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# Nano and Frontier Aspects of Biomedicine

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**ABSTRACT**

The relationship between non-destructive testing of inanimate nanoparticles and the gentle control of biological objects at the nano-level is considered. It is shown that non-destructive testing, in addition to storing a large amount of information, allows one to follow the Hippocratic Principle at the nano-level as well. The description of the most sparing methodology for studying biological objects is given, which, moreover, will allow analyzing the Dynamic Element of Life.

**Keywords:** phenomenology, nano-scale, dynamic element of life, non-destructive testing, NON-HARMFUL, IR spectroscopy, boundary states.

NANO, until recently, and for Physics was the Missed Scale. And this gap was filled primarily with the help of thermoelectric studies [1,2]. These results, which are fundamental for the NANO-scale, as well as the thermoelectric technique, can be fully applicable to biological objects. But even such primitive, in comparison with living, objects like crystals, in order to bring them to the level of nano-chips, were investigated not only in terms of their structure. Although for crystals the necessary stage of research was precisely the structural and microstructural ones, nevertheless, the main contribution to the understanding of the nature of crystals and to understanding: How to control their properties was given by studies of vibrations, phonon and electronic in them. And direct evidence was obtained that these vibrations are determined by the frequencies (energies) of atomic bonds [3]. This also follows directly from the adiabatic expansion of the crystal energy. But the transformation of these Basic Frequencies, in crystals with different elementary cells, especially in incommensurate crystals into a wide low-frequency frequency spectrum [4], testifies to the ELEMENTARY one - it is they that provide the thermodynamic stability of an inanimate object. Incommensurate crystals are very close to biological structural units and the results of their research can, to some extent, be taken as a starting point. Only, naturally, in this case it is in no way possible to throw LIFE out of consideration, both at the structural level - a continuous change in the structure, and at the level of "living vibrations" [5].

So, in principle, many physical methods for studying nano-objects are perfectly applicable to biological objects. But their correct application, on the one hand, should use only those that do not destroy not only the structure, but also LIFE, and on the other hand, when interpreting the research results, it is necessary to take into account not only purely statistical fluctuations of the measured signal intensities, but also the HARMONY OF LIFE. To put it simply, NOTES are the QUANTAS OF LIFE. And a purely harmonic analysis using the Fourier transform of signals should be done according to these Quantums of Life. In classical physical works on the analysis of the Harmony of Life in a living cell [6], a very crude method of measuring electrical potentials was used. This technique, as well as electron or X-ray microscopy, is not NON-DESTROYING even for inanimate objects, and even more so for living ones. This method allows only a relatively simple interpretation of the measurement results, which actually allowed the authors to identify the Harmony of Life. But if we insert the probe directly into the nerve, say, into the

dental nerve (to the patient), then we will see the "unambiguous" rough reaction (of the patient), but we will actually lose the reaction mechanism of the nerve itself. In this case, we will destroy the nerve itself and we can "calmly" remove it. A clear demonstration of such a «calm» primitive approach is, for example, the fact that practically for the entire time of the existence of medicine, before the «mistake» of doctors who did not sew up amputated phalanges of fingers, no one suspected that the phalanges could grow again. Likewise with teeth, artificial killing of which is considered a treatment. And under anesthesia, just a lot of procedures are done that violate the PRINCIPLE OF NON-DESTRUCTIVE TECHNIQUE, and the doctors themselves do not even realize that on the NANO-scale they completely violate the Hippocratic Principle: DO NOT HARM! At the same time, in the event of the patient›s death, the relatives are told: in this, Medicine is POWERFUL! And the patient›s body is powerless to withstand this mass of NANO-disturbances, about which Medicine is even NOT AWARE!

If we go to the dry scientific language, NON-DESTRUCTIVE METHODS FOR RESEARCHING biological objects. give a lot of information that can be reset when using the DESTRUCTIVE TECHNIQUE. And at the end of this, in many ways emotional, but connected with the FUNDAMENTAL PRINCIPLES of the article, I will give a personal example of a NON-DESTROYING METHOD. Once upon a time, traditional medicine healed my sick 4-year-old daughter to such an extent that she was literally burned out. And professor-pediatrician Shabalov first studied my six-month records of her condition and her reaction to medications (the only one of all doctors in half a year) for 15 minutes, and then, in 5 minutes, felt all her organs through her stomach, including her heart. At the same time, the child never made a squeak. And when he groped for the sore, he assigned us to do ELEMENTARY procedures for her for three and a half months, which completely restored her health. And briefly about one of the most NON-DESTRUCTIVE IR spectroscopy techniques, which is applicable for gases and liquids, and for macroscopic crystals, and for nano-structures and for nano-particles. So, almost all scales of biological objects can be investigated using well-established techniques (described, among other things, in my articles and reports), rather reliably and, at the same time, as safely as possible for a biological object. Nano-IR spectroscopy is being actively developed now. And after my proposal to use an IR disinfector to effectively reduce the concentration of any viruses below the critical one [7,8], I receive several articles and books on NANOIC spectroscopy every week (Figure 1).

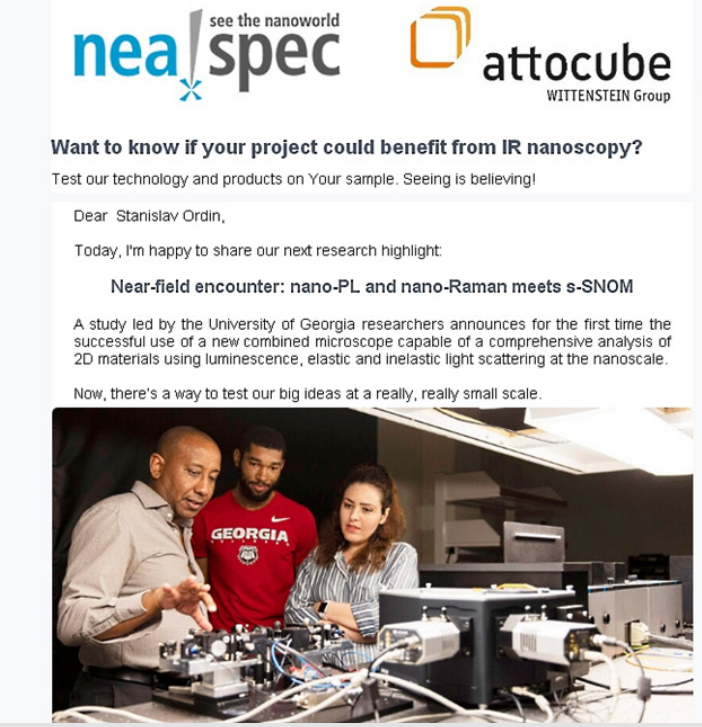


**Figure 1.**

I will not describe my comments, corrections and additions according to the methods described in them, because I do not consider it necessary to be distracted from solving Fundamental Problems. Therefore, I will just specially mark only a few Basic Moments. Safety for a biological object is ensured by the «softness» of the IR spectrum, only which - IR, is not only registered, but,

preferably, also gets to the object under study. For this, I developed a broadband IR emitter, but on the other hand, sharply cutting off the short-wavelength part of the radiation [9]. This IR source provides a high level of pure IR. So high that it provides even more precise measurements than most sources used in IR spectrometers, but orders of magnitude weaker are the radiation intensity of laser emitters, which are especially dangerous near the resonant frequencies of the object and in the IR range of the spectrum. The accuracy of the infrared measurements is determined, first of all, by the sensitivity of the infrared detectors used. In this regard, also initially detectors based on the transverse thermoelectric effect [10,11], and then, as more sensitive detectors based on Local THERMO-EMF [12], were developed specifically for IR spectroscopy. The subtlety of IR experiments increases significantly when using the polarization technique, since in this case, it is possible to measure not only the amplitude of the radiation recorded at the selected frequency, but also its phase. And it is for such measurements that an ultra-wide-range precision graphite polarizer was developed [13].

And finally, the accumulation of the signal, which is done mainly with the help of computers, which has its own errors and limitations. Many of these limitations can be circumvented by using multiple reflections from a nano-thickness layer. For this, an «effective mirror» is placed in the plane of reflection of the IR signal - a void between aluminum mirrors located at a certain angle, on the surface of which a nano-layer of biological objects is applied. By varying the angle of crossing of the mirrors, it is possible to obtain a «specular» reflection from a «void», which is formed by multiple re-reflection of infrared radiation from the mirrors, which has repeatedly passed through the investigated nano-layer (it does not matter whether it is continuous or from individual nano-particles) (Figure 2). Integral, such as shown in Figure 2, IR technique allows you to obtain with high accuracy the Basic Resonant Frequencies of nano-objects and their superstructure (low-frequency) satellites. So at the first stage, this will make it possible to refine or build from scratch the superstructure of the studied nano-objects, including biological ones. But not only. Having tuned in frequency to a highly efficient (maximum) IR absorption peak of the biological object under study, it is possible, in principle, to register in a non-contact, but direct and non-destructive way directly in the amplitude of the absorption peak, or in the radiation peak, register and analyze the «Music of Life» of the biological object under study. But, at the same time, it is desirable to optimize (minimize without loss of sensitivity) the number of simultaneously recorded objects, since although the oscillation phases of living nano-objects, although not random (not purely statistical distribution), they may not be phased. In general, this approach opens up a whole field of new techniques that make it possible to reveal the fundamentally «living» characteristics of biological objects in general. The described approach to the study of biological objects expands the general understanding of the physics of the nano-state and is coupled with purely chemical aspects that manifest themselves on the nano-scale [14], but which required a revision of Basic Physical Concepts [15].

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