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New opinions about some topics of mathematical physics

H.-Q. LIU
Department of Mathematics, Harbin Institute of Technology, Harbin, 150001, China
Email: lauwh@163.com

Abstract. This work is inspired by our recent work of giving a counterexample to the classical complex analysis (SCIREA Journal of Math. (6)4(2019), pp. 189-193).

§1. On the prevalent particle physics

Traditionally, "space" is regarded as an empty existence, in the sense that it has no any specific properties, except that something can fill it. Thus, the notions of "photon" and "ether" have been introduced to illustrate the "light", and physicists also believe that the all kinds of rays(such as the X-ray) are consisted of various kinds of microparicles. In 1925, E. Rutherford considered the following three aspects as the radical findings since the last few years of the 19th century: the X-ray of 1895, the radiativity of 1896, and the "electron" that was "verified" by J. J. Thomson in 1897 (see [R], Chapter 7). Rutherford himself invented the "atomic nucleus" by experiment, which enabled him, by combining with the "electron" of Thomson and by an analogous comparison with the structure of the solar system, put forward the current fashionable model of the structure of an atom—the atomic nucleus likes the sun, it stays at the center of an atom, whereas the electrons like the planets, and they are moving around the nucleus inside an atom. Later, in 1932, J. Chadwick found the "neutron" ([GS]) … . One notes that, the key idea involved in these findings is that of Thomson, who believed that the "electron" is a kind of particles (and thus it has a mass).

We think that these authors have a mechanical materialism about the nature, and they actually turn out to be idealism. What is "nature"? Kant said “Thence we shall define nature as the whole object of all possible experience” ([K], p. 45, the second paragraph), and “We cannot indeed, beyond all possible experience, form a definite concept of what things in themselves may be” ([K], p. 100, the second paragraph). Then, what is “experience”? We think it is different from “experiments”, for the latter may be consisted of indirect verifications (for instance, the experiments of Thomson、Rutherford and Chadwick); by this we mean “experiences” would consist of direct feelings, such as the vision、the audition、and the olfaction.

The works of Thomson、 Rutherford and Chadwick are indirect verifications, containing some hypothesis; and for the phenomena involved there would exit alternative explanations. Newton once believed that the light is consisted of micro-particles, whereas Huygens conceived that it is a kind of “wave” (something spreads in the space, just likes a basin of water after being quaked). As indicated in [GS] (p.57, in explaining J.J Thomson’s work), Hertz and his colleagues believed that the “cathode ray” (which was later “demonstrated” as consisted of “electrons” by Thomson) is also a kind of “wave”, just likes the “electromagnetic wave”.

By intuition it is impossible that everyday one meets numerous “photons” or stays inside the “ether” which are both something independent of the space (if they do exist), whereas the space does not has any given functions. By intuition also, it is impossible that the hard solid is consisted of the atoms inside each of which there is still a “large” empty space apart from the atomic nucleus, several neutrons, and certain electrons (according to the existing theory), the total volume occupied by these particles is only a small portion of the whole space inside an atom; note that the word “inside” is not quite scientific, for there is not an individual space which would contain these particles consisting of an “atom”.

Inspired by the phenomenon of the electromagnetic induction as well as the cell division of physiology, in this section we present a wholly new understanding of a lots of important natural phenomena. One of the most important features of this new theory is that, instead of regarding all kinds of rays as flows of particles, they are regarded as the phenomena of some “inductions” which likes the electromagnetic induction. The rays may be analogous compared with the magnetic lines of force, and thus they are weightless, and free of charge.

(1)Objecting the existence of “atom” as an individual matter

We think that there are not either the so-called individual “atom” or the individual “molecule”. Note that the existence of an individual cell maybe observable under a microscope, where both the existence of the individual "atom" and the individual "molecule" are just imaginary. … This negates the viewpoints of the ancient Greek, and Dalton of 1803(cf.[O],p.193). Of course, there are not also "protons"、 "electrons" and "neutrons" as individual matters. To explain my viewpoint, one notices that if an individual "atom" or the individual "molecule" certainly exists, it would take some special geometrical shape, whereas if the shape is a three dimensional ball, then we would ask that what the "other matters" can fill the "empty spaces" between the different individual "atoms" or the different individual "molecules"? … and thus the only possible "shape" of an individual "atom" or an individual "molecule" may only be the three dimensional cube, but then it seems unnecessary to distinguish the "boundary" between the different individual "atoms" or the different individual "molecules"! … We think there exists alternative explanations about those phenomena of experiments of Rutherford and others. We think that the "atomic number" of a kind of element in the periodic table of elements of Mendeleev is just a kind of characteristic and invariant which can be used to distinguish different matters(cf.[X]).

Thus for "nuclear physics", everything is conjectured. Rutherford's theory of the 1910s about an "atomic nucleus" totally came from idealism, because it was just a kind of assumption which admits the existence of an atom as an individual matter, and it was also inspired by the prevalent structure of the solar system(which may be wrong, see our §5). Thus a lots of basic knowledge of physics and chemistry of the middle school level were already meaningless. We think that in "nuclear physics" every experiments can be reinterpreted suitably(such as Rutherford's famous experiments). And of course, both Bohr's and Schrödinger's theories become invalid.

(2) Electricity and matter

Electricity can be transmitted by the conductors by means of a kind of "induction"; the speed and the strength of such transmissions are different for different matters. "Electricity" is essentially a kind of "induction" between conductors, just likes the magnetic lines of force show their existence in the space.

(3) Light and electromagnetic wave

These two kinds of phenomena are also "inductions" of the space. There are no "ether" and "photon" in the space.

(4) All kinds of rays

These are also "inductions" of the space stimulated by some "emissions". This means that the rays are weightless, similarly to the magnetic line of force, they may have certain magnetism or some similar properties (which may lead them to deflect in an electric field). Moreover, the transmission of these rays in the space is "wave-like".

These hypotheses reveal the covariation、 the unification、 and the consistence of the universe. The space may viewed as a special kind of matter, and so are the electric、 magnetic line of force、and rays. And thus they can vary from one to another. All these are natural but not artificial, although for some aspects they are mysterious. Someone may inquiry that why the nature exists in this way but not in the others. For this we quote Kant's book. In p.42 of [K](the second paragraph) he said "experience teaches us what exists and how it exists, but never that it must necessarily exist so and not otherwise". We think that certain fundamental phenomena of the universe are much similar to the "Axioms" and "Postulates" of the Euclidean geometry, which means that one has to admit them in view of the intuition, whereas it is impossible to deduce these observed phenomena from some other deeper studies. We think that the substantial mistakes of physics and other natural sciences of the 20th century just come from the attempts of clarifying microscale matters. For the microscale world, we propose the agnosticism.

In the following we give necessary explanations of the above (hypothetical) theory.

(A) Charge-mass ratio of an "electron"

The above theory asserts that the "cathode ray" is not the flow of "electrons", and indeed there are no electrons in the nature. But Thomson did get the "charge-mass ratio" of an "electron" in 1897([GS]) .To explain this, one notes that the key gap existing in Thomson's experiment is that he assumed in advance the existence of the micro particles ("electrons") which "have" mass, and plenty of them would form the "cathode ray" ([ZC]). Then, in practice he used the mass to calculate the radius of the deflection. In fact, if one assumes that "cathode ray" is something similar to the magnetic line of force, then the notion of "mass" would be useless, and consequently the so-called "charge-mass ratio" can not be measured.

(B) The nuclear bombs

The working principle of the nuclear bombs came only from some related experiments that certain special matters can loose energy after nuclear decay, such as the experiment of 1938 of the German chemist Otto Hahn and Fritz Strassmann, which have no concern with Einstein's curious formula " $E = mc^2$ "

(C) Verifying the wave-like properties of the rays

Our assertion is that these rays are not (including the "cathode ray" which was considered as "electron flow") particle flows, but instead are certain elusive "inductions" of the space, and they wave-likely spread in the space. In fact, already Laue's invention of the diffraction of the *X*-ray, and Davidson's invention of the diffraction of the "electron", revealed partially the truth of my assertion (cf.[GS]). The flow of the "neutron" also has the diffraction ([GS], p.347).The so-called "wave particle parallelism duality" or "matter waves (the latter came from de Broglie) can not be imagined in practice.

(D) Magnetic matter always has a coherent action with the nearby space.

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§2. The special theory of relativity

Einstein's special theory of relativity is based on some mistaken mathematical derivations by using also some unverified principles of physics, and it is nothing but “makes a mystery”, and some of Lorentz’s reasonings may be false also, for there exists some confusions of the concepts involved, without which those strange formulas, such as the “contraction of length”, cannot be derived on the basis of the classical laws of Galileo and Newton. It is said that Lorentz already derived the necessity of a kind of “contraction of length” in order to explain the experiment of Michelson and Morley, whereas at the same time keeps the assumption for the existence of the “ether”. But we think the existing explanations for Lorentz’s work are all obscure (cf.[B],[M]), and some of Lorentz’s reasonings may be false also.

Einstein’s original work of 1905 was lengthy and was written in German language. Here at least for the presentation of §2.6 of [R] (pp.31~33), we can inquiry the following(regarding its obscurity and confusion).

(i)Which point has the coordinate (x, y, z, t) in the frame S? If it is that of the origin (zero point) of the moving frame S', then “$x'=vt$” holds doubtlessly.

(ii)When a point has the coordinate (x, y, z, t) in the given frame S, how to define t' for its coordinate (x', y', z', t') in the moving frame S' ? Ifthis cannot be explained clearly, then the formula (2.4) on p.32, that is, “$x=\gamma'(x'+vt')$”, would be meaningless.

(iii)The derivation that from“$x=\gamma'(x'+vt')$” ((2.4)), the roles of x and x'can be reversed to get “$x'=\gamma'(x+vt)$” is unreasonable (see p.32,the arguments leading to(2.5)) .

Einstein’s own treatments(after his later refinements) have the similar mistakes, see [E], the part of the special theory of the relativity. At first, we think the purpose of the theory is not clear: is it to get a special transformation of the coordinates with respect to the two “inertial reference systems” K and K'? Then subsequently, for the special transformation (26a), we think the essential mistake is the confusion of the meaning of the coordinate (x'_1, x'_2, x'_3, x'_4)(just similar to the above (i) and (ii)). If it is the coordinate of the point moving alone the given direction of the light (a beam of light), then it is not possible to take x'_1 =0 and $x_1= vl$ simultaneously (see the arguments leading to (27)), for “x'_1=0 and $x_1=vl$” is only for the origin point of the system K'

(which is moving with speed v along a given axis of K). But if (x_1', x_2', x_3', x_4') is really the coordinate of the moving origin (the zero point) of the system K', then it would not satisfy the equation (22a), namely

$$\sum(\Delta x_\nu')^2 = c^2(\Delta t')^2,$$

which means that the point (x_1', x_2', x_3', x_4') has a speed c (the speed of the light), and it moves from the points P_1 to the points P_2 in the space (we think it is also along a fixed direction); note that the equation of transformation (24) just comes from the simultaneous consideration of (22) and (22a).

One notes also that (28) (as well as (29)) is not the only possible consequence of (27). But we think (24) is just of mathematical meaning. The special relativity has thus been suspected in the context of the kinematics. Its extended use in other branches of the classical physics should also be suspected.

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§3. The general theory of relativity

It is said that Newton's concept of an absolute space was objected seriously by Mach and some others until the 19th century (cf.[R],p.5). However, science is not philosophy, and instead it is represented by certain formulas which are useful in the living of human beings. To give an overview of these disputes, one must have a clear notion of "time". Of course whenever a "time" is counted, it must have a reference which is fixed in some sense and thus "time" is always "relative". However, although the initial values for the two "times" may be different, the differences of times during which a particle has moved from one point to another must the same. In this sense, the “absolute space” of Newton is the only choice of physics, whereas the so-called “special relativity” is suspected in our §2 above). In [M] (pp.249~250) the author thought that one of the necessities of developing the “general relativity” is to avoid the so-called “clock paradox” resulted from the “special relativity”, but as we have just explained, that actually the “special relativity” would not be established.

The so-called “general principle of relativity” is: (assumption) all systems of references are equivalent with respect to the formulation of the fundamental laws of physics ([M], p.250, the last three lines). We think this is an obscure principle, for it leaves the readers to guess that what are the “fundamental laws of physics”, what kinds of systems of references are eligible to carry out these “laws”, and how to understand the word “equivalent”. Perhaps “equivalent” means that for two systems of references, one can always choose a suitable transformation for the different coordinates.

As for the theory of the “general relativity”, we think there exist several key mistakes. The first is that it depends on some conclusions of the “special relativity” (such as the “contraction of length”; see §8.3 of [M], for instance). The second is the mistaken use of the 4-dimensional Riemannian geometry, for besides the gaps related physics, the branch Riemannian geometry itself contains as many as some gaps of the basic theories(as we observed in my criticism of another paper). For example we collect several key notes as follows.

(a) For a point of a Riemannian manifold, only real numbers x_i ($1 \le i \le 4$) are permitted to be the coordinate (x_1, x_2, x_3, x_4). But in [E] complex value is allowed for the component x_4(the “imaginery time”; see the continuation part of the general relativity of [E], between (91) and (91a)). In addition, what does it mean for different x'_4s ?

(b) As exhibited in [E], actually Einstein made a lots of correspondences between physics quantities and the coefficients of certain tensors. But note that the “coefficients” are purely mathematical numbers, whereas those numbers are then be put into mixed calculations. Thus we think these “correspondences” are meaningless (as well as in other parts of physics, such as some branches of the mechanics). Of course, to define the speed one uses the ratios of "distances" and "times". But then, For example, what is the physics meaning for a "distance" function to take derivative with respect to another "distance" variable? Another example is that, if x_1 and x_2 are variables which represent distances, then what is the meaning of the (local) tensors $dx_1 \otimes dx_2$? Moreover, after a mathematical operation, how can one identify the physics meaning to a number? An overall opinion is that, even though the original (before a mathematical calculation in the context of Riemannian geometry) physics quantities are meaningful, how to ensure and how can one believe that the final (after the rather complicated calculations involving $dx_1 \otimes dx_2$) mathematical expression has some peculiar meanings in physics?

(c) In the arguments between (89) and (90) of the general relativity part of [E], the author regarded the "geodesics" of a Riemannian manifold as a natural generalization of the straight lines of the Euclidean spaces, but this is a radical mistake, for "geodesics" can be defined (via systems of differential equations) only locally and nearby each given point of the manifold

(d)During the time when Einstein introduced the "general relativity" (before the 1920s), Cartan's theory of differential forms still did not appear, and the precise definition of integration of certain quantities over a Riemannian manifold was actually not known. Presently it is known that only for an n-differential form of a n-dimensional orientable manifold M, that it is possible to define the integration of over M. By this explanation, one finds that the integrations between (84) and (85) of the general relativity part of [E] are all meaningless, for δA^{μ} is even not a tensor, and the use of the so-called "Stokes's theorem" is rather puzzling; at present it is known that there are rather strict requirements for using a version of the Stokes's theorem of a manifold (cf. [CCL], §3.4, or [W], p.148).

(e)In the arguments between (95) and (96) of the general relativity part of [E], the author attempted to get a tensor satisfying the three conditions 1 to 3. However, there exist two substantial gaps in the derivation. Let (locally)

$$\omega = \sum T_{\mu\nu} dx_{\mu} \otimes dx_{\nu} .$$

Then the third requirement is (cf. (47c))

$$\sum_{\nu} \frac{\partial T_{\mu\nu}}{\partial x_{\nu}} = 0 .$$

But one notes that this is only a local condition, for if (y_1, y_2, y_3, y_4) is another local coordinate, then on the intersection of these two local coordinates, if

$$\omega = \sum k_{ij} dy_i \otimes dy_j ,$$

then

$$K_{ij} = \sum_{r,s} T_{rs} \cdot \frac{\partial x_r}{\partial y_i} \cdot \frac{\partial x_s}{\partial y_j} ,$$

$$\sum_j \frac{\partial K_{ij}}{\partial y_j} = \sum_{j,t} \frac{\partial T_{\mu\nu}}{\partial x_t} \cdot \frac{\partial x_t}{\partial y_j} \cdot \frac{\partial x_\mu}{\partial y_i} \cdot \frac{\partial x_\nu}{\partial y_j} +$$

$$\sum_j T_{\mu\nu} \cdot \frac{\partial^2 X_\mu}{\partial y_i \partial y_j} \cdot \frac{\partial x_\nu}{\partial y_j} + \sum_j T_{\mu\nu} \frac{\partial x_\mu}{\partial y_i} \cdot \frac{\partial^2 x_\nu}{\partial y_j^2} ,$$

and thus in general

$$\sum_j \frac{\partial K_{ij}}{\partial y_j} \neq 0 .$$

Then on the one hand, on a manifold the coordinates can be chosen "as arbitrarily as possible" in some sense, so that the above " $\neq$ "would happen; and, on the other hand, to ensure the above " $\neq$ "does not happen, one has to choose special transformations of coordinates, but one does not know how to realize this mathematically for the entire manifold.

(f) Due to the above reasons, we think the so-called "field equation" ((96) in the general relativity part of [E]) is actually not founded, and thus the whole theory is suspected (in [SW], §4.1, the field equation is considered as a "postulate", and thus it is not proven mathematically).

We have to stress once again that even in the 1940s the precise definitions of a Riemannian manifold were still quite confusing amongst mathematicians. Thus, when Einstein used the Riemannian geometry as a model of his "4-dimensional universe" on which to build the theory of "general relativity", he actually did not quite understand this mathematical subject. For example, a "local" equality is meaningless on a manifold(see the above argument of (e1)).

The so-called Chandrasekhar limit ([H], p. 83) is now invalid, for it was calculated by using the general relativity. The "limit" would eventually lead to the notion of "black holes". For the reasons as why Einstein's general relativity once illustrated the movement of the Mercury "successfully", we consider this as just a coincidence. As we observe above, that Einstein's derivation for the "field equation" is not convincing. mathematically. We think that there would exist some other explanations for the observed "red-shifted", and we think that the solar system as a whole actually does not move in the sky(although we believe that actually it is the sun but not the earth that is always moving, for this see §5 of this paper about astronomy).

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§4. On certain classical physics

Physics is about the nature, and thus every theory should be sufficiently verified by experiments(otherwise the theories are not meaningful).

We think the "law of gravitation" is just an assumption, and we consult books about engineering and find actually the principles of both the satellite and the rocket donot use the "law of gravitation" in the practical operations. In fact there should exist other explanation to the so-called "attraction" of the two small balls of Cavendish's famous experiment. We give supplementary materials which support my viewpoint.

(1)The famous experiment of H.Cavendish(1731-1810) was only about two small balls, and actually he neglected other factors, for he admitted Newton's theory in advance;

(2)The laws of J.Kepler(1571-1630) about the movement of planets came from numerical evidence based on observations by telescope of Tycho(who died in 1601), but not from using the "law of gravitation" of Newton(1642-1727);

(3)I think it remains to check the true reason for the discovery of the Neptune and Pluto.

Thus a lots of applications of the "law of gravitation" would be all invalid. We believe that in Cavendish's experiment(for measuring the constant in Newton's formula), the "attraction" between the two small balls can be definitely given some alternative explanations.

The "Coulomb's law"(1785) of electrostatics is obvious a guessed generalization of the "law of gravitation" of Newton, and thus it would be invalid. It is known that "Coulomb's law" implied the "Gauss' law", and the latter implied "Maxwell's equations", and thus both "Gauss' law" and "Maxwell's equations" would become untenable. Note that Lagrange's work on mechanics was also not verified by experiments.