principle of relativity worked, and where the principles of Newtonian mechanics were refined, neglecting the speed of propagation of influences. This is exactly what Ritz was talking about at the beginning of the 20th century, when science was at a crossroads.

But instead of following this classical path, the scientific community chose the risky path of Einstein, who proposed, contrary to logic, to preserve Maxwellian electrodynamics, rejecting classical mechanics. Consider, for example, how Kaufmann's experiment was explained in terms of the theory of relativity. In this experiment, it was found that fast electrons do not behave at all in the way that Maxwell's electrodynamics prescribed them. Moving in an electric field, electrons are deflected by an angle smaller than the calculated one [4]. Since the deflecting action of the electrodes is characterized by an acceleration $a=F/m$, which informs the electron of the mass m the electric force F, then Einstein interpreted this not so that Maxwell's electrodynamics, which predicts the same magnitude of force, regardless of speed, is wrong, but as if classical mechanics is wrong, in which the mass m is constant. Mismatch of deflection and acceleration proportional to it $a=F/m$ with the calculated one is caused, according to Einstein, by an increase in the mass of an electron with an increase in its speed. Although, as is easy to understand, there is no reason for such an increase in mass. Moreover, this contradicts all our experience and the definition of mass as the amount of matter that must be preserved according to the law discovered by Lavoisier and Lomonosov. Even nuclear physicists themselves are already aware of the inconsistency of the concept of growing mass: according to the theory of relativity, the mass of a body depends not only on the speed, but also on its direction with respect to the force [10]. That is, even at a given speed, the mass cannot be considered a uniquely defined quantity: indeterminism arises. Ritz suggested a simpler explanation: the difference between the deviation or acceleration $a=F/m$ from the calculated one is caused by a change in the force F, acting on a moving electron, with its mass m unchanged. Such a change in force is not only quite natural (for example, the Lorentz force and aerodynamic forces depend on speed), but also expected, since taking into account the finite speed of propagation of influences that have the speed of light, as Ritz showed, just should lead to a change in force and acceleration precisely by the same value as was recorded in Kaufmann's experiment [15]. That is, Kaufmann's experience once again revealed the incorrectness of Maxwellian electrodynamics and the inadmissibility of neglecting the finite velocity of propagation of influences.

Strictly speaking, electrodynamics and the theory of gravitation followed exactly this path before the advent of Maxwell's field theory. Already in the works of Ampere, Weber, Gauss, and Riemann, electrodynamics was constructed, in which the electric Coulomb interaction of charges depended on their mutual motion—on their relative velocity and acceleration [1 , 20 , 21]. As a result, they immediately received a qualitative and quantitative explanation of the magnetic and induction forces, which, as you know, are created precisely by the movement of charges. Recall that Maxwellian electrodynamics did not explain in any way why, when charges move, their electrical action generates magnetic and inductive ones. Maxwell only stated in his equations the existence of these forces, presenting mathematical expressions for them. And Weber and Gauss found out their nature: magnetic and induction forces are small changes in the electric force of interaction caused by the finite speed of propagation of electrical influences, that is, their delay. Moreover, even then it was noticed that the constant in the Weber formula for the electromagnetic force is very close to the speed of light *c* [20]. That is, already in Weber's formula, long before Maxwell, one could read that electrical influences are transferred at the speed of light, from where one step to the idea of electromagnetic waves and the electromagnetic nature of light. Ritz showed rigorously that it is the final light velocity *c* of the ejection of particles that carry influences that creates magnetic, inductive effects and determines the speed of electromagnetic waves. Whereas in Maxwell's electrodynamics everything is exactly the opposite: the rate of transformation of an electrical disturbance into a magnetic one determines the speed of propagation of electromagnetic waves. And again, there is no indication of what this rate of transformation of electrical disturbances into magnetic and vice versa is given by.

Thus, there was no reason to prefer the electrodynamics of Maxwell to the former electrodynamics of Weber-Gauss. That is why Maxwell's theory was initially rejected by the scientific community and was not recognized for a long time. And only the discovery of electromagnetic waves by Hertz brought her recognition in 1888. However, electromagnetic waves, as Ritz showed, were also obtained in the former electrodynamics of Weber-Gauss. Thus, the contradiction of Maxwell's theory with Michelson's experience and other experiments should be interpreted as confirmation of the former Weber-Gauss electrodynamics, where the Galilean principle of relativity worked, and where the principles of Newtonian mechanics were refined, neglecting the speed of propagation of influences. This is exactly what Ritz was talking about at the beginning of the 20th Century, when science was at a crossroads.

But instead of following this classical path, the scientific community chose the risky path of Einstein, who proposed, contrary to logic, to preserve Maxwellian electrodynamics, rejecting classical mechanics. Consider, for example, how Kaufmann's experiment was explained in terms of the theory of relativity. In this experiment, it was found that fast electrons do not behave at all in the way that Maxwell's electrodynamics prescribed them. Moving in an electric field, electrons are deflected by an angle smaller than the calculated one [4]. Since the deflecting action of the electrodes is characterized by an acceleration $a=F/m$, which informs the electron of the mass m the electric force F, then Einstein interpreted this not so that Maxwell's electrodynamics, which predicts the same magnitude of force, regardless of speed, is wrong, but as if classical mechanics is wrong, in which the mass m is constant. Mismatch of deflection and acceleration proportional to it $a=F/m$ with the calculated one is caused, according to Einstein, by an increase in the mass of an electron with an increase in its speed. Although, as is easy to understand, there is no reason for such an increase in mass. Moreover, this contradicts all our experience and the definition of mass as the amount of matter that must be preserved according to the law discovered by Lavoisier and Lomonosov. Even nuclear physicists themselves are already aware of the inconsistency of the concept of growing mass: according to the theory of relativity, the mass of a body depends not only on the speed, but also on its direction with respect to the force [10]. That is, even at a given speed, the mass cannot be considered a uniquely defined quantity: indeterminism arises. Ritz suggested a simpler explanation: the difference between the deviation or acceleration $a=F/m$ from the calculated one is caused by a change in the force F, acting on a moving electron, with its mass m unchanged . Such a change in force is not only quite natural (for example, the Lorentz force and aerodynamic forces depend on speed), but also expected, since taking into account the finite speed of propagation of influences that have the speed of light, as Ritz showed, just should lead to a change in force and acceleration precisely by the same value as was recorded in Kaufmann's experiment [15]. That is, Kaufmann's experience once again revealed the incorrectness of Maxwellian electrodynamics and the inadmissibility of neglecting the finite velocity of propagation of influences.

3. Roots of quantum physics and alternative concepts

At the beginning of the 20th century, the crisis affected not only electrodynamics and optics, but also thermodynamics, as well as the theory of the structure of the atom. To resolve this crisis, scientists had to revise the foundations of classical mechanics even more, but not in the area of high speeds and energies, but in the area of low speeds, energies and scales. This crisis originated again in optics, when analyzing the radiation spectrum of an absolutely black body. The fact is that the black body spectrum predicted on the basis of classical mechanics, thermodynamics and electrodynamics did not correspond to the actually measured one. According to the calculations, the spectrum should be described by the Rayleigh-Jeans formula, according to which the radiation intensity increased with increasing frequency [5]. This formula worked well at low frequencies, but contradicted observations at high frequencies. And with an infinite increase in frequency, the radiation power had to increase indefinitely, so that the bodies would glow immensely brightly in the ultraviolet part of the spectrum, and would instantly cool down due to this radiation. This problem, dubbed the ultraviolet catastrophe, further exacerbated the crisis in physics.

The way out of this crisis was found in 1900 by Max Planck, who proposed the quantum hypothesis, according to which the energies E of oscillators - oscillating electrons cannot have arbitrary values, but are rigidly related to the frequency f of their oscillations according to the formula $E=hf$, where h is a fundamental constant, called Planck's constant. This simple hypothesis made it possible not only to eliminate the ultraviolet catastrophe, but also to theoretically calculate the form of the thermal spectrum described by Planck's formula and exactly corresponding to the experimentally measured one. In the very hypothesis of Planck, as he repeatedly noted, there was still nothing that would contradict classical mechanics and electrodynamics. Indeed, since the radiating electrons are in the atom, the mechanism of which was not yet known, it could well turn out that the energies of their vibrations depend in a certain way on the frequency of their rotation or vibrations. We observe a similar dependence for the planets of the solar system, the periods of revolution of which obey Kepler's 3rd law. That is, the frequency of revolution of the planet around the Sun is rigidly related to the radius of the orbit,

Considering that this is how the atom began to be represented ten years later in the planetary model of E. Rutherford (electrons rotate in circular orbits near the nucleus under the influence of its Coulomb attraction), then such a relationship between E and f would only be natural. The fact that this relationship in the Rutherford model would have turned out to be different than $E=hf$ is not so important and only says that the model needs to be corrected, and the relationship between E and f, in principle, can arise within the framework of classical mechanics, it is only necessary to find a suitable model of the atom. The fact that Rutherford's planetary model of the atom is erroneous also followed from the fact that it could not explain the stability of the atom: orbiting electrons, losing energy during radiation, would gradually narrow the turns of the orbit and fall on the nucleus. This also contradicts Planck's formula $E=hf$, from which it can be seen that with a decrease in the energy of the electron's revolution, the frequency of its revolution f should decrease, and not grow, as in the planetary model of the atom.

The instability of Rutherford's atom further exacerbated the crisis of physics. A way out of the crisis was found by A. Einstein and N. Bohr. Einstein interpreted the $E=hf$ dependence in his own way, assuming that it means not just the proportionality of the oscillator energy to its frequency, but that all this energy is emitted at once, in the form of a whole portion of $E=hf$, and this energy is immediately absorbed by such an indivisible portion-quantum: this is how Einstein explained the photoelectric effect. And Bohr developed this conclusion of Einstein, applying it to the Rutherford model: since electrons cannot radiate continuously, but radiate energy only in portions, then they will no longer gradually fall onto the nucleus, but must move along stationary orbits without radiation. Only at the moment of emission does the electron abruptly change its orbit, radiating the corresponding portion of energy. At the same time, since the energy of electrons is quantized, their stationary orbits can only have certain radii. This also explained the discrete line spectra of atoms: each line, each frequency in the spectrum corresponded to a certain transition of an electron from one stationary orbit to another, with the radiation of a certain energy, rigidly related to the frequency of radiation. Thus, it would seem another problem of classical physics was solved, for which the discrete nature of atomic spectra for a long time seemed mysterious. Thus, at first glance, a way out of this crisis in physics was also found, albeit at a high price: at the cost of abandoning the principles of classical mechanics and electrodynamics, where energy changes and radiates continuously.

But even this way out, if you think about it, was not a real way out, because it ran counter to the logic of scientific development. After all, the problems and the crisis were connected precisely with the planetary model of the atom, which had just been created and therefore unverified. Her verification, in fact, immediately showed the fallacy of this model. But, just as in the case of Maxwell's electrodynamics, scientists did not take the path of rejecting the discredited new theory, but the path of rejecting classical mechanics that had been tested for centuries and was not guilty of anything. The desire to preserve, despite all the facts, Maxwell's erroneous electrodynamics led to the emergence of a formal matching link in the form of the theory of relativity and relativistic mechanics, which asserts the fallacy of classical mechanics in the region of high velocities. And the desire to preserve the erroneous planetary model of the atom led,

Such a desire of Niels Bohr to save, by all means, the planetary model of Rutherford, who was his teacher, is quite understandable. But how the scientific community could agree with this output is not entirely clear. Moreover, science eventually abandoned the planetary model, although the quantum physics that arose because of it was preserved. In fact, quantum physics, just like relativistic mechanics, did not eliminate the contradictions that led to the crisis, but only concealed them by means of a formal technique that allowed obtaining results consistent with experience for some time. When discrepancies with experience began to arise again, physicists invented new postulates, introduced new, logically, physically and intuitively unsupported hypotheses to eliminate contradictions. As a result, quantum physics has gone through several stages of such artificial [5]. In many ways, this is reminiscent of the construction of the Ptolemaic geocentric theory of planetary motion, where gradually and without any reason, more and more new epicycles were arbitrarily added in order to obtain an external description of the apparent movement of planets across the sky consistent with experience. Similarly, in quantum mechanics, more and more new hypotheses were introduced, quantum numbers, like epicycles characterizing the movement of electrons around the nucleus, Bohr's exclusion rules were adopted. And up to our days, a pile of unsubstantiated hypotheses, for example, about quarks, is multiplying. However, the number of contradictions in the quantum model of the world does not decrease but multiplies even faster. And now the physicists themselves do not hide the fact that they cannot understand how elementary particles and even the nuclei of atoms are actually arranged. Thus, quantum physics, like the theory of relativity, did not solve the problems led to the crisis, but only formally bypassed them, postponing their decision until later. As a result, the problems only grew.

And the correct and logical way out of the crisis, dictated by the entire history of the development of physics, consisted in establishing the root of contradictions, in studying the real structure of the atom and building such a model of it that could explain all the discovered patterns within the framework of existing theories, including within the framework of classical mechanics and electrodynamics. It was on this path that Planck initially went, who for a long time, until the 1920s, asked physicists to be very careful with the hypothesis of quanta, reminded that quanta cannot be understood as portions of energy that can individually move in space. Planck always believed that the quantum hypothesis was quite compatible with classical physics. Indeed, the relationship between the frequency of electron oscillations and its energy can be realized in the classical model of the atom [9]. Moreover, such a classical connection easily explains the photoelectric effect. If light of frequency f falls on a metal, then, due to resonance, the light effectively acts only on electrons oscillating at the same frequency f, and, swinging them, makes them fly out of the atom and metal with conservation of kinetic energy $E=hf$. Thus, according to Planck, the energy of photoelectrons is contained not in light at all, but in the metal itself, in its atoms, while the action of light only initiates the emission of electrons, like a spark that explodes a barrel of gunpowder [26]. This immediately classically explained the inertialessness of the photoelectric effect and its other mysterious properties, which, at first glance, contradicted classical physics.

So, when studying the laws associated with the behavior of such little studied objects as atoms, it was much more natural not to change and formally adapt classical mechanics to the observed laws, but to study the atoms themselves, their structure. Many physicists, such as M. Planck, J. Thomson, J. Stark, P. Lenard, W. Ritz, went along this classical path. So, Thomson showed that the atom should not be a dynamic, but a static system, due to which the atom turned out to be stable within the framework of classical mechanics. Indeed, Thomson gave specific examples in which systems of many charges or magnets formed stable systems with a standard structure and dimensions [21]. So, Thomson referred to the experiments of A. Mayer, in which a set of identical magnetic floats formed stable configurations near the central magnet (an analogue of the atomic nucleus). Moreover, the magnets were arranged in concentric rings. It was this that led Thomson to the idea that electrons can also be located in separate shells in an atom, and their sequential filling explains the structure of the periodic table, where each period is associated with the filling of a certain shell with electrons. So this idea about the electron shells of the atom naturally arose for the first time precisely in the classical model of the atom. Whereas in the quantum, Bohr model of the atom, the shells were obtained arbitrarily, by artificial introduction of quantum numbers, through unfounded hypotheses and formal methods. Thus, if the classical theory of the atom was well founded.

Even less well known is the classical model of the atom, which for the first time explained the spectrum of hydrogen, alkali metals, and even predicted new spectral lines that were subsequently discovered. This model was proposed by Walter Ritz, who, like Thomson, believed that an atom contains a certain nucleus composed of ordered particles that form a kind of chains and crystals [9 , 15]. Electrons can be located at the nodes of this crystal lattice, and when they vibrate in its magnetic field, they generate precisely those frequencies that correspond to frequencies in the spectrum of hydrogen and other atoms. Thus, it was Ritz, not Bohr, who first built the model of the atom that explained the discrete spectra of atoms [27], and this model was classical (Bohr made no secret of the fact that he based his theory on the Ritz formula obtained in the framework of the classical model of the atom [5]). It turns out that the discrete nature of atomic processes and atomic spectra confirmed not the discrete structure of energy, but the discrete structure of matter, an atom formed from many ordered particles. And Bohr only translated the laws already discovered by Thomson and Ritz into quantum language, although there was no longer any need for this, since they were easily obtained within the framework of the usual classical physics, without any radical, unsupported and contrary to common sense hypotheses.

As shown by Ritz, and after him by Stark, such a classical model of the atom could easily explain the Zeeman and Stark effects, that is, changes in the spectra of atoms in a magnetic and electric field. There was only a displacement of the electrons from the equilibrium positions in these fields and a change in the frequency of oscillations under the influence of the superimposed field, which distorted the intra-atomic field in which the electrons oscillated. But even this classical conclusion was later altered in a quantum way with the help of perturbation theory.

Thus, numerous successes of non-classical science and specifically quantum physics actually belonged to classical physicists who obtained the corresponding regularities within the framework of the classical model of the atom and classical physics. Sometimes, when analyzing the crisis of physics at the beginning of the 20th century, one more phenomenon is mentioned: a decrease in the molar heat capacity of solids and gases during cooling [5]. This experimentally discovered result seemed to contradict classical thermodynamics, where, on the basis of molecular kinetic theory, it turned out that the heat capacity at constant volume should not depend on temperature, as the Dulong-Petit law stated. This contradiction with experience was eliminated by quantum theory, which took into account that the energy of vibrating atoms is quantized, that is, it takes a discrete series of values and cannot be lower than a certain limit value. Therefore, when the temperature drops, when the energy of thermal vibrations of atoms becomes below this limiting value, they cease to oscillate and no longer contribute to the heat capacity, which causes it to decrease. However, even here one cannot agree with such a way out of the crisis. The fact is that the conclusion about the constancy of the heat capacity was obtained in the classical theory, taking into account a number of simplifications, idealizations within which this conclusion was valid. Therefore, contradictions should be eliminated not along the path of a radical revision of the provisions of classical mechanics, but along the path of refining the classical theory, where interactions between atoms, as well as their finite sizes, would have to be taken into account [9].

Something like this, at the end of the 19th century, it turned out that the Clapeyron-Mendeleev equation for describing the state of an ideal gas has only limited applicability and ceases to be valid under certain conditions, for example, at low temperatures. But the situation was easily corrected without a radical break in ideas, but only by refining the rough model of an ideal gas. After taking into account the finite size of molecules and their interactions, a much better agreement between theory and observations was obtained within the framework of the van der Waals law. Note that even this simple law predicts the deviation of the heat capacity from the classical value, and the heat capacity also depends on temperature. Thus, in other cases, when analyzing the heat capacity, an adequate result can be obtained within the framework of the classical theory, if idealizations are abandoned and the theory is refined. At the same time, quantum theory took the path of a purely formal elimination of problems. The same can be said about the quantum theory of electrical conductivity and about other problems of classical physics that led to a powerful crisis. In all such cases, the solutions and ways out of the crisis proposed by quantum mechanics cannot be considered logically justified and rigorous. That is why in the 20th century the problems of physics did not decrease over time, but only multiplied. And at the present time, already in quantum physics, so many contradictions have accumulated that their number many times exceeds the number of contradictions of the former classical physics. Therefore, a way out of the crisis should be sought on the path of refining the old classical models, on the path of revealing the real causes of the crisis and determining the real structure of the atom, and not on the path of a formal description of observations, by means of ever-multiplier contradictory hypotheses.

4. Historical background for the recognition of non-classical physics

It was shown above that non-classical physics, including the theory of relativity and quantum physics, was not a real way out of the crisis, did not solve the problems that gave rise to this crisis, but only formally eliminated, circumvented them. The question arises why, in spite of all this, the scientific community has chosen such an unnatural way out of the crisis? In addition, at first glance, it is completely incomprehensible why non-classical physics still works so far, why its inconsistency has not been clearly revealed, as in the case of classical physics?

The last question is easy to answer. From the very beginning, non-classical physics was built in such a way that unnatural, unfounded hypotheses were introduced to harmonize theoretical predictions with experience. When a discrepancy with the theory arose again, it was not rejected, but additional, even more absurd hypotheses were invented, formally eliminating the contradiction. It is clear that by introducing a sufficient number of hypotheses, moreover, if there is no restriction in their choice, any set of phenomena can be explained. Therefore, such a contradiction could not arise that would force us to abandon the theory: as soon as it arose, new hypotheses were invented (similar to the introduction of new epicycles in the geocentric system). In this sense, classical physics had fewer degrees of freedom: classical physicists severely limited themselves, considering it possible to accept only a limited number of hypotheses, moreover, natural, intuitive and obvious, as well as experimentally substantiated. In classical physics, contradictions could not be eliminated by a formal method; the problem always needed to be solved strictly. Therefore, the crisis in classical physics was very acute.

At the same time, in non-classical science, an acute crisis cannot, in principle, develop, since it would be immediately eliminated with the help of new hypotheses. The fact that such hypotheses, indeed, were regularly added, proves once again that non-classical physics does not reveal the deep structure of the world, and is not a microscopic, but only a phenomenological theory that gives only an external, formal description of phenomena, without understanding their causes and essence. This explains why most of the phenomena discovered in the 20th century were not predicted by either the theory of relativity or quantum physics, which, offering only an external description, did not have predictive power in terms of discovering new phenomena, and only explained them retroactively by attracting new hypotheses. That is how, without the help of non-classical physics, superconductivity, superfluidity of helium, properties of synchrotron radiation, the whole set of elementary particles and space objects. In the same way, many devices that are said to have been created only through the use of non-classical physics were actually built without her help and even contrary to her dogmas and forecasts. It is enough to cite as an example the story of N.G. Basov, who, when creating the maser, turned to many prominent specialists in quantum theory, and they all unanimously declared that the maser should not work according to quantum theory [28]. Similarly, T. Meiman built the first laser, according to him, not thanks to, but rather contrary to the ideas and principles of scientists involved in quantum theory. However, after the maser and laser were created, they were declared a triumph of quantum theory and were called quantum generators, although initially they were created and worked according to classical laws and contrary to quantum theory. The same can be said about accelerators and nuclear power plants. At the origins of their creation, at the origins of the discovery of nuclear reactions were classical physicists, including E. Rutherford and F. Soddy, who were skeptical about the theory of relativity. Therefore, the assertion that modern instruments and phenomena confirm non-classical physics is not entirely justified.

All non-classical phenomenological theories have predictive power only within the framework in which they were developed. Just like the Ptolemaic theory, they explained only what they were invented for, and could not predict anything new. The success of predictions within the limited range of phenomena to which these theories were adjusted is explained by the fact that their formal apparatus contained the correct ratios between the observed quantities, and these ratios could also be obtained in other theories, including classical ones. The only difference was which quantities were considered fixed and which were variables. So, in the theory of relativity, to interpret Kaufmann's experiment, the force F *was considered fixed, and the mass* m was variable, and in the classical theory, on the contrary, the force F changed, and the mass m was fixed, but their ratio $a=F/m$, which actually was measured in the experiment, turned out to be the same in both theories. Approximately in the same way, Ptolemy's theory predicted almost the same relative positions of the planets in the sky as the Copernican theory, but if the geocentric theory fixed the position of the Earth and considered the position of the Sun to be variable, then the heliocentric theory of Copernicus, on the contrary, fixed the coordinates of the Sun, and considered the Earth moving around it. Thus, the performance of non-classical theories is connected solely with the fact that that a number of such relations were obtained for the first time precisely in classical they relativity use the same mathematical relations as in the classical theory, although these relations are understood in a completely different way. And it is characteristic physics, and then borrowed by quantum and relativistic physics. $E=hf$ and the ratio $E=mc^2$, first obtained by Thomson, Lorentz and Heaviside in the framework of classical theories and having a completely different meaning than in the theory of.

The question remains why physicists chose the path of non-classical physics and the rejection of classical physics, although, as shown above, such a path was neither the simplest nor the most natural. The fact is that the heyday and recognition of non-classical physics fell on the era of troubled times of 1910–1920, when the world experienced serious upheavals in the form of the World War, famine, crisis and the October Revolution in Russia. It was literally a troubled time, a time of anarchy not only in the world, but also in science. In connection with the war, science was in a state of decline, it was poorly funded, scientific schools were disintegrating, scientists were scattered and confused. And in this troubled time, theoretically any theory could come to power. That is why, without much effort and without sufficient reason, non-classical physics was recognized in the form of the theory of relativity and quantum physics. They did not meet with due resistance and criticism from classical physicists, although individual voices of protest were heard. In addition, many perceived these revolutionary concepts as a historical necessity, as fresh trends, sweeping away, along with the established world order, the patriarchal classical concept. Many physicists viewed these non-classical theories as temporary, in the hope that things would gradually become clearer, and these theories would either acquire a classical interpretation or be replaced on the basis of strict classical views. But time passed and contradictions, the discrepancies between the new theories and classical physics only deepened. When the situation in the world more or less stabilized, and physicists in the 1920s realized it, starting to point out the unreasonableness of accepting non-classical concepts, it was already too late. Non-classical concepts, accepted only as temporary, firmly entrenched in science, so that their criticism began to be perceived almost as retrograde, as a sign of backwardness and inability to perceive new physical concepts. So such criticism was often not allowed on the pages of scientific journals.

The scientific community itself was also transformed: the leading classical physicists either died or retired, science lost many physicists during world wars and upheavals. So, the Russian intelligentsia was largely physically destroyed during the years of the Revolution, emigrated or starved to death. As a result, the classical physicists were replaced by a new generation of physicists with distorted ideas about the world, brought up on the ideas of non-classical physics. As Planck said: "Usually, new scientific truths do not win so that their opponents are convinced and they admit they are wrong, but mostly so that these opponents gradually die out, and the younger generation learns the truth immediately." And those few classical physicists who survived tried not to speak at all and not to express their views. They only regretted that they had not passed away sooner.

Indeed, modern non-classical physics is distinguished, first of all, by the eclecticism of its views. For example, as was shown above, the first and second postulates of the theory of relativity, in fact, contradict each other, from which all the paradoxes of SRT arise [6 , 7 , 9]. Even more contradictory is the corpuscular-wave dualism of quantum mechanics, according to which a particle can be simultaneously considered as a wave. In non-classical physics, such fundamental concepts as the determinism of natural phenomena and the principle of causality are rejected. Moreover, such eclecticism, as V.I. Lenin [12], is often passed off as dialectics, through the substitution of concepts. Quantum mechanics ostensibly creates a more general holistic picture of the world, although in reality it simply mixes contradictory concepts. Lenin also noted that in non-classical physics there is a strong tendency to replace physics with mathematics: “matter disappears, only equations remain” [29 , 30]. That is, already at the birth of non-classical physics, its idealistic tendencies, alien to the spirit of materialistic science, were clearly visible. These tendencies became even more pronounced in the future - in cosmology, in the theory of the Big Bang (invented by the priest J. Lemaitre and, in fact, returning science to the biblical stories about the creation of the world), in elementary particle physics. Moreover, many physicists, the founders of non-classical physics, even then did not hide their idealistic views, as S.I. Vavilov [30]. Thus, despite the fact that non-classical physics triumphed, its victory was not due to physical, logical, or philosophical reasons, but only to a historical situation, a chain of accidents and errors.

5. Conclusion and conclusions

So, in conclusion, we can say that the crisis of physics at the beginning of the 20th century really had serious theoretical and experimental reasons and was associated with the imperfection of the classical picture of the world. However, these problems were explained not by the fallacy of the classical picture of the world, but by its incompleteness, its idealizations and simplifications that have existed in physics since the time of Newton (when they were natural and necessary), as well as the imperfection of ideas about the structure of matter, the atom, about the structure and nature of the electromagnetic and gravitational fields. Therefore, the most natural way out of the crisis would be to eliminate idealizations and develop a deeper picture of the world. Indeed, the entire history of the development of physics shows that scientists first build an approximate model of phenomena, give a simplified description within the framework of some idealizations (a model of planets in the form of material points, model of an ideally rigid body, model of an ideal gas, etc.), obtaining a solution only in the form of a first approximation. And then physicists gradually refine this solution, abandoning idealizations and rough, simplified models, taking into account a larger number of factors. However, when resolving the crisis of the 20th century, physicists did not follow this natural and natural path of abandoning idealizations, but the path of complete rejection of the well-established classical physics, with a heap of contradictory and unfounded postulates and hypotheses instead. The scientific community tried to overcome the crisis with the help of non-classical science, through the formal elimination of contradictions and an abstract, phenomenological, superficial description of phenomena. Scientists abstracted from the real structure of atoms, electric and gravitational fields, having agreed to describe them as "black boxes", through external characteristics with the help of formal procedures and rules. That is why such a formal way, imprecise and limited, cannot be considered a real way out of the crisis.

Moreover, this path turned out to be not the most logical, because, firstly, there were simpler and more consistent classical theories aimed at eliminating the long-known weaknesses and inaccuracies of classical physics, and secondly, the scientific community accepted non-classical physics in many ways. in order to preserve what in the end had to be rejected anyway. Thus, the crisis testified to the falsity of the concept of the ether, which physicists did not want to abandon and on which Maxwell's theory was originally based. And many saw the way to save the ether in the theory of relativity, even Einstein himself did not deny the ether and, in fact, like Maxwell, kept it in his equations [13]. However, in the end, the concept of the ether was still abandoned, which casts doubt on the expediency of accepting the theory of relativity. Similarly, quantum physics was adopted in order to save the planetary model of the atom, to get rid of the infinities and divergences that the classical model led to. However, in the course of the development of quantum physics, they still abandoned the planetary model of the atom: now it is no longer possible to say that electrons move in orbits around the nucleus. And, therefore, there was no point in accepting quantum theory. In addition, it led to even more divergences and infinities, at least in the thermal spectrum, where, as in classical physics, it turns out that at an infinite frequency, electrons have an infinitely large zero-point energy. That is, non-classical physics did not fulfill the functions assigned to it, for which it was accepted by the scientific community. However, by that time it was already firmly entrenched in science, and these historical premises of non-classical physics were forgotten.

In general, the adoption of non-classical ideas that break the old, well-established classical picture of the world, in many ways resembles the process of the October Revolution (which had common historical roots and prerequisites with the scientific revolution), which won in an era of anarchy and in the absence of serious confrontation, when they were largely exterminated or weakened the bearers of classical traditions, the nobility and the intelligentsia. In the same way, not the strongest, but the most scandalous, radical concept triumphed in physics, completely rejecting the classical foundations, principles and trends in the development of physics. Many noted the nervous, restless atmosphere of that time, a kind of mass psychosis of society, when entire nations, communities of people and scientific circles easily fell under the hypnosis of new, revolutionary ideas, completely devoid of common sense. This was facilitated by the open in 1910-1920. some experimental facts, for example, the curvature of light rays near the Sun, as well as the correspondence of the measured displacement of the perihelion of Mercury with the calculation of the general theory of relativity. However, these same facts found a simple explanation in the classical theory of Ritz [9 , 15 , 22]. But ironically, it was at this time that physicists abandoned Ritz's theory in connection with De Sitter's analysis of binary stars. In fact, De Sitter's argument turned out to be incorrect, and binary stars, as already shown by E. Freundlich and P. Gutnik, just confirmed Ritz's theory [8 , 13]. But their arguments were not taken into account, and Ritz himself had already died by that time and could not respond to criticism. Therefore, since then, all facts have been interpreted one-sidedly, only from the point of view of the theory of relativity. And the development of all alternative classical theories was suspended along with publications on them, which allowed the physicists of the new generation to argue that only non-classical physics is able to explain known phenomena.

So, until now, scientists interpret all experimentally established facts only from the standpoint of quantum physics and the theory of relativity, even if these facts did not initially fit into the framework of these theories, could not be predicted by them, and even contradicted them. As T. Kuhn rightly notes, within the framework of the established paradigm, it is no longer the facts that judge the theory and determine whether it is true or not, but scientists judge the facts, considering them through the prism of their theory, and determine whether these facts can enter into a meaningful experience, interpret them with points of view of the theory, or are rejected as contradicting the theory [31]. Indeed, at the moment, a huge number of facts have accumulated that contradict the non-classical picture of the world, but are relatively easily explained within the framework of classical concepts, including the Ritz ballistic theory and the classical model of the atom [6–9]. This once again proves that non-classical physics did not eliminate the crisis, but only postponed it for an indefinite time. If we draw an analogy, then the crisis of physics can be compared with a crack in the wall, which, instead of being eliminated by eliminating the cause of the growth of the crack, was simply smeared over, painted over with a thin layer of putty and paint over the surface. And if, because of the crisis, the building of physics needed a major overhaul, then non-classical physics, having offered a formal surface elimination of problems, was, in fact, only a cosmetic European-style repair, in which defects were not eliminated, but covered from the eyes with false wall panels, stretch ceilings and self-leveling sexes, in the form of artificial postulates and additional matching hypotheses. Therefore, in the near future, we can expect that the building of physics will crack again, and the crisis will erupt with even greater force.

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