

Fixing the Foundations of Physics

Assumptions Removed

Premises Accepted

Time Might Not Be Eternal

- To conceive of a model where time is not truly eternal introduces irreconcilable paradoxes that can only be solved by embracing the self-evident fact that no span of time ever spun that itself was not preceded by an infinite span of time.
- As hard as it may be for some to grasp, it is the only true paradox-free explanation for reality.
- More so, there is no largest measurement of time nor smallest measurement of time, and all we can ever hope to measure as it relates to time are those spans that are in some way relative to us.
- Not only did an infinite span of time precede the direct chain of events that led to the formation of our visible patch of relative spacetime, but an infinite span of time shall pass long after the last footprints that our planet or species ever existed have long since faded away.

Space Might Not Be Infinite

- To conceive of a model where space is not truly infinite introduces irreconcilable paradoxes that can only be solved by embracing the self-evident fact that any form of bounded or finite universe defies the natural laws of physics.
- If space and time are interwoven and time must be eternal, then space must be infinite.
- As hard as it may be for some to grasp, it is the only true paradox-free explanation for reality.
- More so, there is no largest measurement of space nor smallest measure of space, and all we can ever hope to measure as it relates to space are those spans that are in some way relative to us.
- Lastly, if we found positive or negative curvature within our relative spacetime, it would not indicate the universe was a saddle or a torus.
- It would only suggest that we were inside the gravity well(s) of much more massive object(s) or structure(s).
- Which we likely are, but at enough of a distance away that the effects are negligible within what we can reliably measure.

Our Big Bang Created The "Entire" Universe

- It is pompously arrogant to believe we have importance inside an infinite cosmos.
- To conceive that what we call our visible universe might be the entire universe is a childish farce.

- When we accept eternal time and infinite space, it becomes clear that our visible patch of spacetime is nothing more than a point in time and a point in space.
- A point that is relative to an average group of biped mutant spawns of stellar puke circling an average star inside an average galaxy.
- If we accept the premise of eternally infinite 4D Minkowski spacetime, then our existence inside this patch of spacetime tells us statistically that there must also be infinite energy and infinite mass for it would be statistically impossible to have mass and energy here but not everywhere.

**Our Visible
Universe
Started
From A Hot
Dense
Center**

- An assumption was made over a century ago, a valid extrapolation of observations at the time, and a century of fine-tuning this assumption has created a very elaborate house of cards.
- However, with every new technology we introduce to gather data, the house teeters further, instead of stabilizing.
- A better explanation for the abundance of hot plasma that cooled to form hydrogen and other light elements, than the inconceivable temperatures of a hot, dense center origin lies in accepting the basics of general relativity against the premises laid out so far.
- When we apply the field equations of general relativity against eternal time and infinite space, we do not get inflating bubble universes, but instead, nested successions of larger and larger comoving frames of reference.
- It is the intersection of nested comoving frames of reference, potentially tens of thousands of levels above the scale of our visible universe, that offers the chance for stellar nurseries and black holes to collide at superluminal speeds.
- When we fix our best simulations to remove the hot dense center in place of a much larger field of collisions, I predict over time we will be able to tweak parameters where needed to eventually be able to someday zoom out and watch big bangs occur over and over.

**There Was
Faster Than
Light
Inflation /
Inflaton
Field**

- If there was no hot dense center but instead a large swath of relative space time that saw initial, secondary, tertiary, and subsequent collisions all occurring with similar releases of kinetic energies at each stage, then instead of 380,000 years of cooling we may have only needed 380,000 weeks or days of cooling to see the average mean temperature reach approximately 3000 kelvin across the size we believe the CMB to have started at, with similar homogeneity as to what we have measured.
- The speed of light is a limit within our nested succession of parent comoving frames of reference. A nested succession that is far, far removed from a shared parent with us that has its own cosmic speed limit would not be bound by those limits when considering the relative

velocities that overlapping sections between separate frames would experience.

- With potentials to exceed beyond twice the speed of light and possibly going much higher, it would not only be collisions that create hot swirling eddies of plasma but also any nebulous gas, stray atoms, neutrinos, photons, gamma rays, and even vacuum energy when passing through each other at 4 or 8 times the speed of light could also decombine atoms back into native hot swirling plasma until it cools down and recombines again.
- 42 or 67 times the speed of light become just as possible as 2 or 4 or 8 when we consider it could be hundreds of thousands of nested levels deep before they saw a shared parent frame of reference.

Singularities Exist In Realty

- Without a singularity to blame for the starting conditions that forged our relative patch of spacetime, we must also realize that there cannot be a singularity at the center of black holes.
- Schwarzschild's solution predated knowledge of the strong nuclear force by about twenty years, and we now know that at scales below .08 fm that force is one hundred trillion trillion trillion times stronger than gravity.
- The first of three changes needed to the field equations of the general theory of relativity is the setting of a lower limit where gravity can no longer warp space because a far stronger force takes over.
- We also have no reason to suspect that the energy needed to pull apart a meson would act any differently when we try to condense a meson below the size of a quark, and in the end, that energy just creates additional quarks.
- The center of the event horizon of every black hole is either a dense polyquark or a dense quark soup and the degrees of freedom that quarks find inside nucleons would not exist.
- A law of physics that should exist would be that within any bounded region of spacetime you can not place an infinite amount of relative mass or an infinite amount of relative energy nor an infinite amount of relative time or an infinite amount of relative space.
- It would be interesting one day to see if the higher confinement of free energy would cause any given amount of mass entering a black hole could increase the overall mass of the black hole by a greater amount because of the extra removal of degrees of freedom for the quarks at the center.

The Cause Of Dark Energy Is Unknown

- Vacuum Energy has nothing to do with the expansion of the universe.
- "Dark Energy" is the naturally occurring phenomenon predicted when we take the general theory of relativity and extrapolate what the universe would look like if space were infinite and time were eternal.

- If we live in a homogeneous isotropic universe, then all we can see are just the relative rungs of a ladder that extends beyond our visible horizon.
- Our entire visible universe is just one rung in a nested succession of larger and larger comoving frames of reference.
- What we then need to accept, per special relativity, is the fact that the faster you move through space, the slower you move through time, so each level in the nested succession of comoving frames of reference all playing follow the leader(s) would share the same average trajectory and same average velocity and thus experience the same base perception of both space and time.
- Then, within every comoving frame of reference, each sibling would fine-tune that unique perception of space and time based on their relative velocity within that frame and all the gravitational fields they are passing through at any moment in time.
- It is that fine-tuned perception acquired from their parent reference frame, and the nested succession of parent frames above, that is then modified by their own velocity and the effects of the gravity wells they pass through, that each sibling in turn passes on to all its children frames of reference.
- Anything that changes the relative velocity of any of our nested successions of parent frames of reference, if sustained, could have a measurable impact on the perception of spacetime events occurring outside the affected reference frame.
- With this understanding, we then see that our entire visible universe is likely in orbit and possibly being orbited.
- It would have an approximate rate of rotation and an approximate axis of rotation, as well as gravitational and even possibly magnetic fields.
- Within its shared parent frame of reference, being dragged through spacetime by the most massive relative structures, this nested Russian-Doll-structure to the universe leads us to see where the source of dark energy would stem from.
- Within our visible patch of spacetime, what we observe is that no orbit contains infinite energy and all orbits eventually decay.
- Some decay inwards, while many others decay outwards. Our moon and most moons are slowly moving away from their host planet just as our planet and most planets are slowly moving away from their host stars just as most stars are slowly moving away from their host black holes just as most dwarf galaxies are slowly moving away from their host galaxy just as the diameters of galactic clusters on average are slowly increasing just as we will find over the next ten millennia that our supercluster's orbit around the great attractor is slowly increasing.
- What would that slow dissipation of mass energy cohesion to spacetime across multiple nested parent frames of reference look like to us at our scale factor?
- It would look like the very fabric of space and time was being torn apart, and that is exactly what we are blaming dark energy for.
- The second change needed to the field equations is that our cosmological constant needs to become a ratio, uppercase lambda over

lowercase lambda, to express within any local manifold the current strength of the battle between the localized overlapping gravity wells and the succession of parent overlapping gravity wells that are slowly dissipating.

We Found Anything Elementary

- Vacuum energy, virtual particles, the bending and warping of spacetime, the need for renormalization, and other key factors point to a realm far below our current quantum scales.
- There may, in fact, be an irreconcilable paradox in thinking there could ever be anything elementary.
- While it may very well be that there is no such thing as any smallest piece of mass or smallest piece of energy or smallest piece of time or smallest piece of space, but if nothing else, there is more than ample evidence to support a realm far below our current quantum scales.
- If there were particles billions or possibly trillions of times smaller than the electron neutrino in abundance far greater than neutrinos, then tiny interactions, both repulsive and attractive, would cause the predicted paths of particles we can measure to randomly deviate, and thus we would get a probabilistic wave function.
- Those reactions occurring at subquantum scales could also cause tunnelling and certain instances of superposition.
- When those tiny waves of energy aggregate in phase with sufficient intensity, we would see the particles of our standard model, while in those instances where there was insufficient density or intensity, we would see vacuum energy, and the reason that virtual particles are needed.
- If it were not for mass and energy below our quantum scales, spacetime would have no reason to bend and warp in the presence of mass.
- Quantum fields are not magic, and something needs to make them up.
- That something is a realm below our purview where tiny pieces of mass that are likely all playing follow the leader(s) in a nested succession would appear to be little waves of energy at our scale factor. Tiny waves that occasionally align in phase and increase in intensity and become measurable at quantum scales.

A Non- Mechanical Wave Can Exist In Nature

- All waves are mechanical, and the fact that some waves can propagate through their medium for far greater distances than the natural resistance of the medium would demand due to oscillations between magnetic and electric fields, does not negate the existence of the underlying medium we can indirectly infer, but likely will never directly measure.
- All energy moves in waves, and all waves carry that energy in the amplitude.

- The amplitude is a deviation from some equilibrium state within the medium, and without a deviation from an equilibrium state, a wave would be unable to increase or decrease in intensity.
- All waves always attempt to move in all four dimensions.
- Time is a given, but within the three spatial dimensions, the dispersion of energy across those dimensions would see waves where there is any medium, and the resistance that the wave feels inside that medium directly correlates to how quickly the amplitude of the wave is depleted.
- Each crest in any non-self-propagating wave would see the amplitude diminish proportionally to the resistance met extending that wave one additional wavelength.
- There is an aether, but it is beyond our ability to measure and made from parts moving in all directions, not any specific preferred direction.
- The basic building block of the universe is the wave and the basic force that drives the universe is the attempt of every medium to return to its lowest energy state of equilibrium.

**A
"Particle"
Goes
Through
Both Slits
When We
Are Not
Looking.**

- Seems silly that we know when we try to observe what happens, the interference pattern goes away and that tells us a wave, not a particle, went through both slits, yet we still question which slit a particle went through.
- As an aggregation of tiny subquantum waves in phase trying to move out in all 3 spatial dimensions, we would predict an interference pattern but asking which slit a particle went through can not be answered because a particle did not go through either slit.
- It is not an observer or a measurement that collapses a wave function but any time the sciences of the macro world dictate the need for a particle, an aggregation of tiny waves of energy in motion provides us that particle.
- When physics, electromagnetism, chemistry, biology, thermodynamics, or any other science dictates a need for a particle, then the wave collapses to meet the request from the macro world.
- Early on one of the initial interpretations of the wave function collapse was dismissed and I feel it may have been premature.
- We rely on the Copenhagen interpretation far too much, and we have a century of mysticism to show for it.
- Instead, we can have that subquantum realm produce a particle when and where needed and all the points of those waves in motion that are not near where the particle coalesces are returned to the subquantum realm in equal amounts to the amount borrowed from the subquantum foam at the point the particle was needed.
- Toss out spooky action at a distance in favor of local realism and superdeterminism.

**Bells
Inequality
Proves
There Are
No Hidden
Variables.**

- To contemplate that hidden variables are not correct would mean a particle that became entangled through the laws of conservation could somehow magically lose or reverse those conserved quantities solely because its entangled partner was observed or measured.
- There are far better experiments that could be done to more fully understand what is going on, and with sufficient time, we will uncover that Bell's Inequality was based on faulty assumptions and created faulty conclusions.
- If the Copenhagen interpretation is wrong, and particles are never in two places at once or two different states at once, we can explain observations without mysticism by realizing the mistakes of claiming we found anything elementary and grasping how a subquantum realm would produce all the observations and fields we see around us.

**Dark
Matter Will
Be Found
To Be
Actual
Matter**

- There are no macho wimps nor actual dark matter particles, but instead, when we apply a function against the stress energy tensor in the field equations of general relativity, we can see where aggregations in the energy density caused by multiple bodies moving in phase can increase in intensity and create larger gravity wells.
- It is incorrect to state that gravity is not a force because something is telling spacetime when and where and by how much to bend and warp.
- The fact that those instructions travel at the speed of light offers a reason to suspect there may be some underlying waves moving out spherically from every object with mass, telling all the different points of spacetime how much, where, and when to bend and warp.
- So when you have nested successions of pockets of spacetime where bodies are sharing the same relative trajectory and relative velocity, at each level the overlapping spherical waves of gravitational attraction would align in phase and increase in amplitude and thus cause an exponential, not linear, increase in the intensity of those instructions.
- That is where dark matter is going to be found, in the aggregated effects of bodies playing follow the leader(s).
- The last of three changes to the field equations is to wrap a function around the stress-energy-momentum tensor to indicate when multiple bodies are in phase and their aggregated impact on spacetime.

**There Is
Such A
Thing As
An Inertial
Reference
Frame**

- When we realize we exist inside a nested succession of parent comoving frames of reference that create larger and larger structures, we can technically say that no true inertial reference frame exists.
- Since few orbits are circular and most are elliptical, if we zoom out further and further, we would find multiple instances where parent structures are accelerating and decelerating.
- The implications could be so negligible as to be unmeasurable, which is why I consider this more of a technicality.

- So not only is everything in motion, but everything is going through unmeasurable accelerations and decelerations at truly cosmic scale factors far beyond our purview.

There Is A Standard Model Particles Called The Graviton

- The graviton is not a standard model particle, but could be all mass at sizes below our current quantum scales.
- Lots of evidence point to mass and energy below our quantum scales, and if it were not for that subquantum mass, then spacetime itself would not bend nor warp in the presence of relative mass.
- I feel that ALL mass acts like a graviton, and overlapping gravity wells of many different objects can create a tensor mesh of gravitational attraction, and there exists a non-zero chance that many objects in proximity could end up producing a larger aggregated gravity well in certain areas.
- The Lense-Thirring Effect (frame dragging), tells us this tensor mesh of massenergy cohesion to spacetime is real and needs to be better understood.

The Multiverse Is Speculation

- Nearly all representations of the multiverse are fictional, and there are no shared dreams or memories or objects or people that can move between any two separate pockets of spacetime.
- If you accept infinite space, then you must also accept a very simple truth.
- Somewhere during an eternity across infinite space, there is some age your DNA will reach that is older than every other age you ever reach on any planet, anywhere at any time.
- Well, at this exact moment and at every moment of time there ever was or ever will be, your exact DNA is alive at nearly every single stage from inception up until that oldest age you ever reach, right now, an infinite number of times.
- No shared memories or dreams, but more than that, for each one of those doppelgängers that shares your name in sound, there are likely tens of thousands of others that have a name that sounds different.
- For every one of those that shares the same sounding name, there are likely tens of thousands that spell it using different symbols.
- But it goes much deeper. For every one of those that shares the same sounding name made from the same sounding symbols, very few have parents whose names sound the same and use the same symbols, and far fewer that have the same siblings regardless of their name.
- Even fewer live in geographical regions of the same shape or size or names or live on a planet called Earth.
- For each instance where the same quantum events occurred in succession in a separate area of spacetime that directly match what led all of us to this exact moment in our lives, there could be googols of other lifetimes where things were different from what we experienced.

- It is not true to think that anything the mind can imagine must happen somewhere if the multiverse is true.
- Instead, what we do know is that anything that does happen does so an infinite number of times. Ideas that don't have a basis in a chain of physical causality don't necessarily happen just because there are an infinite number of iterations of existence.
- There are a finite number of separate quantum states from the very moment our visible universe came into existence till now.
- There is also a finite number of different combinations of elements that can make up an object that our species could inhabit, just as there is a finite number of different ways that DNA and RNA could evolve over time.
- So a multiverse is really just an infinite number of different iterations of a finite number of different species living on a finite number of different big wet rocks for all eternity.
- The universe is made from an infinite number of points in space that are each relative to a finite number of other points in space at each moment in time.
- Make a fake gun with the thumb and index finger of either hand, and wave that arm around widely, then stop while pointing in some random direction.
- If you were to follow the line created for eternity, not only would you pass through a living creature with your own DNA, but you would do so an infinite number of times.
- Other pockets of spacetime, other "universes", do not spawn magically because a decision was made or a quantum event took place. Those events occur inside universes that saw a repetition of exactly similar quantum states leading up to the branch point, and the multi-worlds start off as parallel realities until branches occur and they become alternate realities.
- They are not located in nearby dimensions but exist in the same three spatial dimensions we recognize and are physically separated by great distances. No shared memories, dreams, or objects, just your DNA doing the best it can to survive across an infinite number of iterations.

Infinite Regression Is Speculation

- When one truly focuses on the implications of eternally infinite 4D Minkowski spacetime, accepting and embracing all the implications can become overwhelming.
- There is no reason to suspect there is a smallest or largest measurement of space, time, mass, or energy nor any reason to suspect there should be any smallest elementary building block that itself is not made up of anything else.
- One way to realize how this must be true is to recognize that our fine structure constant manifests due to a specific average relative density of energy and average relative density of mass across a specific average relative density of space and average relative density of time.
- Therefore, as we zoom out, looking at a universe of larger and larger comoving structures, if this were to continue indefinitely, then at some point we would predict the same relative densities of mass and energy across the same relative densities of space and time would repeat, and a fine structure constant would replicate at a larger scale factor.
- So if it happens once, it would need to happen at an infinite number of separate scale factors, and that just blows the mind, but embracing this almost certain truth leads to further realizations.
- It explains how life forms on big wet rocks as an eternal evolutionary path through atomic layers, and it explains the root causes of tinnitus as a prediction if there were planets and galaxies teeming with life at scale factors far below the Planck length.

DR JM NIPOK
#thenaturalstateofnature