

MANTHAN

(Sanskrit Meaning – The Churning; Pron. 'Th'- as in Thor)

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MANTHAN

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PREFACE

GENESIS OF AN ALTERNATE MODEL

Curiosity is integral to study of any subject. Curiosity pricks our conscience and guides us towards truth. In this process finding answers is easy, while asking the right questions is the hard part. Ask the right questions and truth will seek you. One such question was....

- How does Gravity get the top job of running the universe despite being a weak force?

Scrape the surface and you will have few more jewels.

- Gravity is a weak force, yet is cause of star's plasma, planet's molten core. HOW?
- What is Gravity? Does gravity exist at all?
- How are Energy, Space, Time, Matter, Life, Infinity related?
- How do two planets communicate with third planet?
- Why do Photons/ Atoms/ electrons behave spookily in Two-Slit Experiment?
- Could there be a theory that unites both Classical physics and Quantum physics?
- How does light Travel? Straight line, Wave or expanding spherical bubble?

Present explanations forwarded by classical model of universe are seen falling short. At best, classical model relies on unknown to explain the unexplainable. Such as Dark Matter, Dark Energy and god particle. At worst, classical model simply brushes away some unknowns as philosophical and hence non-scientific. Such as Infinity, Nothingness, Soul, Existence. At times classical model has comically suggested that Photon behaves spookily in Two-Slit experiment.

To begin with, intention was to find answers to the vagaries of the universe, paradoxes that scientific community was grappling with. However, as we progress it will become clear that classical model needs some serious tweaking. Intention was not to present an alternate model of the universe. But how can you keep doing the same thing and expect a different result?

We now had two basic areas to address. 1) How masses behave & 2) How stars form

- 1) **How masses behave?** There is no denying the fact that a force exists between two masses. But why should it be one of attraction? Why can't it be push force instead of pull force? Gravity being a pull force lays the entire responsibility of cause on mass itself. Whereas Push force will relieve the masses from this burden. So, which is that external force acting on the mass? There is nothing but the two masses, except the space. Exactly!! Why cannot this force be the push force of space. Let us say 'SPACITY'.
- 2) **How stars form?** If gravity being a weak force cannot be the reason for galaxy, star or planet formation, neither can SPACITY. being equal in magnitude both are equally weak. Such a formation needs a violent force. How can 'hot' and 'static' nebular gases be the cause for a violent force? But isn't being ionised a sufficient condition to create a violent force? Just like in the case of lightning. An ideal candidate to replace gravity.

In this journey, equally interesting was the yield of unexpected. Such as Galaxy formation, spiral arms, Bars, Ansaes, Light travel, Dark Energy, Soul, infinity, nothingness, Galactic Cycle, etc. Just the way it was during mythological SAMUDRA MANTHAN. Where good and evil forces encountered unexpected yields during their search for elixir of life.

Two decades ago, I created a folder to store my thoughts related to universe. Little did I know the folder name MANTHAN, would turn out so prophetic.

MANTHAN in Sanskrit means "The Churning". HAPPY READING...

PRESENT

CLASSICAL MODEL OF UNIVERSE

FOUR FORCES

Primarily there are four forces that govern the universe. Electro-magnetic Force, Strong Nuclear Force, Weak Nuclear Force and Gravitational Force. Of these, gravitational force is the weakest force.

CYCLE OF UNIVERSE

The universe originated from an extremely hot infinitesimally small point. The space expanded at a speed faster than the speed of light itself, thus forming a horizon for the visible universe. Universe eventually may either wither away or fall back into a crunch with gravity winning over the expansion forces.

MATTER & LIFE

God particle is portrayed to be the most basic building block of matter. Lighter molecules like Hydrogen were formed at the beginning of universe. Heavier and complex matters were formed during the formation of star. Stars form and die in various forms and many a time, the reason to seed future stars. Classical model does not recognise soul as a basis for existence of life. Life can manifest in extreme conditions.

DARK ENERGY

The universe has been expanding as evidenced in red shifting of every galaxy observed in the sky. The underlying force that is causing the universe to expand is attributed to Dark Energy. An energy that cannot be seen, felt or measured. Hence Dark.

GRAVITY

Gravity is the glue that holds the universe. Gravity is the force between two masses, governed by Newton's equation. Gravity is the reason how nebular gases coalesced to form galaxies, star systems, planets, and moon. Space and Time are interlinked and form a fabric that gives birth to gravity.

DARK MATTER

Stars in the periphery of galaxy should have travelled slower as gravity weakens due to increased distance from center of the galaxy. Evidence to the contrary is attributed to Dark Matter. Thus, Galaxy be is made to behave almost like a solid disc. So, there should be more matter that holds the galaxy together. A matter that cannot be seen, felt or measured. Hence Dark.

QUANTUM PHYSICS

Gravity is too weak to manifest itself at the quantum level. Subatomic mechanics are governed by Quantum science. Classical model is still struggling to come up with a common unifying theory that can reconcile gravity and quantum mechanics

LIGHT TRAVEL

Jury is still out on whether Light travels in a straight line or as a wave or a combination of both. Photon's behaviour in Two-Slit Experiment is still in realms of spookiness.

ZERO & INFINITY

Classical Model treats Nothingness and Infinity more as philosophy than science.

REVIEW

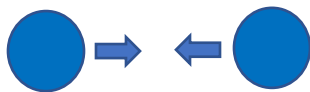
SPACITY, NOT GRAVITY

ROOT CAUSE

Many anomalies in classical model find their root in the concept of Gravity. It warrants reconsideration as it assumes pole position in the classical model. There is no denying that a force does exist between two masses. The evidence to support this force is overwhelming. Apples falling, moon orbiting, us walking on ground etc. But is Gravity the cause?

PULL and PUSH

Let us study the play of forces. Whenever there is a force between two masses, we attribute it to attractive forces. And that is a PULL force. Could this force not be PUSH type?



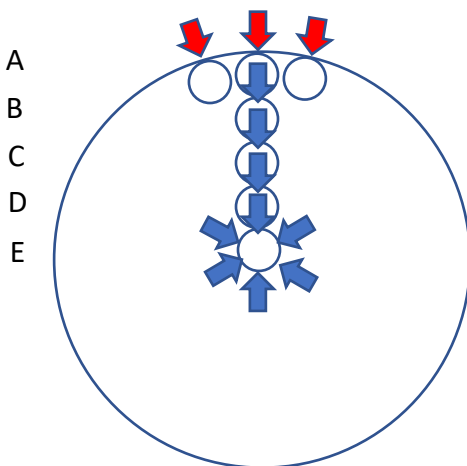
When it is 'PULL' type, the causal factor is attributed to the two masses. The force is then intrinsic to the mass. As long as the mass exists, the force exists.



If not PULL, what is PUSHING the masses together? Apart from the two masses, there is nothing but space. But there exactly lies the answer. SPACE. It is the SPACE which is pushing the masses together. Let us call it SPACITY. Please note that the force between the two masses is of the same magnitude as Gravity except in the opposite direction. The 'why' is addressed later.

DOES GRAVITY EXIST?

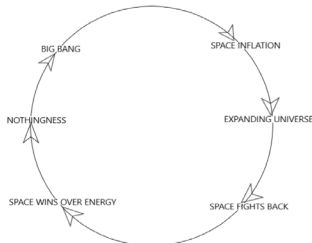
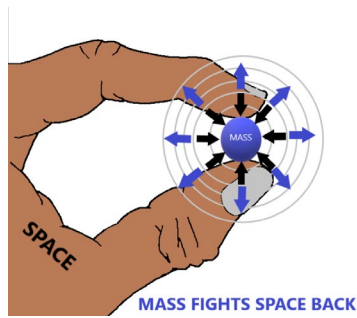
To understand if Gravity exists, let us conduct a hypothetical experiment. Let us have a blob of water, excessively big. As big as earth itself. Let us Position it such that the blob remains in liquid state and achieves perfect spherical shape and has no atmosphere.



Now drop pebbles from many places. All pebbles sink towards the center and on reaching center they settle there. This shows that there is a force that is acting towards the center. But how does each molecule of the blob/pebble know where center is?

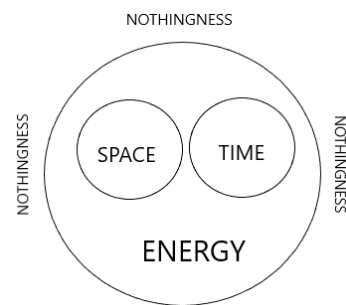
let us go to molecular level to investigate. There are trillions of stacks positioned radially, each stack made up of trillions of water molecules, neatly stacked one above the other. For the sake of argument let there be only 5 molecules. A, B, C, D & E. Each molecule is pushed down by the molecule above it. So, B, C, D & E know which way to push. But what makes molecule A push down? There is nothing above it that would push it. Nothing except space. Well, there lies the answer. Spacity, the space force is initiating all molecules to push towards the center. Causal factor is Spacity and not gravity. Thus, GRAVITY does not exist.

REVIEW



MANTHAN CYCLE

REVIEW



SPACITY, WHY

Why should Spacity try bringing masses together? In fact, bringing the matter together is only an after effect. We can observe that Space is the most dangerous place for any life form. Not just life form but any energy form. Every form meets its end in Space. Space's intent is to annihilate all form of Energy. In a way, mass is in a perpetual struggle with space for existence. It is only natural that bringing the masses together is a precursor to this act of annihilation. But mass does not take it lying down. For every action there is an equal and opposite reaction. When space exerts pressure on mass, it fights back and resists space force. Mass is thus generating a continuous wave of energy.

Once space wins over energy, nothingness follows. Nothingness denotes the area outside the Venn diagram. When Space wins the contest with energy, space itself cease to exist as it needs energy to exist.

SPACITY MODEL

Energy, Time and Space are the basic recipe of all the elements of the universe. Energy is the first among equals. Energy is where it all started. Following Energy, Time and Space came into existence simultaneously.

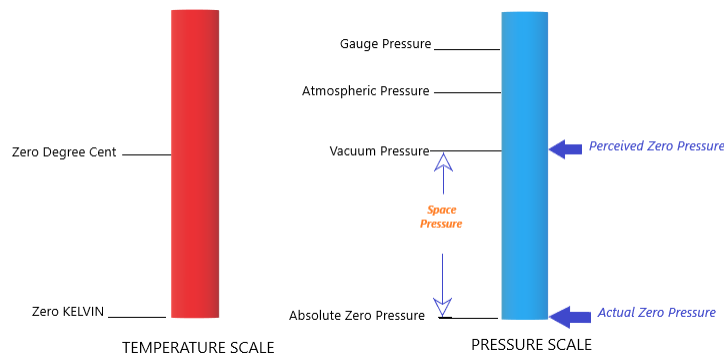
Time and Space need Energy to exist. Space has a construct of its own and needs energy to hold the universe.

Time does slowdown in presence of mass. Denser the mass, slower the time travels. This means it takes energy to slow down time. So, you need energy to keep time ticking.

REVIEW

SPACITY & ABSOLUTE ZERO PRESSURE

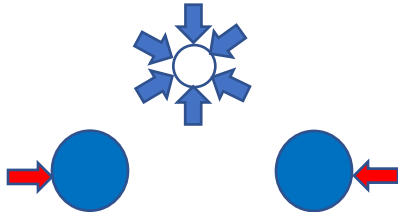
Pressure is measured in terms of Atm Pressure. **Absolute Pressure. = Gauge Pr. + Atm Pr.** We attribute Absolute zero pressure to vacuum. But vacuum does not mean absence of pressure. Space is still exerting pressure. Just the way KELVIN scale provides the absolute zero temperature as 273 K below the Zero Deg C, a pressure scale also needs to be developed where the Absolute Zero Pressure is indicated. Once we know the absolute zero pressure, we can safely say that space is at X PSI above the absolute zero pressure. The space as we know is not the Absolute Zero Pressure. **Absolute Pressure = Gauge Pr. + Atm Pr. + Space Pressure**



REVIEW

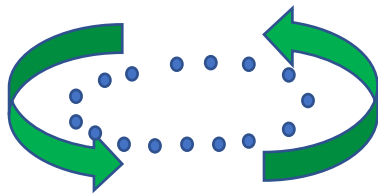
SPACITY COMPONENTS

As per Manthan, spacity acts on energy, matter, and life with the sole intention of annihilating it. In doing so, Spacity acts on more than one level. Principally three levels in fact.



'S1' is the force that acts on **ONE** unit of mass. Independent of anything, just stand-alone force. Like force acting on a molecule, on a pebble, on a planet, star, Galaxy etc.

'S2' is the force that acts between **TWO** masses. Like between two molecules, between two pebbles, between two planets, between two stars, between two galaxies etc. Intent of S2 is to bring the masses together so that it can be acted on as a single mas of unit. Summarily S2 tends towards S1 eventually.



'S3' is the force that acts on **THREE** or more masses or a system. collective group of masses. Like force acting on a group of molecules, group of asteroids, group of Kuiper belt objects, groups of stars orbiting in a galaxy etc.

Nature of S1

It is important to understand the nature of spacity in each case
S1 depends solely on mass that it is acting on. More the mass, more the spacity required to annihilate it. S1 does not depend on distance as it is acting on a mass that is unitary in nature.

Nature of S2

S2 the spacity acting between two masses is pretty much the same as gravity, except for its direction. The magnitude of S2 is the same as gravity. It is affected both by mass and distance separating them. S2 is inversely proportional to the square of the distance between the masses. Much like gravity.

Nature of S3

S3 depends solely on system of masses that it is acting on. More the mass, more the spacity required to annihilate it. S3 does not depend on distance, it only depends on the system of mass it is acting on. S3 follows the general direction of system movement and ensure that mass does not leave the system.

Application

Let us apply S1, S2, S3 in the case of speed of planets in a Solar system vis-à-vis and Speed of Stars in a Galaxy Visa-a-vis Blackhole to understand the nature.

Spacity	Acts on	How Does it affect the speed of	
		Planets in Solar System	Stars in Milky Way
S1	Single Unit of Mass	Does not affect	Does not affect
S2	Two units of Mass	Strong Force, effect Major	Weak Force, effect minor
S3	Cluster of Mass	Weak Force, effect minor	Strong Force, effect Major
Mass Ratio		Sun / Planets 1000: 1	Blackhole / Stars 1: 100,000

REVIEW

SPACITY COMPONENTS (Explanation)

Space inflation:

It is observed that the light from Galaxies is red shifted. This suggests that Galaxies are moving away from one another leading to expanding universe. It is also observed that despite expanding Universe, the size of the Solar System or Size of Galaxies remains constant. But an expanding Universe would stretch space uniformly. So, all the galactic bodies are held in place against the expanding Space. The force that holds the masses in place is what we refer as Spacity. This is proof enough for positive space pressure.

Play of Forces in Space:

We know as a matter of fact that if there is no external force on a mass in a system, it would separate itself from the system. In any rotating system, classical model proposes that there are centripetal forces and centrifugal forces in action. While Centripetal force is acting towards the center, centrifugal force is acting away from the center. The combination of these two forces keep the mass in its orbit.

This is assuming that there is a central influencer because of which the masses are in orbit. If this were true, the stars in Milky way would have flown away eons ago. None of the galaxies would have had stars. The mass ratio between SMBH at the center of the Milky way and stars in the Milky way is more than 1:100,000. SMBH is not capable of keeping a galactic mass that is 100,000 its own size in orbit. Centrifugal force of the stars would have overcome Centripetal force of SMBH many times over and cut themselves loose. But still the Milky way is in motion. What is holding the Galaxy in motion is Spacity. Adding Dark Matter to the galaxy will only hasten the process of stars fleeing galaxy.

This suggests that SMBH is inconsequential to Milky Way. You pluck it out and it would not amount to much. Except for nominal increase in orbital diameters. Similarly, when you pluck the sun off the solar system the planets do not shoot off tangentially, as suggested in classical model of universe. Apart from the Centripetal force and centrifugal force there is a space force that is holding the planets in orbit. The planets still orbit around the imaginary center, except that their orbits would be far bigger in absence of Sun.

So, there are 3 forces that help keep the moving celestial objects in orbit. S1 acting on one unit of Mass. S2 the space force when the masses are two. Third force S3 that acts on system of mass to keep them in orbit.

Direction of Space Force

Direction of Space Force is decided by the result of the force. It assumes the direction, which makes the masses come together thus increasing the chances of annihilation.

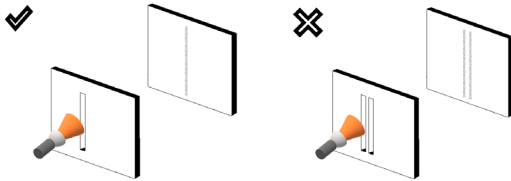
- S1 Direction of Space Force in case of a stationary mass is immaterial. But if the mass is in motion, space force will act against the direction of motion.
- S2 Direction of Space Force in case of two masses will be to bring them together. This acts like a centripetal force.
- S2 The direction of Space Force in a moving system of mass is unique. If it were to act against the motion, the masses would wither away. That is why the direction of space force follows the general direction of the system, as that is how it can keep the mass together so that it can act on it to annihilate.

APPLY

SPACITY EXPLAINS TWO-SLIT EXPERIMENT

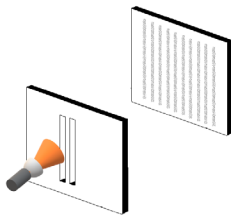
Classical Model of Universe is yet to come up with a cohesive explanation for photon's behaviour in Two-Slit Experiment. It still is termed as spooky. So, what is Two-Slit Experiment? and what are the various observations that seem spooky? Let us see. The experiment is all about sending a light beam through two slits and observing light's behaviour.

Not spooky



If light is streamed through a single slit, it expectedly lights up a single band on the plane of observation. This suggests that light travels in straight line. Accordingly, when there are 2 slits there should be 2 bands. Will there be? Let's see.

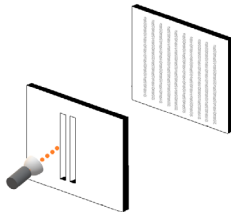
Spooky



Now what happens when light is made to pass through two slits? Assuming light travels in straight line, it should create two bands. WRONG. What you observe is an interference pattern. An alternate pattern of light and shadow. Just the way two water waves combine to form a pattern of crests and troughs.

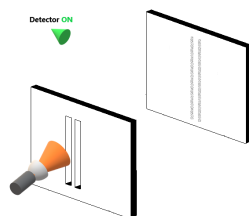
One slit – Light Travels as straight line.
Two Slits – Light travels as a wave.

Spookier



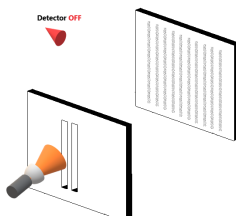
Still spookier is the behaviour of photons when they are sent one after the other instead of altogether in a stream. We would assume that pattern will be anything but Interference pattern. WRONG AGAIN. Once enough photons are sent through, each photon is found to follow the same interference pattern as when the photons were sent altogether as a light beam. As though the photons knew in advance how other photons would have behaved if they were sent as a light beam.

Spookiest



To understand the behaviour of the photon after it passes the two slits, a detector was placed. When this detector was switched on the assumption was that each Photon continues to create the interference pattern and we get to see how each photon behaves. WRONG AGAIN. The interference pattern is replaced by just two bands of light. As though light travels in straight line.

Comical



Now leave the detector set up as it is but switch it off. Now we have grown wiser in beating photon. We shall stop guessing! Who knows the photons may not like being predictive. So just observe! Now they have had their way with us, and we have stopped spying them, interference pattern is back again. Light is back to travelling as a wave.

This means light travels in a straight line when being observed but shifts to wave when not observed. Let us see if Hypothesis based on Spacity holds water in all the cases.

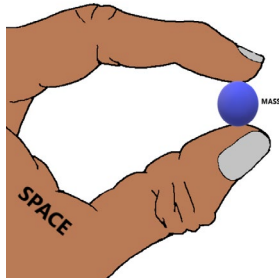
APPLY

SPACITY EXPLAINS TWO-SLIT EXPERIMENT Continued...

NOTE In each of the cases, our focus has been on photon's behaviour. We want to understand why the photon is behaving the way it is, after crossing the slits. As long as our focus is on photon itself, the behaviour will always look spookier.

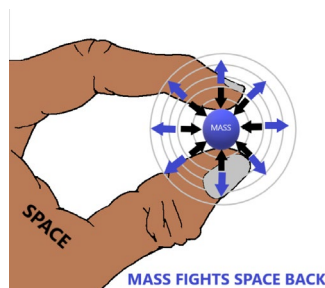
We need to come out of this fixation with Photon and see whether there is another factor that has already paved the path for the photon to follow. Photon after crossing the slits may just be following a pre decided path.

EXTERNAL FACTOR



But what could that external factor be? There is just one entity, Photon itself. What else is there other than Photon? There is nothing else other than Photon, except for the space that the photon is travelling in. Does Space have any effect on photon? An effect that is enough to create an external force that can make the photon dance to its tune. At least now we have two factors to begin with. Photon and Space. We need to find how does Space create an external factor that will force the photon to follow a pre decided path? Hypothesis Follows.

HYPOTHESIS

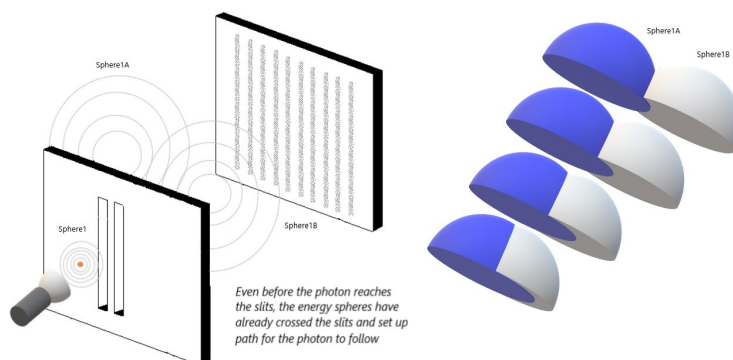


Concept of spacity suggests that mass is in a perpetual struggle with space for existence. So, Space is trying to drive photon into oblivion. For every action there is an equal and opposite reaction. When space exerts pressure on Photon, it fights back and resists space force. Photon is thus generating a continuous wave of energy. This means that the photon is always moving with a sphere of energy that is propagating outwards and ahead of it.

This energy sphere is unique to each photon. As though a unique signature. When two photons travel together their energy spheres do not interfere with each other.

APPLICATION OF HYPOTHESIS Conventional thought process is that action starts after the photon crosses the slit. This is the reason the behaviour appears spooky. Thanks to Spacity, action starts even before the photon reaches the slits. The sphere energy propagates ahead of the photon. It crosses the slits and creates two more identical energy spheres. These spheres create interference pattern and set up the path ahead for the photon to follow. Each photon chooses a path of least resistance. Let us apply this hypothesis to each of the cases.

Not Spooky, Spooky, Spookier, Spookiest & Comical



APPLY **SPACITY EXPLAINS TWO-SLIT EXPERIMENT** Continued...

Not Spooky **Light is sent as a stream of photon through single slit.** Each photon in this beam of light has an energy sphere radiating outwards. Since each energy sphere is unique to each photon, they do not interfere with each other, either before or after crossing the slit. The same situation continues when the photons pass through single slit. After crossing the slit they continue in straight line, as before the slits. Thus, light is seen travelling in a straight line.

Spooky **Light is sent as a stream of photon through two slits.** Since energy sphere of respective photon do not interfere with energy spheres of others, let us concentrate only on one photon. The energy sphere of photon reaches the slit before the photon does. When the energy sphere passes through two slits, they act like two identical spheres emanating from same photon. Since the signature is same, these two spheres interact with each other and create a pattern of interference. Along with that they also create a path of least resistance for the photon to follow. Each photon that makes up the light beam, has been laid up with a unique path to follow. This path follows the crests and troughs defined on the spherical shape of the energy sphere.

Spookier **Photons are sent one at a time.** This is one photon travelling with its energy sphere ahead of it. So, the energy sphere of the first photon passes through the two slits. After passing through the two slits this energy sphere splits into two energy spheres emanating from two identical sources. The two spheres can interfere with each other since both are identical twins. They create an interference path. When the photon reaches the slits and passes through one of them it has many paths to follow but within the band of crest and trough. It chooses a path of least resistance. It will fall on one of the possible spots within the interference band that would have been created when sent together. The process is repeated with the next photon. As can be seen the photons spread themselves along the vertical band. This is because the path is along the sphere's surface and hence covers the entire height of the sphere.

Spookiest **Detector is placed** to understand the behaviour of the photon after it passes the slits. In trying to detect the presence of an atom, the detector has to spread out a pattern of its own waves, so that when the photon crosses the slits it detects its presence. But before encountering the photon, the detector beams have to face off with waves of the energy sphere. Now you can see that the waves from the detector beam box-in the energy spheres. Since the detector receives the bounced off waves, the energy spheres are boxed in from both left and right sides. Thus, not allowing the interference pattern to take shape. The photon is now forced to choose limited paths corresponding to the slit widths and hence we see the light travelling in a straight line.

Comical **When the detector is switched off,** there are no waves from detector boxing in the energy spheres. Conditions revert to the one in either Spooky, Spookier condition and the same explanation holds good.

Thus, it is seen that Spacity Hypothesis explains the spooky behaviour fair and square. Not spooky after all!

APPLY

Status Quo

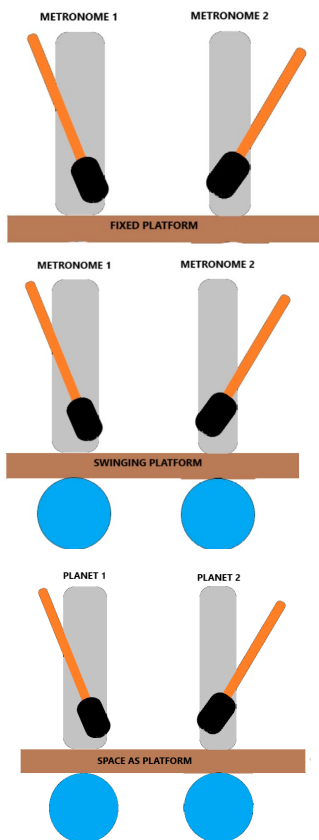
SPACITY EXPLAINS TWO-MASS PROBLEM

Newton's equation of gravity defines the force of attraction between two masses. The force is directly proportional to the two masses while inversely proportional to the square of the distance between them. This was fine if you were applying this to two mass system. Newton himself was perplexed as to how will the equation account for a third mass thrown in. Or many masses.

Explanation

Let us look at an experiment known as Grand Tack Experiment. It is often cited as an evidence to explain how planets of the solar system achieve synchronisation.

This experiment involves multiple metronomes mounted on a common platform. Each metronome can be set to unique frequency of its own. The behaviour of metronome is observed in two conditions. First when the platform on which they are mounted, is fixed. Second when the platform is free to swing.



Fixed Platform: When the metronomes are set to different frequencies, each keeps its oscillations till the friction brings the metronome to standstill position. They never sync.

Swinging Platform: When the platform is free to swing, the metronomes achieve perfect sync with each other soon.

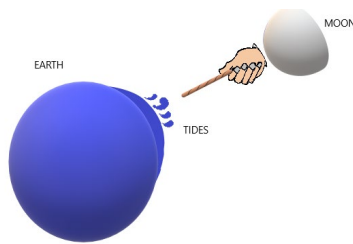
This experiment shows that when the platform has been allowed to swing, it facilitates the transfer of information from one metronome to the other. And this happens instantaneously. This is how planets of a solar system achieve synchronous orbits with each other. But what is perplexing is the Grand Tack Experiment had a platform that could transfer the information between each other and facilitate the balance. What about planets. Who is transferring this information across vast astronomical space?

Well the answer is space itself. SPACE is the platform on which/ in which the planets are mounted, and SPACE is the platform which instantaneously transfers the information among the planets.

In the same manner, in Newton's equation it is the space which is transferring the information to the third mass and affecting its motion. When you calculate the value of $F = m_1 * m_2 / d^2$ the force calculated is not force with the two masses in isolation. The Force F is a resultant force after having arrived in equilibrium with third mass. This third mass could be the universe itself.

So, the universe has already communicated to both the masses and the result measured is post communication. Every such measurement has in it, an in-built the universe's effect.

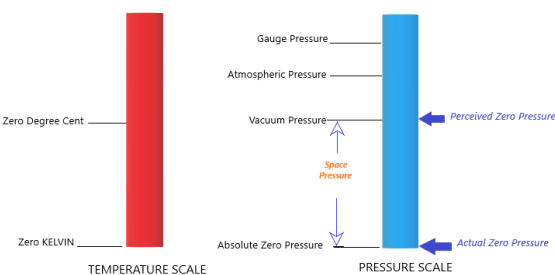
APPLY



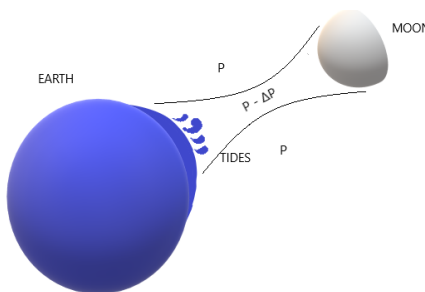
SPACITY EXPLAINS TIDES

We based our explanation of Spacity on the premise that it is 'PUSH' type of force rather than 'PULL' type of force of gravity. Then how does spacity explain the formation of high tides? These tides form right when moon passes over them and seem to be under the influence of moon's attractive force. If it were to be PUSH type of force, either these high tides would not have formed, or moon would have created a dent on the ocean along its path. Nothing like that is evidenced. Spacity does perfectly explain the high tides and we will see that gravity is not the reason.

Why does ocean water move up? Centrifugal force is ruled out because the effect would then be limited to equatorial area. At best perpendicular to the earth's axis but more importantly centrifugal force works even if moon is absent. So, the cause should be capable of moving up the ocean water and following the path of the moon. One possible reason could be pressure difference. But what kind? This is where spacity comes into picture.



Let us revisit the space pressure concept discussed earlier. **Absolute Pressure = Gauge Pr. + Atm Pr. + Space Pressure.** As enumerated in this equation Absolute Zero Pressure is not pressure in the space. Absolute Zero Pressure is the pressure when there is no space, no energy. In effect, Absolute zero pressure could only be achieved during phase of Nothingness. Space pressure is actually a positive pressure. Space spends energy to maintain this level of pressure all over universe. Space pressure is constant all over the universe except in presence of mass. In the presence of mass, Space is called on to do more work and hence naturally weakened. This is where the pressure drops by a fraction. Let us say if 'Ps' is universal space pressure, it is $(Ps - \Delta Ps)$ near a mass. Extent of drop is directly proportional to the size of the mass/ system of mass.



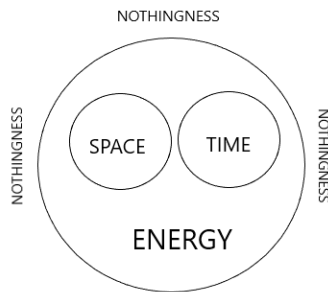
Now let us apply this drop of pressure to the Earth and Moon System. The spacity weakens a bit in keeping the moon in its orbit as it has to spend energy. When spacity weakens, there is a drop in space pressure. Thus, there is a constant tube of lower 'space pressure' between Earth and Moon. So, a chunk of ocean water is sucked into this tube which we call as High tides. As the moon moves, this tube moves along with it and so do the tides.

During full moon/ new moon the tides are highest because the drop in space pressure is also highest. Space has too much on its hands when Sun, Earth and Moon are in line.

In Classical Model, the attractive force of gravity is attributed to mass. Whereas, in Alternate Model it is Spacity that acts on Mass. Left to themselves mass is happy being themselves. But the space around them conspires to bring them together. PULL or PUSH is secondary.

APPLY

ENERGY, TIME, SPACE



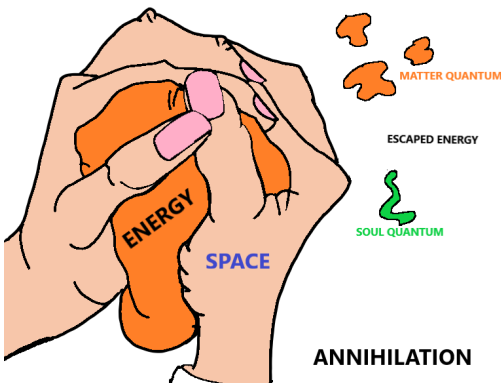
SPACITY EXPLAINS MATTER, LIFE, NOTHINGNESS & INFINITY

Of all the elements of the universe...Energy, Time and Space are the basic recipe. Energy is the first among equals. Energy is where it all started. Following Energy, Time and Space came into existence simultaneously. Time and Space need Energy to exist.

Space has a construct of its own and needs energy to hold the universe. Time does slowdown in presence of mass. Denser the mass, slower the time travels. This means it takes energy to slow down time. So, you need energy to keep time ticking.

There is an eternal struggle between Energy and Space to achieve superiority. Space's sole intent is to annihilate Energy. Once space wins over energy, nothingness follows. Nothingness denotes the area outside the Venn diagram. When Space wins the contest with energy, time and space itself cease to exist as they need energy to exist.

MATTER & LIFE



During the struggle between Space and Energy, some quanta of energy separates from motherlode of energy. Space again acts on two or many such escaped quanta creating Matter. Depending on the nature of the escaped quanta various building blocks are formed. Electron, Proton, Neutron, Quartz, Boson etc.

But not all escaped quanta end up being matter. The one that stays in its pure form lays the foundation of Life. Let us call it Soul Quantum. Life takes shape whenever, wherever this "soul quantum" combines with the building blocks of matter. Life does not wait for appropriate conditions of GOLDILOCK Zone Viz., temperature, sunlight, water, amino acids, etc. All it needs is Soul quantum and matter. Thus, extremophiles exist everywhere. Life continues till the substrate sustains the *Soul quantum*. When the substrate is incapacitated, *Soul quantum* leaves in search of another suitable substrate. Cycle of Life & Death.

INFINITY & ZERO

$$1 / \infty = 0$$

$$1 / 0 = \infty$$

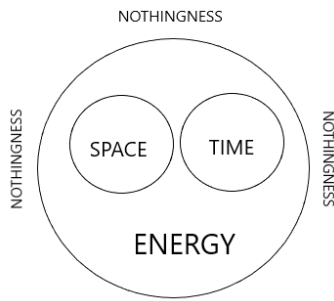
Venn diagram implies that Nothingness contains Infinity. Only zero has the capacity to contain Infinity. In our context Infinity denotes Space/ Energy/ Time, while Zero denotes Nothingness.

When space wins over the contest with energy, phase of nothingness begins. With end of energy neither space can exist nor Time, as both are dependent on Energy.

This is akin to space (INFINITY) driving existence (Energy, Time, Matter & Life) into nothingness (ZERO). So now ZERO (nothingness) is pregnant with INFINITY. Nothingness is holding Infinite energy in its womb. How long does this phase of Nothingness last? When will universe come to life again? In fact, instantaneously. Because time stopped existing. So, whenever INFINITY breaches NOTHINGNESS it will seem instantaneous.

APPLY

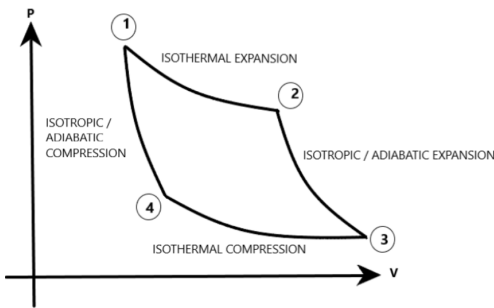
SPACITY EXPLAINS GALACTIC CARNOT CYCLE



The cyclical nature of Manthan model Universe implores us to seek the workings of the universe further. A universe that moves from Nothingness, Big Bang, Space Inflation, Expanding Universe, Space Winning over energy, Existence driven into Nothingness and Instantaneous escape of Energy from Nothingness and Big Bang again.

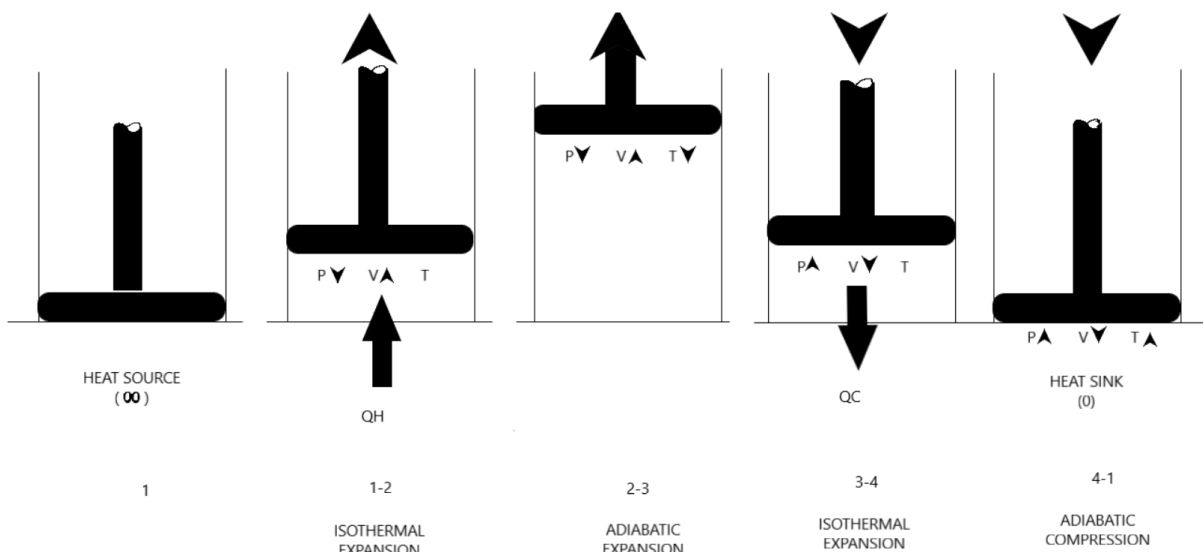
The uncanny resemblance of UNIVERSE to CARNOT CYCLE is striking. A cycle that defines the working of an Ideal Heat Engine in an ideal universe. What we will see through this section is that Manthan Model of UNIVERSE is an ideal CARNOT ENGINE.

Let us study the CARNOT CYCLE first. It deals with processes involved in a Heat Engine. The cycle helps us study the effect of heat on the medium. To extract maximum work output from a heat source one needs to increase the efficiency of the engine. Pressure, Volume and Temperature being the governing parameters, the PV Graph summarises the processes with included area of the graph indicating the work yield. The CARNOT CYCLE concludes that 100% efficiency is not possible in real life because the ideal conditions do not exist. Infinite Heat Source, Heat Sink, and Perfect insulation.



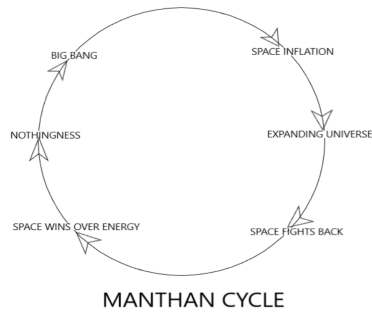
CARNOT CYCLE - IDEAL HEAT ENGINE

- 1-2 Isothermal Expansion where heat gets transferred from Infinitely hot Heat Source to the system. The Temperature remains same as the gas expands with pressure dropping.
- 2-3 Adiabatic Expansion where the hot gas expands owing to its latent heat. The gas keeps expanding with temperature and pressure dropping.
- 3-4 Isothermal Compression where the gas is compressed to higher pressure, but the temperature maintained same, as the heat is removed from the system.
- 4-1 Adiabatic Compression when the gas continues to be compressed but the temperature increasing since the heat has nowhere to go.



APPLY

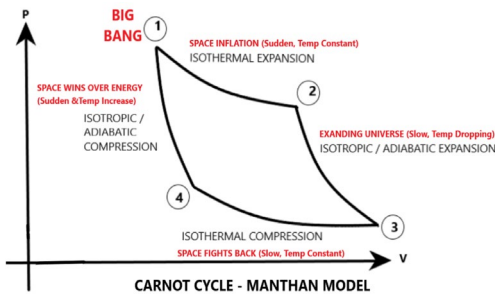
SPACITY EXPLAINS GALACTIC CARNOT CYCLE



Now Let us compare the notes on the two cycles. Manthan Model does hypothesise that pure energy escapes from state of NOTHINGNESS leading to BIG BANG. Nothingness is the only state which can hold the infinitely hot heat source that is Big Bang. This can be considered as the Point 1 on the CARNOT CYCLE. A point where Space and Time come into being.

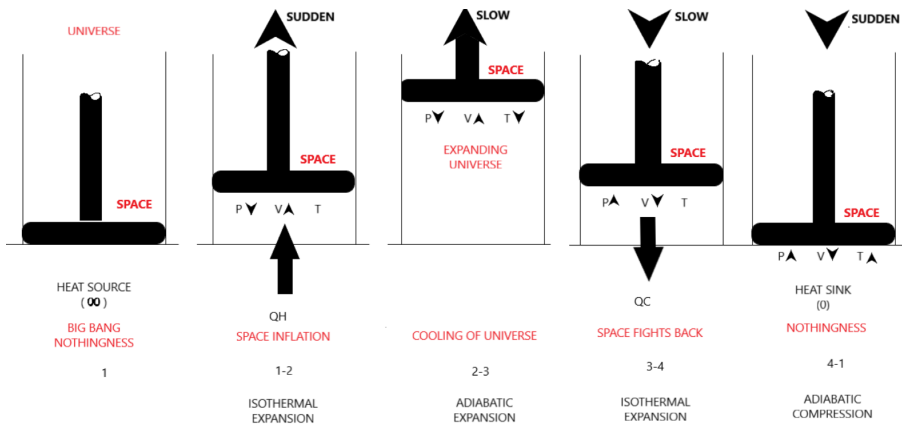
Thanks to the infinitely hot heat source, the gas expands exponentially in noticeably short time and the system pressure starts dropping. However, the system temperature stays constant because the system is still connected to the infinitely hot heat source. This is similar to Space Inflation where the space expands at a speed higher than speed of light. Space in the Universe acts like piston in CARNOT CYCLE. This process is 1-2

Once the heat source from BIG BANG is spent, the gas keeps expanding due to innate heat transferred during the previous process. This process is when the universe expands slowly and with the temperature dropping, the universe is cooling too. The drop in temperature is basically due to spending of latent heat. On CARNOT CYCLE this will indicate Process 2-3. This is the stage our Universe finds itself in currently.



At point 3, this is when the Space starts fighting back. Just like the inertia in a CARNOT CYCLE pushes the next process, the inherent annihilation nature of Space kicks in. The Space executes slow compression of the universe with temperature remaining constant. Since the motion is reversed, the system is now connected to the Heat Sink that is nothingness. This takes out any heat that may be generated due to compression and retains the temperature as constant. This is the process 3-4 on CARNOT CYCLE.

Once Space (Piston in CARNOT CYCLE) reaches the point 4, the space enters into exponential compression stage. In this stage pressure and temperature increase to infinity just the way they were at Point1 to begin with. Since the system is connected to NOTHINGNESS, the infinitely cold Heat Sink, Space ends up driving the energy into NOTHINGNESS. At the end of this stage, space also reduces itself to zero.



EFFICIENCY: Unlike CARNOT CYCLE, universe does have ideal conditions. Temperature of BIG BANG is infinitely hot heat source, Nothingness is Infinitely cold Heat Sink and the universe and Nothingness are well insulated. So, efficiency of UNIVERSE CYCLE is =

$$1 - T_2/T_1 = 1 - 0/\infty = 1 = 100\%$$

Nothing Lost. Perfect cycle. Just as it should be.

APPLY

SPACITY EXPLAINS GALACTIC CARNOT CYCLE

UNIVERSE can be treated as an ideal Heat Engine. This is borne out though application of CARNOT CYCLE to UNIVERSE as a model. But the graph needs some basic corrections.

1-2 At beginning of process 1-2, point 1 is where the BIG BANG occurs. Infinite pressure at Big Bang would indicate that the volume is zero or near zero. Thus, the Point 1 should lie on Y axis where Volume is Zero.

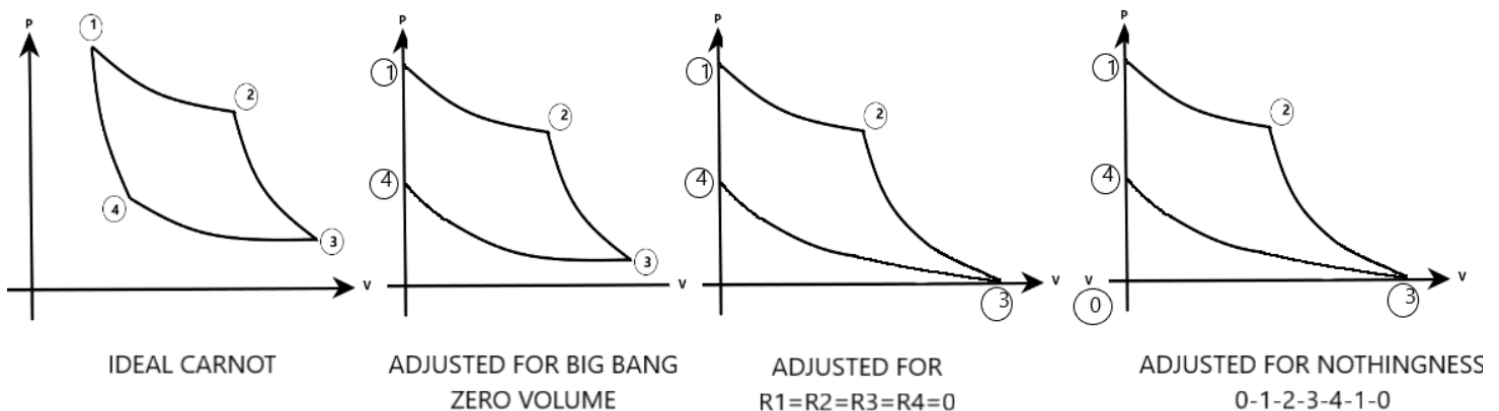
2-3 2 is a point where the pressure is positive, and the universe is naturally driven towards the lower pressure system of Nothingness. But how far does the universe cool down? Space starts to fight back when this expansion reaches it end. So, where does the point 3 lie? Does the point lie on X Axis or just near X axis? The $PV=RT$ nature of gas helps us. At any point on the cycle R should be the same. So, it does mean that point 3 lies on X axis where the temperature and pressure are zero. $R1=R2=R3=R4$

3-4 Why doesn't the universe just slip into NOTHINGNESS at point 3? This is because NOTHINGNESS resides at Point 0 and not at Point 3. At point 3 the Pressure and Temperature may be zero, but space is infinite. Thus, Space still cannot breach the walls of nothingness at this stage.

4-1 To breach NOTHINGNESS three conditions are sufficient to exist together. Zero Volume, Infinite Temperature, and Infinite pressure. At 4, the volume may be zero, but it is still not a sufficient condition. This is when Space wins over energy and moves to 1. Where the sufficient conditions are met to breach the walls of NOTHINGNESS. attains Zero Volume

1-0 Walls of NOTHINGNESS are breached and space drives UNIVERSE into nothingness.

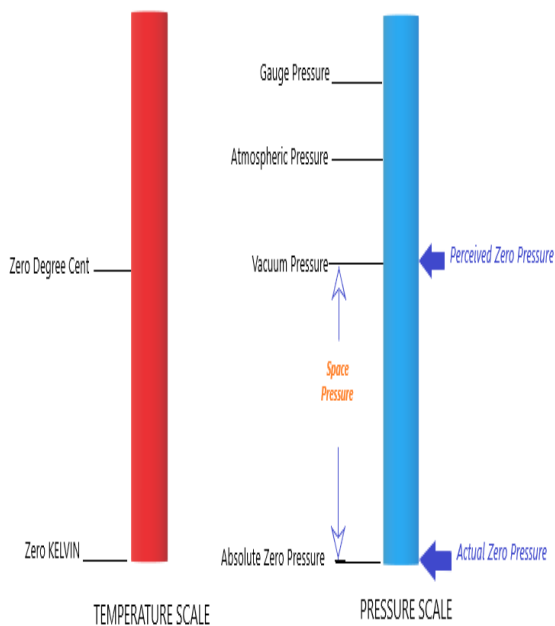
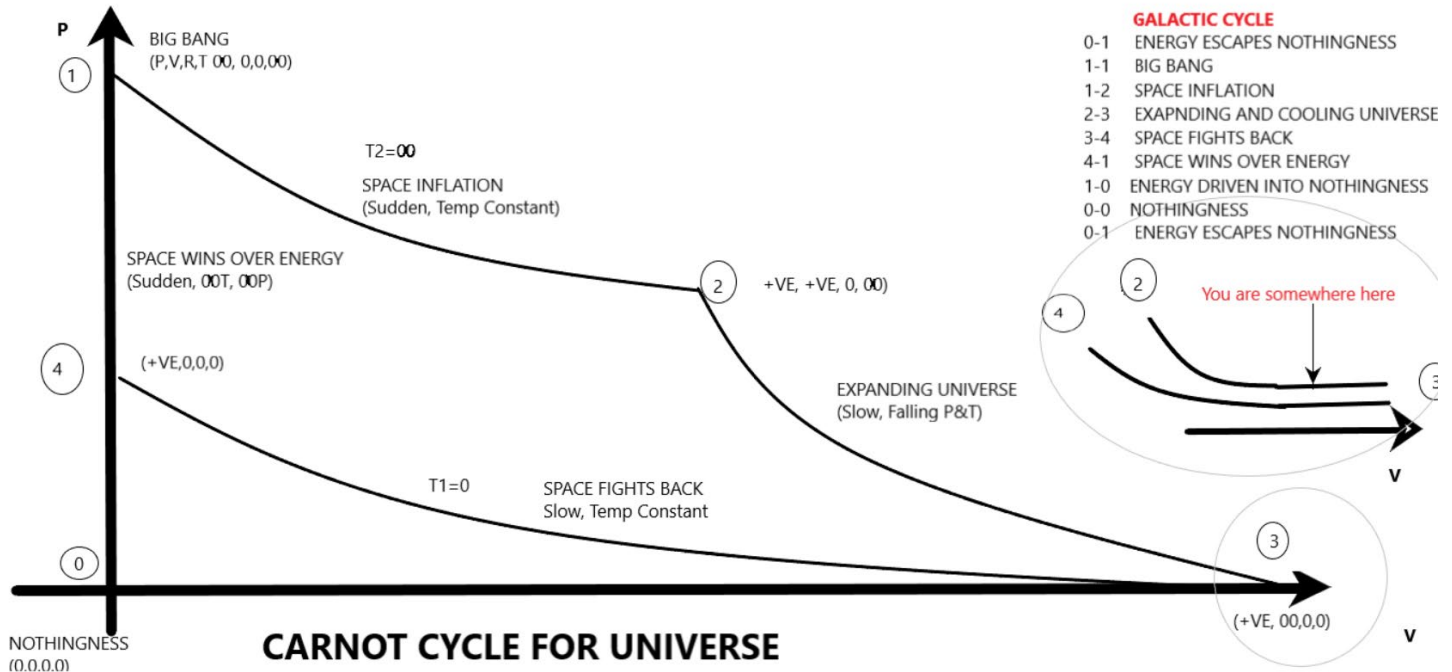
0-1 At NOTHINGNESS time also ceases to exist as it depends on energy. Since Time does not exist, whenever pure energy escapes NOTHINGNESS, it would be as though it was instantaneous. BIG BANG again at point 1.



APPLY

SPACITY EXPLAINS GALACTIC CARNOT CYCLE

Now that we have amended CARNOT CYLCE for UNIVERSE it is important to find out where does the space pressure lie. CARNOT CYCLE defines the basic parameters of system. Pressure, Volume and Temperature of an ideal gas as defined by $PV=RT$.



Just the way KELVIN scale provides the absolute zero temperature as 273 K below the Zero Deg C, a pressure scale also needs to be developed where the Absolute Zero Pressure is indicated. Once we know the absolute zero pressure, we can safely say that space is at X PSI above the absolute zero pressure. The space as we know is not the Absolute Zero Pressure.

Temperature Scale:

Let us understand the temperature scale first. Temperature is a measure of how excited the matter is. Higher the temperature higher the commotion. This would mean that for a matter to be at Abs Zero Temp, it should be standstill. One way to reach this stage is to cool a system to the lowest possible temperature. And as of now that is 0 Kelvin, which is 273 deg/ 273 Kelvin below zero deg c or 460 F below Zero Fahrenheit.

Pressure Scale:

Now let us understand Pressure Scale. Just the way temperature is a measure of the commotion in a system, pressure is a measure of the density. Tightly packed matter has more pressure than sparsely packed matter. This would mean that Absolute Zero Pressure is reached when density reaches zero level. Zero Density is Empty Space. But when universe is emptied to achieve zero density, space itself collapses as it depends on energy to exist. So, it may practically be not possible to reach this stage of Absolute Zero Pressure.

p - Density V - Volume m - Mass

$$\text{Change in Density } p_2 - p_1 = \frac{m_2}{V_2} - \frac{m_1}{V_1}$$

Since total n the universe does not change $m_2 = m_1 = M$

$$\text{Change in Density } p_2 - p_1 = \frac{M}{V_2} - \frac{M}{V_1}$$

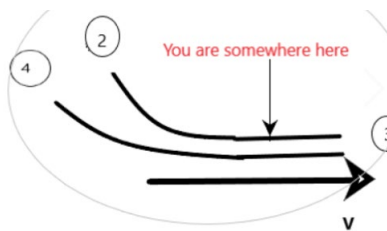
$$\text{Change in Density } p_2 - p_1 = \frac{M(V_1 - V_2)}{V_1 V_2}$$

$$\text{Absolute Change in Density} = \frac{M(V_2 - V_1)}{V_1 V_2}$$

After 13.8 Billion Years of expansion $V_2 - V_1 / V_1 V_2$ will be nearing zero

So we are on the CARNOT CYCLE where the pressure difference is near zero.

Which means we are on the part of 2-3 that is parallel to the X Axis



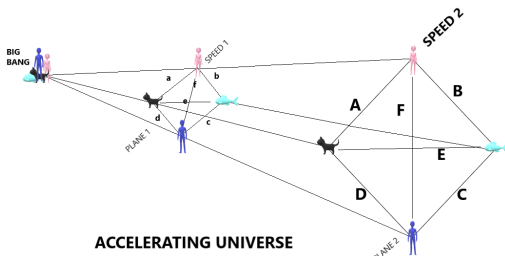
But what is possible is to find the space pressure, this is directly proportion to the density of the universe as of now. Space as an entity is holding up the universe. Space is expanding but universe of the weight is not changing. This means that with an expanding universe, space pressure is reducing. But after 13.8 billion years of continuous expansion the volume of universe should be changing very slowly. Change in Volume or Change in Density will be near zero. This indicates that the space pressure may be reducing but excruciatingly slowly. So, the process 2-3 is not as sharp as shown. It is almost parallel to X Axis. So, wherever we are now on process 2-3, we are not in a hurry to reach point 3 on X Axis. So, whenever we can measure the space pressure, it should stay at that value for a long time. What is heartening is that the space pressure is not Zero. It is above X axis and it has a positive value. We need to find a way to calculate the PSI value of it. But how and when? Whatever and whenever, this space is remaining vacant for some time.

This space pressure is an average pressure of the universe. But this space pressure can change locally depending on the mass distribution at that place.

Piston in a Carnot cycle represents the space in universe. Piston comes back because it is connected to piston rod and crankshaft. The inertia of previous cycle pushes it back. But what makes the space to contract? How does the universe reverse itself from Point 3 of Carnot cycle? If Point 3 denotes Zero pressure all mass would have disappeared. Mass cannot be terminated entirely. Also, the space needs energy for the return journey from 3-4. So, this may suggest that Point 3 is not at infinity. It gives us an idea when the space compression starts.

But why should the space contract in the first place? Why can't the space just keep expanding and the universe end frigid place. There lies the smartness of the idea. Why take so much of trouble creating the universe, and redo the same work again when universe reaches its end? Why not build a cyclical universe? Best part being only two key ingredients. Nothingness and Pure energy. Which actually is just one ingredient, Pure Energy. Set off the chain of reactions once and it will keep repeating its cycle forever. No end in sight. There is no loss of energy or mass as the system is 100% efficient. No loss. Pure Energy starts from Nothingness and comes back to Nothingness.

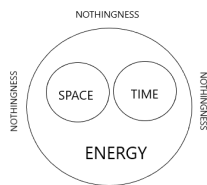
APPLY



SPACITY EXPLAINS DARK ENERGY

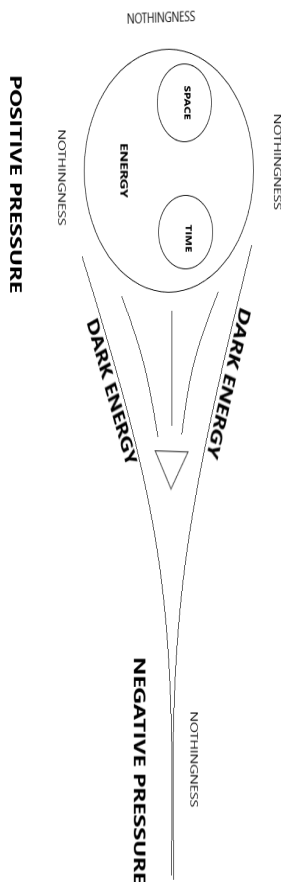
HUBBLE observed that each fudgy star in the night sky, was a galaxy by itself. Redshifted light from these Galaxies suggested all of them moving away from each other. Thus, possibly originating from a single point in the past. A point that was infinitely bright and hot. BIG BANG. It was believed that the force originating from BIG BANG will be taken over by gravity and the universe will be slow down. It was expected to be slowing down when this observation was being made. However, evidence was to the contrary. Every Galaxy was accelerating. Universe was expanding at a higher rate. Acceleration is possible only with energy. But this energy cannot be seen, measured, or accounted for. Hence, DARK ENERGY.

MANTHAN MODEL



Now let us bring in MANTHAN Model. Universe needs three basic parameters to exist. Energy, Space and Time. Energy being the first among the equals. Space and Time need Energy to exist. Space is in permanent contest with Energy to annihilate it. When Space does win the contest, all three basic parameters of universe cease to exist. This phase is the phase of nothingness.

APPLICATION



On one side we have Existence characterised by Energy, Space, Time, Matter & Life. On the other side we have Nothingness. If the existence can be considered as positive pressure system, then Nothingness can be a No Pressure System or an Absolute Zero Pressure system. Basically, a Negative Pressure system.

It is natural for the positive pressure system to be driven towards negative pressure system till an equilibrium is struck. This makes the universe move from high pressure existence to no pressure nothingness. And this energy is something that can neither be seen nor measured. In other words, DARK ENERGY. This is the energy that is making the universe hurtle through the space at astronomical speed towards nothingness.

At the time of BIG BANG, the universe expanded astronomically rapidly because of the infinite pressure difference between Existence and Nothingness. Also known as INFLATION. The universe will always be expanding till such time as it exists. However, the rate of expansion will slow down over millions of years. So long as the Universe exists, the pressure difference is maintained, and Universe keeps expanding.

Expansion is reversed only when space starts fighting back and wins the contest with energy. Only NOTHINGNESS remains with infinite energy in its womb. Waiting to burst out, instantaneously.

This may suggest existence within a blackhole. But the primary difference being that NOTHINGNESS allows universe to exist in its form and shape, while BLACKHOLE shreds it.

APPLY



GALACTIC LEVEL

SPACITY EXPLAINS DARK MATTER, VELOCITY CURVE

Let us study if the alternate model of universe is able to account for the concept of DARK MATTER better than classical model. Let us understand what DARK MATTER is as per Classical Model.

The construct of the universe is largely based on two constituents. Star systems and Galaxies. As per scientific reasoning it is important to find a common cause that is universal. A cause that can be applied to both Solar system and Galaxies.

Classical model says that common universal cause is Gravity. So, if gravity is what makes the solar system behave in a way, then gravity should also be the reason for Galaxy's behaviour. Unfortunately, gravity fails to do so.

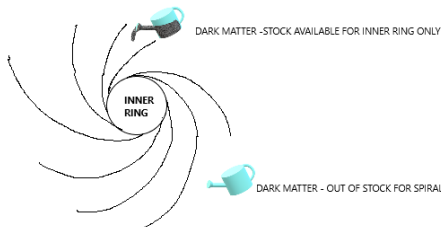
Concept of gravity fits well with the working of the planets in a solar system. The planets slow down as they move away from parent star. This is owing to gravity being inversely proportional to square of distance. Perfectly alright.

But what is good for goose should be good for galaxy also. Unfortunately, not. Stars in the galaxy seem to be orbiting faster than the stars near the center of the galaxy. Exactly opposite to the way planets behave in a solar system.

To reconcile this anomaly, classical model introduces DARK MATTER. As per Classical model, there is more to Galaxy than is seen. Though Galaxy looks like a loosely held mass of orbiting stars, instead it behaves like a tightly bound cohesive disc. That is possible only if there is more mass to the galaxy's construct than what is seen. So that unseen mass which makes galaxy behave like a solid disc is termed as DARK MATTER. A matter that cannot be seen, felt or measured. Matter that is dark. Very dark. So, the name, DARK MATTER.

CONTRADICTIONS

DARK MATTER - OUT OF STOCK FOR SOLAR SYSTEM



By its own volition, classical model should apply DARK MATTER to solar system also. But strangely, it is applied only to Galaxy selectively. What is good for goose should be good for planets also. If DARK MATTER can speed up stars in a galaxy, then it should speed up planets also. Evidence is to the contrary.

Worse is that DARK MATTER is not applied to Galaxy in totality. It is applied only to stars in the inner ring. Evidence in the **Velocity Curve** shows that stars in the spiral arms are not speeding up as distance increases. In fact, they are seen to be orbiting at constant speed irrespective of their radial distance.

What Classical Model fails to realise is that this anomaly of gravity is irreconcilable. Because gravity does not exist. Thanks to gravity Classical Model ties itself in knots again and again.

SELECTIVE APPLICATION OF DARK MATTER IN GALAXY

APPLY

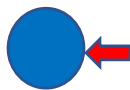
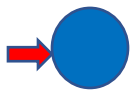
SPACITY EXPLAINS DARK MATTER, VELOCITY CURVE

That was about inadequacies in Classical Model of Universe. What about the alternate model? Does MANTHAN provide a satisfactory explanation through its hypothesis on Spacity? Yes, it does. Convincingly so, without resorting to any DARK types.

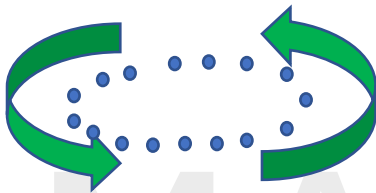
As per Manthan, spacity acts on energy, matter, and life with the sole intention of annihilating it. In doing so, Spacity acts on more than one level. Principally three levels in fact.



'S1' is the force that acts on **ONE** unit of mass. Independent of anything, just stand-alone force. Like force acting on a molecule, on a pebble, on a planet etc.



'S2' is the force that acts between **TWO** masses. Like between two molecules, between two pebbles, between two planets, between two stars, between two galaxies etc.



'S3' is the force that acts on **THREE** or more masses or a system. collective group of masses. Like force acting on a group of molecules, group of asteroids, group of Kuiper belt objects, groups of stars orbiting in a galaxy etc.

Nature of S1

It is important to understand the nature of spacity in each case
S1 depends solely on mass that it is acting on. More the mass, more the spacity required to annihilate it. S1 does not depend on distance as it is acting on a mass that is unitary in nature.

Nature of S2

S2 the spacity acting between two masses is pretty much the same as gravity, except for its direction. The magnitude of S2 is the same as gravity. It is affected both by mass and distance. S2 is inversely in proportion to the square of the distance between the masses. Much like gravity.

Nature of S3

S3 depends solely on system of masses that it is acting on. More the mass, more the spacity required to annihilate it. S3 does not depend on distance, it only depends on the system of mass.

Application

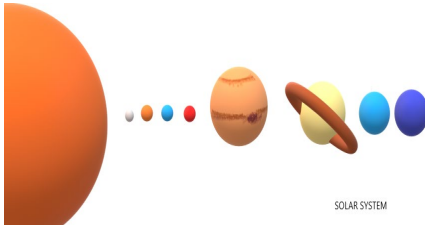
Let us apply S1, S2, S3 in the case of speed of planets in a Solar system vis-à-vis and Speed of Stars in a Galaxy Visa-a-vis Blackhole to understand the nature.

Spacity	Acts on	How Does it affect the speed of	
		Planets in Solar System	Stars in Milky Way
S1	Single Unit of Mass	Does not affect	Does not affect
S2	Two units of Mass	Strong Force, effect Major	Weak Force, effect minor
S3	Cluster of Mass	Weak Force, effect minor	Strong Force, effect Major
Mass Ratio		Sun / Planets 1000: 1	Blackhole / Stars 1: 100,000

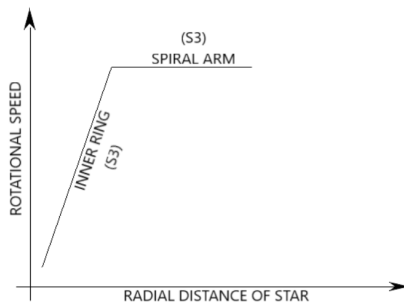
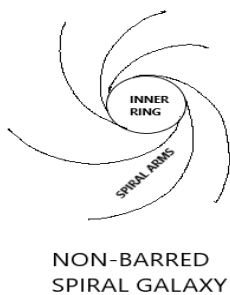
APPLY

SPACITY EXPLAINS DARK MATTER, VELOCITY CURVE

SOLAR SYSTEM



GALAXY



VELOCITY CURVE

Strong Force S2: In a Solar System the overarching force that can affect the speed of planets is the force between planet and Sun. S2 Type of Spacity. S2 Depends on the distance between the masses and hence the planets slow down the farther they are away from the Sun.

Weak Force S3: S3, the space force acting on the cluster of masses (planets) is so negligible (0.01% of the Solar System) that it does not affect the speed of the planets significantly.

Strong Force S3: In a Galaxy the overarching force that can affect the speed of stars is the force acting on cluster of stars. S3 Type of Spacity. S3 depends only on the mass it is acting on. It acts uniformly on star cluster in inner ring and in spiral arm.

Weak Force S2: S2 in a Galaxy is the space force acting between the Blackhole and the cluster of stars. But this force is negligible since blackhole mass is negligible (4 Million Suns) as compared to the cluster of stars orbiting it (400 Billion Suns). It may have a minimal effect, if at all.

VELOCITY CURVE

Inner Ring: In the inner ring, the cumulative star mass keeps increasing as you go away from the center. Hence the strong force S3 on them increases linearly. Accordingly, the speed of stars increases linearly as you go away from the center in the inner ring.

Spiral Arm: In the spiral arm, the speed stops increasing because the mass of stars in the spiral arm does not increase. As you go out, the arms are sporadic and are less densely packed. The cumulative star mass at different radii beyond inner ring, remains approximately same. Hence S3 force and orbital speed remain same, flattening the velocity curve. When this rotational speed holds steady and is not increasing, the stars on the outer part of arm keep falling back and hence you see the spiral arm effect.

Cross Over: At the cross over point between Inner Ring and Spiral arm, there is a sudden change/ reduction in mass of stars. But the speed of stars in the spiral arm does not drop proportionately. In fact, it holds onto the top speed of inner ring edge. This is because, at the rim, S2 assumes principal role as the space force between two masses. The first mass being the inner ring and the second mass being the spiral arm. This acts as a base speed for spiral arm. The incremental speed added corresponds to the cumulative star mass at various radii of the spiral arm. And that mass remains constant, so does the speed of the stars in the spiral arm.

Thus, Alternate Model perfectly explains this anomaly without resorting to DARK MATTER.

REVIEW & APPLY

SPACITY EXPLAINS EARLY UNIVERSE

EARLY UNIVERSE

This is when the future of the universe was decided. The seeds of the Universe as we see now, were sown during this stage. Thanks to nature of the processes it yielded a universe that is Gaseous, Fluffy, Spongy and light.

SPONGY UNIVERSE

Why did the plasma after conversion to gas remained in fluffy condition? Why not a continuous gaseous mass uniformly spread across the universe? Who disrupted this chance?

SPACE. Space was that disruptor! Since the Energy inflation happened against space, the space acting like a 3D sieve. If not for this feature, we would have had a uniform universe. No Galaxies would be dotting the night sky. Just stars everywhere. Or at best, maybe just one big galaxy equivalent to the universe.

GASEOUS UNIVERSE

Immediately after the Big Bang, it is but natural that the infinite energy gets spent as time progresses. When space acts on Plasma to convert it into matter it has three options. Solid, Liquid and gas. But what we see is that much of it was only in Gaseous form. Why not a Universe filled with liquid Hydrogen or a solid Hydrogen?

At the temperature reigning after the big bang it is almost impossible for any matter to be in any form other than gas. Hydrogen needs to be cooled to -257 Deg c to achieve a liquid form. Hydrogen is found in gaseous form at room temperature so early universe must have been Gaseous. With these conditions Hydrogen could never attain a solid state.

LIGHT UNIVERSE

Lightness is in the context of presence of lighter molecules during the early stages. To begin with only Hydrogen, Helium and small quantities of lithium were present after the big bang. When pure energy was escaping space and space was trying to contain energy, it could only muster enough energy to create light unit of mass. Electrons, Neutrons, Protons and Hydrogen Molecule. It could not muster up higher metals since by then it had lost the conducive conditions of high pressure and temperature. So, metals had to wait till star formation where H₂ Molecules could be driven up to higher levels of periodic table.

APPLY

SPACITY EXPLAINS GALAXY FORMATION

Present Explanation

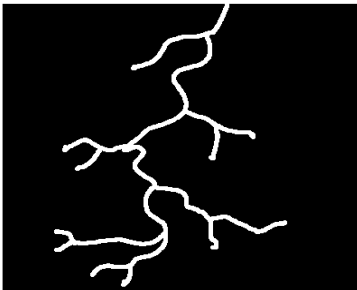
Gravity is credited as the force behind the Galaxy/ Star/ planet formation. Gravity is supposed to coalesce hot nebular gases to form stars, over millions of years. Alternately an event like supernova could also seed an existing nebula. In this case compressional forces are credited with star formation. Accretion discs around the stars give birth to planetary systems.

Anomaly

You need violent force to form a star's plasma-core or a planet's molten-core. Additionally, these violent forces are expected to be available for sustained period. Gravity, being a weak force does not have the strength to create such a violent force. Whereas compressional force of a supernova is at best a short-lived force. The alternate explanation follows as below.



Nebula is not simply a mass of gas and particles. It is an extremely hot mass of gas and particles. The temperature levels are so high that despite the Kelvin-cold Space, the nebula maintains a cocoon of hot and energized atmosphere. The distance and size under consideration are many thousand light years.



IONS DISCHARGE

Initially the space forces are not much of a contributing factor because of their weak nature owing to scattered mass. But at such high temperatures, particles that are in ionised form have the capacity to generate electric discharges. Discharges like those seen in a lightning. The lightning current mobilises the surrounding mass to move with it in the general direction of the discharge. This has a cascading effect on many such discharges. Resultant mass movement is of astronomical proportions. This is when space forces start contributing by enabling the formation of galactic shape. S2, S3 and centrifugal force create disc shape.

A dominant discharge assumes lead among the many discharges. The discharges move along an arc. This creates a system for galactic masses to move around an imaginary axis and along a physical plane. The plane and Axis are perpendicular to each other. This imaginary axis and the plane form the final construct of the future galaxy. Radius of curvature of the arc decides the size of the galaxy. Straighter the arc, larger the size of the Galaxy. Thus, we see different sizes of galaxies each oriented on its own axis. Single dominant axis may lead to spiral, circular or ring galaxy, Cluster type of galaxy may be formed if the distribution of mass and the resultant axis are not coherent.



The nebular gases at the center are likely to be left out. But it has its own capacity to create a super massive star at the center. Whose going Supernova will clear much of central gas and create a Super Massive Black Hole at the center. This shows that blackhole is not the initiator of galaxy formation.

APPLY

SPACITY EXPLAINS STARS, PLANETS, MOON FORMATION

STAR



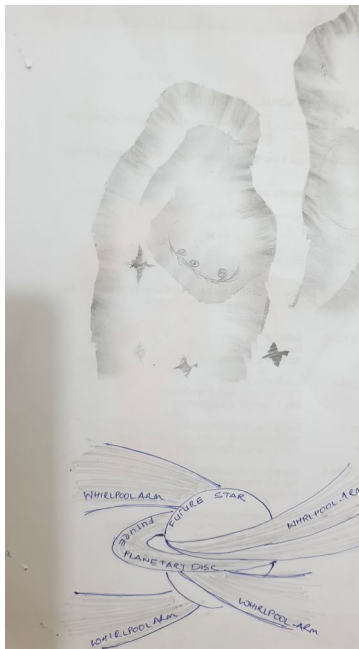
We addressed galaxy formation in the earlier section. Now let us see how the stars form. We already have a swirling galactic mass around an axis and along a plane.

In a galaxy, radius of curvature of the arc is not acute. So, there is no violent interaction of galactic mass when they move along the straighter arc. But among this swirling mass there are many local spots where the arcs of discharge are acute. They create discontinuity in the general flow of the galaxy. Acute nature of the arc also creates a whirlpool. This whirlpool forcefully brings all the local mass to the central area and smashes them violently. The temperature levels of the already hot gas now reach astronomical levels. High enough for the gas in the center to reach plasma stage. Thus, a star is born.

Each star system has a plane and axis that correspond to that of the mother galaxy. But not always. There may be some star systems whose axis may be skewed differently depending on how the ionized mass and the resultant discharge is skewed. This is the reason why we have Sun's axis almost perpendicular to the axis of milky way.

The radii of curvature of the dominant discharge during star formation ultimately decides the size, density, luminosity and type of the star it will end up as. It also has a bearing on its lifetime and overall architecture of the planetary system.

PLANETS



In classical model of universe, the masses in the planetary discs are supposed to form mountain sized structures and are supposed to crash into each other forming the future molten core of the planet. These masses are travelling together in the planetary discs at negligible relative speeds. Even if they collide, the force that is violent enough to yield a molten core is missing. Let us see what MANTHAN has for an alternate explanation.

During Star formation, majority of the mass is used up in forming the parent star itself. However, violent centrifugal forces free up some mass that eventually becomes planetary system. Due to inertia of the original mass, this residual mass would follow a route around the star axis. Centrifugal force will coalesce this mass either into a flat disc or cylindrical ring/rings.

Planets form in the same way as stars. Accretion disc has mass that is ionized. Acute arcs of discharge leading to whirlpool that leads to molten cores. Molten cores do not reach plasma stage because there is not enough mass to begin with. These acute arcs and whirlpools may occur in more than one place in accretion disc around the star.

But eventually they will all lead to being accumulated into single planet. This is because of S3 Force. Since they are all at same distance from mother Star S2 is similar. Whereas S3 that depends only on mass, will speed up the smaller components and they will all eventually coalesce into one mass.

Arc of the dominant discharge again decides the parameters of the planet. Size, density, axis etc. Thus, it is very natural for Neptune to have an axis perpendicular to the solar plane yet follow the general swirl of the solar system.

Parameters of planet formation viz., Molten Core, whirlpool, discharge, Ionisation all need higher temperatures. So, all planet formation takes place near the star as temperature drops rapidly away from star. Planets migrate out as they gather mass.

Why are some planets rocky and others gaseous? Place pebbles of different size on a plate and give it a spin. Owing to centrifugal forces heavier ones remain inside while lighter ones move out. Similarly, when accretion disc revolves around the star, heavier materials lead to rocky inner planets and gaseous outer planets. So, the Mercury, Venus, earth, Mars are those rocky planets while Jupiter, Saturn, Uranus, and Neptune are gas giants. The Kuiper belt objects also may have started off as gaseous objects but solidified due to extreme low temperatures and absence of inner heat source.

MOON

Just like stars have accretion discs, planets too have their own accretion discs. This is because the nature of forces acting are the same. Ionization, discharge, whirlpool, molten core etc. Except that the accretion disc responsible for the final moon is the one that formed after the parent planet took shape. Just the way planets form near the parent star, Moon too forms near their parent planets.

Many Moons do not have moonlets because by then the mass is either exhausted, used up or just not enough of it there to form anything sizeable.

Rocky planets having rocky moons is understandable. But Why do gaseous planets also end up having rocky Moons? In accretion disc around star, centrifugal force is supposed to segregate heavier rocky mass and lighter gaseous mass, but it is not an ideal process. With Gaseous material there may be heavier suspended particles moving along. But when gaseous planets end up having accretion disc, further straining of heavier particles leads to rocky moons.

OTHERS

Other bodies relate to irregular shaped asteroids, comets, planet rings etc. Each of these would have formed into spherical planets with molten cores or cold cores. The only way the irregularly shaped asteroids could have formed is if and only if two spherical formed objects collided and broke into smaller irregular shaped objects. Once broken the smaller pieces can never coalesce back since bigger rocks do not have the chance of charged particles generating electric current. They just keep moving in the resultant orbit due to inertia. Unless they fall into the main planet over many millions of years.

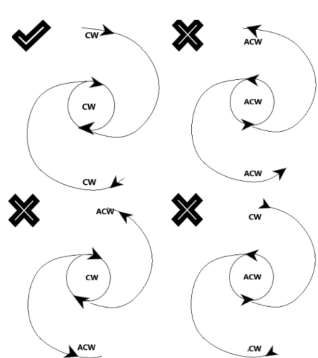
APPLY

SPACITY EXPLAINS SPIRAL GALAXY (NON-BARRED)

There are many forms of Galaxies that are formed in the universe. Spiral, Elliptical, cluster, Irregular and many others. Of these myriad types, 70-80% of Spiral type. So, let us study this type of galaxy further.

Elsewhere in Manthan we have addressed the genesis of galaxy, evolution of galaxy, star formation in galaxy and blackholes. They remain applicable for Spiral Galaxies also. However, we will concentrate on the Spiral arms of the Galaxy in this section.

Spacity explains how stars behave differently in the inner ring and the Spiral arm. Speed of stars increases linearly in the inner ring, while it almost remains constant thereafter in the spiral arm. But it does not explain as to why and how do the galaxies end up having spiral arms with such regularity.

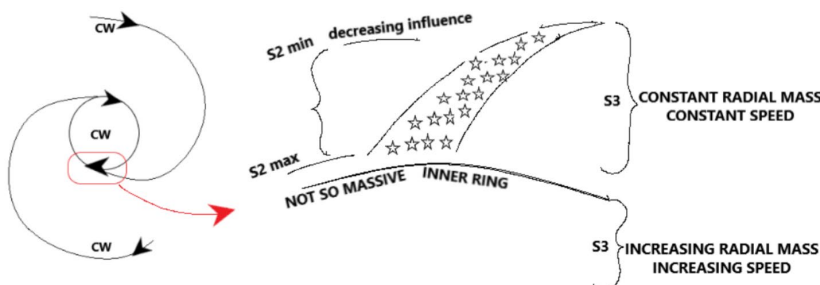


SPIRAL GALAXY ROTATION

Crucial to understanding the spiral formation is the orientation of spiral arm relative to the twist of inner ring. The sketch shows four possibilities of the combination of Clockwise and Anti Clockwise spin of spiral arm and the inner ring. Suggestion of spiral arms spinning in opposite direction to that of inner ring does not hold true. Because S3 the space force acting on inner ring will act in the same way. So, both inner ring and spiral arms must have same orientation. If the spin of inner ring and spiral arm is ACW, the stars in the spiral arm seem to come out of inner ring and spit outwards. Whereas if the spin is CW, then the stars in the spiral arm are being pulled in.

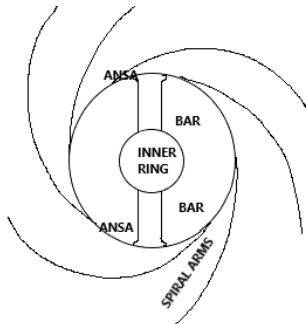
Applying Spacity at the edge of inner ring we see that space force S2 is strong force. It is the force between the Inner Ring as first mass and the spiral arm as the second mass. This will only have a pull effect on the stars in the spiral arm. So, this leaves us with only one possibility. Both Inner Ring and Spiral arms spinning clockwise. Having sorted that out, let us try and see how the spiral arms come into being in the first place.

Ionisation in nebular gas kicks off movement of majority of the gas to form inner ring. There will be some irregular mass of nebular gas on the edges that will remain unaffected by this movement. Stars nevertheless form simultaneously in these irregular masses. When Inner ring eventually assumes massive mass S2, starts influencing the sporadic gas mass/ star on the edge. This creates a first layer of stars of narrow bandwidth just outside the inner ring edge. The S2 also creates a second layer of stars just outside the first layer but with an offset. This is because S2 being dependent on distance its effect is lesser on the second layer. But stars in the first and second layer are travelling at almost same speed since S3 is the same at that radial distance due to approximation of mass of stars in other arms. This phenomenon eventually leads to spiral arms the way we see it.



SPIRAL ARM FORMATION

SPACITY EXPALINS SPIRAL GALAXY (BARRED)



BARRED
SPIRAL GALAXY

Spiral Galaxies maybe the norm in the Universe. But all of them are not of similar type. Half of the spiral galaxies observed are Barred type. Our own Milky way is one such type.

In Barred type spiral Galaxies, the spiral arms do not start at the outer edge of the inner ring. The inner ring and spiral arms are separated by a dense band of stars that are confined within a Bar. Thus, named the Barred Spiral Galaxies. There always are two almost identical bars occurring on diagonally opposite sides of the Galaxy.

At the junction between these two Bars and Spiral Arms, there is a dense grouping of stars that look like a loop. Hence named ANSA. These ANSAE are bright and dense.

S2 & S3

Let us apply S2 & S3 of MANTHAN model and seek answers for these questions. How do bars form? Why only two bars? Why on opposite sides? And why Ansaes?

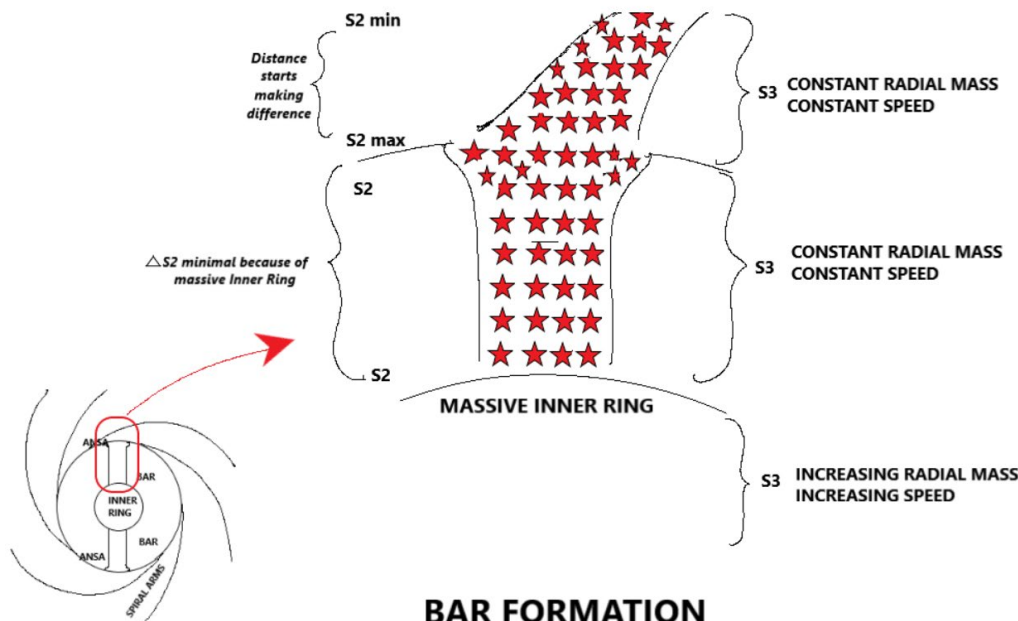
How do bars form?

A Spiral Galaxy has

A Black Hole at the center
An Inner Ring of stars
Many Spiral Arms

A Barred Spiral Galaxy has

A Black Hole at the center
An Inner Ring of stars
Two bars and Ansaes
Many Spiral Arms



How do bars form?

We have already observed the action of S2 and S3 in leading to formation of Spiral Arms. S3 owing to the cumulative star mass in a specific ring keeps them orbiting at constant speed. But it is S2 which is dependent on distance makes the farther band of stars fall back. Thus, creating Spiral Arms.

For the sake of argument let us have a constant S2 up to a limited radius from edge of inner ring. Then the stars in each concentric ring would be moving together. Without falling back. Now compare this situation with Barred Spiral Galaxy. This is what is happening. But why is S2 constant despite the distance increasing. This is only possible in two conditions a) if cumulative star mass increases as radius increases b) If the inner ring is so massive that the change in radius has effect only at a larger distance. The first possibility is not possible since S3 will speed up. So, it should be the massiveness of the inner ring that gives rise to BAR. So, a BAR is born. This Bar gives way to spiral arms when S2 starts getting affected with the distance.

This suggests that Massive or densely packed Inner Rings lead to Barred Spiral Galaxies, while lighter ones limit themselves to Non-Barred Spiral Galaxies. This is in line with the observations.

Why only two bars?

Why are there only two bars and that too diagonally opposite? Why couldn't there be multiple bars uniformly spaced like spokes of a wheel?

Let us observe what happens when first band of stars form just outside the inner ring. This would disturb the balance of the galaxy. A spinning galaxy is nothing but a galactic Gyroscope. It ensures that the next band of stars is takes shape on the opposite side. Thus, all the stars within the region between inner ring and spiral arms will be banded within these two bars.

Why on Opposite Sides?

The Gyroscopic forces ensure that there are only two bars and that they are on opposite sides of the galaxy. To attain balance.

Why ANSAE?

If left to themselves, the stars in the BAR region would have distributed themselves sparsely. But since due to combined effect of S2 and gyroscopic forces the stars have to be clubbed within the boundary of the bars.

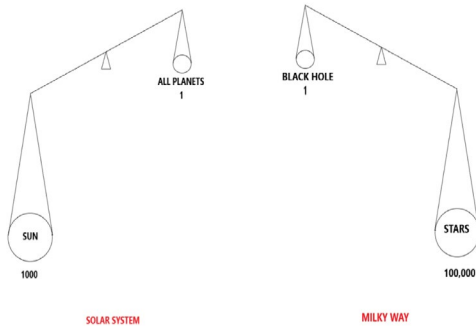
Assume there are no spiral arms on the periphery. Then these widths of the bars would have steadily reduced radially. We would have then had two pointed diagonal spikes outside the inner ring. But the spiral arms have already started forming and have created a barrier at the node of the bars and spiral arm. So, these stars which otherwise would have been part of those pointed spikes have nowhere to go. They have to cram themselves at the edge.

Thus, we see two ANSAE at the edge. Bright and Dense.

APPLY

SPACITY EXPLAINS BLACKHOLES

Importance



A blackhole in a Galaxy is not as important as Sun is to a Solar System.

Sun forms 99.9% of the solar mass, with planets accounting for only 0.1% of the solar system mass. But when you consider the Milky Way the Super Massive Black hole accounts for only 0.001% of the Galaxy Mass. A total role reversal. This shows that Milky Way will survive even if you remove the Super Massive Blackhole from the center.

Having proven that Blackhole is not central to the scheme of things, its genesis may be easier to decipher. It does not make a difference if the blackhole is formed along with the galaxy or after galaxy formed. We will consider both the cases.

Along with the galaxy

When the galaxy is forming on the periphery, The nebular gases at the center are likely to be left out. But it has its own capacity to create a super massive star at the center. Whose going Supernova will clear much of central gas and create a Super Massive Black Hole at the center. This shows that blackhole is not the initiator of galaxy formation.

After galaxy formed

Irrespective of whether there is an SMBH at the center, blackholes keep popping up both in the inner ring area and the spiral arm. When such a blackhole pops up around a swarm of stars how does the spacity act? Initially each blackhole may have the same mass as the parent star and it may move in the same path. But as it gathers mass, S3 acting on the cumulative mass, will not be able maintain the pace of the blackhole in sync with the stars. The blackhole can either slow down, slide in or out of the galaxy. Eventually the blackhole would slide in towards the center and join the existing SMBH at the center.

Sink

The space pressure at Black Hole is near the absolute zero, like that of nothingness. And this Absolute Zero pressure is surrounded by positive pressure. Then why wouldn't the entire galaxy not get flushed into the back hole like in a sink? If the galaxy were a static structure it sure would. Since the galaxy is already in motion because of its own inertia, spacity would follow the same. But if at all that 100000:1 ratio comes into effect, we will have a galactic clog for sure.

APPLY

SPACITY EXPLAINS THEORY OF EVERYTHING

GRAVITY at ATOMIC & GALACTIC LEVEL:

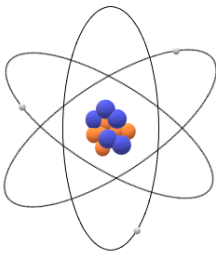


GALACTIC LEVEL

Since the gravitational force is a force of attraction between two masses, it is intrinsic property of Mass. If that is true, gravity should manifest itself in every form of mass. Be it stars or the quarks. Unfortunately, it does not. It is said that gravity is too weak to manifest itself at quantum level.

Even at Galactic level, where gravity is supposed to make its grand presence felt, it is found wanting. If it was left to gravity, the peripheral stars of the galaxy should have moved slower. This is because the gravitational force weakens as you go away from its source. But the evidence is to the contrary. The stars on the edge move faster. It needs selective application of DARK MATTER. OK for inner ring of galaxy, NOT OK for planetary systems, spiral arms. Thus, gravity falls flat everywhere.

SPACITY at ATOMIC & GALACTIC LEVEL:



ATOMIC LEVEL

The spacity being omnipresent, can influence at micro level. It is the Spacity that creates matter and the force that holds mass together. It is in continuum with every particle in the universe. Effect of Spacity at atomic level is evidenced in the two-split experiment. How the interference pattern is maintained even when atoms are sent one by one and why interference pattern disappears moment you try detecting the atom.



GALACTIC LEVEL

Spacity is in sync with the observations of Velocity Curve across the galaxy. Be it inner ring or spiral arm. You don't need dark matter to hold the galaxy. S2, S3 combine well to hold the galaxy well.

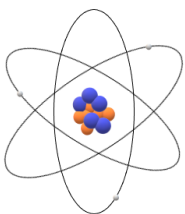
Spacity equally applies to planetary system, allowing them to slow down as they move away from parent star. Thanks to S2 being the primary force. The one that gets affected with distance.

When Space inflated across the universe, space the within the galaxy did not inflate. Space with an intent to drive mass into oblivion intends to keep it closer. It is Spacity that creates a bridge between infinity and nothingness.

THEORY OF EVERYTHING:

Concept of Spacity is in consonance both at Galactic level and Atomic level. The basis for Theory of everything. Spacity addresses a vast range from sub-atomic, atomic, mass, planets, solar system, stars, galaxies, nebulae, Infinity to Nothingness.

Ironic that the relation between Spacity & everything else is one of annihilation, but the elements of universe find solace in this.



ATOMIC LEVEL



GALACTIC LEVEL

SUMMARY

SPACITY

Birth of Space:

The journey of space starts with Big Bang. As soon as infinite pure energy escapes nothingness, Space is born. Though Space, Energy and Time are basic recipe of Universe, only infinite energy can exist inside nothingness. Energy is the first among equals.

Space and Disruption:

It is natural for Energy to expand from high pressure system (Big Bang) towards low pressure system (Nothingness). It is also natural for Space to keep a lid on this expanding energy. Energy or its associated forms; Matter and Life. So that is why you see that eventual mass distribution is sponge like rather than consistent diffused state of mass. Space acts like a disruptor. Else, the Universe would have ended as a uniformly diffused mass leading to infinite stars. Or at best one Galactic Galaxy.

Space and Energy:

Someone who is bearing the burden of all the mass in the universe would surely need energy. Space's primary mission since birth is to take absolute control of the pure energy and push it back into Nothingness. In this entire process of inflation, expansion and compression, space does need energy for these tasks. In the end of this Galactic Carnot cycle, When Space wins the battle over energy, it is writing its own epitaph. Thus, Space joins Energy in Nothingness.

It is equally important to note that Universe does spend the entire quota of energy during the Galactic Carnot cycle. Then how does it recreate infinite energy in the end? Without condition of infinite temperature and pressure, walls of Nothingness cannot be breached. So, Energy must reach the same point as it was when it all started in big bang. This is where Space does the crucial task of bringing the Universe to zero volume. This will automatically yield infinite pressure and temperature. Good enough condition to gain entrance at gates of nothingness.

Space and Matter:

In this struggle between Energy and Space, some pockets of energy escape space but those pockets of energy are again subjected to space pressure. Idea is to send that escaped quanta of energy back to mother lode. But in this commotion two or more such quanta of escaped energy are brought together. This is when building blocks of matter are born, further action leading to molecules. Every molecule is under the pressure of the space perennially. The molecule fights back and creates its own sphere of energy as evidenced in 2 slit experiment.

It is important to understand that left to itself, space could not cobble up any molecules heavier than Hydrogen. This is possibly because the time lost in getting the building blocks of matter, space has lost valuable energy that would have been sufficient to build heavier metals. They would have to wait till stars are born to elevate themselves up the periodic table.

Construct of Space:

Space has a three-dimensional continuum. This is what gives Space the capacity to hold the universe. This capacity is what we perceive as Space pressure. Space Pressure is a positive pressure. Absence of general matter in space is wrongly attributed as vacuum or absolute zero pressure. It may be true that you do not find matter in space, but since space is in continuum and the fact that matter exists in space leads to positive Space Pressure. This space pressure is not constant across the universe. Higher the density of mass, higher will be the space pressure. Space pressure is decreasing uniformly across the universe as it is expanding. But there will be a time in future when it will start contracting and the space pressure would increase.

Space & Movement

When stars and planets are born, the space is still acting on these masses to bring them together and annihilate. One can overcome this space pressure by spending energy against it. So, to keep moving inside a space, in any direction one needs to spend energy.

It is possible to pierce through the space, but you need to spend energy. Space will let you go only till the external energy is overcoming space's innate pressure. Once energy is spent, space starts acting on the mass to bring it back to its original position. That is why a rocket keeps moving till it has energy and that is why a pebble thrown up comes down after spending its energy.

Space Force S1, S2, S3

Space acts on mass in three forms. The first one on **1 unit of mass**. This is to annihilate that mass unit. This space pressure **S1** is directly proportional to the mass that it is acting on. Next it is the force that is acting on **2 units of masses**. This is the force acting to bring them together. Idea is to make them one and start acting on them as a single unit. **S2** is directly proportional to the masses it is acting on and inversely proportional to square of the distances between them. Just like in the case of gravity, except in opposite direction. Third, **S3** the force acting on **3 or more masses**. This is when the space pressure is trying to bring all the units into one. So, it generally follows the overall or aggregate mass in the reconciled direction between the member units of the system that it is acting on.

Space Continuum:

The space is in continuum all through the universe. Space can communicate instantaneously across universe. The space maintains balance despite the expanding universe. Space acts like a flywheel. Absorbing any imbalance created and transferring it across the universe. We may realize Sun's vanishing act only 8 minutes later, but its effect on earth's orbit will be instantaneous. Conversely if a star turns into a blackhole the effect may not be felt as quickly. Because it is still equivalent to weight of parent star. It is only when it starts feeding and grows that it starts making a difference. Except the ones that bear the immediate shock in the immediate vicinity.

Space and Time

Just like Space, Time too needs energy to exist. It may seem that Space per se does not have any effect on Time. However, in presence of mass it starts having effect. Higher space pressure will slow down time. So, when you are in space where there is no mass nearby, time whizzes by. But when you are near a massive mass like blackhole, time slows down considerably.

If we extrapolate it to Big Bang the concentration of mass reaches infinite proportions, so does the space pressure. So, during the initial stage when universe was born the time was moving slow. As space inflated and lost its density and hence the space pressure the time started moving fast. Thus, we may not be as far away from Big Bang stage as we think we are. The time as we know is only a recent construct. It was moving much slower earlier. With this Hypothesis every moment the time is speeding up because space is expanding, and the space pressure is reducing. After 100 million years, mankind life expectancy would be much lesser. All other things remaining the same.

This is till when the space is expanding. Once the space starts fighting back as in an Ideal Carnot cycle, the time starts slowing down. When the universe reaches the big crunch the density and space pressure reach infinite proportions, stopping the time entirely. This is when space has already won over energy, now it will win over the time also. So, we now have Energy, Time and space all in the bosom of nothingness.

Space Contraction

Piston in a Carnot cycle represents the space in universe. Piston comes back because it is connected to piston rod and crankshaft. The inertia of previous cycle pushes it back. But what makes the space to contract?

How does the universe reverse itself from Point 3 of Carnot cycle? If Point 3 denotes Zero pressure all mass would have disappeared. Mass cannot be terminated entirely. Also, the space needs energy for the return journey from 3-4. So, this may suggest that Point 3 is not at infinity. It gives us an idea when the space compression starts.

But why should the space contract in the first place? Why can't the space just keep expanding and the universe end frigid place. There lies the smartness of the idea. Why take so much of trouble creating the universe, to be at it once again when universe reaches its end? Why not build a cyclical universe? Best part being two ingredients. Nothingness and Pure energy. Which would mean just one ingredient, Pure Energy. Set off the chain of reactions once and it will keep repeating its cycle forever. No end in sight. There is no loss of energy or mass as the system is 100% efficient. No loss. Pure Energy starts from Nothingness and comes back to Nothingness.

Space and Nothingness: Among the three Energy, Space and Time, only space and time can touch nothingness. In fact, they are always in touch with nothingness all through their existence. Whereas Energy can never touch Nothingness. Because as energy expands, space is bound to be a step ahead of it. Energy's interaction with Nothingness is only at the beginning and at the end.

At the end of universe, Space creates the conditions of infinite pressure and infinite temperature. The only condition under which gates to Nothingness open up. You need a Big Bang to come out of Nothingness and a Big Crunch to enter the Nothingness.

Space and Death: When does Space meet its end? This is when the space contracts back and reaches the point 4 on the PV Diagram. Since the Mass cannot be compressed any further, the contractional inertia takes it to Zero Volume. At this point 1 on PV Diagram Infinite temperature and infinite pressure are reached. Good enough to knock the universe into Nothingness. That is when space meets its end. To be born again instantaneously because time too has stopped. Only thing that does not have death or birth is the NOTHINGNESS.

MANTHAN

REVIEW

HOW DOES LIGHT TRAVEL

Status Quo

Shadows mean it travels in a straight line
Frayed edges of the Shadow suggest it is wave form
Interference pattern means combination of both.

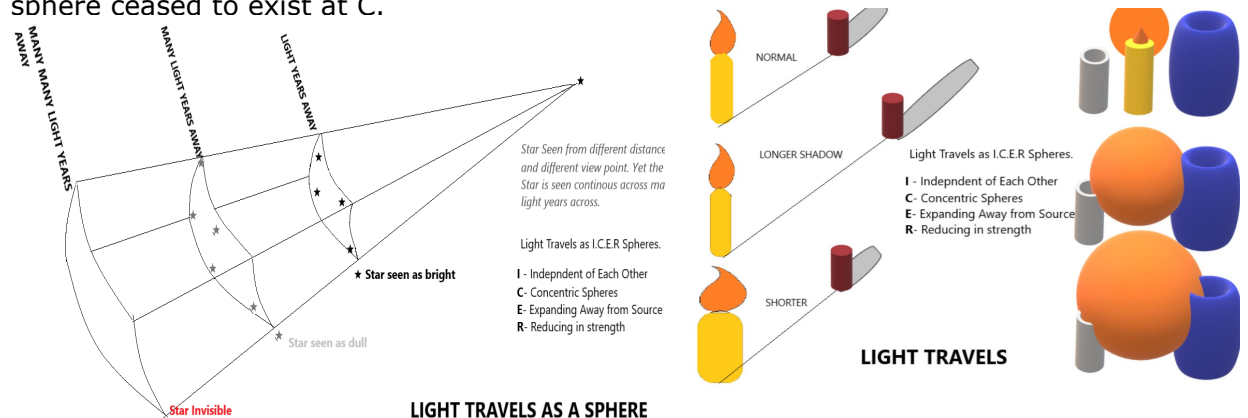
Straight or wave:

As the light from a source travels straight, the distance between adjacent rays of light keeps increasing. When you are observing the source from astronomical distances, the gap is considerable. When you step to the right or left, the star should be invisible. Even if the light is travelling as a wave this observation of source disappearing when stepped right, left, above below will hold true.

Expanding Bubble:

Consider a star many light years away. As shown, there are three observational planes each a part of a sphere. A is light years away from source star, B is many light years away and C is many-many light years away. Each sector is light years across. When you observe the source star from A it looks brighter and dimmer at B. Brightness is same when looked from any point in respective sectors which is light years across.

This is possible only if the light travels as a continuous layer that is spherical in nature and is expanding outwards. This is as though, the spherical layer when at A was thicker and by the time it reached B it became thinner. From C, the star is invisible thus indicating that the sphere ceased to exist at C.



But the issue with the spherical layer hypothesis is the continuity. So, it will have to be continuous layers of spherical bubbles. One after the other. Each layer independent of the preceding layer. Thus, the source is putting out continuous bubbles of light that are expanding outwards and growing weak.

When there is an obstruction this bubble has a tear in its surface. But the peculiar thing about this tear is that the layer is repairing itself. That is how you see the shadows not so crisp. When you retain the obstruction at the same distance and increase the strength of source the shadow will start to disappear. This is because the tear gets repaired faster. The shadows are longer when the obstruction moves away from the source that is kept constant because the tear takes it longer to repair.

What happens when this spherical layer hits an opaque surface? Will it reflect the same way as a straight line? Instead, the layer bounces as though it inverts itself inside out. And the surface itself acts like a new light source. Interference pattern applies just as in the case of waves.

REVIEW

LIGHT TRAVELS AS A BUBBLE – An EXPERIMENT

Manthan Proposes that Light Travels in concentric, independent spherical bubbles growing away from the source of light. As per this each sphere is independent and travels through the space decreasing its strength as it gets farther from the source. This is as though Photons were thickly populated and as time progresses, the photons keep spreading themselves.

Thus, whenever there is an obstruction, this sphere suffers a tear. As sphere crosses the obstruction, it repairs itself by redistributing the photons near the area of tear. As though the photons acting like a reserve army. The distance of the source and the size of the tear decides the length of the shadow.

How do we prove that the light travels in spheres? A simple experiment can be conducted. Bubble hypothesis suggests that when there is an obstruction, the tear is repaired by redistributing the photons from surface near the tear. Which means that every time there is an obstruction the strength of each bubble reduces. Which means the reach of the bubble reduces uniformly in all 360 deg directions.

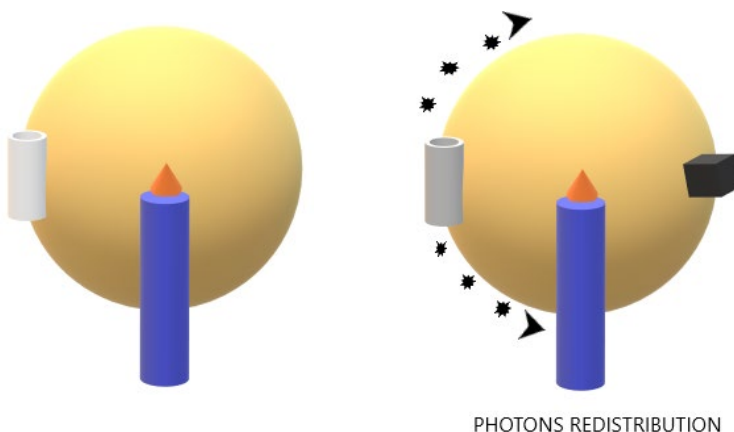
So, the experiment shall have

- A Birthday candle As a Light source, as less bright as possible
- A Dozen incense sticks As an obstructions, Min area, min reflection, max absorption
- A Reflector Preferably White in colour to enable observation of changes
- A Mobile Flash disabled to eliminate external lights
- A Dark Room To eliminate external lights.

Now light a candle and place it in the center of the board. On exactly 180 deg keep one of those incense sticks. Light the candle. Set the camera. Switch of the camera and capture the brightness of the reflector in dark conditions.

The second instance place few more incense sticks randomly on the same side of the earlier incense sticks. Repeat the same experiment.

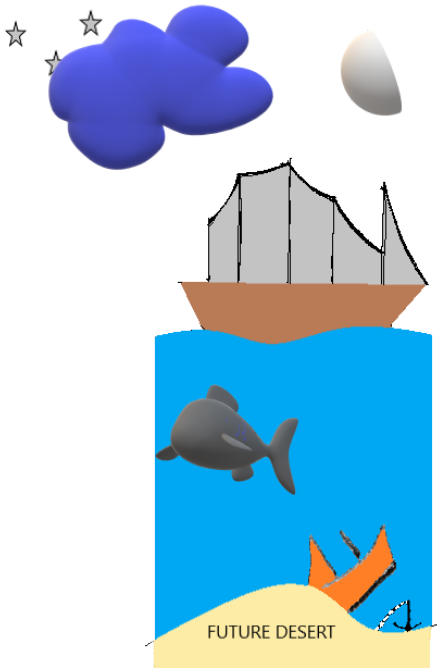
Result : If the Reflector glows less bright than earlier, then the bubble theory holds true.



COROLLORIES

REAL WORLD

Desert & Seabed



Origins of Water

It is said that deserts were formed by exposure to harsh weather over millions of years. Harsh winds and temperature at best can kick up a storm over million years. But it is just not possible to pulverise the entire topography to fine sand and remove any vestige of life and minerals. This pulverisation is evidenced up to considerable depths.

You need heavy load to pulverise Earth's mantle to such depth. Another peculiar thing about this heavy load is it has to weed out every chance of plant life. Which other earthly force other than Seawater has this quality? Sea at its bottom is heavy load and at that depth no plant life can survive such salty conditions. Fortunately, Sea has been dumb enough to leave the evidence of crime on the crime site. Sand Dunes. Who else but sea can create such art?

Finely manicured deserts surfaced when seas moved. This could be because of tectonic plate movement, draining of seas, evaporation due to harsh weather or a combination of all. Many seabed of present era would resemble desert land scape. If the seabed has fresh plant life and soil bed, it can be safely assumed that the ocean is young.

Is water native to Earth or alien? It is hard to imagine water being native to earth given the fact that earth's origin had its genesis in molten core. It is surmised that water was brought to earth by icy asteroids and meteorites. But the heat generated on impact would have evaporated whatever water cargo they brought. It could as well be that earth came across an icy planet which when neared earth turned into water blob. This also may have eliminated chances of heavy impact and the surface tension would have made all the water creep up on earth's surface.

How do we conclusively prove water is alien to earth? Every planet has suffered asteroid impacts since genesis. So too Earth. If, however earth has deep sea craters, it would conclusively prove that water is alien to earth. If water were native, the asteroids could not have created huge craters on the deep seabed. If you find a crater on deep ocean bed, it will mean water is alien to earth. Only problem is that many million years of sea water attrition may have washed away the evidence. But we do not need to find them all, just a few is sufficient to prove.

COROLLORIES

Search for Alien Life

REAL WORLD

Let us assume there is Alien life elsewhere in the universe. But where exactly do we search for them? It would have been wonderful if Aliens landed at one of our airports and presented themselves at the immigration. Till that happens, our scientists keep the watch through their hunt of exoplanets. These are then bracketed into those falling in GOLDILOCK Zones. Safe for Life.

But looking at the vastness of the universe and the tedious nature it is a long-drawn job. Is there any way they could be assisted in this?

Study of Gender Ratio could be one such area. Consider any region of the world, any country, any province, any district, or any community one thing that is strangely consistent is Gender Ratio. There are as many men out there as women. Roughly.

Left to themselves, humans do not have any control over the sex determination. So, it is nature which seeks, creates, and maintains this balance. Probably it is true for all species on earth. Even when man-made disasters skew or distort the gender ratio, nature restores the balance in the blink of any eye.

This shows that life is interconnected. Life has an in-built system to communicate. It not only transmits appropriate information across the world instantaneously, but also influences action. Life balances itself. Why should we assume the communication of life is limited to our world only? May be life is communicating across universe. Crack this communication and you have the Alien life map of the universe in front of you.

This study falls under social science and we may already have valuable information to work on. Maybe it is easier to work with species that are on the brink of extinction.

Blackholes

If blackholes were spherical in shape, it would have sucked in matter from every point on the spherical surface. Then the accretion would not be limited to disc only but to the entire spherical surface. The blackhole then would have looked like any other star. Lit from all sides. It would have looked black only when it has finished its meal. However, we know that it is not so. The matter is seen falling from side on only. The central part is black. So Blackholes are disc shaped or at best doughnut shaped.

Blackholes are classified by their weight in terms of sun's mass. So, the matter that is devoured by blackhole has not disappeared. It still is part of this universe. Only way to pack in in such small size is by rearranging the mass into pure energy. Thus, Blackhole is similar to the bosom of nothingness where the pure energy is struggling to escape. But is it?

COROLLORIES

Galaxy Selfie



Due to the large size of the milky way, there is no way we can look at ourselves and say for certain what is the size, shape, and contour of the milky way. How we wish we could take a selfie of our galaxy? Sure, Milky Way would love to see itself in a mirror occasionally. A galactic mirror would help! Or are there flat frozen slabs with smooth surface that can act like mirror? Maybe an ice shelf in space.

Stop Earth

How would the earth that is hurtling in space were to be abruptly stopped? All life as we see will be thrown eastwards. Sea water from the western half would rush towards eastern half. May be escape the grip of earth and form an umbrella in the space, creating a circular curtain of water, which in a day will be frozen and fall back to earth. Or maybe the entire mantle on eastern hemisphere would collapse into molten core. All we would have is a flat disc of molten core that will cool off in time.

Space Travel

As of today Space travel is limited to solar system and its backyard. Is it possible to travel from one edge of the universe to another edge instantaneously and safely? Possible if you consider Space as one entity. All you need to do is manipulate space itself. Change the X.Y.Z coordinates and you can transfer yourself from one corner of the universe to another corner instantaneously. No hassle of wormholes, speed of light, Fuel limitations, transportation etc. Just change the coordinates of where you are. You can in an instant traverse the entire universe and then parameters like infinity, edge of universe, origin of universe, big bang etc are within your reach. No need to bend, cut, tear or curl space. But how do we do that.

MANTHAN

INFERENCE **SPACITY** not **GRAVITY** (Theory of Everything)

Unexplained Gravity is the force that holds the matter in the universe together.

Explanation Space's sole intent is to annihilate energy and its related entities, matter, and life. In doing so it is the push force of 'Spacity' that is bringing two masses together. Spacity is the exact opposite of Gravity. Equal in magnitude but opposite in direction. Mass has no business in attracting other mass. Instead, it is the space which is pushing them together. The concept manifests itself well in Two-Slit Experiment.

Unexplained Gravity manifests itself only at galactic level, gravity too weak to make its presence felt at quantum level.

Explanation In the struggle between space and energy small quantum of energy escapes. These quanta of energy can be of myriad forms depending on size, shape, frequency etc. When space acts again on these various quanta with the sole aim of destroying it, in fact creates matter. Thus, spacity bridges the gap between classical physics and quantum physics by manifesting in both.

INFERENCE **TWO SLIT EXPERIMENT**

Unexplained Why do photons follow the same spectrum-pattern, even when they are streamed one at a time through the two-slit arrangement.

Explanation Every speck of mass is fighting off an existential threat from Space. As a result, that speck of mass is propagating continuous energy in every direction. This energy wave sets the path in advance for the photon to follow. When this wave passes through the two slits, it acts as two independent sources and creates trough-crest path to follow. A path of least resistance. Each photon that follows the other has a unique pre-decided path as per the interference pattern of crest and trough. Hence each photon ends up following the same pattern as when the photons were being streamed together.

Unexplained Photons choose to follow the interference pattern depending on whether they are observed or not.

Explanation When detector is switched on, it is creating a wave pattern of its own which is interfering with the energy wave propagated by photon. With the probable paths of photon being boxed in by the detector waves, the photons follow simple pattern. When the detector is switched off the photons create the entire pattern like earlier.

INFERENCE SPACE AS THE BINDING MEDIUM

Unexplained How do Planets influence each other without being connected to the other?

Explanation Space is the platform that connects the metronomes in the Grand Tack Experiment. Space is the platform that connects planets in solar system facilitating transfer of information between planets.

Space is the medium that holds all that is there in the universe both on Galactic scale and the Quantum scale. Space is thus the ubiquitous factor across the universe, the omnipotent and omnipresent.

Unexplained How does a dual mass system react instantaneously when a third mass is introduced?

Explanation Since Space is a singular entity it is a single homogeneous entity. Thus, making it possible for two masses in equilibrium to relay information with a third mass instantaneously.

Spacity works both at galactic level as well as atomic level. Thus, bridging the gap between quantum physics and classical physics. Spacity could be the basis of 'Theory of Everything'.

INFERENCE ORIGIN OF MATTER & LIFE

Unexplained To what do Matter, and Life owe their existence to?

Explanation During the struggle between Space and Energy, some quanta of energy separates from mother energy. Space again acts on two or many such escaped quanta creating Matter. Depending on the nature of the escaped quanta various building blocks are formed. Electron, Proton, Neutron, Quartz, Boson etc. But not all escaped quanta end up being matter. The one that stays in its pure form lays the foundation of Life. Let us call it Soul Quantum. Life takes shape whenever, wherever this "soul quantum" combines with matter. Life does not need sunlight, water, amino acids, temperature etc. to come to fruition. All it needs is Soul quantum and matter. That is why we see extremophiles everywhere.

INFERENCE EXISTENCE & NOTHINGNESS / DARK ENERGY / DARK MATTER

Unexplained **What is the construct of Existence?**

Explanation Universe needs three basic parameters to exist. Energy, Space and Time. Energy being the first among the equals. Space and Time need Energy to exist. Space is in permanent contest with Energy to annihilate it. When Space does win the contest, all three basic parameters of universe cease to exist.

Unexplained How are Existence (Infinity) and Nothingness (Zero) related?

Explained When space wins over the contest with energy, nothingness begins. This is akin to existence (Infinity) being driven into nothingness (ZERO). So now ZERO (nothingness) is pregnant with INFINITY. Nothingness is holding Infinite energy in its womb. Waiting to burst out. Instantaneously.

Unexplained **What is Dark Energy**

Explanation Positive pressure existence is driven towards negative pressure Nothingness due to existing pressure difference, till an equilibrium is struck. This energy that moves the universe towards nothingness is the Dark Energy.

Universe INFLATED at astronomical speeds due to infinite pressure difference. So long as the Universe exists, the pressure difference is maintained, and Universe keeps expanding. Only when space wins the contest with energy an equilibrium between Existence and Nothingness is struck, does the universe stop expanding.

Unexplained **What is Dark Matter**

Explanation The nature of spacity allows it to act in different ways. It allows it to slow down planets as you go away from the sun because S2 is the overarching force in a solar system. This is because Sun is the principal mass in a solar system with planets accounting for only 0.1% of the solar system mass. A ratio of 1:1000

Whereas, in a galaxy the stars surrounding the galaxy outweigh the supermassive blackhole. 100,000:1. Thus S3, the force acting on the swarm of stars in a galaxy becomes the overarching force. S3 being directly proportional to the mass it is acting on, increases as you go away from the center of the galaxy. As you go away, the number of stars and their collective mass increases.

Thus, MANTHAN does not need a Dark matter to reconcile the speeding stars on the periphery of galaxy. As it is, Dark matter is selectively applied to Galaxy only. Star system being a part of galaxy, cannot remain unaffected from Dark matter. If rightly applied to solar system, dark matter will speed up the planets too. And that would be contrary to the evidence. Dark Matter is not applied spiral arm where the speeds the curve flattens. Whereas S2,S3 explain it right.

INFERENCE IONISATION & GALAXY/STAR/PLANET/MOON FORMATION

Unexplained Gravity brings the hot gas particles of the Nebula together to form plasma core of star. How can a weak force like Gravity be the reason for generating a highly violent, supremely hot plasma core in a star?

Explanation Gas in the Nebula is hot and ionised. Positively ionised particles tend to discharge their charge towards negatively ionised particles. This forces the particles to move along this path of discharge. This has a cascading effect, thus kickstarting the Galaxy & Star formation. This swirling hot mass attains astronomical temperature leading to hot plasma/ molten core. Gravity being a weak force, cannot create such violent forces.

The most dominant force creates an axis of its own, that guides all the matter to circle around that axis. The straighter the arc of this force, larger the size of the Galaxy/ Star/Planet/ Moon. Single dominant axis forms spiral galaxy, while many axes will lead to cluster galaxy. Majority of Stars/ planets/ Moons have the same axis of their parent Galaxy/ star system. But some of them like Sun in Milk way and Neptune in solar system may have their own axis.

INFERENCE LIGHT TRAVELS AS AN EXPANDING SPHERICAL BUBBLE

Unexplained Does Light travel in a straight line or as a wave or both? Or something else?

Explanation Light instead, travels as an ever-expanding bubble travelling away from the source. The spherical bubble has a strength of its own which dwindles as it moves away from its source. As though layer of bubble has its own thickness. Source of light transmits continuously one spherical bubble after the other.

When this bubble experiences an obstruction, there is a momentary tear in the bubble layer which is repaired after surpassing this obstruction. This layer repair is facilitated by photons surrounding the tear, moving along the surface of the layer.

When this bubble hits a surface it is bounced off as though the surface becomes new source of light.

PROPOSED

MANTHAN -AN ALTERNATE MODEL OF UNIVERSE

SPACITY

Spacity is the force that brings the two masses together by pushing them together. Its magnitude is same as defined by Newton's equation of gravity but vectorially opposite. Spacity owes its origin to existential struggle between space and Energy/matter. Space is trying to drive Energy/matter into oblivion.

MATTER & LIFE

Basic recipe for universe is Energy, Space and Time. Energy being the first among equals. Space is in perennial struggle to drive energy into oblivion. During this struggle, some quantum of energy escapes the mother lode. Space acts again on this energy and brings two such escaped quantum of energy together to annihilate. Instead this leads to building blocks of matter. Among the escaped quantum of energy some energy stays in its pure form, unaffected by space. That is soul quantum, which when combined with mass leads to life as we know.

DARK ENERGY

Existence is defined by Manthan as sum of Energy, Space, Time, Matter and Life. Existence is akin to a high-pressure system. Whereas nothingness being at zero pressure is the low-pressure system. This pressure difference forces the Existence towards nothingness. This movement from existence to nothingness is perceived by us as expansion of universe. The energy that owes its allegiance to this pressure difference is what we call DARK ENERGY.

CYCLE

The universe expands as long as there is existence. The rate of expansion may vary. After big bang when the universe expanded at a speed faster than the speed of light itself. This expansion stops abruptly when Space wins the struggle with energy. This is when even space and time cease to exist as both depend on energy. This is the stage when Nothingness is pregnant with infinite energy waiting to burst out and start the cycle of universe once again. Energy In fact is released instantaneously since Time has stopped existing. Thus, universe moves from nothingness to nothingness.

DARK MATTER

Spacity S3 does not depend on distance. It proportional to the mass that it is acting on. This makes the stars travel faster as you move away from center. So, no need to plug in dark matter into the galaxy. There is not selective application to solar system or galaxies.

QUANTUM

Spacity is in continuum both at galactic level and at subatomic level.

LIGHT TRAVEL

Light propagates continuously away from source in the form of expanding spherical bubbles. Each layer is independent of its successor and predecessor. This spherical layer has the capacity to repair itself by moving photons along its surface.

ZERO & INFINITY

Zero is akin to Nothingness and Infinity corresponds to Existence. Thus, universe moves from nothingness to nothingness with space undoing the universe in between.

COMPARISON

CLASSICAL Vs MANTHAN

Attractive Force between matters is Gravity. The force exists but it is PUSH instead of PULL

Gravity is too weak to manifest itself at Quantum level. Spacity works both at Atomic and Galactic level

Photon acts spookily in Two Slit Experiment. Photon only follows the path created by interference pattern created by the energy generated by spacity

Gravity is the reason for galaxy, star, noon formation. Ionisation is the reason which kickstarts ionisation, similar to violent lightning force. Gravity is too weak to create star plasma

Matters attract each other. Space pushes matter together, Matter is free from affecting each other

Newtons equation applies to two planets but does not explain how third planet affects. Space is the communicator. The force between two planets is arrived after the effect of the universe is already accounted for

Genesis of matter from pure energy is unexplained. Matter is the by product of the tussle between space and energy. Depending on 'quantum' of energy escaping this tussle various building blocks of matter are born.

Light Travels as straight line, wave, or a combination of both. Light propagates as stream of expanding spheres. Each sphere independent of other. Sphere suffers a tear when obstructed and repairs itself through movement of photons across the surface

Dark Energy makes universe expands. Universe expands because of pressure difference between existence and nothingness. Universe expands as long as energy exists. Rate of expansion my reduce. Expansion continues till space wins contest with energy

Space and Time form the fabric of universe. Space and Time are independent of each other but need energy to exist.

Existing Model does not explain Type, Size, Density, Orientation of Galaxy. Arc of discharge decides that leads to which way the ionised gas will end up. Sharper arc leads to star while straighter arc a galaxy

Accretion discs leads to planetary system because of gravity. Planets and moons are also formed due to ionisation, discharge, arc. Same as galaxy and star. Gravity is too weak to form molten core

Life is a concoction of DNA, Flesh and bone. And needs favourable conditions to exist. Soul quantum is that part of pure energy which was unaffected by space. And can form life with matter. Does not need favourable conditions.

Space is the elephant in the room. Unacknowledged. Space has a construct of its own and holds the universe. Space is in perennial tussle with energy. When space wins, existence is driven into nothingness. Only nothingness has the capacity to contain infinity. Energy escapes nothingness almost instantaneously since time does not exist. New universe is born.

EXISTING MODEL
OF UNIVERSE
Vs
MANTHAN -AN ALTERNATE
MODEL OF UNIVERSE

TRIBUTE

This work of science would not have been possible without the contribution of my Family and Friends. Hearty thanks.



My father Mr. Ashokrao N Khatavkar, whose beginnings may have been modest, but his dreams were always Nobel Worthy.

Man, who was brave enough to make us believe that all it takes to follow a cause, is heart and commitment. He may have set this work in motion many decades ago, how I wish it were concluded a few months ago.

True to his life's teaching, real tribute would be to not have any regrets. A son in debt.



My Mom Smt Arati Ashokrao Khatavkar who instilled a sense of self belief in us to take on the best in the world.

Without imbibing her 'No-task-is-big-in-life' attitude, this work would not have been possible.

Thank you for making us believe that means are never an impediment to a cause.

& THANK YOU



A mighty thanks to my wife Gayatri. Concluding this work was not possible without her unflinching support

To pen one's thoughts is basis for giving shape to one's work. Her perseverance in bringing this to a logical conclusion was great motivation. At times, she seemed to have a stronger belief in MANTHAN being worthy of a read than me myself.

Thank you for being there.



To all those crazy friends who de-criminalised the concept of 'out-of-syllabus'.

Some who seeded many thoughts, Some for introduction of paradoxes of life, some for their infectious passion.

I thank all those faceless friends for their assistance.

ABOUT AUTHOR



RAJAN ASHOKRAO KHATVKAR

Born and brought up in the cradle of nature that is Gokak Falls. A place not far from City of Belagavi in the state of Karnataka, India. Studied in State Board Kannada Medium Gokak Mills' Schools, Gokak Falls.

Graduated in Mechanical Engineering from Karnataka Regional Engineering College, now known as NITK. Concluded his Post Graduation Diploma in Marketing from Symbiosis Institute of Foreign Trade Pune, now known as SIBM.

An interesting career spanning various cities of India leading up to his entrepreneurial venture Alpha Sierra Fze in UAE, now serving the Middle East Aviation and Rail Industry.

Intrigue and fascinations of Astronomy had always been mesmerising to engage. Understanding Universe's design and unravelling its mysteries have been comforting to the soul. An exercise not just for the grey cells, but soul too.

Presenting an alternate model of the universe was never an idea to begin with. Intention was to find answers to the vagaries of the universe, paradoxes that scientific community was grappling with. But you cannot keep following the same path and expect to reach a different destination.

Thus, propped the need to question the long-accepted concepts of Gravity and seek uncharted, long-neglected paths. While gravity was attributed to everything that happens in the universe, space was an elephant in the room.

Hypothesis of spacity helped explain the Two-slit experiment paradox but it cannot explain the genesis of galaxies and planetary systems. So, an alternate model could not be complete without addressing the formation of galaxies and planetary systems. That is when the idea of ionisation struck root and grew to explain the basis of formation of celestial bodies. Ionisation is a feature that we are so familiar with in the form of Lightning. A violent force in our own backyard.

The alternate model assumed a holistic proportion when it addressed equally important issues such as Dark Energy, Dark matter, Light travel, Infinity, Nothingness, Matter and Life.

However, proposing Hypothesis is not the be all and end all of it. It must stand the test of time, situations, and conditions. If Hypothesis has truth on its side, it will run its full course. The only way to check that is to go public. Thus, the document MANTHAN- An Alternate Model of Universe took shape.

There will be holes blown into the hypothesis but that is healthy. What does not kill you, will only make you stronger. However, what will last a lifetime, is the itch to seek truth.