CLARIFICATION OF THE THEORY OF SUPERCONDUCTIVITY AND SUPERFLUIDITY BASED ON SCIENTIFIC PHILOSOPHY

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Annotation: The development of the results of the theory of superconductivity (BCW) is based on the idea of a deep analogy between some ideas of quantum electrodynamics and quantum hydrodynamics. On the other hand, there are reasons to doubt the basic results of quantum electrodynamics. The reason is that in order to complete the development of quantum electrodynamics, it is necessary to supplement it with the results of reassignment operations. The founder of quantum electrodynamics, Dirac, believed that such a necessity arose because of the defects in this doctrine. In this article, the main results of quantum electrodynamics and quantum hydrodynamics are obtained quite correctly on the way, where the basic ideas of scientific philosophy are taken as a basis.

§1. I would like to point out the following from the very beginning. In the article/1/ on the basis of joint analysis of results, which since the time of Descartes began to receive in private sections of science and ideas, which are taken into account in the construction of scheme 1, it was possible to come to the realization that the results, which are taken into account by schemes 2 and 3, ripen results, which are taken into account by schemes 4 and 5. Then, after it was possible to interpret the philosophical nature of the results taken into account by schemes 2 and 3, it was possible to realize that there are results systematized by schemes 6 and 7.

I would like to point this out as well. Having satisfactorily solved the problem of unifying the foundations of theoretical physics in this way, the following conclusion was reached: on the basis of the results obtained in this way, any problems on the way to the truth should be solved. This was shown to be true when/2/ was able to solve the problem of quantum gravity theory. Then/3/ solved the problems of quantum particle theory. In particular, quantum structure of matter theory and quantum string theory. Now in this article, taking as a basis the possibilities of the idea of scientific philosophy, an attempt is made to solve the problem on development of quantum theory of superconductivity and super fluidity.

§2. Attempting to obtain new results inherent in the development of the quantum theory of superconductivity and super fluidity, I want to say the following. I first became aware of the possibility of such results in 1984 when I read Einstein's article/4/. Then, influenced by Einstein's new ideas, I quickly wrote articles /5-6/ and deposited them in VINITI. After many years, when he realized the special importance of the fundamental ideas of scientific philosophy for solving the problems of theoretical physics, he wrote more articles/7-9/. Now I would like to talk about how I managed to solve these problems. It is known that some authors at that time obtained the following results on the basis of experimental data

$$Q = \frac{\pi R^4}{8\mu} \nabla p, \qquad (1)$$

in the fluid flow area, and the results

$$I = \frac{\Delta U}{\rho \frac{\ell}{S}} \qquad (2)$$

in the field of flow of electronic fluid. In these expressions μ - viscosity and ρ resistivity; ∇P - differential pressure; ΔU - potential difference; Q - fluid flow rate; I - current strength. Of course, after these results were obtained, a problem arose in interpreting the nature of viscosity and resistivity. I will now talk about how I have managed to come up with solutions to these problems. I want to make the following points. Solving these problems was possible after I realized the following truths. To solve any theoretical physics problem correctly, the results obtained by solving the Hamilton equation must be taken as the basis

$$\dot{q}_i = \frac{\partial H}{\partial p_i}, \quad \dot{p}_i = -\frac{\partial H}{\partial q_i} \qquad (3)$$

Here I refer to the following equations:

$$\begin{aligned} &\text{а)}\ \frac{\partial S}{\partial t} + H\left(q_i, \frac{\partial S}{\partial q}, t\right) = 0, \\ &\text{б)}\ H\left(q_i, \frac{\partial S}{\partial q}\right) = E, \\ &\text{в)}\ \Delta\psi + \frac{8\pi^2 m}{\hbar^2}(E - V)\psi = 0, \end{aligned} \qquad (4)$$

$$\begin{aligned} &\text{а)}\ \frac{\partial \rho}{\partial t} - [H\rho] = 0, \\ &\text{б)}\ [H\rho] = 0, \\ &\text{в)}\ \rho_i = \exp\frac{F - \varepsilon_i}{kT}, \\ &\text{г)}\ \rho_{i,n} = \exp\frac{\Omega + \mu n - \varepsilon_i}{kT}, \end{aligned} \qquad (5)$$

$$\boxed{\begin{aligned} E_i &= \alpha + k\beta_i, \\ \psi_i &= \sum_{ir} C_{ir} x_r, \end{aligned}} \qquad (6)$$

$$\boxed{\begin{aligned} n_A^0 &= \frac{n^0}{\frac{1}{n_A}\exp\frac{\varphi - f}{kT} + 1}, \\ n_\phi^0 &= \frac{n^0}{\frac{1}{n_\phi}\exp\frac{\varphi - f}{kT} - 1}, \end{aligned}} \qquad (7)$$

which are obtained when solving (3) for 1) many particles subordinate to external forces; 2) Many particles that move randomly. So, after realizing that such results take place, I was able to understand that the nature of expressions (1) and (2) manages to understand how the results that make sense solution (3) for many particles subject to the forces of differential pressure and difference of potential. Of course, after realizing this truth, there are still problems in interpreting the nature of viscosity and resistance. I would like to make the following points. In order to solve these problems, we interpret their nature using the equations (7a) and (7b). For these results have been obtained precisely to solve such problems. Thus, the results were obtained in this way

$$Q = \frac{\pi R^4 \nabla p}{8\left(\dfrac{h\nu_{\varphi f}}{\dfrac{1}{n_\Phi}\exp\dfrac{h\nu_{\varphi f}}{kT}-1}\right)}, \qquad I = \frac{\Delta U}{\dfrac{\ell}{S}\left(\dfrac{h\nu_{\varphi f}}{\dfrac{1}{n_\Phi}\exp\dfrac{h\nu_{\varphi f}}{kT}-1}\right)},$$

(8) (9).

Based on the possibilities of these results, it is possible to come to an understanding: why, when the temperature drops to the critical region, such phenomena as superconductivity and superfluidity appear. In addition, I think the main advantage of these new results is that it will not be as problematic a way as the need to prove attraction between pairs of electrons.

§3. Now I want to tell you that I have given new results for the interpretation of the nature of the results obtained by Drude and Lorenz. They obtained their results while developing the basis of the electronic theory of the electrical conductivity of metals. As it is known, in obtaining their results, Drude and Lorenz rewrote the expression (1) as follows

$$j = \sigma E \qquad (10).$$

For this purpose, the concept of current density j =I/S, of specific electrical conductivity σ=1/ρ, electric field strength E= ΔU/ℓ was introduced. Then nature (1) began to be understood as integral law of Om, and nature (10) - as differential law of Om. Of course, it was then necessary to obtain evidence for (1) or (10). It was necessary to obtain an interpretation of the resistivity or specific electrical conductivity in such a way that it led to the description of experimental results. As you know, Drude and Lorenz, in deciding this issue, have chosen in favor of the need to interpret the nature of specific electrical conductivity. In so doing, they received

$$\sigma = \frac{N \cdot \ell^2 \tau}{m^*}, \qquad (11)$$

Where N is the number of electrons, τ - the time of relaxation, m* is the effective mass.

In 1922, Einstein/4/ analyzed the results of the electron theory of metals, mainly analyzing the possibilities of this ratio (11). He reached the following conclusion: "The theory of thermal motion of electrons proves untenable in the field of normal conductivity, even without taking into account superconductivity". I would like to point out that Einstein thus discovered that there were some contradictions in the main results of the Drude and Lorentz theories. However, he was not able to determine the exact nature of these contradictions. However, on the basis of the new results it was possible to find out exactly the nature of this contradiction: the fact that these authors at that time decided in favor of the necessity of proof for the expression (10) was a step in the wrong direction. It was also a wrong step to obtain an expression (10). For as it was proved in the new way, the originally obtained expression (1) is true. Therefore, it was necessary to get a proof for that particular expression.

§ 4. Now I will talk about what gave new results to interpret the nature of the results obtained by Bardin-Cooper-Sheriffer /10/ in his development of quantum superconductivity theory.

I will make the following points. In 1922, Einstein wrote the following in an article/4/ . "It is obvious that new ways must be found to explain superconductivity. In view of this fact, it is possible to draw the following conclusion: for the correct development of the quantum theory of superconductivity, it was necessary to find a new way. However, an analysis of the results obtained in /10/ shows that this is not quite the case. The authors of the paper /10/ used the concept of current density to obtain their results. This means that all the results of the BCS theory were obtained in a way that puts the results and the role of the differential laws into the mainstream. This shows that the results of BCS theory were not the results obtained in the new way that Einstein talked about. On the contrary, the results obtained in this theory, as well as the results of the Drude and Lorentz theories are directly related to the ideas originally developed within the framework of the molecular kinetic theory of gases. Einstein also wrote: "But it is possible that conductivity at normal temperature is based on superconductivity, which is constantly destroyed by thermal motion". I want to emphasize that there are very deep truths in these thoughts that Einstein said. In the works /5-6/ written under the influence of these ideas, for the first time I had confidence in the following. The theory of superconductivity and super fluidity can be developed in such a way that equations (4) and (5) are accepted as the basic equations of theoretical physics. However, only then is it possible to interpret their philosophical nature. This means that it is possible to correctly understand the roles of subject (numbers) and objects in order to understand the main results obtained in theoretical physics. Even then, I began to realize that the results of the theory of BCW, where the basic equations of quantum mechanics are considered:

$$i\hbar\frac{\partial\psi}{\partial t} - H\psi = 0 \qquad (12)$$

$$\left.\begin{aligned} &\dot{q}_k = \frac{\partial H}{\partial p_k}, \quad \dot{p}_k = -\frac{\partial H}{\partial q_k}, \\ &q_k q_s - q_s q_k = 0, \\ &p_k p_s - p_s p_k = 0, \\ &p_k q_s - q_s p_k = \frac{\hbar}{\imath}\delta_{is}, \end{aligned}\right\} \qquad (13)$$

Contains errors. These equations were obtained only by the matching principle. I think it is appropriate here to recall the following fact. Einstein did not like the basic equation of matrix mechanics from the beginning.

Therefore, he criticized the ideas and equations of this doctrine for many years. Finally, in 1949, in his article "Remarks on Articles"/11/ he openly stated that the basic equations of quantum mechanics, which were obtained to describe a particle, could not become the correct basis for quantum theories. For the basic results of quantum theory can be obtained correctly only when equation (3) is solved for many particles.

The following points can still be made about the main errors in BCS theory. As is well known, the main results of BCW theory are based on the idea that so-called Cooper electron pairs appear at low temperatures. Thus, it is believed that Bose particles are formed. Superconductivity is then thought to appear as the fluidity of an electron fluid. Moreover, because of the fact that there is a phenomenon of Bose condensation. I would like to make the following points. Based on the new results, the whole basis is critical in the truth of the obtained results. It is in the truth of the fact that the ideas and results obtained in the works of Bose and Einstein became the basis for the attempt to develop the theory of superconductivity. For after the new results of the form (7a) and (7b) as more refined variants of the Fermi-Dirac and Bose-Einstein statistics were further obtained for the development of the theory of superconductivity, in fact there were completely different possibilities. Here I mean the following fact. In a new way, by solving equation (3) for many particles, it is possible to obtain a justification for both integral law of Om (4). It is also possible to obtain results (7b) on the basis of which it is possible to interpret the nature of both viscosity and resistivity.

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