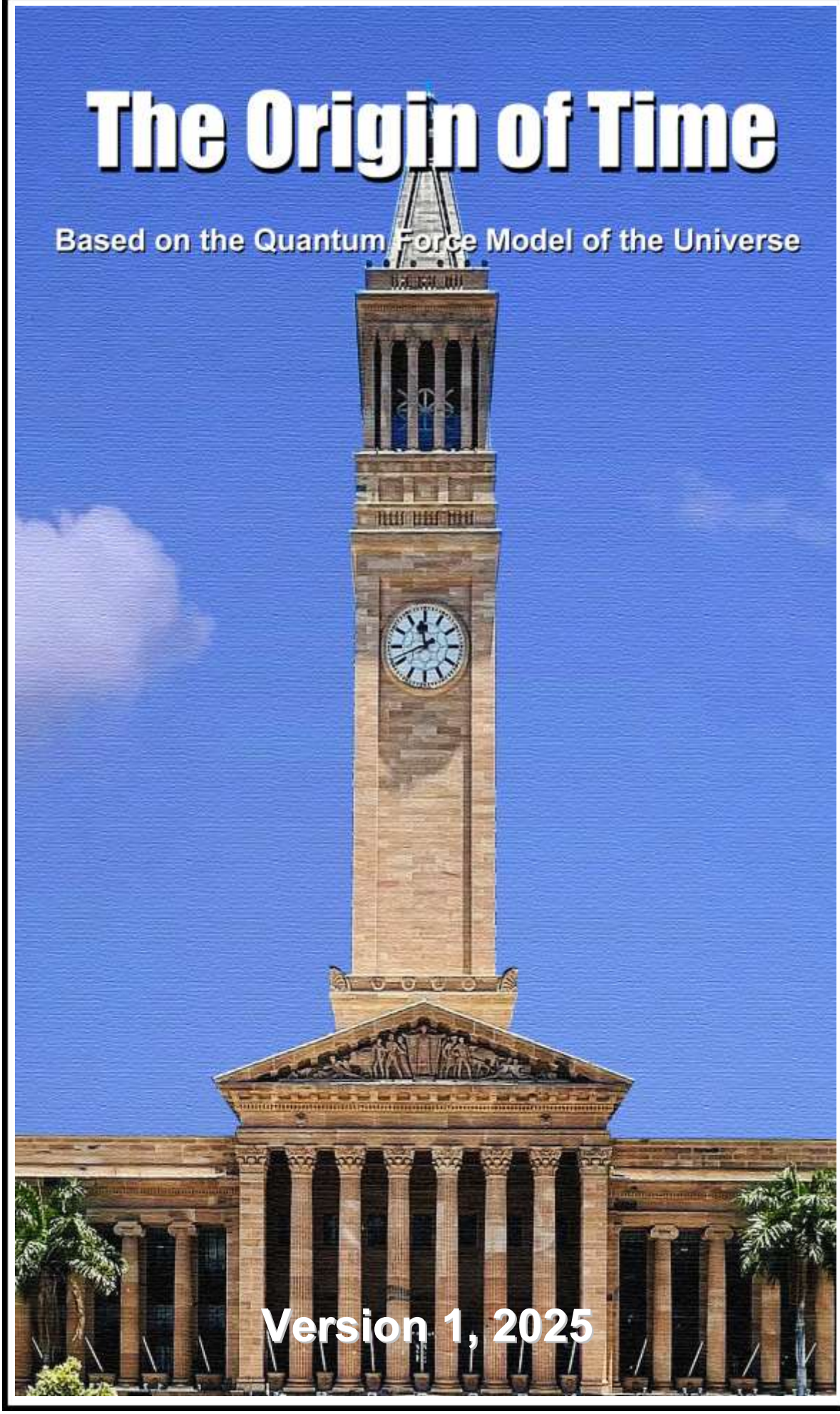
The Origin of Time

Based on the Quantum Force Model of the Universe



Version 1, 2025

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Version 1, August 2025

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Cover: Brisbane City Town Hall clock tower, Brisbane, Queensland

About the author

Grant Witheridge is a retired civil engineer with both Bachelor and Masters degrees from the University of New South Wales. He has over 40 years experience in the fields of hydraulics, stormwater management, creek engineering, and as a lecturer in coastal engineering.

Grant brings to this discussion an understanding of fluid mechanics, and his belief that:

- the mechanics of the Universe must be founded on just a few simple principles/actions
- all forces originate from quantum forces, which are the building blocks of energy
- mystery and complexity exist only in the absence of knowledge.

Contents

1. Introduction

If you think about 'time' the same way I currently do, then you would wonder why anyone would bother writing a paper about such an inconsequential topic. But, if you think about time in the way I did before I started this investigation, then you would probably believe that time is a big deal; that the topic of time is something worthy of a book, or even a movie (*The Time Machine*).

In reality, universal time, or just 'time', is nothing more then the exhaust gas of the rumbling engine of our universe. Time is simply the by-product of movement, just like exhaust gases are a by-product of a petroleum engine.

Unfortunately, I cannot prove any of these statements. I also cannot prove that time exists, or doesn't exist. In fact, nobody has ever proven that time exists. We cannot detect, touch, or feel universal time, we just assume that it exists because we spend so much of our life talking about it. We grow up looking at clocks and noting the current time-of-day.

But, clocks don't measure time! They only measure movement. The movement of a shadow on a sundial, the movement of sand in an hourglass, the movement of a particle in an atomic clock.

When you go on a driving holiday, the tripmeter measures the distance you have travelled. In reality, you cannot reverse your travels, because putting your car in reverse only changing the direction of your forward movement. If you tamper with the tripmeter and wind it backwards, nothing changes in regards to your actual journey. In real term, your travels can only move 'forward'. Consequently, the tripmeter is simply a by-product of your journey. It does not control anything, it only holds the meaning that you are willing to place on it.

Just like the tripmeter in your car, 'time' is the tripmeter of atomic activity, it is a by-product of movement, and it can only move forward. Changing time cannot change the activity, but changing the activity can change our perception of time.

Every 'action' that occurs within the universe is associated with both an action time, and a reaction time. Nothing in the universe occurs instantaneously. Everything takes time. Just like every movement requires a distance; well, every action requires a time. Just as distance is the by-produce of movement, so too is 'time' a similar by-product of movement.

Every movement is an action. Every movement produces the by-product of the first three dimensions of space, x, y & z. And every movement produces the by-product of the fourth dimension of space, time.

If we throw a ball into the air, then its movement will take a certain amount of time, but that does not mean that 'time' needs to exist as a type of cosmic force. If you were to throw that ball, what does this thing called 'time' actually do? Does it change the universe? In fact it doesn't do anything, because it does not exist outside our concept of measuring movement, and movement only exists when something moves relative to something else.

The questions people are most likely to ask about 'time' are likely to include:

- What is time?
- Is universal time the same a clock time?
- Did universal time exist before the Big Bang?
- Is time travel possible, and can you travel back through time?
- Has time been constant since the Big Bang?
- Is universal time constant across the universe?

The easiest question to answer is in fact the question most frequently asked: *Is time travel possible?* And the answer is: Yes, of course it is!

Time travel has always been possible. We experience it all the time. You are travelling through time as you read this document. We are always travelling through time. We just can't travel backwards through time, or move faster through time.

So why can't we travel backwards through time? Answer: Because just like all 'forces' and all 'pressures', 'time' can only be positive. Universal time is created by 'actions', or 'movement'. But unlike our concept of movement, time can only advance. If a car moves forward it takes a certain amount of time. However, if a car reverses that motion, its 'real' movement is always forward, and the time period is always positive.

Let us now consider what I believe is the hardest of the above questions to answer, that being: *What is universal time?* And we can add another question to that: *Was universal time created, and if it was, how was it created?*

The reason I consider this to be the hardest question is because most of us have spent our entire life thinking of universal time as being the same as clock time. It is difficult to talk to anyone about time because we developed our understanding of time from a young age, and as adults, it is difficult for us to totally change our mind on something we have always believed.

We think of time as being the fourth dimension, as being a variable that we can measure with a clock, but we cannot detect, see, smell, hear, taste, or touch 'time'. Our five senses are useless when it comes to detecting the passing of time, even though some of us may have a good internal body clock.

The only scientific fact that we have some confidence in is Einstein's idea that a relationship appears exists between universal time and velocity. Einstein tells us that time stops if an object travels at the speed of light. Stephen Hawking even tells us that time stops within a black hole.

But how can that be? How can time stop if you are travelling at the speed of light? Surely, if time actually exists, and a photon of light is travelling at the speed of light, and time were to stop, then wouldn't the photon of light also stop?

Well, believe it or not, but there are logical answers to each of those questions. Firstly, it is not universal time that stops when something is travelling at the speed of light. It is just clock time that stops.

Secondly, a photon of light doesn't physically travel at the speed of light. Only the energy message (or force message) of the light travels at the speed of light. When you speak, the air that the sound travels through does not move at the speed of sound, only the compression wave (or force message) travels at that speed. When a photon of light hits your eye, it is the energy wave that your eye detects, not a massless particle.

The reason why clocks must stop operating at the speed of light is simply because the speed of light represents the maximum speed of a force message, which is termed the speed of causality. If you were to travel at the speed of causality, then no force or energy message could move away from your current position because you (and everything about you) are already moving at the maximum speed of any message. So your heart will stop beating because no message could travel to your heart. You wouldn't even be able to scratch an itch because no message could be travelling to, or from, your brain. Oh, and your watch would also stop because no message of movement could occur.

Think of it this way: If you were to fall through a vacuum, then you would accelerate at 9.8 m/s/s (or thereabouts). Now while you were falling, you would not be at risk of loosing the change from your pocket because if your change were to fall from your pocket, it too would continue to accelerate at the same 9.8 m/s/s. This is because both you, and your change, had reached the limit of acceleration. Well, at the speed of light, all actions, and therefore all messages, have reached the limit of their ability to move.

As humans, we grow-up believing that our aging process is linked to time, when in fact the aging process is more closely linked to temperature. It is just that humans don't notice the effects of temperature on their aging because warm-blooded animals regulate their temperature. This means that humans won't age slower simply by moving to a cold climate, or a colder room.

If only humans were more like a slab of butter, then we could just pop into a cold storage room to slow down our aging process, or maybe we could learn how to hibernate each winter.

Even though the lifespan of humans may not be significantly affected by temperature, the aging of our skin is much more closely linked to temperature changes. A simple comparison between an elderly English person, and an elderly Australian will confirm that fact. While our body remains at a near constant temperature, the temperature of our skin can vary significantly, and so does its aging process. Dark pigments and/or suntan lotion may protect our skin from damaging UV rays, but it does not protect our skin from the aging effects of elevated temperatures. Only shade, clothing and hats can do that. Spending our youth in the sun could mean that when our body is turning fifty, our skin is turning sixty.

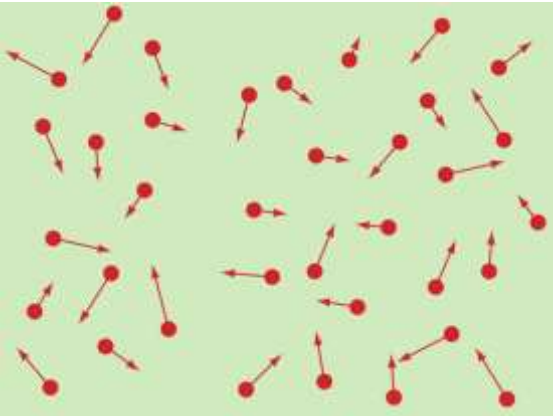
Oh, and best of luck with your use of age-defying creams because the skin you are treating today will be replaced by new skin very shortly. Unfortunately, the skin you will have in your 40s will have no idea that you spend all that money in your 20s.

Introduction

New ideas

Introduction

- The discussion presented in this paper is based on the adoption of quantum forces as the primary product of the Big Bang, which is different from the current energy-based model.
- While all actions within the universe may require energy, all of these actions are enacted through the application of forces.
- I have termed the most basic of these forces as 'quantum forces', which ultimately generates gravity, magnetism, and all the atomic forces.



Quantum forces

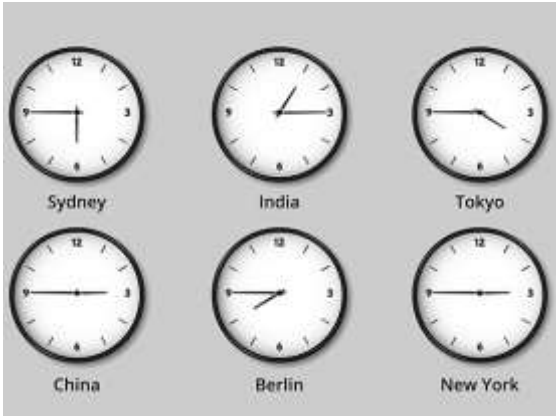
Quantum forces

- A quantum force is considered to be a force that has no dimensions or physical existence, such that an infinite amount of quantum forces could exist at a single point; hence the singularity theory.
- However, before you start laughing too loudly, please tell me if 'energy' or 'magnetic force' have dimensions, or a physical existence.
- With the adoption of a force-based model, nothing in science changes, except the explanation of the science.

Space

Universal time

- From this point on, any reference to 'time' shall mean 'universal time', not clock time.
- Clock time shall always be referred to as 'clock time'.
- I assume that most people believe that time existed before the Big Bang.
- I also assume that most people believe that universal time is linked to velocity, and that time stops at the speed of light, and within a black hole.



Clock time

Clock time

- Clock time is simply a measure of the rate of movement of specified matter:
  - the movement of the Sun
  - the movement of sand
  - the gravitational or electrical movement of gears and weights in a house clock.
- Clocks don't measure universal time, they only measure the rate of movement of a particular object, which we use as a measure of 'time'.

What is universal time?

Clock time

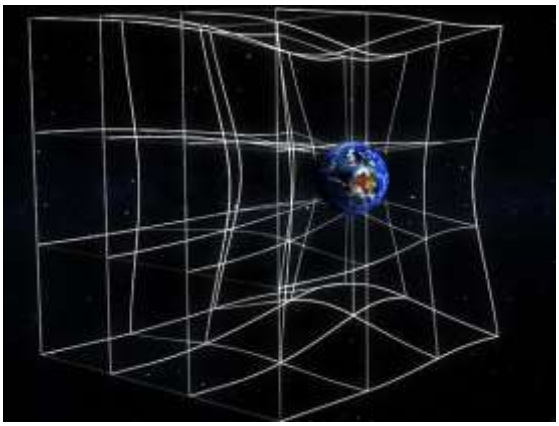
Introduction

- In order to understand universal time, it is first necessary to understand the role that time plays in the operation of the universe.
- It is a very hard task to question the functioning of universal time because you need to remove from your mind all of the assumptions you had gained over your life.
- Most of us believe that universal time and clock time are the same thing, but they are not.

The unknown

How does ‘time’ work?

- For most people, time is just ‘time’.
- We assume that it exists because how else could we move from one moment to another.
- But how does time achieve this ‘act’ of moving from moment to moment?
- What actually happens to the universe in order to allow it to move from one moment to another—how does ‘time’ work?



A representation of curved spacetime

Does ‘time’ just happen?

- If ‘time’ just happens, without any action being applied to any aspect of the universe, then how does the rate of time change as a result of changes in the existence and/or velocity of a mass?
- How could the rate of time be different in different regions of the universe?
- How could time interact with space to form spacetime?

The Big Bang

Does ‘time’ need to exist

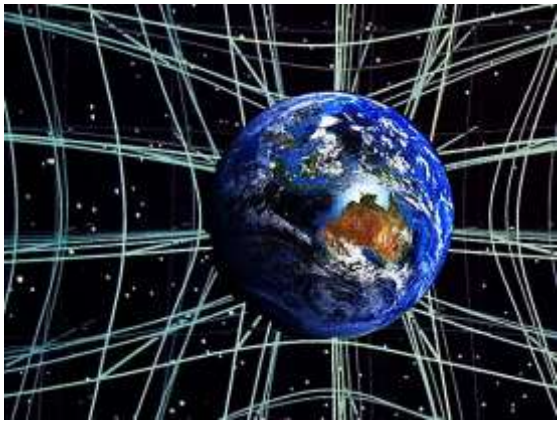
- Just say an object suddenly appeared in space—is ‘time’ really needed in order for that object to move?
- Why can’t something just move without the need for time.
- Besides, what actually does ‘time’ do that allows movement to occur? Does it rebuild the whole universe every millisecond?
- Of course ‘time’ doesn’t do anything—it doesn’t do anything because it doesn’t really exist—it is just something invented by humans to define ‘instances’.

Universal time as based on an energy model, and a force model of space

Singularity (nothing to see here!)

Assumptions

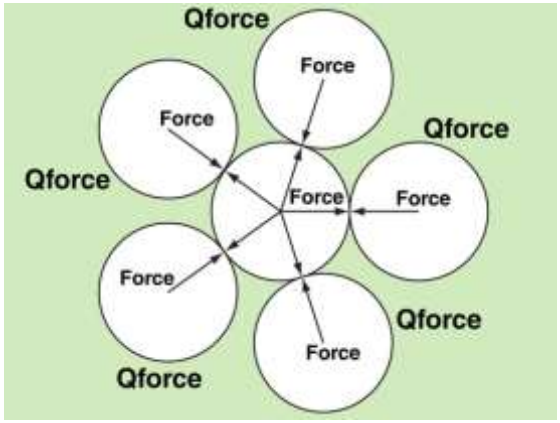
- In this paper, the assumptions that I have adopted are:
  - singularity existed pre Big Bang
  - the Big Bang theory is an accurate description of the universe's expansion
  - the singularity, Big Bang, and universe are all formed from quantum forces that have no dimensions or physical existence
  - universal time is an invented by-product of movement.



Spacetime

The energy-based model of time

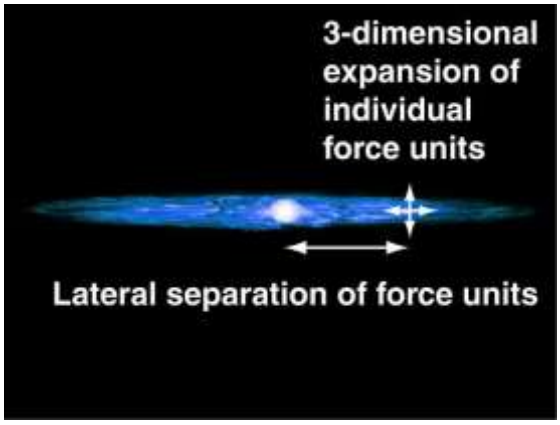
- In our current energy-based model of the universe, 'time' is assumed to be the same as 'clock time'.
- It is considered to be the 4th dimension.
- It is a parameter that appears to be independent of the first three dimensions, x, y and z.
- However, Einstein suggested that 'time' could not be separated from space, and thus the concept of spacetime was developed.



Quantum forces

The force-based model of time

- In the force-based model of the universe, 'time' could be treated in exactly the same manner as above.
- We could consider 'time' to be:
  - an invented term
  - a product of the movement of force messages, or
  - an independent variable.
- The model of the universe continues to work no matter what option is chosen.



Expansion during the Big Bang

The space occupied by a quantum force

- Quantum forces were earlier introduced as being dimensionless, meaning that an infinite concentration of quantum forces would still be dimensionless, which would allow 'singularity' to exist.
- However, as a result of the ongoing expansion of the universe, a single quantum force would be associated with an expanding region of influence.
- As the universe expands, the region of influence of a quantum force would also expand.

Universal time

Unknown

We have a choice

- Personally I stand firmly in the ‘position’ that universal time does not exist in reality, just the same as physical matter does not exist in reality.
- My previous publications show that our perception of physical matter exists only because of the actions of forces, which themselves, have no physical existence.
- So, we have a few ways we can choose to think about universal time.

A ‘lot’ of nothing before the Big Bang

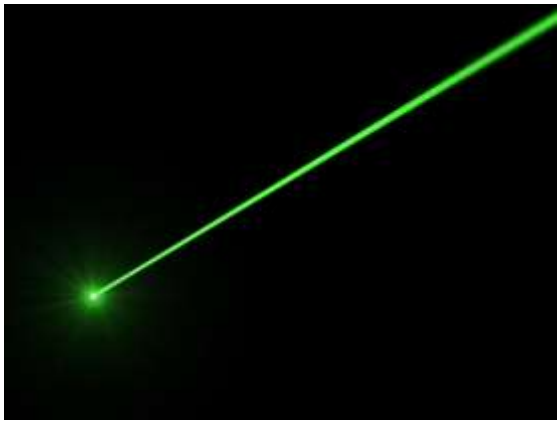
Time as an independent product of the universe

- We can choose to believe that universal time has always existed as an independent variable.
- This would likely mean that ‘time’ existed before the Big Bang.
- However, this idea leaves us with the unanswered questions of:
  - when did ‘time’ start? and
  - how did ‘time’ start?

The Big Bang

Time as a product of movement

- We can choose to believe that universal time resulted directly from either the movement of quantum forces, or the movement of the force messages that cause such movement.
- This would mean that ‘time’ started at the commencement of the Big Bang.
- It would also mean that ‘time’ is unique for every action and movement, resulting in ‘time’ being highly variable across the universe.



Light

Time as a human invention

- We can also choose to believe that the concept of universal time is simply a human invention that is used to identify different ‘frames’ of motion.
- This would mean that universal time is effectively the same as clock time.
- It would also mean that universal time is unaffected by the velocity of matter, meaning that even though a physical clock may stop if it were to move at the speed of light, universal time would be unaffected.

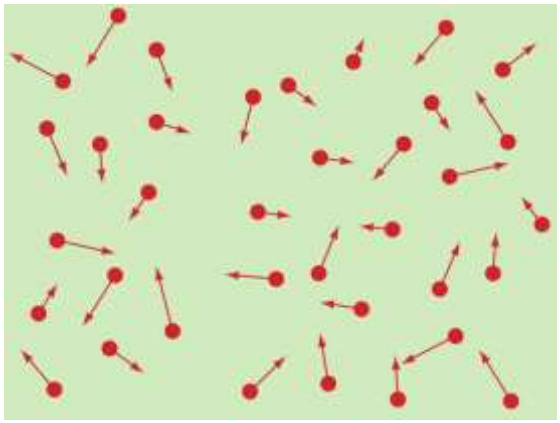
2. A Force-based Model of the Universe

Introduction

Space

Introduction

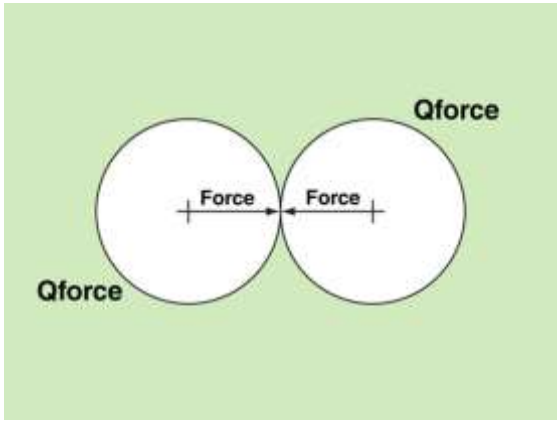
- Simply by replacing our concept of a universe filled with energy, with a universe being filled with quantum forces, we establish a basis for:
  - the make-up of all matter
  - the make-up of all forces
  - an explanation of gravity
  - an alternative understanding of time
  - and an understanding that nothing physically exists within the universe.



Quantum forces

All forces in the universe originate from quantum forces

- The current belief is that there are four fundamental interactions:
  - gravity
  - electromagnetism
  - weak interaction
  - strong interaction.
- However, I believe that it is possible to demonstrate that all of these interactions originate from quantum forces.



Two quantum force units

All forces are positive in magnitude

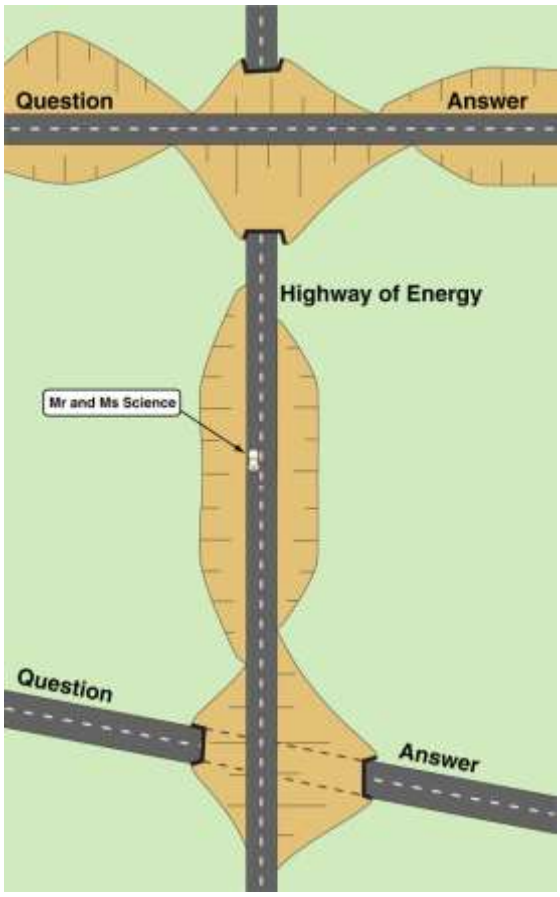
- A quantum forces (Qforce) is:
  - a positive force
  - a pushing force
  - a force that can only interact with other quantum forces
  - a force that can only act through close contact, but its magnitude can be affected by distant objects.
- All of which supports the idea that there can never be a true 'pulling' force.

The effects of gravity

Action at a distance

- I believe there is no such thing as 'a force acting at a distance'.
- But, there is such a thing as 'an action at a distance', such as the effects of the Earth acting on the Moon.
- However, such an action can only occur as a direct result of pushing forces acting directly on the object.
- Any observation of an apparent action at a distance, is simply an observation that fails to recognise the direct connection between the action and the force.

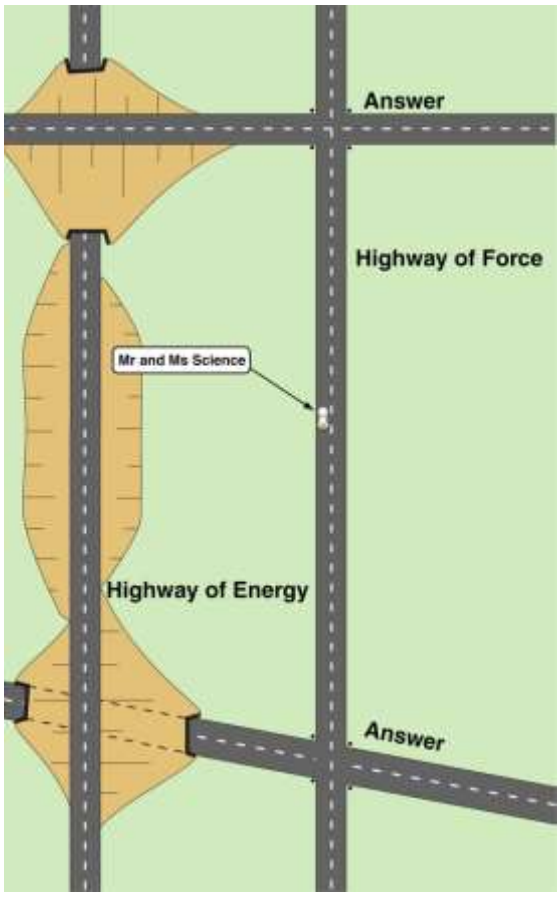
Comparing an energy-based model with a force-based model



Energy-based model

The existing energy-based model of the universe

- In our existing energy-based model of the universe, it is assumed that:
  - the primary produce of the Big Bang was 'energy'
  - all actions result from the work of energy
  - physical matter is a product of concentrated energy
  - energy is related to mass through the equation: $E = m.c^2$.
- The problem we have with this current model of the universe is that the model fails to answer many of the questions we have about the universe.
- The energy-based model of the universe is similar to a highway that fails to connect with many of the crossroads that we face in science.
- The energy-based model (left), and the force-based model (below), are both highways heading in the same direction (with regards to the science), but only one of the highways connects with all the answers.

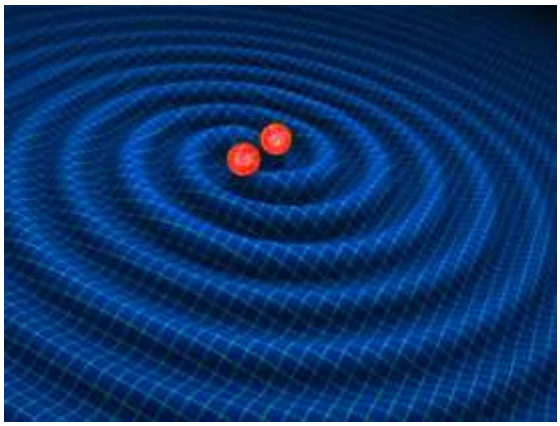


Force-based model

The proposed force-based model of the universe

- This alternative force-based model of the universe assumes that:
  - the primary produce of the Big Bang are forces (named: *quantum forces*)
  - all actions within the universe result from the actions of quantum forces
  - physical matter is a product of highly concentration quantum forces.
- The problems solved by the adoption of a force-based model of the universe include:
  - an explanation of the Big Bang
  - a logical explanation of gravity
  - a better explanation of the movement of light
  - an explanation of what magnetism and electricity are made of
  - an explanation of what causes planets to spin.
- The force-based model of the universe is similar to a highway with many well-connected crossroads, all of which provide answers to the many outstanding questions we have in astrophysics.

Properties of an expanding universe



Representation of gravity waves

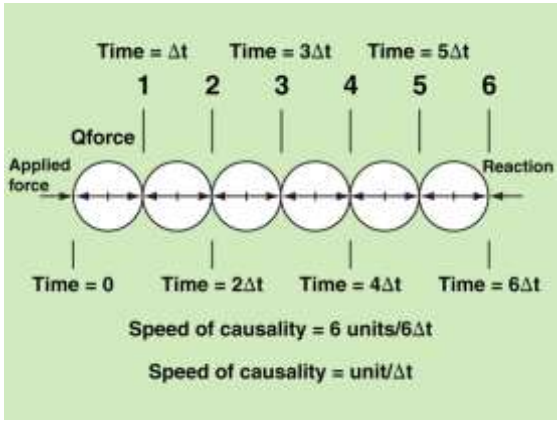
The effects of connectivity

- Whether people wish to believe it, or not, space exists as a continuum.
- The existence of gravity waves tells us that space exists as a fluid-like continuum.
- There is no 'empty space' in space.
- The expansion in the universe from the time of the Big Bang has resulted in each quantum force influencing a greater and greater volume of space, but always staying in virtual connection with adjacent quantum forces.

Expanding universe

The effects of an expanding universe

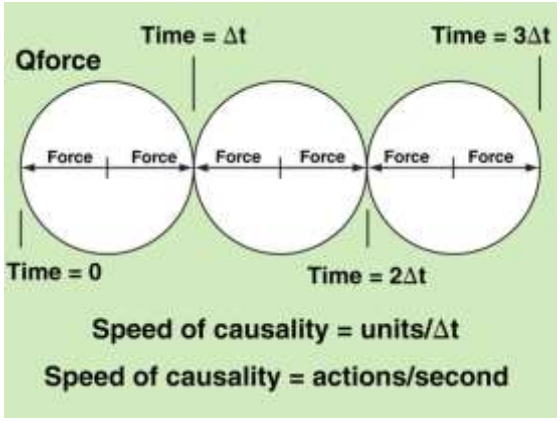
- As the universe expanded, the time delay between a change in the force applied to a quantum force, and the reaction by that quantum force, must also increase.
- This reaction time appears to be related to the space occupied by the quantum force, and possibly other factors.
- It could be said that 'reaction time' is the time taken for a force message to travel across the space occupied by a field of quantum forces.



Reaction time

Properties of a quantum force

- Using this idea of a reaction time, we can conclude that each quantum force would have the following internal properties:
  - the ability to apply a force to another quantum force that is inversely proportional to the square of the distance of separation
  - the need to repel other quantum forces
  - a time delay between an applied force and the resulting reaction.

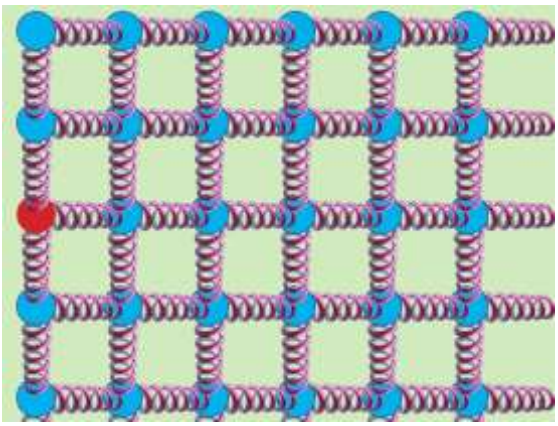


Speed of causality

The speed of causality

- The speed of causality is defined as the speed that a message can travel from one quantum force to another.
- We can call each of these message transfers an 'action'.
- Therefore the units of the 'speed of causality' is really: the number of actions a force message achieves within a set unit of time.
- Speed of causality = actions/second.

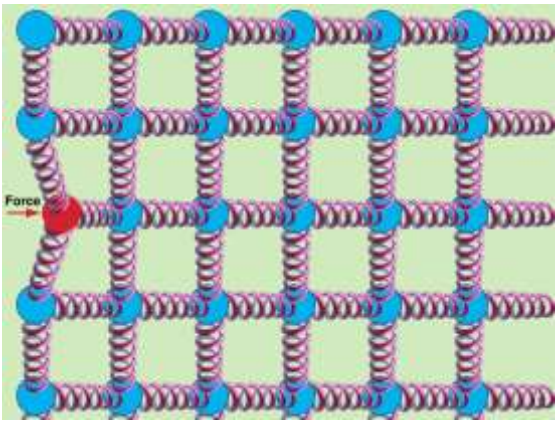
The speed of causality



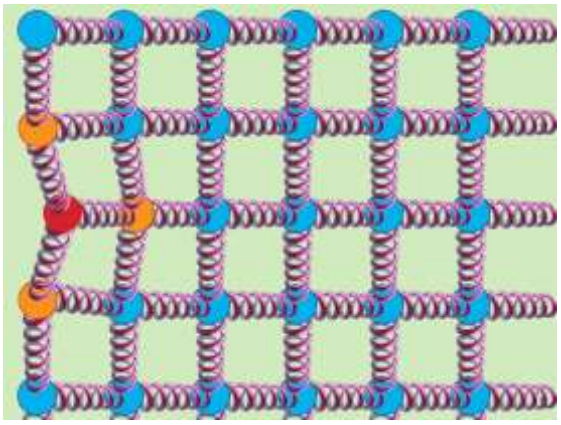
Energy field at rest

The speed of causality

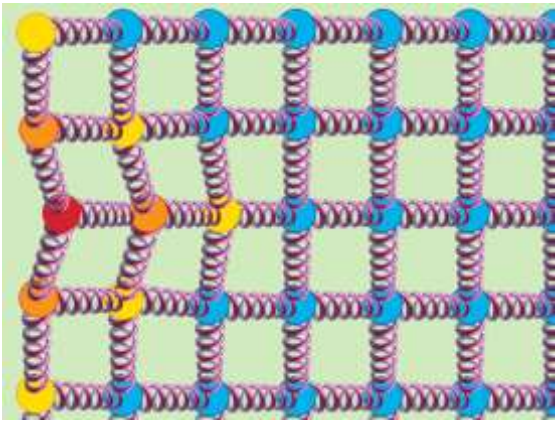
- The speed of causality is the speed of a force message or energy message.
- Light travels at the speed of causality for the material through which it is currently travelling (space, air, glass, or water).
- Imagine an energy field with springs carrying these force messages.
- If you apply a force to one energy unit, then the speed of causality is the speed that this force message travels through the energy field (I am avoiding the use of the term: 'force field').



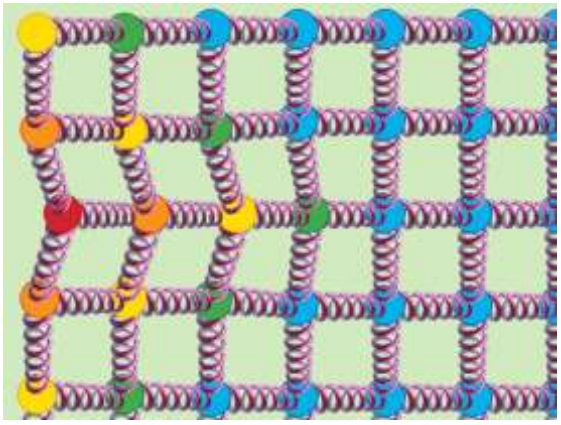
Force applied (t = zero)



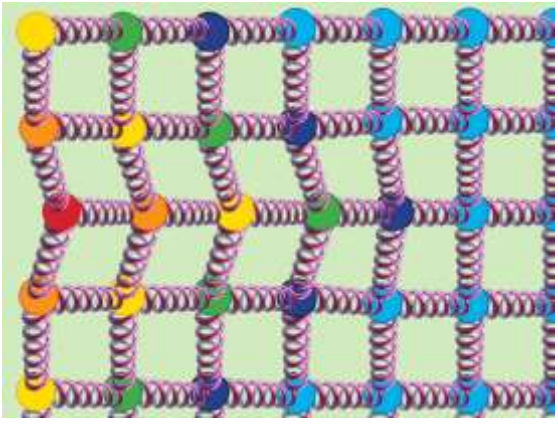
Time = Δt



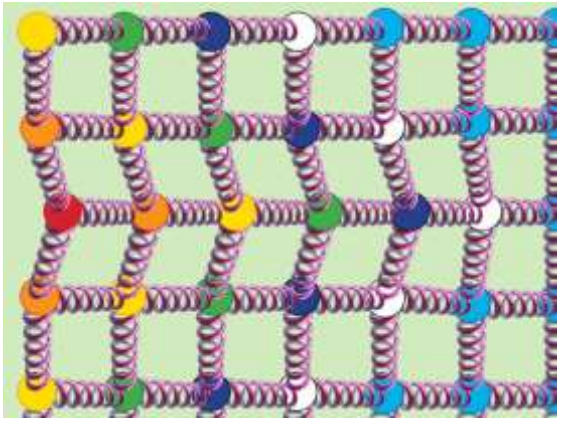
Time = 2Δt



Time = 3Δt

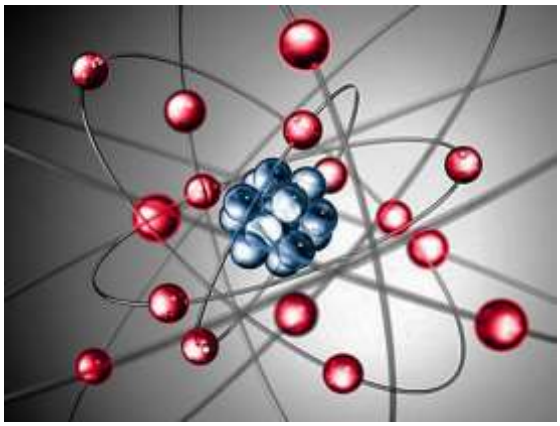


Time = 4Δt



The domino effect

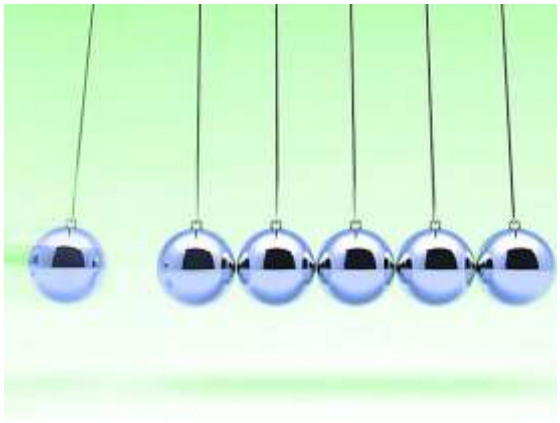
The speed of causality



Atomic ‘movement’

The speed of causality

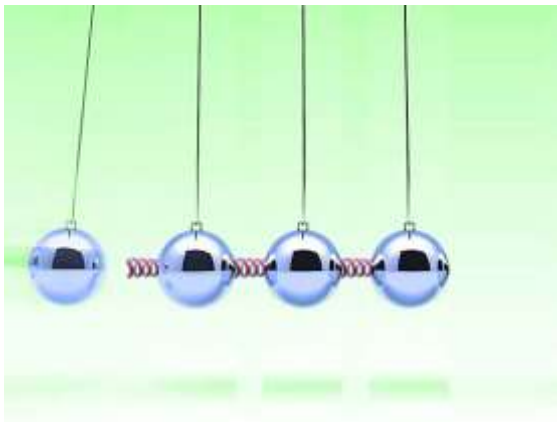
- The speed of causality is a measure of the speed of an ‘action’.
- All movement within the universe is based on the movement of quantum forces.
- These movements include: the movement of light, the movement of planets, and the movement of people.
- The quicker a force message can travel through a series of quantum forces, the quicker these movements or actions can occur.



Reaction time

The reaction time

- It would be logical to suggest that the time interval of each ‘action’ of a quantum force would be related to the spacing of the quantum forces.
- This would suggest (possibly incorrectly) that the speed of causality would approach infinity within a singularity.
- This would suggest that time ‘races’ at an infinite rate while the universe existed as a singularity, which is highly questionable, something more must be happening!

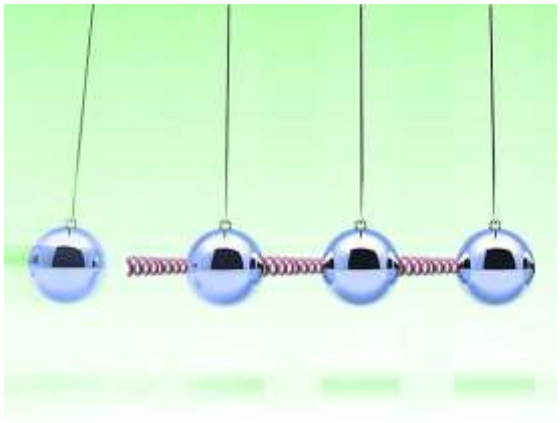


Newton’s cradle with short springs

Modifying the speed of causality

- Now consider the outcome of Newton’s cradle if small springs were placed between each sphere.
- The reaction time would be slower, meaning the speed of causality would be slower.

Yes, the cradle will no longer work properly because there will be a pronounced secondary action due to the delayed energy recovery of the springs.



Newton’s cradle with longer springs

Further modifications

- If we change the spring rating, or the distance between each sphere, then the speed of causality will again change.
- This suggests that as the universe expands, the speed of a force message passing through a field of quantum forces will decrease, meaning a slowing of the speed of causality.
- This suggests that as the universe expands, the rate of expansion will slow, but will the passing of time change?

3. Creation of a Universe

(The random thoughts of an untrained mind)

Albert Einstein

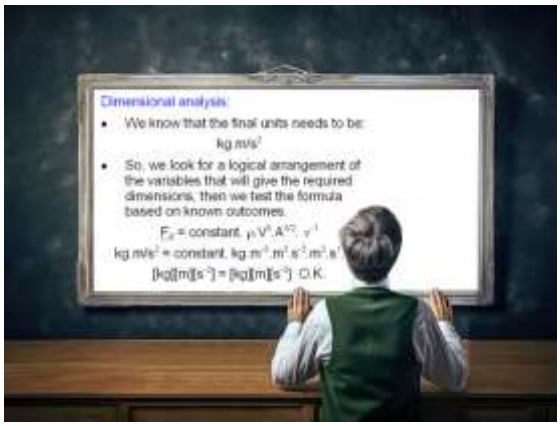
Introduction

- Unfortunately I am not as smart as Albert Einstein; nowhere near, not even close.
- It is my understanding that Einstein had figured out his conclusions before he even started to write his papers.
- I on the other hand, currently have no idea where this paper is heading.
- As I write this introduction I honestly have not figured out where this investigation is going to take me.

Options?

What are my options?

- When you are stabling around in the dark like I am, there are a few well-established processes that a person can follow:
  - dimensional analysis
  - ponder the issues, develop a logical concept, then testing that concept against known outcomes
  - breaking each issue down to its smallest components, and then letting the laws of physics guide you to an explanation or outcome.



Dimensional analysis

Dimensional analysis

- In a dimensional analysis process, you list all the variables that are likely to influence a given outcome.
- You then layout the 'units' of each of these variables, along with the units of the desired outcome; let us say we are looking at drag force, with units of Newtons.
- Drag force: Newtons = $[kg][m][s^{-2}]$
- And the likely variables are velocity, projected area, fluid density, and fluid viscosity, and some combination of these units should finish with $[kg][m][s^{-2}]$.

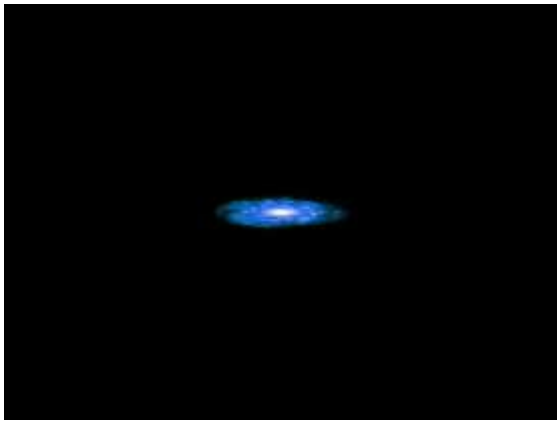
The author with a loan car back in 1986

What I have done

- In preparing this paper I intend on using dimensional analysis wherever I can, but my primary tool will be breaking each issue down to its smallest components, and then letting the laws of physics guide me to an explanation that aligns with known outcomes.
- When I finish the paper I will write the main introduction, but as of now, the next few pages should be a real adventure for me, and I hope worthy results for you to read.

Expansion of a singularity

Singularity



Initial expansion

Expansion in two dimensions

Expansion in three dimensions

Introduction

- One of the many outstanding questions in astrophysics is: *Why did the universe expand primarily along a two-dimensional plane, rather than expanding equally in all three dimensions?*
- In order to answer this question, or actually, in order to propose an answer to this question, it is necessary to think very carefully about what a singularity formation actually means.

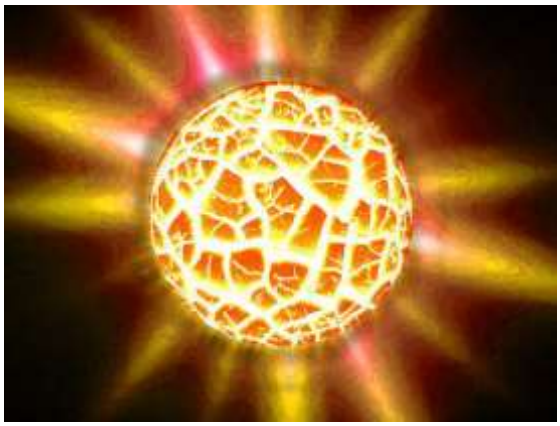
Singularity: A difficult concept!

- I imagine that a lot of people would picture a singularity as an almost infinite amount of material 'stacked' into a single point.
- Consequently, it is difficult to think of a 'explosion' of quantum forces that would not spread equally in all three dimensions, but that is because we humans think of the Big Bang as being like an explosion, an explosion that occurred in three dimensions.

The expansion of a singularity

- When we think about a singularity it is very important that we do not think of the quantum forces being very tightly packed into a grid-like structure.
- There is no three-dimensional form within a singularity.
- At the very instant that expansion started to occur, the expansion would have occurred in one particular direction (one direction must have been first).
- Now, being a singularity means that all of the expanding quantum forces are, in effect, clones of each other.
- This mean that in whatever direction the initial expansion occurred, all quantum forces would have expanded in that same manner or direction.
- Consequently, the expansion of the universe must initially have occurred across a two-dimensional plane, with the 'depth' of the plane being defined by the region of influence of a quantum force.
- The gradual expansion of this two-dimensional plane into a three-dimensional universe would have been caused by collisions, which would have been caused by the non-uniformity of the universe.
- A non-uniform universe would have been the result of 'changes' (i.e. force messages) not being instantaneous across the universe.

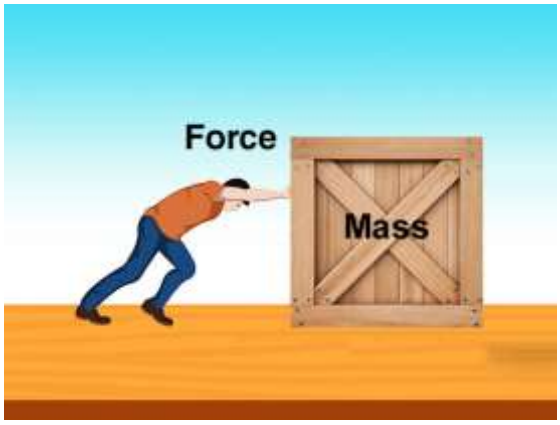
Expansion of the universe



The Big Bang

Expansion wasn't instantaneous

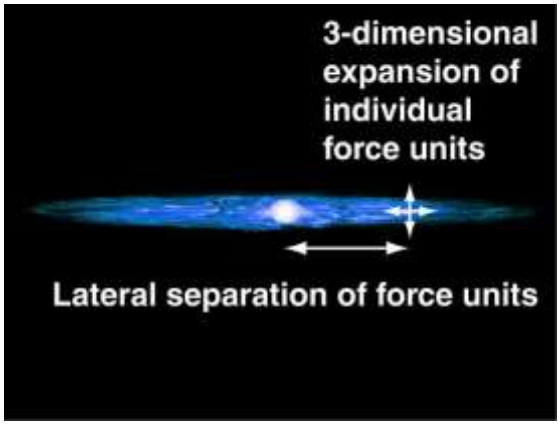
- I think it is safe to say that the expansion of the universe was not instantaneous, which means either:
  - universal time does exist, and it is controlling the rate of expansion of the universe, or
  - the expansion of the universe was delayed by the effective mass and inertia of the quantum forces.
- The latter case could occur with, or without, the existence of universal time.



Force, mass and inertia

Mass, inertia and momentum

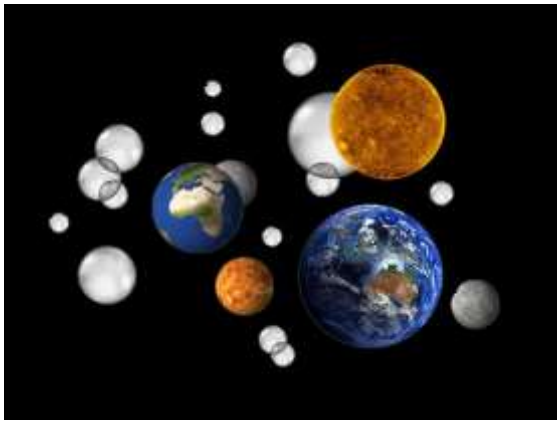
- The effects of mass, inertia and momentum can be experienced in everyday life.
- If we assume that everything in the universe was created by these quantum forces, then it can be deduced that if physical matter has the properties of mass, and experiences the effects of inertia, then quantum forces must also have mass and inertia.
- Therefore, quantum forces must exhibit the properties of mass and inertia.



Expansion of the universe

Expansion of the universe

- Initially the expansion of the universe from a singularity would have involved two forms of movement:
  - the three-dimensional expansion of the region of influence of each quantum force
  - the two-dimensional expansion of the quantum forces relative to each other.
- Both of these forms of movement were not instantaneous, and therefore must have involved the effects of inertia.



Creation of matter

Non-uniformity across the universe

- The primary elements of any movement are:
  - the force (if a change in momentum is required)
  - the message that controls that force
  - the mass on which the force acts.
- It is the progressive movement of the force message that creates non-uniform outcomes across a space, which ultimately allows different outcomes to result from the expansion of a singularity.

Expansion of the universe

Stars and planets

The outcomes of non-uniformity

- In a singularity, everything is the same. The system is uniform in nature.
- However, when the singularity expanded into the universe, it expanded with a single feature that caused non-uniformity across the universe, that being the speed of causality.
- Force messages that travel across the universe at speed will reach different parts of the universe at different times, which results in a non-uniform application of those forces across the universe.

Empty room

Movement of an empty room

- If you were to observe the 'actions' within an empty room, then:
  - you would observe no actions occurring
  - you would have no idea of the location or speed of the room within the universe
  - you would have no indication of the passing of time.
- In fact, 'time' would become meaningless, and would not need to exist.

Complete darkness

Days in solitary confinement

- If you were best friends with Steve McQueen while spending time in a prisoner of war camp, then you would have spent a lot of time in an isolation cell.
- While inside that isolation cell you would have no sense of the passing of time, other than the growth of hair on your body.
- When you slept you would not know if an hour had past, or eight hours.
- When you were released you would have no idea of time—time would have become meaningless.

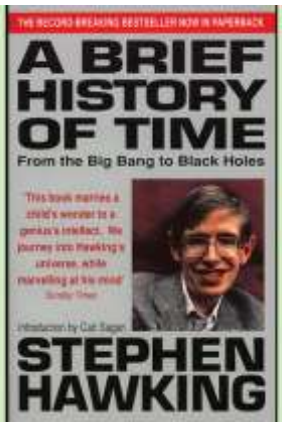
The meaning of time

The meaning of time

- If a singularity suddenly expanded, why do we believe that 'time' played any role in the expansion.
- Are we saying that physical matter cannot exist without 'time'.
- Our idea of there being a 'universal time' just does not make sense.
- Time is really just a human invention that we use to distinguish the actions of movement—'time', along with the three spatial dimensions, are simply the parameters we use to record movement.

4. Time and the Speed of Causality

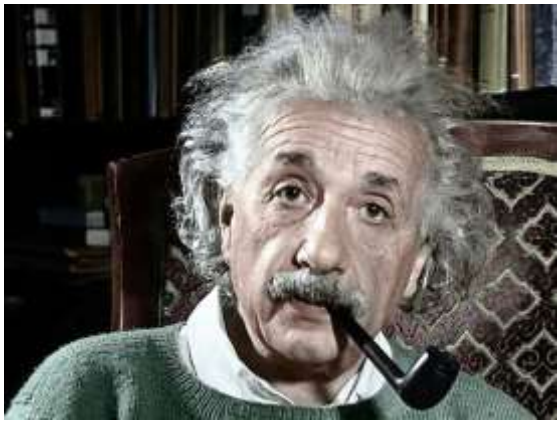
Introduction



A Brief History of Time

Existing concept of 'time'

- Our current understanding of universal time is largely based on the writings of people like Stephen Hawking.
- Time is considered to be a variable that has always existed in the background.
- Albert Einstein told us that 'time' could not be separated from the functions of 'space', hence the concept of 'spacetime', but how could spacetime exist if he also believed that vast regions of space were empty?



Albert Einstein

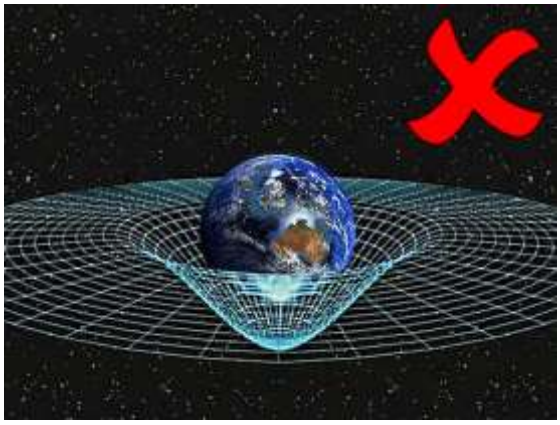
Einstein and his mathematics

- Currently there is enormous support for Einstein's theory of relativity because of his supporting mathematics.
- However, mathematics can be both a tool of great discovery, as well as a cloak of disguise that hides the truth.
- In my opinion, Einstein did not 'prove' his work with mathematics, he simply supported the concepts of his work with mathematics.

I don't think so!

Einstein's theories

- Einstein believed that light would appear to travel at the same velocity no matter what the frame of reference of the observer.
- If you were a photon of light travelling behind another photon, then the photon in front of you would appear to be motionless (i.e. travelling at the same speed that you were), and Einstein would justified this by saying that time had stopped at the speed of light.
- I think this is all rubbish!



Curved spacetime

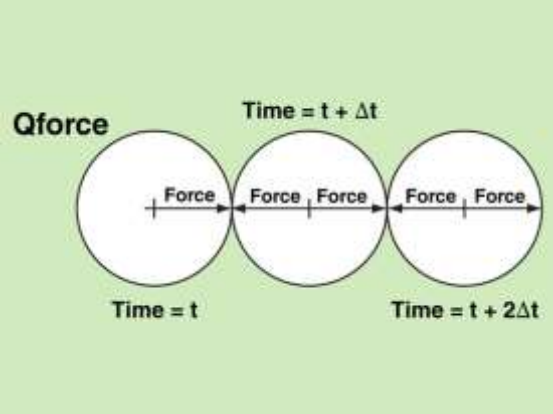
- I think Einstein has taken us down a rabbit hole, and since then we have been forced to develop more and more counter-intuitive concepts in order to justify our existence in the rabbit hole.
- Time does not exist as an active variable, it only exists as a human concept—if it does exist, then it exists as a non-active variable.
- The actions that we wish to link 'time', are actually linked to the speed of causality.
- It is the speed of a force message that controls our universe, not changes in time.

The ‘reaction time’ of the universe

Clock time

Time

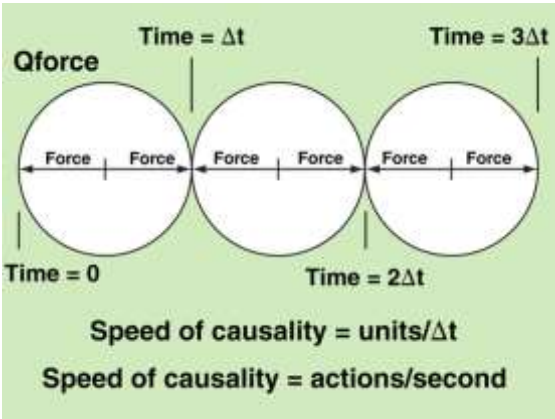
- Universal time exists in reality just as much as clock time does.
- Clock time was invented by humans as a means of identifying one instant from another.
- But clocks only measure actions, they do not measure time—how could they measure time if we cannot even detect ‘time’.
- If clocks measure ‘actions’ then what governs those actions—I believe it is the speed of causality.



Reaction time

Reaction time

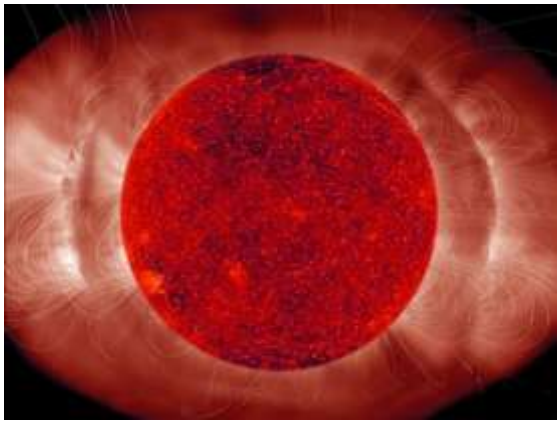
- There are three key properties of any force, whether physical or non-physical:
  - magnitude
  - direction, and
  - rate of application.
- The ‘rate of application’ introduces the concept of ‘time’ to a force.
- If an external force is applied to a quantum force, then its reaction time is the time delay experienced by this force as it passes across a single quantum force.



Possible components of a reaction time

Possible components of a reaction time

- It is my opinion that the speed of a force message can be broken into two components:
  - travel time across the region of influence of a quantum force, plus any correction factor associated with the lateral movement of the ‘region of influence’ caused by the expansion of the universe, and
  - the delay experienced by a force message crossing between two regions of influence (if such a delay occurs).



The Big Bang

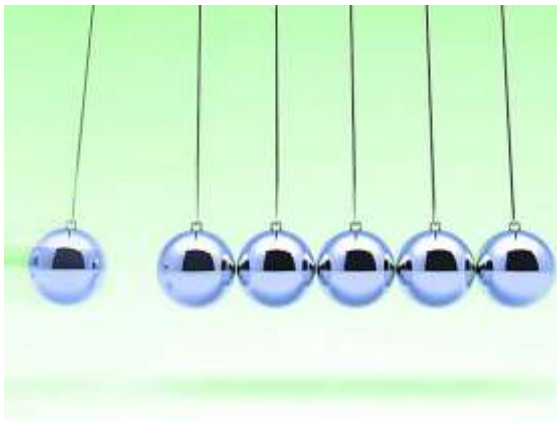
Changes in the speed of causality as the universe expands

- The speed of a force message travelling through space could be constant, or it could vary with the expansion of space.
- The speed of a force message travelling across the region of influence of a single quantum force could be constant, or it could decline as the region of influence expands with the expansion of space.
- If a delay occurs when a message crosses a boundary, then this delay would be evident in the early part of an expansion.

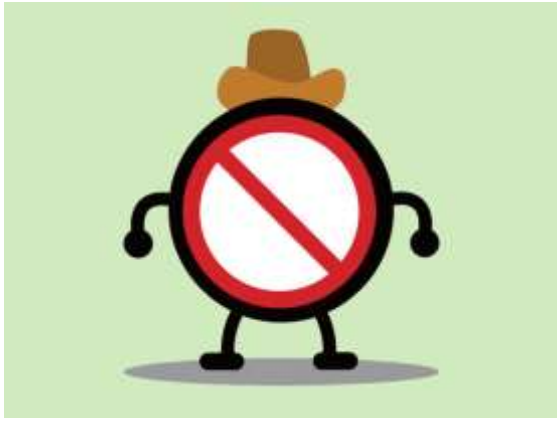
A universe without a 'reaction time'

The Big Bang (not a real photo!)

Adelaide, 1987



Newton's cradle



No 'time'

Introduction

- In this discussion we are going to assume that the life of a universe could consists of:
  - the Big Bang
  - expansion of the universe
  - creation of physical matter
  - the potential collapse of the universe back to singularity.
- If a reaction time did not occur, and actions were instantaneous, then the life of a universe would take zero seconds!

Newton's 3rd law of motion

- Newton's third law of motion effectively states:
  - When one body exerts a force on a second body, the second body exerts an equal and opposite (opposite in direction) force on the first body.
- In motor racing this means that when a race car exerts an impact force on a crash barrier, the crash barrier exerts an equal and opposite force on the race car.

The importance of 'reaction time'

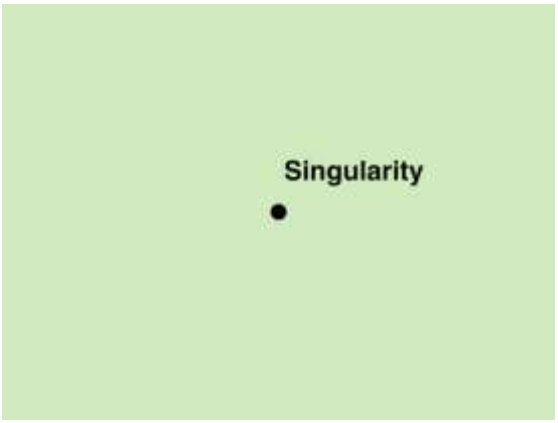
- In physics we assume from Newton's third law of motion that the reaction force is instantaneous.
- We assume that there is no time delay.
- However, when a force is applied to a mass, there is a delay in that force travelling through the mass, which relates to the compressibility of that mass.
- In a quantum force model of the universe we can assume that a delay occurs as a force moves from one quantum force to another.

A universe without a reaction time

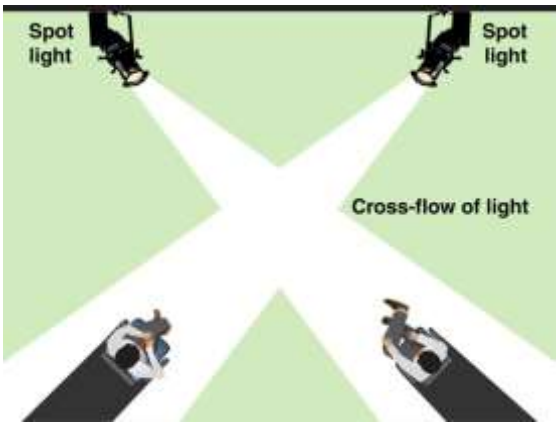
- If a reaction delay did not occur when a force moves from one quantum force to the next, then every action within the life of the universe would be instantaneous.
- Every train ride would last zero seconds.
- Every marriage would last zero seconds.
- A human life would last zero seconds.
- Every star would live for zero seconds.
- Our universe would move from the Big Bang to singularity in zero seconds.

Testing the idea that the speed of causality may be the key variable

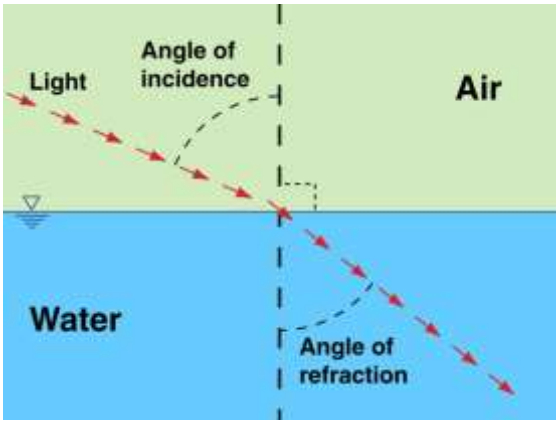
Testing outcomes



Singularity



The cross-flow of light



The refraction of light entering water

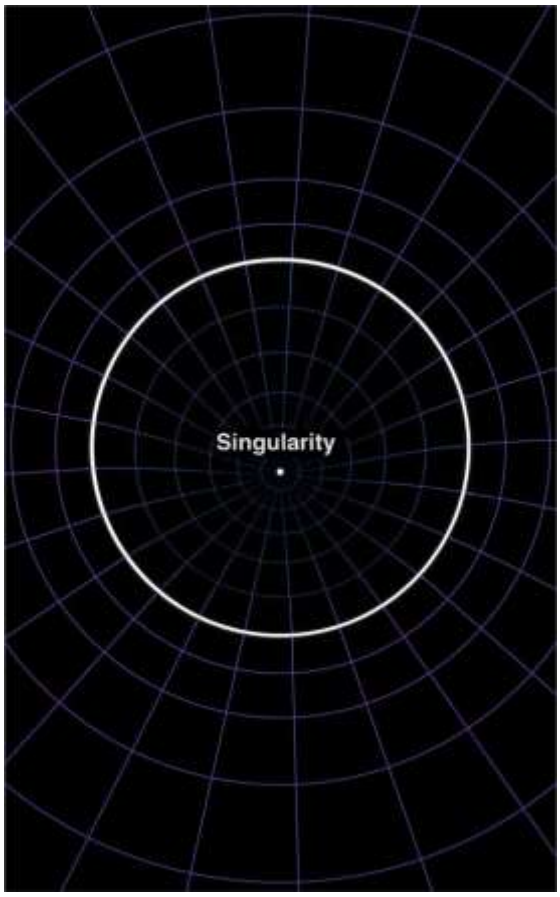
Testing method

- The task I currently have before me is to convince you (and myself) that every action we currently associate with a change in universal time can also be explained by a change in the speed of causality.
- In order to test this idea, I will consider how changes in the speed of causality could produce 'known' (or expected) outcomes at different stages of the expansion of the universe, and for different conditions on current-day Earth.

Known outcomes

- The 'known outcomes' I am considering are:
  - a stable condition exists during the singularity phase, which I believe could only have existed if the speed of causality was zero
  - the early stages of expansion, when our concept of time tells us that expansion occurred extremely rapidly (or that time moved very slowly)
  - a black hole, in which time is believed by Stephen Hawking to be zero
  - the speed of light in current-day deep space
  - the speed of light on the surface of Earth
  - the speed of light in water.
- Tables 4.1 to 4.4 represent a simple comparison of speed changes if:
  - Table 4.1 represents the speed of causality is independent of the cell size, and no time component for a force message crossing a cell boundary
  - Table 4.2 represents the speed of causality is dependent of the cell size, and no time component for a force message crossing a cell boundary
  - Table 4.3 represents the speed of causality is independent of the cell size, and a time component included to simulate a minor time delay for a force message to cross a cell boundary
  - Table 4.4 represents the speed of causality is dependent of the cell size, and a time component included to simulate a minor time delay for a force message to cross a cell.
- The 'values' are meaningless, only the 'trends' have meaning.

Test conditions



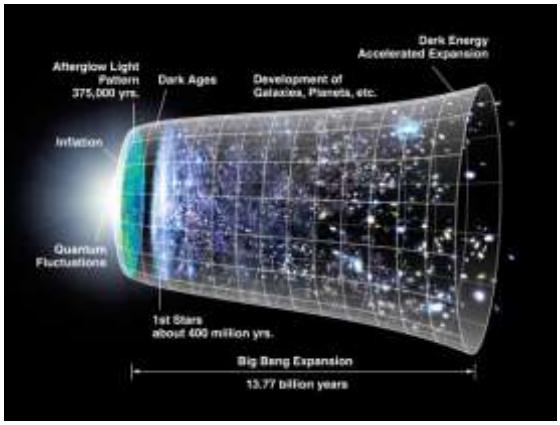
Singularity

First test case: a singularity

- The concept of singularity is difficult to accept until we accept the idea that physical matter does not really exist.
- Our concept of physical matter is generated by our five senses, which are all generated within our mind, which itself is just a form of concentrated forces.
- If we accept that the speed of causality is governed by the movement of force messages through a field of quantum forces, then we could express the travel time of a force message as:

$$\Delta t = K_1(\text{distance}) + K_2(\text{density})$$

- Now, in the singularity condition, there is no travel distance, but there are an infinite number of dimensionless quantum force boundaries to cross.
- So, there may be zero distance for a force message to travel, but there is an infinite number of boundaries to cross, which means that the speed of a force message (i.e. the speed of causality) is zero, meaning that if there were no cosmic disturbances, which means the singularity would remain stable (i.e. not expand).



Early stages of the big expansion

Early stages of the big expansion

- Before discussing the period of early expansion, I would like to remind all readers that ‘time’, or the rate of time, has no influence over the rate of expansion.
- Time, if it exists at all, is just a by-product of actions—it does not control those actions.
- Therefore, events don’t happen fast or slow because of time moving fast or slow.
- In the early stages of the Big Bang there is believed to have been a very rapid expansion of the universe because of the high concentration of repelling forces.
- However, the speed of light, and thus the speed of causality, is a different story.
- In the very early stages, the movement of a force message, and therefore the speed of causality, would be slowed by the enormous concentration of quantum forces, each causing a time delay as the force massage passed from one quantum force to another (if such a delay occurs).
- Thus the speed of causality, and the speed of light, starts from zero, then increases as the universe expands.

Early expansion

Test conditions

Black hole

Third test case: A black hole

- In a black hole, the speed of causality, and therefore the speed of light, are said to approach zero of the extreme gravity.
- This means that while the speed of an object increases as it approaches a black hole, both ‘time’ and the speed of light should slow.

Space

Fourth test case: Space (today)

- It is believed that as an object moves away from the Earth, the rate of time increases.
- However, for astronauts, their rate of time may slow because of their high rate of speed, which would more than compensates for their existence in space.
- In general, we expect the speed of causality to be faster in space due to the reduced density of quantum forces.

Earth’s atmosphere

Fifth test case: Air

- In air, we expect the speed of causality to be slightly slower than that in space due to the higher density of quantum forces.

Water pond

Sixth test case: Water

- In water, we expect the speed of causality to be slower than that it is in air due to the higher density of quantum forces in water.
- I believe that it is this slowing of the speed of causality that ultimately causes the refraction of light.

Test outcomes

Table 4.1 – Demonstration of changes to the speed of causality based on the velocity of a force message inside a force cell being independent of the cell size, and no time component for a force message crossing a cell boundary

Test case	Width of force cell $\in L$	Velocity inside force	Total travel distance (L)	Total delta (sum of t1)	Number of force cells	Delta (t2) per cell-to-cell	Total travel time (t)	Speed of causality (c)
Singularity	0	1000	0	0	10^6	0	0	—
Early universe	10	1000	10^6	1000	10^5	0	1000	1000
Black hole	1	1000	10	0.01	10^6	0	0.01	1000
Space (today)	1000	1000	10^6	1000	1000	0	1000	1000
Air on the surface of the Earth	900	1000	10^6	1000	1111	0	1000	1000
Water	800	1000	10^6	1000	1250	0	1000	1000

Table 4.2 – Demonstration of changes to the speed of causality based on the velocity of a force message inside a force cell being dependent of the cell size, and no time component for a force message crossing a cell boundary

Test case	Width of force cell $\in L$	Velocity inside force	Total travel distance (L)	Total delta (sum of t1)	Number of force cells	Delta (t2) per cell-to-cell	Total travel time (t)	Speed of causality (c)
Singularity	0	1000	0	0	10^6	0	0	0
Early universe	10	999	10^6	1001	10^5	0	1001	999
Black hole	1	999.9	10	0.010	10^6	0	0.010	1000
Space (today)	1000	900	10^6	1111	1000	0	1111	900
Air on the surface of the Earth	900	910	10^6	1099	1111	0	1099	910
Water	800	920	10^6	1087	1250	0	1087	920

Discussion of tables 4.1 and 4.2:

The first condition fails all the tests and should be discounted. The second condition provides the right outcome for the singularity test, but fails the black hole test. The speed of causality for the early expansion cases is faster than current day conditions, which does not match our initial expectations, but could be true.

However, the speed of causality is faster in water than in air, which in-turn is faster that the deep space condition. None of these outcomes appear to be consistent with our observations, and so the whole case should be considered a failed outcome.

Test outcomes

Table 4.3 – Demonstration of changes to the speed of causality based on the velocity of a force message inside a force cell being independent of the cell size, and a time component included to simulate a minor time delay for a force message to cross a cell boundary

Test case	Width of force cell $\in L$	Velocity inside force	Total travel distance (L)	Total delta (sum of t1)	Number of force cells	Delta (t2) per cell-to-cell	Total travel time (t)	Speed of causality (c)
Singularity	0	1000	0	0	10^6	1	10^6	0
Early universe	10	1000	10^6	1000	10^5	1	101,000	10
Black hole	1	1000	10	0.01	10^6	1	10^6	0
Space (today)	1000	1000	10^6	1000	1000	1	2000	500
Air on the surface of the Earth	900	1000	10^6	1000	1111	1	2111	474
Water	800	1000	10^6	1000	1250	1	2250	444

Table 4.4 – Demonstration of changes to the speed of causality based on the velocity of a force message inside a force cell being dependent of the cell size, and a time component included to simulate a minor time delay for a force message to cross a cell

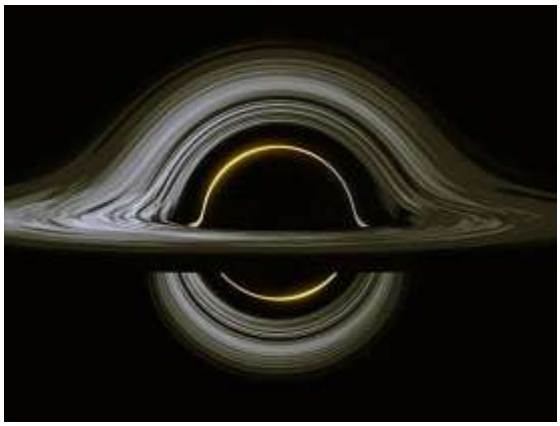
Test case	Width of force cell $\in L$	Velocity inside force	Total travel distance (L)	Total delta (sum of t1)	Number of force cells	Delta (t2) per cell-to-cell	Total travel time (t)	Speed of causality (c)
Singularity	0	1000	0	0	10^6	1	10^6	0
Early universe	10	999	10^6	1001	10^5	1	101001	10
Black hole	1	999.9	10	0.010	10^6	1	10^6	0
Space (today)	1000	900	10^6	1111	1000	1	2111	474
Air on the surface of the Earth	900	910	10^6	1099	1111	1	2210	452
Water	800	920	10^6	1087	1250	1	2337	428

Discussion of tables 4.3 and 4.4:

In the third case (Table 4.3), the singularity outcome is agreeable, the early universe outcome is closer to want I had expected, the black hole outcome is agreeable, and the speed of causality in deep space is faster than on the Earth's surface (the 'air' condition), which is faster than the water conditions. Consequently this condition appears to pass all the test outcomes.

Similarly, the fourth case (Table 4.4), produces an agreeable outcome for the singularity condition, the early universe condition, the black hole condition, and the speed of causality in deep space is faster than the Earth surface 'air' condition, which is faster than the water conditions. Consequently this condition also appears to pass all the test outcomes.

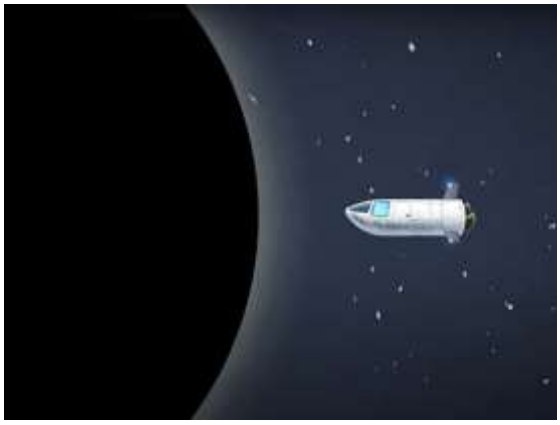
Black holes



Representation of a black hole

Expansion of black holes

- It is likely that black holes are of such a dense concentration of matter, and therefore, quantum forces, that the concentration of attached quantum forces that surround a black hole begins to reach that of physical matter.
- Consequently, a black hole would effectively feed off the surrounding space, slowly (or not so slowly) adsorbing the surrounding attached quantum forces as additional matter, which would prevent the release of light.



Approaching a black hole

Objects approaching a black hole

- I do not understand why people talk about objects entering inside a black hole, as if a black hole is some type of fluid.
- Approaching objects would crash into a black hole like they were crashing into the hardest and largest diamond they had ever met.
- Not only would an object approach a black hole at high speed, but it would appear that the surface of the black hole would be growing towards the object at a high speed.

Representation of a black hole

The speed of causality

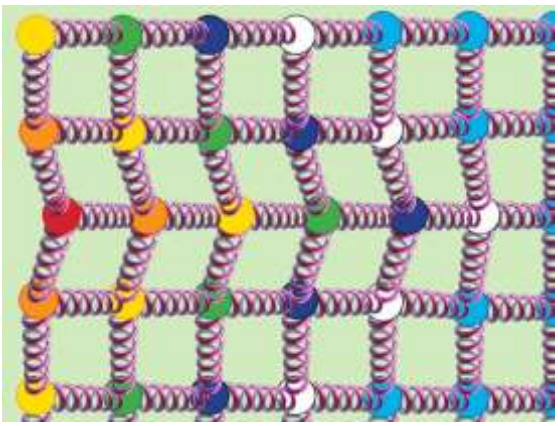
- The outcomes reached in this paper suggest that the speed of causality approaches zero within a black hole—this is because of the extreme density of black holes, and the consequential delays in the movement of force messages.
- It is the near-zero speed of causality that prevents the movement of light.
- But, this speed of causality would also slow the adsorption the surrounding attached quantum forces.

'Something Strange Happens'

Rate of expansion of a black hole

- If the speed of causality were unchanged near a black hole, then a black hole would expand by adsorbing compressed aether at a rate equal to the speed of light, meaning that the entire universe would already be consumed.
- However, because the speed of causality approaches zero, this means the local speed of light approaches zero, which means the rate of expansion due to the adsorption of compressed aether is very slow.

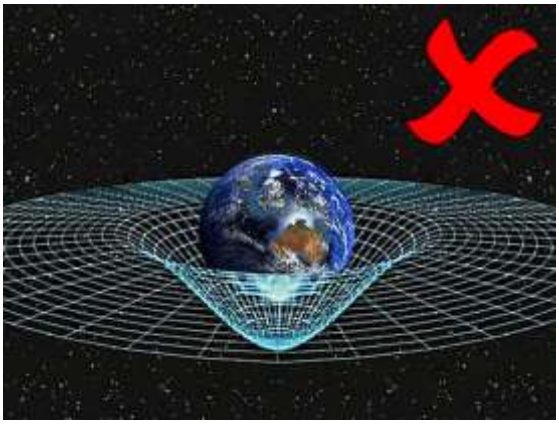
Conclusions



The speed of causality

The speed of causality appears to be the critical parameter that controls all actions in the universe

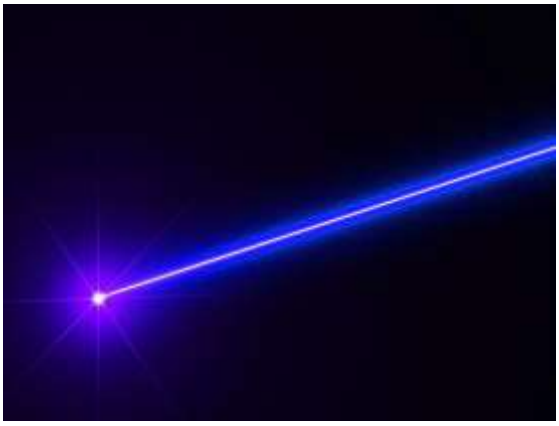
- It would appear that our observations of astrophysics can be explained by considering the impact of changes in media density on the speed of causality.
- However, this outcome does not prove that these changes could not have originated from changes to 'time', or 'spacetime'.



Curved spacetime

A consideration of the importance of speed of causality does not require the acceptance of counter-intuitive outcomes

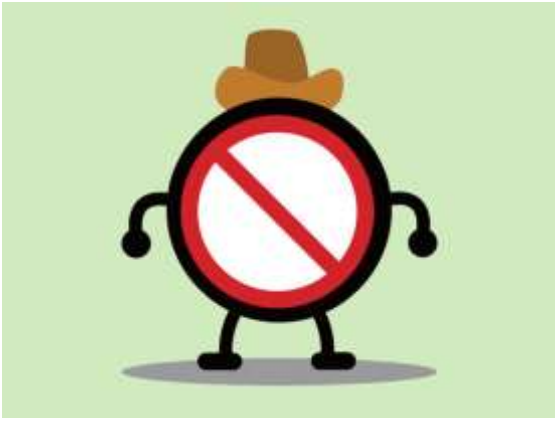
- The physics associated with a universe controlled by the density of the media and the speed of causality is a logical outcome, and does not require the adoption of our current, counter-intuitive theories.



Light

The speed of light is not constant for all observers

- This outcome suggests that the speed of light varies with the speed of causality, which varies with the density of the media.
- The outcome suggests that the speed of light is not independent of the motion of the observer.



No 'time'

The origin of time

- 'Time' is a parameter invented by humans as a means of measuring the movement of objects relative the movement of other objects.
- Time becomes meaning less when the observer exists in a space where there is no observable movement.
- Even if 'time' existed as a variable, it does not control any aspect of the universe, and at best it is just a by-produce of movement.