

# Resolving the Unknown Universe

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3<sup>rd</sup> April, 2020

## 1. Introduction

No one knew most of what exists around us, where we live, how it works, until it was directly explored; continents, islands, the sciences, and so on. To present a theory of the cosmos therefore with 95% of the data missing (DE, DM), and to then explore it, it is certainly consistent with how things have worked historically, yet is it ideal? If a model of the cosmos, a theory, that uses all the data that is real and verifiable in this local reality of ours, was presented, one which also provides new insights to things such as quantum gravity in our local reality, isn't that still a step in a better direction than what currently inspires, than the current big bang (BB) theory? Or, is the idea that the cosmos should represent a type of mirror to our own local reality fallacious as a process of logic, is the principle of relativity itself wrong? Should clear omissions of understanding be acceptable? Must the current undecidability, uncomputability, and unpredictability of cosmology and associated physics theory be upheld?

## 2. Cosmological axioms of theoretical physics

To explain the current logos of modern cosmology theory requires one to think on a number of different fronts of opinion and conjecture. For instance:

- Although physics theory aims to uphold the *principle* of relativity, how does it become to physics theory to propose a model for cosmology that bears no reference to the structure of our local reality? Specifically, why would cosmology propose ideas beyond the scope of our local reality, by proposing concepts such as DM and DE, and the associated metric expansion of space (not measured locally), such that 95% of the ingredients of modern cosmology (DM and DE) are absent from our local reality?
- Should not a model of cosmology propose features co-existing in our local reality, and ideally therefore propose solutions to our local reality yet to be solved, such as quantum gravity (QG)?
- On top of this, why is cosmology theory unable to account for five fundamental issues that contradict DE and DM, general relativity (GR), and the metric expansion of space, namely:

- (I) The **Horizon Problem** [1]: photons have the same uniform temperature, regardless of distance, roughly 2.725 degrees Kelvin.
- (II) The **Flatness Problem** [2]: nearly all the evidence collected by cosmologists indicates that the Universe is flat, as though spacetime shows almost no curvature whatsoever, an extremely unlikely thing in the context of a required BB.
- (III) The **Monopole Problem** [3]: the enormous energies that would have been produced by the Big Bang should have created a magnetic particle as a monopole, not a dipole, a unique entity, and yet there is no evidence for it.
- (IV) The **Hubble Constant Problem** [4]: the difference in  $H_0$  determinations has surpassed 5 sigma.
- (V) The **Cosmological Constant Problem** [5]: that the amount of energy required for the BB to have taken place is off the scale compared to the calculated background energy, of an order of  $10^{121}$ .

Given all of such, quite a list of things to consider, what are the basic axioms of modern physics and cosmology that have led it to this situation?

An “axiom” according to Merriam-Webster [6], is:

- i. a statement accepted as true as the basis for argument or inference.*
- ii. an established rule or principle or a self-evident truth.*
- iii. a maxim widely accepted on its intrinsic merit.*

Looking at the forest for the trees, what does cosmology rely on **as a physics**? For instance, is physics the **spawn** of cosmology, a cosmology that must be abided by and yet solved to then understand this local reality reference from seemingly unknown physical beginnings and associated axioms and laws? That may be true in a big bang (BB) theory scenario, where the BB can only spawn everything thereafter, yet such a scenario requires physics to propose the BB theory in the first place, to then set that agenda for what should only exist locally in those conditions. At any rate, given the intrinsic logic of the BB, it does seem that the BB theory, in requiring DE and DM, are the axioms itself of cosmology and thus physics theory, as they represent the codex of the “great beginning” in being the idea of a BB theory and associated requirements of DE and DM.

Simply, the problem of the insertion of the BB theory and DE and DM is that it becomes the code of axioms according to a simple theory of time, linear, from a murky and generally theoretical beginning to a just as ambiguous end. Surely physics is more insightful as a discipline, even today, than to employ such a process of logic to cosmology and hence all of physics? Surely any theory that leads to (and is instrumental for) the BB theory (and DM and DE) can only **also** be held accountable to such a travesty, and here general relativity (GR) and special relativity (SR) needs to be brought to question, and even more fundamental to such, the idea of mass as “inertia”, as shall be presented shortly.

### 3. Recent disruptions to physics theory: Relativity and the BB theory

To address the modern age of science is to start with Newton, and there the idea of gravity as inertia, a primordial idea to this day that physics does not question other than Einstein's development of relating gravity with the curvature of "*spacetime*", despite there being no physical evidence for a curved universe (Flatness problem [2]). What is interesting to note is that Newton considered gravity to be an immediate field force effect **as** that inertia effect, not paying attention to the idea of light and thus the speed of light regarding bodies in relative motion, until of course the time of Einstein who brought the idea of gravity as inertia to bear on the idea of light and its associated speed between bodies in relative motion, and the associated nature of spacetime thereof with those equations of inertia. Simply, relativity theory based itself on mass as inertia and thus gravity, and therefore relative motions between masses involving gravity became the basis of relativity theory central to the idea of registering that process in the manner of light. Despite the advancement of relativity theory, one needs to still remember how Newton contrived the idea of inertia and in what context, namely the context of the considered "immediate" nature of gravity, that there can exist a process of immediate action and reaction, as though if mass exists a certain way it can be considered by measuring the amount of resistance it offers to a change in its rest-state through the dual compass of potential and kinetic energy. Yet such a process of measurement is pure duplicity of definition, namely mass as inertia, while creating the paradigms of *potential* and *kinetic* energy. There, "inertia" is merely a manner of regarding mass by altering its defined rest-state through the gradients of perceived *potential* and *kinetic* energy determination. In a certain way, it is precisely a *particular way* of considering something by changing its state of rest and thus perceived energy state (potential or kinetic).

Given the spurious nature of inertia as a fundamental descriptor for reality nonetheless, how was the idea of a constant speed of light arrived at in the context of inertia theory? The constancy of the speed of light was derived as a natural consequence of *two* experimentally demonstrated facts:

1. The velocity of light is independent of the *velocity of the source*, as demonstrated by the De Sitter double star experiment, [7]
2. The velocity of light is independent of the direction of *velocity of the observer*, as demonstrated by the Michelson–Morley experiment (MMX) [8]

These two principles were taken up by Einstein in his special relativity theory, as per his associated combined application of inertia. Once again though, this use of inertia resulted in ludicrous conclusions, the key one being the cosmological constant problem [5]. Further to this, much of what Einstein *didn't* explain was regarding the potential doppler effect regarding light, not just relative motion, yet which direction that relative motion occurs in. Such has presented much debate for aether theorists, who claim that the doppler shifting of light (such as the redshift effect) is an effect that can only be based on the idea of aether. Yet the idea of the doppler effect of light being held to a wave-function as per an aether medium (for otherwise in empty space what medium is light travelling in to be doppler shifted, as that argument goes) **lacks proof**, much like DE and DM. Converse to the idea of light as a wave-function was presented the idea of light as a massless particle, the photon, with the consideration of empty space, empty space

being the ideal medium for a massless particle. Here, the redshift of light was considered to be a type of metric expansion of space, with light being a massless particle in that medium appearing “redshifted” by that proposed metric expansion of space. Aether therefore would lose to the photon given no proof has been forwarded successfully for aether’s existence. Yet aether theorists would claim that the photon and metric expansion of space has also delivered a dud with DE and DM.

Indeed, there is nothing wrong with proposing that light can be an a-priori wave-function in empty space, as it merely requires the proper definition of such to be the case, in much the same way quantum mechanics (QM) considers light to be massless photons of energy travelling through space, an arbitrary use of ideas and terms to describe known phenomena of light. Despite this, doppler studies still show that light has both wave and particle functionalities, however it’s sole property as a wave-function in *empty* space is not something presented as a theory, yet, or so it seems. For instance, an over-looked feature of light being a wave-function in space, is that any clock that is moving at relative speed compared to another object must show what it only can dependent on the relative lines of motion between any two objects, if indeed light is a wave-function in space at “c”. Simply, if the objects are moving away from each other, the wavelength and thus time-function must increase uniformly, and thus conversely the wavelength and time function be shorter if the objects are getting closer, which in itself is not proof of aether specifically if light can solely be a wave-function in empty space; aether argues that a wave can only exist if there is a medium that the energy of light can make its way through, as opposed to being an a-priori wave-function itself in the concept of empty space. Thus, dispelling aether alone should not qualify the idea of light as a primary wave-function construct to be dispelled also entire.

It is no difficult task to reach the idea of the metric expansion of space in aiming to account for a redshift of light in the case of photons travelling through space as massless light particles, for of course in that situation of theory space would have to expand to account for a redshift effect of light being a part of that theoretical redshift of expanding space. Yet not so if light were described as a wave-function in space and the natural propagation of light through space had a redshift-type effect. Zwicky attempted to explain light as a wave-function in regard to the redshift effect as “tired light” [9] yet this contradicts the Horizon problem [1], namely that there is no evidence for light getting “tired” to support a redshift effect given the relatively uniform energy state of light in space. Yet the proposal of the metric expansion of space to explain the redshift effect presented the problem of how the stars become clumped together as galaxies, requiring Einstein’s general relativity theory fix. Yet this “fix” then lead to two new problems, namely what keeps those stars together (requiring a thing called dark matter (DM)), and what is the force behind the metric expansion of space itself in the first place, which appears to be accelerating called (requiring a thing called dark energy (DE)). These features (DM and DE) account for 95% of what cannot be proven in reality, so clearly the basis for DE and DM is wrong, and thus clearly one option remains, namely how light can perform as a wave-function through space in displaying a redshift effect, and how it can do this without getting “tired”, and thus maintaining its basic underlying temperature, without aether.

The question then beckons, can a wave-function proposal for light in space avert the disaster of DE and DM (and associated notion of the metric expansion of space)? It would be a fundamental departure from contemporary theory, as the basis of particles and light would not be the idea of particles

as mass (elementary particles) or non-mass (photons), yet “wave-functions” of energy in empty space (in discounting aether as much as DE and DM must be discounted in their absence of proof).

#### 4. The Physics Chimera

The Newtonian dance of mass as inertia requires two key ingredients of thought regarding energy, the first being potential energy, the second being kinetic energy. According to the Cambridge dictionary [10], potential energy is regarded as:

*“the energy stored by something because of its position (as when an object is raised), because of its condition (as when something is pulled or pushed out of shape), or in chemical form (as in fuel or an electric battery)”*

Kinetic energy [11] is regarded as:

*“energy that an object or system has because it is moving”.*

The idea of potential and kinetic energy though is essentially one of creating a **gradient** of energy in comparison to what existed previous to the initial inertial incursion displacing an object into a higher or lower energy state of regard through such intervention, from **stored** energy to **motive** energy and/or vice-versa. Indeed, it is not a way to approach the idea of space or time, let alone the massless entity of light; to explain reality fundamentally in terms of potential and kinetic energy is like saying that reality prior the BB had an infinite amount of potential energy and then all that energy was released as kinetic energy as the BB and associated kinetic metric expansion of space, yet then everything in that kinetic energy context can thence, as the theory goes, be potential or kinetic depending on the local role-plays of inertia, which in itself as a basis for a theory is not only inconsistent with the basis definition itself of potential and kinetic energy, and thus merely a virtual ad-hoc definition of regard for mass, yet missing so much detail regarding the definition of space, time, and light which would otherwise underpin in all likelihood the idea of mass itself. Further coupled to this is the need to use the idea of DE to account for all that potential>kinetic energy, which is roughly 80% of reality, an amount that cannot be found, anywhere, leading to the associated cosmological constant problem [5]. Indeed, on top of this issue in using relativity theory was incorporating light as a constant referenced to the idea of time in the form of time dilations and time contractions regarding the motion of masses, the problem there being the idea of gravity and thus mass being alterable values as objects in relative motion, implying mass and thus gravity can be created or destroyed based on the varying relative motions of masses with each other in the context of a constant speed of light, which of course is ludicrous, the sole culprit there being inertial theory, therefore becoming the culprit of the need to formulate DM and propose an associated curved universe, a curved universe contradicted by the Flatness problem [2].

To consider inertia as the ability for mass to store kinetic energy is essentially ignoring the background reality and thus **gradient** field effects mass would exist in and be a part of, and thus suggest a virtual, unreal, logic as "inertia", ignoring those **gradient** background field entities. Indeed, is not mass merely **put** in a new field effect location **with inertia** and **requires energy** to achieve that **new potential location of apparent stored kinetic energy as potential energy**? Inertia uses the fulcrum of potential and kinetic, yet these are words that describe a secondary process to a more fundamental field force with all those associated grades of field force effect based on measured distance in that field force in play, are they not? The idea of the **scalar potential (gradient)** is such, namely where the difference in the potential energies of an object in two different positions depends only on the positions, not upon the path taken by the object in traveling from one position to the other, as for example potential energy due to gravity, a "**gradient**" field effect.

To therefore describe space, time, and light, using inertia, puts mass as the principle a-priori, does it not, above that of the basic nature of the field-effect in play? Yet is such a process of regard right, is it sound, or is it counter-intuitive logic? Indeed, the fruits of that spacetime tree of knowledge **defy** known data in cosmology, such as the need for DE and DM, entities not apparent locally, leading to the Cosmological Constant problem [5], not to mention the Flatness problem [2] (no spacetime curvature in the general shape of reality), all traced back to the idea of using "inertia" to explain space, time, and light, which pre-supposes mass as inertia to exist "before" space, time, and light, to be more fundamental than space, time, and light, to be more "primary" than space, time, and light, does it not? Further still, what is the connection between the so-called curvature of space (as gravity) with mass, for instance? Formulas using "inertia" and "momentum" that depend **primarily** on mass? As a process of logic, that does seem odd, making one consider a classic "*chicken and the egg*" scenario, namely *what came first*? The question should be, "what is more primary"? If inertia theory leads to a BB theory proposal, according to inertial theory what came first was a super-condensed "mass", a super condensed mass that created what appears to be more mass. That defies logic in the lab though, locally, despite how our minds can wonder the possibility of such a thing as the idea of a super condensed nothingness that bursts all of a sudden in what we perceive as this universe.

Inertia can do many things for mechanical engineering locally, yet the paradox exists of limiting physics through such logic given the unapproachability of any such cosmological inertia research applications. To successfully explain the primary scale data of reality as a pan-theory demonstrable in the lab, one needs to perhaps have the sense to dispense of the idea of inertia, perhaps, or at least consider that possibility of theory, the theory of space, time, and light, that does not rely on inertia, yet is still able to accommodate for all the known equations of field forces, associated constants, and all cosmologic phenomena data. Indeed, inertial cause-effect is perhaps the most obvious if not simple starting point for scientific congress regarding physics, regarding bodies in motion and how they interact, as Isaac Newton demonstrated, yet is it the most fundamental?

Beneath all those layers of inertial congress, and this is the suggestion, would be an even more fundamental relationship of logic regarding space, time, and light, more fundamental than inertia, such that without that more fundamental concept of logic inertia will always prove useless in aiming to explain the fine-tuning structure of space, time, and light. Despite this, "inertia" can still nonetheless be considered

as an "emergence" of logic from a far more fundamental concept of logic. Simply, theories such as DM, DE and inflation, each independently tied to the BB paradigm, fail in describing known empirical phenomena that the required mathematical framework of "inertia" as mass local data and associated theories actually summon to it. The basic problem with cosmology theory today is that it must be accepted that 95% of the cosmos is unaccounted for care of the foundations of SR and GR, Hubble's law, and the subsequent metric expansion of space, *and* the associated understanding of light explained as a photon (QM). In the context of a BB theory, that's an axiomatic wasteland. On top of this heap of issues, there are 5 other "***independent***" key problems with cosmology theory in the context of the BB theory, namely the Horizon problem [1], the Flatness Problem [2], the Monopole Problem [3], the Hubble Constant Problem [4], and the Cosmological Constant problem [5].

All in all, there have been a series of disruptions in physics theory over the past century, initially offering great promise, now all of such being questioned, setting the stage for a new disruption that can ideally solve all current questions. One thing is obvious though, namely the common link between all these features, all these issues, is the idea of using "inertia" as mass, creating such disproportionate values for mass and energy, all in the presumed context of a metric expansion of space in aiming to rectify the redshift effect (as *it only could*). To solve this problem, the issue of "inertia" needs to be addressed, if not replaced.

## 5. Proposing a fundamental change

The difficulty in proposing a fundamental change to physics and cosmology theory is explaining a new mathematical paradigm that upholds all the relevant physical data and equations of physics and cosmology, while presenting the required modifications **to** the *theory of physics and cosmology* that the new mathematical modelling would inscribe for each of those equations and sets of data, as based on what could only be its new axiomatic principles for time and space, devoid of non-existent data (DM, DE, aether). For physics to do that though, something quite astounding must happen, namely clear proof that such a process is useful in the regard of any new theory that is relevant to our local reality, to our solar system, in using that new methodology.

In taking a general look at this task, in approaching a new pan-theory, putting the "data" together is the task, provided there is a common fundamental basis linking the data and how that data is measured. Is there a problem though with using a new base-theory to link the data of G and EM? A few things need to be observed when documenting physical data therefore. For instance, changing the basis of the data is only going to change the basis of all the other data. If data that can be proven originates from key equations, those equations should not be in dispute given the data that can back up those theories and equations. The question with a pan-theory is how those equations can be newly derived to "better" put the data together with associated theories. A pan-theory that derives all the equations and constants, keeps all the data in check, one that proposes "new research" that is backed-up with proof, that's where the emphasis should be in reaching that pan-theory basis.

As a process of simple deduction, to solve the issues in cosmology, those problems in cosmology, is to suggest those problems, those features, would no longer exist. Thus, as a starting point, let it be suggested that DE, DM, and aether do not exist given their absence as provable data. In saying that therefore, let it be presented that the metric expansion of space does not exist to warrant DE and DM. And thus in saying that, that the redshift effect of light is not due to a metric expansion of space, yet an effect of light in space, thus far unaccounted for in physics theory, and not due to anything that cannot be proven locally (such as aether theory), yet something else. Let a steady-state cosmology be therefore considered that has a feature of light in space providing a natural redshift effect and a measurable consistent CMBR, a constant photon temperature, across what appears to be a flat non-curved space universe. Those suggestions deal with what is real, what the data presents to be the case without entertaining unknowns other than the fundamental and clear unknown of “what theory can achieve incorporating all of these new suggestions into the one pan-theory?” Above all, this new theory would detail the principle that cosmology is only useful if it is relevant locally, especially in presenting a new provable phenomenon not understood without that new model of cosmology.

Let it be suggested that the one key thing not understood locally is the idea of gravity, namely it's aetiology, how it works, how it relates with EM, and so on and so forth. This is the elephant in the room in regard to what is known and what is unknown in theoretical physics. So, for the purpose of this new proposal, let the idea of gravity as inertia be discounted as a “basis” of force and motion. An interesting thing to bear in mind though is that when gravity as inertia is taken away as the basis of force and motion for mass, “light” in regard to “perception” (as per relativity theory) becomes the basis of measurement for mass and energy, as it only can. Yet, if light is limited by time at “c”, as light speed, as confirmed per the Michelson Morley Experiment [8], then apparent changes that happen between objects in relative motion are only that, “apparent”, as per regarding the nature of light and those relative references of observation regarding not necessarily “mass” yet “energy”; gravity and thus inertia and those transformation equations become therefore, in such a condition, “unnecessary”, replaced by what can only be, by default, “*energy in the context of a particular measurement scaling system of time (understood as the process of entropy)*”. Thus, let the following be considered:

- Space is as a “0” construct, a vacuum.
- Space is not expanding.
- Light is an energy wave propagating at a constant speed in empty space.
- The redshift effect is a feature of light in space.
- The concept therefore of light as energy measured in space between different spatial references would be equivalent to different references of space associated with that light and thus energy *as a way of measuring time*.
- Mass therefore would be implicit to the idea of light (in space) as energy, as unique references in space relative to each other, and thus would logically be a particular *function* of light as energy in space, most logically as a “wave”-function, yet a particular organisation-relationship of wave-functions.



- The relationship of mass in space in regard to light would thus be central to a fundamental feature of time as energy in space, not the idea of mass itself as action-reaction (inertia).
- “Inertia” therefore would be considered as a superfluous basis of relativity, as it merely represents the notion of cause-effect of mass, dealing out other newly and more fundamentally defined entities of consideration in this new regard of theory.

If physics is a giant puzzle awaiting solving (in the absence of the notion of “inertia”), if each piece of relevant physics-data is a jigsaw piece, all those pieces must be put together, and in doing so the general shape of reality become self-evident. To bring this into effect, a key new approach to physics theory must be made; the difficulty in proposing a fundamental change to physics and cosmology is explaining a new mathematical paradigm that catches **all** the relevant physical data and equations of physics and cosmology, in presenting the required modifications **to** the *theory of physics and cosmology* that the new mathematical modelling inscribes for each of those equations and sets of data, as based on what could only be its new axiomatic principles for time and space. For physics to do that though, something quite astounding must happen, namely clear proof that such a process is useful in the regard of any new theory that is relevant to our local reality, to our solar system, in using that new methodology, together with acknowledging such a process would approach the idea of a “pan-theory”: a “unified field theory”, or a “grand unified theory” (GUT), or a “theory of everything” (TOE), whatever the case may be. Jarvis S.H. [12] presents such a case.

## 6. Conclusion

In approaching this pan-theory, in solving the riddle of the current undecidability, uncomputability, and unpredictability of contemporary cosmology and physics, there are two processes in the discipline of physics that need to be observed, one is what has been achieved and the other is what has yet to be achieved; there are guardian-tenets and associated data of what has been achieved, and there are those who promote what has yet to be achieved with or without those guardian-tenets. It is not possible though to achieve something new while discrediting the guardian-tenets of what has been achieved. The issue is presenting an upgrade for all those guardian-tenets of physics. That is not a concept of dispensing what has been achieved in physics by ignoring basic tenets and associated facts, guardian-tenets. If there are holes in physics theory, those holes need to be investigated, which is what a new pan-theory with associated axioms must address without disrupting known solid truths around those holes. In endeavouring to best define cosmology with a pan-theory, if physics is a giant puzzle awaiting solving, the puzzle of **real** data needs to be presented, and all those pieces need to be put together in the absence of the data that cannot be verified, data that is hoped for, anomalous data such as dark mater (DE), dark energy (DE), aether, and so on. To bring this new theoretical proposal into effect, to bring into effect all the relevant data, a key new axiomatic approach to space and time theory needs to be made minus the use of inertia, as this essay has highlighted, installing a new theoretical basis for space and time.

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