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## NEW PARADIGM AND PARAMETRY

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**Abstract:** Currently, the ongoing paradigm change requires both opening up the main provisions formulated by T. Kuhn and their further development. The article formulates the signs of scientific revolutions and the necessary conditions for their implementation. The history of the new paradigm is given and the periodicity in its emergence is revealed. A conclusion is made about the need to create a new research direction - Parametry. Areas of research are indicated, which scientific results will lead to new scientific revolutions in the foreseeable future.

**Keywords:** paradigm, scientific revolution, low-energy nuclear reactions, history of science, philosophy of science, metrology

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### 1. INTRODUCTION

The science itself that classifies objective knowledge about the world around and formulates the laws of nature obeys objective laws in its development. One of these laws opened and formulated by T.S. Kuhn in his book: "The structure of scientific revolutions" in 1962 is the law of paradigm shift [1]. The last paradigm shift or scientific revolution began with the discovery in 1896 by A. Becquerel of such an "anomalous" phenomenon as the natural radioactivity of uranium salts. Currently, a new paradigm change is taking place associated with the discovery, in 1989-1992, of "impossible", radiationless and low-energy nuclear reactions [2].

The scientific revolution that takes place now is the only one so far after the discovery of the law of paradigm shift. This circumstance led to reflections and some conclusions about the objective properties of the law of the shift of paradigms, about the development history of the last of them and about the need to create new scientific directions, including the parametry of physical objects.

### 2. PARADIGM DEFINITION

Each new paradigm is generated by a new idea of the structure of Nature.

Each new paradigm describes the World around a human being more and more objectively.

The paradigm is an interconnected, leading system of views, notions and concepts, including postulates, theories and research methods, in accordance with which subsequent scientific constructions and generalizations are carried out, new scientific, technical and industrial technologies arise, thanks to which the civilizational evolution of mankind is carried out. T.Kuhn wrote: "By paradigms, I mean universally recognized scientific achievements that, over a certain time, provide the scientific community

with a model for posing and solving problems.” A specific paradigm, adopted as a model for reasonable scientific activity, dominates the scientific community for a certain, limited time, until it is replaced by a new paradigm.

The above definition of the paradigm refers exclusively to the scientific activity of mankind and formulates the most general concept in Science. However, at present, the general concept – the paradigm of Science – has been fragmented and is applied to specific scientific disciplines, for example: a paradigm shift in physics, biology, geology, etc. Moreover, the concept of a paradigm begins to spread to other areas of human activity: engineering and technological paradigms, paradigms in art, social and political paradigms, civilizational paradigms. And if one should reconcile with the “fragmentation and dissemination” of the general concept of a paradigm with the indispensable formulation of definitions in many of its specific manifestations, then the use of the word paradigm, which simply characterizes a change in conditions in any randomly chosen human activity, is unacceptable.

It should be remembered that a paradigm shift in a particular area of human activity means a revolution in this area. Moreover, the results of a revolution in this area will inevitably lead to revolutionary changes in other spheres of human activity. In this article, the concept of paradigm is used in its initial meaning.

A paradigm shift is a rare event. The influence of each of the known paradigms lasted for several generations of scientists who, in their scientific activities, were not aware of their involvement in this paradigm, which is natural.

The today’s generation of scientists is in luck! We now know about the law of paradigm shift, and due to scientific specialization, some of us can just observe the process of paradigm change at its initial stage, while others can and should take an active part in the scientific revolution that has come, with an inevitable confrontation, at the beginning, between supporters of old and new

paradigms. The outcome of this confrontation is historically predetermined.

### 3. SIGNS OF SCIENTIFIC REVOLUTIONS

The scientific revolution, which consists in a change of paradigm, is characterized by three qualitative features [3], and it occurs when:

Firstly, scientists discover anomalous phenomena that cannot be explained using the current paradigm. This is the main feature of an emerging scientific revolution [1];

secondly, a discovery of new particles, new objects, new structures, up to the discovery of new states of matter takes place; and, thirdly, the creation of new theories, the discovery of new laws of interaction between old and new objects, up to the discovery of new types of fundamental interactions takes place.

However, even in the presence of the above signs, the scientific revolution may not take place immediately. A public demand associated with the development of productive forces of society is required for its implementation.

The beginning of the scientific revolution of 1896 coincided with the second industrial, technological revolution of 1870-1960 that was taking place at the same time. The technological revolution was based on advanced scientific discoveries in physics and chemistry and on the desire to introduce scientific achievements into production. The rapidly developing, due to these discoveries social productive forces, in turn, would enthusiastically accept and support any new scientific achievements. Therefore, the 20th century went down in history as the century of scientific and technological progress.

The discovery of natural radioactivity was followed by other, numerous discoveries in physics, the most fundamental of which were: the discovery of new particles: electron, proton, neutron, neutrino and their antiparticles; discovery of new structures: atomic nuclei, atoms, molecules, including organic ones and

biomolecules; the discovery of new states of matter: charge plasma and quark-gluon plasma; creation of quantum mechanics, special and general theory of relativity; discovery of new types of fundamental interactions: strong and weak interactions.

The development of any paradigm is realized in two directions. Within the framework of the first direction, firstly, initial theories are built that explain the anomalous phenomena that gave rise to a new paradigm and, secondly, emerging advanced hypotheses create, both new theories that explain old facts and replace previous theories, and a new toolkit, which allows the creation of new technologies. “The new paradigm means a change in the rules that scientists were guided up to this time in the practice of normal science, which these scientists have already successfully completed. That is why the new paradigm, no matter how special the area of its application, is never just an increment to what was already known. The adoption of a new paradigm requires a restructuring of the previous paradigm and a reassessment of previous facts, an internal revolutionary process that is rarely within the power of one scientist and never takes place within one day [1]”.

The second direction is “hidden” theories and technologies, which appear as extensive research is carried out within the framework of the new paradigm. The history of the development of science demonstrates that “hidden” theories, methods and technologies are superior to the initial theories and technologies in their significance for human evolution.

It is obvious from the above that the change of paradigms gives rise to new scientific and technical directions and disciplines in all fields of human activity.

The scientific revolution provides unique opportunities for all generations of scientists, both in restructuring old theories and in the development of “hidden” theories and advanced technologies. It is obvious that the restructuring of old theories and reassessment of old facts

can be carried out faster by scientists who have developed old theories up to the present time and possess a huge amount of empirical data, but who, at the same time, recognize the need for an “internal revolutionary process”. It is not enough to declare the beginning of a new scientific revolution, the practical implementation of that revolution is necessary.

#### 4. NEW PARADIGM

Currently, a paradigm shift is taking place; a new scientific revolution has begun, associated,

- firstly, with the discovery of multinuclear, radiation-free and low-energy nuclear reactions: reactions of cold nuclear fusion and reactions of low-energy transmutation of chemical elements [4-7]. Low-energy transmutation reactions are reactions of transformation of some chemical elements into other chemical elements in weakly excited condensed matter;
- secondly, with the discovery of a new state of atomic and nuclear matter: spin nuclide electron condensate [8-9]; and,
- thirdly, with the discovery of a new, fundamental resonant interference exchange interaction (RIEX interaction) [10-11].

It is necessary to understand for the transition to a new paradigm that nuclear reactions occur at low energies in condensed matter, in strong magnetic fields (in the reaction volume  $< 10$  eV/atom), and they occur everywhere in the Universe [2].

Low-energy nuclear reactions (LENR) were discovered and subsequently reproduced by electrolysis in heavy water; in a glow gas discharge; at electronic melting of zirconium ingots; in explosions of metal targets irradiated by a powerful pulse of electrons; in explosions in liquid dielectric media of metal foils, through which a powerful pulse of electric current was passed; when exposed to a pulsed current on a lead-copper melt; at the passage of electric current in water-mineral media; in ultrasonic treatment of aqueous saline solutions; when

irradiated with braking gamma quanta of condensed gases; in growing biological structures, and in many others [4-7]. It becomes obvious from the above list that the methods of experiments carried out on LENR are extremely diverse and fundamentally different from the methods of nuclear physics. Despite the variety of techniques, the results of LENR experiments are qualitatively similar to each other.

Analysis of experiments on the transmutation of chemical elements and their results showed that they occur in strong, more than 30 T, magnetic fields. It turned out that atomic and nuclear matter in strong and ultrastrong magnetic fields are transformed into a new state of matter: into a spin nuclide electron condensate. A characteristic feature of such a condensate is that pairwise electrons and pairwise protons and neutrons (fermions with spin equal to  $S = 1/2\hbar$ ) are in a bound state, in a state of orthobosons in it, when the total spin of each pair is equal to one,  $S = 1\hbar$ .

Magnetic fields begin to emerge in ionized, liquid media as a result of the passage of unidirectional flows of electrons with a density of more than  $10^{21} \text{ cm}^{-3}$  through them [12]. Those magnetic fields owe their origin to the magnetic moments of the electrons  $m_e$ , which are parallel to each other in a unidirectional flow. Since the electron spins in this case are also parallel, then, in addition to the magnetic field, the electrons generate an exchange self-consistent field with a negative potential. Electrons with parallel spins in a negative potential, in order to comply with the Pauli principle, are forced to pair into orthobosons with a spin  $S = 1\hbar$ . This pairing is carried out because electrons in a magnetic field obtain new, oscillatory quantum numbers [13]. An orthobosonic pair of electrons is a toroidal, ring current of radius  $R_z$ , which rotates around a counter flow of positive ions that move at a speed  $V_i$  (Fig. 1a). The orthoboson has external and internal strong, more than 30 T, magnetic fields  $\mathbf{B}$ , and a strong electric field. External magnetic fields connect orthobosons into electronic

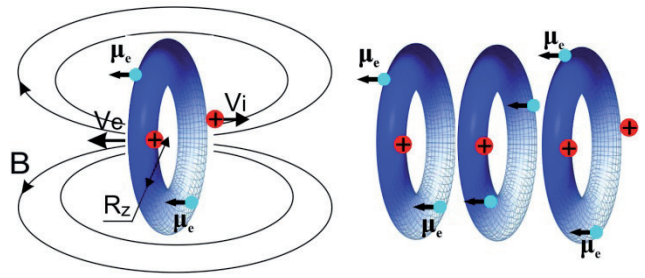


Fig. 1. a – orthoboson, b – “capsule”.

orthoboson “solenoids” - “capsules” (Fig. 1b). “Capsules” can have a different number of orthobosons. They can fly out of the condensed medium. Then the “capsules” are registered as “unknown” particles.

The atoms are transformed into transatoms in internal strong magnetic fields of the “capsules”. Electrons in a transatom are also coupled in pairs to form orthobosons. Atomic electron orthobosons merge into a Bose-Einstein condensate, in which all electron spins and their magnetic moments are parallel to each other (Fig. 2). The magnetic moments of electrons generate ultrastrong magnetic fields inside and around transatoms up to  $B_s \sim 10^5 - 10^{10} \text{ T}$  [8,14]. The internal ultrastrong magnetic field interacts with the magnetic spin and magnetic orbital moments of nucleons in the nucleus, changes the structure of the nucleus and turns it into a Transnucleus. Nucleons in the transnucleus also form orthobosons with  $S = 1\hbar$ , but these are already nuclear orthobosons. The transnucleus with the surrounding electron orthoboson Bose-Einstein condensate forms a spin nuclide electron condensate.

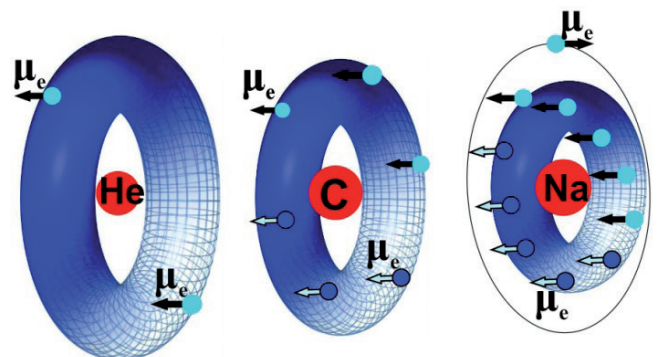


Fig. 2. Examples of transatoms: helium, carbon, sodium.

External ultrastrong magnetic fields of transatoms attract them to each other. Electronic Bose-Einstein condensates of two transatoms are combined into a common condensate. A double nuclear transmolecule is formed from their transnuclei. Other transnuclei can join it. A multinuclear transmolecule is formed, in which multinuclear reactions take place, including those with electron orthobosons. Thus, nuclear-electronic reactions occur, which products are non-radioactive. These reactions occur due to the resonant interference exchange interaction.

The nature of RIEEX interaction is associated with the overlap and interference of the wave functions of objects that have resonant  $R$ -states. Resonant interference exchange interaction is an exchange interaction between any two or more objects, including between atomic nuclei  $A$ ,  $B$ ,  $C$ ..., which have resonant  $R$ -states belonging to a composite system that consists of these objects [2,11]. The wave functions of the nuclei interfere with each other in the  $R$ -state. The wave functions of the resonant  $R$ -states contain all wave functions of the nuclei  $A$ ,  $B$ ,  $C$ ... It is namely due to the wave functions of  $R$ -states that atomic nuclei are simultaneously “in each other” through exchange interactions with each other. Thus, short-range strong and local weak interactions between nuclei become “long-range” interactions. Strong-weak, electromagnetic and inertial-gravitational interactions are realized between the nuclei simultaneously. RIEEX interaction is characterized by the interference of all types of interaction.

Thus, multinuclear, radiationless and low-energy nuclear reactions occur due to the RIEEX interaction. RIEEX interaction is a universal interaction. It includes and controls all the other fundamental interactions. The action of the resonant interference exchange interaction extends to the whole of Nature, from elementary particles to complex biological and social systems.

It is known that low-energy nuclear reactions are accompanied by unknown radiation,

which leaves strange tracks and craters on the “detectors” [15,16]. It is assumed in [12] that the unknown radiation is orthobosonic “capsules” emitted from a condensed matter. It was shown in [16] that the source of unknown particles can be hydrogen-saturated metals and an electric discharge in a hydrogen-containing medium. In addition, the same work demonstrates that the radiation that produces tracks and craters on CDs is generated when a hydrocarbon burns, when an internal combustion engine is running, when charging a smartphone, and in many other processes. In addition to tracks from LENR, background tracks from unknown sources of radiation were recorded, which, apparently, surround us everywhere [15]. We can conclude from the above and from the variety of techniques for low-energy nuclear reactions that they occur throughout the Universe.

The industrial use of low-energy nuclear reactions is associated primarily with the development of new energy sources and with the production of rare elements and their isotopes from cheap and widespread chemical elements.

## 5. HISTORY OF EMERGENCE OF NEW PARADIGM

Each new paradigm arises in the depths of the old paradigm, due to its scientific and technological achievements; it appears in the form of anomalous phenomena in the beginning. The latter can be perceived by the scientific community as scientific curiosities at its best that require careful research, at worst as “pathological” results of experiments performed by “illiterate” scientists.

As indicated above, the last scientific revolution began in 1896 with the discovery of the natural radioactivity of uranium salts by A. Becquerel. Two years later, E. Rutherford showed that radioactive rays consisted of alpha and beta radiation. A year later, P. Villard discovered gamma radiation. In 1900, A. Becquerel determined that beta rays were electrons, which were discovered by D.D.

Thomson in 1897 while studying the behavior of cathode rays in electric and magnetic fields. In 1903 W. Ramsay and F. Soddy investigated radium emanation by optical spectroscopy and discovered helium lines in it. E. Rutherford proved soon that alpha rays are nothing more than ionized helium. In 1911, Rutherford finally determined, as a result of experiments on alpha particles scattering on gold foil, that an atom consists of a positively charged nucleus and negative electrons surrounding it. Thus, the hypothesis of the transformation of chemical elements in the process of their radioactive decay was substantiated. That hypothesis was put forward by E. Rutherford and F. Soddy as far back as 1903. Soon, in 1913, Rutherford's nuclear model was successfully confirmed by N. Bohr, who formulated postulates about the behavior of atomic systems and created the quantum theory of hydrogen-like atoms.

It became clear that, for the approach of atomic nuclei to the distance of the action of nuclear forces, it is necessary to overcome the Coulomb barrier between these forces, which ranges from tens of keV to hundreds of MeV. This statement was confirmed in 1919 by E. Rutherford, who was the first to carry out a nuclear reaction of nitrogen nuclei with fast alpha particles (helium nuclei):  ${}^{14}_7\text{N} + {}^4_2\text{He} \rightarrow {}^{17}_8\text{O} + {}^1_1\text{H}$ .

Thus, nuclear physics, that has manifested itself in natural radioactive decay, as low-energy nuclear physics in the input channel, has established itself as high-energy physics due to the creation of a nuclear model of the atom and collisional nuclear reactions [17].

For these reasons, the low-energy experiments by J. Wendt and K. Irion on the alpha decay of tungsten induced by an electric explosion [18] (1922), and the experiments of A. Smiths and A. Karssen on the alpha decay of lead induced by electric current [19] (1925), carried out almost thirty years after the discovery of natural radioactivity, were perceived by the scientific community as impossible, and their results as erroneous.

The experimental works in the next thirty years carried out under the leadership of I.V. Kurchatov, on the launch of thermonuclear reactions with a high-precision discharge in a gaseous medium of hydrogen, deuterium, helium and their mixture, which would lead to the appearance of neutrons and powerful X-rays (1956) [20], as well as the device of I.S. Filimonenko on the electrolysis of heavy water with a palladium cathode, in which electricity was generated due to the reactions of nuclear fusion of helium from deuterium at a temperature of  $\sim 1150^\circ\text{C}$  (1957) [21], did not arouse wide scientific interest. Probably, such an attitude was due to the fact that the power engineering based on the fission of uranium was developing rapidly at that time, and work on controlled thermonuclear fusion began.

Another thirty years have passed. The nuclear accident at the Chernobyl nuclear power plant (1986), the protracted implementation of controlled thermonuclear fusion, catastrophic environmental pollution and global warming have formed a societal demand for renewable energy sources, alternative to oil, gas and coal. For this reason, the implementation, by M. Fleischman and S. Pons, of the reaction of cold fusion (CF) during the electrolysis of heavy water with a palladium cathode at room temperature (1989) [22] caused a violent reaction of scientists who began to check their results around the world. It was soon discovered that CF reactions are accompanied by reactions of transformation of some chemical elements into other chemical elements, for example, in experiments with a glow discharge of deuterium with a palladium cathode (1992) [23,2]. Moreover, such reactions, called low-energy transmutation reactions, have been recorded in numerous other experiments that have nothing to do with cold fusion [4-7].

Low-energy transmutation of atomic nuclei and cold fusion are united under the general name low-energy nuclear reactions (LENR) or nuclear science in a condensed matter (CMNS - Condensed Matter Nuclear Science).

The absence of a theoretical explanation for LENR, which affected the reproducibility of the experimental results, gave rise to skepticism in the scientific community regarding the possibility of this type of reactions.

It took another thirty years for the Incredible to turn into the Obvious. This transformation occurred, firstly, due to the creation of the theory of pairing of atomic electrons into orthobosons in strong magnetic fields arising in weakly excited condensed matter, and the pairing of identical atomic nuclei in ultrastrong magnetic fields created by the atomic electron Bose-Einstein condensate. And, secondly, due to the discovery of fundamental resonant interference exchange interaction, which manifests itself between objects that are connected by resonant states.

If we consider the implementation of the cold fusion reaction by M. Fleischman and S. Pons as the beginning of a new scientific revolution (1989), then the duration of the previous paradigm from the discovery of natural radioactivity (1896) to the discovery of CF, is equal to approximately 90 years.

It can be seen that the main events in the history of low-energy nuclear reactions took place at intervals of thirty years. Apparently, each time this is associated with the emergence of a new generation of scientists who were not affected by the opposition between normal science and a new, emerging paradigm, and who enthusiastically began on the implementation of the latter paradigm in the practice of their scientific activities. Time will tell whether a thirty-year period is an objective parameter in the history of the emergence of subsequent paradigms.

## 6. PARADIGM SHIFT AND PARAMETRY

What is the reason that nuclear physics, born as low-energy science, but forgotten for 90 years and also considered a pseudo-science, gave priority to high-energy nuclear physics in scientific research? The reason is in measurements. It turned out that to measure and to determine the parameters

of individual elementary particles under the use of a wide variety of detectors, up to devices that consist of many thousands of detectors, was much easier than to perform analytical studies of substances and materials.

For registration of elementary particles, nuclei and individual atoms such detectors as, for example, gas detectors have been developed and are being developed now: Geiger counter, ionization, proportional, streamer detectors; liquid detectors: bubble chambers and scintillation detectors; solid-state detectors: scintillation and semiconductor detectors, microchannel plates and CCDs. These detectors and their combinations make it possible to identify particles: to determine their energy, charge, mass. The main trend today in the development of detecting systems is the development of detectors based on new materials, new technologies and the creation of multi-channel devices on a single basis.

It was necessary to develop analytical instrumentation, computer technologies and to improve the above-mentioned detectors in order to be able to study technical, industrial materials and geological samples, to reliably determine the presence of chemical elements in them and their quantity. The successes achieved in these areas at the end of the last century made it possible to create everywhere analytical laboratories for general use, by means of which researchers have the opportunity to obtain independent, reliable information on the mass and elemental composition of both geological samples and materials gained in various technological and experimental processes.

Thus, quantitative information obtained about the properties of certain objects with a given accuracy and reliability turned out to be a decisive factor in choosing a direction in the development of science at the beginning of the 20th century. In nuclear physics, the choice between low-energy and high-energy reactions has been made in favor of the latter.

The science that deals with measurements, measurement methods and means of ensuring their uniformity is metrology. By metrology, we mean the accuracy of measurement of measures, weights, time and other physical quantities. The role of metrology in the development of science can be understood from the statement of D.I. Mendeleev: “Science begins as soon as they begin to measure. Exact science is unthinkable without measure.”

In addition, the determination of the exact numerical values of certain parameters of objects in the formulation of physical experiments allows scientists to make the right choice between various assumptions and theories about the processes with which they are experimenting. It is known that any hypothesis or theory must have predictive power, i.e. be able to anticipate new facts, the numerical values of which can be verified by experience.

We introduce a new concept – Parametry – in this article. Thus, we transfer measurement accuracy to parameters that characterize objects. Objects should be understood as a whole group of objects of the same type.

Parametry is the selection of essential, characteristic parameters of objects that sufficiently describe them and distinguish them from other objects, and the determination of their numerical values. The parametry of the main groups of objects and their relationship with scientific disciplines can be systematized in the following areas:

- the parametry of the physical vacuum (PV);
- parametry of elementary particles, atoms and atomic nuclei (PN) - atomic and nuclear physics;
- parametry of molecules and high-molecular compounds (M) - chemistry, biochemistry;
- parametry of substances and materials (SM) - solid state physics, biology, materials technology;
- parametry of planets (P) - planetology, geophysics, geology;

- parametry of stars and stellar systems (S)
- astrophysics;
- parametry of galaxies (G) - astronomy;
- parametry of the Universe (U) - astronomy.

Parametry objects are located in this list as they increase in size. Since the physics of the microworld – the physics of the physical vacuum, elementary particles and atomic nuclei, is closely related to the physics of the megaworld – the physics of the Universe, then these groups of objects should be connected. Obviously, due to the general universalism of physical laws, all other groups of objects should be connected with each other (**Fig. 3**).

The history of the development of science and the above example show the following: as regards the role of measurements in the choice between low-energy and high-energy nuclear reactions, we can conclude that successes in the parametry of objects are directly related to the emergence of new paradigms and ongoing scientific revolutions. It becomes obvious from the proposed scheme (Fig. 3) that low-energy nuclear reactions could not be discovered and understood without studies of elementary particles, atoms, molecules, without studying high-energy nuclear reactions, i.e. without

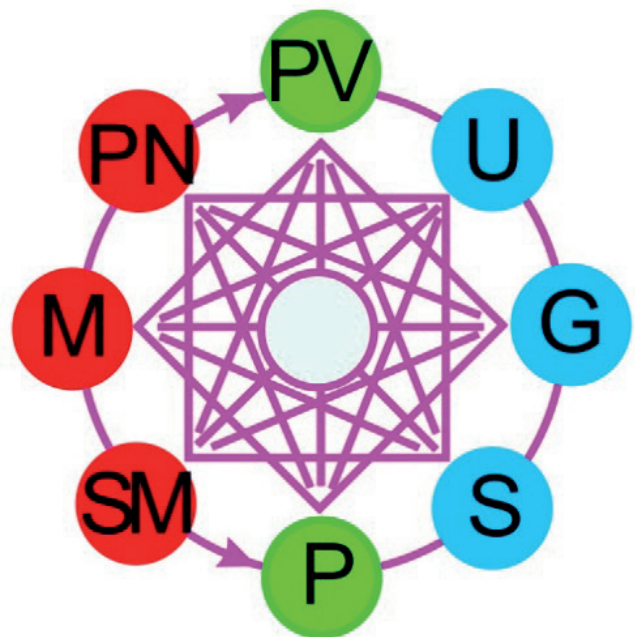


Fig. 3. “Wheel” of objects for research.



scientific and technological achievements realized within the framework of the old paradigm.

At present, the groups of objects highlighted in red (Fig. 3) are sufficiently well studied and continue to be successfully studied by modern science. This cannot be said, due to objective reasons, with respect to other groups of objects, which, despite their ancient history, are in their instrumental studies in their initial positions (green and blue). Obviously, the closest ones for intensive research are, first of all, groups by the size of objects that are adjacent to the already studied groups, namely: the parametry of the physical vacuum and the parametry of the planets, first of all, the parametry of the Earth (green). The creation and formation of the Earth's parametry based on the Earth sciences and Geology is, in addition, a vital direction, since it is associated with the preservation of Mankind as a species, because the mankind continues to irrepressibly and catastrophically pollute their planet.

Full-scale parametry of the physical vacuum and the parametry of the Earth are impossible without a practical revolution in the field of low-energy nuclear reactions. Parametry of the Earth is associated with the emerging new direction in geology – with Quantum geology [24-26]. According to quantum geology, the evolutions of geological processes and ore formation on Earth are determined, among other things by low-energy nuclear reactions: by quantum, nuclear transformations of some chemical elements into others at low energies, in other words, planetary nucleosynthesis. Obviously, quantum geology will not be limited, in its development, only to planetary nucleosynthesis.

A new state of matter that arises in a strong magnetic field – a spin nuclide electron condensate, characterized by ultrastrong, inhomogeneous and anisotropic magnetic and electric fields in which integrals of motion are not preserved, – is a “desktop” laboratory for studying the processes that occur in a physical vacuum, and, therefore, it forms its parametry.

The parametry of the physical vacuum and the parametry of the Earth should develop as intensively as possible and in parallel with the ongoing scientific revolution, caused by low-energy nuclear reactions.

If a thirty-year period in the development of paradigms is an objective parameter, then one should expect the flourishing of resonant technologies based on low-energy nuclear reactions and resonant interference exchange interactions in the fifties of this century. At the same time, the development of the physical vacuum sciences and planetary science will obviously raise the question of a new paradigm shift. Therefore, scientists involved in the study of the physical vacuum and planetology should pay close attention to the registered anomalous phenomena, begin their detailed study and carry out their publication, possibly in special journals.

Two different, “dangerous” directions should be distinguished separately in the group of substances and materials: organic and inorganic, which go still “in parallel” to each other.

– Organic direction: nucleotide-DNA, RNA, protein-cell-organ-Homo sapiens-collective, public consciousness, formed, inter alia through social networks - civilization.

– Inorganic direction: transistor-logical element-chip-processor-computer networks-artificial intelligence-collective, network intelligence-AI sphere, AI nationalism.

The danger of the organic direction is associated with the uncontrolled genetic modification of existing biosystems, including humans. The medium and long term consequences of genetic modification are unpredictable and, therefore, there is no guarantee that they do not lead to the death of existing humankind.

The danger of the inorganic direction is associated with the replacement of human consciousness with artificial intelligence, and as a result the loss of human intellectual and conscious properties. It is now obvious that the use of artificial intelligence is required for the study of all groups of objects and the creation

of their parametry, and it is required to put the parametry of the objects under study into the initial data for solving problems with the help of artificial intelligence. It should be noted that public consciousness is being actively formed by social and computer networks, which are now monitored and controlled by artificial intelligence, and in the future, they will possibly be controlled by AI itself!

In order to withstand the emerging threats, the humankind needs to understand: what is the sense of their existence, what is their undeniable advantage over artificial intelligence. It seems impossible to overcome the impending threats without creating the parametry of biosystems, the parametry of human and of whole mankind, and the parametry of artificial intelligence.

## 7. CONCLUSION

A present paradigm change requires the scientific community to be aware of the ongoing scientific revolution, to explore the main provisions formulated by T. Kuhn and to develop, as soon as possible, new theories and new technologies on the basis of a new paradigm. The peculiarity, attractiveness, but also the danger of the onset stage in the development of Humankind lies in the transition in all spheres of its activity to the widest use of Artificial Intelligence and Resonance Technologies. Both of these areas are methods to obtain maximum results at the lowest cost. The interpenetration of these directions is inevitable.

At present, the evolutionary development of wild life, the biosphere is in a state of noosphere, where the Humankind is an irresistibly growing, powerful Geological force of a planetary scale [27]. The Humankind realized, due to the development of productive forces, the transition to the state of the noosphere, but the Humankind, in its approach to solving emerging crises, in its Consciousness remains at the pre-Christian and even at the pre-Old-Testament level. This unresolved contradiction constantly gives rise to the reproduction of ongoing crises.

Therefore, the creation, by Humankind, of a number of new technologies, the consequences of which are sometimes impossible to predict, for the first time brought the Humankind to the brink of a possible self-destruction. Such a threat comes from probable military, anthropogenic, biogenic, cyber disasters. Moreover, since the emergence of new paradigms leads to the rapid development of the productive forces of society, which, according to the laws of dialectics in history, at a certain stage come into conflict with existing social relations, the beginning scientific revolutions are the forerunners of prompt economic, socio-political crises and crises in the human consciousness. These crises are countered in the form of necessary and inevitable social revolutions and mandatory, traditional or non-traditional world wars. The history of the 20th century demonstrates that these two events are interconnected and proceed at the same time.

It becomes more and more obvious that if a Human does not change his own Consciousness in all its manifestations from individual to public – interstate consciousness, no, even the most advanced, technologies are able to prevent impending catastrophes, but they can only bring them closer. The complexity of the forthcoming change in Consciousness is associated with the need to simultaneously preserve the Human as a Conscious, Humanistic, Universal species.

Stagnation in the development of productive forces, as well as the invariableness of Consciousness, and even more so its degradation, lead to the destruction and death of Civilizations. The inevitability of scientific Revolutions makes the creation of a new Consciousness inevitable.

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