Article

Revelation's Role in the Act of Science

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ABSTRACT

No role is granted to revelation (as disclosure by God) in the act of science. However, Einstein's derivation of the Lorentz transformation in [1], and his later disregarding of it are the most striking proof that revelation plays an essential role in the act of science. Once we identified the mark of revelation in [1], it is (more or less) identifiable in the valuable work of any physicist. Unfortunately, when it happened, the identification of the mark of revelation was not followed by a rationale of the work. As to the impact of the missed revealed knowledge on the human progress, we will examine the consequences of the works of Einstein, Dirac and der Waerden.

Key Words: revelation, role, act of science, Einstein, Lorentz transformation, special theory of relativity.

20. REVELATION'S ROLE IN THE ACT OF SCIENCE

A successful trend of both science and secularization accredited the idea that science and divine work would be antinomies. Physicists supported this idea by *a fortiori* interpreting failures of the theoretical work as natural steps toward the truth, so disregarding -against the evidences- the century-old crisis of physics.

No role is granted to revelation (as disclosure by God) in the act of science. A definition of revelation free from any suggestion that God has anything to do with the creative insight was put forward as "a sudden, creative coming together of several previously unconnected lines of reasoning which are combined in a new synthesis" (English dictionary). When faced up to the "incomprehensible" successful work of some among them, "who did not seem to be reasoning at all but who jumped over all intermediate steps to a new insight about nature" [36], physicists confined to name them "magicians", and 'felt' "compelled to redo the work of the magicians so that they seem like sages" [36] ("sages" are those physicists who "reason in an orderly way about physical problems on the basis of fundamental ideas of the way that nature ought to be" [37]). They claimed that "otherwise no reader would understand the physics" [36]. Then they established a 'prophylactic' editorial quarantine against new "magicians" (see Sec. 43).

This is the mainstream in modern physics. In despite its strategy, the crisis is evolving. It means that something is wrong with this strategy. Whether discarding any role to revelation in the act of science seemed to be a natural attitude when physics emancipated as science by measurements and elementary mathematics, it became questionable when syntheses of experimental data, novel ideas and advanced mathematics faced physics. To resolve the dilemma, a question is essential to be answered: Whether revelation (as disclosure by God) would play indeed a role in the act of science, could its mark be identified in the valuable works of the physicists denying its role, or just believing (like Einstein) that a revealed knowledge cannot be rationalized?

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To this end, let us consider the derivation of the Lorentz transformation in [1]. By a deep insight into this derivation (Sec. 14), we conclude that Einstein was playing the role of a magician -the most important:

First, he "jumped over all intermediate steps" -consisting in the physical motivations of the manipulations of equations that led to the Lorentz transformation in [1] (see Sec. 13). It was by deducing the complementary time-dependent coordinate transformations (Chs. 2 to 8), and the Lorentz transformation as such a coordinate transformation (Sec. 9) that we identified the objective reality warranting the manipulations of equations (Sec. 14 (Sect. 2)). It was the tracing of radius vectors by light signals. Hence, in despite their strong appearance of mathematical tricks, the manipulations were not tricks at all. The derivation of the Lorentz transformation in [1] was correct.

Second, he "did not seem to be reasoning at all". He discarded the concepts of absolute rest and absolute motion but described in detail a thought experiment which seems to be the only one enabling the 'blind' inertial observers to determine absolute speeds in their reference frames (see Sec. 17). He proposed the experiment for deducing the Lorentz transformation in the idea that identical inertial clocks would run at rates depending on their speed (see Sec. 13). But, because he did not realize the role played by the light signals in this experiment, needed to manipulate some equations to this end. Unfortunately, he did not investigate further the diagram describing the experiment (the upper diagram in Fig. 10) to see that this diagram actually validated (see footnote 7 and Sec. 14 (Sect. 1)) the 'abstract' coordinate systems at absolute rest (defined in Sec. 4 (Sect. 1.1)) in special relativity theory. There becomes evident that Einstein was not aware that i) by light signals has specified the time-changing magnitude and direction of the radius vectors of geometrical points moving with respect to inertial observers (which should lead him to the Lorentz transformation as a complementary time-dependent coordinate transformation) but he used light signals, ii) the graphical addition of travel times as scalar quantities (developed in Sec. 7) needed be developed in his theory but he worked only with light signals tracing abscissas of geometrical points and dropped the square of β in his equations linear in β^2, according to the graphical addition of travel times as scalar quantities, iii) the equation $x = wt$ assured the independence of the linear equations in β (making them a coordinate transformation) but he took into account this equation in order to obtain... the "addition theorem for speeds" ([1], Sect. I.5) (see Sec. 16) and iv) the coordinate system at absolute rest playes an essential role in his theory but he compensated its lack by consecrating a version of the light-speed principle ([1] (Sect. I.2)) (see Sec. 16) which saved his theory from the inconsistencies raised by the arbitrary removal of the coordinate system at absolute rest.

It is as if Einstein reconstituted by flashes in [1] a paper on the derivation of the Lorentz transformation as a complementary time-dependent coordinate transformation that pre-existed in his subconscious. The correctness of all the manipulations of equations (the clue of [1]) supports the revealed nature of the original paper. The lack of their physical motivation shows that Einstein turned into rational knowledge only pieces of the revealed knowledge. That is why he never became aware of the correctness of the derivation of the Lorentz transformation in [1], and, fatally, developed special relativity theory without the derivation of the Lorentz transformation in [1].

Einstein's derivation of the Lorentz transformation in [1], and his later disregarding of it are the most striking proof that revelation plays an essential role in the act of science. Once we identified the mark of revelation in [1], it is (more or less) identifiable in the valuable work of any physicist. Unfortunately, when it happened, the identification of the mark of revelation was not followed by a rationale of the work. The "jumps over the intermediate steps" of the authors were not filled with the missed information. The work identified as revealed (like [1]) became thereafter *unalterable*, of *eternal value*, completely foreign to the advancement of physics. The identification of the mark of

revelation by authors themselves depends on their attitude toward revelation (see also [37-39]). The disclosing of the revelation role in the act of science allows physicists to take rational decisions which strongly disturb their revealed knowledge. So are raised the "jumps over intermediate steps" - particularly of explanatory nature- in their work, loosings and distortedly perceivings of esential physical information. The crisis of modern physics is the result of disregarding all these evidences. It is the unseen, dark face of the secularization. So fundamental for the eradication of this crisis is the physicists' acception that revelation playes certainly the key role in the act of science.
Far by his development of special relativity theory without the derivation of the Lorentz transformation in [1], and the foundation of modern physics on special relativity theory- Einstein was the main contributor to the crisis of modern physics. Other key contributors were the great physicists P.A.M. Dirac and B.L. van der Waerden (who disregarded revelation). Both they missed the subquantum information embedded in Dirac's equation. Like Einstein, they failed in rendering conscious the whole information revealed them through their subconscious (*humans touch divine through subconscious*). Their work stands for proof (Secs. 28, 32) that they couldnot provide a complete rationale for the revealed knowledge. They, like all the "magician-physicists", behaved as if have had accessed intermittently a superhuman database.

As to the impact of the missed revealed knowledge on the human progress, let us examine the consequences of the works of Einstein, Dirac and der Waerden if they gave a complete rationale in them. Most important, Einstein should obtain the terms of the Lorentz transformation as Cartesian coordinates and Newtonian times. There has been evident the lack of any conflict between his special relativity theory and the Newtonian mechanics. The principle of the physical determination of equations worked successfully in both theories. There has been no mental alienation by the famous time dilation and twin paradox. The validation of the principle of the physical determination of equations in modern theories concerning the quantum and subquantum structure of matter through the relativistic energy-momentum relationship should follow. Dirac and der Waerden should obtain genuine subquantum information. The application of this information (disclosed further in this book (Chs. 28 to 32)) to radically new technologies should happen as early as by the 1940's. All these give the real dimension of the impact which the missed and distortedly perceived revealed knowledge had (still has) upon the advancement of physics, finally upon the progress of the mankind.

However, decoding the revealed knowledge is not so easy. Einstein's failure in providing a rationale for the derivation of the Lorentz transformation in [1] points to the existence of some hardly to identify but easily 'deletable' passwords for accessing the understanding of a revealed knowledge. The concepts of absolute rest and absolute speed prove to have been such 'passwords'. These 'paswords' were 'deleted' neither by Einstein's followers nor by Einstein after ending special relativity theory but by Einstein in the preamble of his original paper on relativity [1], when stated that "no properties of phenomena attach to the idea of absolute rest". So that an undisturbed conversion of a revealed knowledge into a rational one is assured by a careful search for hidden passwords and a careful choise of decisions. Discarding or disregarding the role plaid by revelation in the act of science, so these requirements, substantially affects physicists' performance. Breaking (like individuals) the atheistic mentality (beneficiary of a formidable logistics), as well as the mentality that revealed knowledge cannot be turned into rational knowledge is needed to this end.

The rationale which we give for the first time to a revealed knowledge has also main religious impact. There becomes evident that by disclosing a rationale is substantially enriched our rational knowledge. This conclusion suggests that the Ten Commandments should also prepare people for accessing revealed knowledge benefic to the material progress of the mankind. Completely foreign to religion, the slogan "Do not search, believe!" has strongly distorted this mission. The claimed common successful trend of both science and secularization is based on a false -the hiding of the one

century-old crisis of modern physics, against its just pointed out effects. The Malraux's revealed assertion "The 21st century will be a religious one or will not exist at all" becomes meaningful.

21. THE CRISIS OF MODERN PHYSICS: HYPERMATEMATIZATION VS LITTLE PHYSICAL INFORMATION

Einstein's foundation of the special relativity theory on his 1905 paper on relativity bar the derivation of the Lorentz transformation in that paper strongly altered the physical grounds of both the special relativity theory and the relativistic physics, and so the development of modern physics. Although mathematically equivalent, the various derivations of an equation are not physically equivalent at all.

The whole physical information embedded in the terms of the Lorentz transformation is exclusively provided by its operational derivation as a complementary time-dependent coordinate transformation. This information was hidden in Einstein's 1905 derivation of the Lorentz transformation, and did not exist at all in any other derivation of the Lorentz transformation. The meaning of Cartesian coordinate and Newtonian time of the terms βx and βt of the Lorentz transformation, disclosed by its operational derivation, validates the principle of the physical determination of equations in Einstein's special relativity theory. In lack of this principle, the special relativity theory developed by Einstein without the derivation of the Lorentz transformation in [1] was a mathematical structure filled deliberately with hypothetical contents having little or nothing in common with the objective reality. This theory worked well due to the coincidence of the denominators in the Lorentz transformation and the relativistic mass, but allowed predicting the famous time dilation and the metaphysical speculations on time, as well as passing from the Minkowski space-time to the spacetime (space-time) assumed to be a physical entity giving rise to physical effects [31-34].

Founding modern physics on Einstein's special relativity theory at the time the principle of the physical determination of equations was not validated in this theory also invalidated the principle in modern physics. All restraints required by this principle were off. Hypermatization flourished by redundancies of equations and mathematical theories having little in common with objective realities, while large amounts of physical information remained undisclosed in the terms of the true underlying equations. Ignoring revelation's role in the act of science, and "redoing" the revealed work of the "magician-physicists" also contributed to the crisis of modern physics. Corruption (see Sec. 43) just blew up the crisis.

Therefore, a policy of reviewing modern physics according to the principle of the physical determination of equations, and of wide-spreading the "magicians"' original work for deep investigation is required to put an end to crisis and assure a true advancement of physics (see also [4, 40-41]).

22. OPERATIONAL THEORIES

A physical theory is an operational theory if and only if the quantities entering its underlying equations are expressed in reference frames where measurements are performed [26, 42]. Essential for the inertial observers is to determine by own means durations of events at sites where phenomena happen. The Newtonian physics is evidently an operational theory: all measurements are performed in the observer's reference frame. As concerns the theories describing phenomena happened in inertial spaces, other than that of the observer, knowing the duration of such phenomena is done by physical signals connecting those spaces to that of the observer. Complementary time-dependent coordinate transformations are involved, and their time equations

provide durations in terms of signal travel times. Einstein's principle of relativity, rewritten with respect to suitable complementary time-dependent coordinate transformations, is required for such theories to be operational theories.

22.1. Special Relativity Theory like Operational Theory

The special relativity theory was founded on the principle of relativity, but Einstein's interpretation of the durations (time intervals) elapsed in inertial spaces as time dilations has obscured its operational nature.

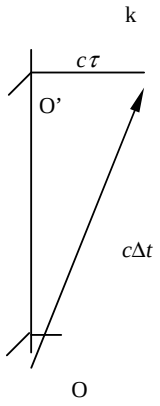

Figure 11.

It is our derivation of the Lorentz transformation as complementary time-dependent coordinate transformation corresponding to the tracing of radius vectors by light signals, that which enlightens this issue. Our proof that the terms βx and βt of the Lorentz transformation are actually a Cartesian coordinate and the Newtonian time in which light travels this coordinate (Sec. 9) has removed the time dilation. Obtained from the diagram in Fig. 11, the equation

$$\tau = \beta \Delta t, \qquad (26)$$

also predicted by the time equation of the Lorentz transformation, gives a duration τ elapsed in an inertial space (carrying the inertial coordinate system k) in terms of the travel time Δt of the helping light signal (this is the operational significance of the metric of the Minkowski space-time). It is with this operational meaning that Eq. (26) turns the special relativity theory into an operational theory.

22.2. Electromagnetic and General Relativity Theories like Operational Theories

To show that the electromagnetic and general relativity theories are operational theories, we must show that the 'retardation' of the electromagnetic and gravitational potentials is related to a complementary time-dependent coordinate transformation. To this end, we focus our attention on the mathematical quantities f and ξ^μ that appear in the two theories by the gauge transformations of their four-potentials. Observe that dependence of f and ξ^μ on $t - x/c$ has been historically obtained by imposing the Lorentz conditions $A^\mu{}_{,\mu}=0$ and its gravitational counterpart $\psi^{\mu\nu}{}_{,\nu}=0$ [43] (alternatively the transverse-traceless conditions $\psi^\mu{}_\nu u^\nu =0$, $\psi^\mu{}_\mu=0$ [34]) on the four-potentials of the plane electromagnetic and gravitational waves, respectively, A^μ and $\psi^{\mu\nu}$, just to bring into accord the omnipresence of the 'retarded' potentials with experiment [44].

Since the waves carry an inertial coordinate system k at speed c along the x-axis, it is straightforward to conclude that A^μ and $\psi^{\mu\nu}$ are defined in k, and their dependence implicitly that of f and ξ^μ- on time is determined by the complementary time-dependent coordinate transformation

$$x' = x - ct,\ t' = t - x/c, \qquad (27)$$

obtained for $v = c$ from the particular complementary time-dependent coordinate transformation (3), associated to the diagram in Fig. 12. Thus, by relating the retardation

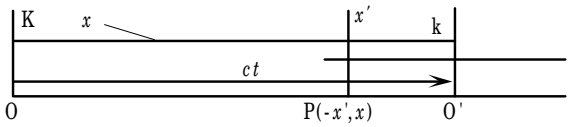

Figure 12.

of the potentials of the electromagnetic and general relativity theories to the complementary time-dependent coordinate transformation (27), we made these theories operational theories.

Concluding, all the theories of modern physics can be made operational theories by removing those mathematical conditions imposed exclusively to bring in accord the time dependence of their physical quantities with experiment. To this end, should be identified an inertial coordinate system, a suitable physical signal and its corresponding complementary time-dependent coordinate transformation.

22.3. Weak Gravitational Waves like Physical Entities

The main consequence of the foundation of the general relativity theory like operational theory is defining the weak gravitational waves -the solutions of Einstein's equations of the gravitational fields in vacuum, *viz*.

$$R_{\mu\nu}=0$$

where $R_{\mu\nu}$ is the Ricci tensor- as physical entities. Carried by wave, the k in Fig. 12 assures the dependence of the gravitational potentials on $t - x/c$ without additional mathematical conditions.

23. EINSTEIN'S SPECIAL RELATIVITY THEORY IS IN FACT TWO THEORIES

Our 'reinstatement' of the derivation of the Lorentz transformation in [1] proves that Einstein launched actually two theories under the name of special relativity theory, namely: the special relativity theory introduced by his 1905 paper [1], and the subsequently developed special relativity theory (the standard theory) without the derivation of the Lorentz transformation from [1]. The first one is a theory which physical grounds existed, but remained not understood due to the deliberate ignorance of the derivation of the Lorentz transformation in [1]. The second one is a pure mathematical theory which physical content was replaced by the famous time dilation and length contraction, both physically untrue. In both cases the principle of the physical determination of equations did not work in the special relativity theory. The relativistic quantum theories were built without the principle of the physical determination of equations. The resulting lack of restraints upon the terms of the underlying equations of these theories raised the crisis of modern physics, with major human and technological consequences. Without deducing the Lorentz transformation as a complementary time-dependent coordinate transformation, and discerning between the two versions of Einstein's special relativity theory, the perennial criticism just failed in desuetude.

24. FOUR-VECTORS, 'ABSTRACT' COORDINATE SYSTEMS AT ABSOLUTE REST AND THE PRINCIPLE OF RELATIVITY

The defining relationships of the four-vectors and four-tensors show that the mixture of their components originates in their dependence on coordinates and times connected by the Lorentz transformation, in consequence of tracing radius vectors by light signals. These relationships look like the Lorentz transformation, but are improperly called Lorentz transformation. As long as the speeds appearing in the Lorentz transformation and these relationships are relative speeds, they all support Einstein's principle of relativity. The principle is a law of nature, validating any physical theory for any inertial observer. However, the principle *does not require at all the removal of the concepts of absolute rest and absolute speed*. Such a requirement originated exclusively in wishing to determine experimentally absolute speeds with respect to a physical substratum (according to the Newtonian definition of absolute speed), and not in terms of travel times, specific to a theory manipulating light signals as special relativity theory is.

The removal of the concept of absolute rest involved not only the removal of the reference frame at absolute rest, but also the removal of the 'abstract' coordinate systems at absolute rest (defined in Sec. 4 (Sect. 1.1)), which altered a thoroughly understanding of special relativity theory. To this end has contributed the nonchalant use with the same meaning of the concepts of reference frame and coordinate system. However, the 'abstract' coordinate systems at absolute rest do not deny the principle of relativity. They are not associated (by definition) to the hypothetical physical reference frame at absolute rest. Writing physical laws with respect to them is nonsense.

But, associated to inertial coordinate systems, the 'abstract' coordinate systems at absolute rest enable observers to correctly describe graphically and mathematically uniform rectilinear motions relative to them (Sec. 6 (Sect. 1)). They also enable observers to determine physical quantities not only as relative quantities but also as absolute quantities (defined in Sec. 6 (Sect. 1)). The lack of the 'abstract' coordinate systems at absolute rest mainly altered the understanding of the concept of, and the exploitation of energy.