

# Anthropic Physics

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### **Overview**

This paper follows on from my [Something From Nothing](#) and [Universal Existence](#) papers. Its purpose is to highlight in a bit more depth how multiverse laws of physics explain our particular universe. I don't claim any extensive originality here, but in my observations, it still seems that the forest can not be seen as the trees are in the way.

The Anthropic principle trivially explains the existence of:

- 1 Conservation of Momentum
  - 2 Conservation of Energy
  - 3 Special Relativity
  - 4 Quantisation
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### **Introduction**

My other papers argue that there is realistically and rationally, only one possible way that this universe and us can exist. That is, there *must* be an almost incredible vast number of other universes, each with their own random laws of physics, and that we just happen to be in one those universes that allow for our own existence. The essential idea that we must inhabit a universe that has properties that allow us to exist is well known and referred to as the [Anthropic Principal](#). However, the principal in as of itself, does not actually require multiple universes, it just states what some conditions must be, without giving an explanation as to how or why those conditions actually arise.

This multiverse universe idea has gained quite a bit of traction of the years, coming from outright ridicule from the historical established guardians of physics to semi mainstream acceptance as a valid idea, even if many still consider the idea almost vacuous. A key point is that, if it is accepted that there is some process that generated our big bang, then its pretty much ludicrous to claim that that process can only generate a single one of them. It no different from the earth is the center of the universe claim.

A common objection is the view, that as the other universe are unobservable, that the idea explains nothing. Its just metaphysical waffle. If anything can happen, in the 'theory', it's useless. For the multi universes of the MWI of QM, I would agree, however, there is a fundamental difference here. The MWI is just *one* physical interpretation of QM, there are

others such as Bohmian Mechanics, that are just as valid. There is no compelling physical evidence to chose either, so sure, neither has a lot of value. However, as explained in the other papers, there is simply no rational way to account for the incredible fortuitous way that the laws of physics and physics itself can conspire as electrons, protons, hydrogen, carbon etc, in such a way that we can exist, unless they are a huge number of ways that such a menagerie can exist, and we are simply one of them.

The immense attraction of the multiple laws of physics and physics objects, is that it trivially explains why the fundamental laws must to be the way they are. One simply asks the question:

*1 "If a fundamental property of our physics were not true, could we exist?"*

with reference to:

2 An objects long term stability being independent of time, position and velocity.

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### **Conservation Of Momentum**

Without conservation of momentum, we could not exist in this universe.

Suppose conservation of momentum was not true. For example, suppose that every single interaction between atomic particles resulted in a net loss of momentum. This would mean that all objects would eventually grind to a halt. Clearly, we could not exist if all objects are not moving. Neither could we exist, if all objects were continually increasing to infinite velocities.

So, we must live in a universe that has conservation of momentum. Period.

Conservation of momentum, cannot be "explained" in any other way.

There is is of course, no requirement for that result to hold in other, unobserved universes. Conservation of momentum is not sacrosanct. An empty universe generating mass-energy from nothing has no such law to force such a conclusion.

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### **Conservation Of Energy**

Without conservation of energy, we could not exist in this universe.

Suppose conservation of energy was not true. For example, suppose that every single interaction between atomic particles resulted in a net loss of energy. This would mean that there would be no ability to change anything in the long term. Changing an objects motion, requires energy. Neither could we exist, if all objects were continually increasing to infinite energies for obvious reasons.

Note that this argument, say noting about whether or not energy can disappear and appear over some short time period to give an average of conservation of energy.

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### **Symmetry Laws**

It is often held that in Physics, symmetry is everything. For every symmetry there is a conservation law. In this way, conservation laws are "explained" by [Noether's Theorem](#). The alternative, is that conservation laws are fundamental to explanations of existence, and that those conservation laws simply result in consequential symmetries. The standard view does not explain why symmetry is actually relevant to existence at all, so does not really explain anything. It just replaces one unknown, with another. All objects grinding to a halt explains why conservation of momentum *must* be true, in our universe, from which symmetry is a *derived* quantity.

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### **Special Relativity - Maximum Velocity**

Without Special Relativity, we could not exist in this universe. This universe requires a maximum velocity for atomic stability.

That is, that there is a maximum speed that any object is limited to.

Atomic stability requires that there must be some long term average velocity for its constituent parts that is stunningly constant. For example, if an idealized electron were spinning around the idealized (somewhat fictional) atom core, had a velocity that drifted significantly over time, then the atoms properties would change, with the result that the atom and the elements themselves would all washout to a large smudge, or something no less unpleasant. Indeed, 1 second in 5 billion years is of the order of 6 parts in  $10^{18}$ .

*If there was no maximum speed limit, then there would be nothing to prevent an objects velocity changing.*

Hence, nothing to prevent physical structures dismantling themselves. If there is a limit, then, and only then, is there a mechanism for an infinitely stable atomic structure, by having internal velocities locked in some way to this maximum velocity. It is noted here the [Rydberg Constant](#) for the spectral lines of Hydrogen, and its inclusion of  $c$ .

Note that the argument is not that an object itself travels at  $c$ , but that without a mechanism to limit a process own frames local velocities, there would be nothing to prevent an internal velocity drifting, given sufficient time, to dismantle the object itself.

Assuming conservation of energy and momentum, it can be shown from the [E=MC](#) (<http://www.kevinaylward.co.uk/gr/emc2/emc2.html>) paper that the form of space-time must be of only one form. So, SR is forced on the universe by the requirement to have, essentially, a stable operating frequency.

### **Special Relativity - Physics Independence of Velocity**

This universe requires "*That the Laws of Physics are independent of uniform velocity*" for atomic stability. If the laws of physics that hold atoms together, changed with velocity, things moving would dismantle themselves.

### **Space-Time Requires Physical Objects**

The standard view of Special Relativity, is that the strange relation of time and space just is. It is claimed that no explanation is required at all. Its just the way time and space behave, but you have simply not developed that "intuition" because you don't observe much at high relative velocities in your daily life. For example, no matter how fast you run towards a light source, the photons coming from that source always hit you at the same speed. This standard view, is trivially nonsense. This property is clearly very bizarre. How does the photon "know" how to change its speed? The standard view is akin to declaring consciousness does not exist because it can not be measured, despite the fact that a kick in the balls usually changes the holders mind when such an act is actually brought to their attention...

Time is simply the observation that *physical objects have changed their position relatively to other physical objects.*

That's it.

If nothing changed position, time would be stopped. Period. If there were no objects to move, there would be no time. Period. That is, *time requires physical objects to exist.* Time is *created* by physical objects changing their positions. Time requires the physical properties of real objects in order for it to be constructed and defined. It can not just "exist" on its own, as another invisible god. A grid needs to be drawn, with real objects, that interact with each other. Time must be the result of real physical objects, with the exact nature of the relation between those physical objects being the result of a real physical process. That is, if a physical object changes its position,  $dx$ , there must be some relation of time,  $dt$  such that:

$$dx = f(dt)$$

That is, space and time *must* be functionally, and causally related. SR, is the simple observation of what that relation is, irrespective of the physical mechanism that creates this space time interaction relation.

The Anthropic Principal says that SR must be true for this universe to exist, however, it does not explain physically how objects interact to actually produce such a space-time.

It is noted that one attempt to physically "explain" the physical nature of SR, was the Lorentz Aether Theory (LET). This theory postulates that light is a disturbance in a medium, and that objects interacted in that medium in such a way to generate all the strange results of Special Relativity. However, the rejection of this particular approach, does not defeat the original explanatory issues as to why measurements of the speed of light, and the subsequent explanations derived from that idea, are what they are.

*The universe must be filled with with physical objects, everywhere, to give other physical objects their laws of physics.*

It is only interactions between objects, that give objects laws of physics to interact with. There is no physics 'god' magically endowing objects with properties. It is also clear that these objects must be extremely uniform throughout the universe, otherwise atoms moving about the universe would fall apart if the laws of physics changed with position and velocity. One of these objects, apparently, is the Higgs boson...

As explained in [Something From Nothing](#), it is completely irrational to claim that laws of physics can exist independent of physics, i.e. independent of other physical objects. An empty universe is empty. Dah..

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## **Quantum Mechanics**

Without Quantisation, we could not exist in this universe.

Q. Why did the world transition from analog plastic records to digital CDs?

A. Stability and immunity to errors.

Long term stability of changeable objects, can only be achieved if such changes are quantised. That is, changes are only restricted to specific values. For example, an atom radiates and absorbs energy at quantised values. Traditionally, it has been argued that atomic stability owes its existence to quantisation, in that without photon energy being radiated in lumps, the electron would spiral into the nucleus due to loss of classical energy. It is argued here that quantisation is more fundamental.

Irrespective of the details, essentially, all continuous process objects degrade. Quantisation, solves the degradation problem. For example:

The two key properties in physics are length and momentum.

It is immediately noted that length is not quantised in standard QM. Well, draw a square grid, then ask, what is the minimum distance between a point not horizontal or vertical from its neighbor!

So, there are major problems with quantising distance, and hence, also velocity, momentum is what is left.

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## **Summary**

Basic laws of physics are trivially explained by the assumption of multi universes.

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