

How Physicists Failed to Recognize the Failure of Modern Physics

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Abstract

The belief in the absolute correctness of the foundational concepts in modern physics and the perceived beauty of the constructions based on those concepts has prevented physicists from waking up to the reality that modern physics has gone a long way in the wrong direction. Physics has long run into complex problems: dark matter, dark energy, black holes, string theory, multiverse, Physicists are searching for yet more complex and highly mathematical solutions having no connection with the real world. Losing sight of simple yet subtle solutions may have led to this situation.

I usually wonder how physicists failed to recognize that much of the accepted ideas in modern physics are wrong. For example, why physicists have failed to recognize that they are not on the right track when, for example, Einstein's relativity theory led to dark matter and dark energy, when they failed to reconcile relativity and quantum mechanics, when they ended up in proposing unfalsifiable theories such as string theory and when special relativity led to the twin-paradox ?

My explanation is this. If you have premises that (you think) *are* absolutely correct then (you believe that) the consequences are correct, as long as you correctly build on those premises. The consequences are correct even if they appear to be counterintuitive, illogical or unnatural.

Physicists today believe that the premises, that is the foundational concepts, in modern physics are absolutely correct. After decades of building on those premises, however, they have reached a stage where they have begun to question the consequences of those premises (postulates). Since they believe that modern physics (for example, relativity) is based on a rock-solid foundation, they think that the problem arose not because of a problem in the foundations but perhaps because of a problem on how they built on those premises. They never question the foundation.

If you believe that your premises are absolutely correct you will continue to build on them even if this leads to apparently illogical, counter-intuitive and unnatural predictions, until you wake up and realize that you have come a long way in the wrong direction, at which point you turn to and question the premises. Physicists, believing that the foundational concepts such as the two postulates of relativity and the equivalence principle are absolutely correct, have come a long way in the wrong direction but have not woken up yet.

Why have physicists failed to question the foundational concepts in modern physics ? Because they could find no cracks in those foundational concepts. If we consider the two postulates of

relativity, for example, they are based on a firm experimental and logical foundation. The principle of relativity has been proved by the Michelson-Morley experiment. The principle of relativity is also implicit in Newton's laws of motion and gravitation, which were and still are highly successful in predicting and explaining planetary orbits, for example. Newton's laws have enabled the design of countless machinery and has enabled humans to reach the moon. The fact that the ether hypothesis led to several conceptual problems is also a logical evidence for the theory of relativity.

In spite of all the confidence in the relativity principle, however, a few anomalies remained. One of these is the fact that Newtonian mechanics could not completely account for the perihelion advance of planet Mercury. Another is the apparent small fringe shifts observed in the Michelson-Morley experiments.

However, the small fringe shifts observed in the conventional Michelson-Morley experiments, such as in the Miller experiments, could be attributed to experimental error. One argument supporting this view is that the Michelson-Morley experiment should have given the *expected* fringe shift if the ether existed, which was *at least* 0.04 fringes in the 1881 Michelson experiment and 0.4 fringes in the 1887 Michelson-Morley experiment. These were based on the known speed of the Earth in its orbit around the Sun which is 30 Km/s. The fact that the solar system itself is in motion in the galaxy (or in space), at about 390 km/s, which would cause much larger fringe shifts, gave further reason to interpret those small fringe shifts as null. But there is another evidence that reinforces and justifies this interpretation: the modern Michelson-Morley experiments which are based on optical cavity resonators gave complete null result.

The second postulate has been confirmed unambiguously in several experiments and observations[1]. The second postulate says that the speed of light in vacuum is constant c independent of source velocity. It has been confirmed by terrestrial moving source experiments, such as the Q. Majorana 1918 ? experiment and the 'positron annihilation in flight' experiment. De Sitter's binary star experiment is also one of the astronomical evidences. No one, except proponents of emission theory, which has been almost completely abandoned today, questions that the speed of light is independent of the velocity of the source.

Einstein derived the special theory of relativity and the Lorentz transformation equations based on these two postulates. The two postulates are the pillars of SRT. The constancy of the speed of light in all inertial reference frames, that is the constancy of the speed of light relative to all inertial observers, is a consequence of the two postulates. Thus, it is the correctness of the two postulates that always gave Einstein confidence in his special theory of relativity. No cracks could be found in the foundations and no flaws could be found in the derivation leading to relativity of space and relativity of simultaneity, which always gave assurance that special relativity is a correct theory of nature. One can imagine that whenever Einstein was faced with logical or experimental threats to his special relativity theory, he would always return to its foundations and would find no cracks, which reassured him that his theory was safe. This is how

and why it has always been believed by mainstream physicists that the special theory of relativity is based on a 'rock-solid' foundation.

It should be mentioned that many people believe in the two postulates, but have difficulty accepting their consequences such as the constancy of the speed of light relative to all inertial observers and relativity of length and simultaneity. Many people accept the first postulate because, as mentioned above, it is supported by logical and experimental evidences. The second postulate also is accepted almost universally, except by the few proponents of emission theory as mentioned above. Many researchers feel that that there is something wrong with the theory of relativity but no one can point out where exactly the mistake is.

However, Einstein also realized that the special relativity theory, despite its flawless construction, had serious limitations, one of which concerned Newtonian gravitation. Newton's law of gravitation implied instantaneous action at a distance gravitational interaction. This destroyed the causality structure of special relativity, which didn't allow superluminal transmission of information. Thus, Einstein, instead of abandoning his special relativity theory, searched a way to modify Newton's law of gravitation. In this effort, he gained a beautiful insight: the equivalence principle. The equivalence principle and the four dimensional space-time view led to general theory of relativity (GTR). According to GTR gravity is not a force as viewed by Newton. It is caused by warping of the four dimensional space-time caused by massive objects such as the Earth and the Sun. Einstein's equivalence principle appeared to be self-evident because it solved the long standing problem: why are inertial and gravitational masses equal ?

Thus, one can see that confidence in the two postulates created confidence in special relativity and confidence in special relativity and in the equivalence principle created confidence in general relativity. The theory of relativity (the special and the general) seemed to be a beautiful and seamless construction based on a few premises: the two postulates and the equivalence principle. Also Minkowski's four dimensional space-time view of special relativity played a key role. How could such a beautiful theory be wrong ?

Thus, even in the face of apparent logical and experimental counter evidences today, the scientific community is stuck with the theory of relativity. Many of those experiments and arguments contradicting relativity are ignored, and those which are recognized by mainstream (such as, for example, dark matter) are interpreted as showing a possible incompleteness, not a complete failure, of the theory.

However, here we point out that the experimental and observational basis of general relativity is not as firm as that of special relativity. For example, Eddington's 1919 gravitational deflection of light experiment has long been highly criticized. Also the explanation of Mercury perihelion advance and GPS gravitational time dilation are being criticized by experts. Many consider it a

failure of general relativity the need to invoke dark matter and dark energy to explain some observed astronomical phenomena.

Why then has the physics community failed to question Einstein's relativity theory ? It is because the theory of relativity is based not only experimental and observational evidences. It is based on another kind of 'evidence' and that is 'beauty'.

One can say that the apparent beauty of the relativity theory and its philosophical implications have played a key role in its continued acceptance in the face of increasing number of logical and experimental counter evidences. In fact one can say that the theory of relativity is being accepted mainly because it is considered beautiful and self-evident. However, the curious confirmation of some of its predictions have also played a key role. Some of these are the Ives-Stilwell experiment, the Fizeau experiment and the limiting light speed experiments. But the role of physical experiments in the theory of relativity seems to be mainly to reinforce the view that relativity is a beautiful and self-evident theory.

Our discussion so far has been mainly from the perspective of the supporters of the theory of relativity. We have not raised many of the experiments some of which directly contradict the theory of relativity and other experiments that may or may not be seen as contradicting relativity, but to which relativity has basically nothing to say, such as the Sagnac effect. To this day, more than one hundred years after Einstein's 1905 paper, the Sagnac effect remains to be one of the insurmountable problems to the theory of relativity. There are also experiments that directly disprove the very principle of relativity, such as the small and consistent fringe shifts observed in the Miller experiments, which always pointed consistently in the same direction in space. The scientific community just managed to suppress and ignore the Miller experiments when in 1976 Stephan Marinov unambiguously detected Earth's absolute velocity to first order, based on a novel time of flight method . Then followed the Ernest Silvertooth first order experiment of 1986 which should have been, in combination with the NASA CMBR experiment, the final blow to relativity. The Silvertooth and the NASA CMBR experiments used completely different methods but gave almost the same magnitude and direction of Earth's absolute velocity.

On the face of it the second postulate, which says that the speed of light is independent of the velocity of the source (as formulated in Einstein's 1905 paper), is an experimentally established fact which no one questions today. However, there is a subtlety to the second postulate: 'velocity of the source' relative to what? In Wikipedia article [3] the second postulate has been restated as:

As measured in any inertial frame of reference, light is always propagated in empty space with a definite velocity c that is independent of the state of motion of the emitting body.

This restatement of the second postulate will change our previous conclusion that it is an experimentally established fact. No experiment has been performed and confirmed that the speed of light is constant in *all* inertial reference frames independent of source velocity in that frame.

What has been confirmed is that the speed of light is independent of source (absolute) velocity. Regarding the independence (or dependence) of the speed of light from the motion of the observer, there is no direct experimental evidence to this date.

There are also several experiments contradicting many of the predictions of special relativity. For example, a recent experiment [2] has apparently disproved SRT's constancy of the speed of light. In another experiment[3], SRT's assertion that no information can travel faster than the speed of light has been disproved. Many experimental and observational evidences are known today that contradict the theory of relativity, not to mention the countless arguments being raised on the internal inconsistency of the theory, including the twin paradox.

We conclude that both postulates of relativity have been disproved experimentally. The principle of relativity has been disproved because absolute motion has been detected in multiple experiments. Regarding the constancy of the speed of light in *all* inertial reference frames, this is not supported by experimental evidence. On the contrary, there are experiments that apparently disprove it. Existence of absolute motion also implies invalidity of Einstein's equivalence principle which states that there is no way of distinguishing between acceleration in free space and gravitation.

The question arises: why have all these experimental and logical evidences failed to convince the scientific community to abandon the theory of relativity? I think one explanation is the same reason we discussed already: the apparent seamless and beautiful construction of the theory based only on a few premises, and the apparent experimental and logical basis of those premises. Some of those premises are the two postulates and the equivalence principle.

However, the main reason is the lack of a competing alternative theory of (absolute) motion and the speed of light. Many researchers have pointed out contradictions in the theory of relativity, proposing the abandonment of one or both of the two postulates, for example. But no compelling alternative explanation to the long standing problem of motion and the speed of light has emerged. Many researchers propose the old ether hypothesis or different versions of it, which are known to have failed all experimental and conceptual tests. One hundred years after the supposed revolution in physics, the scientific community has no idea about a replacement theory even if it decided to discard relativity!

Perhaps the only way to abandon relativity is to create a new alternative model of the speed of light that can explain all light speed experiments and observations in a compelling way. Such a new theory not only provides explanation of phenomena but also sheds light on the cracks in the foundation of relativity. Only after the mystery of the speed of light is revealed is it possible to locate the extremely subtle cracks in the foundation of the relativity theory. I have already proposed a new theory (Apparent Source Theory) of motion and the speed of light. Apparent Source Theory not only successfully explains many of the light speed experiments but also sheds light on the foundations of the theory of relativity, revealing the cracks in it.

Apparent Source Theory: A simple solution to a complex problem

Physics has long run into a complex problem: dark matter, dark energy, black holes, string theory, multiverse . . . But complex problems do not necessarily need complex solutions. Losing sight of a simple, subtle solution can lead to such situation. Much of the current problems in physics originated with the 1887 Michelson-Morley (MM) experiment ‘null’ result. I have proposed a simple yet subtle theory [1] [5] that can explain not only the Michelson-Morley experiment, but also the Sagnac effect, stellar aberration, the Silvertooth experiment, and many others.

Concerning the Michelson-Morley experiment, Apparent Source Theory is stated as follows:

For co-moving light source and observer, the effect of absolute motion is just to create an apparent change in position of the source relative to the observer. Such an apparent change of source position is equivalent to an actual change in source position which will create only a small fringe shift (and a null fringe shift for some particular orientations).

Relative to the detector, the effect of absolute motion is just to create an apparent change in the position of the light source. Such apparent change of source position creates only a small fringe shift (or no fringe shift for some orientations of the MM apparatus relative to the direction of absolute velocity) *as if* it is an actual change of source position. Apparent Source Theory not only predicts the small fringe shifts observed in the Miller experiments but also the complete null results in modern Michelson-Morley experiments using optical cavity resonators.

This is the simple yet subtle idea that eluded physicists for decades and centuries.

According to Apparent Source Theory:

1. The principle of relativity is wrong; absolute motion exists.
2. The postulate of constancy of light is wrong as stated and understood in special relativity.
3. The whole concept of reference frames is fundamentally wrong [4].

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