The Case for the Aether and its Implications in Physics

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The existence of aether (ether) was considered real until the first couple decades of the 20th century. It is simply a misconception today that the notion of aether was abandoned after the negative result of the famous Michelson-Morley (M-M) experiment or that it was abandoned later by the development of the theory of relativity. Starting first by relativists and followed by quantum theorists, the inclination was to deny the existence of the aether. If however, the aether exists as the founders of physics theories and relativity believed, its impact on the shape of physics theories like quantum mechanics and gravity, or its impact on the nature of the universe would be immeasurable. So this paper will be devoted to scrutinize certain indirect evidence, which when logically examined point to the existence of the aether or point to a non-empty vacuum of space.

Introduction

In the field of physics the existence of aether is denied and the prevailing assumption is that the vacuum of space is empty[i]. However, the founders of relativity like Einstein, Lorentz, Poincaré, Edington and others were strong proponents of the aether. For instance, a not so well known statement made by Einstein in his May 5, 1920 University of Leiden address states the following: "*According to the general theory of relativity space without ether is unthinkable; for in such space there not only would be no propagation of light, but also no possibility of existence for standards of space and time (measuring-rods and clocks), nor therefore any space-time in the physical sense.*"

Latter relativists and quantum physicists denied the notion of aether primarily because the aether is not observable or tangible, and they could not attach to it substantiality. The error of this omission during the early part of the 20th century was compounded by the assertion that whether aether exists, it plays no role or its inclusion is not necessary in the formulation of physics theories. This assertion, however, is vastly wrong as will be elucidated in this paper. Eventually, the notion of the aether was completely abandoned to the point that it was treated as nonsensical.

A physics field without aether lays a foundation that gives rise to concepts that are often hard to reconcile with reason or logic. For instance, the concept of fictitious forces, which have real manifestations and yet, without causality or corporeality, transmission of gravitational forces restricted by the speed of light yet, the Sun attracts planets at its instantaneous position in the sky, expansion of the universe due to space-time expansion while the space-time is empty, universal constants that also have no causality and are rendered absolutes of nature. Even such mathematical notions as the so called spontaneous symmetry breaking concept are at the core hypothetical and are not actually grounded on reality. In fact, some physicists argue that reality is the very mathematics that describes such concepts.

During the late 19th century, experiments were conducted by Michelson and Morley (M-M) and repeated later by others to examine if the speed of light varies in different directions on the surface of the earth (i.e., north, east, west and south), Ref. [ii]. A positive result would have provided the proof that aether exists and that the Earth has a certain velocity with respect to the aether. The M-M test as well as subsequent tests showed no such variation with the speed of light, which is considered today as the pivotal experiment in regards to the existence of the aether. This is despite the fact that physicists like Einstein, Eddington, Poincare, Lonenz, Jeans and others considered the aether indispensable or the actual media responsible for the transmission of light.

The M-M type experimental results, however, did not seriously consider the possibility that the aether may be endowed with special non-fluidic properties, which make it a stationary aether. Stationary alludes to the idea that the aether is somehow tightly coupled to mass and there is no relative motion between aether and mass. A stationary aether also means that the aether is not directly observable. It's worth noting that if aether exists, a stationary aether is the only possibility according to investigations and conclusions reached around the end of the 19th century about the *aberration of light*, Ref. [iii].

Einstein chose to move forward with the theory of relativity and *Special Theory of Relativity* (STR), bypassing the aether, since he could not attribute to it tangible qualities, which he could incorporate into the theory. In this process he created the concept of the *geometric space-time*. Even though, Einstein's intensions were not to promote the abandonment of the aether, the development of his abstract theory of the geometric space-time contributed to it. Consequently, this gave rise to a new era of thought experiments and abstract concepts.

Nevertheless, so much evidence, some of which will be covered in this paper, point to the fact that the aether is real. If

the aether is indeed real, its absence in physics theories creates a barrier by which the scientific space of knowledge is artificially constrained. This artificial constraint of knowledge which is created, and attempts to bridge over it, brings forth elusive theories and mathematical abstracts. Moreover, the lack or the diminutive logic exhibited in some of these ideas bears little resemblance to the beauty and simplicity of nature, and in itself, should become a clue that something is awry.

It is one thing to come up with thought experiments and abstracts of how nature should behave, but it's altogether different as to whether nature indeed, behaves that way. Take for instance the concept of *all possible histories and parallel universes* or *multiverse*, which both defies logic and has zero proof. So to a good extent, today's physics theories are built from assumptions or empirically constructed behaviors. Such behaviors, like that of the *Standard Model* (SM) of particle physics[iv], may provide some of the right answers, but that doesn't necessarily mean that the foundation of these theories is sound.

Arguably, the accuracy of such models of nature is verified by their predictions. Yet, verified predictions should not necessarily be a sufficient proof of theory validity. This is true especially for cases where equations or theories have been devised to fit experimental data or for instance, if predictions or trends are specifically interpreted in a way that fits the narrative of the theory.

The works described in Refs. [v] & [vi] were based on the scientific explanation of a phenomenon that involves gravity, which gave rise to *the continuum theory*. As it turns out, central to this theory is the aether, which permeates the vacuum of space. The theory describes the mechanics for the speed of light and also explains the fundamental "tick of time". Moreover, it provides a formulation for the gravitational constant. In this theory there are no absolutes, whereby the foundation of nature is the luminiferous aether. The purpose of this paper, however, is to forgo the mathematics and built the case for the aether strictly based on logic weighted by evidence. Thus the aim in this paper is to shed light as to why the foundation that gives rise to physics theories to date is flawed.

Fictitious Forces and the Aether

The assumed fictitious forces, like the inertial force, $\boldsymbol{F} = m\boldsymbol{a}$, are forces that have real manifestations and yet, without causality. This notion of forces with no causality or corporeality is counterintuitive to everything that we come to understand about nature. As we grow-up observing nature, whether through plants or animals, rock formations, water bodies, or weather conditions, we come to the realization that every question about nature has a rational answer. That is always true, despite the fact that some questions are more elusive than others and much harder to resolve. So when one is first introduced to the inertial or the fictitious force, $\boldsymbol{F} = m\boldsymbol{a}$, questions may arise as to why this concept does not fit the pattern we have grown to recognize about the workings of nature. Whether this notion about fictitious forces is just an isolated exception, or whether something fundamentally is missing about our understanding of nature.

We know that the inertial force, $\boldsymbol{F} = m\boldsymbol{a}$, is the same everywhere - independent of locality. That is, given a certain mass this force is the same whether the mass accelerates on Earth, on the Moon, or even on the surface of the Sun whose gravity is much greater. Moreover, this force is the same even if the mass is situated deep inside the vacuum of space – far away from any celestial bodies. Because this force is the same in vacuum as well as on any space body, it's logical to assume that this force originates from the vacuum of space. If the vacuum of space is indeed empty, as contemporary physics theories have entertained for approximately one hundred years, this force then must be absolute (like divine) or as currently labeled "fictitious."

Even if we remotely consider the possibility that the vacuum of space is not empty, or that an unknown aether exists in vacuum (despite the negative result of the M-M experiments), then it is certainly worth further pursuit of this investigation. This is again because the implications of the aether to physics and science in general are vast. Since in such case, the so called fictitious forces will no longer be fictitious and instead, they will be due to physical mechanisms. This includes a whole host of things that the existence of aether can explain, some of which will be covered later. For example, imagine that in such a case there will be a "cause and effect," absoluteness in nature will become obsolete, and nature will be harmoniously restored back to its prior glory of "corporeality." So if aether occupies the vacuum of space, many of the physics concepts that we take today for granted will need to be substantially revised.

Expanding Universe and the Aether

Let's imagine that an observer positioned somewhere in space is observing the Earth going by, wanting to calculate the velocity by which the Earth travels in space. What would be an estimate of this velocity? Well, to answer this question a little more information is needed about the reference point of the observer. For instance, if the observer is stationary with respect to our solar system or the Sun, the observer is calculating the orbital velocity of Earth. On the other hand, if the observer is stationary with respect to our galaxy, he/she is computing the orbital velocity of our solar system as it travels around the Milky Way galaxy, and so on.

Say, however, that the observer is stationary with respect to a reference point situated outside the boundaries of our universe, and say that somehow he/she can still observe the Earth. What would be an estimate of Earth's velocity observed in this situation? In this extreme case the observer will be computing a velocity that is several times the speed of light. This is because it is a known fact that the visible Universe is approximately 93 billion light years across. So the Universe during its time of existence, approximately 13.8 billion years, has expanded with a radius of approximately 47 billion light years relative to Earth. This is without counting the radius of the whole universe, which we can't observe, and also without counting its accelerating rate of expansion. Thus, an estimated velocity for Earth or for the expansion of the Universe for this observer will be at least four times the speed of light.

If the Earth travels with such a vast speed with respect to the extended cosmos, the obvious question is "does this velocity violate the speed of light?" The answer of course, is no! The reason that the speed of light seemingly is exceeded in this case is because here space itself is expending, or if you will the space-time is expanding. So this expansion transports the Earth and the rest of the bodies in the Universe. The expansion of the universe is much like a water flow in an ocean that flows in more than just a single direction, with distances between say, dust particles that float on the water surface increasing over time. While such particles on their own, have no relative velocity with respect to each other.

This expansion of space or space-time brings forward an interesting question: since space is empty according today's physics theory, how is empty space (i.e., vacuum, nothing, or zero in mathematical terms) able to expand? Obviously it can't! No matter by how much nothing or zero is expanded, even multiplying zero by infinity, the answer will still be zero.

Lately, it is hypothesized that a *dark energy* permeates space, which is responsible for this expansion. However, if we accept the notion of dark energy, we have no choice but to accept the aether. Is this the old aether in new clothing? If so, a dark energy cannot exist in the vacuum of space while at the same time the vacuum of space is empty.

In fact, the cosmological constant problem is the greatest discrepancy in physics between observations and theory. While the observed vacuum energy is very small (a few meV)^4, the Higgs field's contribution to the vacuum energy density is in the order of 10^8 (GeV)^4 or 54 orders of magnitude larger, Ref. [vii]. Moreover, a nonzero vacuum value for the Higgs field implies a uniform energy density of the vacuum that seems incompatible with observations and the SM. The vacuum energy or the cosmological constant problem must be an important clue that something is seriously wrong with our current understanding of physics theory. On the other hand, if a stationary aether exists, then the vacuum energy can be vastly high, while at the same time direct observations will still register a very low energy value. In Refs. [v] and [vi] a stationary aether is theorized and the universe expansion is the result of a high density 4-dimensional electric scalar potential bubble of the universe expanding into lower density surroundings.

If we accept the notion of an expanding universe, which is a proven fact, or if we accept the notion of dark energy, then we also have no choice but to accept the notion that the vacuum of space is not empty. This is without even considering the supposition of virtual particles flickering in and out of existence in the vacuum of space. Thus, the universe expansion is a rational proof in itself, or it leads to a rational conclusion that brings forth the existence of aether. This conclusion is based on sheer evidentiary logic. As discussed before, one can imagine the implications that such a conclusion has, not just on fictitious forces, but also for the absoluteness of the speed of light and for other cosmological constants. This means that our physics theories need to be revisited in regards to fictitious forces, gravity, as well as with respect to quantum mechanics.

Speed of Light and the Aether

The speed of light in vacuum is 299,792,458 m/s and the uncertainty of light speed is 4 parts per billion. Officially, the length of a meter is computed by the distance light travels in 1/299,792,458 s. This precise speed is because the length of the meter itself is computed based on the speed of light. Besides measurement uncertainty, however, there is no detectable statistical variation around this speed. Moreover, the speed of light is considered to be an absolute; belonging to the group of cosmological constants. A question that can be asked here is "why is the speed of light or for that matter, the value of all universal constants absolute?"

If the vacuum of space is indeed empty, then we have no choice but to accept this notion of absoluteness. That's because in such a case there would be nothing in the vacuum, which could potentially be responsible for changing the speed of light or the values of other cosmological constants. However, the notion of absoluteness has certain strong connotations; arguably of supernatural qualities. For cosmological constants to become absolute, either there must have been "something" that occurred prior or at the instant of the big bang that set their values – perhaps pure coincidence, or there was some divine intervention.

For pure coincidence to be the case that set the speed of light as well as the values of other cosmological constants, this means that a plethora of cosmological constants and moreover, a plethora of particles suddenly and critically came into

existence by chance to produce the nature we know of. However, because of the number of quantum particles and cosmological constants, etc., the probability of coincidence would have been an infinitesimally small probability. So if one considers that absoluteness is indeed fundamental to nature, they must also consider "divine intervention" as the prevailing explanation. I do believe in divine powers. But it's difficult to imagine that God would be revealing his presence through the absoluteness of cosmological constants. There may be other possibilities, like those entertained by proponents of the *anthropic principle* or concepts like the *holographic universe* and the mathematics which describe the universe, which is considered by some as the only reality. However, such alternatives for explaining the nature of the universe or the absoluteness of cosmological constants are characterized here as nonsensical.

If the vacuum of space is not empty or if aether exists, absoluteness for cosmological constants could be done away with. This will open the field of physics to investigate the origins or the mechanics of these parameters, which can then be derived from the properties of the aether.[v,vi] With aether filling the vacuum, we can redefine fictitious forces, we would not need to grapple with notions of absoluteness, or we will not need to deal with the paradoxes that come about with such notions. Moreover, the fact that the speed of light or the values of these cosmological constants are exact, with no known statistical variation, points to an aether with certain exact properties which drives the values of these constants.

If a source at rest switches on a beam of light, a photon of light in that beam starting at rest, instantly arrives at light speed with no time delay. If a source in motion with velocity v projects a beam of light, the velocity of light emanating from this source will be at c (the speed of light), rather than at velocity of $v+c$. In both cases, this behavior of light is somewhat counterintuitive. However, it is a known fact that the speed of light is independent of the motion of the source and of the inertial frame of reference of the observer. This invariance of the speed of light was postulated by Einstein in 1905.

A question that can be raised here is why light behaves this way. Discounting absoluteness for now, the question is what can possibly force light photons to instantly go from rest to light speed, and also photons emitted from a source in motion to instantly transfer to light speed, independently of the speed of the source. If aether exists, are there any possible qualities that such a media can possess that can make both of these behaviors occur at the same time? The answer is yes; if the aether has a resonance and if the aether is such that this resonance or the peaks of the resonance attract photons, then photons could instantly adjust their speed to the frequency and wavelength of this resonance, independently of the motion of the source – see Ref. [vi]. It's worth noting that Nikola Tesla in his 1892 London I.E.E. lecture said the following: "*…and my conviction has grown strong that, to whatever kind of motion light may be due, it is produced by tremendous electrostatic stresses vibrating with extreme rapidity*."

Based on these evidences, one could reasonably conclude that the speed of light as well as the values of other cosmological constants point to the existence of an aether permeating the vacuum. The theory described in Refs. [v] & [vi] identifies a stationary aether with certain properties, which so far defines mechanics for the speed of light, for the permittivity of free space, for the gravitational constant, for gravitational acceleration, for the fundamental tick of time, and the mechanics for the *equivalence principle*.

Gravity and the Aether

Even though, formulations which explicitly relate gravity with aether properties have been described in detail in Ref. [v], this section covers the connection of gravity with the aether based on pure reasoning or logic deduction. The assumption in physics is that gravity is transmitted by force transmitting particles called gravitons. This assumption has survived for so long and repeated to the extent that is accepted without questioning. Despite the fact, that there is no direct evidence of the existence of gravitons.

If gravity is transmitted by gravitons, it is arguably a mystery how exactly these particles communicate gravitational force to other objects or how exactly this force is activated by this communication. In lack of better terms, how do gravitons know where to go, and how do they know what to do; do they travel in straight lines or based on the curvature of space? One can think of some more questions about how gravitons behave. It will be hard to reconcile most of these questions without again resorting to things like absoluteness or divine intervention.

According to current physics theory, gravitons travel with the speed of light. As everything else in nature, supposedly even gravitons obey the speed of light limit. Yet, we know for a fact that the Sun attracts the planets at its instantaneous positon in the sky. For instance, the Sun attracts the Earth at its instantaneous position and not at the position of the Sun approximately 8 minutes ago; the light distance separation of these two bodies.

So the question here is how the speed of gravity can be limited by the speed of light yet, gravity is transmitted seemingly instantaneously. The most acceptable short answer by physicists is that the Sun's gravitational field is static. That is, no changes travel in the gravitational field, and as such the entire gravitational field moves as a single entity. Based on

that, the assumption is that if some unknown force were to accelerate the Sun, this would introduce a change in the Sun's gravitational field and this particular change will arrive at Earth 8 minutes later.

If this is how gravity works in relation to planetary dynamics, then the job of gravitons gets to be even more complicated. This would be as gravitons under these circumstances need to differentiate and communicate changes to Sun's position due to its normal path in the sky vs. say that of a large impact which generates acceleration and changes the Sun's path. Moreover, under the static gravitational field assumption, gravitons would need to differentiate between normal acceleration due to the Sun's movement in space vs. that caused by say, an impact of a foreign body colliding with the Sun. While such momentum change caused by the Sun's orbital path in the galaxy is quite small or negligible, the momentum change or acceleration caused by the co-orbital path of two large bodies in close proximity would be much more significant and cannot be ignored.

However, even this latter effect is explained by physicists as anticipation of future position. Are we to believe that gravitons or gravity in general can somehow anticipate and recognize or communicate future positions of celestial bodies? This makes the job of gravitons even more challenging and arguments about their existence even more complicated, even to the point of being bizarre! Moreover, if somehow anticipation of future position in regards to gravity were to be believed, how then would binary pulsars anticipate each other's future position, velocity, and acceleration faster than the light time between them would allow?

Such questions about the existence of gravitons (or bosons in general), which are all force transmitting particles, could also open up inquiries into questioning the transmission of the electroweak force, and even transmission of the strong nuclear force along with questioning the entire field of chromodynamics.

Notwithstanding, these questions about gravitons, the transmission of gravity by gravitons vs. that of a pure scalar type field or gravitational forces generated due to the abstract STR concept of the geometric space-time, these are still open questions that have not been settled. It is however, a known fact that gravity behaves similarly to electrostatic forces, which arguably are transmitted instantaneously. Alternatively or as physicists would say, electrostatic forces like gravity propagate as a single entity or in a static fashion. In any case, gravitational and electrostatic fields have much in common and this is not purely coincidental, as gravity itself is a certain form of an electrostatic field according to the continuum theory, see Ref. [v].

If gravity was purely due to a field, in the absence of gravitons or the geometric space-time, many of these unresolved questions could be settled. In that case, aether in the vacuum of space would be the vehicle from which this field of gravity originates. Such a scalar field of gravity would do away with the seemingly magical powers of gravitons, or the conundrums associated with the propagation of the speed of gravity. Even though, the argument here is that gravity is transmitted instantaneously or at least 10,000 times the speed of light (based on the findings that satisfy orbital stability of the solar system), the velocity of light would still be the limit for mass. Not because mass goes to infinity as velocity approaches light speed, but rather because the efficiency of transferring energy to a mass in order to accelerate it, precipitously falls to zero as velocity approaches the speed of light, see Ref. [vi]. Therefore, it will take infinite energy to accelerate a mass to light speed, as the fundamental tick of time ceases at light velocity.[vi] This is due to the properties of the aether and its coupling mechanism with constituents of mass or energy at Planck length scales.

Note however, that for most physicists, questions such as those raised here about gravitons are not questions at all, as they have a way of overlooking facts and make their way forward in defense of STR and quantum particle theories.

The Standard Model and the Aether

The SM[iv] of particle physics is so complex that only a handful of physicists around the world are either recognized or claim to fully understand its details. Thus, this section will not make any attempt to explain the details of this model as this is beyond the scope of the paper and admittedly even beyond the faculties of the author. However, the attempt here will be to briefly describe the bases of its origins and its potential shortcomings, and how this model may or may not be related to the vacuum of space or the aether.

The SM describes three out of the four fundamental forces. That is, all except gravity, and also classifies all known elementary particles. The SM has been developed in stages during the latter part of the 20th century as newly discovered particles were added to the model, including the latest particle – the Higgs boson. The model has predicted the existence of particles like the W and Z boson, which were experimentally confirmed. However, the SM does not fully explain certain particle behaviors and besides gravity, the SM cannot explain the expansion of the universe or the existence of dark energy and dark matter.

More importantly, the SM all together includes 26 free parameters that have been experimentally determined, some of which are cosmological constants. Based on that, one could arrive at the conclusion that the SM is just an empirical model

of nature. Assuming, however, that the vacuum of space is empty, the SM will be both an empirical model and a fundamental physics model at the same time. This is because a model that is developed to provide a best fit of experimental data is by default an "empirical model." However, if the vacuum is empty, there can be no mechanics that can describe these free parameters. That is, in such case these free parameters would be absolute and the SM also by default becomes a fundamental physics based model of nature.

On the other hand, if we entertain the possibility that the vacuum is not empty, then the SM will be just an empirical or behavioral model of nature. If the SM is purely an empirical model, the question then is how can we consolidate the fact that this model has also been used to make verifiable predictions? The first thing to consider here is the assumptions under which those predictions were made, like the predictions of the existence of particles like the W, Z, and the Higgs bosons.

It has been generally theorized that if high energy particle collisions indicate boson activity or if the collision products combine to produce particles whose existence are even very short lived (e.g. half-life of about 3×10^{-25} s for the W and Z boson), the theory is that such events must signify the existence of fundamental particles. Moreover, it is theorized that such particles would be abundantly stable at different temperature regimes. If the vacuum of space is empty, then there could be no other explanation for such observations. On the other hand, if the vacuum is not empty, different potential justifications may exist for such particle phenomena. For instance, if certain energy like aether exists in vacuum, the observed particle like behavior could just be due to harmonic or subharmonic frequencies of this energy field and its coupling mechanisms with ordinary particles, which perhaps momentarily favors recombination of the collision products. Then, it is possible that the force phenomenon that has been observed via the so called *weak neutral currents*[viii] and the supposed exchange of a Z boson for instance (evidence of weak force), may have been misinterpreted.

The Higgs boson, which implies a uniform energy expectation of the vacuum or the cosmological constant problem that was mentioned before are additional discrepancies for the SM. Even seemingly some inconsequential model properties further point to theory shortcomings. For example, the proton electron charge balance to within an astonishing degree of $< 10^{-21}$, while in the SM there is no link between quarks and leptons.

Radioactive decay is attributed to the weak force. Based on the continuum theory, Ref. [vi], however, radioactive decay will be instead due to fundamental electromagnetic interactions initiated at Plank length scales. These interactions are the outcome of resonant coupling between the aether and matter or energy constituents, Ref. [vi].

Generally speaking, additional issues can arise with model predictions such as knowing the experimental answers and working backwards to make predictions, slightly changing the standards for predictions so that it is no longer a case of searching for the proverbial "needled in the haystack," or conveniently overlooking unsupportive or contradicting evidence or data. Historically, the SM has been developed from experimental observations. So while some its predictions may closely agree with experimental observations when scrutinized from a micro point of view, this may not turn out to be the case when the whole history of the model evolution is scrutinized in detail.

Model predictions and the experimental proof required for the existence of short lived fermions or bosons is wholly and unequivocally predicated on the notion that the vacuum is empty. But if the vacuum is not empty or if aether exists as evidence shows, assumptions about experimentally verifying the existence of particles can certainly fall apart and so is a large part of particle physics or quantum mechanics. Despite all that, the sheer number of free parameters utilized in the SM and the absoluteness of these parameters should at the very least raise the question as to whether the very foundation of the SM should be reexamined.

The famous physicist Stephen Hawking said the following in one of his books, Physics today has become so specialized that any future advancement can only be made by specialists in the field. Considering, however, the doctrinaire in this field or the scientific pressure to march to the same tune, any substantial breakthrough in the future is more likely to come from outside the field.

Additional Evidence in Support of the Aether

By no means is this paper meant to be encompassing in terms of providing elucidating evidence in support of the existence of aether. A publication that the reader may resort to for further evidence in consideration for the existence of aether, is Ref. [ix]. This reference claims evidence for experimentally producing large quantities of hydrogen gas from vacuum, and also explains other observed physical phenomena in support of aether.

In general, a plethora of evidence in support of aether can be found as long as one is reluctant to readily accept abstract mathematical concepts and remains keen about questioning existing theory assumptions.

Conclusion

This paper covered some evidence that lead to the conclusion that a luminiferous aether permeates the vacuum of space. The existence of aether was supported by all the well-known physicists up until the early part of the 20th century. Denied or abandon afterwards by latter physicists, mostly for convenience, for not having to deal with a substance that is not observable. As was discussed in the paper, the absence of the aether in modern or quantum physics is not just a superficial matter. Instead, the very bases of our theories and models, like the standard model or the theory of relativity, need to fundamentally change due to aether. The aether also changes the fictitious forces, for they will possess causality. It should also remove absoluteness from universal constants or remove the need for free parameters. As the speed of light for instance, should now be due to definable mechanics. The four fundamental forces will no longer be fundamental with the existence of the aether. The only influence or substance fundamental in nature will be the aether itself, out of which all physical existences come into being. In conclusion, the aether is real and the role the aether should play in our understanding of the laws of nature will be profound. In this regard, some of the deepest notions in physics today can be characterized as mirage; when the figure of inquisitiveness is poked deep inside it, a void will be found.

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