

17 Essays On Modern Physics: From Sonoluminescence To Superconductivity

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Physics is beautiful & amazing. This paper contains 17 easy-to-read essays on modern physics over various aspects that can easily manifest a curiosity in the young minds. Essays are there without any math which entails for a easier read. They are, Complexity of Physical Law In Unification, Levitation Using Superconductivity, Cryogenics, Nuclear Energies, Speed of The Sound, To Travel In Time Is To Travel In Space, Restricted 3-Body Problem of Mechanics, Sonoluminescence, Acoustic Levitation, Evolution & Physics, 11-Dimensional Super-Gravity, Black Hole Titbits, Frequency & Wavelength (Å), Investigating The Possible shapes Of The Universe, Chaos & Unpredictability, Cat's Schrodinger, Isoperimetric Inequality.

1. Complexity of Physical Law In Unification

It is quite incomprehensible to digest the metabolism of modern physics. Modern physics is now in a state of veteran. Despite of its abstractness and complexity there lays 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 misunderstood or dislike it. Mathematics have gone rogue. Meta-physics started to rule over physics and nature become aware of the forthcoming conclusions that may dispose her identity. Many theories have developed in physics in the late 20th and beginning of 21st century. Some of the theory has already established themselves in the sophisticated chapter of the golden book where as 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 cleverly 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's which still needs to be deciphered. Unification aims to testify the gravity of the 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 the physics to a finite wavelength. But still, the concept of infinity is now an oblivion. The edge of the sophisticatedly enriched modern physics aimed to hold the edge of uncertainty with a handful of so called certainty in the mathematics. Physicists have stretched their hand 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 in its microscopic level. The fabric itself is distorted to a maximum randomness of inconsistent blobs.

Albeit of its abstractness and compulsiveness the physicists have struggled to portrait the underline hidden principles into a meaningful form for the layman to understood. But among many possible conclusions, they have failed as the language has become so coarse that a highly 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 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 have developed and so are the minds of scientists.

The more compulsive the physics become, the more interesting the subject is. Abstractness have become reality and so the enriches have become the conclusion.

Physics is beautiful and so is its principles. The tougher the physics got the more interesting and the more astonishing it sounds like. The fine tune 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.

2. Levitation Using Superconductivity

Quantum Physics comes with a lot of surprises. The most profound surprise among them is the Quantum Levitation of the Type II Superconductors. Well, it's not going to be easy. After all who said Physics is Easy. Richard Feynman once quoted "Nobody Understands Quantum Mechanics".

In order to rise above the surface without any stand, two things are needed. The lifting force, the stabilizing force. The lifting force lifts the object, the stabilizing force stabilizes the object. It counteracts the effect of air resistance, friction & gravity.

What is a superconductor?

A Superconductor is a special type of substance cooled with a layer of liquid nitrogen of thickness of 1 microns in such a way that electricity passes through it without any dissipation. The Liquid Nitrogen must be cooled near to absolute zero or cryogenic temperature in order to achieve Superconductivity.

You all have seen movies of James Bond with the flying cars... Cars that can levitate from the ground. Well, this is not a fiction. This is the combined effect of Quantum Locking & Magnetic Flux Pinning.

A superconductor when placed above a magnetic material, then the magnetic flux lines go surrounding it by bending the flux lines as it can't penetrate the superconductor because of Meissner Effect. An effect which does not allow the flux lines to pass through a Superconductor. But when the Superconductor is topologically defect that is it allows the flux lines to pass through them forming flux tubes.

What is a topological defect?

In algebraic topology, a topological defect is said to be a non-continuous transformation from 2 corresponding points to the other through corresponding points due to the puncture inside it called non-trivial homotopy.

But when the Superconductor is made with a thinness coating of 1 micron then there are little perforations or topological defect inside the superconductor. This helps the magnetic flux lines from the below magnet to pass through the Superconductor through Little Vortex forming flux tubes. This creates the flux lines to form an invisible field or pillar through the Superconductor Type II, thereby support the super conductor to support it above the magnet. Both stability & anti-gravity repulsion is achieved by this flux pinning.

The Superconductor must be cooled with a crucial density between Hc1 & Hc2. The little vortex inside the superconductor must have a proper boundary conditions so that only the perturbations at a certain repeated frequency allowed the flux to pass through it. The boundary conditions should reside in a field outside the area governed by differential quantum field equations.

The invisible pillar is a majestic gift of Superconducting magnetic pinning.

3. Cryogenics

Cryogenic is a very important term used in modern rocketry. Well, the details of this Quantum Hydrodynamics can be traced back to the year 1930, when one Herman & one Indian Scientist tried to establish a different structure of atom altogether based on a research conducted 200 Years ago in 1730.

Yes, Albert Einstein & Satyendranath Bose. The Bose-Einstein Condensate or the 5th State of matter. The most abundant has obtained in the universe is Helium-4 isotope. It is a boson with Zero Spin obeying Bose-Einstein Statistics having 2 Protons, 2 Neutrons, 2 Electrons. "0" or integer Spin. Spin is a property of angular momentum which is $h/2\pi$. 360° makes a complete Spin of a subatomic particle. However there is another isotope of Helium, Helium-3 which obeys Fermi-Dirac Statistics having half-integer Spin, but Helium-3 can fuse with another Helium-3 to form a Helium-4 isotope. Helium-3 isotope has 2 Neutrons, 1 Protons, 2 Electrons.

Now comes the cryogenic concept?

What will happen at 0° Kelvin or 273.16° C or 459.99° F. Well, it's the lowest possible temperature ever attained on this universe & called as "ABSOLUTE ZERO". When temperatures are increasing, the gas molecules become loosely packed with a tremendous kinetic energy. The opposite happens when the Temp is cooled. The Gas molecules becomes so tightly packed that the atoms have got "0" Kinetic Energy thereby clumped together to form a "Super-Atom" called Bose-Einstein condensate.

It is crucial to understand the fluid dynamics of Helium-4 isotope. Cooled it to 0° Kelvin or near to it as absolute zero is quite

impossible, the Helium will become a super-fluid that will have a distinct properties. The super cooled helium will behave as a solid with zero viscosity & zero kinetic energy. The friction becomes zero & inertia will taken over. The outcome is amazing... A gas which turned to a liquidized solid when stirred, it will continue to whirl until eternity as there is no friction between the atoms inside it.

In the Liquid Propellant Rocket Engine, This property is used to cool Liquid Nitrogen which in turn can be used as a Rocket Fuel & gives the rocket a higher specific impulse (measured in seconds as the momentum in opposite directions combined by Newton's 2nd & 3 Rs Law of Motion) which helps the rocket to achieve a speed of 7.8 Km/Sec (Parabolic Trajectory) to 11.2 Km/Sec (Hyperbolic Trajectory) & thereby attaining the escape velocity to reach the outer space.

4. Nuclear Energies

Nuclear bombs are weapons of mass destruction. They harness the forces that hold the nucleus of an atom together by using the energy released when the particles of the nucleus (neutrons and protons) are either split or merged.

There are two ways that nuclear energy can be released from an atom:

Nuclear fission - the nucleus of an atom is split into two smaller fragments by a neutron. This method usually involves isotopes of uranium (uranium-235, uranium-233) or plutonium (plutonium-239).

Nuclear fusion - two smaller atoms are brought together, usually hydrogen or hydrogen isotopes (deuterium, tritium), to form a larger one (helium isotopes); this is how the sun produces heat.

The atomic bomb uses nuclear fission and the hydrogen bomb uses nuclear fusion.

The Atomic bomb

Nuclear fission produces the atomic bomb, a weapon of mass destruction that uses power released by the splitting of atomic nuclei. When a single free neutron strikes the nucleus of an atom of radioactive material like uranium or plutonium, it knocks two or three more neutrons free. Energy is released when those neutrons split off from the nucleus, and the newly released neutrons strike other uranium or plutonium nuclei, splitting them in the same way, releasing more energy and more neutrons. This chain reaction spreads almost instantaneously. Atomic bombs were exploded in war in Hiroshima and Nagasaki at the end of World War II.

The hydrogen bomb

Nuclear fusion is a reaction that releases atomic energy by the union of light nuclei at high temperatures to form heavier atoms. Hydrogen bombs, which use nuclear fusion, have higher destructive power and greater efficiencies than atomic bombs. Due to the high temperatures required to initiate a nuclear fusion reaction, the process is often referred to as a thermonuclear explosion. This is typically done with the isotopes of hydrogen (deuterium and tritium) which fuse together to form Helium atoms. This led to the term "hydrogen bomb" to describe the deuterium-tritium fusion bomb.

Tsar Bomba is the largest nuclear bomb ever tested in the world by Russia which is so dangerous that it produces a third degree burn 100 kilometre radius across the place of bombing.

5. Speed of The Sound

This term is used to measure the speed of any object with relative to sound and therefore Mach # 1 is taken as the speed of the sound. The normal speed of the sound is 1,100 ft/Sec or 760 mph but this varies with temperature. The more colder the temperature the less the speed of the sound and so in the uppermost part of the Stratosphere where the temp is -57° C ... The speed of sound becomes 500 mph & that's what is an ideal Mach # when concerned with supersonic travelling in a modern fighter plane or B-2 Bomber.

Sound is a vibration in air, or more prominently a pressure wave. When sound is emanated from a particular point a wave of high pressure is created at this region which expands like a spring and the sound travels from a high pressure to a low pressure due to the gradient.

Now a days all fighter planes are Supersonic. So, to move faster than sound with a Mach # 2 or 3 or 4... The aircraft has to pass from a

subsonic to transonic to supersonic stage. All this 3 stages and their flowing interconnected-ness has make the aircraft body a smoother one without any curvature so that the friction between the air molecules with the body can be reduced or else the temperature will be around 600°C which will kill the Pilot. Moreover a DELTA shaped aircraft is needed for a much larger sweep back which helps in the steady flow of the air around the craft when the barrier of the speed of the sound is crossed. Which is called the Bow Shock or Shock Wave.

When the craft is moving subsonic then the air pressure behind it is travelling at the speed of the sound which communicated to the air pressure at the front of the plane that the craft is approaching and this makes the air at the front of the craft to adjust its pressure gradient before the craft is approaching on it. But if the plane travels at a supersonic speed then the pressure waves will be lagging behind the speed of the craft or plane and this will create a position in which the air at the frontier part of the craft is still uninformed and so it is still remains compressed and when the craft approaches the pressure gradient then the air comes as a shock to the plane in the form of a shock wave which results in an immense jerking of the plane along with the increase in air pressure, air density & a decrease in the craft velocity accompanied by the sonic boom. The boom spreads as a comic structure behind the craft and the object in which it hits gets torn apart. This sonic boom acts in 4 Stages....

Stage 1

The air at the front part of the craft is when at .8 Mach # then a small small shock wave I screamed at the front but the air at the rare portion of the plane is still subsonic.

Stage 2

The air at the front part comes to the trailing edge when the speed is .9 Mach # and therefore acts as a inclined shock wave with a greater frequency and starts to move backwards even more & more.

Stage 3

When the speed is transonic or 1 Mach # then the air at the back or trailing edge of the plane is quite supersonic and the air at the front edge of the plane is more than supersonic which creates two separate shockwaves at the leading & the trailing edge which is accompanied by a high pressure gradient.

Step 4

When the speed is more than 1 Mach # then the shock wave will get inclined towards the plane with a more acute angle in between them and thereby producing sonic booms which breaks the barrier of the sound by the ordination of two separate shock waves counteracting with the plane in the opposite directions from the front and rear thereby giving the plane a supersonic speed and breaks the barrier of the sound with a high velocity of craft in the air compared to the speed of the sound.

The design of the modern aircraft has been made to make the flow of the air around the edge of the plane in a proper order without any eddy currents. The engine used for this is a ram-jet which takes air from the atmosphere and then heat is provided to the air which in turn expanded and tries to except from the nozzle at the very higher velocity thereby giving the plane a supersonic effect. The wings are delta shaped without any separate prominent wings as because the delta shape of the aero foil is very much necessary to reduce the stage and increase the lift during the stage of passing a shock wave. The velocity of the air above the craft is high and so according to Bernoulli's Principle the velocity will be high on the other hand the air below the craft will be of lower velocity which goes a high pressure and this high pressure puts the plain in a lifting stage and minimize the drag when the subsonic flow at the upper stage of the trailing edge gives a downward pressure which increases the stage by a phenomena known as Shock Stall. The supersonic jets when passed away ... After few moments the sound will come as because the craft is travelling higher than the speed of the sound.

6. To Travel In Time Is To Travel In Space

To Travel in One Hour Past.. One has to Travel approximately. Wait. Let's do the math!!!

The first thing to consider is the earth's rotation. The earth is 24,900 miles in circumference at the equator, or 40,000 kilometers. The earth takes 24 hours to make one rotation. So: $24,900 / 24 = 1,037$ MPH or 1,666 KPH. As you move toward the poles that number decreases. At the North Pole the speed is zero and you are simply rotating in place at one rotation every 24 hours. So let's assume you are sitting somewhere on the Equatorial Region.

The Earth is also making one orbit around the sun every year. That sounds like a long time, but the orbit is huge. The Earth is roughly

93 million miles (150 million km) away from the sun, giving its orbit a circumference of 584 million miles (942 million km). That works out to 66,666 MPH or 107,000 KPH.

If you are on the side of the planet where the planet's rotation is moving in the same direction as the orbital direction, these two speeds add together. If you are on the opposite side, they subtract. We are trying to calculate a maximum speed, so we will be adding.

Our solar system itself is also moving in an orbit around the galactic core. The solar system is something like 25,000 light years away from the center of the galaxy, and the galaxy makes one rotation every 250 million years or so. That gives the solar system a speed of something like 420,000 MPH or 675,000 KPH.

And then the galaxy itself is moving.

The Milky Way and Andromeda galaxy are approaching each other with a speed of about 130 km/s, however the collision of these two galaxies will not occur for about 5 billion years. Another result I found was that our galaxy and neighbors are moving at 600 km/s in the direction of the constellation Hydra. Finally, I found that the Milky Way moves through space within the cluster of galaxies it is a member of, and this cluster in turn moves through space towards yet another larger cluster of galaxies off in the direction of the constellation Virgo. This speed is approximately 300 km/s.

So there is speculation that the galaxy is moving through the universe at a speed of 1,000 km/s, which means 3,600,000 KPH or 2,237,000 MPH.

Adding it all up, you get:

$$1000 + 66,666 + 420,000 + 2,237,000 = 2,724,666 \text{ MPH}$$

Or

$$1,660 + 107,000 + 675,000 + 3,600,000 = 4,383,670 \text{ KPH}$$

In other words, you are hurling through space & Time at 2.7 million MPH (4.4 million KPH) even though it feels like you are sitting still.

So, To travel one hour past you have to travel backwards at 4.4 million KILOMETER + S*

S* is constant as travelling at the speed of light will make the time constant.

So, if you are travelling at the speed of light... You will take... $4.4 * 1,000,000 / 299792 * 60 * 60 = 0.004076900725244$ Hour.

Well, That's called a Real Time Travel.

7. Restricted 3-Body Problem of Mechanics

Back in the earliest days when Physics or Celestial mechanics is yet to be developed, Kepler discovered the relation between 2-bodies, the Sun & the Planet & how the Planet sweeps equal area in equal time along with Sun at one of the focus of the Ellipse which is a conic section. Further in 1700's Newton developed the 2-Body problem of planetary motion by combining Kepler's laws with his laws of Motion & Gravitation. That is Gravity depends upon masses & increases when two massive objects came closer & decreases by a inversely proportional square of the distance the bodies are moved apart from each other. In those days the relationship of Gravity is confined between 2-bodies... The satellite & the planet... Or... The Planet & the Star. Like Earth & Moon or Earth & Sun. Now, Gravitation as a part of angular momentum is came into concept from the Einstein's General Theory of Relativity. Gravity distorts Spacetime & makes the massive objects to spin in a moment of momentum around the distortion. But those days have gone... Now Physics becomes more complicated with the invention of artificial satellites or Space crafts. Now as soon as a satellite is launched into space then there exists 3-Body relationship between the Moon, Earth & the satellite. Or, The Earth, Sun & Satellite. Or maybe, The Earth, Jupiter & the satellite. So, Lagrange has developed a complicated solution by generalizing gravity into a 3-Body problem. The Primary being Sun which has a higher dominance of Gravity. The secondary being earth whose rotation gives a centrifugal Pull & The moon (although excluded) but still revolving around Earth which in turn revolving around Sun in a common centre of Mass. Yes, that common centre of mass is the equilibrium point of the "Cm" or the 3-Body centre of mass along which every object rotates or revolved in celestial mechanics. This intersecting common centre of mass of the Spacecraft, Sun & Earth is called the Barycentre. Barycentre balances all the masses on a fulcrum & acts as just in the middle position of the centre of mass. 3-Body Problem has several ways of trajectory mechanics which helps to compute 5 Points in space among which 3 Points L1, L2, L3 at the Primary,

Secondary and its middle makes a position of unstable equilibrium as when the Primary & Secondary objects move, this Lagrange Points also moves. So, for a stable equilibrium the Space-Craft is kept at L4 & it covers a halo orbit circling L4 & L5 in order to maintain stability by neutralizing the Gravitational pull of the Sun & Centrifugal Pull of the Earth. L2 points are also used for placing articulate satellites around the earth. It's complicated yet interesting.

8. Sonoluminescence

A Process in which the light can be produced from Sound!!! Sound & Light.... Shockwave & Superluminal!!! Both the phenomenon are related.

This experiment is defined in a research paper in 1931 but at that time the results of this SONOLUMINESCENCE is still unknown. No scientists can find out the cause but in 70's the science flourished & the cause of this mystical glow of light from sound is deciphered.

How?

Take a jar full of water. Insert a small bubble inside the water in the jar. Bombard the water bubble with sound waves of high intensity from opposite directions. The sound wave will enter inside the bubble & makes the bubble expands... The density decreases and the bubble increases in size. Then suddenly the bubble just can hold its own weight in its position inside the jar and implodes inward. The density increases. All the water molecules are rushing towards the interior of the bubble with a tremendous high velocity. The friction between the molecules inside the bubble will create a massive heat some trillions of degree Celsius which then tries to make out through the barrier of the bubble with a rush of light and heat. The bubble collapses with its own density and gravity & hence the heat & light which generated upward through the collapsing of the bubble by a process of nuclear fusion. The nucleus inside the atom of the water will try to fuse with each other as they get compacted & comes closer & closer. This results in a shockwave with a high pressure gradient which causes the heat to escape outwards with a speed greater than that of light. As a result, the wavelength of the light will squeeze tremendously & thereby the frequency & energy increases exponentially resulting in a ultraviolet glow.... Starting from blue, then violet, then ultraviolet. The water molecules are actually travelling faster than that of the light and hence the Superluminal glow is observed.

So, Light can be produced from the sound by combining the Mach # with Cherenkov Effect along with the Shockwave relating to the nuclear fusion. The Physics is simple as that of a star collapsing under its own weight to form a black hole. The star whose core is burning in nuclear fusion radiates energy & when the hydrogen gets burned out and the helium gets deposited in the core followed by a chain of reaction from Lithium to Berilium-8 isotope to Carbon, it collapses and make a distorted Spacetime with an escape velocity equal to that of the light.... A Black Hole.

The similar thing happens inside the jar. The implosion produces a supernova and the bubble acts like a star in the jar.

Amazing Physics.

9. Acoustic Levitation

How Sound is used to levitate objects in Space against the Pull of Gravity ?

Three things are involved here, Air, Sound & Gravity.

Sound is usually taken as a transverse wave with the wave propagation at right angles to the wave amplitude. A sound is a simple vibration in air molecules. That's why the sound can only be heard when there is air present in the atmosphere. Imagine an example : How a bell rings in a temple? You push the bell, The bell gets forced to the opposite side thereby compressing the gas molecules of air and creates a region of high pressure which will produce a non-linear high sound. On the other side, the pressure is low or the wave is rarefaction.. A region of low pressure where the sound waves are linear & hence the sound is less. The bell then moves backwards again creating a high pressure compression zone & makes the sound. The rarefaction is on the opposite side.

The principle is used to levitate objects like solid or liquid bubbles in the air against the pull of gravity. There are two parts in this mechanism... The lowest part is called the Transducer & the highest part is called the reflector. An intense sound of 150 Decibel is needed... So, The ultrasonic sound of high pitch is ejected from the transducer and it strikes the reflector. Remember the law of reflection.... The angle of incidence is equal to the angle of reflection. The sound waves reflect to & fro from the transducer to the reflector & again backwards. There creates two portions... The portion of compression & rarefaction. Interference occurs between

them. Compression with compression gets amplified. Rarefaction with rarefaction gets non-amplified. Rarefaction with compression gets neutralized. There forms a region in the sound wave called node : A region of low pressure. Anti-Node : A region of high pressure. The reflection and interference between the Non-Linear sound waves produces a standing sound wave. This standing sound wave from the upwards creates a downward pressure & from the downward creates an upward pressure. It is this standing waves which creates a region of acoustic radiation pressure. A region where the gravity pull is neutralized by the standing wave. In Gravity environment the particles get stuck in the acoustic radiation pressure zone and remains floating in space because of the increasing pressure from upwards & decreasing pressure from downwards. But in Space, where there is microgravity the particles stuck at the node : A region of minimum pressure. The particles may be liquid provided the surface tension of the liquid due to gravity must withhold the acoustic radiation pressure or else the water bubble will get flattened like a donut & bursts away. Air behaves like a fluid except that there is no fluid but gases and the molecules move faster & as sound is the movement of molecules in air by pressure, So, levitation is done by controlling and stabilizing the pressurized environments of standing waves of sound.

10. Evolution & Physics

It was around 4.5 billion years ago that the sun goes into a deep cataclysmic explosion and sends a huge junks of fiery mass of lava and rocked in its orbit. The gravity was huge which results in a greater angular momentum of this rocky mass and its day is only 2.5 hours & night 2.5 hours. In total this was the earth with a rotation period of 5 Earth hours. Slowly by slow the rocks moves to a greater distance and thereby makes herself quite free from the sphere of influence (SOI) of the Sun. The earth cools down and the SOI as becomes quite less the rotation speed ceases and the Earth hour changes to 24 hours. The lava goes deep inside the core & the whole earth becomes water without any land. "The Great Oxidisation event" occurs and the amino acids gives rise to single cellular organisms. The cells multiply and thereby gives rise to underwater plants. This is 80 million years ago when the first life appears on Earth. Stages by Stages life changes and evolved followed by 5 Mass Extinction....

By Ice
By fire
By water

By tectonic plate erosion of Pangea thereby formed two surface region.... Angaraland & Gondwanaland with the Tethis ocean in the middle.

The last Extinction occurs during the Jurassic Period when a huge asteroid hits the earth & wipes out its every life from there.

But life originates every time with a new form, new look, new selective evolutionary pattern. The 4 Epochs of Geological Evolution are,

80 million years ago
PRECAMBRIAN PERIOD

40 million years ago
PALAEOZOIC PERIOD

20 million years ago
MESOZOIC PERIOD
(Jurassic & Triassic Era)

1.6 million years ago
CAINOZOIC PERIOD

Tertiary Period - The Hominoids.

Quaternary Period - 60,000 Years ago first modern humans appeared on Earth in Africa. Homo Sapiens.

Now we are heading for a 6th mass extinction. We have evolved from the Chimpanzee by a change of 1.5% of the Genetic 23 Pairs. During 4 million years the genetic code evolved by 1%. So, it took 6 million years to change into humans from Chimps.

The 3 Genes responsible for this change are...

HAR1 - Straightening of Spinal Cord.

HAR2 - Separation of hand & legs.

FOX2 - Evolution in the brains in 4 Parts, The frontal lobe, The Occipital lobe, The Temporal lobe, The Parietal lobe.

We humans are currently having a consciousness of Cognitive Level III.... i.e, Perception, Preparation, Prediction.

We are the only species which have a brain with 100 billion Neurons along with each dendrites corresponding to 10,000 connections thereby making a total of 1 Quintillion (1,000,000,000,000,000) connections of Polarised Neurons inside our brain. We have the most complex brain developed from the Reptilian & Limbic Brain some 60,000 Years ago in Africa.

We have Space-Time theory of consciousness. We can imagine the Future and can predict the outcome of some 1000 years later. We have self consciousness and we can dream by the signalling channeling from the brain stem to the dorsolateral prefrontal cortex to orbitofrontal cortex to temporo-parietal cortex. We are aware of our own position and we can know the difference between the right & wrong. We can choose the right or wrong from a 1000 parameters with the help of the Thalamus & Hypothalamus of our brain.

We are the only creature which have evolved through the natural selection and thereby have the concept of PLASTIC TIME & BACKDATING TIME. The Plastic time is the time that correlates between the mental & physical world by a cycle of events or packets of time loops running inside the anterior part of the temporal lobe inside our brain. We have the complex control centre called Thalamus along with memory corners like Hippocampus & emotions like Amygdala. Everything we felt is about 1 / 2 millisecond delay & that delay is the Backdating time which brain covers up and we can't feel the delay as we have the highest level of consciousness in the Cognitive Level of Psycho Physics.

Our tail got vanished and the organ responsible for the digestion of those raw organic foods like grass, the cover of banana is called the Caesium which is still inside our stomach but it is invalid.

We are the humans. The evolved humans with 4 chambers of heart along with modified reproductive organs and a brain as a size of 4 A4 size papers which got folded inside the skull by various cortex and consumes only 20 Watt of Energy.

If our ancestors doesn't follow the proper laws of natural selections, extinctions & reproductions with relation to the earth then we won't be the humans of Level III Consciousness, we end up in just as a Bacteria or Molasses.

11. 11-Dimensional Super-Gravity

11 Dimensional Supersymmetry & Supergravity are a definitive Principals of Membrane Theory by combining quantum theory with general relativity. The Distance black holes when collides together by mutual Gravitation at about 15,000,0000 Light years away they used to give a Pulse of sinusoidal waves Or a Ripple of sine Waves which spreads through the universe across vast Regions without any medium. Space is a void of dark matter. A Plasma. So, what causes those Sinusoidal waves to Travel millions of Light years without any medium. There is indeed a medium.

According to quantum mechanics Gravity is a Boson followed by Bose-Einstein statistics. So, gravity must have a dual nature - Waves & Particles. According to SUSY the 11D SUGRA has with it a Fermion particles which obeys a Fermi - Dirac Statistics. As a Fermion, It must have a half integral spin like 1/2, 3/2, 5/2. Similarly as a Boson it has an integral spin like 1, 2, 3, 4. The Spin is an angular momentum measured by Reduced Planks constant divided by 2 PI. So, Instead of being repelled in single, Gravity comes in Pairs... the Boson particle is called the Graviton, the Fermion Particles is called the Gravitino. The Graviton is a distinct elements of Superstring Theory & So as it is a Boson it is a Closed String... Perhaps the smallest String with spin 2 & mass 0 like Photon. The Gravitino is beyond the Standard Model & the shadow Particles of Graviton. The Gravitino is too a Closed String like Graviton but has a Spin of 3/2.

The Graviton - Gravitino Operates beyond the Planks Scale that is $1.6 * 10^{-35}$ meter... Therefore the notion of Space & Time breaks apart. The time remains constant for each SUSY & its Partners and the medium doesn't have to be a Dark Matter. The medium itself loses its sense of existence beyond this Scale 7 Hence the wave When propagates Gets the Kinetic Energy from the High Vibrating Graviton - Gravitino Partner which acts as a closed loop Vibrating Unison and coherent with the Void of nothingness. Even Graviton Operates at the scale of Small Extra dimensions as Presented by Kaluza-Klein. The Extra dimensions are so squeezed up in that scale that the straightning out of a Loop Releases enough kineticity to ripple The waves Through the space & Time.

According to Brane cosmology, The P-Brane where we survived is full of closed Loop gravitons which can act as a portal to another universe by Directly Penetrating through the Barriers of the Branes as because Unlike Photons, the Graviton doesn't have any open ends attached to that Particular Brane. It is free to propagate & Navigate in the entire Cosmic-Dimensional-Continuum By means of a Ripple through the network of Space & Time.

The Supersymmetric model (SUSY) assumes the Boson with integer Spin with Fermion the half-integer spin as...

Photon (1) - Photino (1/2)
Gluon (0) - Gluino (1/2)
Electron (1/2) - Selection (1)
Graviton (0) - Gravitino (3/2)
Proton (1/2) - Sproton (1)

12. Black Hole Titbits

Nuclear Fusion of Proton-Proton collision is the result of Forming the Helium-3 Atoms which when combined in Pairs forms Hydrogen with 2 Protons leftover. Hydrogen Fusion when ends, then the helium ashes which deposited in the core started to fuse. Further Fusion results in Lithium-Beryllium (8) Isotope to finally Iron. The Charged Particles while accelerating in a high Pressure environment with temperature upto 1,00,000 Joules can withstand the force of Gravity. After the Fusion stops the stars becomes a neutron Stars with the electrons attached to the nucleus of an atom. The density is high and further Temperature loss results in Weaken the force of The Inward Momentum thereby Creating the Gravitational Collapse and a Puncture in the fabric of the Space-Time called as a Black hole. In Binary Group Black holes can be formed by the Fusion of two stars. Black holes are a lobs. They may be Static like Schwarzschild BH or spinning Like Kerr BH. The entire matter is collapsed to singularity which is a Point In Static Black hole & Circle in Spinning Black hole. Beyond the Singularity there is a Region Called event horizon which acts as a point of No return. The future Light cones are all aligned in Parallel with the Event horizon thereby making the escape from there inevitable. Beyond the event horizon there lies a Symmetric Jets of Gamma & X-Rays by a process called Lens-Thirring effect which occurs due to Electron degeneration and ionization with acceleration in the rotating region of the BH called as a Static limit. The Region Between the event horizon & Static limit is the Ergosphere which is an Oblate Spheroid in shape. The gases of dust and other hydrogen ions along with plasma is rotating at a very high speed which makes the Black Hole emission of jets outside the Event horizon in 22-28 % the speed of light. Beyond this region there is Photon Sphere.... The Prograde motion of The Photons marked the end of the Light rays which encircled around the BH due to immense Gravity. This led in the emission of a faint glow called of Gamma rays called synchrotron effect. The Rotating material of the BH Rips apart the electrons of the Hydrogen & Helium nuclei along with some other elements which results in the development of an electrostatic force called Eddington effect. The Spiral accretion disc takes the matter or sucks the matter from a donor star which eventually results in the interaction of the Cosmic Microwave Background radiation by the absorption & Emission Of Photons which results in the emission of High Energy short wave X-Rays by exact difference in energy levels between two States of Electrons before & After absorbing Energy. There is another region which is there within 4 times the Swartzchild Radius called the Retrograde Photon Sphere. There the photons are travelling In an opposite spin with effect to the Spinning Accretion of the BH disc. The Bridge between Black hole & White Hole is called Einstein-Rosen Bridge or Wormhole which ceases to exist more than some seconds due to the lack of Negative energy. The Protons are positive and hence the Negative energy of the electrons are not dominatable and so the BH attracts masses but the white hole should be rejecting masses and so it needs negative matter or negative energy for stopping collapsing in the Inter-Universal Void. There are BH at the Centre of The Galactic disc which acts as a revolutionary attraction for the stars and the Solar System family in 200 million years having its length 10 million times bigger than the Sun. The surrounding region of event horizon is full of Vacuum energy fluctuations which results in the Creation & Annihilation of Matter-Antimatter Pairs thereby results in the burst of a Faint radiation called Hawking Radiation. This is called Black hole entropy & the rotation results in the conservation of The Laws of angular momentum.

The most distant black hole X-ray jet ever observed has been discovered some 12.4 billion light-years from Earth, giving astronomers a peek at the life of giant black holes not long after the Big Bang. The enormous stream of radiation, which is believed to stretch about twice the diameter of the entire Milky Way, is the byproduct of a quasar— a galaxy dominated by a super-massive black hole in its center. Huge black holes like this become extremely bright when they rapidly suck in matter and then hurl beams of high-energy particles back into space. These particles travel at nearly the speed of light and can interact with cosmic clouds of photons left behind after the Big Bang. This interaction ratchets up the photons' energy, pushing it into the X-ray band of light, which results in a bright jet of radiation, as researchers have observed in an object designated quasar GB 1428. The BH is 1.2 Billion years old and shows the exact conditions to be observed during the Big Bang as the Photons are very intense at that time thereby making the BH X-Ray Jets overcoming the dimming nature in Time.

Do black holes implode or explode? Initially they implode but after critical circumference is reached they explode and gets cut off from the universe rather spacetime and travels through hyperspace and rejoins to another universe. That's what initially believed. But actually black holes implode and creates a singularity. They never explode. Any star with irregular mass distribution, spin, charge, radiation contribute highly and increases exponentially when it becomes a blackhole due to gravity potential acceleration. A Roy Kerr singularity is therefore created. Any ideal star with spherical, no spin, no charge, no radiation is hardly found. But if found then they will give birth to a new universe via Big Bang. Moreover, there is teleological evidence that the apparent horizon is the event horizon with absolute horizon as the absolute frame of reference. Any apparent horizon is relative to the in falling persons perspective. Absolute horizon makes the boundary of return & no point return. Black holes do emit radiation and jets due to magnetorotational instability. The Pair-AntiPair of particles..... if they arises due to quantum vacuum fluctuations near the event horizon, then, they borrow energy and gives back energy, but if in this process the Pair goes inside event horizon, the antipair remains glowing outside the horizon. That emit radiation. Moreover the accretion with high in falling plasma having an unstable orbit interacts with magnetic fields and emit synchrotron radiation. The radiation of photons needs more energy to borrow to balance hogh gravity. Frequency increases and wavelength decreases due to gravitational redshift. The X-Rays produced are due to inverse Compton scattering. Black holes never emit information. Any information which is inside the black hole is trapped within absolute horizon. However, the teleological evidence says that effect occurs earlier than cause. How? Because the absolute horizon grows in future in anticipation of the in falling radiation to apparent horizon. There is a static limit and the area between static limit and event horizon is ergosphere. Everything is in a spiral motion. The nearest unstable orbit is the Prograde Photon sphere with spin coincide with black hole. About a distance there is retrograde photon sphere with spin opposite to black hole. The electro dynamic plasma creates a strong magnetic field and as photons are trapped, they goes in a orbital period and after that radially inside black hole. The black hole is of (NO HAIR THEOREM).... it dosent conclude any information of the parent star. However, the nearest orbit which is stable experiences the frame dragging and infinite tidal forces to stretch and squeeze into singularity. A star forms white dwarf due to electron degeneracy pressure which opposes the gravity to collapse. If the star gets more compact then electrons gets attached to the neutrons and radiation pressure attracted by gravity is counteract with neutron degeneracy pressure. However, if the parent star crosses the 10 solar masses or chandrasekhar limit, then, the inward implosion is greater enough to collapse into a singularity. The black hole is unstable to inward perturbations. Any black hole with high plasma density will eventually have less tidal force. To explain, when two binary stars becomes a black hole, they collided but the mass and radius of the black hole is far greater than that of the addition of 2 binary stars radius. This is because mass is proportional to radius which is related to surface area. The larger the BH..... the less the Tidal force and you can hover your spaceship at a orbital period near to it. As the orbital period reduces, it reaches the speed of light and there after no elliptic path can be followed, you have to go radially inwards with a Tdal effect of 1 million times greater than that of Earth $1/8 \times 1000000$ the space time warpage is so high that no classical physics rules here. Quantum gravity becomes prominent.

BH emits gamma Ray's of very long wavelength like $1/4$ th the holes mass. It emits Neutrino. It emits Graviton. But how does a black hole emits electromagnetic radiation and gravitational radiation? This is because both the 1st & 2nd laws of thermodynamics are proportional to black hole. The entropy is proportional to the horizon which is proportional to its mass. The temperature is proportional to gravitation which is inverse the mass. That means more the radiation, less the mass. Black hole shrinks by radiating particles. A black holes entropy is given by $(1/4 \text{Log}(e)10) * \text{Surface Area} / \text{Gh}/c^3$ where $\text{Gh}/c^3 \rightarrow 2.6 * 10^{-66}$ Square Centimeter. And all this equal to $\text{Log } 10^{79}$ (If the BH is of 10 solar masses or 11000 Square Kilometers) This is indeed a huge number. How can a BH irrespective of empty contains so much entropy..... The answer is we determine the black hole by its spin, charge and mass. The event horizon spins and this spins accelerates the vacuum surrounded to it. The Gravitational & Electromagnetic Vacuum fluctuations are accelerated by the spinning horizon. This in turn gives them rotational energy. The vacuum is always chaotic due to maintaining a zero energy balance.... sometimes some virtual particles absorbs energy and makes a negative energy gradient which in turn is compensated by a highly positive energized particles. If this particles are energized then they will be real particles and this real particles will be either a PAIR or an ANTI-PAIR. if any such Pair or Antipair got ejected outwards as a real particle due to positive energy then it is the radiation. The counterpart of the Pair is absorbed inside the Black hole by Strong Tidal forces. But remember, a virtual particle is different on the frame of reference. An accelerated observer with an orbital period near the spinning black hole will see the real particles (obviously misunderstood by him as its formed of vacuum fluctuations) but on the other hand the infalling observers will see the vacuum functions as virtual particles one inside, other part outside. As they are separated they can't compensate each others energy and hence cant annihilate to zero energy. Therefore, they are vacuum fluctuations of real particles triggered by the tidal effect of BH horizon and some fall back into black hole while others radiate. BH radiate and shrinks.... however the smaller the BH is, the greater the amount of radiation. The radiation gives a negative push to the horizon which lowers its spin a bit. The spin ultimately shrunken as the BH evaporate and then it becomes a non spinning BH. Black hole is governed by classical physics but virtual particles are quantum physics.

THE MARRIAGE OF GENERAL RELATIVITY & QUANTUM MECHANICS occurs at the Black hole singularity.

This region of blackhole forms between event horizon and static limit called Ergosphere. The most important relativistic effect in this region is Lens-Thirring effect where a non-uniformly distribution of mass rotates at a high speed to bend the time like light cones. There is a rate at which it rotates called Eddington rate where the gravitational effect is same or exactly proportional to the outward radian, the maximum the photon sphere can radiates called Eddington luminosity. A event horizon is a hollow sphere with a stretched horizon as the firewall of the information loss paradox by virtually charged particles. Black hole has two types of photon sphere the

prograde spinning in accordance with black hole rotation and retrograde spinning opposite to black hole rotation. There arises a point of MRI in magnetogravitics and magnetohydrodynamics called Magnetorotational instability which makes an accelerating magnetic field when the plasma rotates near to the spinning black hole. This includes two types of radiation....

Synchrotron Radiation which is the radiation of accelerated plasma field revolving in black hole accretion.

Compton radiation or inverse Compton scattering where the electrons get ripped out of atoms due to high centrifugal force and then they recoil their energy to surrounding photon making them highly energized for scattering outwards.

Also, these are accompanied by Gamma Ray's and X-rays being projected outwards via jets.

Black holes are not so black after all. They radiate and glow but that's not Hawking Radiation. Hawking radiation will happen only when universe gets more colder than black hole enabling the warm black hole to radiate energy to the surrounding universe via Hawking radiation. Present temperature of universe is -270° and all masses are homogeneously distributed.

13. Frequency & Wavelength (\AA)

From the tiniest of the particle such as strings, resonates at a precise frequency. Their oscillation pattern produces the element which we see in everyday life. Each cycle per second of the frequency is measured in Hertz. The strings are electrically charged and hence they are under rotational amplitude of a frequency curve that determines their vibrational pattern. Quarks are formed from strings in six flavors, up, Down, Top, Charm, Bottom, Strange which amplifies in a particular Hertz though the gluons in between to develop the protons and neutrons. Again aside this there is a balancing charge called electrons which thereby is a frequency curve of probability existing in an electron cloud. The more probability the more frequency. The two atoms are bounded together by residual electromotive force where the proton of one atom is connected to the electron of one atom to form a molecule. The molecule in turn vibrates at a specific oscillation to bond with the other molecules thereby making up the periodic element. The electromotive Force is actually an EM wave whose simple structure is the Light emitting Photon that resonates at a particular wavelength or \AA Angstrom which is $1/100000000$ cm thereby making a length of an amplitude wave. This wave gets compressed in higher frequencies and stretched in lower frequencies. The higher frequency provides more energy like the UV rays, X Rays and that harms our health but on the other hand the beta wave which is also a high amplitude EM wave hampers our blood through radiation. This is the invisible spectrum. Now comes the visible spectrum or the low energy wavelength that corresponds to the light we see in this universe. But we humans also emit infrared radiation, even sun has the invisible spectrum of wavelength detected by hydrogen alpha filter but that's not all. The EM wave is similar to the sound wave in terms of Pitch or Loudness with sharpness. The higher pitch indicates moving the frequency level to the Blue shift of the spectrum with a high speed, on the other hand the lower pitch generates the frequency to a red shift with a higher wavelength and a slow speed. Our cosmos is full of frequency in the microwave spectrum. Frequency diminishes and its wavelength increases..... the sound of the Big Bang which has happened at about 13.7 billion years ago is moved towards the low energy spectrum which we can detect in our television set or radio set as a hissing sound when turned on. Even the fundamental spectrum of the current has direct frequencies that is DC & alternating frequencies that is AC which provides a cycle of waves crest & trough to produce the electricity. Even the gigantic cosmic objects have their frequencies.... black hole dynamics proved that there are Photon spheres of prograde & retrograde movement with altering frequencies. This is not all. Our universe has a set of combined superimposed frequencies arising from the number of objects accordingly the number of combined frequencies of the strings. Each universe has their own vibrating pattern and yes if a graph can be plotted connecting each point of vibrating zone with a line then we will get a trace about how the universe oscillates in the multiverse void. The quantum physics already proved the existence of numerous quantum wormholes connecting different universes and thereby each universe can only be connected to the other universe through a set of matching frequency. But the frequency is dependent on vibration, so, the oscillating pattern varies and when a mismatch of resonance occurs between two universes the wormhole gets collapsed. There are numerous microscopic wormholes in our universe scattered throughout make fun a thousand portals to the dusting parts inside and even outside the universe but the duration of the wormhole to remain open depends on the resonance of the frequencies. By wavelength we mean only sinusoidal waves but that's not all.... there are over a million varieties of waves and this varieties of random occurrence produces a specific pattern, a pattern in the chaos to depict the Hertz and duty cycle of the Modulated signals like Square wave, Triangle wave & sawtooth wave.

14. Investigating The Possible shapes Of The Universe

Our universe is definitely not a square or a triangle. The circle being an universal shape dominates our universe in the form of multiple coordinates or higher dimensions. Nobody knows for sure what exactly is the shape of the universe. I did some little research a few months ago and came into a conclusion which is rather imperfect but still holds true in many aspects. Our universe is a GLOME. A higher dimensional form of Sphere where there are 4 Spatial coordinates along with additional time coordinates which is independent

and orthogonal to the spatial coordinates. Excluding time.. if A 3D Sphere can be projected via stereo graphic projection into a 2D Screen we will see a mere flattened circle or an ellipse. Similarly the GLOME or 3-Sphere which is 4D if projected on a 3D Background then this will turn to an ellipsoid. A ellipse with volume. This is rather unphysical..... how can there be only one ellipsoid when there are numerous ellipsoid stacked themselves in all the X,Y,Z,U (t) Coordinates from every possible directions with parallels, meridians and hyper meridians that actually stacks up a hypersphere. It is no doubt that our universe is higher dimensional and what we perceive is just a lower dimensional blob. A 3D Cross section of a 4D universe. I thought about this for a moment and came to a beautiful conclusion. Our universe is actually a closed curve. Every lines from the starting point will eventually curved back and end in the own point where it starts. Our universe If is a closed curve with a stack of ellipsoid in it then this can be possible that the homogenous universe we see is actually an illusion. There are several gaps between each ellipsoid projected on any one of the 4 axis X,Y,Z,U. The Projection is stereographic or point to point projection and denotes that holographic Principle holds true for such projection. I can not say on the basis of my thinking that GLOME is totally an hologram. Rather I would say that universe has no surface just like the sphere has no length. The universe If is surfaceless then there must be a huge gap between the two consecutive ellipsoid and this denotes the dark energy or the expansion of the universe. A sphere which is 3D normally is not visualisable at its centre. But to drop a dimension and then try to visualise the centre of a circle is easy. In the same way the universe being a GLOME or a Hypersphere when projected via stereographic point to point projection then it generally shows that the centre of the universe is visible. As I have said that universe is homogeneous and isotopic, the centre of the universe is everywhere. From every location, it seems that you are at the centre of the universe. Although universe is finite but relativistically universe is infinite due to its accelerated expansion. The bridging point between the ellipsoid or where two ellipsoid meets in the GLOME can act as a patch of high dark matter disk. When the sun revolves around the black hole at the centre of the galaxy it wiggles up and down due to the gravity of the dark matter which is tremendously heavy in this regions. The baryonic matter is less compared to the non baryonic matter and this leads to the increased or fluctuating gravity which triggers the comets from the Oort Cloud which have an impact on the mass extinctions. Scientists showed that the dark matter disk or the patches of dark matter along the path of solar revolution (Approx 250 million years) can be the potential cause for the wiping out of the dinosaurs due to meteor shower. However, I try to link this theory with the help of the hyperspherical coordinates of the GLOME. The GLOME has a volume and one possible fact is that everybody is trapped outside the GLOME. The Hypersphere has both the properties of a topologically curved spaces as well as the 4th Dimension. The 5th dimension might be time. The extra 6,7,8,9,10,11 are the extra Spatial curled up hidden dimensions. If we consider our universe as a Dp(5)-Brane then our universe is floating in the bulk of 11D. Colliding universes may exist and this can alter the shape of the coordinates. Generally a Hypersphere having no surface area has a positive curvature. But with the special alignment of the other 4 axis... the Hypersphere can be squeezed down into a flat disk and we humans are the 1D objects then relatively compared with the flat 2D disk of the Hypersphere but this actually never happens. Our universe can also have a chaotic shape like an ameba. Or two ameba joined together with a tiny tissue. In that case we can not rule out the effect of Hypersphere. We have to think of this universe as a truncation point between the D-7 Branes where all the matter curve exists and their junction may give rise to a U(1) Abelian Gauge Bosons. But that D-7 Brane or the 7D is a part of a higher dimensional calabi-Yau 4-Fold which is too infinitesimal to notice. We can say for sure that our universe is not an hypercube or a Tesseract. But we can say that our universe might be a Hypersphere where the extra dimensions are hidden from us and what we see is their projection on the 3D-Dp-Branes. Our universe is floating like a bubble... which when I thought...an idea came to my mind. What if the coordinates of the universe is also changing with the floating speed. That means our universe squeezes from its normal value but that doesn't happens. The curvature can only be either positive or zero... it can't get negative. Negative curved universe is not our universe as because the coordinates will never align in such a way that the curvature goes below zero. This is mathematically impossible. Therefore, as it's hard to find the proper shape of the universe, it is also hard to determine what probabilistic shape the universe holds that's unknown to us. Holographic Principle is a very nice idea. Moreover the Conformal mapping of the stereographic projection is angle preserved and the CFT/AdS correspondence holds true for the geometry of the universe.

15. Chaos & Unpredictability

Our universe is dynamical. It is changing. The shapes and formations are evolving with respect to time. Take time as a function and you will notice a new pattern emerges after each periodicity. To Plot the time graph Oscilloscope can be the best but to plot the Graph on the account of every hindrance, every stochastic affects that might probe into the system and distracts it from being a final provided output, you will be surprised. Nature is so nonlinear. So much very dynamic that the approximation of the future or "What will happen Next?" will evidently influenced by the Present but to a very small degree of accuracy even if we had all the information needed to carry out a perfect approximated future events. There is always be some discrepancy in the outputs. There is always something unpredictable... Future can't be deterministic in its own norms. There will always be a new orbit every time even if the 'NEW' is a small deviation from the "OLD". But when all the "OLD" factors are taken into account to present a final scenario, the deviations in each step will add up more and more and the successive steps will be far more CHAOTIC than the "OLD". But there must be some crucial points that determines the system, those critical links should be observed and modified by our present day experiments. Like, for example, a boy is running behind a moving ball. Can we predict when will the ball come to stop, yes, in using some classical mechanics, taking into account the frictions of the ball with the ground, the gravity, the air resistance, all will eventually build up in the equations of motions of that ball and we can't say for sure that when the ball will stop. Now, imagine the boy running behind the

ball, will we trace the trajectory of the boy in a phase space? We can but it depends on the position and velocity of the ball. The ball if influenced by a high jolt of wind might change its course of action or trajectory and the critical point of the “Ball & the Boy” will be hampered which leads to the notion that “If this same action can be Performed from the starting Point, like the Time reversal Phenomena in which again the boy starts to run behind a ball, we will get an orbit” But will that orbit or Trace be the same as the “OLD BOY & BALL”. Nature itself is dynamical and therefore if all the Stochastic influences are taken into account then we will find that, the answer diverges from the Predicted value. Because in each Periodic orbits where “the boy is assumed to run behind the ball every time” there are a Large source of external influences that are beyond the prediction. That’s APERIODIC & UNPREDICTABLE. But if a smooth curve can be traced in the PHASE SPACE we will get some regions where there is an ATTRACTOR which occupies the more condensed Part of the Periodicity which are Probe to less fluctuations in every successive orbit. There is disorder in every aspect but it is the disorder that makes up beautiful and successive patterns within the Universe. This Patterns are the ORDERS IN CHAOS. Chaos is everywhere starting from the Growth of Population, from the Growth of money market, from the weather Predictions, from the epidemics that could eat away humans. Everything is unpredictable but if there are two notions or stages say X & Y. and we want to Predict Y in respect of X, we have to map each and every approximated conditions that may come between X & Y in the Successive intervals of Time. Like We Can Trace the dots as each successive events which is linked to the other dots that might linked to the final answer Y. We want FEEDBACK-LOOPS from each & Every Possible Dots. And then what we can predict is the Approximated Future. The Mapping can be shown as $X - - - - - (.) \dots \dots (.) \dots \dots (.) - - - - - Y$. These 3 dots are the approximate part of the distinguishable events. But one thing we must have to keep in mind and that is the BUTTERFLY EFFECT.... THE SENSITIVE DEPENDENCE ON INITIAL CONDITIONS. A system can be non-linear and dynamical but there must be some Initial Conditions upon which the Factors of Predictability of CHAOS are Sensitive. We can’t approximate anything while rounded up to a Specific value. We have to initiate from the NON-APPROXIMATED Results that might hamper the final conditions. A SET contains a Patterns and that Patterns is the MANDELBROT SET. When we zoom in to the set we will see the similar pattern repeating each time in the inner-self of the magnified set. That’s the FRACTALS and it’s the FRACTALS which Preserves the Orders within a disordered System which should be Non-Linear and Dynamical. CHAOS not only Predicts the Shapes, Patterns, future of the Events, it Predicts several astronomical phenomena’s. But that Prediction if is Non-Local then it can hamper the total predictions. Like, we can say that Mercury will come close to earth during 2157(Just assuming). A small change in the Sun’s revolution due to a devastated Earthquake in its core will not hamper the Meeting of the Two Planets by coming close but if such little disturbances occurs each and every year then when we will reach 2157, a large number of errors will exponentially build up deviating the final meeting of the Earth & the Mercury. A CHAOTIC System has CHAOS, A DISORDERELY system has Disorder but there is some ORDER in both the CHAOS and DISORDER. And if we succeed in making the CHAOS DYNAMICS “” SENSITIVE TO INITIAL CONDITIONS”” then we can Presumably determine the overall goal. But still it’s difficult to Predict. We can Predict with certain degrees of accuracy for a certain period of time beyond which our Prediction seems useless and we can’t Predict Properly as the initial errors will exponentially rise in the longer Periods. The differential equations of CHAOS are extremely helpful but still there are some degrees of uncertainty in every CHAOTIC Prediction.

16. Cat’s Schrodinger

Schrodinger’s Cat or Cat’s Schrodinger are the same thing. In one way, the Schrodinger closed his Cat in a BOX & in the other way the Cat closed Schrodinger in the box. Both are the same principles of quantum mechanics if the BOX is not opened. Perhaps some of you might have thought that why not put a camera inside the BOX and let it record the Cats Position: ALIVE or DEAD. But in order to see the picture you have to open the BOX and take out the camera but the BOX can’t be opened. The Cat is in a superposition of being LIVING and DEAD at a same time. either the Cat is Deadly LIVING or the Cat is Livelyly DEAD. Anyway. Either the Schrodinger is Deadly ALIVE or the Schrodinger is Livelyly DEAD. The Cat has a perfect Eigen function, the two properties of which can’t neither be determined or the two properties stay side by side. Anyway or reverse way it works the same. If the Cat is stimulated with the COPENHAGEN INTERPRETATION, then there exist two worlds for the Cat... one in which the Cat is LIVING & the other in which the Cat is DEAD. Imagine with you... the two states exist side by side... One you are reading this post & the other you are sleeping peacefully. Or in one world Hitler Wins WORLD WAR II or in another world HITLER loses WORLD WAR II. But the Cat or the Schrodinger... whoever locked whoever is the Macroscopic version of the Microscopic quantum reality. It bridges between the wavelength of an electron to that of a wavelength of a Cat or Schrodinger. It is the basic. The wave function works perfectly smoothly until you observe it but when you open the BOX to see what is the condition of the Cat inside it, the wave function of the Cat got immediately collapsed into two possible states, One, in which it is LIVING, Other, in which it is DEAD. But what is the actual realm? Is it actually LIVING or actually DEAD? Well, according to COPENHAGEN INTERPRETATION this can’t be said. Neither can be said if the Cat packed Schrodinger inside the box. Everything is a Possibility. Everything is a Probability. You can’t differentiate between two worlds at a particular instant of Time, either you got it wrong or you got it collapsed. Some uncanny always happens at the quantum Realm. That’s the PROBABILITY FUNCTION or The Heisenberg’s Uncertainty Principle. Every person has its wavelength inside Earth as well as in Andromeda Galaxy. But the person can be found in the region where the wavelength is more. The same thing happens with Dirac’s electron. The position & Velocity can’t be determined instantaneously, either you got the wavelength or you got the velocity. And the wavelength spreads from your room to the outside of earth. And if you try to watch the position or Velocity of the Electron then its momentum will increase so much that it will ultimately became a Miniature Black hole.

So, the Cat or Schrodinger, whoever is locked is only a thought experiment or theoretical observation. It is a superposed state of a specific quantum function whose probability becomes $\frac{1}{2}$ when observing. It is a process of CLONING. LIVING & DEAD Both at the Same Time.

17. Isoperimetric Inequality

In Geometric Topology the oldest problem can be traced back to 200 BC. The problem is known as ISOPERIMETRIC INEQUALITY. The Problem is based on the assumptions that.... Given a simple closed curve, A circle will always have a larger area inside it than any other shapes. This is a 2 Dimensional problem, however this can be generalized in N Dimensions in Topology. The Solution is based on $2ab \leq a^2 + b^2$ { Where a^2+b^2 represents a circle of length L & the Length which goes from 0 to L having a Perimeter P always greater than any curves that is $2ab$ } The history of the origin goes like this.... Once upon a Time there lived a Queen named Dido. She migrated to Africa and asks the local landlord to give her land for setting up a new palace. The local landlord gave her a Bull and said... "Kill the Bull and enclose the space with its skin. The amount of space you can enclose with its skin is your land".... So, Dido did a clever thing.... She cuts the skin of the Bull to pieces and enclosed a region of circle. She didnt enclose any other shapes thinking that the circle will enclose more areas within it. And this turned out to be true. So, she assumed the answer of the ISOPERIMETRIC PROBLEM. However, the real mathematical solution came in 1840 AD. ISOPERIMETRIC INEQUALITY = ISOMETRY+ PERIMETER INEQUALITY. Here Isometry means invariance in rotation, translation and reflection symmetry.

More works of the authors and his collaborators can be found at –

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