, is that most of the spectrum of reflected light *(Figure 3)* is sent back through the semi-transparent front mirror of the laser resonator - inside the laser resonator.

The consequence of this alignment is partial penetration of the light reflected back into the laser resonator, and as result we have the following:

First, the stream of light, modulated (diffracted) by the biological sample that's reflected into the resonator, begins to be amplified by the laser. This is almost the same way as the unmodulated light of the pump source was amplified.

Second, due to the action of the resonator the laser will emit not a flat non-modulated wave, but a much more complex wave, which has been modulated by biological structures. First of all, by the chromosomal DNA, RNA, proteins, and other metabolites.

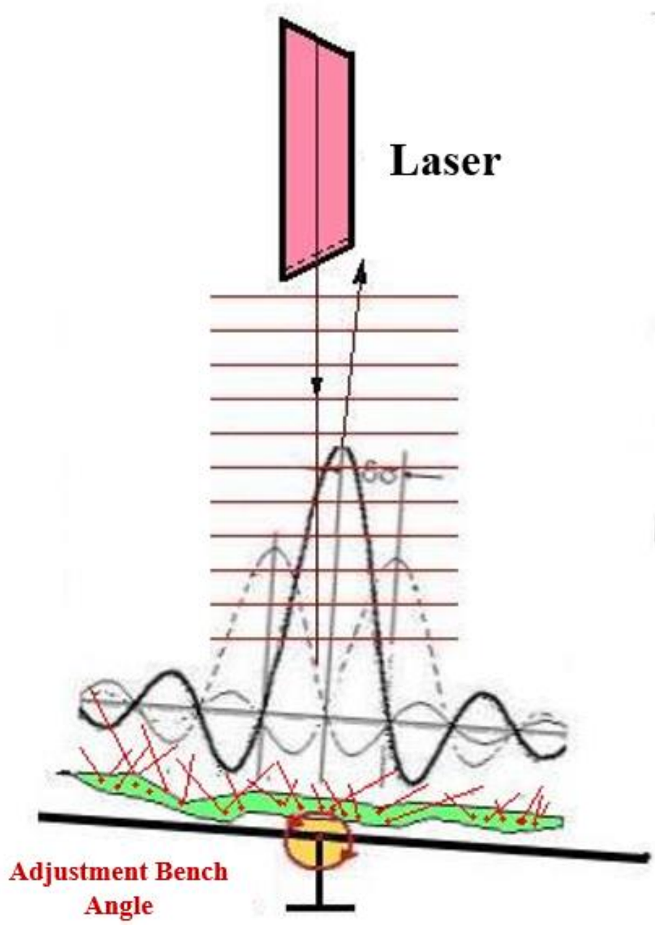

Fig. 3

This wave is modulated by various parameters, including polarization (spin of a photon), which also has bio-sign biological significant function.

Gene structures are optically active and in this regard include a huge pool of structural and dynamic information, including genetic [1, 3-9]. It is this complex wave that will be amplified by our laser.

As a result, we will have a zone of intersection of two colliding beams of waves (along the axis of the laser) with a variety of different frequencies, as all possible types of scattering, reflection and refraction of the optically nonlinear objects generate optical spectra with very rich frequency spectra.

Complex interference of the aforementioned multi-frequency and modulated waves is the main condition for the formation and recording of special holograms in colliding beams. The recording of interference patterns (with subsequent conversion of the recording into holograms) usually requires screens or photo-sensitive plates, capable of recording the obtained interferograms/holograms. However, in our case, this is not required as we deal with special kinds of Denisyuk holograms (dynamic holograms of traveling intensity waves). The peculiarity of these holograms is that they are generated in a purely nonlinear, so-called quadratic media [26], which are the tissues of the biological systems [18].

Let's describe a wave of the investigated bio-sample as a sum of the wave flow ***A1 = (Ax + A0)***, where ***Ax*** – the stream of light scattered from bio-sample and ***A0*** – the primary (unmodulated) laser wave.

"A1" wave according to the description of our experience is the amplified wave, the primary source of which was light (Fresnel range), reflected from the bio-sample.

Almost the same wave, but not enhanced, ***"- A1"*** wave moves towards amplified ***A1 = (Ax + A0)*** wave, all this creates a unique interference pattern with the recording of the dynamic colliding hologram of travelling waves of intensity.

Special conditions should be met to make such a recording:

1. a stable in time and space, zone of interference of two colliding beams (***"A1"*** and ***"-A1"***) directly in the space (volume) of our bio-sample.

2. The presence of complex-modulated polarization and phase components in the light beams, generated due to the interaction of coherent laser radiation with a nonlinear biological sample.

3. The presence of the Fresnel reflective spectra of both beams, where multi-frequency components interfere, enabling the formation of a dynamic hologram of the traveling intensity waves (TIW).

As proven by *Y.N. Denisyuk* [24] and a number of his colleagues [27-31] "the dynamic hologram of the traveling intensity waves" (TIW) - is a ***unique*** hologram.

We emphasize that in fact it is a unique (and little known to the wider circle of specialists) property of holography - its ability to record light holograms directly within light itself, as well as the reconstruction of "light" holograms (from light structures) in a form of the new light structures.

It is crucial to note that this process which represents a complex interference of light waves cannot be observed directly optically (by a human eye). And, perhaps, that's why this process has never drawn any attention. However, the phenomenon of generation and operation of traveling waves of intensity (TIW) holograms, discovered by Academician of the Russian Academy of Sciences of the USSR, *Yury Denisyuk*, actually known since 1974, was repeatedly proved by special experiments, as well as a variety of relevant works and mathematical calculations [27].

Sign orientation of TIW holography phenomenon:

1. In the inner "zone of intersection" of colliding beams of light, that is, inside of nonlinear bio-sample, the classical law of refraction (Snell's law) is violated. And for this reason the phenomenon of interaction between any two material photon beams (paired) becomes on the one hand, possible, and on the other hand invisible to the naked eye of a regular observer.

2. Once the two beams of light come out of the zone of intersection, the classical Snell's laws are automatically restored, and the special interaction of wave fronts (beams) of light ceases.

That is why the colliding beams of light, consisting of material, as is commonly said, photons, after their actual interaction in the inner zone of intersection, when exiting this zone do not contain any traces of this interaction - no recording, no reconstruction of holograms.

3. Now it is clear that the laser system used by us in genetic experiments, is a new practical and visual method for identifying the phenomenon of hidden TIW hologram operation.

TIW Hologram Manifestation:

Let us recall what a traveling intensity wave is about. In 1974-1978 the attention of *Yury Nikolaevich Denisyuk* was drawn to the possibilities for recording moving objects using a new nonlinear-optical class of recording media, which allowed simultaneous dynamic recording and reading of information about an object without stabilization of the traveling interference patterns. *Yury Nikolaevich* reviewed the most common reflection properties of a new class of holograms - dynamic holograms with the recording in cubic nonlinear media.

This review led to his prediction of a surprising property of dynamic holograms of a moving object – the automatic focusing of radiation on the object and forecasting of its position in space, determined by its current speed [27, 28].

For a series of works on dynamic holography *Y.N. Denisyuk* in 1982 was awarded the State Prize of the USSR (as one of the group authors). Upon his return from Italy, throughout 1998-2005, *Y.N. Denysiuk* once again returned to the theme of the holographic recording of travelling interference patterns.

This time he turned to the method for recording holograms in quadratic nonlinear media with extremely high speed, down to fractions of femtoseconds, which allows using methods of dynamic holography to transform and create new light beams that differ in frequency by tens and hundreds of percent. He studied in detail the transformation properties of such holograms, the properties which determine the position, scale, and color of the received images in the case where the image is generated on the second harmonic of the recording hologram radiation, and also where the wavelengths are different from each other and image generation takes place at the sum frequencies [27, 28].

The physical essence of the TIW hologram phenomenon – it is periodic, manifesting itself in the form of a sequence of alternating light waves with different intensities.

Figure 4 is an explanatory diagram of the operation, which describes the manifestation of such TIW holograms.

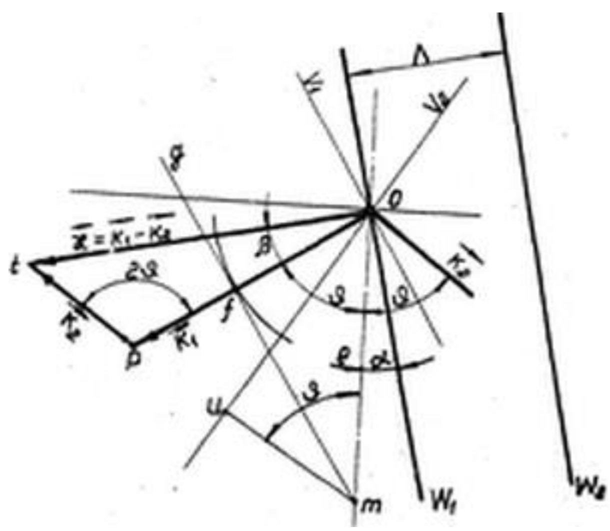

Fig. 4

A traveling intensity wave is constructed as a result of interference of the reference wave with a complex, generally arbitrary wave of radiation scattered by the object[1].

[1] http://bsfp.media-security.ru/school6/1.htm

A hologram of the traveling intensity wave occurs only in quadratic nonlinear media and in the inner zone of intersection of colliding beams of light (inside the bio-sample).

Secondly, this hologram is recorded (and reconstructs itself) only in the presence of light beams with different frequency polarized components of light information waves.

Thirdly, traveling intensity wave holograms in principle are suitable for use especially with fast-paced processes - up to the proportion of femtoseconds, which corresponds to the rate of living biological processes[2].

Atoms in such time intervals are practically immobile. Only perhaps in hundreds of femtoseconds it is possible to observe any displacement of atoms in a crystal lattice, in units of tens of femtoseconds atoms can be considered simply immobile, and in this domain electrons and various electronic effects predominate [2].

But the electrons, in fact, also move with different frequencies, different speeds. That is, outer electrons are moving slower, inner atomic electrons move faster.

The word "move" means are observed with a certain probability in locations around an atom, however if you initiate any non-stationary process - for example, excite atom in any way or knock out an electron - then you will see some interflow of wave functions.

In cases of fast-paced processes, where charges are transferred, such as with electrons and protons, it means you may observe electromagnetic radiation, wherein its frequency corresponds exactly to the typical transition time in this process.

Therefore, if you look at process in detail and register its outburst of electromagnetic radiation, it is possible, by deciphering this outburst, to learn something about the process itself.

Recently, it has been applied to an interesting protein - bacteriorhodopsin. This is a unique protein. In reality it is produced naturally in a certain type of bacteria, moreover, it is an integral membrane protein, that is, it is sitting in the membrane, performing the following function. It is a light-sensitive protein: when it is illuminated, a photochemical reaction cycle occurs, causing various reconfigurations of the protein, resulting in the transfer of a proton from one end of the molecule to another. Since this protein is embedded in the membrane, it turns out that when exposed to light it acts as a proton pump. It pumps protons from one region to another, then it releases them.

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[2] http://elementy.ru/lib/430939#femto

There are stages with completely different time scales in this protein. In general, the whole cycle takes approximately 20-30 milliseconds, that means, it is quite slow.

However, certain stages take microseconds, other stages take nanoseconds and even picoseconds, there are 12 stages of various transitions inside this molecule. The first response to light takes 1-2 picoseconds. In order to understand the dynamics of this process a technique with temporal resolution of less than a picosecond is required, i.e. in the femtosecond range, it is desirable to resolve at least hundreds or tens of femtoseconds, using this technique…

Thus, we can conclude that dynamic TIW holograms is the tool that physicists and biologists dream about. With the help of dynamic holography it has become possible ... to transform and form new beams of light that differ in frequency by tens and hundreds of percent [27, 28, 30].

We recorded this special phenomenon in our experimental system - an unusual occurrence of radio frequency oscillations, correlating with the information content of biological objects, irradiated with laser light. However, for the truths sake, it should be noted that multi-frequency responses of the bio-sample to the laser irradiation can have a number of other, completely different reasons, including the interpretation described in the previous model [3, 4].

Here we interpret that very same phenomenon, which for a long time had no explanation, we explain from a new perspective. And we propose only one version of this phenomenon, explaining where the radio signal carrying actively working genetic information is coming from. This version complements the previously proposed by us hypothesis of the occurrence of Modulated Broadband Electromagnetic Radiation (MBER) based on the theory of localized light [3].

The radio signal is generated by a dynamic TIW hologram due to reading of fast-paced responses (up to femtoseconds) of the set of all the bio-sample's optically active molecules, including DNA, RNA and proteins, to the complex laser irradiation. Such a signal is a part of the secondary Modulated Broadband Electromagnetic Radiation of the given laser.

Such Modulated Broadband Electromagnetic Radiation is an accompanying by-side phenomenon of TIW hologram operation and has not yet been fully explored. This phenomenon manifests itself through transformation of the integral light response of the bio-sample that also includes chromosomal DNA, when the DNA's informational content is read. The information content of the Modulated Broadband Electromagnetic Radiation is also contributed to by all other optically active molecules (metabolites) of the tested bio-sample - amino acids, nucleotides, vitamins, organic acids, etc.

It is important to note two important facts:

The first fact, is the dynamic lattice of intensity waves in our TIW hologram has a very high resolution, which makes it easy to read and register the substructures of DNA, RNA, proteins and low molecular metabolites in sizes many times smaller than a quarter of the laser wavelength (possibly, down to the atomic level).

The second fact is that such a high-resolution dynamic lattice of light intensity waves, functioning as a spectrometer, and this lattice at the same time is unpredictably highly dynamic within living cells *in vivo*, and also when we perform laser scanning of the biological-substrate *in vitro*.

This allows comprehensive bio-sample scanning to be performed. That is the integral scanning of the bio-sample's whole volumetric information content into a nonlinear complexly-modulated radio signal, as Modulated Broadband Electromagnetic Radiation.

However, this is only one particular form of response, as there are other forms of responses, in terms of so-called "nonlinear optics".

Any living cell, a biological tissue or organism will naturally seek to adapt to the unfamiliar direct laser exposure as well as the secondary Modulated Broadband Electromagnetic Radiation.

If this Modulated Broadband Electromagnetic Radiation signal is recorded and then "read" in a certain way, then every cell of another organism "listening" to this Modulated Broadband Electromagnetic Radiation can receive the signal-program to function in a reverse direction. For example, to initiate reverse aging processes in the body, as we see in some cases of practical application of Modulated Broadband Electromagnetic Radiation[3].

There is the third fact. All of the above processes take place in specific space-time of the biosystem.

As a result, one observes a non-trivial phenomenon. In practical application of our laser technologies we probably have some reconciliation of the biosystem in its time and space with its own informational blueprint, from which the biosystem had been materialized by Nature. These are the ideas of *Bohm* and *Berkovich* about some Universal Hologram or Physical Universe, where the chromosomal DNA of any biosystem represents a "bar-code" to its structural and functional state, needed in a specific given moment of time. With this, we perform some corrections of the human health. This corresponds to Bohm-Berkovich statement about the

[3] See Testimonials: http://wavegenetics.org/otzyvi/

universal information (hologram), which reflects all manifested life, from birth to death [41, 42]. In this regard, the Modulated Broadband Electromagnetic Radiation of umbilical cord blood and placenta of newborns is, probably, some kind of addresses (bar codes) to their holographic blueprints that we use to normalize people's health.

Furthermore, probably these two objects (Man and his Bohm's hologram) not only coexist, but also strongly and intensively interact.

Here we see one more surprising property of dynamic traveling intensity wave holograms. Omitting detailed explanations, we'll say only the most important. As it was already mentioned, the light image, reconstructed from a TIW hologram and combined with its original, is fully equivalent in the respect of information.

In conventional holography there is a common property: during reconstruction of a hologram not only the main image of the object is created, but also a second, pseudoscopic, "virtual" image of the original is created. And as a rule, this "virtual" image is considered to be interfering and parasitic. Therefore, it is being fought in every way, as if it is taking energy from the useful "real" image of the original. This is not the case in TIW holograms. It has been proven experimentally that in TIW holograms the spectral composition of the pseudoscopic ("virtual") image radiation is distorted in accordance with the law of Doppler Effect. And thus, the virtual image radiation does not affect the structure of the TIW hologram. What does this mean in practice?

This means that although a dimensional material dynamic standing waves system (the model of the object capable of recording and reconstructing any real objects) is generated, it is not able to create an "virtual" image. At first, they assumed that in TIW holography no medium was able to reproduce a subtle, high-frequency oscillation of intensity. However, this was a mistake. Moreover, it was found that any oscillations are reproducible. But the most important thing was the fact that the TIW hologram began to generate only one image, identical to the original object.

The "virtual" image is always automatically suppressed (self-extinguished) and the "real" beam **($\boldsymbol{Ax}$)** is always amplified [27].

Therefore, eventually, only the information image, encoding the biosystem is dominant, which, as we have already noted is fully reconciled with the real biosystem. This means that the real biological system receives as if amplified, a double information "framework". And thus biosystem receives a powerful energy-information feed and a direct opportunity for supplementary correction of its structure, if we possess the appropriate technology. Not considered here is the specific content of such supplementary correction.

However, the semantic content of this phenomenon (in our case) can be expressed as in the Bible: *"Let us make mankind in our image, in our likeness..." (Genesis. 1:26).*

Another experiment on our same laser system may have interesting and significant consequences. If in the course of the experiment the original irradiated bio-sample is removed from the adjustment bench, then everything will remain unchanged for a while, because the real object will be fully substituted by its full holographic copy, which informationally and physically cannot be distinguished from the original. In this regard there are not only direct experimental facts within wave genetics (phantom images) [32, 33], but purely physical analogues, implemented at the atomic level, as was described, for example, in paper [24].

Phantom phenomena can be illustrated in a different way [37], if we see this as follows. We observe (or it seems to us) the manifestation of something that is not physical (or is not present in reality). For example, we can record on a hologram an ordinary optical lens, and then, after a chemical treatment or manifestation of the hologram, use this perfectly flat "lens hologram" as a real lens in the sunlight. And it will successfully physically replace a real lens that, although structurally and physically it does not look like one. This is another fundamental property of holography: Holography is a direct replacement or substitute for reality.

In biological experiments, this phenomenon also finds practical confirmation. Namely, in the phenomena detected during transfer of the information content of the simplest bio-substrate – ‘glucose’s Modulated Broadband Electromagnetic Radiation spectrum’ (in the mp3 audio format) to samples of purified water. The result was a phantom glucose equivalent manifested in water, which provided a quality color reaction to glucose on special test strips *(Figure 5).*

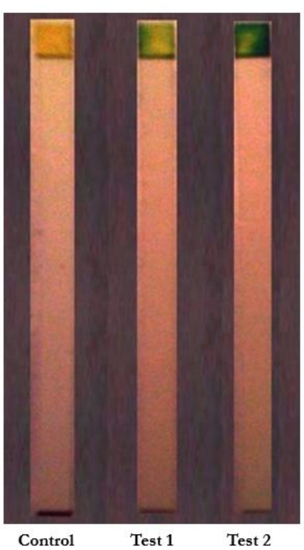


Fig. 5 Glucose water phantom from mp3 – Modulated Broadband Electromagnetic Radiation

This situation is analogous to Modulated Broadband Electromagnetic Radiation materialization of DNA fragment (DNA phantom) in a Polymerase Chain Reaction (PCR).[4]

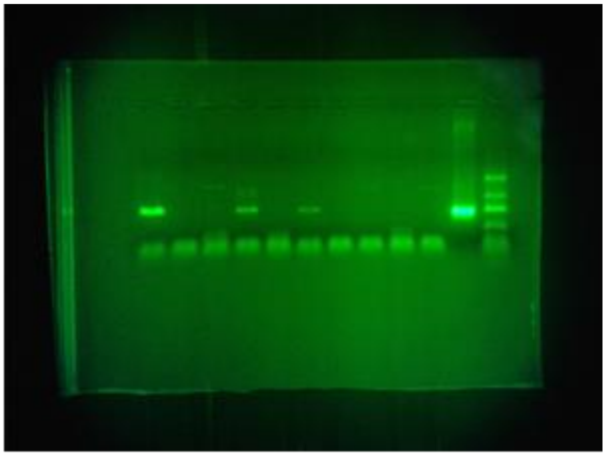


Fig. 6. Identification (materialization) of the phantom DNA fragment with known nucleotide sequence by PCR method. DNA phantom obtained by the author's method [32, Patent No. 2014/06578. 8]. The nucleotide sequences of obtained materialized copy of DNA phantom are 98% identical to the original physical donor DNA (this data is under preparation for publication).

From left to right the 1st, 4th and 6th tracks - DNA, synthesized in pure water. 11th track – initial DNA sample (268 base pairs) from which Modulated Broadband Electromagnetic Radiation spectrum was obtained. The 12th track - marker bands 139, 268, 394 and 613 DNA base pairs, the lower band of this track - primer smears. The 9th track - control without Modulated Broadband Electromagnetic Radiation of DNA.

This phenomenon, discovered by *Peter Gariaev* group [32] has been independently proven by Noble Prize Laureate *Luc Montagnier*, who also created DNA phantoms, but by a slightly different method, and they also materialized it with the PCR system [33].

In these experiments, some not yet fully understood properties of DNA and glucose phantoms "tricked" the chemical reagent for sugar on test strips and DNA polymerase in the PCR system, which took both glucose and DNA phantoms for real molecules. It is necessary to emphasize certain difficulties with registering of given phantom effects and their materialization, associated with time unpredictability of phantom-formation moments and the moments of their materialization. This is probably related to the unpredictable dynamics of TIW holograms for biological objects.

A similar transfer in principle may also be possible for DNA holographic polarization information. As discussed herein "dynamic lattice of intensity waves" is, in fact, the usual material lattice, then it, like any diffraction lattice (DL), is able to perform the functions of a spectral device, i.e. refract the light (similar to the glass prism, depending on the characteristics

[4] https://en.wikipedia.org/wiki/Polymerase_chain_reaction

of its resolution, light frequency and the angle of incident light on the surface of diffraction lattice (DL). This is illustrated in *Figure 7*.

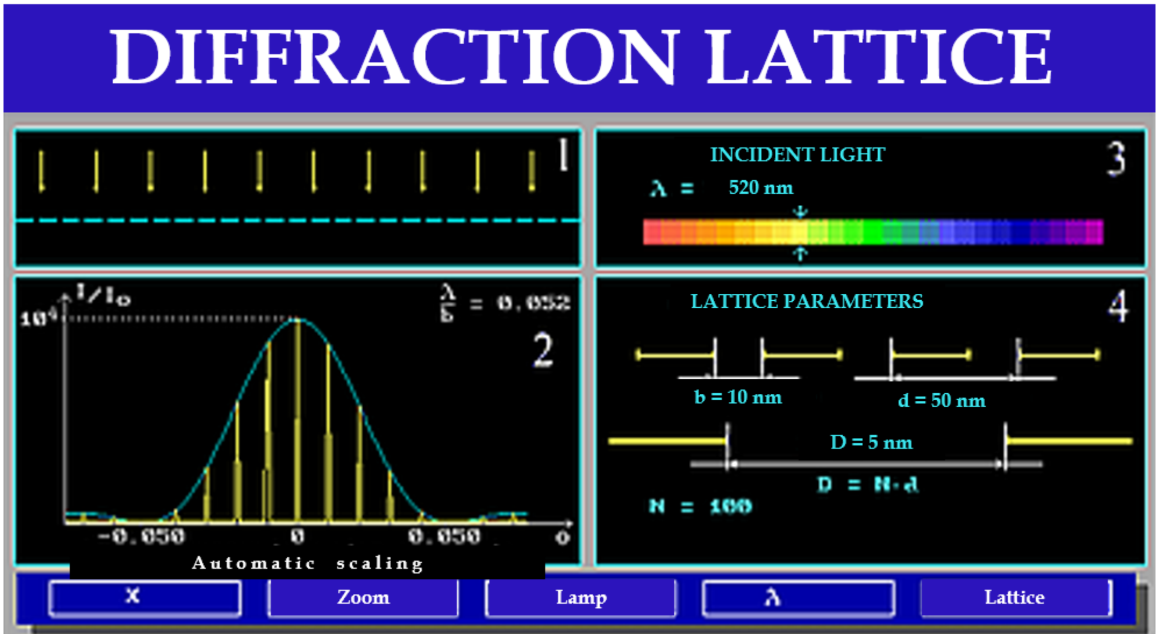


Fig. 7

What are the implications of the above?

The main conclusion is that, in the reflected bio-sample radiation spectrum, created by such a lattice, there will be large amounts of valuable and subtle information about the processes and elements of the living cells structure, including information about DNA in chromosomes. We should learn to explore and apply this information.

To understand the importance of what has been said, it is enough to remember breakthroughs in distant (non-contact) research methods made possible with a variety of spectroscopic instruments. Even in a simple prism *(Figure 8)*, a color multiple frequency spectrum is derived from the fact that with a fixed dielectric constant of the glass prism, each color (from the white light spectrum) is refracted at its own individual angle.

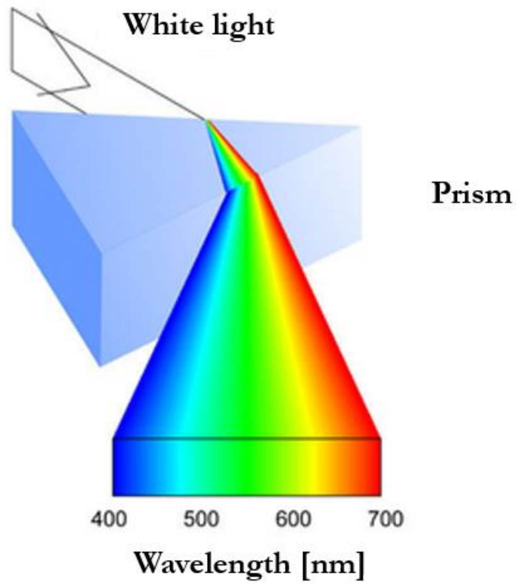


Fig. 8

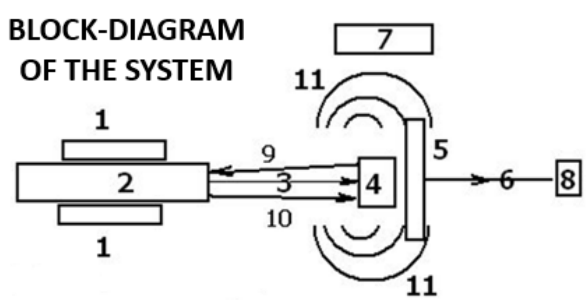
Processes (in our bio-technical experiments) in the TIW hologram are similar, but they are more complex, because they take place simultaneously with other optical-physical processes.

But above all, we would like to remind you that the laser spectrum reflected from a living object is an information signal, which is modulated in all optical parameters – amplitude, phase, conditions of reflection, absorption and polarization.

Therefore, the dynamic TIW hologram, as a complication of a conventional diffraction lattice, will be recorded and reconstructed with all the variety of ***Ax*** bio-sample information parameters, where ***Ax*** is the bio-sample information content.

Technically, lifeless nonlinear mediums can be simplistically described as a chain of resonating circuits (with electrical capacitance). Light modulated by a biological sample, propagating through such a nonlinear medium with quadratic nonlinearity, modulates the dielectric constant of the medium. The power of the optical radiation is the amount of energy released per unit of time. Wherein, if the laser working non-stop has an output of ~2mW/sec, then in a pulsed mode, for example during 1 millisecond, the laser power will increase 1000 times and amount to as much as 2 watts. The process of conversion of laser optical frequencies into a lower radio frequency spectrum, as mentioned above, takes place particularly in nonlinear medium of a bio-sample, where two colliding optical laser beams target within the framework of our experiments. In our case, the nonlinear medium is actually the initial bio-sample containing chromosomal DNA. TIW hologram theory also implies that the entire structure (system) of intensity waves moves at a speed proportional to the frequency difference of interfering waves. Moreover, it was proved that TIW holograms are capable of reconstructing the subtlest and highest-frequency oscillations, phases and amplitudes [27, 31]. This occurs as under the influence of the waves of intensity the dialectic constant receives some perturbations that change the wave functions. It is this perturbed part of the wave function is precisely the unknown wave function of radiation, reconstructed by TIW hologram.

Returning to the issue of "Modulated Broadband Electromagnetic Radiation" and aspects of its nature. The nature of "Modulated Broadband Electromagnetic Radiation" was interpreted by us above, based on the effects of dynamic TIW holograms. The donor of the wave information in the form of "Modulated Broadband Electromagnetic Radiation" may be, for example, a preparation of radial glial cells from the cerebral cortex and the recipient of genetic information may be the genome of mesenchymal stem cells (MSCs). These MSCs will be located outside of the laser beam, which means that they can receive third-party genetic information only through the mediation of the "Modulated Broadband Electromagnetic Radiation phenomenon" *(Figure 9).* This study was conducted and MSCs were programmed to differentiate into neurons and were placed into the blood circulation of a paralyzed person with spinal cord injury. Several sessions of introducing MSC to the patient led to the return of motor functions toward 90% compared to total immobility at the beginning of the treatment (Ready for publication).



1. Laser pump lamps
2. He-Ne laser (2mW)
3. Laser beam (primary)
4. Biological object (with DNA)
5. Alignment table
6. Laser beam (behind the object)
7. Radio receiver
8. Spectrum analyzer
9. Spectrum of the beam reflected from the object
10. Amplified reflected signal
11. Modulated Broadband Electromagnetic Radiation

Fig. 9

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