Before the Big Bang

Solving all of Physics Outstanding Questions from a Single Assumption Change

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Acknowledgement

Professor Milgrom for humouring my emails over two decades.

Professor Hawking for a Brief History of Time.

To my Dad for the early maths advantage.

To my Brother for making me compete.

To my Mum for everything.

To Gemma for being everything.

And to my sons.

Foreword

> “Serenity to accept the physics we cannot change,
> Courage to change the physics we can,
> And Wisdom to know the difference.”
>
> (Anon)

Noel B. Cornerstone

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Chapter 1 First Principle Identification of Pseudoscience

"*We must remember our observation bias, a chosen direction in Time.*"

We create a First Principle with the objective of an *infallible* way to identify incoming pseudoscience invading our physics theory stack.

We aim to produce a situation so that any pseudoscience that has become so insidiously believed, that there would still be those clinging to dogmatic theories post-falsification.

"*Either the First Principle is false, or the theory is pseudoscience*."

Those that cling must show fault in the First Principle or accept their theory is falsified. This is our aim.

Our theory stack in physics is precious. We must make sure that stack is clean of any pseudoscience, so we go back and evaluate Relativity's introduction, the Big Bang's introduction, and the introduction of the Standard Model of Quantum Mechanics. Later, in the next three-book series, we will look at the introduction of relativistic quantum field theory.

General Relativity and Quantum Mechanics are perfect examples of what is not pseudoscience under the First Principle method.

The Big Bang is a perfect example of pseudoscience being introduced against the First Principle. As are Dark Matter, Dark Energy, and of course, Inflation.

If the Big Bang theory is wrong then, it has become an erroneous dogma today, we must investigate where it is holding us back.

If anyone suggests the Universe is not expanding, it is treated as heresy. This is also an indication of cultism or pseudoscience.

The Axis-of-Evil discovered in the Cosmic Microwave Background (CMB), and the new physics needed for expansion of the Universe should have killed the Big Bang Theory in the mainstream many decades ago.

By the second NASA microwave probe results, the dogma was too entrenched for real science. Any observation against the CMB as a Big Bang relic was also heresy; pseudoscience. Two competing definitions of pseudoscience; the very definition of cognitive dissonance.

The only other examples of such awful scientific cancer are Dark Matter and Dark Energy.

If we toss the Big Bang Theory, and employ a simple orthogonal rest frame explanation for red-shift which obviously would increase with distance, this removes the need for Dark Energy.

If we change *one single assumption* that we are 100% on knowing the Sun's mass, then we have several relativistic explanations, before introducing exotic new physics without explaining why or what that is. By our First Principle, this falsifies Dark Matter.

If we are allowed to increase the Sun's mass and we show it is an ancient black hole, now that the Big Bang does not restrict the age of the Universe, and that all anomalies and issues have a potential solution with a single assumption change, what is the problem?

Dogma. The cancer of science in the final terminal form.

Dogma and those who believe in only one possible theory for red-shift simply cannot cope that the Universe may not be expanding, and is of a fixed width from our rest frame reference.

We can deduce the size and shape of the Universe from two dimensionless constants, one from maths, one from measurement and observation. We can then crosscheck that deduction from a simple prediction that there is a coincidence in the view of Big Bang proponents, that will act as our cross-check for our deduction from the two constants. See chapter six for more details.

When we falsify the Big Bang theory, and change only a *single assumption*, we need no new physics that violates relativity (the Big Bang Theory falsifies relativity by default in its early epoch) and have a full explanation for the following gravity related anomalies and resolution of a paradox, and three hindering problems from particle physics resolved with the same single assumption change:

a. The anomaly of accurately measuring G, the gravitational constant
b. The Pioneer Anomaly
c. The nature of the Microwave Background and the Axis of Evil
d. The flattening of galactic rotation curves.
e. Dark Matter falsification
f. Dark Energy falsification
g. Relativistic Mass in Neutrinos
h. The size and shape of the Universe from two important constants

i. The resolution of the Antimatter imbalance paradox

So, we create a *First Principle* definition of pseudoscience with a method that stops new or exotic physics entering our theory stack without need. This is agreed and then tested against *three* existing theories retrospectively, when these theories entered the theory stack.

We specifically create a First Principle that *all* can align with. Those in the mainstream, and those on the fringe.

With that alignment, we have an irrefutable foundation.

We can state the spirit of the First Principle succinctly. This can show we understand it at a high level.

> "No new or exotic physics to explain anomalous observation can be introduced until current physics is exhausted."

We must state the First Principle verbosely, aiming towards context-free, while remaining intelligible, lest ambiguity corrupt the spirit of our intent.

> "Even when audited retrospectively, the introduction of new or exotic physics to explain unexpected observation before exhausting existing options at the time, whether known or not, is here defined as *pseudoscience*, with no exceptions. The theory and any subsequent theory based on this pseudoscience is automatically falsified."

Our First Principle has the objective that it must allow for us to identify the introduction of pseudoscience to our theory stack at any moment in time in the history of science both backwards and forwards.

An example of a theory passing this process is given, followed by an example of a theory failing this process, followed by a final example. The final example is the Standard Model of particle physics. All three are the most well known theories today.

When we apply our First Principle method, if a theory that it is applied to is successful, we have confirmation that the theory is unlikely to be pseudoscience.

With failure of a theory against our First Principle method, we can only choose between whether our First Principle is wrong or the theory is pseudoscience. If we cannot fault our First Principle, the theory is falsified, and observations since it was accepted, must be reinterpreted without any reference to the new physics, and previous default positions then apply, such as the default being that the Universe is effectively infinite in time and space, though there may be a horizon

Chapter 2 Extrapolation Method of Anomaly Resolution III

"When we solve anomalies properly, suddenly coincidences make sense."

We aim to get the most information we can deduce from the observations of anomalies, since this information tells us what is falsifying our theories

Anomalies that lead to a change in theory and can be resolved with the mathematics and mechanism to go with it that can be tested by observation.

It takes one genuine observation to falsify a theory. Anomalies are those. Repeated. This must be considered as the most valuable property of anomalies.

Newton's theory of mechanics was used to calculate or determine the orbits of the planets and celestial objects.

Mercury's orbit did not fit the predicted outcome from Newton's equations.

This was called an anomaly. It is an observation that falsifies theory. Simple as that.

Relativity brought new physics, testing the assumption that space and time were separate or independent, and the same for mass and energy, and finding out each pair were not.

Relativity provided a resolution to the anomalous orbit of Mercury that does not fit Newtonian dynamics. Relativity provided the mathematics, reasoning to resolve the anomaly, and could be tested.

Our Second Thesis

That anomalies contain enough information to be used to identify and falsify dogmatic theory, in particular where Einstein's theory of relativity is not appropriately applied. Mercury's orbit of the Sun is our base example.

Our second thesis is that other anomalies besides Mercury should be tested for what the incorrect application of relativity would mean or imply in that domain.

Anomalies Today.

There are remaining anomalies in cosmology and particle physics. We described briefly how Mercury's orbit falsified Newton and was later formalised as one of the victories of relativity

for Einstein. We should be able to answer all of these anomalies with a single assumption change.

What we are saying then is that anomalies are essentially our ways of seeing what is falsified and how it is falsified. We should really couple this to the coincidences that physics tells us cannot be anything other than coincidences, because if there really is a fundamental problem anywhere with the ways we are measuring a dimension (age of the Universe) and it's the wrong dimension or the wrong way to measure this, then the signal for that may well show up in these same proponents of that view then calling a coincidence on something that is deeper than their understanding of reality.

Chapter 3 First Principle Applied to the General Theory of Relativity

The way our First Principle method behaves when applied to the general theory of relativity seems like the perfect result when a good theory is tested, which is what we expect from Einstein's Field Equations.

What we call Newton or Newtonian or sometimes *classical* mechanics is the pre-spacetime world. In this world space and time are separate, mass and energy are separate, and there is no limit to how fast we can go in a vacuum as long as we can accelerate.

In Newtonian model, we do not have the means to account for Mercury's orbit.

The precession of Mercury's orbit was an anomaly under Newtonian mechanics.

The precession of Mercury's orbit falsified Newton's model.

An anomaly is a falsification of theory.

What we want to know is if anomalies also tell us more information than we knew, and whether anomalies hold the key to their own solution.

Relativity unites space and time into spacetime. Relativity unites mass and energy via the famous equation.

That we have observation bias and that there is no difference between space and time or a difference between mass and energy, just some weirdness of human perception, that perhaps requires a massive disparity in one dimension or direction in order to exist. This is fundamentally important to remember, and it may become obvious when we show why.

Let's be very, very clear.

Two things we thought were completely different kinds of things were in fact the same thing. And there was more than one pair of these things after relativity.

These pairs of things we thought were different, or independent. Absolute in their own right.

Space and time.

Energy and mass.

We thought about these as independent concepts. The three dimensions we experience and a continuum on which our direction of time unfolds. Mass we can hold in our hands, and energy does stuff or burns. This is not the case.

Our perception differentiates these concepts, not physics, it is our experience that is creating a belief that these are not the same.

Again. Two different types of things were the same thing. Only our perception interferes with seeing that. An asymmetry across our experience. Like an arrow. Pointing.

Relativity brought new physics, combining space and time, manifesting as Newtonian dynamics at certain scales including Victorian experience, yet solved Mercury's anomalous orbit due to proximity to the Sun and the curvature of spacetime consequence. This is not included in Newton's laws.

We can pause there and conclude that from a First Principle point-of-view, the General Theory of Relativity was a perfectly valid introduction of new physics and not pseudoscience.

Chapter 4 First Principle Applied to the Big Bang Theory

The information required for Edwin Hubble to meet our First Principle with respect to orthogonal observer rest frames was not available at the time of his red-shift observations that led to the Big Bang theory, explaining why recessional red-shift was ever even considered.

Recessional red-shift is a Doppler shift of electromagnetic photons towards the red end of the spectrum; the end with less energy per photon when two observers are moving directly away from each other. Blue-shift is the movement of light towards the blue end for observers that have rest frames moving towards each other.

The orthogonal Doppler contribution between observers is only ever a red-shift. It is the velocity from side to side, or up and down in the plane perpendicular *between* observers.

Orthogonal red-shift increases with distance, is summative from each spin or orbital system as scale increases, and each system at each scale increases, and that increase is at least an order of magnitude larger than the *sum* of those before it. This is a known type of geometric growth.

Orthogonal red-shift is also probabilistic. The probability in a flat finite handed universe (hyper mobius strip) universe (our observer reference frame) two rest frames will be moving fast orthogonally with distance that will be inversely proportional to the Universe's width. We have those measurements that were confused under the Big Bang theory and these also can be derived from a dimensionless constant.

Orthogonal rest frame observer velocity has the speed of light, c, in the limit. At some point in the distance, the orthogonal velocity ***between*** observers shifts the light received between them towards a limit in the red end of the electromagnetic spectrum, potentially appearing as a microwave background. This is representative of all the objects that are beyond our observational horizon, on our observational horizon, and approaching our observational horizon, and when we do not introduce an expanding Universe and the falsification of relativity that brings, observer orthogonal rest frame disparity can account for observations without needing recessional red-shift.

The existence of orthogonal red-shift (and it is always red-shift in Doppler contribution) alone nullifies the Big Bang theory. No new physics is needed and this is the use of existing physics, despite not being known by Hubble.

The speed of light in the limit for orthogonal red-shift, means that even if the Universe is infinite, the furthest we can see will be something like a microwave background, not from expansion, instead it is likely objects being seen which are towards that limit, where their rest frames are approaching the speed of light, c and red shifted to microwaves, relative to each other. And also blackholes will be in this microwave 'layer'.

The microwave anisotropy data from our three historical NASA satellite data sets should be a completely different treasure trove when interpreted as above, since effectively the

microwave background becomes a more powerful telescope than the James Webb Space Telescope by many orders of magnitude.

The instruments that recorded *polarisation* of the microwaves in the microwave background have inadvertently given the gift of “post-selection” of focal depth, since if we have photons, plus polarisation information, we can choose our focal depth after-the-fact. So NASA has three datasets of the full sky in microwaves, that can be used to see the topology of ANY object on, or near the horizon of the celestial sphere at the instruments’ resolution at any depth within that edge of the celestial sphere’s horizon (our observable Universe).

The polarisation data will allow resolution of objects at far greater resolution than was measured with photons alone. Polarisation data allows a 3D representation of all objects between the observer and the horizon, essentially it is like creating a hologram of the night sky that can use quantum mechanics to zoom in and out with inherent error correction.

Hubble’s recessional red-shift requires new physics due to inconsistency with the General Theory of Relativity in the early epoch of the Big Bang model, and that is inescapable; new physics is required and *still* is required at the time of writing for an expanding Universe under the Big Bang theory. If that epoch simply does not exist and was delivered by pseudoscience, then a headache of physics goes away. Neat.

Our First Principle demands we toss the Big Bang theory and recessional red-shift, until we have exhausted what would happen if we treated orthogonal redshift as the dogma instead.

Let’s paraphrase our First Principle in a way that it still holds.

> “*We agree that new physics must never be introduced when current theory has not been exhausted lest it be the lazy way of creating dogma that only builds a house of cards.*”

We must audit honestly historically and remove where new physics has been added against our First Principle. We agreed on this in the first chapter.

In summary, the means and observations were not available to Hubble for him to know orthogonal red-shift could perhaps account for his observations, and that just by the existence (and unexhausted existence) of orthogonal red-shift, it was not appropriate to introduce any explanation that would need new physics, since we have agreed it is pseudoscience to do so.

This is falsification of the Big Bang theory.

And this is before the Axis-of-Evil in the Microwave Background.

The Microwave Background from the entire celestial sphere is a near-perfect black body spectrum.

New/exotic physics at the time and since by Big Bang proponents creates a belief that the microwave background was observation of a remnant of the Big Bang, though the

observation was in the predicted part of the spectrum, the microwave background falsified the Big Bang theory there and then, since the observation temperature of the observed microwave background did not match prediction.

The slight variations away from a perfect black body of the microwave background are very small. NASA was interested in gleaning information about the Big Bang from these variations, and never once interested in falsifying the Big Bang theory, which should perhaps be unforgivable. This is the wrong way round. The experiment should be to falsify the Big Bang, not assume it is true and find out information about it. The same effort can achieve more if falsification is the aim, and not the pseudoscientific objective based on believing theory as dogma.

Three NASA experiments to measure the anisotropy in finer and more granular detail each time confirmed local features that falsified the microwave background as from the big bang. I.e. The microwave background cannot be used to support the Big Bang theory or as some remnant of an epoch boundary of transparency, it has local features aligned to the ecliptic. This is the literal prediction of being a horizon *between* observers, since the observer at our end of these observations is travelling in the rest frame of the ecliptic.

The Axis-of-Evil microwave background anomaly is clearly locally aligned with the ecliptic in each set of results. This should have been the discovery of the century. Each time.

NASA's three programs were COBE, Planck, and WMAP. All in space to measure the microwave background, believed to be the remnant of the theorised Big Bang.

Each successful NASA mission inconveniently showed local features in the anisotropy measurements. Each was more accurate in chronological order. No mission included an objective of falsifying the big bang theory.

Before the Big Bang theory, that the Universe was infinite in time and space, or equivalent for us to observe as such, was still on the table.

Relativity does not preclude an infinite Universe in space or time (spacetime).

Orthogonal observer velocity at distance has the speed of light c in the limit *between* observers.

By definition we face a choice between science and pseudoscience.

The good news is that we can tell the difference between whether the observed Doppler shift to the red end of the spectrum is orthogonal rest frame red-shift versus recessional red-shift; there is a difference in what will be observed. That means we may already have the data to check.

Orthogonal red-shift may have a distinct quasi-quantisation pattern due to a signal expected for scale changes; solar system to galactic centre, to supercluster centre.

This signal is unlikely to have a natural explanation from Hubble's exotic recessional red-shift, and orthogonal red-shift has a natural explanation from scale changes of rest frame difference between observers (solar system rotation, galactic rotation, super cluster rotation).

Chapter 5 First Principle Applied to the Standard Model

This chapter is going to be light due simply to the successes of the Standard Model in predicting the existence of particles, and the many anomalies that cannot be explained by classical mechanics.

Couple this to the successes of symmetry groups and algebras from mathematics that so elegantly fit, this is similar in terms of metric to relativity.

Relativity and Quantum Mechanics have mathematics that make predictions that can falsify.

The Big Bang Theory keeps having parameters added to it, and cannot explain what it brings for the cost of falsifying both Relativity *and* Quantum Mechanics, instead of explaining the difference and how those arise as a special case. The Big Bang Theory exists purely as an incorrect interpretation of observed celestial body red-shift.

The lack of accountability of the Big Bang Theory and steady rise in the number and latitude of parameters added after each falsification. These are not enough red flags for today's academia?

Our First Principle asks if new physics was necessary for classical anomalies. There are almost too many to mention. This is a very good sign for Quantum Mechanics.

We can quickly conclude that Quantum Mechanics was not added as pseudoscience.

As we look at each remaining problem or anomaly in quantum mechanics, we find these are blockers demanded by pseudoscience as a result of being constrained by the pseudoscience Big Bang Theory.

Chapter 6 Resolution of the Gravitational Constant Measurement Anomaly

There are a set of physical constants in nature that pop up together and in groups across equations and across disciplines of physics. The speed of light *c*, is one. Planck's constant is another. The gravitational constant, *G* is also one.

Over time, a growing number of credible teams have designed and run experiments to see how accurately the gravitational *constant*, G, can be measured.

Those experiments exposed an anomaly in the accuracy of the measurement of G.

The anomaly has odd characteristics, especially compared to the experiments measuring other physical constants such as c, and subsequent experiments over time spent in efforts optimising the accuracy of the other constants.

We note again that the constant G appears in many important equations across physics, so anything we do not understand that we can then understand has implications across those different fields. This may not mean that physics or data changes, it is that we understand where our perception is incorrect, and we re-interpret certain datasets much, much, more usefully in terms of what they tell us, and in terms of removing any anomalies.

There is an agreement on *roughly* what the constant G is, yet when attempts are made to measure beyond a certain accuracy, it is that the error *margins* of those results do not *overlap*. Only agreeing roughly on a constant should not be underestimated. That these error margins again and again do not overlap.

The number of experiments points to what the answer to this is.

That the experiments to measure other constants in physics were much more successful is another pointer to the answer.

A missing relativistic consideration can explain the anomaly, much as relativity did for the orbit of Mercury. A large enough gravitational field may not affect our day to day business, yet is so vast, our existence is because of it. A field this large and close enough would mean accurate measurements of G would be sensitive to the time of day, Moon position, Earth’s orbital position, etc.

If the solar system is within a large enough gravitational field that is of a size completely misunderstood, then the reason G is hard to measure accurately is clear. This can cause the problem as described above due to the relativistic contribution not taken into account.

Just like the orbit of Mercury.

Chapter 7 Resolution of the Pioneer Anomaly

Two NASA spacecraft Pioneer 1 and Pioneer 2 were launched at different times, in different directions and away from the Sun.

Each spacecraft experienced an unexpected extra constant force after passing a certain distance from the Sun, and towards the Sun, that is an anomaly.

Many attempts were made to explain the acceleration. The anomalous acceleration towards the Sun remained. The distance at which this force began can be referred to as the Pioneer Cliff and is as if the spacecraft are each passing a gravitational boundary, a surface, at a certain distance from the centre of the Solar System where the Sun's mass is.

A missing relativistic component can explain the Pioneer Cliff as the spacecraft passing through a gravitational surface. If there is a gravitational contribution from the centre of our Solar System that is larger than previously understood, then the gravitational surface experienced by the Pioneer craft could be a relativistic effect of that gravitational field, if of sufficient size.

A missing relativistic component may appear as a constant force to a great distance after the Cliff, if it is caused by passing a gravitational surface. If experienced by the Pioneer craft, this would fit observation without new physics and the anomaly would be resolved, on the condition that one of the solutions to the Sun's mass in General Relativity satisfies, and we remove the erroneous assumption that there is only one solution to the Sun's mass in General Relativity.

Again, there is no evidence for one solution to the Sun's mass under General Relativity and it is pseudoscience to dogmatically introduce this theory, or to claim that General Relativity does not allow at least one other solution for the Sun's mass. If another solution for the Sun's mass is valid under relativity, and anomalies disappear, then by default we throw out the pseudoscience theory that assumes one solution in General Relativity.

Chapter 8 Galactic Rotation Curve Anomaly Resolution

Without the Big Bang theory, we do not have the introduction of Dark Energy or Inflation into the theory stack. What about Dark Matter?

Dark Matter is new and exotic physics, which we still cannot explain to this day, and has had many failures and falsifications from prediction.

When we observe the movement of galaxies, we believe those observations do not contain enough mass within the galaxies to explain the rotation curve. The galaxies are rotating too fast for what our understanding tells us is what we should observe.

No relativistic component was considered, instead Dark Matter which is new and exotic physics was introduced before exhausting relativity. By our First Principle, we can falsify Dark Matter.

A missing relativistic component can explain the galactic rotation curve anomaly.

Both gravitational time dilation and incorrect assumptions about the mass of stellar objects can both account for mistakes in galactic mechanics, and must be exhausted before introducing new physics, otherwise that new physics is considered pseudoscience as per our agreed First Principle.

Chapter 9 Resolution of Olbers Paradox

We start with an assumption that the Universe is not expanding and is something that looks infinite, and perhaps in some sort of dynamic equilibrium, before introducing the Big Bang theory and new physics.

Olbers Paradox is a response to this model and an argument *for* the Big Bang theory model instead.

The paradox suggests for the infinite Universe model that we should see a Universe at the temperature of the surface of stars. This is supposed and reasoned due to light having no red-shift component, since it has not experienced expansion such as under the Big Bang model. Again, this shows the orthogonal red-shift is not accounted for.

Due to velocity differences in orthogonal rest frames *between* observers, as that velocity approaches the velocity of light, c, a red-shift horizon is created for any Universe beyond a certain size, long *before* infinity.

Assuming a long age of the Universe, we would expect nearly every line of sight to end on the event horizon of a black hole or be *extremely* red-shifted from the orthogonal rest frame observer difference.

An trending-towards-infinite Universe is composed of objects that have had time to accumulate the mass past the limit needed to become a black hole under relativity.

Olbers Paradox does not stand as a reason to suggest a Universe cannot be infinite in time and extent. Olbers Paradox absolutely does not support the pseudoscience of the Big Bang theory (by our First Principle definition).

The best information Olbers Paradox gave us was how poorly scientists have investigated orthogonal red-shift, and how poorly communicated the anomalies are regarding these experiments which all reported anomalies that disappear without recession, and only orthogonal red-shift.

Chapter 10 Resolution of the Dark Matter Implication

In terms of particle physics, the resolution of Dark Matter as an implication is simple.

Is Dark Matter new/exotic physics?

Yes, without doubt. There is no idea what it is.

Can relativity have any effects that can explain galactic rotation curves?

Yes, gravitational time dilation from our reference frame if we have made an incorrect assumption about the Sun's mass and the gravitational well we are in is different in certain ways.

Any other simpler physics?

Yes, if we don't understand the mass of our Sun and have not understood that the stellar mass contribution in galaxies is higher than previously understood. This can account for more mass in galaxies and hence their flattened rotation curves.

Have we exhausted existing theory before bringing in new/exotic physics?

No, we have not found a way to rule out relativistic contribution.

Result: Dark Matter was pseudoscience when introduced..

Chapter 11 Resolution of the Dark Energy

It is simple to show Dark Energy does not exist and was made up as pseudoscience, and it will seem obvious in hindsight. Dark Energy is only needed in an expanding Universe because of the Big Bang Theory not explaining the new physics required to explain it.

And this is on top of the Big Bang Theory falsifying The Theory of General Relativity with an expanding Universe, since in earlier epochs under the model General Relativity breaks down. When we falsified the Big Bang Theory, by definition we falsified Dark Energy, since the Universe has no basis for anyone to believe it is expanding and Dark Energy is not required to explain phenomena the Big Bang Theory introduces yet cannot explain.

The first test for Dark Energy is, '*is it the result of the Big Bang Theory"*?

Yes absolutely. Dark Energy would not exist if we did not believe the Universe was expanding. Since we have falsified the Big Bang Theory, Dark Energy is automatically falsified.

The second test for Dark Energy uses the default Universe.

We start with the simple or default Universe. Finite in extent, and not limited by time, and is therefore flat.

Since we have an expanding Universe that has been introduced, and some strange exotic Dark Energy introduced, it will be a complete giveaway if these cancel each other out in the most likely flat Universe, then both are unnecessary pseudoscience. Observations not matching the Big Bang Theory or the mathematics around the conservation of energy, spawned Dark Energy, effectively driving us to cancel the Big Bang expansion that was introduced.

Observations confirm this about Dark Energy. Not a surprise. What this implies is that our default Universe is either correct, or the configuration is a good approximation to it.

Conclusion: Dark Energy is demonstrably pseudoscience.

Chapter 12 Explanation of Orthogonal Relative Rest Frame Neutrino Mass

Neutrinos are being observed where there are unexpected signals of mass showing up or predicted by model, given what is assumed.

There is a relativistic solution requiring no new physics.

We need only assume the default of a finite Universe in extent, not limited in age, and that the microwave background is sunlight on a return journey over the horizon, redshifted from an orthogonal emission rest frame, at nearly the speed of light with respect to our receiving rest frame. This is not new physics, it is the default assumption when we remove the Big Bang Theory and examine what we know.

We predict there should also be a neutrino background coming over the celestial horizon as well as the microwave background which has the Sun's signature in the Axis of Evil, again Stellar emissions, again in equal amounts or thereabouts to the current Solar output, and that these neutrinos may often appear different from those emitted or re-emitted directly from the Sun, since these neutrinos are also in an orthogonal rest frame that is moving at nearly the speed of light with respect to ours.

While red-shifted photons will be polarised over the horizon from the orthogonal rest frame disparity of nearly c, neutrinos will arrive with relativistic mass, which will be covered by quantum gravity later in the series. It is this relativistic mass that accounts for the disparity in the Standard Model and experimental outcomes.

After falsifying the Big Bang theory, and given that neutrinos rarely interact in previous observations, we can also now add that the Universe may be much older than we believe, and that there is no evidence the Sun isn't at least as old as the diameter of the Universe, given the microwave background has the Sun's signature in it.

In summary, the mass signal in the neutrino observations can be accounted by a missing relativistic component from an origin rest frame of the neutrino that is close to the speed of light relative to ours, the orthogonal component, and the mass we are observing is that orthogonal velocity adding a relativistic effect; an increase in mass.

Chapter 13 Deriving of the Size and Shape of the Universe

At this stage, we have confirmed with our *infallible* First Principle process that relativity and quantum mechanics are theories that did not arise out of pseudoscience.

The Big Bang Theory absolutely failed this test process and was shown to be categorically pseudoscience when introduced.

Earlier, we falsified Dark Matter from our First Principle, since there are relativistic avenues open and Dark Matter *requires* new physics *without* an explanation of why, or what it is; it is pseudoscience by our agreed definition.

We also falsified Dark Energy, since this only exists to explain observations that expansion from the Big Bang alone cannot, and it *requires* new physics without an explanation of what, why, or how. This again is our definition of pseudoscience, and this definition of what is fake science stands up to any scrutiny, and we have done this by design.

Nothing stops us from bringing in fancy new ideas or theories to gain entry to the physics stack once rigor has been applied to what we have. We must know why the incoming exotic theory now falsifies and/or makes a special case of our existing theory. There must be explicit accounting for what other avenues need to be exhausted with what we know now, so everything possible is laid bare to make falsification as simple or easy as possible. If our theory is correct, it will stand any scrutiny. We have not performed that rigor to-date with what we have as a cohort or community in physics.

We now derive a default size and shape for the Universe starting with two dimensionless constants. The natural constant *e*, and the fine structure constant *a*, or alpha.

One of these constants that are called dimensionless because they have no units-of-measure is a transcendental constant from mathematics. This particular constant is unique in that the derivative of this constant e to any power, is the constant e to that power. It is unique in that it is its own derivative when expressed as a curve (when e to the power of a variable is expressed as a curve, like e to the x, where x is for example, a real number).

The constant, *e*, is called Euler's constant, and also called the natural constant and *appears* everywhere in its related famous spirals found in nature. As an exponentiation function that was mentioned above for the properties of the derivatives (and similarly the integrals), choosing this transcendental constant is useful for simplifying mathematical descriptions in calculus, including any mathematics with derivatives, particle derivatives, or integrals that in any way, shape, or form describe symmetries, especially surfaces and spaces involved in symmetries. This seems extremely appropriate as a choice from mathematics that we need as natural or physically applied mathematics.

The CPT symmetry of Charge conjugation, Parity mirror image, and Time direction together have never been seen to be violated, much as angular momentum etc and energy etc are conserved. This implies five dimensions, or three spatial, plus time, plus charge in the symmetry breaking model our observation conditions impose on the Universe. We can see charge as the symmetry breaking through a five dimensional twist to spacetime that

determines the geodesic over spacetime of particles that now *appear to observers in a particular rest frame* to behave differently than before symmetry breaking, *in the way they are observed by us*, yet nothing has really changed except for each dimension *appears* under *observation* to be stretched and twisted.

To understand this twist in all the appropriate dimensions, we take the fine structure constant alpha, or a that is calculated from contributors including all the above dimensions, and can be done so in more than one way, always deriving the fine structure constant when dimensions cancel out. This is approximately the reciprocal of 137.

Since these are demanded by our perception and observation conditions including our arrow of time, we assume that these constants come in pairs, and each pair is related, and that rest frames mean these constants are *not* absolute, constants are rest frame dependent. This is another way of saying that some measured '*laws of physics*', where we believe those are fixed constants of nature, actually depend on rest frame conditions, and for us these conditions are clearly a dimension (time) so stretched it appears independent of the other three (spatial) and that this dimension only moves in one direction.

The description above describes why we observe handedness in this direction of time, and that handedness is the opposite in the other direction of time.

We add the fine structure constant alpha, which is the curvature in five dimensions of spacetime from observing under our constraints, or rather our rest frame, and we add this to the natural constant, e. We can then take this number and find the natural logarithm, and then simplify by using this result as the power of e. The result should be the temperature of the blackbody spectrum peak of sunlight coming over the horizon, red shifted from the temperature of the surface of the Sun.

This sum that gives us the peak in the blackbody spectrum of sunlight coming over the horizon is red shifted from the Sun's blackbody peak after travelling a geodesic, each photon tracing out a mobius strip, when that sunlight comes over the horizon, it is in an opposite rest frame to ours travelling orthogonal at nearly 90 degrees and co-moving at nearly *c*, the speed of light. Another equal journey to the horizon returns the rest frame back to its first position. The Universe is roughly the inverse of that blackbody peak in hundred of millions of light years in radius, the diameter is twice that.

Euler's constant, *e*. And alpha, *a*, the fine structure constant, approximately the reciprocal of 137, or roughly 0.0073 add together to roughly 2.73. Taken as a blackbody peak temperature of roughly 2.73K, then this is the observed blackbody spectrum peak of the Cosmic Microwave Background. And the polarisation percentage of CMB photons matches the Sun's output as measured from space.

We can take a trip back in time and suggest a timeline that looks like this…

a. Einstein's General Theory of Relativity comes out

b. Edwin Hubble notices spectral line galactic redshift in all directions

c. Hubble considers that this is due to special relativity and orthogonal motion

d. Hubble considered that an inflationary explanation would violate general relativity, so he decided to stick to a proposal that was not arbitrary and had nothing to support the assertion of violating relativity. Nothing.

e. Hubble proposed that sunlight was in a rest frame that when coming over the cosmic horizon in a flat Universe would be redshifted just above a limit due to the angle and co-moving frame.

f. Hubble proposed that the limit would be the dimensionless natural constant e, and that the sum of this constant and the fine structure constant, alpha, would be the value of the temperature of some yet-to-be discovered microwave background

g. Hubble proposed that the value of alpha would be reciprocal of the width of the Universe in deci-mega light years, and that alpha would also be the numerical value minus relativistic effects of the rest frame curvature of the spacetime geodesic around the finite Universe

h. He proposed that the Solar System would be many times the age of the width of the Universe in light years; i.e. multiple of 13.7 Billion years.

i. Hubble suggested that the Universe was therefore 13.7 Billion light years across and we would see sunlight in an almost completely red-shifted frame from every direction and that the polarisation of this light from the Sun that is redshifted, should match the polarisation of sunlight as a percentage.

Had Hubble realised and chosen not to go a path that automatically led to the falsification of relativity without a reasonable explanation of how that would work, he may have come to the realisation that it is rest frame curvature over the spacetime manifold.

Chapter 14 Resolution of Apparent Observed Matter Antimatter Disparity

The antimatter disparity anomaly is asking:

Why is there more matter than antimatter observed?

The implication in the question can be rephrased as:

Why don't we see 50% antimatter?

Without the Big Bang theory there is an argument to suggest this matters less. Nonetheless, we need a default position. Is it a real paradox?

First we can disambiguate that the description includes a parameter that a direction in time has been chosen, since it is us that are observing this disparity.

If we create matter in our direction of time, then we violate energy conservation.

If we create matter and the equal and opposite of that matter, then we do not.

This is where the paradox still arises. The equal and opposite of matter to our frame of reference is matter, since the equal and opposite of matter is antimatter moving backwards in time.

The conservation of certain particle numbers. Conservation usually implies a symmetry.

We do not need a beginning with the removal of the Big Bang.

We do not increase or decrease the number of certain types of particles in our observed induced direction.

Our default is a finite extent, without a limit in time Universe in dynamic equilibrium, when we observe from our frame of reference.

There is an excess of antimatter particles in the other direction of Time than the direction we observe Time passing, which is a consequence of our direction being chosen.

It is our observation bias that causes the problem. It is not there in spacetime without that bias of a chosen direction.

Without a Big Bang we can now be free to suggest that our observations are made from a position in the Universe where a gravitational well has caused the spontaneous symmetry breaking that our Solar System is in and that we live in.

We must remember that we do not know what the Sun's rest frame is like to observe from, since we have made no observation from that rest frame.

Our observations come from a rest frame on Earth, or from satellites we launch that were built in that same rest frame and barely change from it are our sole method of collecting observations.

We assume that the Sun is a black hole of unknown mass.

We assume that the Sun is spinning at a rate that may mean relativistic effects need to be accounted for, and we need to assume we may not see these due to our observation bias. We remember our direction-in-time bias that is quite startling considering the symmetry of Einstein's Field Equations. to start with that is spinning close to the speed of light

Chapter 15 Coincidence for Natural Derivation from the Physical Constants

In chapter 6 we showed a simple way to start with two important dimensionless constants and get a measure for the size and shape of the Universe, a flat spacetime that from our observer rest frame, there is a preferred direction in spacetime that bends symmetries in our perspective, and this is left-handed curvature imposed in five dimensions to the geodesics of particles that travel the four dimensional spacetime.

In the next series we will be exploring the derivation of all observed particles and masses in the Standard Model and continue to show why this simply arises out of a five dimensional handed curved spacetime that is necessary for our observer conditions.

We will continue to explore the three axes of rotation and their quantum numbers of the local manifold, and the three axes of rotation of the global manifold and their quantum numbers, and the associated geodesics of both.

Anyone who understands what we have done with respect to the two constants will understand the derivation of all the physical constants. And we will go into that detail.

As mentioned in the introduction, we can predict that if we are correct then the proponents of the Big Bang Theory are likely to be calling something important a *coincidence* that doesn't make sense, and then we show it makes perfect sense in our simpler view.

The Hubble size as determined through multiple observations seems to be coming out as the same as the *age* of the Universe under the Big Bang model. This makes no sense unless the Hubble constant is changing, otherwise the coincidence only happens right now in this epoch, and not in the future or the past. In our model, the Universe is not limited in age, instead it is the size required to cause the red shift created by our two constants added together.

Our simpler explanation and calculation from appropriate constants stands as testament to our approach and the sense it makes to remove pseudoscience. In this instance, the dogma of not falsifying the Big Bang Theory has essentially put a roadblock in front of nearly all physics, which quickly disappears in the converse approach.

Chapter 16 Conclusion

We end this series with this book and the undeniable falsification of the Big Bang Theory, and a solid foundation for the size and shape of the Universe that fits with relativity and quantum mechanics, and is then cross-checked with a predicted coincidence from the dead Big Bang Theory.

We have solved anomalies in physics to do with gravity and quantum field theory. And a paradox.

We have used the transcendental natural constant from mathematics and combined it with the fine structure constant from the intersection of all fundamental forces to give the peak of the blackbody curve of the Cosmic Microwave Background from these two dimensionless constants.

The CMB then is by default coming over the 13.7 billion light-year horizon of a flat spacetime curved in five dimensions to arrive over the spacetime horizon at a near 90 degree or orthogonal angle and a rest frame co-moving relative to us at nearly the speed of light. No new physics. Just the removal of pseudoscience via an infallible method.

In the second series and book we will take further steps into what this means for the remaining questions still outstanding in physics.

Chapter 17 Constants and Equations Referred to in this Series

The Fine structure constant

$$\alpha = \frac{1}{4\pi\varepsilon_0}\frac{e^2}{\hbar c} \approx \frac{1}{137}$$

The Gravitational constant

$$F = G\frac{m_1 m_2}{r^2}$$

$$G_{\mu\nu} + \Lambda g_{\mu\nu} = \kappa T_{\mu\nu}$$

$$\kappa = \frac{8\pi G}{c^4} \approx 2.076\,647(46) \times 10^{-43}\ \mathrm{N}^{-1}$$

The natural constant, *e*

$$\lim_{n\to\infty}\left(1+\frac{1}{n}\right)^n$$

$$e=\sum_{n=0}^{\infty}\frac{1}{n!}=1+\frac{1}{1}+\frac{1}{1\cdot 2}+\frac{1}{1\cdot 2\cdot 3}+\cdots$$