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Art of Natural Philosophy

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For every norm concerning mother nature, there's physics to implement that in theories.

Before start writing this, I like to raise some fundamental questions about the creation of humanity and the universe itself. What is the secret ingredient behind the origin of the universe? Is it a myth or a reality? What is the big bang which happened some 13.7 billion years ago thereby initializing the history of mankind itself?

Who are we? Where from we come and where will we end? Is our universe finite or infinite? Does our identity remain confined within our universe or does some of its wavelength spread beyond its normal intuition? These questions are puzzling scientists for more than a thousand years. Only in the 19^{th} it appeared to humans that an answer is probably found.

So, the first answer that pops into our mind after reading these questions is whether is it possible for the scientists to make the laws of the universe like a solved paper of mathematics or a precise mathematical theory that has been discovered for the creation of the mystery of the universe.

Everything in this universe from the smallest atoms to the largest stars can be linked in a single unified framework. Well, to some extent physics did that. But what about the answers behind the origin of life and the death of life in our universe? Are we a set of precisely calculated software programs that governs what we did & what we see & what we imagine? If the mystery can be shaped using computer algorithms, then who is the programmer & who is the destroyer? Do the creator and destroyer are the same sides of two coins or are they completely different coins? If they are the coins or our creator, then where do these coins generate from? Is there an infinite creation before every little creation of the universe? Is it so? Then where does this infinity end & who sees the infinity or more actually how this infinity can be seen?

In this book, we will explore a magical tour emerging from Einstein's law of relativity to the tiniest of the tiny vibrating strings which formed the spices of the creation of our universe or our mother nature itself.

We will get to know how this macro object can be innumerably linked with the micro object. We will try to demonstrate the basic principles behind the hidden dimensions, superstrings, parallel universes, and the almighty invincible God.

To reveal the magic behind the secrets of this universe is not an easy task to accomplish but scientists over the generations after generations tried their best to place the zig-zag puzzle of infinity and align them in a mere simple way to understand its aspects for the commoners like us.

Nature behaves perfectly touchable and distinguishable within certain limits but beyond that nature remains very very rigid. She doesn't like to reveal its secret beyond the highest of the highest and the smallest of the smallest level. This is probably the reason why our universe seems so interesting to us despite its hidden aspects.

But humans are smart enough! What we can't see with a microscope or telescope, we can predict its possibility using abstract mathematics of higher dimensions like that of 26.

Dimensions are the key to the lock of the vault of the universe. But God wants to keep the key hidden. Okay so let's find out to how much extent humans can turn or try to probe the numerical password of the mystical vault of nature.

It is quite incomprehensible to digest the metabolism of modern physics. Modern physics is now in the state of the veteran. Despite its abstractness and complexity there lies an underlining fabric of smoothness and simplicity. The linen of recent physics is so beautifully enriched that there is an infinitesimal chance of a layman to misunderstand or dislike it. Mathematics has gone rogue. Meta-physics started to rule over physics and nature become aware of the forthcoming conclusions that may dispose of her identity. Many theories have developed in physics in the late 20^{th} and

beginning of the 21st century. Some of the theory has already established themselves in the sophisticated chapter of the golden book whereas some are still struggling for the right track to catch on or still waiting to be proven. Observational physics & thought experiment has ruled over experimental physics due to its nature of ingenious intellect and clever attempt to unify the so-called underline principles for uniting the vast areas of physics into a single structural framework.

Unification in physics is a trillion-dollar question. The undetermined amplitude of unification lies in the forbidden and hidden aspect of math which still needs to be deciphered. Unification aims to testify to the gravity of physics. The gravity needs to be sensational enough to unify all possible branches or sub-branches of physics into a finite structure from an infinite framework. Renormalization takes place to wave out the infinity of physics to a finite wavelength. But still, the concept of infinity is now oblivion. The edge of the sophistically enriched modern physics aimed to hold the edge of uncertainty with a handful of so-called certainty in mathematics. Physicists have stretched their hands far beyond infinity to take into account the hidden abstractness of the linen fabric. But the fabric itself is not smooth as it seems. Although it seems to be perfectly shaped and shaved from the macroscopic view, it is not as that at its microscopic level. The fabric itself is distorted to maximum randomness of inconsistent blobs.

Albeit of its abstractness and compulsiveness, the physicists have struggled to portray the underline hidden principles in a meaningful form for the layman to understand. But among many possible conclusions, they have failed as the language has become so coarse that a high intellect of mathematical geniuses is only capable of unpacking its inner meaning.

The concept of physics has evolved with the departing time. Many new approaches have been discovered and many more are yet to come. The manipulation of derivation has integrated itself into a far more rhythmic structure with a tune of noisy symphony far beyond the reach of the common man.

Beginning with the Newtonian concept and ending with the string theorists the physical undulation has become so stubborn that its principles have started to question their own identity. Physics has developed and so are the minds of scientists.

The more compulsive physics becomes, the more interesting the subject is. Abstractness has become reality and so the enriched has become the conclusion.

Physics is beautiful and so are its principles. The tougher the physics got the more interesting and the more astonishing it sounds. The fine-tuning of physics needed to be kept in a perfect frequency synchronizingly matched with our mind thereby making the physics more touchable. The more perfectly the scientists have developed physics, the more uncanny it sounds. This is not due to its immobility but it is due to the hidden truth behind the fractals which makes the total physics outstanding and overwhelming.

Let us come to a 1000-year own puzzle, what comes first? Egg or Chicken. This is a paradox as no one can exactly say which event will occur at the initial stage and which event will occur at the final state. This is because the egg and chicken are so interwoven with each other in a closed loop that it seemed either both of them come first or both of them come second. Which one is exact, is hard to say. Being a closed-loop if you start with the egg you will end up with chicken and if you start with chicken you will end up with an egg. So, this remains an unsolved paradox after all.

Science and society are dependent on each other. The constructive framework of society comes from the complicated designation of scientific minds. Without science, there is no society and without society, science is meaningless. But what comes first and what is indeed important to hold the first place. From an unambiguous point of view or speaking precisely science is needed like a reference toolkit for the manufacturer of different sectors of society. The engineering sector, the medical sector, the financial sector, and the scientific sector itself is a dependent entity on science.

Speaking frankly, science now a day means a billion-dollar project which needs to accomplish to achieve something. For NASA billions of billions of dollars are spent to send satellites, space stations into space. Curiosity rover is

sent into space to accumulate the data on mars properly. Various other projects are going on with full blaze having related to not only NASA but different space agencies of the world. This is the macro aspect of science. But what about the micro aspect?? Well, there is always an answer for this. In CERN, Geneva, Switzerland, two proton beams collided face to face to find the HIGGS field at the LHC or the Large Hadron Collider. Moreover, in LHC, the conditions of the Big Bang itself are thought to have been recreated. So, this always involves billions and billions of money. But what is the ultimate conclusion?? Yes, we are using NET and GPS and playing internetworking games, calling over mobile, sending E-mails.… Also from the commercial point of view using online databases for the banks, sophisticated engineering design from the software, using nuclear medicines for treatment… yes, indeed we are thankful to science for achieving this!! But everything has a limit…? Do the people living in the BPL category or Below The Poverty Line can use the sophisticated fascinating advantages of this marvelous scientific technology? No. coz, because they have no money to avail them. So science is only restricted to the upper strata of the society. But what about the lower strata? If you transfer the resources for the lower strata of the society from those sophisticated scientific experiments, then probably the poor man will get at least his bread and butter for his survival.

Although the science is correlated to society, and society is a dependable entity on science, but still the most important question remains unanswered? Which comes first… science or society? I am not a student of economics but what I can say is that resources should be distributed evenly in all the strata of the society for its development along with some cut in the funding of finding the impossible of the possibility of science. By, this I don't mean that sending a robot to mars is a luxury or searching for strings is not noteworthy… what I am trying to say is that proper mobilization of the resources is necessary for the construction of the society and for bringing the lower strata of the society to the middle strata for providing their necessities of utmost importance.

Indeed, we need science as without science the society is blind, but still, science should be funded properly to make an equilibrium between the society and science itself

There has been a long-standing conflict between science and theology. The divine principles oppose the scientific truth. God or theology acts as a hindrance to the further development of science. Science itself conflicts with theology. Science sometimes required divine principles to take into account. But theology ignores the scientific assumptions. There has been a pandemonium between Godly creation and the scientific origin. In recent years with the advancement of physics, a new branch of physics came into an account called meta-physics which tries to answer the secrets of the hidden aspects of nature. It is believable that God is there interwoven in the mysteries of nature but science still tries to explain it in a mathematical playground.

The resultant conclusion is called the Theosophy which is the amalgamate form of philosophy and theology. The underline conclusion states that science even required or forced us to believe in the mysteries of nature as a divine creation. Creation itself cannot be possible without God but still, the basics of creation can be properly structured with the help of science. God, being an element of a higher dimension resides within the boundary of physics, and physics is capable of solving the eternal mystery depending upon theology. Although there exists a huge line of difference between God and Science.… But still, the scientific breakthrough would not have achieved its peak without taking into account the divine aspects.

The hidden talents of science remained hidden in the medieval period. Jules Verne in his book 'Around the world in 80 days' showed us how much struggle a scientist had to make to prove his invention correct.

But times have changed now. The predominance of religion over science has lost its importance. But that doesn't mean that science dominates religion. Both science and religion go hand in hand. Science has taken the concepts of religion to question the properties of nature and religion has accepted the thinking of science for further development.

Now a day, it becomes easier for a scientist to publish his invention in front of the public as religion would not stand as a barrier against it. But during the time of Copernicus, Kepler, and Galileo… it is not so smooth to develop a scientific idea and publish it in front of the public. They have to face criticism beyond the limit for providing the key elements of science to the public.

Science Fiction gives us a triumph of knowledge whereas science can't. Fiction is fantasy. Science is reality. Science fiction combines reality with fantasy. The most inconvenient task for a science fiction novel is to provide in-depth knowledge of the author's imagination beyond a critical point. It is this critical point that science can never reach but fiction can. Fiction provides faster than light travel whereas science has put some limitations on it. It is the fiction itself that makes the science more incomprehensible. Science fiction is invincible like God. There is no means by which science fiction can be proved wrong. Why?? Because it is a fantasy of science. The combination of utter imagination without an in-absolute rigidity over its boundary imposes the conditions essential for making the fiction work.

It is quite easy to write a science book than that a fiction book. The complexity of calculations, numeric, and complex mathematics are ignored in science fiction. Fiction doesn't necessarily depict the true state of physics rather it gives a comprehensible idea of what science does & how far is its continuity. Many non-scientific attributes have to be assigned for making an average science fiction work. Although science fiction is dependent on science but still, science is not dependent on fiction. If we intricate science, then we will with utter beautifulness of nature, then perhaps we will get a so-called fiction.

Many new ideas are taken from fiction novels like H.G Wells's The Time Machine and others. Although fiction lacks reality but still if proper fiction can be understood then this will provide a zing in the scientific minds of humans. After all, imagination is an important part of humans and we humans will survive as long as our imagination supports us with utter surprise and hidden conclusions.

Fiction develops the framework, which can be later transposed to reality. The reality of fiction is much more adventurous than that of science. Science has a scope within a particular value beyond which either science go meaningless or science goes abstract. But those abstracts can be put into reality by examining the fiction with the normal intuition of the scientists.

If we humans need to get super-intelligent then we have to depend on fiction. Coz, the very notion of intelligence marks the beginning of the fiction which then proceeds further to make the challenging truth come to reality.

Science has developed. So, the minds of scientists. Many new and amazing ideas are proposed by the fictionists which in turn helps indirectly for the further proceeding of the technological advances of the humans as a whole.

The vicinity of science lies in the fiction itself. It's the nature and notion of transforming absurdness into reality with an acute perception of thought that is imagined to have played a key role in the development of fiction.

If science fiction gets transformed into science as a whole, then we will be intelligent of the intelligent species with the power of encompassing a star and draw the energy from it for the proper utilization of the sophisticated machinery used for the progressive line of sight of mankind.

Physics is a well-mannered, well-structured, self-content, inter-disciplinary subject. Mathematics is the key element of any physical law. The subject of physics is solely dependent on mathematics. Without mathematics, it is impossible rather difficult to explain the very fundamental properties and equations of the physical law. The branch of

mathematical physics has gained its dominance over metaphysics rather than physics. As it is impossible to see the inert structure of nature through an open eye, mathematics is the only key to the answer which describes its properties in a precise mathematical algorithm.

From this viewpoint, physics can be broadly classified into two parts. The macro physics & the microphysics. These two parts can be further integrated into numerous small parts which have their way of explaining their properties and deriving a conclusion from that. Between assumptions and conclusions, it is difficult to say which comes first. Either the conclusion is the resultant theorem of assumptions or the assumptions are the source code of conclusions. Deriving the conclusions from the assumptions is not an easy task to accomplish. Many years of research and well-defined formulated mathematics are needed to achieve the final footprint of assumptions. The resultant conclusions give us the current understanding of nature and its hidden prospects and by compiling the conclusions we can derive the advanced machinery required for our day-to-day use. Without the use of physics, one can't predict the uncertainties of the certainties, unpredictable of the predictable, unimaginable of the imaginable. All those complex instruments resulting from hair drying machines to satellites are the final evidence of the conclusions of assumptions.

It will be a stupid question to ask what type of physics is needed to develop the finite theory to the infinity of fortune. Both the micro and macro have their way of explaining things based on certain assumptions. The micro aspects help people by providing nuclear medicine and study of the atomic structure while the macro aspect of physics helps in the development of space-time geometry, rockets, jets etcetera. The micro aspect is called the quantum part while the macro aspect is called the relativistic part. Although there is a huge line of difference between macro and micro aspects still both the portions are quite dependent on each other. Laws of relativity are used to describe the law of particle physics, as well as the laws of gravity, which are used to describe the properties of quantum gravity. The quantum aspect is as important as the relativistic aspect. It is as much tough to understand the relativistic aspect of space-time geometry as it is difficult to understand the properties of the strings or quarks or nucleons. Being an interdisciplinary subject, physics has gained importance in the fields of research in both the macro and micro aspects. The macro aspects studied in NASA is as important as the micro aspect studied in LHC or the Large Hadron collider. For every micro object, there is an independent notion of macro aspect and for any macro aspect, there is an independent notion of micro aspect. Like Gravity in cosmology, there is a notion of loop quantum gravity in Quantum mechanics. Like the giant black holes observed in quasars, the microscopic black hole is observed in the electron if it can gain maximum momentum while observing it. Space-time is a notion of higher dimensions are observed in dark matter. Likewise, the curled up higher dimensions called the Calabi-Yau manifold are observed at a quantum level.

So, physics will remain physics. It will dominate its status till the end of the earth whether from micro aspects or macro aspects.

Science should not be orthodox. If it is orthodox then it should not be called a science. The notion of science remains boundless. Its intone remains free from religion, culture, heritage, and limits of freedom.

Our past is certain from a future point of view. But our future is uncertain. Different models have been developed for the progress of science, a vast majority of which came from the past. But we should always keep faith in the past and try to conclude the future by developing the assumptions of the past and thereby progressing in the pathway of the future. Science has been modified. New ideas should be taken into account and old ideas should be preserved for their betterment. The more the days are passing, the more are we advancing toward a developing technology. Future irrespective of being uncertain should be modeled in such a way as though we all have a share of the betterment of its progress.

Scientific assumptions in the past remain fruitful in the future and proved as the base for today's scientific research background. But we must not remain confined within the knowledge of the past. We will strive to make the future better and better by providing more sophisticated ideas regarding the past theories as the base. But it is the inert nature of science that its identity remained confined for more than 100 years in a nutshell. Newtonian mechanics are used by NASA for applying propulsion to a rocket. Similarly, Einstein's theories provide helpful for the progress of space research. Particle physics has paved a long way for the development of the Large Hadron Collider at CERN. But the ideas behind it were

invented much before the physical test. So, we have no other way than to put our trust in science. The future is indeed uncertain. A law when constructed takes a minimum of 100 years to come into effect, although there is a possibility of the law being proven wrong. Nobody knows that, in cent present accuracy. String theory is now an eminent branch of research among theorists. There are accounts for the unification in physics or TOE. But has anyone proved the evidence of string experimentally no? why? This is because the energy required to probe into the tiny tiniest of the string requires to be so huge that the recent technology has lost the challenge. But we will hope that it should be proven in the future. We will hope irrespective of the uncertainty.

According to the Kardashev Scale, there are three levels of civilization that depends upon its energy absorbing and energy utilizing method.

- A type I civilization which is capable of harnessing the energy reaches from the star to the planet.
- A type II civilization that is capable of harnessing the energy of the entire star itself.
- A type III civilization that is capable of harnessing the energy of the entire galaxy as a whole.

But the most disheartening fact is that still now we are not able to reach the Type I civilization. It will take another 100-200 yrs. To reach the stage of this civilization. So compared with some super intelligence Aliens, we are lagging far behind.

But still, it is the hope of uncertainty that will help us achieve this someday or tomorrow.

Speaking, of our home or motherland, the earth is inside a giant, huge, massive universe. How big our universe exactly is, is just a question of oblivion. Nobody knows that. Neither can be no one. The one & only thing that we know is we are just a part of the infinitesimal planet Earth. Our birthplace. Our origin. Our evolution. Regarding the shape of the universe, there is a doubt, that some scientists have expressed their viewpoint as a toroidal or doughnut shape with the maximum entropy in the middle. According to others, it is a sphere or maybe surprisingly flat. Every part of this universe is a doubt of infinity. Nobody knows what exactly are the answers to the question of the universe. But what is the origin of the universe?? How does the matter of giant masses come into existence in the form of stars, planets, quasars, and even the cosmic holes like a black hole, wormholes, and white holes? From a layman's point of view, our universe originated from nothing… actually nothing. Even space or so-called dark matter came to existence at the very onset of the beginning of the universe. According to cosmic microwave background radiation (CMBR), our universe originated from Big Bang, cosmic inflation which occurred for so-called some 13.7 billion years ago. But the radiation was so tremendous that even today we can hear its ***Hiss*** sound through our television or radio when they got started.

A universe from nothing, yes it is actually from a different perspective or point of view. But what leads to the formation of the Big Bang?? There are many possibilities that we will discuss at some later period in this book. But believe me, this universe is a far more mysterious creature than we even can imagine. This infinitesimal place in this infinitely large universe is the birthplace of humanity, the birthplace of several millions of millions of species that we encountered in our everyday life.

But does another planet exist where is the possibility of the existence of Alien life? It is far beyond one's imagination. The universe spreads at about 96 billion light-years on the horizon, which is the observable universe so far, which creates oblivion in the human mind. Speaking frankly, traveling such a long distance is not possible for humans as her life will end just within a fraction of the journey. But if we take into consideration the probabilistic and relativistic definition of special relativity, then perhaps we can travel beyond the horizon and peek to the edge of the universe.

As we are confined within the space-time limits of our universe, so there is no chance to see whether there exists an infinite amount of parallel universes or not. Perhaps we have to tear the space of our universe and then we have to float over nothing and again we have to tear the space-time fabric of the other universe to see what exactly it is.

Imagination is far beyond one's relativity. We humans being intelligent of other species tries to question the unquestionable, imagine the unimaginable, and then quest for an ultimate answer that will meet our satisfaction.

Mathematics formed an integral part of our day-to-day life. Its complexity is its beauty. Its difficulty is its charm. Its ambiguity and abstractness are its wonders. Although it is hard to imagine a world without mathematics still its importance is growing in everyday life. It is complex albeit it is charming. The day-to-day mystery unraveling aspects of mathematics have wondered many scientists and have been able to prove its place in the 1st among the other subjects. The complexity of mathematics is very complex and it is this complexity that gives rise to some of the marvelous questions of physics and its implications on our everyday observable life. Starting from the counting eggs in the market to the rocket science of NASA the position of mathematics remained unquestionable for a century. It is this idea that led the scientists to discover the undiscovered and give a thoughtful conclusion form that meets the higher requirement of mankind.

The complex gave rise to simple & the simple gave rise to simpler and the simpler gave rise to layman's term. Although every subject depends on mathematics for its self-fulfillment mathematics never depended on any subject for its enrichment. It is as if a self-contained and independent subject ranging from zero and extends up to infinity.

In the field of medicine, starting from counting cells to engineering, making highly complicated trigonometrical diagrams to the field of commerce making business mathematics for foreseen the unseen prospects of the future projects, the importance of mathematics never gets diminished. It is flourishing, flourishing constantly without any dependence on a timely manner.

The thought-provoking experiment of theoretical physics to the complexness of mathematical physics and most-mentioning the different aspects of calculus the importance of mathematics will always remain self-satisfied irrespective of its uncanniness which gave rise to complicated theorems for perturbation of day to day activities.

Mathematics has different branches with each branch accidentally discovered hundreds of thousands of years ago. The self-contained aspect of mathematics will give an eerie feeling to the layman but still, I can argue that they will attain hard to enter the world of its perfection.

Mathematics itself got different branches of study concerning modern physics raising from differential calculus, calculus of variations, manifolds of N-Dimensions, Riemannian geometry, supersymmetry, lie group etcetera with each group giving new insight into what the secret the nature holds in it and tries to unfold them with utter sincerity and complexity.

I will not say that higher mathematics is easy enough for a layman to understand but I will say that what beauty remains hidden inside its applications remains unimaginable and unquestionable to mankind.

In preparing this, I have ignored the complexity of mathematics and tried to portray a picture of nature through theoretically enriched languages which will make them grasp the subject easily and accordingly in a well-known precise manner.

Physics & philosophy are one & inseparable things. It is very hard to draw a separate identity regarding both. They are so just interrelated. At the very onset of the physics lies meta-physics. And at the very onset of meta-physics lies philosophy. Philosophy starts with thinking about a complex object of nature... Then draw some evidence from it. After that, it is physics that gives the conclusion to the evidence using physical and mathematical proof. Now, in every essence of physics, it is hard to draw a physical conclusion due to the abstractions of nature. So, in this case, physics entirely depends

on mathematics for bringing or shaping the abstractness to a realistic point of view. At the very start of a theory... An assumption is required to be made by taking some sort of a constant because our nature is changing its nature from time to time. Now, after that a law needs to be formulated and then based on this law the scientists will try their best to paint the law into reality. But does anything as such reality exists in nature?? Or everything is relativistic from a different person's different point of view. Sometimes the portrait of physicality got diminished due to the absence of technology and we humans have to depend on the law and derive the conclusion from it until and unless the real picture of the law comes to our point of view by experiment. Speaking precisely physics is the mathematical form of philosophy and it is that philosophy that holds the ultimate fate of our world in our hands. If thinking is absent... Then there will be no meaning to knowledge. And if knowledge is absent then there will be no meaning to reality. And the absence of reality makes our nature unquestionable as though everything exists but nothing exists in our consciousness. Many theories are yet to get proven and many prove are yet to get re-proven. The human mind is questionable and it is this question which strives in our minds from the onset of mankind and we are still trying to find a meaning of this. It is the philosophical abstractness or the beauty which makes the inaccessible physics more interesting than the accessible ones.

According to Plato, there are three types of world. The Physical World, The Mental world & The Mathematical world. There exists a discrete relation between the three worlds. In the first stage, we are in a state of Mental world where we form questions and strive for answers... Then we come to the Physical world... Where every act of nature takes place in its resonance & then we come to the Mathematical world where every happening of the physical world can be described as the answer to the question of the mental world by the use of the mathematical world. So, there is a chain of sequence that takes place between the Mental, Physical and Mathematical worlds. This chain is the basic foundation of the so-called advanced mainstream physics.

Let's explore the fascinating physics hidden behind Einstein's greatest challenge – The theory of relativity.

The theory of relativity consists of two parts – The special theory of relativity & the general theory of relativity. Einstein wrote the special theory of relativity first. After that, he gave a generalized concept of the theory – The general theory of relativity.

Now, for the sake of understanding, we will explore the general theory of relativity first.

According to Newton, gravitation is just a force of attraction between two objects having mass. And gravity gets declined by the square of the reciprocal of the distance the objects are moved apart. Suppose that A & B are two objects at a distance of 2 units apart. So the gravitational force between A & B will be $1/2^2$ or ¼. Now, move A & B 3 units apart. Now their gravitational force will be $1/3^2$ or 1/9 units. Newton explains his simple laws of gravity by giving an example of an apple falling from a tree due to the gravitational attraction of the earth. But then why the moon doesn't fall on the earth? Well, regarding this Newton's laws seemed to be less practical compared to Einstein's laws of gravity.

Let's see what Einstein says in his universal laws of gravitation. According to him, gravity is just an illusion caused by the curvature of space-time due to the presence of massive objects. Space-time. That is Einstein reunites space and time thereby making a new dimension or rather the 4^{th} dimension.

Let me give you an example.

Consider that there are 4 friends A, B, C & D. Each of them is holding the 4 corners of a bedsheet. Let's assume the bedsheet is our space or rather space-time. Now one of the other friends E throws a heavy iron ball over the bedsheet. What will happen? The bedsheet will form a curvature in its center due to the heavy mass of the iron ball. Say, the iron ball is our sun. Now another friend F throws some other small balls over the bedsheet. Surprisingly, all of them will see that all the small balls get attracted to the large ball due to curvature. Consider these small balls as our planet.

The same thing happens in our universe. The sun with a giant mass causes a curvature in the fabric of the space which in turn creates an attraction of the planets towards the sun. This curvature creates an angular momentum in the planets which will make them rotate in their axis as well as revolve around the sun for a specific interval of time.

Now, you must be thinking about what angular momentum is? Well, what is momentum? Momentum means mass with a product to velocity. A truck with more load requires more velocity to move forward. Now when a rotation is occurring with the momentum then it's called angular momentum. So, from general relativity, we have learned a new concept of gravity which is that gravity is caused by the massive bodies forming curvature in the space-time fabric.

Now, let's come to the explanation of special relativity. Special relativity has some beautiful aspects. It depends on the frame of reference. While studying special relativity you can understand the relation between light, time & relative motions.

According to special relativity, nobody can cross the speed of the light which is 3,00,000 km/sec. why so? Why could nobody cross the speed of the light? What will happen if anybody can travel equally at that the speed of the light? Does any particle exist which can break the speed barrier of light? Well, we will see that step by step.

Now the speed of light is 3,00,000 km/sec. suppose an object A is getting closer and closer to the speed of the light. By doing so he will require intense kinetic energy for that. Now this kinetic energy will get converted into mass by the famous equation $E=Mc^2$ thereby making object A an imaginary massive object. So, it will require higher energy to move forward. But the more energy it needed the more its mass will be increasing thereby making object A slower than the speed of the light.

Now, for the sake of imagination let us consider that A is moving faster than the speed of the light say by 1 km/hr. What will happen?

- The speed of light is so fast that if anybody can travel at that speed then they will reach Mars in 4 minutes & Sun in 8 minutes.
- Suppose you are traveling faster than the speed of light towards the sun. what will happen? Normally, the sun will appear closer and bigger to you as you approach it. Nope. The sun will get smaller & recedes away. Why? This is because you are traveling faster than all the reflections carried by the light from your backward. So, your field of view widens and you will be able to see both your front and back view.
- If you are traveling faster than the speed of light, then you will not be able to see your reflection in the mirror. Why? This is because light reflecting from your eye to the mirror is traveling at the speed of light but you are traveling faster than that. So, how can you see your reflection in the mirror?
- While traveling at the speed of light your length will get contracted. That is called Lorentz contraction.
- If you are traveling at the speed of the light, then you will see that the space surrounding you will get contracted to give you only the area required by you to travel at that speed.

Now, let's give you a funny example which I am sure will depress you.

Suppose light is traveling at a speed of 100km/hr. and you are traveling at a speed of 50 km/hr. or 70 km/hr. or even 99.99 km/hr. in all three cases, the light will always remain 100 km ahead of you. This is because the relative speed of light remains the same compared to the one approaching the speed of the light no matter at what speed he is traveling.

So, the conclusion states that technically nobody can travel more than the speed of the light.

Now, again let's come to general relativity.

In the Theory of General Relativity Einstein combines acceleration with gravity. Thereby making gravity and acceleration inseparable from each other. The best way to feel this is a free-falling lift.

Imagine 1. If the lift is free-falling, then your weight will be Zero... As gravity equals zero.

Imagine 2. If the lift is accelerating upwards... Then the force of acceleration is against gravity. In this case, the gravity increases, and the weight of the person increases.

Imagine 3. If the lift is accelerating downwards... Then the force of gravity is in the same direction of acceleration. So the gravity decreases. In this case, the weight of the person decreases.

Imagine 4. If the lift is falling downwards more than the acceleration due to gravity (small 'g') then the person will have flown upwards in the lift and will feel no gravity at all.

This same thing is used by space agencies to train astronauts by making them fall from space in a vessel more than the acceleration of gravity... Then the person will feel 0 Gravity and will be free-floating inside the vessel.

Everything in this nature is relative to what is happening. Suppose you are traveling on a train with all the doors and windows closed. Even the train is traveling in a straight line without any curvature of up-downs. You will feel that you are at rest. Now, if you open the window of the train a tree is receding backward at the same speed the train is traveling forwards. So, now the relative motion of the trees will make you feel that you are moving. So, everything u feel, u perceive is always relative to some other.

While exploring the laws of relativity you will get to know one more interesting topic…... which is TIME DILATION.

Well, what is it? I will give you two examples now.

- The clock on the surface of the earth will run faster than the clock in the mines. Again the clock on satellites runs faster than the clock on the surface of the earth. Why? This is because gravity slows down time.
- Suppose you & your father will be carrying on an experiment on time dilation. So you both went to a railway station. The clocks in your hand and your father's hand are precisely set at 12 noon even concerning seconds. Now you board the train while your father will stand on the platform. The train starts its journey at exactly 12 noon. The train is speeding up to about 2,00,000 km/sec. Now the speed of the train is much closer than the speed of the light. Just after 15 minutes, you called your fathers mobile to know what exactly the time is on his watch? Your father will say 12;15 while your watch will say 12:10. Well, why is there a 5-minute difference between you and your father's clock? This is because the speed slows down time. Your father is in a stationary reference frame while you are in a moving reference frame. This results in the relative time difference between you and your father. Now, if the train will acquire the speed of the light then the time will freeze and your watch will say that the time is still 12 noon although the time on your father's watch is 12:15 Pm. That difference is called time dilation.

Now let's come to the question of why an apple falls on the ground but the moon never falls?

If you throw a ball upwards, surely it will fall to the ground after a certain interval of time. But if you throw the ball at a much higher velocity then the upward trajectory of the stone will make the stone revolving the earth due to the curvature caused by the earth instead of falling in it.

Apart from the 4^{th} spatial dimension Kaluza & Klein gives us a glimpse of the 5^{th} or higher dimensions. Let's see what it looks like?

This is a unified field theory in physics. This theory laid the foundation of the string theory. It contains an extended approach to the theory of relativity. It is also one of the toughest theories in theoretical & mathematical physics.

Before coming to the theory, let's concentrate on a certain point.

Suppose, you want to purchase something from the internet. Then how will you give the address.... 32/A Park Ave nue street Acex – 81B. 5th floor. Now here you are mentioning three things like House name. Street name & Floor name. Im agine this as the three coordinates. Now, is these three coordinates enough to explain your position? Well no. Why???? Supp ose u want to arrange a meeting in your flat. Here u need to specify one more thing. That is time. Maybe it's 10 AM. So, apar t from the three coordinates or dimensions, one extra dimension is needed here... That is time. Now here comes Einstein's view. That is to fulfill your position u need 4 dimensions. That is length, breadth, height & time.

Now Kaluza-Klein Theory deals with an extra dimension that is the fifth dimension. But what is it??? Well, the extra dimension is curled up in space & is so small that it is difficult to notice.

Suppose, you rolled up a paper in a cylindrical shape in so small a radius that it will appear as a line. So, that's how the extra 5th dimension is curled up in space & is so small to notice.

Now, according to this theory, everything will come back to its initial point from where it started. So, if u continue your journey from one point on earth... U will return to this point as the earth is round. So, u can say that the rocket comes back to its initial position. Well, no. Why??? Because of the nature of the circle. The circle of space is so big that the rocket ca n't come back to its initial position.

Kaluza-Klein theory deals with the 5th dimension apart from length, breadth, height & time. The extra 5th dimensi on is curled up in space & is so small to observe it. This theory unifies the laws of gravity with electromagnetism. The effect of gravity on the 5th dimension is very little but on a larger scale, this gravity will act as electromagnetism. So, Kaluza-Klein t heory is a unified field theory in physics. This theory combines gravity or especially quantum gravity with electromagnetism. This deals that something having a charge vibrates in the 5th dimension. One particle is vibrating in one direction whereas t he other particle having an opposite charge is vibrating in opposite direction. So, this theory lays the basic milestone for the higher dimensions of string theory.

Seeing and believing are two different things of the same origin. Our mind. What we see we can't believe!!! And what we believe we can't see!!! Nature is mysterious. The relativistic nature and the quantum nature are the hidden reality and are so mysterious that nobody can even imagine?? What exactly does the science say then?? Well, it takes into account some of the facts of the mystical nature and then tries to provide a theoretical and mathematical conclusion to it. But despite giving such conclusions?? Do we even believe… or do science can make us even believe that a single strand of DNA if extended can cover the distance between earth to the moon? Or even inside our earth and sun… all the eight planets of our solar system fit precisely one after another. Although it exploits our common sense still we are human and we tend to believe the impossible of the impossible and tries to draw a fact forcefully from it. But the weirdness and randomness of nature will remain a mystery to us?? I don't know whether God exists or not? I don't know whether there is any supernatural power or not? But I do believe that there is something… something beyond our dimensions and common

sense and that tells our intuition of what to do and what not. Nobody has seen any strings yet. Nobody has seen any photons yet. But we still believe it. We have to believe it for the sake of science. We still wonder why a candle flame always lit upwards despite the downward gravity. Why do we float in the air when there is no air at all on the moon. And what should be then the exact nature of gravity?? Sometimes when I watch the open sky... I wondered who am I? I am just a part of this planet earth, which is inside our solar system, which is again inside our galaxy, which is again inside one of the 225+ million galaxies of our universe. So what exactly is our evidence??? While doing the relativistic mathematics we sometimes wonder what will happen if we traveled backward in time and kill our grandfather before he gave birth to my mother. Then even if I returned to the present… will I exist?? No. coz my parents will never get married as I have killed my grandpa before giving birth to my mom. This sort of paradox, the so-called 'grandfather paradox' is one of the challenging areas of physics which still needs to be deciphered. We don't know even whether or not any information moves out from a black hole or not. It's simple as we don't even have the technology to prove it till now. But what about mathematics? Yes, the world of mathematics is surprising. It gives us the answers to the unanswered questions that we have struggled with for the millennia.

Sometimes while writing this… I asked some questions to myself?? Is everything that I am writing a fact or just a fantasy. Is our everyday day-to-day occurrence of events can unfold the mysteries of nature and advance humans to super-intelligent beings... is it even possible?? What about the AI?? If we told the robot to cross a road it will cross the road without even seeing whether any car is coming or not. Can we plant artificial intelligence in the robotic brain?? Even if we do so… can they dream?? Can they have the sexual urge like the humans?? I'm in a paradox. A much desired unsolvable paradox. And yet after advancing on so many aspects of science… how life came to an individual is still a mystery?? Then there is a God?? If so where is he?? In heaven?? In the sky?? I can't say, nor you can't. Some mysteries will always remain unsolved. It is the mysteries that bring a zing to our life while we try to study the effects and after-effects of nature.… As cosmologists say that the Sun will still survive for another 5 billion years that is 5,000,000,000 years. Will we humans be still there on earth to see it forming a black hole? Will there be any ever intelligent species evolved out of humans that will predict the possibility of Earth's dead and then stop the sun from being turned into a black hole? Or can they move to parallel universes?? Now do parallel universes exist?? If so who lives there… the so-called ghosts or dead people or maybe super-intelligent aliens?? All the answer to such questions lies in the hand of physics?? There is no other subject as marvelous as physics… as a beautifully mathematically enriched subject.

Many things are unknown and I believe that they will remain unknown till the end of this universe. It's impossible to question natures identity?? And why should nature be so free-minded that it will let us know all the facts that we want from her? No. No way. We are humans. And our scope is limited to our consciousness. We can't cross that limit… although different individuals have a different perspectives of thought still they are so closely attached that all the thoughts will get intersected at a small point. Isn't it strange Nah?? Yes, indeed it is.

There are many questions still not understandable to human perceive-ness but we are striving to achieve beyond the critical limit!! We are humans and that's what humans want? They want an answer for every question and a question for every answer. Do humans want the outer limit of logic must be explained?? But where does this outer limit?? It is within our reach but hidden in our eyes or is it beyond our reach… But we struggle, yes we humans will struggle to achieve the unachievable.

Physics has developed much abstractness and tries to renormalize to minimize the infinity of the equation. But we still don't know the meaning of infinity?? Do two parallel straight lines meet at infinity or does they will go one more and more keeping their distances the same.

Physics has developed much in the 20^{th} and 21^{st} centuries. Although the underline principles of physics lie some thousand years ago. We are using mobile… but we don't know who is the inventor of it?? We only know the inventor of the telephone. Now we are using Riemannian geometry for solving the calculus of N-dimensional manifolds… but how many men have heard the name of Riemann. But we all know the names of Euclid and Pythagoras.

In 1930, a report was published in a newspaper that nobody can cross the atmosphere of earth? But we have achieved it. What remains impossible some 100 years ago is now possible in the eye of physics. Maybe after some

hundred years, we will be able to do time travel. We will be able to change our past. And we will be able to see those strings that are operating at planck's length. We will… and we know that we will??

The fate of mankind lies in the hand of future scientists and their brainy inventions. We at least hope so… maybe one day we can compress the size of the photon and can be capable of penetrating it inside an atom or strings to see its underline or hidden structure.

After all, we are humans and we are the genius of all species.

Physics is governed by precise mathematical and physical rules and regulations formulated by nature that are not meant to be broken. From the boiling point of water to the freezing point of ice is from 100 degrees to 0 degrees… specific lines of rules to be obeyed. The tension force acting upon strings to the gravitational force acting upon stars are all acting on a precisely lined fabric of space-time. From the relativistic notion to the quantum weirdness every tiny fraction of them is majestically assigned algorithm encrypted by nature's choice of code.

The calculation is an essential part of theoretical physics. The more accurate the calculations the more accurate the result. But this can only be applied to some aspects of physical nature. Beyond it where the notion of space-time itself breaks down like in a Planks Length or where the natural laws of physics disobey like the singularity of a black hole…. The concept of physics remained in the doldrums. The quantum weirdness of a tiny string is equal to the relativistic weirdness of a photon sphere where you can watch what is there behind your head.

The concept of antonyms is not perfectly valid from the viewpoint of physics. Just as matter there is a corresponding sequel of anti-matter. A positive mass has a sequel to a negative mass. A positive velocity has a sequel to a negative velocity. Even the positive time has a sequel to imaginary time. But does the opposite notion of physics that much opposite. Nope. It's not. The negative factor or the imaginary factor needs to be eliminated from physics to provide mathematics a beautiful playground to play with derivations and integrations.

As everything is governed by one aspect that "Rules are not meant to be broken" … but does the word 'anti' or 'negative' are also governed by this specific set of source code. It is a tough answer to decide as the role of physics gets limited in the antonyms of its objects.

Every branch of physics followed the 4-coordinate system except string theory where there is l, b, h, 'ct'… l being length, b being breath, h being height, 'ct' being the speed of light product it's mass. Whenever anything tries to go beyond this level then the normal parody of physics will get detuned from its symphony.

If the 'positive' aspect of physics will follow the exact opposite notion that "Rules are meant to be broken" … then our whole universe will turn upside down. The normal laws of physics will be taken as a stubborn identity separate from the mathematical law to get disposed in the infiniteness of infinity.

So, for centuries after centuries, physicists are researching the positive aspects more crucially than the negative aspect.

But the impact of negative-ness is as crucial as the positive-ness. Or else nature will not remain balanced. We all are the creature balancing between the 'rules' and the so-called 'no rules' at every milestone of our life. This is the law of the universe itself as a whole.

What are the furthest limits of reason?? Where lies the answer to the mysteries?? How can we probe the deepest part of nature?? What exactly happens when we are running out of logic to explain the phenomena of daily occurrence??

Nature is complex. No doubt. But that doesn't mean that we are running out of logic to explain their phenomena. Where the mathematical tools of physics have failed to arrive at any conclusions, then philosophy holds the hand. From an unorthodox and unexpected view of logic, the philosophy tries to explain the farthest fathom of the mysteries to develop a knowledge of interest among the commoners like us. But does philosophy succeed at the farthest level of logic?? Humans have no answer. Just when people try to explain the absurdness of the hidden beauty of nature from a viewpoint of infinity then the complex physics has taken the aspects in such a difficult manner that the mathematics itself called out for new mathematics to be invented.

Our knowledge is not sufficient and neither will be after some 1000 yrs. Of time. Knowledge always strives to gain more. And we humans always want to race behind the fast-forwarding knowledge of reason and try to provide a complicated solution to it easily.

Just as the limits of big have no end, so as the limits of small has no end. It will never be sufficient to probe into the greater of the greater and into the smaller of the smaller to provide a physical understanding of the human mind.

The limits of reason are limitless. And the limitless is the consequence of infinity. When will it be possible for humans to probe deeper into the infinity and attempt a solution to the infinite model finitely? If the infinity can be seen as finite, then probably the edge of knowledge can be reached by humans. Beyond this end, either there will be no more knowledge to acquire or there will remain something as unachievable as though the edge is just a horizon with a further area to be covered afterward.

The limits of thought and the limits of reasoning are quite different from the perspective of the limits of nature. Natural law never is completed as though something unattainable always remains to be attended to afterward at the outer limits of reasoning.

The greatest mystery of nature lies in its origin and the greatest limits of the original lie in the infinity. It is beyond the capacity of modern philosophy to question the finiteness of infinity beyond the ordinary boundary of knowledge. The unattainable knowledge even though can be attained remains unattainable. Nature is aware of its prediction and so is infinity as a part of it. The knowledge of knowing and the knowledge of gathering seemed meaningless when the concept of the fundamental aspects of the knowledge tends to take over the infinity.

Nothing in this nature is finite. Not even the conclusion. Everything remains infinite in its point of view as if something more needs to be deciphered to attain the edge of the subject.

What is beyond infinity is oblivion. And what is oblivion being an uncertain boundless barrier of knowledge? So, finite things will always tend to become infinity and the outermost reason of knowledge remains a question to all of us!

There are three things that a human would require to become an Alien. As being an Alien is not an easy task to accomplish so let us consider these impossible facts for consideration.

1. To travel at the speed of the light.
2. To stop the duration of aging.
3. To make the time constant or slow.

Well, although these 3 things are seemed to be perfectly distinguishable from an advanced viewpoint of physics, these things are quite interrelated. They are so interrelated that you can explain them just in a single frame. That is, if you travel at the speed of the light then the time will remain at a standstill and your duration of aging will be slower or even can get constant.

Now, why travel at the speed of light?? Because such tremendous speedy warp drives are needed to float across light-years of space. Even from one galaxy to the other. Now without those warp drives, it is not possible to travel at the speed

of light, especially for humans having mass. Because while traveling at the speed of the light, the huge kinetic energy that will be formed will get transformed and added with mass thereby making the object heavy. So, there remains an infinitesimal chance of being massless or of negative mass so that the object can lose energy instead of acquiring energy while traveling at that giant speed. But we humans are neither photons nor tachyons!! So, without warp drives cosmic traveling is not possible.

Now, while traveling at this high speed the notion of time gets slower as the speed increases from time to time. And when the speed of light is achieved then the time will become constant. As if the duration of events came to a standstill notion. So, even if you travel massive distances your aging will become slow. It can come comes to a constant. You will not age anymore due to the concept of time dilation.

Now, apart from that three possibilities there comes the 4^{th} possibility. That is the concept of 'exotic mass'. The spaceship that is needed to be built must travel inside a warp bubble by expanding space before it and by contracting space ahead of it. To make this warp bubble work, one needs to cover his entire spaceship with the so-called 'exotic matter' like dark energy and negative energy. But building such a spaceship with our current technology is not possible as of now… not even possible after some 100 years also. This is because without the exotic matter one neither can go from one universe to another nor can make any interstellar travel. As because to travel through a wormhole or a closed time-like curve one needs an enormous amount of exotic energy to prevent the throat of the wormhole from collapsing thereby making it a transversal wormhole.

So, now the readers can easily conclude why I make the name of the chapter with a ***not*** inside it. Coz, it is impossible to the power infinity.

Colors. The most important enigma of our eye. More specifically the visible spectrum. Colors are many, infinite in number. Colors develop from colors and disintegrate into colors. The first successful experiment regarding the colors was first conducted by Newton. He throws a white light on side of the Prism & then from the other side of the Prism seven different colors evolved according to the order of *VIBGYOR* that is Violet, Indigo, Blue, Green, Yellow, Orange, Red… in an order of increasing wavelength & decreasing frequency. The red being the least scattered is used to provide railway and traffic signals because it can be observed from a longer distance. Now, the sky is blue due to its scattering properties.

The water seemed blue due to Cherenkov Radiation. Different colors have different properties. These seven sets of colors make up the *RAINBOW*. But in our universe, hundreds and thousands of colors can be done by mixing up those seven colors. But the only problem is our vision… the *VISIBLE SPECTRUM.* Our visible spectrum consists of colors of different wavelengths… the wavelengths vary from 400 to 700 Nanometers(nm). The colors which are either less than 400 nm or more than 700 nm remain invisible to our eyes. That means there are many objects which are beyond our visible spectrum and that's why we can't see them. That is the reason, why we don't see ghosts or aliens? Maybe they are beyond the spectrum of visible wavelength. So, this remains a mystery to us. To every human. Maybe other species can see beyond this wavelength. God knows.

The wavelength of color is an important aspect of Cosmology. The colors are used to predict the distance of stars from the earth by a process called *REDSHIFT*. The stars which are going away or moving away further beyond our universe, are of longer wavelengths, so the less their frequency and the more reddish they become called Red Shift.

There is another concept called *BLUE SHIFT*. Those objects which have radiating power when radiating towards our earth and are coming closer then due to their approaching nature their wavelengths become shorter and hence the more frequency it gathers which makes them a bluish glow called Blue Shift.

Those who are blind will not get the concept of colors and those who are not blind will remain blind beyond the visible spectrum. so, the invisible colors remain a mystery to us. An unsolved, untouched, unseen mystery whose key element is hidden from us by mother nature itself.

Nature is unpredictable. The hidden reality of its structure lies within an infinitesimal limit of what is called fractals. It is the unpredictability that gives the shape of extreme beautifulness to nature to the extent human eyes can perceive. When seen through the right eye, nature reveals its structure, as one of the most marvelous concepts of art one can even imagine. The study of this pattern of nature is known as CHAOS THEORY.

Chaos Theory being a sub-discipline of mathematics, studied the patterns of complex structures like the earth's weather system, the behavior of water boiling on a stove, migratory patterns of birds, or the spread of vegetation across a continent. Chaos is everywhere, from nature's most intimate considerations to art of any kind.

The chaotic world of nature is not a constant. It is random. Always fluctuating. It is this randomness, that a probabilistic structure is needed to study the internal pattern of these complex systems. Such as a falling snowflake is star-shaped. Within this star-shaped structure, there is numerous little star-shaped structure that makes up this snowflake. Even while probing deeper, within the star shape of the star-shaped structure there is another small star-shaped structure that makes up the consistent snowflake. Chaos theory takes into consideration all of these structures.

Chaos Theory however taught us that nature most often works in patterns, which are caused by the sum of many tiny pulses.

It all started when a man named Edward Lorenz created a weather machine to predict the weather conditions. A sequence of weather predictions is shown in the machine as the clouds blew, winds move, heat happens, and then cooled down. But each pattern was different from the previous one. There was no similarity with the weather pattern. It is of so complex structure. But one day Lorentz decided to do something different. He input certain parameters and waited for the program to respond according to it just like the previous run. That is as if he wants to do a forecast of the natural outcome. Instead of giving the exact numbers like wind, temperature etcetera, Lorenz had set for approximations. This made the entire system spoiled. The whole weather consists of the different types of patterns that make up the earth's atmosphere. And a slight change in a single pattern will ruin the entire system as a whole with the so-called bogus weather forecasts. This is all because nature doesn't want to let herself be predicted.

Complex systems often appear too chaotic to recognize a pattern with the naked eye. Therefore, we have to probe deeper to recognize its pattern using certain parameters.

Chaos theory is a cycle as if the same thing is repeating in its structure itself with smaller and smaller aspects. Studying the interwoven structures of the aspects of nature is called the chaos theory. The theory of beautifully enriched randomness of nature itself.

MULTIVERSE or Multiple Universe is a concept of many clusters of universes that our nature consists of. But before coming to this point let us clear a few things first…... 1 Billion equals 1 after 9 zeros which are 1,000,000,000. And one light-year equals 9.461 * 10^15 meters. A light-year is the unit of distance, not time. Many people mistake it for the unit of time. There are many units of astronomical distances like AU, Parsec, Light Year, etc. Among this Light, Year is the most used unit of measuring cosmic distance.

Multiple Universe is the concept…. Which is more than science fiction rather than science. It is a branch of metaphysics. The concept states that there is an infinite sequence of multiple aligned universes one after the other and we live in any one of them. As it is not possible to take pictures of your own home by staying inside it…. So, in the same way, it is not possible to picture the entire universe by residing upon it. The picture we see is just an artist's imagination.

There is a famous theory regarding the infinite arrangement of universes. This theory is called the bubble theory of the universe. Just imagine... that many soap bubbles are floating in the air. Each soap bubble consists of a single universe among infinitely many universes. These soap bubbles can split into two bubbles or two bubbles can merge into one bubble. So this happens with our universe also. The merging and splitting are done at the same time instantaneously. But this theory defines it in one way. That new soap bubbles are emerging from the big bang every second after second. There can be a particular emptiness between two soap bubbles or the two soap bubbles can be attached by a narrow space. The same thing can be compared to our universe. If the universe is attached then there is a bridge of space between them. But if the universe is completely separated then there is emptiness between them. This emptiness can be space-time or can be another thing, unlike space-time which is beyond our perceive-ness or imagination. Maybe there exists a different form of matter between the two universes other than dark matter or emptiness itself. If we have to get out of our universe and travel to another universe, then we have to tear the space-time fabric itself just like tearing the soapy skin of the bubble.

Among an infinite alignment of universe.... The universe where we live is composed of 200 million galaxies. Each galaxy consists of numerous solar systems. And our galaxy milky way is one of the galaxies.... There are many solar systems and inside one of these solar systems, there is a single planet among many planets where we lived called Earth.

We still now don't know how other universes have been created but our universe was created out of Big Bang some 13.7 billion years ago. At the time of the big bang, there is a perfect symmetry in the universe with a high tension force. As a result of this tension force there forms a way of quantum tunneling which splits the 10-dimensional universe into 4 and 6-dimensional universes. The 4-dimensional universe is inflating or expanding from time to time.... Where we reside. The 6-dimensional universe is getting compacted or smaller and smaller where it is believed that God resides. The 6-dimensional universe is so small now that it is beyond our normal visionary range.

A different universe is of different time frames and different dimensions..... mostly higher dimensions. So even if anything comes to our universe from the higher dimensions to the lower-dimensional universe we will only be able to see their 3-dimensional cross-section. A blob changing shape and color contentiously.

According to string theory, apart from 1-dimensional vibrating strings there exists branes of 2 dimensions even 3, 4, or higher dimensions which are called P-branes... 'p' being a variable regarding dimensions. There is an alignment of infinitely P-Branes aligned one after another in the space. When two of these Branes collide with each other then a new universe is formed and this collision results in the Big Bang. We can't able to see other universes even if we are closed to them.... This is because photon or Quanta of light being an open string cannot cross the barrier of our universe. But graviton consists of closed strings that can easily escape from one universe to another universe. So, gravitation is the only means of communication from our universes to the other universes.

We exactly don't know what is the shape of our universe or the observable universe. And so we can't determine what is the curvature of our universe.... Is it positive, negative, or zero curvature? Many scientists believe that we live in a flat universe.... Although this theory is being diminished by a toroidal or doughnut-shaped universe. If the universe is toroidal.... If one starts its journey from one end of the universe then they will come to the starting point of our universe. Our universe is a closed-loop there is a finite possibility of every human to have duplicate partners in any region of the universe irrespective of their shape, size, and mass. That is every human has a duplicate in front of him or behind him in this closed loop of the universe. That means he will meet his duplicate while traveling from one part of the universe to the other as the universe is a finite arrangement of one's consciousness.

The universe being infinite.... There is nothing as the center of the universe. Every point of the universe is its center irrespective of the space, time, and matter surrounding him. According to the law of infinity.... Infinity doesn't have any center. Coz there is an equal distribution of space-time surrounding at every point taken as its center.

We don't know whether our universe is finite or infinite. The part of the universe which can be observed is called the observable universe. We can only see those lights coming from a distance of 13.7 billion light-years away from our universe. However, there is a horizon of our universe. This horizon is stated to be 96 billion light-years wide and 43 billion

light-years away from earth. The observable horizon means that… from that portion of the universe from which light travels to earth. There is a clear line of distinction between the observable and unobservable universe. There are many concepts of horizon.… Among which the particle horizon is the famous one. This particle horizon states the limit upon which information can travel from the very far region to the center of the universe or earth. And the unobservable universe is the universe from which information is still now traveling from the past to the present.… Although it hasn't reached the present yet. I am not calling earth the center of the universe.… Rather earth itself is in the center according to the infinite theory of the universe.

Nobody knows what exactly is beyond the horizon of the universe. Maybe there is a boundary wall of space-time. Beyond which there is another universe. Beyond which there is another one. According to the bubble theory of the universe, all the universes are floating.… Bouncing and colliding each other over the fabric of something unknown. I said something unknown coz I don't know whether the concept of relativistic space-time applies to the other universes or not. Maybe the multiverse is separate or maybe they are linked together with some unknown formation of a finitely large bridge.

In this context, the parallel universe can be or cannot be the existence of the eternal space-time fabric. Parallel universes or multiverse is also known by different names like 'alternate universe', 'quantum universe', 'interpenetrating dimensions', 'parallel dimensions', 'parallel worlds', 'alternate realities', 'alternate timelines', 'dimensional planes'.

Maybe the notion of space-time itself is different from one universe to another. Only the creator can know it. Then there lies the question who is the creator? How does our universe form? How does the other universe form? How many alternate universes are there? All the questions remain buries in our outer limits of limited reasons and logic.

Hearing range describes the range of frequencies that can be heard by humans or other animals, though it can also refer to the range of levels. The human range is commonly given as 20 to 20,000 Hz, though there is considerable variation between individuals, especially at high frequencies, and a gradual loss of sensitivity to higher frequencies with age is considered normal. Sensitivity also varies with frequency, as shown by equal-loudness contours. Routine investigation for hearing loss usually involves an audiogram that shows threshold levels relative to a normal.

Several animal species can hear frequencies well beyond the human hearing range. Some dolphins and bats, for example, can hear frequencies up to 100 kHz. Elephants can hear sounds at 14–16 Hz, while some whales can hear subsonic sounds as low as 7 Hz (in water).

If you turn on any old radio or TV that is not tuned to any station, a percentage of that white noise you hear is the sound of the Big Bang, the moment of the creation of the Universe.

Well, now you might be saying how sound travels in a vacuum???

There are gases in space, and these gases can indeed propagate sound waves just like earth's air allows sound to travel. The difference is that interstellar gas clouds are much less than the earth's atmosphere (they have fewer atoms per cubic foot). So if a sound wave is traveling through big gas clouds in space and we were out there listening, only a few atoms per second would impact our eardrum & we wouldn't be able to hear these sounds because our ears aren't sensitive enough. Maybe if we had an amazingly large and sensitive microphone we could detect these sounds, but to our human ear, it would be silent.

What is the time? Time itself is a very big question in research among physicists and meta-physicists. The notion of time remains somewhat alike in both the relative as well as quantum aspects of physics.

Time is an illusion or oblivion or reality. From the Newtonian concept of time which is an absolute quantity in which matter plays its game to Einstein's concept of time as an illusion varies on different reference frames and is directly related to the speed of the light. Einstein combines time with space thereby making space-time a new dimension. The more the speed, the less the time. At the speed of the light time itself stops.

From the relativistic point of view, we can go backward in time through a wormhole but can we go backward in time through quantum physics?? Well, let's find out what time is in the definition of quantum mechanics.

Let's begin with a clock. A clock is a machine that is the marker of time. Which leads us from past to present and then future. But do all parts of the clock face the same duration of time just like the ticking arrow of time? Well, no.

A clock is composed of machines. A machine is composed of molecules of a substance. The molecules in turn contain atoms. These atoms consist of a nucleus with electron revolving around it. The electrons are moving at a rapid rate. The protons & neutrons in turn contain quarks that are vibrating more rapidly. So, the more the object gets smaller the more the vibrations are increasing. The quarks, in turn, consist of 1-dimensional strings which are vibrating faster in a chaotic order. This vibration is so fast that the notion of time itself gets slows down. So, the notion of time is not constant throughout the clock. It is variable. It varies with speed and motion. So, the more quantum the particles are, the slower the clock ticks due to special relativity. Now, see how to use quantum mechanics to travel backward in time.

Here we are in a world of quantum weirdness, the infamous double-slit experiment. To understand this experiment we first need to see how particles or little balls of matter act. If we randomly choose a small object, say a ball at the screen through one slit we see a pattern on the back wall where they went to the slit and hit.

Now if we added a second slit we will see a second band duplicated to the right.

Now, let's look at the waves. The waves hit the slit and radiate out striking the back wall with the most intensity directly in line with the slit. The line of brightness on the screen shows the intensity.

This is similar to the line the balls make, but when we add the second slit something different happens. If the top of one wave meets the bottom of another wave they cancel each other out. So, now there is an interference pattern on the back wall. So the bright lines are the highest intensity and when they cancel each other out there is nothing. So, we can conclude two things…..

1. Wave----The interference pattern of many bands.
2. Particle----Two separate bands.

What is the most fundamental particle in this universe and what is the tiniest of the tiniest particle which consists of everything or everything's consisted of it? Even to a child's wonder, they will say that the answer is an atom. Earlier atoms are said to be the smallest particle in the universe. Later this assertion proved wrong.

Now, this makes a new generation of physics, or precisely particle physics, which states that an atom is divisible into proton, neutron, and electron. The proton carries a positive charge and electrons carry the negative charge and the neutron is neutral.

Moreover, defragmentation of the particles will give rise to a new family of more subatomic particles. We will take the quark as an example. Moreover, to every matter, there is a corresponding sequel of antimatter. Although the ratio of matter to antimatter is 1 million: 1. Now antimatter is a peculiar type of matter having the same mass as the matter but an opposite charge. For example, a matter called an electron having a negative charge has a corresponding antimatter positron having the same mass as that of the electron but has an opposite charge.

Now let's come back to the quarks, the quarks have three colors (red, blue & green). An antimatter pair that is two (quark and anti-quark) which again comes in six flavors (up, down, top, bottom, strange, and charmed). Thereby making a total of 6*2*3=36 in number.

Now, what the quarks are made up of?

Here to obtain the perfect answer we have to jump into the prospects of string theory which states that every particle is composed of tiny vibrating strings of 1 Dimension having mass and carrying a specific charge which is dancing in the resonance of nature. Each vibrating pattern gives rise to a specific element. So, we all are living in the aroma of strings. Let's explore it further.

Based on the origin of the string theory, the theory has two successors. The superstring theory and the M-Theory. M-Theory is called the mother of all strings. Scientists sometimes say M-Theory as the Monstrous theory or the Mammoth Theory sarcastically. But despite all these theories…. There exists a wonderfully enriched concept of physics in the M-Theory. String theory has 5 parts (Type I, Type IIA, Type IIB, Heterotic O (32), Heterotic E8*E8…. Where E means exception and 8 is the dimension). Although these 5 theories seem to be different still they are based on one common assumption that is everything in the universe is made up of tiny vibrating strings.

Now the strings are of two types, one is open strings and the other is closed strings. The open strings represented photon and the closed strings represent graviton. As neither, we can see strings nor can perceive their identities. So, we used abstract mathematics for taking into consideration the marvelous world of strings.

Strings usually operate at the Planck's scale which is $1.6 * 10^{-33}$ meters. So the smallest wavelengths of light are greater than the largest wavelength of strings. So strings remain invisible in our common eye even microscopic.

The most amazing aspect of the string is that the strings operate in higher dimensions. String theory takes into account 10 dimensions. Superstring theory unites the 10 dimensions by taking into consideration 1 extra dimension which is eleven dimensions thereby incorporating supergravity. M-Theory is the most advanced and breath-taking theory of string which takes into account 26 dimensions. It is the only theory that can accomplish the TOE or Theory of Everything in physics which tries to unite the four forces of nature into a single unified framework. The four forces are strong nuclear force, weak nuclear force, electromagnetic force, and gravitational force. Superstring theory makes the unification possible by the incorporation of supersymmetry, another beautiful aspect of theoretical and mathematical physics.

The incorporation of gravity into the strings is not an easy task to accomplish. But with the introduction of supersymmetry, we have found a relation between the bosonic and the fermionic particles that is in supersymmetry every bosonic particle has its fermionic partners. Like graviton (a bosonic particle of 0 mass and 2 spin) has a fermionic partner called Gravitino (having a half-integral spin of 3/2 just like the fermions).

So, supersymmetry gives a step forward in unification. But will string theory achieve this TOE? Only time can say!

Now, you may wonder what a Graviton is?

Well before crawling into the topic let us consider what space is?

A (empty) space can be called a dark matter which is a specific type of matter consisting of 68%-73% of the total mass of this universe. Every dark matter has its gravitational pull which holds the cluster of galaxies, stars, and planets together.

Space is not as empty as it seems. If you see space from the microscopic point of view then you will see that there are many distortions in the fabric of the space itself giving rise to quantum foam. Quantum foam is a form of bubbles that emerges and diminishes in the space in a chaotic order.

Space itself consists of tiny vibrating strings vibrating randomly at a specific resonance thereby acting as the mediator of gravity (Graviton) and light (photon) to pass from such distant Sun to earth through a vacant space.

Edward Written formulated a new theory called M – theory that has created a sensation in the world of physics, with a scope to unite Einstein's theory of gravity with quantum theory. This theory explains the instant of the very creation of the universe. Strings can vibrate self-consistently only in 10 and 26 dimensions. The essence of string theory is that it can explain the nature of both matter and space-time. String theory explains both space-time as well as the nature of particles. As a string moves in space-time, it executes a complicated set of motions. The string can in turn break into smaller strings or collide with other strings to form longer strings. String theory can derive Einstein's relativistic equations by demanding that the string move self-consistently in space-time. In this way, we can get a most comprehensive theory of both matter-energy and space-time

One of the most mysterious aspects of the string theory, which is still not well understood, is why it is defined in only 10 and 26 dimensions. If the theory was 3 dimensional, it would not be able to unify the known laws of physics in any precise manner. Thus the higher-dimensional geometry is the central feature of the theory.

If we calculate how strings are formed in N-dimensional space, we constantly find abstract terms coming up that destroy the marvelous properties of the theory. Fortunately, these unwanted terms have to be multiplied by (N – 10). Therefore, to make these anomalies vanish, we have no choice but to fix N to be 10.

The HETEROTIC string consists of a closed string that has two types of vibrations, clockwise and counter-clockwise, which are treated differently. The clockwise vibrations live in a 10 Dimensional space. The counterclockwise in a 26 Dimensional space, of which 16 dimensions have been compactified.

It is quite easy to understand the mass of a particle according to the notion of string theory. The loops in string theory vibrate in a resonance pattern similar to those of the vibrating strings of the violin. A more frantic vibrational pattern has more energy and a less frantic vibrational pattern has less energy. The energy of a vibrating string depends on its energy, the corresponding amplitude, and the distance measured between the wavelengths of crests and troughs. If the energy is more than the wavelength will also increase and vice versa. And greater energy of string will correspond to a particle of greater mass. Thus, the mass of the elementary particle is dependent on the vibrational pattern of its internal strings. The different vibrational pattern gives rise to different notions of mass. The electric charge, the weak charge, and the strong charge are carried on by the strings, and the different ways it vibrates. Just as photons are the existing results of the string vibration, the graviton is also the same.

Different elementary particle has different charge. Just like electrons have a negative charge and protons have a positive charge. But string theory changes this notion of difference as the underlying principles of the elementary particles is that they are composed of the same strings. This is in a way of unification which is the main aim of the string theory. This universe is composed of a different number of vibrating strings is the resultant of a cosmic symphony just like the individual strings of the violin make up its symphony.

The string has corresponding tension on its loops. Two vibrating strings having the same tension will not have the same energy. The string on higher tension will have more energy than the string with lower tension. And it is also proportional to the number of crests and troughs in the corresponding vibrating pattern.

Now let's discuss the name of the supersymmetric particles of the strings. What exactly is supper symmetry?? Well, it is the quest for unification. Suppose that there are two particles, A & B. Now both the particles have different characteristics. So, how to unite them. Let's imagine that particle A has a shadow like a particle B, & particle B has a shadow like a particle A. then by unifying the shadow with that of the particle we can make a proper symmetry within A & B. Thus all bosons have a fermionic partner and all fermions have a bosonic partner. The superpartner of neutrinos is called sneutrinos and quarks are called squarks. For photons, there should be photinos and for gluons, there should be gluinos. For W & Z bosons there should be Winos & Zinos. For an electron, there is a selectron. So we can see that all bosonic that is force-carrying particles have their fermionic partner with half-integral spin and vice versa.

Now, let's come to the notions of distance in string theory. What can be the operational definition of the concept of distance? It is that by which a spaceship travels at a distance by a static speed & we can determine the distance by determining how long the spaceship takes to traverse it. Well, there are two different yet related concepts of distance in string theory. The first definition uses unwounded strings whereas the other definition uses the wounded strings circularly.

Now let's see how these two concepts vary? Unwound strings are freely movable and can cover the full and can probe the circumference of the circle, a length proportional to the radius of the circle that is R. so, their energy will be proportional to 1/R. But the exact opposite happens with the wound strings. They will cover the distance proportional to R with an energy corresponding to 1/R. The idea is to see that if each is used to measure the circular dimensions of space, unwound strings will measure R whether wound strings measure 1/R. so, the result obtained by wound and unwound strings is inversely proportional to each other. As different methods are used to measure the circular dimensions of space, albeit, with different answers, the interwoven concepts remain the same.

As we have seen in Kaluza-Klein theory, circular dimensions are wound up in space like curled up dimensions when they are of higher order, so in string theory itself, these curled up dimensions are called *CALABI-YAU* manifold. They are interwoven in the space-time fabric like higher dimensions where there is always a tear and repair of space is occurring at a random level. Space itself is also not smooth. If space can be viewed from the microscopic point of view, then there will be acute distortions in space called quantum foam which forms and disappears in a chaotic state.

Here is the definition of the four fundamental forces of nature. Gravitational Force – The gravitational force is a force that attracts any object with mass. Every object, including you, is pulling on every other object in the entire universe! This is called Newton's Universal Law of Gravitation. ***Electromagnetic Force –*** Electromagnetism is a branch of physics that involves the study of the electromagnetic force, a type of physical interaction that occurs between electrically charged particles. The electromagnetic force usually exhibits electromagnetic fields, such as electric fields, magnetic fields, and light. ***Strong Nuclear Force –*** In the context of binding protons and neutrons together to form atomic nuclei, the strong interaction is called the nuclear force (or residual strong force). In this case, it is the residuum of the strong interaction between the quarks that make up the protons and neutrons. ***Weak Nuclear Force –*** In particle physics, the weak interaction, the weak force or weak nuclear force, is one of the four known fundamental interactions of nature, alongside the strong interaction, electromagnetism, and gravitation. The weak interaction is responsible for radioactive decay, which plays an essential role in nuclear fission.

Supersymmetry – What exactly is the shape of our mother nature??? Is it a sphere, is it a toroid, is it a hemisphere...? Well, we don't know for sure. If it has got a particular structure, then will all the dimensions be smooth... Will there be no curvature??? Well, the symmetry of nature seems to be broken. Not all but most. The mountains, the plains, the oceans, and the clouds all are irregular. All have different wavelengths & distinct frequencies. Even the atoms are not symmetric. So, why the symmetry of nature is broken??? Well, the answer lies in the origin. Since the big bang, every object in nature tries to go from a high energy level to a low energy level. The water falls from high to low but not from low to high. So before the big bang, there is a perfect symmetry in nature. Everything is smooth even at the Planck's length. Nothing is irregular. There is a tremendous amount of energy to some trillion volts and some billion degrees. But due to high tension force, the symmetry got broken & nature splits itself from 10 to 6 & 4 dimensions. It is just before the Big Bang that all the 4 forces of nature are united into a single framework... The gravity, strong & weak nuclear & the electromagnetic force. But what now... Yes, still symmetry can be observed. Water itself is the perfect example of symmetry. No matter how you rotate the water molecules at a particular point in space & time the symmetry remains similar in all the cases of spinning. Now, will we ever see the perfect supersymmetry structure of the universe... Yes, we will but we have to create an energy of some billion trillion mega volts which will bind all the four forces together in a unified (TOE) Framework. Only the supersymmetry string theory or superstring theory can achieve it by making a symmetry structure of E8*E8 (E stands for exception and 8 stands for dimension).... in which all bosonic particles have a fermion partner and all fermion particles have a bosonic partner. Like Graviton of spin 2 has a fermion partner Gravitino of spin 3/2... So this theory unites gravity with relativity. That is in Superstring Theory Quantum theory marries Relativity.

Well, what is it... Okay, let's see a few things first.

In particle physics, the smallest thing is point-like particles. Now further derivation, we got strings of 1-dimensional objects. These strings vibrate at a specific resonance giving rise to various forms of matter.

Now extend the string theory to a little bit more! You will get P Branes. Here p is a variable that stands for dimensions ranging from 1 to 9. The 3-D Branes cover the entire universe. But for the sake of simplicity let's take 2D branes. In branes, strings with open ends representing photons are attached. They can vibrate only in the specified area of the 2 branes. But the closed string represents Graviton (mediator of gravity) which is free to vibrate from one brane to another because it is not attached to any points.

Our universe came to existence from the explosion caused by the collision of two branes together called the big bang. These two branes are spreading far away now... But when the critical density of the matter in our space (including the dark matter) is reached then the two branes come close together and again collide to form another big bang. This process will continue but the lifespan of each newly created universe will decrease as the entropy decreases. Now the two branes represent our universe or rather our dimension. What lies next to us is another two branes which create a new universe of another dimension (probably higher).

Now the photons being attached to the branes can't escape the branes. But the graviton representing a close string (called loop quantum gravity) is free to move from our brane to another new brane. So in a new universe or a higher dimension, only gravitons will enter but not photons. So gravitons are the only means of communication from our universe to a new universe. At the beginning of the universe, large cosmic strings are present which are vibrating at a particular resonance creating the clumps of the galaxy. But these strings have now become smaller due to the fall in temperature.

Okay... Let's talk about the loop quantum gravity. According to Newton's law, we know that if the distance between 2 objects decreases to 2 ft... Then the gravitational force will become the reciprocal of 2 squares (1/4). If the distance between the objects decreases to 3 feet, then the gravity decreases to the reciprocal of 3 squares (1/9). Now, this statement holds for an object of $1/10^{th}$ of a millimeter. But what happens when the size becomes smaller... This law doesn't exist. So loop quantum gravity doesn't necessarily follow the Newtonian gravitational law of nature.

Well if we extend relativity to further then we will enter into Kaluza-Kleins theory which shows that higher dimensions are so small that they curled up in a circle inside normal spatial dimensions with a negligible radius. But according to brane theory, higher dimensions can also be bigger. But who knows it except Graviton!!!!

So we all are confined within a 3 Dimensional Brane.

What is the 11th dimension??? Is it real or fantasy??? Is it absolute or relative??? Is it abstract or physical???

Well, the answer lies in string theory. 11th dimension is a dimension that has its existence before the big bang. The 11th dimension can be the dimension of parallel universes. But how do we feel it???

Well the COBE satellite has got some cosmic microwave background radiation which depicts the existence of the big bang some 13.7 billion years ago. But the echo is still heard at a certain amount of frequency. But nature's 11th dimension is called the mother of all strings as it not only unites the 5 theories of string but also incorporates supergravity. The 11th dimension is highly symmetric. Every particle in the 11th dimension comes in pairs... Like Gravity consists of graviton with Gravitino. Gravitino is its superpartner. Each bosonic particle having spin 0,1,2,3 has its fermionic partners of half-integral spin of 1/2, 3/2 etcetera. The higher dimensional object (being 11th) incorporates supersymmetry in it which makes them accelerate through space-time at a speed near the speed of light. But analyzing the Gravitons. Could we possibly hear the echo of the 11th dimension...? Could we possibly hear about the binary signals from outer alien planets some billion light-years away...? Could we possibly see the two black holes merging with an intense ripple in the curvature of space-time..... God knows that! Just like the ripple which occurs when a stone is thrown on the surface of the water.

Where are we living? Where is the point of our existence? How many dimensions do we need to live in it? What is the nature of our state of reference? How can we exist in an infinitesimal limit within a much higher identity?

All of these questions are troubling in the mind of physicists and philosophers for a long period. This is so-called the quest for the hidden arrays… the arrays of space and time, and the hidden dimensions.

Higher dimensions are impossible to visualize as the size of the dimension varies inversely proportional to its level. The more the dimension ranges, the least its size. We are a set of points living in a particular point of space and a particular frame of time. that is, we live in space-time. or in short the so-called space. Is it so? No, coz the space has more dimensions than meets the human eye. We are living in a world of hyperspace. Our world is a smaller dimension floating in higher dimensions. The quest for the visually of higher dimensions has been a fantasy to mankind but this aspect of nature is completely locked. We can transform dimensions that are from higher to lower dimensions, or from lower to higher dimensions, but only through mathematics. The relative notion of mathematics helps us to do the thing, which is perhaps impossible in the experimental part of physical reality.

Humans being an element of 3 Dimensions… length, breadth, and height can only perceive one higher dimension, that is space-time. but beyond that, the notion of dimension itself changes. The dimensions got curled up in every intersection of the coordinates of space in such a way that the higher dimensions remain stable to us. But in reality, it is highly unstable. In the higher dimensions, above 4, the space is tearing apart and joining again spontaneously, but the tearing portion itself is covered by 2-dimensional branes which act as a stabilizer for the unstable dimensions.

Dimensions will get smaller and smaller with the space-time interwoven in it. But at Plancks length that is $1.6 * 10^{-35}$meter, the notion of space-time itself breaks down thereby making it impossible for the higher dimensions to coexist along with space. Without space, there will be no identity of any dimension. The space itself is the fabric for the milestone of residing in higher dimensions.

Imagine our room, which is 3-dimensional. But what is there inside the room? The space and of course the time. space-time being a separate entity is not quite separate when compared with other dimensions because it makes the residing place for the higher dimensions or the hyperspace itself. We all are confined within a lower-dimensional world within the randomness of higher dimensions.

Time being alike like space is an arrow that has the capability of slicing space into different forms. Thereby taking a snapshot of our every Nano Second we vibrate within space-time. as each slice of time represents each slice of space, similarly each slice of space represents each slice of time. The nature of space-time is beyond human consciousness. It is the identity by which we breathe, play, and we survive. It is the whole localization of species that encompasses itself with space thereby making space-time a relative quantity depending upon the reference frame.

The only thing that can encompass space-time or even change the relative definition of space-time is the speed, the speed far beyond the speed of light. The more the speed, the less the array of time flows. Space-time being an invisible entity makes the other dimensions visible residing in it only into the level of 3, that is l, b, h. after that there is an infamous structure formed by the curling of higher dimensions called CALABI-YAU manifold. This manifold depicts the usual nature of the dimensional quadrants of the higher-order by containing several small spherical spheres inside it. The mathematics of string theory is still unable to solve the genus and the containing spheres of the manifold which can be the ultimate quest for the hidden dimensions. Yes, hidden, coz, the higher dimensions are hidden from a human perspective of macro-level but if we probe deeper into the fabric of the space-time of General Relativity then we will find the 5^{th} dimension according to the Kaluza-Klein theory. And if we probe even deeper into it from the perspective of string theory we will be amazed to see the real nature of the quantum world. They are so marvelously beautiful, they contain so many forms of higher dimensions ranging from 6 to 26. And even many more of that, but we are still not sure about it. After all, quantum nature is far more beautiful than one can even imagine with a full faze of weirdness.

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