smw-genart-02-06

Beyond Einstein ... Are we all afraid of the Truth?

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(Dated: March 20, 2006)

Abstract

The power-point presentation [1] provided herein shows exactly why Einstein's field equations of his general relativity are based on an illogical approach to representing the observable world. Einstein had, in fact, discarded these equations way back in 1928 when he had began his solitary search for a unified field theory. However, the rest of us learned, taught, and also put too much faith for too long (for more than seventy years) in an illogical approach to representing the observable world. Consequently, we have developed great reluctance, resulting from dogmatic perceptions, prestige, reputation, ..., that is holding us back from orienting ourselves in the "right" direction to the understanding of the observable phenomena. This raises the question mentioned in the title: Are we all afraid of the Truth? Rhetorically speaking, we could then also ask: are we all afraid of Virginia Woolf? In the sequel, I also illustrate my approach to going Beyond Einstein for developing an appropriate mathematical framework for the fundamental physical ideas behind the General Principle of Relativity, for the unification of fundamental physical interactions and, hence, for a theory of everything.

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The title of this article may appear only as an eye-catching one to some, repelling one to some others, a thought provoking one to few others ... Only the person reading it can tell. However, before we plunge ourselves into the issues related to this title, a preamble to it appears necessary to setup the backdrop against which it should be viewed to get an insight into the question it poses.

Physics is our attempt to conceptually grasp the happenings of the observable world. Concepts of Physics are also succinctly expressible in the language of mathematics. Then, to obtain a genuine understanding of the physical phenomena, observable changes in physical or observable bodies, it is necessary for us to formulate appropriate concepts and to also express them by proper mathematical notions.

This last issue is clearly perceptible [2] with the pre-Newtonian development of Mechanics. The concept of the motion of a physical body involves change in its “location” relative to a reference body - another physical body. This “location” is physically “measurable” using still another, third, physical body as a measuring scale. This measurement yields a “number” - the “distance” between the reference body and the physical body whose “location” is being ascertained with respect to the former. The motion of the first physical body is then mathematically expressible as a rate of change of this number, distance, with respect to Time. [Time here is a concept related to the “location” of the “hand” of a clock body relative to the reference physical body. Here, we will not enter into further details about Time, not that these are unimportant.]

Because the distance is a pure number, a scalar, its rate of change with time is a scalar, the speed. Descartes then used this notion of speed to formulate and propose the Laws of Motion of observable bodies using it.

Observations with collisions of physical bodies did not, however, support the Laws of Motion as proposed by Descartes.

Huygens then realized that if we appropriately associated a positive and a negative sign with the speeds of two colliding bodies, then the Laws of Motion so obtainable are in agreement with the observed collisions of bodies. This assignment of positive or negative sign to the speed was only an ad-hoc proposal of Huygens and was restricted only to his considerations of the collision of two physical bodies.

Of course, it was yet to be realized that an appropriate notion to describe motion is that of "displacement" and that it involves not just the change in distance to a physical body but also the "direction" of this change in its distance. That is to say, it was yet to be realized that we have to treat the "displacement" as a vector.

As is well known, Newton, with a deeper insight than his contemporaries, provided us a logically consistent conceptual framework for Mechanics using vectors. As Newton's Laws of Motion were in "agreement" with most subsequent experiments, the concept of motion then found its proper mathematical representation. Descartes and others also provided geometrical background to these notions by invoking the Euclidean geometry and the mathematical notion of a (Cartesian) coordinate system. This is the representation of physical bodies by a point of the Euclidean 3-dimensional space.

Experiments "verify" theoretical explanations of phenomena and, in turn, indicate the appropriateness of our choice of, both, the physical conceptions and the mathematical structures representing them. Due mainly to Galileo, experimental methods of determining this appropriateness were already well established before Newton who always used such methods to substantiate his theoretical conclusions.

To state his Laws of Motion, Newton introduced an important concept, Force, as a "cause" behind the motion. He defined force as the rate of change of (Descartes's) quantity of motion, the momentum vector, with time. He then also related force with the acceleration and the (Galilean) inertia of a physical body.

There also are purely logical methods to decide, at least partly, the appropriateness of concepts. These determine the *mutual compatibility* of our concepts, *ie*, the *internal consistency* of the theoretical framework. Newton also used logical methods, *eg*, the formulation of his third law of motion, to "construct" theory.

As only a physical body should be the "cause" behind a physical phenomenon, every force was expected to have physical bodies as source(s). This, however, was not to be with Newton's definition of force. The *Coriolis force* did not have any source in physical bodies. This *pseudo-force* only arises because the chosen reference body, the Earth, is rotating relative to some "standard" reference physical bodies.

What then are these "standard" reference bodies? To analyze this issue, Newton devised the famous bucket experiment. This thought experiment was an indication to Newton himself that his conceptual framework was not logically completely satisfactory. There also were observations from Optics to indicate to Newton that his framework of Mechanics was insufficient to explain all the physical phenomena.

Moreover, Newton had mathematically represented a physical body as a point of the underlying 3-dimensional Euclidean space. Newton's laws of motion were then closely related to certain mathematical properties of (time-parametrized) curves of the Euclidean 3-dimensional geometry, and, as is well known, Newton himself developed corresponding mathematical notions of Calculus.

In this connection, Descartes [3, 4] rightly pointed out that this representation of a physical body by a point of the Euclidean space is not in *conformity* with our everyday experience that reference bodies do get affected by physical processes. Specifically, he was concerned about the fact that the coordinate system of the Euclidean 3-dimensional space underlying Newtonian Mechanics, when viewed as a "material construction" of a reference body, does not get affected by physical precesses.

Generically, using checks of either experimental origin or logical origin (the internal consistency of the theory), we judiciously accept or reject any conceptual framework as an admissible theory of the observable world. When an internally consistent theory fails to explain some observations, we need to *expand* the conceptual basis of that theory and, hence, mathematical structures representing those concepts. As an acceptable explanation of the observable world, the conceptual framework of the "expanded" theory must also be internally consistent in the sense of Logic.

But, alternative mathematical notions were simply not available in Newton's times. Therefore, although Newton and a few others "sensed" that the mechanistic framework needed "modifications" at fundamental levels, neither Newton nor could anyone else (of Newton's times, sensing this need) suggest any alternative to it.

The world, then, got blinded by successes of the Newtonian Theory, and fell pray to the Mechanistic Dogma - that the entirety of physical phenomena could be explained using the Newtonian conceptions from Mechanics.

Scientific developments after Newton followed the path of "experimental" checks. Mechanistic Dogma and the lack of alternative mathematical notions, both, prevented the majority from exploring alternatives to Newton's Mechanics.

As is well known, only the experimental data, increasingly getting inconsistent with Newtonian theoretical predictions, ultimately severed, once for all, strong links with the Mechanistic Dogma of the post-Newtonian era.

Perhaps, if fundamental limitations of Newton's theory were widely known, mechanistic dogma would not have gripped the majority in the first place. Of course, the lack of means of rapid communication was the reason for these limitations not being widely known. Only a few centuries after Galileo and Newton, Einstein could free us, still only partially [20], from the dogmas associated with Newton's theoretical constructions.

I am referring here to Einstein's famous contributions [3] to two well known revolutions in Physics, *viz*, Special Theory of Relativity and Quantum Theory. Einstein's analysis of the role of Light in physical measurements freed us from "fixed" Euclidean 3-space and "universal" time, both of the Newtonian era. On the other hand, Schrödinger's and Heisenberg's mathematical methods of Quantum Theory [5] showed us, among other things, that mathematical methods significantly different than those of the Newtonian theory do describe the observable world in a better manner.

With these revolutions, Science, in general, has developed so rapidly that it has greatly influenced almost every aspect of our lives. In comparison to Newton's and Einstein's eras, we have rapid, almost instantaneous, means of communication, thanks to the technological revolution with Computers, the Internet... . Then, with these developments, experimental methods have also advanced and have also become exceptionally cutting into the pockets of the tax payers globe over. The role of "all of us" in promoting an open dialogue over fundamental physical conceptions and their limitations is therefore quite important to free us from associated dogmatic perceptions, if any.

The above appears to be presently very relevant simply because dogmatic perceptions do appear to prevail within the physics community at large. The following discussion considers these dogmatic perceptions from my perspective.

First such deep-rooted dogma appears to be that mathematical methods of Quantum Theory will [6, 7] lead us to a *Theory of Everything*. Here, it is then forgotten that mathematical methods of Quantum Theory do not represent physical bodies in such a way that the effects of physical phenomena on any reference body are encompassed by this mathematical representation. That is to say, Descartes's criticism of Newton's mathematical representation of a physical body as a point of the Euclidean space applies also to this quantum theoretic representation of a physical body.

The issue here is also that of the limitations of the conceptual framework as well as those of the mathematical methods of Quantum Theory as discussed in [8]. Specifically, quantum theory uses inertia, potential, source of the potential and a law of motion as fundamental notions. These four notions are however *mutually logically independent*. Hence, no explanations of any kind for these four basic notions are possible within the conceptual framework of the quantum theory.

The mathematical framework of the quantum theory faithfully expresses its physical conceptions and is, consequently, inadequate to remove the mutual logical independencies of its above basic notions. That is to say, the (extended) Lagrangian, or the Hamiltonian, method needs the aforementioned four conceptions to first yield mathematical expressions to correspond to them, and only after this has been done that the method provides the evolution of the system that it represents. But, neither that Lagrangian nor that Hamiltonian is obtainable within this framework.

Then, the mathematical framework of the quantum theory can do no better than the (extended) lagrangian or hamiltonian frameworks, which cannot of course remove the mutual logical independencies of the aforementioned four basic notions of the quantum theory. A question is also whether these frameworks can, with *prior* specifications of *all* the relevant physical conceptions by appropriate mathematical expressions, account for the entirety of physical phenomena.

This is really an issue of non-lagrangian and non-hamiltonian mathematical systems. The point is that mathematical such systems do exist. Then, if a theory better than the quantum theory were to be fundamentally based on such mathematical notions, lagrangian or hamiltonian representation for every physical phenomenon may not exist within it. A better theory here must first remove the mutual logical independencies of the fundamental physical concepts mentioned before.

That is why we need to "look beyond" the mathematical framework of the Quantum Theory for developing an appropriate theoretical framework within which the mutual logical independencies of fundamental physical notions are removed [8]. Such a "framework" may be termed as a *Theory of Everything*. We already have a "good" understanding of physical phenomena of the microscopic domain (corresponding to electromagnetic, weak and strong nuclear interactions) on the basis of the quantum theory and an appropriate inclusion of gravitational phenomena within this "framework" may, thinkably, exhaust the entire list of observable phenomena needing description.

But, many may have developed a frame of mind that such a theory of everything is not possible. Surely, we have to be cautious with any such claim, but to turn completely away from the possibility of a Theory of Everything is dogmatic.

In this connection, we recall that the purpose of physical science is to “describe” changes in physical bodies as are observed. That such a description is possible is the basis of our developing physical theories.

As we have stressed before, mathematics is the language of physical science and physical concepts are also succinctly expressible using mathematical notions. Then, we may think of a *single* mathematical notion to “represent” not only *all* the characteristics of physical bodies but also their “changes” (mathematical transformations).

Here, we then note that a mathematical transformation essentially “knows” about the mathematical structure it “transforms”. This single concept, that of the transformation of a mathematical structure representing *all* the characteristics of physical bodies, appears to possess therefore the ingredients necessary to be the single conceptual entity that may be the basis of a Theory of Everything. That this description may really be possible [9] goes against the dogma that a Theory of Everything is impossible.

Another dogmatic perception appears to be that Einstein’s field equations of General Relativity should describe well the phenomenon of gravitation at least in some suitable approximation to a better theory. Consequently, predictions obtainable from the analysis of these equations are considered [10] as *physically relevant*.

With Schwarzschild’s monumental discovery in 1916 of a spherically symmetric solution to these highly non-linear, partial differential equations, the attention of the world, in particular, of various mathematicians, had turned to these equations [21]. Important mathematical methods related to solving non-linear partial differential equations were developed and numerous solutions [22] of Einstein’s field equations were obtained. This is still an active area of research in General Relativity.

In recent times, to be specific since 1963, the discovery of Quasi Stellar Objects and high energy phenomena in Active Galactic Nuclei have brought into prominence with physicists and astrophysicists these solutions of Einstein's field equations and methods of perturbational handling of these equations themselves. The Black Hole solutions of these equations are also considered [11] to be very significant advances in understanding the related astrophysical events, considering particularly that precursors to Black Holes, the Neutron Stars, have been discovered in the form of Pulsars.

Interesting speculations about possible detection of the Black Hole or the Event Horizon in astronomical observations of certain X-ray sources have also been attempted [12]. These have also found places as headlines with various media. In a "scientifically aware society", this is certainly desirable as well as inevitable.

The same applies to astrophysical models of the entire Universe - the Cosmology. Hubble observed that the red-shifts of distant galaxies increase with their distance from us. When red-shift is interpreted [23] using Doppler's effect, this all leads to an interesting picture of an expanding universe of galaxies. One implication of this could be that galaxies had been closer to each other in the past.

Then, the Universe of Galaxies should have "originated" out of a *unique* event in the history of this Universe. This is then as if matter had been thrown out in a Big Explosion - the Big Bang. The explosive event imagined here should have associated with it radiation, which should decouple from matter at some stage because of cooling due to expansion, and should be observable as a relic of the Big Bang. The observed Cosmic Microwave Background Radiation is then "naturally" explainable on the basis of the Big Bang assumption as its relic radiation.

Apart from the Big Bang conception, an alternative explanation of the expansion of the Universe of Galaxies is also possible if, in addition to the attractive force of gravity, some suitable "repulsive force" between galaxies is assumed. With an appropriate behavior of this repulsive force, galaxies then need not originate out of any unique event such as a Big Bang. This explanation also becomes as attractive as the Big Bang proposal when "natural" explanation is provided for the existence of this repulsive force. This is the basis of the Steady State Cosmology [13, 14].

The sixties had thus witnessed the famous debate of Big Bang versus Steady State Cosmology. It was then subsequently claimed that the Steady State Model is untenable vis-a'-vis observations of radio sources. So much had been the general, justifiable, interest in these Cosmological issues that this scientific debate also found an appropriate place in various enjoyable novels of satirical nature!

But, a cursory glance at the submissions, of theoretical as well as observational nature, to various databases is sufficient to show that this debate is not settled as yet. However, the "majority" seems to be favoring the Big Bang Model and most researchers therefore interpret observations from only the point of view of this model.

As observations improved, the need to postulate the aforementioned repulsive force has become more imminent. Observations appear to indicate that the rate of expansion of the universe is currently increasing. Then, the Big Bang conception needs to explain these observations. Any explanation is possible only if some repulsive force has, in the recent times, become "operative" to accelerate the expansion. Within this scenario, Inflation, Quintessence, Coasting etc. are just manifestations of different behaviors of the assumed repulsive force, needing natural origin [13].

A preliminary mathematical rendering of this physical picture of the universe at large was then to be "found" within the homogeneous and isotropic Friedmann-Lemaitre-Robertson-Walker geometry [13] for the spacetime. Of course, this geometrical rendering is *valid* if the galaxies are homogeneously and isotropically distributed.

The corresponding solution of the Einstein field equations then represents the Big Bang picture. In this case, the "initial singularity" of the FLRW spacetime then signifies the unique event of the Big Bang. But, the spacetime singularity implies the breakdown of the geometric description in terms of Einstein's equations. The problem of the spacetime singularity, it was hoped, would then go away with the "quantum" considerations related to geometry, *ie*, with the Quantum Theory of Geometry [7, 15].

On the other hand, the Steady State Cosmology uses [13] the same homogeneous and isotropic FLRW spacetime geometry, but its equations of evolution are modified away from those of Einstein's theory of gravity by the presence of the creation-field terms producing the repulsive force mentioned before. The latest version of this theory, the Quasi Steady State Cosmology, then assumes [13] certain behavior for the creation-field terms, but the original philosophical appeal is then lost for many.

But, it is crucial to realize that Einstein's equations are, as the provided power-point presentation clearly shows, based on an illogical and, hence, unscientific, approach to explaining the physical world.

Even if these equations were assumed to provide some "geometric" explanations of observable phenomena, the corresponding conceptual formalism [24] is not satisfactory. This is because electromagnetic phenomena will then not be geometrically explainable as arising due to the curvature of the underlying geometry.

We also note here that Einstein had, in fact, begun discarding these equations [3, 4, 16] by 1928 when he started on his solitary search for some satisfactory Unified Field Theory of gravity and electromagnetism.

Moreover, the action-at-a-distance formalism cannot remove [8] the mutual logical independencies of the fundamental physical conceptions mentioned earlier. This is so because the action-at-a-distance framework, unavoidably, needs to associate "source characteristics" with observable bodies corresponding to assumed forces. Explanations for such source characteristics and the assumed Law of Force are then outside the scope of any action-at-a-distance framework as was Newton's.

This is what brings us to the question raised in the title of this article. It refers to above situations with the aforementioned dogmatic perceptions associated with the two fundamental pillars of the modern physical science.

In what follows, we will discuss some lopsided developments of ideas when alternative explanations to concerned phenomena should really have been explored. These lopsided developments appear to be based on the aforementioned dogmatic perceptions and, hence, on inappropriate conceptions. Unjustifiably, alternative explorations were, time and again, simply shunned as a result of dogmatic perceptions.

Due to many dogmatic perceptions, there has only been a lopsided development of models of the Big Bang conception, and that too using the inappropriate mathematical framework of the Einstein field equations of general relativity. Observations have mostly been interpreted from the point of view of this conception. Alternative cosmological scenarios have not been explored to the same level of details and researchers exploring such alternatives do not find the required support [25].

This lopsided development is also seen with the models of astrophysical bodies such as Quasars and Active Galactic Nuclei based on an entirely inappropriate notion of general relativistic Black Holes, not worth mentioning here are the naked singularities (that, justifiably, were complete anathema to Einstein). Alternative models have also been explored, no doubt, but only by the minority of researchers who find it hard to garner support for their results. An already famous such case related to alternative ideas has been that of H Arp's Quasar-Galaxy associations [13].

Such situations have arisen because of dogmatic perceptions at various levels of the scientific echelons. If not, then how else do we explain these lopsided and inappropriate developments of only certain ideas? One could of course blame the lack of means of rapid communication in the past for the propagation of various inappropriate conceptions. But, this alone does not completely absolve us of the relevant sin.

In order to proceed "Beyond Einstein," let us then recall at this place Einstein's personal approach to his own theoretical constructions. The pivotal point of Einstein's formulation of relevant ideas is the equivalence of the *inertia* and the *gravitational* mass of a physical body, a fact known since Newton's times but which remained only an assumption of Newton's theory.

On the basis of this *equivalence principle*, Einstein then arrived at the *General Principle of Relativity* that the Laws of Physics be applicable with respect to <u>all</u> the systems of reference, in relative acceleration or not, *without unnatural forces* (whose origin is not in physical or observable bodies) *entering into them.* Then, the Laws of Physics should be based on the same mathematical structures, and be also the same mathematical statements, for all the reference systems.

The *equivalence principle* implies that the Lorentz transformations of the Special Theory of Relativity are not sufficient to incorporate the explanation of this equivalence of inertia and the gravitational mass of a material body. Furthermore, it also follows that general transformations (of coordinates) are required by the equivalence principle, and the physical basis is then that of the *general principle of relativity*, which is certainly more appealing than the restricted special principle of relativity.

To arrive at his formulation of the general theory of relativity, Einstein first raised [3] (p. 69) the following two questions:

- *Of which mathematical type are variables (functions of coordinates) which permit expression of physical properties of space ("structure")?*
- *Only after that: Which equations are satisfied by those variables?*

In 1949, more than thirty years after he proposed his field equations of the general theory of relativity in 1916, he still wrote [3] that:

> *The answer to these questions is today by no means certain.*

He then elucidated his steps to these questions by his considerations of the

(a) pure gravitational field

(b) general field (in which quantities corresponding somehow to the electromagnetic field occur, too).

He then wrote [3] about his approach to a general theory of relativity in the following "recollective" words that:

It seemed hopeless to me at that time to venture the attempt of representing the total field (b) and to ascertain field-laws for it. I preferred, therefore, to set up a preliminary formal frame for the representation of the entire physical reality; this was necessary in order to be able to investigate, at least preliminarily, the usefulness of the basic ideas of general relativity.

In 1916, as is well known [10, 13], he then proposed the following equations for his preliminary explorations of the representation of the entire physical reality:

$$R_{ij} - \frac{1}{2} R \, g_{ij} = - \kappa \, T_{ij}$$

where the left hand side is a geometric quantity while the right hand side is the energy-momentum tensor representing physical matter. These equations reduce to appropriate Newtonian equations in a suitable limit.

In 1949, he still expressed his concerns [3] about these preliminary equations in the following words:

The right side is a formal condensation of all things whose comprehension in the sense of a field theory is still problematic. Not for a moment, of course, did I doubt that this formulation was merely a makeshift in order to give the general principle of relativity a preliminary closed expression. For it was essentially not anything more *than a theory of the gravitational field, which was somewhat artificially isolated from a total field of as yet unknown structure.*

In 1949 again, he further wrote [3] about his perception of any satisfactory formulation of a theory incorporating the general principle of relativity in the following words clearly indicating that "geometric" singularities are anathema (my underlining):

> *Maxwell's theory of the electric field remained a torso, because it was unable to set up laws for the behavior of electric density, without which there can, of course, be no such thing as an electromagnetic field. Analogously the general theory of relativity furnished then a field theory of gravitation, but no theory of the field-creating masses. (These remarks presuppose it as self-evident that a field-theory may not contain any singularities, i.e., any positions or parts in space in which the field-laws are not valid.)*

Einstein had, in 1928, concluded that his equations of General Relativity were not any satisfactory formulation of the physical reality. He had attempted numerous formulations for the unified field theory. Pauli [16, 17] (p. 347 of [16]) then criticized:

> *[Einstein's] never-failing inventiveness as well as his tenacious energy in the pursuit of [unification] guarantees us in recent years, on the average, one theory per annum ... It is psychologically interesting that for some time the current theory is usually considered by its author to be the "definitive solution"...*

and had already demanded to know from Einstein, in a letter to Einstein dated December 19 1929, as to "what had become of the perihelion of Mercury, the bending of light, and the conservation laws of energy-momentum."

Einstein had no good answers to these questions within his Unified Field Theory. He however was not overly concerned about the issues raised by Pauli. But, in a letter written on January 1, 1930 to W Mayer he wrote: (my underlining)

> *Nearly all the colleagues react sourly to the theory because it puts again in doubt the earlier general relativity.*

In 1931, in a note [18] he also admitted that his earlier attempts at a unified field theory constituted a *wrong direction* to follow.

Interestingly, in the early forties, Einstein also explored [16] (p. 347) the question of whether the most fundamental equations of physics might posses mathematical structure other than that of the partial differential equations.

As Einstein's field equations are based on logically unacceptable substitution of only the force of gravity by the curvature of the spacetime geometry, their solutions cannot form any logically or scientifically acceptable explanations of observable phenomena. Hence, explanations based on black hole solutions, the naked singularity solutions as well as the analysis of cosmological solutions of these equations, including perturbations, are no explanations of the concerned physical phenomena.

Einstein had very clearly recognized that a field theory must not contain any singularities as particles. However, perhaps under the pressure of the "Publish or Perish" syndrome and due to lack of relevant information, both, we attempted unscientific descriptions of physical phenomena for over the last century almost. We also gave to the general masses an impression of satisfaction with such descriptions.

The Truth however remains that Einstein's field equations are logically unacceptable as forming any basis for scientific explanations of the observable world. Origins of the persistent dogmatic perception, that Einstein's equations describe the behavior of matter when gravity dominates, rest then with the following situations.

It is certainly true that Einstein's equations provide us a mathematical method of determining a 4-dimensional geometry. Properties of the 4-dimensional geometries are of course based on mathematically consistent methods.

Therefore, equations of geodesics of the geometry, equations of geodesic deviations, perturbational analysis of the underlying geometry, etc. are mathematically consistent. It also is quite justifiable that we construct [7] 4-dimensional geometries using "non-metric building blocks made up of" spinor variables.

Consequently, any use [7] of quantum theoretic methods for the Einstein-Ashtekar gravity can also be expected to provide us some mathematically consistent framework of the "Quantum Theory of Geometry".

But, how can these methods yield us any acceptable [26] explanations of the observable phenomena if their basis, Einstein's equations themselves, is logically unacceptable? How do the conceptual difficulties [19] with the quantum theory of the spacetime get resolved? These methods are also based on the lagrangian or hamiltonian formalism. In the absence of logically consistent underlying conceptions of Physics, what have these mathematical methods got to do with the observable phenomena?

The Truth also remains that procedures of quantum theoretic origin as used in highly innovative approaches to unification of basic forces are based on lagrangian or hamiltonian methods, which cannot provide explanations for the aforementioned four fundamental conceptions of the quantum theory. No doubt, the conceptions behind various attempts such as superstring theory, Euclidean quantization program etc. have been ingenious and highly innovative. The fact still remains that these approaches are explicitly or implicitly based on lagrangian or hamiltonian method.

How then can the unification of fundamental interactions be possible in any of such approaches [6]? We could again ask, what happens to conceptual difficulties with the quantum spacetime here? How do these difficulties get resolved?

Is not an open-minded recognition of such facts by all of us required? We should remember what Einstein had said:

Anyone who has never made a mistake has never tried anything new.

How true this is! As a child, we all make a mistake, learn from that mistake and turn away from that mistake to other matters. Is that why we, as children, are creative, innovative, and always exploring something new?

The elders are reluctant to admitting a mistake, perhaps because of their false notions of pride, reputation ... Should we be prey to such false notions? Then, is it not in the wider scientific interests to accept (in reality, Einstein's) mistake and progress along the right path to a better understanding of the observable world?

Einstein was an honest man. Unperturbed by his failures, he had openly admitted to his formulation of a theory of general relativity in terms of his equations being not right. Unafraid of losing his reputation, he had solitarily pursued the unified field theory. Again, he had openly admitted to his path being not the right one to follow. Due only to his such qualities, a common person regards him as an Icon of Science.

The then torch-bearer of physical science, Einstein, had shown us that the path of his field equations of general relativity is an incorrect one to follow. Due however to the lack of relevant information in the past, we “followed” that incorrect path even to this date. In the present IT-era, we are fortunate to possess the means of rapid communication. Then, are we to discard the inappropriate path and “search” for the “correct” path to the understanding of the physical world?

My purpose behind this article is to criticize (but not in any manner belittle other lines of thoughts) and to plainly state all the related facts so that we could all rethink about pros and cons of approaches to explaining the observable world.

History of Science beyond Galileo and Newton has shown that only right ideas survive and the incorrect or inappropriate ones simply vanish into oblivion. To accept a mistake is the right thing to do, and Einstein had openly admitted to that mistake. It is then a right way to go Beyond Einstein. This is a way to genuine progress. Has not the Time come today for the majority of us to take a definitive stance in favor of the Truth and to take steps in the “right” direction?

Are we then progressive? Or, are we all afraid of the Truth? And, because we are afraid of the Truth, shall we suppress and not let the Truth be out? Then, rhetorically speaking, are we all afraid of Virginia Woolf?

Acknowledgments

I am grateful to my brother Hemant Wagh and to Dilip A Deshpande for proposing that I write this article, for reading it, for suggesting improvements to it and also for various discussions about concerned issues from time to time.

[1] Wagh S M (2006) file:**no-efogr.ppt**. This is a part of the talk *How do we understand the Universe around us?* given on the occasion of the World Year of Physics 2005 at the Janakidevi Bajaj Science College, Wardha on January 7, 2006, and also as a part of the talk *Information Communication Technology in Education* to participants of the Seminar on ICT in Education organized by the Institution of Electronics & Telecommunication Engineers, Nagpur Center and the VMV Commerce, JMT Arts & JJP Science College, Wardhaman Nagar, Nagpur on February 4, 2006, and also as a part of the talk *Use of Information Communication Technology in Teaching and Education* to science and non-science College Teachers at the Academic Staff College, Nagpur University, Nagpur during an Orientation Program on March 6, 2006

[2] See an excellent article by von Laue M (1970) in *Albert Einstein: Philosopher-Scientist* (Ed. P A Schlipp, La Salle: Open Court Publishing Company - The Library of Living Philosophers, Vol. VII).

[3] Einstein A (1970) in *Albert Einstein: Philosopher Scientist* (Ed. P A Schlipp, Open Court Publishing Company - The Library of Living Philosophers, Vol VII, La Salle). See, in particular, his Autobiographical Sketch and his reply to essays by others.

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[5] See any of the many standard books on Quantum Theory. For example, Varadrajan V S (1988) *Geometry of quantum theory*, Vol. I and II (Van Nostrand Reinhold Co., New York)
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[20] Even during Einstein's times, the rapid means of communication were unavailable. Access to needed information in printed research journals was severely limited and involved inordinate delays. Media provided scientific news from time to time. Media therefore played an exceptionally important role in educating the masses then, and continue to play a similar role even in the modern IT-era.

[21] Of course, David Hilbert, a mathematician, had also proposed these equations.

[22] However, it should also be noted here that various properties of many of these solutions are, from the physical point of view, exceedingly perplexing, for example those of the Taub-NUT and other spacetimes.

[23] But, is this interpretation of red-shift using Doppler's effect correct? Is there another permissible explanation for (part of) the red-shift that is more significant in the cosmological context? These are still open issues.

[24] Einstein's intentions behind these equations was that of the representation of the entire physical reality. See later.

[25] Substantial support comes neither with the refereed journals nor with the funding agencies. Most journals then shoot a stereotyped rejection or the referees reject such speculative research without paying much attention to alternative ideas.

[26] Some beautiful part of Mathematics may not have anything to do with observable situations.