

Advance Studies In Mathematical And Theoretical Physics:

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1.Universe's mystery at quantum level (Mystery of quantum mechanics) and measurement problem solution in quantum mechanics:

Introduction:

“At quantum level” means at the most fundamental level.Three physicists John Clauser, Anton Zeilinger and Alain Aspect proved that the universe at the quantum level is not locally real but why is the universe at the quantum level not locally real? And the biggest question why do laws of physics get violated at the quantum level? e.g how and why does measurement collapse quantum wavefunctions? Which is also called the measurement problem in quantum mechanics, why can quantum particles go even back in time? etc. In order to know the answers of these questions first of all we will have to understand the concept of the 4th dimension.

4th dimension:

We know that the 4th dimension given in physics books and the internet is time but **mathematically** the 4th dimension is not time because according to Minkowski spacetime the linear displacement equation for light in vacuum is $D^2 = x^2 + y^2 + z^2 - (ct)^2$ where x, y, z are three spatial dimensions, c is the velocity of light in vacuum & t is the proper time taken by light in vacuum $\Rightarrow D^2 = x^2 + y^2 + z^2 + \left(\frac{c}{c}\right)ict)^2$ where i is an imaginary number but an object with mass can never travel at the maximum velocity of light therefore the **linear** displacement equation for an object is $D^2 = x^2 + y^2 + z^2 + \left(\frac{v}{c}\right)ict)^2$ where v is the velocity of an object & t is the proper time taken by an object, if the 4th dimension is time then this equation should show t^2 in place of $\left(\frac{v}{c}\right)ict)^2$, this means that **mathematically** the 4th dimension is not time but rather $\left(\frac{v}{c}\right)ict$, **in easy language** we can call the 4th dimension as time because the universe is a web of spacetime (according to Albert Einstein) but it is **mathematically** wrong because **mathematically** the 4th dimension is $\left(\frac{v}{c}\right)ict$. By the way **mathematically** time should not even be the fourth dimension because the SI unit of time is second whereas the SI unit of the other 3 dimensions is meter, in order to go to the 4th dimension our speed must be **least** near the 1% of the maximum speed of light **because 4th dimension is in the form of i**, only this is why even practically the relativistic effect arises **least** close to 1% of the maximum speed of light (according to special relativity), meaning we can never go to the 4th dimension with the latest technology because we practically can't even reach near the 1% of the maximum speed of light with the latest technology e.g the speed of fastest human spacecraft is 163 km/s which is not even near the 1% of the maximum speed of light but quantum particles (fundamental matter particles) can go to the 4th dimension because the **minimum** speed of electrons is about 2200 km s^{-1} (according to quantum physicists) which is about 0.73% of the maximum speed of light which is near the 1% of the maximum speed of light therefore the world is 3 dimensional for us (**practically**), meaning practically our world is 3 dimensional & the world is 4 dimensional only for quantum particles (**practically**), meaning practically only quantum world is 4 dimensional but the 4th dimension is not time but rather $\left(\frac{v}{c}\right)ict$ (**mathematically**) where c is the maximum velocity of light, i is an imaginary number, t is proper time taken by quantum particles & v is the velocity of quantum particles therefore the **linear** displacement equation for quantum particles is $D^2 = x^2 + y^2 + z^2 + \left(\frac{v}{c}\right)ict)^2$ where x, y & z are 3 spatial dimensions & $\left(\frac{v}{c}\right)ict$ is 4th dimension where c is the maximum velocity of light, i is an imaginary number, t is proper time taken by quantum particles, v is the velocity of quantum particles & D is **linear** displacement for quantum particles and the same equation applies for light as well, this equation tells us that the 4th dimension is $\left(\frac{v}{c}\right)ict$.

Is Albert Einstein wrong?

The progression of an event from past to present and present to future is time and its SI unit is **second** and according to special relativity **least** at close to the 1% of the maximum speed of light, even practically time is of two types 1. Proper time 2. Observer time. Proper time is constant everywhere (where space is flat) because proper time taken = $\frac{\text{actual distance covered}}{\text{speed}}$ whereas observer time is variable everywhere because observer time taken = $\frac{\text{observer distance covered}}{\text{speed}}$, meaning if a person moves **least** close to the 1% of the maximum speed of light, only then practically the flow of observer time will be slow for him or her and if a person is at rest (relatively) then the flow of observer

time will be fast for him or her (according to special relativity), only this is why **in easy language** we can say that the universe is a web of spacetime and only this is why **in easy language** we can call the fourth dimension as time but it is **mathematically** wrong because **mathematically** the 4th dimension is $(\frac{v}{c})ict$, this means that **mathematically** albert einstein is wrong because according to albert einstein the 4th dimension is time. By the way **mathematically** time should not even be the fourth dimension because the SI unit of time is second whereas the SI unit of the other 3 dimensions is meter.

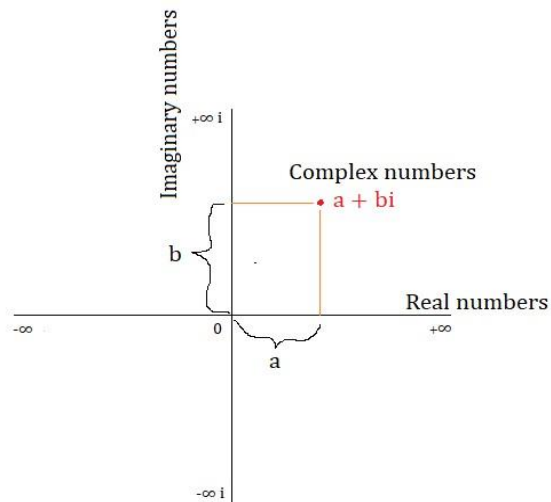
An example of the 4 dimensional object:

An object whose speed is **least** near the 1% of the maximum speed of light is an example of the 4 dimensional object **because 4th dimension is in the form of i**, only this is why even practically the relativistic effect arises **least** close to 1% of the maximum speed of light (according to special relativity), this means that **practically** the fastest star that revolves around the supermassive black hole, a black hole itself and a star whose revolution speed around the supermassive black hole is **least** near the 1% of the maximum speed of light are the examples of the 4 dimensional object because black holes rotate at a speed of about 80% of the maximum speed of light (according to astrophysicists) and black holes can move through the universe at about 17,500 miles per second (according to astrophysicists) which is more than near the 1% of the maximum speed of light and the speed of fastest star that revolves around the supermassive black hole of the milkyway is about 8000kms^{-1} (according to astrophysicists) which is more than near the 1% of the maximum speed of light and **theoretically** a quantum particle is an example of the 4 dimensional object because its **minimum** speed is about 0.73% of the maximum speed of light which is near the 1% of the maximum speed of light, **this means that only 4 dimensional object can enter into the 4th dimension.**

Note: **In easy language** we can say that if we want to go to the 4th dimension then either we will have to be as small as a quantum particle or we will have to move **least** near the 1% of the maximum speed of light, meaning **least** at the minimum speed of electron (about 2200kms^{-1}) which is near the 1% of the maximum speed of light, which is practically not possible for us with the latest technology.

Mystery of the universe at the quantum level:

Mathematics tells us that there are two types of world 1. Real world 2. Imaginary world because if an imaginary number comes on calculating like i , in the form of i , etc. e.g if we put $v > c$ in relativistic factor gamma (lorentz factor) then the value of gamma will be **in the form of i**, so that means this situation is not possible in the real world, meaning this situation is possible only in the imaginary world because it is not possible to represent an imaginary number on the real number line (x axis of the number line), meaning it is possible only to represent an imaginary number on the imaginary number line (y axis of the number line), so the way any complex number which is in the form of $a+bi$ as shown in the figure below, when becomes $b=0$ then complex number becomes real number which can be represent on the real number line & when becomes $a=0$ then complex number becomes imaginary number which can be represent on the imaginary number line,



Since mathematics is the language of the universe, therefore in the same way this world is also in the form of $a+bi$ where a represents real world & b represents imaginary world, when we are awake then there is $b=0$ for us and when we dream while sleeping then there is $a=0$ for us, this means that when we are awake then our soul(consciousness) is in real world where the laws of physics work & when we dream while sleeping then our soul(consciousness) goes to an imaginary world where the laws of physics get violated, meaning where everything is possible, this means that practically real world is 3 dimensional for our soul(consciousness) & practically only imaginary world is 4 dimensional for our soul(consciousness) because imaginary world is quantum world where the laws of physics get violated, meaning where everything is possible because 4th dimension is in the form of i , meaning **since 4th dimension is in the form of i and practically only quantum world is 4 dimensional, therefore quantum world is an imaginary world where everything is possible, this means that universe at quantum level is an imaginary world where everything is possible**, only this is why laws of physics get violated at the quantum level.

Measurement problem solution in quantum mechanics:

Since quantum world is an imaginary world and imaginary world is a simulation world where everything is possible, only this is why measurement collapses quantum wavefunctions, meaning, only this is why in double slit experiment when we observe the quantum particles then the quantum particles show particle nature & when we don't observe the quantum particles then the quantum particles show wave nature, only this is why in delayed choice quantum eraser experiment when we observe the quantum particles then the quantum particles go back in time in order to show particle nature, only this is why a quantum particle is in its superposition state and only this is why in quantum entanglement phenomenon the principle of locality gets violated.

Conclusion:

This explanation leads to the conclusion that laws of physics get violated in the world of quantum mechanics because universe at quantum level is an imaginary world where everything is possible, meaning quantum world is an imaginary world where everything is possible because there are two reasons, first reason is that **practically** only quantum world is 4 dimensional and the second reason is that **4th dimension is in the form of i** and only this is why the Schrödinger equation, the Dirac equation and the lagrangian equation are also in the form of i .

Note: Our soul(consciousness) never dies and we can also call our soul(consciousness) as a quantum body because it can move to the 4th dimension as well & according to paranormal experts our soul(consciousness) is in electromagnetic form and if our soul(consciousness) is in electromagnetic form then this means that our soul(consciousness) is in the form of energy because energy is radiation(according to $E=mc^2$) & radiation is an electromagnetic wave, by the way I also think that our soul(consciousness) is in electromagnetic form because there are two reasons, first reason is that everything in the universe is in the form of energy like matter is the dense form of energy(according to $E=mc^2$), etc and the second reason is that paranormal experts have also given proof of this thing with the help of their electronic gadgets in haunted places and if our soul(consciousness) is in electromagnetic form then this **also** means that we are both matter and nonmatter because this means that our body is matter but our soul(consciousness) is energy, in other words we can say that if our soul(consciousness) is in electromagnetic form then this **also** means that our physical body is matter but our quantum body is energy.

2.Neutrino's mass mystery and their role in the universe's evolution:

Introduction:

Neutrinos are fundamental matter particles with no electric charge, very little mass, non-baryonic, the spin of neutrinos was worked out using a law of physics that angular momentum is conserved, i.e. it is the same before and after any process. Neutrinos are emitted in Nuclear beta decay and to conserve angular momentum they had to had this spin of $\frac{1}{2}$, it comes under neutral leptons and Every time atomic nuclei come together (like in a star) or break apart (like in a nuclear reactor), they produce neutrinos. Even a banana emits neutrinos—they come from the natural radioactivity of the potassium in the fruit. Once produced, these ghostly particles almost never interact with other matter.

Wolfgang Pauli first proposed them in 1930 to explain the missing energy in beta decay. Since then, they have been detected in various experiments and the properties of neutrinos are known to exist in three different flavours: electron, muon, and tau.

Neutrino properties **make them difficult to detect** because they can pass through most matter without any trace. However, when interacting with matter, they produce a shower of secondary

particles that can be detected by specialised instruments such as neutrino telescopes or detectors made of heavy water or liquid scintillator.

Neutrino interactions occur through the weak nuclear force responsible for nuclear decay and fusion reactions.

Neutrino's mass mystery:

Neutrino oscillations have revolutionised our understanding of these elusive particles. In 1998, the Super-Kamiokande experiment in Japan showed that the properties of neutrinos change flavour as they travel through space due to quantum mechanical effects called oscillations. This discovery revealed that neutrinos must have non-zero masses, confirmed by subsequent MINOS and Daya Bay experiments, even by the way particles with mass can never travel at the maximum speed of light because even mass near the maximum speed of light has relativistic effect (according to special relativity), this means that a particle that travels at the maximum speed of light is massless, only this is why nothing can travel faster than the maximum speed of light and since the speed of neutrinos is less than the maximum speed of light, therefore even neutrinos have mass but since their speed is close to the maximum speed of light, meaning 299792457.99985 meters per second according to quantum physicists, therefore their mass is **about 6.022×10^{-10} amu** because neutrino masses as tiny as 10^{-36} kg would be measured with KATRIN. This is achieved via the spectroscopic energy measurement of the beta-electrons from tritium beta-decay with the KATRIN spectrometer and $1\text{kg} = 6.022 \times 10^{26}$ amu because $1\text{gram} = 6.022 \times 10^{23}$ amu (according to avogadro constant), meaning it should not be that there is no interaction of neutrinos with the Higgs field, we believe that there is no interaction of neutrinos with the Higgs field because there are two reasons, first reason is that interaction of neutrinos with the Higgs field is **negligible** because their mass is **almost** zero and the second reason is that neutrinos do not interact with anything. Now the question arises that why do neutrinos not interact with anything? The answer to this question is that neutrinos do not interact with anything because there are three reasons, first reason is that neutrinos are the **fundamental matter**

particles, the second reason is that the speed of neutrinos is **about** equal to the maximum speed of light and the third reason is that universe at quantum level is an imaginary world where everything is possible, meaning quantum world is an imaginary world where everything is possible because there are two reasons, first reason is that **practically** only quantum world is 4 dimensional and the second reason is that **4th dimension is in the form of i**.

Role of neutrinos in the universe's evolution:

As we explore the past, we can glimpse the secrets hidden in the fabric of time and space. The study of neutrinos gives us a unique window into the early Universe, allowing us to understand its history and evolution better.

Neutrinos played a crucial role in the formation of our Universe, and studying their properties can reveal important insights into cosmic events that occurred billions of years ago.

The properties of neutrinos provide insight into the early Universe through their oscillations. Neutrino oscillations refer to the phenomenon where neutrinos change flavour as they travel through space. This property allows scientists to study how neutrinos interacted with matter in the early Universe and track their journey across vast distances.

Another critical aspect of studying neutrinos is their connection to cosmic microwave background (CMB) radiation. The CMB is leftover radiation from just 380,000 years after the Big Bang, making it a precious tool for understanding the Universe's earliest moments. It's believed that the properties of neutrinos may have played a significant role in shaping this radiation due to their interactions with other particles during this period.

Studying neutrinos provides invaluable insights into the most fundamental aspects of our universe's creation. Their ability to travel vast distances without interacting with matter means they carry

information from billions of years ago, allowing us to piece together what happened during those critical first moments after the Big Bang.

Conclusions:

This explanation leads to the conclusion that neutrinos interact with the Higgs field but **very weakly** and they are not useless fundamental matter particles.

Note: By the way, **practically** the speed of neutrinos is even more than the speed of light because this thing is correct that light's speed is fastest in the universe but only in vacuum and it is not possible that light travel only in vacuum, meaning when any medium (like air, water etc.) comes in the way of light then the speed of light slows down and if a black hole comes in the way of light then the speed of light will become 0 because the black hole absorbs everything inside it whereas the speed of neutrinos never slow down even if a black hole comes in its path because neutrinos do not interact with anything.

3. Dark matter mystery:

Physicists calculate almost same speed of every planet that revolve around the sun and due to this cause physicists believe that there is a mysterious matter exists in the universe that controls the speed of all the planets that revolve around the star and physicists named this mysterious matter, 'Dark matter' but there is no experimental evidence of the dark matter because dark matter must not be exists in the universe, we believe that dark matter exists in the universe because we are doing a technical mistake, we are considering only universal law of gravitation, we know that **technically**, all the planets in our solar system do not revolve around the Sun but rather revolve around their respective barycenters which are formed due to their own mass and the mass of the Sun and in order to revolve around their respective barycenters which are formed due to their own mass and the mass of the Sun the magnitude of centrifugal force must be less than the magnitude of centripetal force and in order to reduce the magnitude of the centrifugal force of those planets that are either close to the Sun or have a lot of mass, nature slows down the speed of those planets that are either close to the Sun or have a lot of mass, only this is why we calculate almost same speed of every planet that revolve around the sun and only this is why we believe that dark matter exists in the universe that controls the speed of all the planets that revolve around the star and only this is why we calculate almost same speed of all the stars also that revolve around the galactic center (supermassive black hole) because **technically**, even all the stars in our galaxy do not revolve around the galactic center (supermassive black hole) but rather revolve around their respective barycenters which are formed due to their own mass and the mass of the galactic center (supermassive black hole) and in order to revolve around their respective barycenters which are formed due to their own mass and the mass of the galactic center (supermassive black hole) the magnitude of centrifugal force must be less than the magnitude of centripetal force and in order to reduce the magnitude of the centrifugal force of those stars that are either close to the galactic center (supermassive black hole) or have a lot of mass, nature slows down the speed of those stars that are either close to the galactic center (supermassive black

hole) or have a lot of mass, only this is why we believe that dark matter exists in the universe that also controls the speed of all the stars that revolve around the galactic center (supermassive black hole).

Conclusion:

This explanation leads to the conclusion that dark matter does not exist in the universe, we believe that dark matter exists in the universe because we consider only universal law of gravitation.

4.Cosmic inflation and dark energy mystery:

Cosmic inflation mystery:

Introduction:

In physical cosmology, **cosmic inflation**, **cosmological inflation**, or just **inflation**, is a theory of exponential expansion of space in the early universe. The inflationary epoch is believed to have lasted from 10^{-36} seconds to between 10^{-33} and 10^{-32} seconds after the Big Bang. Following the inflationary period, the universe continued to expand, but at a slower rate. The acceleration of this expansion due to dark energy began after the universe was already over 7.7 billion years old (5.4 billion years ago).

Reality of cosmic inflation theory:

The Big Bang is a one-time event of an expansion from a singularity. The only elements were hydrogen and helium. After a few billion years, stars formed. As stars end their life and explode as a supernova, more elements are formed, this means that big bang is similar to the supernova, the main difference between the big bang and the supernova is that the big bang happens on a very large scale whereas the supernova happens on a very small scale (in comparison to the big bang) and both big bang and supernova happen because of the repulsive gravity, this means that cosmic inflation theory is not 100% correct, meaning cosmic inflation had happened but the speed of cosmic inflation can not be more than the maximum speed of light because the maximum speed of light is the speed of casualty, meaning if anything moves faster than the maximum speed of light then the law of casualty will get violated which says that first there will be a cause then there will be an effect. Now the question arises that why is the universe almost homogeneous everywhere?, why is the universe almost flat everywhere? And why there is no magnetic monopoles? Because the big bang theory does not tell us that how, why and about when universe began? but rather tells us that how, why and about when universe evolved? In order to know the answer of these questions that why is the universe almost homogeneous everywhere?, why is the universe almost flat everywhere? And why there is no magnetic monopoles? Which is also called the horizon problem, the flatness problem and the monopole problem, we will have to understand **least** that why and about when universe began? Which is a separate topic which we will study in 8th, 9th, 10th and 11th topic because in order to solve the horizon, the flatness and the monopole problem we will have to know first of all universe's language(technically) then fundamental constant's mystery and then cause of low entropy of big bang (mystery of 'arrow of time') but please before that study each topic in order.

Dark energy mystery:

Physicists observe that universe is expanding at an accelerating rate and due to this cause physicists believe that there is a mysterious energy exists in the universe that expands the universe at an accelerating rate and physicists named this mysterious energy, 'Dark energy' but in reality, dark energy must not be exists in the universe, we believe that dark energy exists in the universe because we observe that all the galaxies(except neighbour galaxies) are going far away from our milky way galaxy at an accelerating rate and we believe that, this means the universe is expanding at an accelerating rate but if we assume that all the galaxies(except neighbour galaxies) are going far away from our milky way galaxy at a constant speed, only then we must believe that dark energy exists in the universe because, only then, this means that the universe is expanding but if all the galaxies(except neighbour galaxies) are going far away from our milky way galaxy at **an accelerating rate** then this does not mean that universe is expanding at an accelerating rate because **in space, without gravity, acceleration is not possible**, meaning there is something which is attracting all the galaxies in the observable universe towards itself because its gravity is strongest and it is largest and most massive thing, this means that it must be largest and most massive galaxy cluster but we can say this thing '**The Greatest Attractor**' instead of saying the largest and most massive galaxy cluster because we have no scientific evidence that this thing is largest and most massive galaxy cluster.

Conclusions:

This explanation leads to the conclusion that dark energy does not exist in the universe because **in space, without gravity, acceleration is not possible**, we observe that all the galaxies(except neighbour galaxies) are going far away from our milky way galaxy at an accelerating rate because there is something which is attracting all the galaxies in the observable universe towards itself because its gravity is strongest and it is largest and most massive thing, this means that it must be largest and most massive galaxy cluster but we can say this thing '**The Greatest Attractor**' instead of saying the largest and most massive galaxy cluster because we have no scientific evidence that this thing is largest and most massive galaxy cluster and cosmic inflation theory is not 100% correct, meaning cosmic inflation had happened but the speed of cosmic inflation can not be more than the maximum speed of light.

5.Complete formula of Electromagnetic force:

We know that the formula for the magnitude of electromagnetic force acting on an electric charged particle given in physics books and the internet is $|F|=qE+qvB\sin\theta$ but this formula is **incomplete** because there are two reasons, first reason is that if any electric charged particle enters parallel to the uniform electric field then that electric charged particle will experience no electric force(according to electron's motion properties in an electric field) and the second reason is that only radiation can produce both electric field and magnetic field **simultaneously** because radiation is an electromagnetic wave and since $E = cB$ in case of electromagnetic wave where E is the electric field intensity of the electromagnetic wave & B is the magnetic field intensity of the electromagnetic wave & c is the speed of light in vaccum(according to EM wave properties) therefore the complete formula of magnitude of electromagnetic force acting on an electric charged particle will be $|F|=qcB\sin\alpha+qvB\sin\theta\Rightarrow|F|= qB(cs\sin\alpha+vs\sin\theta)$ where α is the angle between velocity of charge q and electric field intensity E (where $E=cB$) and θ is the angle between velocity of charge q and magnetic field intensity B , this means that electromagnetic

force is produced by the interaction of radiation and electric charged particle only because the electromagnetic field is produced by the radiation only.

Note: The Standard Model of elementary particles states that the force carrier particle of electromagnetic force is photon, which is **technically** wrong because photons produce only electromagnetic field, **technically** the electromagnetic force is produced only by the interaction of the photons and the electric charged particle (according to this formula), meaning this statement is correct that the force carrier particle of electromagnetic force is photon but only **in easy language**.

Conclusion:

This explanation leads to the conclusion that the complete formula of magnitude of electromagnetic force acting on an electric charged particle is $|\mathbf{F}|=q\mathbf{B}(c\sin\alpha+v\sin\theta)$ where α is the angle between velocity of charge q and electric field intensity E (where $E=cB$) and θ is the angle between velocity of charge q and magnetic field intensity B and this statement is correct that the force carrier particle of electromagnetic force is photon but only **in easy language**, **technically** the electromagnetic force is produced only by the interaction of the photons and the electric charged particle (according to this formula).

6. Fundamental cause of gravity:

Introduction

In 1687, English mathematician Sir Isaac Newton published Principle and wrote, "I deduced that the forces which keep the planets in their orbits must be reciprocally as the squares of their distances from the centers about which they revolve: and thereby compared the force requisite to keep the Moon in her orbit with the force of gravity at the surface of the Earth; and found them answer pretty nearly." This became known as Newton's inverse square law of gravity. Although Newton was unable to define the exact nature of the gravitational force, Newton's law of universal gravitation became widely accepted right up to the beginning of the 20th century. It is often taught in high school science classes and for most applications is a good approximation regarding the behavior of gravity.

In 1915, Einstein published his theory of gravity within the framework of his now famous theory of general relativity. According to general relativity, the effects of gravitation are caused by a spacetime curvature and not a force, as Newton had asserted. Einstein's theory of general relativity was able to successfully account for several effects that were unexplained by Newton's law, such as the anomalies in the orbits of Mercury. Einstein's theory of general relativity proposed that spacetime is curved by matter, and that free-falling objects are moving along locally straight paths, called geodesics, in curved spacetime. A simple way to think about this is to think about a drum. Now think about pushing down in the center of the drum. This would cause the entire surface of the drum to become concave (i.e., curve inward). If you drop a marble on the drum, it will fall to the center due to the inward curvature of the drum's surface. Although Einstein general theory of relativity is now a corner stone of modern physics, especially astrophysics, it still did not explain **fundamentally** why does gravity get produced? which still left the nature of gravitation a mystery. On a side note, while general relativity predicted numerous phenomena, such as gravitational lensing (i.e., the bending of light by a large mass) and an effect of gravity on time known as gravitational time dilation (i.e., the slowing down of "clock" in a strong gravitational field), it is incompatible with the highly successful theory of quantum mechanics, which describes the behavior of atoms and subatomic particles.

Concept of graviton

Modern physics holds that the gravitational force is mediated by a particle called the graviton, the speed of which has postulated to be equal to the maximum speed of light, However, graviton is a hypothetical particle because there is no experimental evidence that the graviton exists because gravitons produce gravity only if matter curves space because **technically** everything of the universe is quantized e.g energy, higgs field etc, which means space is also quantized and the smallest particle of space is graviton, Its length is equal to the Planck length and the value of planck length is about $1.6 \times 10^{-35}m$, only this is why when matter curves space, only then gravitons produce gravity and only this is why it is not possible to get experimental evidence of graviton particle, this means that graviton is not a hypothetical particle, meaning **the force carrier particle of gravitational force is graviton.**

Properties of graviton

1. Massless (because its speed is equal to the maximum speed of light, only this is why the speed of gravitational waves is equal to the maximum speed of light and the range of gravitational field is also infinite like electromagnetic field)
2. Spin value:- 2 (because gravity is 2nd rank tensor field)
3. Charge:- Neutral

Note: By the way, **technically** this statement is wrong that the force carrier particle of gravitational force is graviton because **technically** both gravitational field and gravitational force are produced only by the interaction of gravitons and matter (because graviton is Planck space), meaning this statement is correct that the force carrier particle of gravitational force is graviton but only **in easy language.**

Conclusion:

This explanation leads to the conclusion that the force carrier particle of gravitational force is graviton but only **in easy language**, **technically** both gravitational field and gravitational force are produced only by the interaction of gravitons and matter (because graviton is Planck space), meaning neither string theory nor loop quantum gravity theory is 100% correct because string theory includes the concept of gravitons but it does not include the concept of planck length whereas LQG theory includes the concept of planck length but it does not include the concept of gravitons but both these theories have helped us to know the fundamental cause of gravity, by the way, LQG theory is better than string theory because LQG theory works at 4 dimensions whereas string theory works at **least** 10 dimensions but existence of more than 4 dimensions is not possible because even **mathematically** dimensions exist only 4.

7. Quantum Gravity:

We know that quantum gravity means existence of gravity at quantum level but there are only two places in the universe where practically gravity exists at quantum level 1. At the center of a black hole 2. Point of Big Bang but why do we need to understand the concept of quantum gravity? The answer of this question is that we need to understand the concept of quantum gravity because general relativity fails at the center of a black hole but why does general relativity fail at the center of a black hole? The answer of this question is that general relativity fails at the center of a black hole because we use wrong schwarzschild metric, **We know that the schwarzschild metric given in physics books and the internet is**

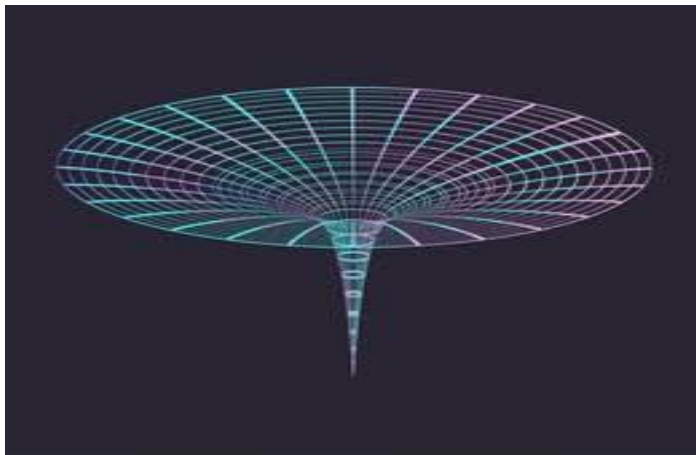
$$ds^2 = -\left(1 - \frac{2GM}{c^2 r}\right) c^2 dt^2 + dr^2 \left(1 - \frac{2GM}{c^2 r}\right)^{-1} + r^2 d\theta^2 + r^2 \sin^2 \theta d\psi^2$$

but this schwarzschild metric is **wrong** because the shape of the spacetime may be either flat or curved or infinitely curved(theoretically) but the shape of the spacetime has no relation with the value of the 4th dimension because the shape of the spacetime is related only to the value of the 3 spacial dimensions (length, width and height) because light does not experience time(in vacuum) because from light's point of view(in vaccum), there is no "journey", because from light's point of view(in vaccum), every point along its path is located at exactly the same position in space, and they all pass by at exactly the same moment in time(according to special relativity), this means that light(in vaccum) always travels along paths where the space-time interval(observer distance covered) is exactly zero between every two points along the path, therefore **if the value of the 3 spacial dimensions (length, width and height) are correct in this schwarzschild metric** then the correct schwarzschild metric is

$$ds^2 = -c^2 dt^2 + dr^2 \left(1 - \frac{2GM}{c^2 r}\right)^{-1} + r^2 d\theta^2 + r^2 \sin^2 \theta d\psi^2$$

Here, G is the gravitational constant and M is the mass of a black hole.

Note: By the way, the value of the 3 spacial dimensions must be wrong in this schwarzschild metric because in case of singularity (at the center of a black hole), the curvature of spacetime is conical as shown in the figure below, this means that in order to form the schwarzschild metric we will have to study 3 spacial dimensions of a cone and in order to study 3 spacial dimensions of a cone we will have to study the conical coordinate system.



Conclusion:

This explanation leads to the conclusion that general relativity produces a metric tensor problem at the center of a black hole because of which we think that general relativity fails at the center of a black hole, meaning we will have to form correct schwarzschild metric in order to understand the concept of quantum gravity.

8. Universe's language(technically):

Universe is a web of spacetime(according to albert einstein). **Common sense says that mathematics is the language of the universe** but it is not necessary that common sense is always **absolutely** right because if it were so then we would not have needed physics to know the secrets of the universe like electromagnetism, electromagnetic induction, heisenberg uncertainty principle etc. Therefore in order to know the language of the universe first we will have to understand the concept of energy and higgs field.

Higgs field is responsible for mass, and energy can neither be created nor be destroyed because energy is radiation(according to $E=mc^2$) and non existence of radiation means change in entropy to be undefined because there are two reasons, first reason is that the formula of change in entropy of a system is $\Delta S = \frac{Q}{T} \left(\frac{\text{Joules}}{\text{Kelvin}} \right)$ where ΔS is the change in entropy of a system, Q is the heat transfer and T is the temperature at which the process takes place and the second reason is that without the existence of radiation, temperature of the universe will become 0 Kelvin and anything divided by 0 is undefined, meaning 0 Kelvin temperature is not possible because if existence of higgs field is denoted by H & if existence of radiation is denoted by E and if existence of spacetime is denoted by S then there will be $H \propto E \propto S$ because there are two reasons, first reason is that radiation and higgs field can not travel without spacetime and the second reason is that frequency of radiation can never be 0 Hertz and without higgs field, existence of mass is not possible and without existence of mass, existence of gravity is not possible, this means that If radiation and higgs field did not exist then spacetime would have also not existed which is not possible.

Note: By the way, since universe is a web of spacetime, therefore existence of time \propto existence of space, this means that planck proper time, planck space(graviton), planck energy(energy of lowest frequency photon) and higgs boson had born **simultaneously**. The value of planck space(graviton) is about $(1.6 \times 10^{-35})^3 m^3$ & the value of planck proper time is about $5.4 \times 10^{-44} s$ because planck proper time = $\frac{\text{planck length}}{\text{maximum speed of light}}$ and the value of planck energy(energy of lowest frequency photon) is about $1.96 \times 10^9 J$.

Energy,higgs field,spacetime and matter formation procedure never get destroyed in the universe because they were not created by chance in the universe, this means that if energy, higgs field, spacetime and matter formation procedure get destroyed in the universe then no fundamental force will also exist which is not possible because then the laws and principles of physics and mathematics will get violated which is not possible because **technically mathematical physics is the language of the universe because this thing is correct that mathematics can answer every question but without physics it is unable to explain the mysteries of the universe** e.g in electromagnetic Induction. The formula of induced emf in the coil is $\epsilon = -N \frac{d\Phi_B}{dt}$ where ϵ is the induced electromotive force, $d\Phi_B$ is the change in magnetic flux and N is the number of turns, The negative sign in the formula tells us that the induced emf in the coil opposes the rate of change of magnetic flux but why does the induced emf in the coil oppose the rate of change of magnetic flux? The answer of this question is that if the induced emf in the coil does not oppose the rate of change of magnetic flux then, this means that we are creating energy due to which induced current is producing in the coil which is

not possible because energy can neither be created nor be destroyed, this means that mathematics is explaining electromagnetic Induction **with the help of physics, which means technically mathematical physics is the language of the universe**, another example is in special relativity, the equation of time dilation is $t'^2 = t^2(1 - v^2/c^2)$ where t' is the observer time taken, t is the proper time taken, v is the velocity of an object & c is the velocity of light in vacuum.

According to the time dilation equation if any particle velocity $v = c$ then observer time taken $t' = 0$, meaning observer time stops completely at the maximum velocity of light but why does observer time stop completely at the maximum velocity of light? The answer of this question is that since the maximum velocity of light is the speed of causality, meaning if we assume for a while that an object moves faster than the maximum velocity of light then the law of causality will get violated which says that first there will be a cause then there will be an effect, only this is why in order to protect the law of causality, nature stops observer time at the maximum velocity of light because of which observer time stops completely at the maximum velocity of light, only this is why light does not experience time (in vacuum) because from light's point of view (in vacuum), there is no "journey", because from light's point of view (in vacuum), every point along its path is located at exactly the same position in space, and they all pass by at exactly the same moment in time & according to special relativity, light's point of view is equally valid to our own, this means that mathematics is explaining time dilation **with the help of physics, which means technically mathematical physics is the language of the universe**, another example is in thermodynamics, the formula of the change in entropy of a system

is $\Delta S = \frac{Q}{T} \left(\frac{\text{Joules}}{\text{Kelvin}} \right)$ where ΔS is the change in entropy of a system, Q is the heat transfer and T is the temperature at which the process takes place. **We know that entropy is a measure of disorder** & entropy of a system never decreases and according to this formula, at 0 Kelvin temperature, change in entropy of a system is undefined (because anything divided by 0 is not defined), which means temperature of any object can never be 0 Kelvin which is also the third law of thermodynamics, this means that mathematics is explaining the third law of thermodynamics **with the help of physics, which means technically mathematical physics is the language of the universe**.

Note: We know that the value of entropy given in physics books and the internet is exactly 0 at 0 Kelvin temperature but it is **mathematically** wrong because the value of Boltzmann constant is undefined at 0 Kelvin temperature, which means even the value of entropy is undefined at 0 Kelvin temperature (which means temperature of any object can never be 0 Kelvin) because the formula of Boltzmann constant is $K_B = \frac{PV}{TN}$ and the value of T is 0 Kelvin at 0 Kelvin temperature and anything divided by 0 is not defined, only this is why the value of Boltzmann constant is undefined at 0 Kelvin temperature, which means even the value of entropy is undefined at 0 Kelvin temperature, which means temperature of any object can never be 0 Kelvin, which means mathematics is explaining the third law of thermodynamics **with the help of physics, which means technically mathematical physics is the language of the universe**.

Another example is in electronics, the relation between electric field intensity & electric potential difference is $E = -\frac{\Delta V}{r}$ where E is electric field intensity, ΔV is electric potential difference, r is the displacement between the source charge and test charge & negative sign in the formula tells that the direction of electric field intensity is from higher electric potential to lower electric potential.

According to the formula, if electric potential difference $\Delta V = 0$ then electric field intensity $E = 0$, meaning if the electric potential of source charge and electric potential of test charge become equal then there will be no electrostatic force exerted between them because the

formula of **electrostatic** force is $F = qE$, this means that mathematics is explaining the relation between electric field intensity and electric potential difference **with the help of physics, which means technically mathematical physics is the language of the universe**, similarly in gravitation, the relation between gravitational field intensity and gravitational potential difference is $I = -\frac{\Delta U}{r}$ where I is gravitational field intensity, ΔU is gravitational potential difference, r is the displacement between the source mass & test mass and negative sign in the formula tells that the direction of gravitational field intensity is from higher gravitational potential to lower gravitational potential.

According to the formula, if gravitational potential difference $\Delta U=0$ then gravitational field intensity $I=0$, meaning if the gravitational potential of source mass and gravitational potential of test mass become equal then there will be no gravitational force exerted between them because the formula of gravitational force is also $F = mI$ where m is a test mass & I is the gravitational field intensity, this means that mathematics is explaining the relation between gravitational field intensity and gravitational potential difference **with the help of physics, which means technically mathematical physics is the language of the universe**.

Conclusion:

This explanation leads to the conclusion that **technically** the language of the universe is not mathematics but rather mathematical physics.

9. Fundamental constant's mystery:

Dimensionless constants are numbers that don't have units attached to them. The speed of light, for example, is a fundamental constant measured in units of meters per second (or 186,282 miles per second). Unlike the speed of light, dimensionless constants have no units and they can be measured, but they can't be derived from theories, whereas constants like the speed of light can be. In his book "Just Six Numbers: The Deep Forces That Shape the Universe" (Basic Books, 2001), astronomer Martin Rees focuses on certain "dimensionless constants" he considers fundamental to physics. In fact, there are many more than six; about 25 exist in the Standard Model.

For example, the fine structure constant, usually written as alpha, governs the strength of magnetic interactions. It is about 0.007297. What makes this number odd is that if it were any different, stable matter wouldn't exist. Another is the ratio of the masses of many fundamental particles, such as electrons and quarks, to the Planck mass (which is $1.22 \cdot 10^{19}$ GeV/c²). Physicists would love to figure out why those particular numbers have the values they do, because if they were very different, the universe's physical laws wouldn't allow for humans to be here. And the theoretical explanation for why they have those values is that without the existence of those values, the laws and principles of physics and mathematics will get violated which is not possible **because technically mathematical physics is the language of the universe** and the reason the language of the universe is technically mathematical physics is because if the language of the universe were not technically mathematical physics then the laws and principles of physics and mathematics would not have existed and without the existence of the laws and principles of physics and mathematics, the creation of the universe would not have been possible.

Conclusion:

This explanation leads to the conclusion that the theoretical explanation for why fundamental constants have those values is that without the existence of those values of fundamental constants, the laws and principles of physics and mathematics will get violated which is not possible **because technically mathematical physics is the language of the universe.**

10.Cause of low entropy of big bang (mystery of 'arrow of time'):

The arrow of time is forward because the Big Bang had low entropy. And still, 14 billion years later we are swimming in the aftermath of that tsunami that started near the Big Bang. Only this is why time has a direction for us. But the underlying question here is, why the big bang had low entropy? In order to know the answer of this question we will have to know that why big bang's singularity (where a huge amount of energy was crammed together in a small amount of space) formed? because the big bang only happened because of the formation of the big bang's singularity because big bang's singularity couldn't control its own gravity because of which repulsive gravity produced and because of repulsive gravity big bang happened, our common sense says that before the formation of the big bang's singularity, there was nothing but 'First law of thermodynamics' says that something can't come from nothing, this means that universe existed even before the formation of the big bang's singularity, meaning in order to know that why big bang's singularity formed? first of all we will have to know that why universe began?, our common sense says that before universe beginning, there was nothing but 'First law of thermodynamics' says that something can't come from nothing, this means that first of all the laws and principles of physics and mathematics had formed because without the formation of the laws and principles of physics and mathematics, the formation of the universe would not have been possible (only this is why technically mathematical physics is the language of the universe) then in order to protect the existence of laws and principles of physics and mathematics, nature started the formation of the universe, In order to begin the universe, nature formed planck space (graviton) and since existence of time, energy and higgs field are all proportional to the existence of space (because technically mathematical physics is the language of the universe), therefore planck proper time, planck energy (energy of lowest frequency photon) and higgs boson formed automatically but without the existence of four fundamental forces, the laws and principles of physics and mathematics would have been violated, only this is why in order to produce four fundamental forces, nature formed big bang's singularity and we all know that the big bang only happened because of the formation of the big bang's singularity and after some time of the big bang four fundamental forces got separated, only this is why entropy of the big bang was low, this means that only the laws and principles of physics and mathematics is 'God' because there are three reasons, first reason is that first of all the laws and principles of physics and mathematics had formed, the second reason is that without the existence of the laws and principles of physics and mathematics, the formation of the universe would not have been possible and the third reason is that if the laws and principles of physics and mathematics do not get violated then nothing is impossible in the universe **because technically mathematical physics is the language of the universe**, meaning in **easy language** we can say that only rules and laws of nature is 'God' because if the rules and laws of nature do not get violated then nothing is impossible in the universe.

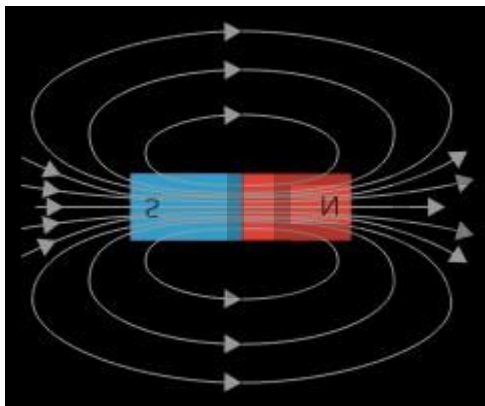
Conclusion:

This explanation leads to the conclusion that the reason the entropy of the big bang was low is because if the entropy of the big bang was not low then the formation of four fundamental forces would not have been possible and without the existence of four fundamental forces, the laws and

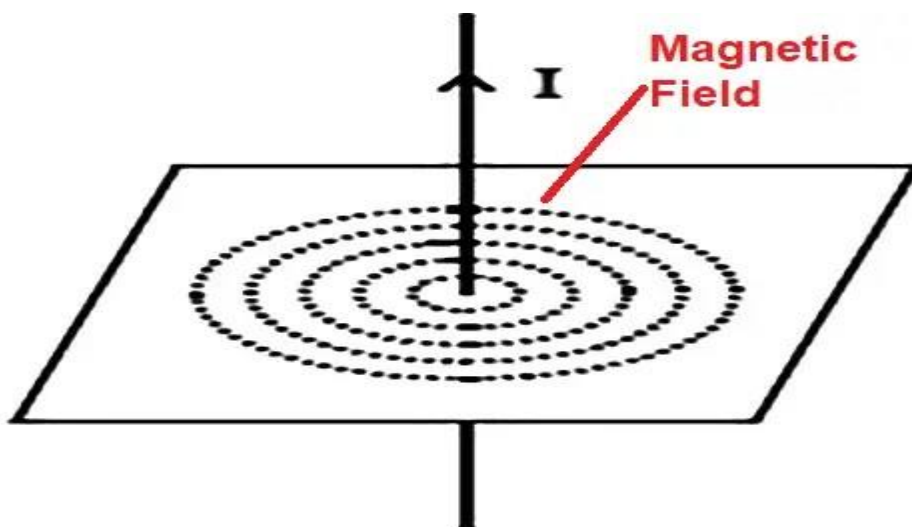
principles of physics and mathematics would have been violated which was neither possible nor is possible **because technically mathematical physics is the language of the universe.**

11.The horizon, the flatness and the monopole problem solution:

How long after the formation of planck space(graviton) did the Big Bang happen? This is a separate topic but it could take trillions of years, which means we'll never know when time began, meaning **theoretically**, time has no beginning. Only this is why the universe is **theoretically** infinite because space is expanding at the maximum speed of light since the beginning of time because gravitons are massless and only this is why the universe is almost homogeneous and flat everywhere and since magnetic field lines always form a closed path or closed loop as shown in the figure below, which is a property of magnetic field lines, only this is why the existence of magnetic monopoles is not possible.



ESEM



Now the question arises that why magnetic field lines have such a property? The answer to this question is that magnetic field lines have such a property because **technically mathematical physics**

is the language of the universe, meaning if the laws and principles of physics and mathematics do not get violated then nothing is impossible in the universe, only this is why magnetic field lines have such a property.

Conclusions:

The reason the universe is almost homogeneous and flat everywhere is because the universe is **theoretically** infinite and the reason the existence of magnetic monopoles is not possible is because magnetic field lines always form a closed path or closed loop, which is a property of magnetic field lines.

12. Baryon asymmetry problem solution:

Physicists believe that the big bang should have produced equal amounts of fundamental matter particle & fundamental antimatter particle but if it were so then all the quarks & antiquarks and all the electrons & positrons would have attracted to each other and all of them would have annihilated by colliding to each other due to their opposite electric charges because of which no atom would have formed and without an atom's formation, the formation of the four fundamental forces was not possible and without the existence of four fundamental forces, the laws and principles of physics and mathematics would have been violated which was neither possible nor is possible **because technically mathematical physics is the language of the universe**, only this is why the number of fundamental matter particles is much greater than the number of fundamental antimatter particles, meaning if the laws and principles of physics and mathematics do not get violated then nothing is impossible in the universe, this means that this statement is wrong that the big bang should have produced equal amounts of fundamental matter particle & fundamental antimatter particle, but there is fundamental matter particle—fundamental antimatter particle symmetry, meaning there is evidence of fundamental antimatter particle of each type of fundamental matter particle (according to lagrangian equation), this means that **the standard model of elementary particles must mention fundamental antimatter particle of each type of fundamental matter particle.**

Conclusion:

This explanation leads to the conclusion that this statement is wrong that the big bang should have produced equal amounts of fundamental matter particle & fundamental antimatter particle but this statement is right that **the standard model of elementary particles must mention fundamental antimatter particle of each type of fundamental matter particle.**

13. Parallel universe's mystery:

First of all I will tell you about one of the most popular parallel universe's incident then I will answer you of this question after conclusion that "Is parallel universe exist?"

Taured Mystery: The Man Who Vanished As Mysteriously As He Came

The Man Said That His Country Has Been In Existence For 1000 Years And Was A Little Puzzled Why His Country Was Called Andorra On The Map.

There are many incident of parallel universes but this incident of parallel universe is one of the most popular parallel universe's incident. It was July 1954 when a smartly dressed man arrives at Haneda Airport in Tokyo, Japan. Much like other passengers, he makes his way to customs. But whatever happened from this point onwards have left all puzzled and concerned. When questioned by the customs officers, the mysterious passenger said he was from Taured, also referred to as Taured Mystery. The mystery man claimed that it was the third time he was visiting Japan from his country. But, to the surprise of officers, they couldn't find any country named Taured. The primary language of the man, described as Caucasian looking with a beard, was French. However, she was purportedly speaking Japanese and many other languages as well.

Officers were perplexed because they had never heard about any such country. The passport of the man was issued by of course the Taured. The passport looked authentic but the place was not recognized.

Location of Taured

The man was then given a map and asked to point out his country. He immediately man pointed to the area occupied by the Principality of Andorra. Andorra is at the border of France and Spain. The man said that his country has been in existence for 1000 years and was a little puzzled why his country was called Andorra on the map. The man argued with the customs officers for long and refused to give in.

What Is The Mystery All About?

He was also carrying currencies of different countries, probably because he had made several business trips. The mystery man shared other details like the company for which he was working and the hotel where he stayed. Officials find out that the company which he mentioned existed in Tokyo but not in Taured. Similarly, the hotel he mentioned did exist but hotel employees informed them that no such booking was made. This prompted officers to take the man in custody for further interrogation. Officers were suspicious that he might be some criminal and confiscated his documents and personal belongings. The officers put the mystery man in a nearby hotel whilst they conducted their investigation.

Mystery Man Vanishes Amid Tight Security

To ensure that the mystery man didn't escape, two guards were placed on the door. It must be mentioned that the hotel room in which he was staying only had one entry and exit point. But to everyone's surprise, the man vanished the next morning. Not only that, but all his personal documents had also disappeared. A search was launched to find the man but in vain. The thing that was troubling investigating officers was that he was put up in a room high up in the multi-storey hotel building with no balcony.

Conclusion:

This phenomenon leads to the conclusion that if parallel universes exist then we can go there only by chance and that too only temporarily, in other words we can say that if parallel universes exist then we can go there only if the nature wants and that too only temporarily.

Note: By the way, in reality, parallel universes do not exist, we know that universe at quantum level is an imaginary world where everything is possible, meaning quantum world is an imaginary world where everything is possible because there are two reasons, first reason is that **practically** only quantum world is 4 dimensional and the second reason is that **4th dimension is in the form of i** and since **theoretically**, 4th dimension exists in our world also and **4th dimension is in the form of i**, therefore **practically**, our world is not 100% real, meaning our world is about 99.9999% real and

about 0.0001% imaginary but since our world is only about 0.0001% imaginary which is about 0%, meaning since **practically** 4th dimension doesn't exist in our world because the existence of the 4th dimension is **about** 0% in our world (because we practically can't even reach near the 1% of the maximum speed of light with the latest technology), only this is why strange and mysterious incidents are very rare in our world because of which we think that our world is 100% real and strange and mysterious incidents happen because parallel universes exist, strange and mysterious incidents e.g Taured mystery, Mandela effect etc. If you don't know about Mandela effect then study below.

Mandela effect: The Mandela effect refers to a situation in which a large mass of people believes that an event occurred when it did not. The term was originated in 2009 by Fiona Broome, after she discovered that she, along with a number of others, believed that Nelson Mandela had died in the 1980s (when he actually died in 2013).

Origins of the Mandela Effect

The term "Mandela Effect" was first coined in 2009 by Fiona Broome when she created a website to detail her observance of the phenomenon. Broome was at a conference talking with other people about how she remembered the tragedy of former South African president Nelson Mandela's death in a South African prison in the 1980s.

However, Nelson Mandela did not die in the 1980s in a prison—he passed away in 2013. As Broome began to talk to other people about her memories, she learned that she was not alone. Others remembered seeing news coverage of his death as well as a speech by his widow.

Broome was shocked that such a large mass of people could remember the same identical event in such detail when it never happened. Encouraged by her book publisher, she began her website to discuss what she called the Mandela Effect and other incidents like it.

Final conclusion:

This explanation leads to the conclusion that parallel universes do not exist, we think that parallel universes exist because we think that our world is 100% real but **practically**, our world is not 100% real because there are two reasons, first reason is that **theoretically** our world is also 4 dimensional and the second reason is that **4th dimension is in the form of i**, only this is why strange and mysterious incidents happen in our world also e.g Taured mystery, Mandela effect etc.

Note: Please study each topic in order.

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