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Algebra-Arithmetic Approach to the Development of Quantum Theory of Gravitation

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ABSTRACT

Heisenberg and Pauli began to realize that it would be possible to develop the quantum theory of gravitation based on the ideas that were developed in obtaining the basic results of quantum electrodynamics [1]. There is a basic assumption that this is indeed a possibility. However, only preliminary results of quantum electrodynamics can be obtained in a more correct version. In this paper, this goal was achieved based on the idea of scientific philosophy. Then based on analysis of new results, it was possible to realize that, as it turns out, these same results contain results inherent also to the quantum theory of gravitation.

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How based on the ideas of Algebra, Arithmetic it was possible to develop the basis of Quantum Electrodynamics, and then realize that these same results contain also the results of the Quantum Theory of Gravitation?

As it is known Dirac obtaining the results of quantum electrodynamics took as a basis the possibilities of the basic equations of quantum mechanics. On the other hand, to realize that in this case a false step was made, in our opinion, it is possible to pay attention to the following fact. As it is known in his time, Maxwell obtained his equations based on analysis of accumulated experimental data. Therefore, there is every reason to believe that these equations have the sense of a solution obtained with the accuracy of empirical physics. For example, in the same sense as the basic equations of technical and chemical thermodynamics. Therefore, there is reason to believe that for Maxwell's equation, there was a need to obtain theoretical justifications in the same sense as Gibbs obtained for the equations of technical and chemical thermodynamics. However, in due time for Maxwell's equation such justification could not be obtained. Therefore, the understanding that this equation is inherent to theoretical physics was formed. That is why Dirac also began to get his results thinking in this way. Probably, therefore, further, when began to use the possibility of the basic equation of quantum electrodynamics of Dirac, from the very beginning difficulties began to appear. For example, such as those related to infinities. Therefore, there is a basic belief that the main reason for all this is that earlier the basic equations of quantum electrodynamics were indeed obtained with defects. Note one more reason that these equations of quantum mechanics and quantum electrodynamics have been obtained with defects in our opinion is the following. As it is known many years there was a discussion between the founders of quantum mechanics Bohr, Born, Heisenberg, and Einstein. Therefore, in 1949, Einstein wrote an article [2] that is called: "Remarks on Articles" where he wrote: "All this discussion was necessary for us only to find out the following. Trying to defend the thesis that the statistical quantum theory in principle can give a complete description of separate physical systems, we come to very improbable theoretical concepts. On the other hand, the above-mentioned difficulties in interpreting the theory disappear if the quantum-theoretical description is viewed as a description of ensembles of systems".

(A) As it is not difficult to notice this Einstein wanted to say that in his opinion the main mistake that was made in his time when the basic equations of quantum mechanics were obtained, these equations were obtained as some analogs of the basic equation of classical mechanics obtained for a single particle. Then he also wrote thoughts that are in the following lines: "In future physics (provided that attempts to construct a complete description of a physical system succeed) statistical quantum theory will occupy approximately the same position as statistical mechanics occupies within the framework of classical mechanics. I am firmly convinced that the development of theoretical physics will proceed in this way, but its path will be long and difficult."

(B) As one can see Einstein was deeply convinced that the basic equations of quantum mechanics did contain defects. Mainly because these equations were derived as some analog of the "basic equation of classical mechanics". While assuming the possibilities of the correspondence principle. It is similar to what Einstein felt that the results of quantum theory are only obtainable by solving the equations of classical mechanics for many particles. Thus, he wanted to say that the role of the fundamental equations of quantum physics should be taken not the equation of quantum mechanics, but the basic equations of classical and quantum statistical mechanics. For example, such as Hamilton-Jacobi-Jacobi-Schrodinger and Gibbs equations have been taken into account in the construction of scheme-2 and 3 [3]. In my opinion,

just such thoughts are contained in lines (A) and (B). Now I want to say the following. Analyzing the ideas and results taken into account when constructing schemes 2 and 3.

Scheme No. 2:

			$\dot{q}_i = \frac{\partial H}{\partial p_i}, \quad \dot{p}_i = -\frac{\partial H}{\partial q_i}$ **(13)**
		Algebraic Kinematics (10в)	$\frac{\partial S}{\partial t} + H\left(q_i, \frac{\partial S}{\partial q}, t\right) = 0$
	Algebraic Geometry (10a)	**Algebraic Geometry (10в)**	$H\left(q_i, \frac{\partial S}{\partial q}\right) = E,$ $\Delta\psi + \frac{8\pi^2 m}{\hbar^2}(E - V)\psi = 0$ **(14 а в с)**
Algebraic equations, Arithmetic equations (7)	**Arithmetic Geometry (10a)**	**Arithmetic Kinematics (10в)**	**?**

Scheme No. 3:

			$\dot{q}_i = \frac{\partial H}{\partial p_i}, \quad \dot{p}_i = -\frac{\partial H}{\partial q_i}$ **(13)**
		Algebraic Kinematics (10в)	$\frac{\partial \rho}{\partial t} - [H\rho] = 0,$
	Algebraic Geometry (10a)	**Algebraic Geometry (10в)**	$[H\rho] = 0, \quad \rho_i = \exp\frac{F - \varepsilon_i}{kT},$ $\rho_{i,n} = \exp\frac{\Phi + \mu n - \varepsilon_i}{kT}$ **(15 a,b,c,d)**
Algebraic equations, Arithmetic equations (7)	**Arithmetic Geometry (10a)**	**Arithmetic Kinematics (10в)**	**?**

which are available in article [3] (and also in books and articles, texts which are available on the site of the International Club of Scientists: scicom.ru) it is possible to come to the proof that Einstein was right when he wrote his thoughts contained in lines (A) and (B). For the basic equations of classical static mechanics Hamilton-Jacobi- Schrodinger (14, a in c) and Gibbs (15 a in c e), which were taken into account in constructing these schemes, were obtained by solving the equations of classical mechanics Hamilton (13) for many subordinate bonded particles and many chaotically moving particles. Moreover, as results of sense for 3N+1 and 6N+1 dimensional spaces. In my opinion, these results are sufficient proof that at one time the basic equations of quantum mechanics

were obtained on false paths when they began to consider them as analogs for the equations of classical mechanics. It means that the basic equations of quantum electrodynamics, which have been received at taking as a basis these equations of quantum mechanics, are also equations received falsely.

Now I will talk about how it was possible to obtain new results that can be accepted as basic equations of quantum electrodynamics. In my opinion is the equation of the form:

$$\rho_v = \frac{8\pi v^2}{c^3} * \frac{h v_{\varphi f}}{\frac{1}{n_\phi} exp \frac{h v_{\varphi f}}{kT} - 1} \qquad (1)$$

which in [4] was obtained as a strictly theoretical proof for the analogous equation obtained by Planck in 1900. In obtaining this equation (1) the results which are taken into account at the construction of scheme-2 and scheme-3 were taken as a basis. At the same time, the following fact was realized. Taking these results as a basis at first, it is possible to solve the problems for the interaction of substances with substances (BBSV). Then was paid attention to the fact that the Schrödinger wave equation, which in this case is obtained strictly theoretically, on the other hand, is an analog for the Maxwell wave equation:

$$\nabla^2 \bar{E} - \frac{1}{c^2} \frac{\partial^2 \bar{E}}{\partial t^2} = 0, \qquad (2)$$

$$\nabla^2 \bar{H} - \frac{1}{c^2} \frac{\partial^2 \bar{H}}{\partial t^2} = 0,$$

Therefore, at this stage, the following fact was realized. That, all this means that the nature of equation (2) also there is a possibility to understand as the equations having sense solution obtained at the solution of the Hamilton equation for many subordinate bonded particles. Thereby it is now possible to understand the nature of the relations:

$$\frac{8\pi v^2}{c^3} \qquad (3)$$

which in his time was obtained by Rayleigh based on the analysis (2). The nature of this relation can be understood as a solution having sense in three-dimensional space with the accuracy of quantum physics. In my opinion exactly for this reason the nature of this result can be taken as a result based on which it will be possible to understand the nature of the gravitational interaction. As it is known in his time, Planck used the possibility (3) to obtain the result inherent for the first multiplier of equation (1). It is also known that then Einstein noticed that in the future the nature of this result would have to be obtained with precision in quantum physics. So, in a new way after the reception of such a result for this purpose using the possibility of ideas of scientific philosophy, thus it became possible to understand that on its basis it will be possible to understand the nature of quantum theory of gravitation. That it will be possible to understand the nature of this relation (3) exactly for that wave solution about the possibility of obtaining of which Heisenberg and Pauli began to guess [1]. On the other hand, G. Weyl also began to guess, when he expressed the thought: "Electrodynamics is a general theory of relativity in the charge space". All this means that those thoughts that in their time were expressed by Heisenberg and Pauli are similar to the truth. For the nature of gravitation managed to understand after it was possible to come to obtaining true equations of quantum electrodynamics. For this purpose, correctly using the possibility of ideas of the scientific philosophy of Descartes. Here I consider it appropriate to notice also the following. In a new way, all these results became possible to receive after it was possible to realize some essentially important new ideas. It turns out that in his time Descartes, when he introduced the results of the Cartesian coordinate system, thus he took the equation of algebra and arithmetic as the basis of the theory of thinking. In this way, he even then understood the nature of these equations as basic equations having properties of supersymmetry. Moreover, exactly in such a way that in the future it becomes possible to solve problems of other private sciences on their basis. I also want to note the following. Some physicists, (Golfand, Lichtman) working in the field of the theory of elementary particles also realized the necessity to use the possibility of supersymmetry idea. However, they could not realize that it is expedient to use these ideas together with the ideas of scientific philosophy, which are taken into account using scheme-1 [3]. Therefore, they were not quite able to reveal the essence of these ideas. That is, they could not realize that the basic such theory having the possibility of supersymmetry is the equation of algebra and arithmetic. Therefore, they were given the erroneous idea that the essence of the idea of supersymmetry is connected with the necessity to prove the possibility of unification of fermions and bosons. They failed to realize that this was impossible, for the basic Bose and Fermi relations of statistics were obtained based on the analysis of experimental data. Therefore, they needed to obtain only proofs in the way where the equation of algebra and arithmetic is taken as the basis of the theory of thought.

On what may provide new ideas for refining those results that have so far been obtained within the standard model

As was pointed out by the authors of the books [5], the theory - of quantum electrodynamics, completely confirmed by experiment, is a special case of the gauge theory. I want to say that these authors by this wanted to say the following. Further, all results that have been received within the framework of the standard model have been received in a way where the results available variant of quantum electrodynamics, and also quantum field theory began to be considered true, however, it is not so. It turns out that the results inherent to this doctrine, for example, for quantum electrodynamics there is a possibility to develop an even truer version. All this means that now there is an opportunity to rethink the nature of the results that have been obtained so far within the possibility of the standard model. I would like to note the following. Trying to solve this part of the problem as a basis, I took the thoughts that are available in the article [6]. Reading [6], I realized that some problems in this way are solved a little differently than these problems could be solved in a new way. I am referring here, first of all, to the following facts:

1) On the new path of all, all main results were obtained in the path where there is a necessity to solve Hamilton's equation (13) for many subordinate bonded particles and many chaotically moving particles (schemes-2 and 3). However, it turns out that in the path where the results of the standard model are obtained the ideas and results based on the Lagrangian analysis take the main place. As a result, all results in this way are obtained with the accuracy of quantum field theory. On the new path, all results manage to be obtained with accuracy inherent to quantum particle theory.

2) It turns out that this is why in the old way such notions and ideas as commutative (abelian) and non-commutative (non-abelian) transformations are emphasized in the main place. In a new way, the idea that it makes sense to work only with solutions inherent for many subordinate particle connections and many chaotically moving particles is emphasized in the main place.

3) On the old path there is a problem related to ideas about the need for renormalization. On the new
There is no such problem at all.

4) In the old way there are problems related to extra degrees of freedom. This is what is required by the need to obtain solutions based on which it would be possible to correctly establish the relationship between the observed quantities. In the new way, such problems do not arise. Therefore, on this path, no problems related to the necessity of fixing the calibration arise. This is because on the new path where the basic equations inherent to the basis of theoretical physics (14) and (15) are taken into account in the construction of the schemes -2 and 3 (article [3]) can be obtained as equations having meaning in multidimensional spaces. Then further results having the sense of the solution in three-dimensional space for the interrelation of observables manage to obtain quite correctly.

5) In the old way the possibility of perturbation theory is taken as the main method in describing the peculiarity of interaction. In the new way, such a problem is solved in a slightly different way. Here for the basic solution, those decisions at the reception of which the fact that there is an orderly and chaotic moving particle is taken into account.

6) In the old way the results get so that we often all forget the facts that there is such a fundamental theory called Gibbs statistical mechanics. In a new way, it was possible to realize that the necessity of taking into account the role of this theory is not less important than taking into account the role of classical and quantum electrodynamics, and the role of the stationary Hamilton-Jacobi-Schrödinger equation.

7) The weakest point of the old theory is that all those problems that should be solved for it, accepting the possibility of static Gibbs mechanics, are tried to be solved for it, adapting the possibility of classical and quantum electrodynamics. For this purpose, therefore, the ideas that have been obtained in the Yang-Mils theory are taken as a basis. However, when applying the possibility of this theory to solve problems to interpret the nature of weak and strong interaction, some hypotheses have to be invented. For example, such as asymptotic freedom and spontaneous symmetry breaking. Not realizing that they should have solved the stage their problems based on those results, which are obtained, by solving Hamilton equations for many subordinate and non-subordinate particle coupling. In my opinion, the same defect is admitted in this case as was once admitted in obtaining the basic equations of matrix mechanics. Then Heisenberg, not realizing that for the realization of his purpose, it is necessary to solve the Gibbs equation, began to take advantage of the possibility of the results that led to obtaining the equations of matrix mechanics.

8) In the old way one tries too hard to arrive at the results of the final theory in a way where it would be possible to unify all kinds of interactions. It is not possible to realize that this is impossible. For, obtaining results in such a way, for example, it is not possible to use correctly the possibility of Hamilton's equation, which in its way is a deeper possibility in comparison with the possibility of Lagrange's equation. For example, when developing the theory of many particles the necessity of classification into problems 1) for many subordinate bonded particles and 2) for many chaotically moving particles. In my opinion, in this case it makes sense to recall the thoughts of philosopher William James, who says: "If you encounter a contradiction, introduce a finer distinction" ("Pragmatism"). Thus, the organicity of the field theory based on the possibility of the Euler-Lagrange equation on a new path could be overcome only after the possibilities of such classification on a new path had become available.

9) In my opinion, at one time many difficulties arose mainly because of the following reasons. The results inherent to the foundations of mathematical analysis and theoretical physics began to be obtained separately on independent paths. Thus, the essence of the basic ideas of scientific philosophy was violated. I agree with the essence of the ideas of scientific philosophy in the way where the equation of algebra and arithmetic is taken as the basis of the theory of thinking, and then these doctrines should have been developed together. Therefore, that it became possible to use the possibility of the method of separation and abolition of variables. All this on the other hand means that in due time not only to obtain differential equations for the 1st geometrical and kinematic point it was necessary to use the possibility of the tangent method. It was necessary to use the possibility of this method to obtain the basic equation for studying the string vibrations. In such a case, it was possible to realize that the basis of the string theory could be developed as a basis of the final theory.

10) As it was pointed out in [7], the weakest point of the string theory in my opinion is the following. In its time at the development of the foundations of mathematical physics, its main equation was obtained with accuracy when in the role of the object under study is considered a point particle. At the same time, they forgot the fact that earlier the most important equation of theoretical physics, Newton's equation was obtained for one physical particle. A particle that has mass. Therefore, it in no way can be regarded as a point particle. On the other hand, the following facts are still known. Further, at reception of the wave equation from Newton's equation it has been received, investigating strings having properties of elasticity. At that, it was necessary to use the possibility of tangent method. It means that it was assumed that such a string is a more complex object consisting of many physical particles between which there are interactions. So, when writing the article [7] was realized the following facts. It turns out that those disadvantages that are because we have to take advantage of the possibility of a point particle can be overcome in the following way. For this purpose, it is necessary to understand the nature of the Hamilton-Jacobi-Schrödinger equation (Scheme-2 in the article [3]), which was derived from the Hamilton equation, as an equation having a meaningful solution while taking advantage of the possibility of multidimensional space, which has dimension 3N+1. Only in this case it will be possible to obtain the solutions having sense in three-dimensional space inherent for quantum physics, thus it is possible to understand that the investigated object, for example, such as strings or atoms, molecules are objects formed of many subordinated particles. Here I consider it appropriate to notice the following. It turns out that at one time Nordström came closest to the realization that the possibility of multidimensional space should be used as a number equal to 3N+1. However, he did not realize it at that time. Because he could not realize what the equation for this GR, it will be possible also to use Maxwell's equation.

11) As it is known to obtain results with accuracy of the standard model [8] the idea of the necessity of joint use of possibilities of ideas about local and global symmetries is especially important. However, within the framework of the possibility of this project, the true nature of all these ideas remains undiscovered. In the new way thanks to the fact that for a basis the possibility of ideas of scientific philosophy of these problems is accepted it is possible to solve correctly. For example, it is possible to disclose facts that the nature of local and global symmetries should be understood as results inherent in differential and integral calculus.

Conclusion

As we know so far, the problem of the nature of the quantum theory of gravitation was considered the most difficult one problem. Now after it has been possible to solve this problem based on the possibility of new ideas, there is reason to draw the following conclusion. That the ideas and results of the new theory are probably more general and fundamental than the ideas and results of the standard model. Therefore, there are reasons to believe that, taking as a basis the possibilities of new theory there is a possibility to revise many ideas and results. For example, the ideas of Paul Dirac's paper where he combined quantum mechanics with special relativity theory to describe the electromagnetic interaction. As we know this paper stated that particles are represented by solutions to fundamental equations. Dirac inferred that if the behavior of one particle, say an electron, is described by a solution of the fundamental equations, then these equations must have other solutions with the same particle mass but with charge opposite in sign. As is known, taking as a basis for such results was discovered positron as an antiparticle for the electron. I would like to note, taking as a basis the ideas and results of the new theory, there is every reason to believe that the results obtained in this way are false. As it was pointed out in [9], such results were obtained based on analyzing those conclusions which were made based on analyzing the solution obtained by solving the equation: $x^2 = 4$ based on analyzing the solutions x= +2 and x= -2. If one number is a solution, then the other number is also a solution. Dirac believed that similarly if one particle exists, the other must also exist. As it is known in the framework of the standard model, it was further concluded that the results obtained by Dirac refer to all quanta and particles. In my opinion, there all grounds to believe that all these ideas and results are false. It seems that in those years still young Dirac made all these conclusions hastily. As if it seems that then he did not realize that earlier Newton of the basic equations of theoretical physics had received for one particle. Therefore, further any problem of theoretical physics makes sense to solve for it, solving this equation for many subordinate particles or many chaotically moving particles.

Thus, in conclusion, I would like to say the following. In my opinion, accepting the possibility of the results obtained based on the new theory, (assuming that these results are obtained on the way of truth) there is still a need to analyze many other problems. Problems, which so far within the framework of the possibility of the standard model have not been solved quite correctly.

References

1. Heisenberg W, Pauli W (1929) Toward quantum dynamics of wave fields. Pauli W (1977) Works on quantum theory. Moscow: 30-89.
2. Einstein A (1949) Remarks on articles. Collected scientific papers. Moscow 4: 294-315.
3. Altayev N (2024) On the Unification of the Foundations of Physics Based on the Ideas of Algebra and Arithmetic. Journal of Physics Optics Sciences 6: 1-7.
4. Altayev N (2022) Toward a statistical theory of superfluidity and superconductivity. Problems of the Universe research 1: 142-158.
5. Slavnov A, Fadeev L (1978) Introduction to quantum theory of gauge fields. Moscow: 240.
6. Diakonov D. Calibration fields. Big Russian Encyclopedia-electronic version.
7. Altayev N (2020) Possibilities of ideas of scientific philosophy for solving problems of string theory. Problems of the Universe research 39: 98-110.
8. Gerard Hooft (1980) Gauge theories of forces between elementary particles. UVN 135: 479- 512.
9. Gordon Kane (2015) Supersymmetry and Beyond. From Higgs boson to new physics. Moscow. BINOM. Laboratory of Knowledge. https://sites.lsa.umich.edu/gordonkane/wp-content/uploads/sites/117/2014/07/SSandBeyondContents.pdf.