

The Science Behind the Projection of the Universe

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The Science Behind the Projection of the Universe

Vedanta teaches us that the universe 'out there' is the projection of the mind. This is completely contradictory to what science teaches us. Science teaches us that there is already a universe 'out there' made up of unlimited number of objects. To perceive this universe, light travels from these objects and hits the retina of our eyes. The image in the retina is upside down, this image is reversed and the optical signal from the retina is transmitted to the brain. What happens in the brain is still unknown, but somehow, we perceive the image of the universe out there.

Vedanta teaches that the 'inside' subtle objects in the mind comes first and this becomes the 'outside' gross objects. Science teaches that the 'outside' gross objects becomes the 'inside' subtle objects in the brain. Both are completely opposite. Only one of them can be true? Which one? It is important to resolve this issue before we move forward with the discussion in this article. Since we are talking about projections, Vedanta's teaching is the only correct way to understand this issue. Projection of the universe by the mind is the only truth. We will now analyze this issue from different angles to show this hypothesis as correct.

1. By using Science
2. By using logic
3. By using Math's

1. By using Science – Theory of Special Relativity

Einstein's theory of special relativity was a major discovery in science, it discovered a connection between motion and time. The underlying theme of this discovery was that speed of light is fixed at 186,000 miles per second irrespective of the frame of reference. To understand this, let us say a person is traveling in a car at 40% of the speed of light and this person takes a measurement of light from the car. This person would expect that the speed of light to travel at 60% of its original speed. This person will be surprised to learn that the speed of the light is still 186,000 miles per sec. How does this happen? The only way to explain this is that the 'time' of the person travelling in the car has slowed down. His clock will move slower as compared to people outside the car. His space or ruler will also be more compressed. Since time has slowed down and space has been compressed, his measurement of the speed of light will still be 186,000 miles per second. So, the main conclusion from this discovery is that if you have motion (in fact any motion), time slows down. Even if you are walking or traveling at 40% of the speed of light, time slows down. How much time will slow down will depend on speed. Higher the speed, more the slowing of time. At the speed of light, time does not move, it remains stationary. Higher the speed, space gets more compressed. We do not realize this, but

the connection between motion and time has tremendous implications in our daily life. Do we see motion in this universe? Of course, there is motion everywhere. We see an ant crawling, we see a person walking and someone else is cycling or going in a car. Some are going faster while others are slower. If you apply the principles of Einstein theory, it would mean that the time clock for each person is beating differently. If two people are stationary, their clocks will beat at the same rate, the moment one of them starts walking, the clock for that person walking will slow down.

If the time clocks are different, the space compression is also different for each person. If the clocks are beating differently for each person, that would mean that the atoms are vibrating differently. If you are stationary and I am walking, my clock is different, my atoms are vibrating differently, so all my objects are completely different from your objects. What does this mean? It means, that I project my own objects and universe, and you project your objects and universe. In the same way, every living being creates their own universe.

The only correct conclusion from this discussion is that each person is projecting a different universe based on their internal clock. Einstein's theory of relativity therefore supports what Vedanta is teaching us about the projection of the universe.

2. By using Logical Reasoning

Let us study the external objects 'out there'. If we can see a faraway star, say 5 million light years away, it will take light from that star 5 million years to reach us. Now, we see the sun, the light from the sun takes 8 min to reach us. We look at the moon; its light will take 3 seconds to reach us. We look at the plane flying in the sky, at 30,000 feet; its light will take about 300 milliseconds to reach us. As the distance of the object being viewed is reduced, the time taken for light to reach us or for us to see it is much smaller. I now look at the tree outside the window; the time taken for light to reach me is 10 microseconds (10^{-6}). I am looking at the computer screen 1 ft away typing this article, light will take about 1 nanosecond (10^{-9}). As the distance reduces the time taken for light also reduces. If you extrapolate this backward, the only logical place for t to be equal to 0 is the Observer, who is watching all these objects. This means that the observer within you is the starting point of space. This starting point of the universe is $t = 0$.

If you or anyone else looks at the universe, they will reach the same conclusion. Everyone has their own $t=0$, which is within themselves. This will apply to every living being in the universe. It would seem; therefore, I have my own $t=0$, you have your own $t=0$ and every living being in the universe has their own $t=0$. The only way to understand this, is that every living being creates their own universe and this universe starts with $t=0$.

This logical reasoning does show that each individual living being projects their own universe and the space of this universe starts with the observer within you.

3. By using Mathematical calculation – Hubble Constant

Does the universe expand? Science tells us that the universe is expanding. Why is the universe expanding? How fast is the universe expanding? Science is not very sure about these questions. Using powerful telescopes, they have watched the movement of different planets and galaxies, and noticed that the expansion is uneven. At some places the expansion is faster and at other places the expansion is slower. There is no explanation about this uneven expansion. Looking at some far away planets and looking at their rate of expansion, they have come up with a Hubble constant. The Hubble constant states that the [rate of expansion](#) is about 71 kilometers per second per megaparsec. A megaparsec is a million parsecs, or about 3.3 million light-years. It means objects 3.3 million light years away are expanding at 71 kilometers per second. This is based on observation only. If you understand the fundamentals of the universe expansion, it is possible to calculate and prove the Hubble Constant.

So, what are the fundamentals of this expansion? Understanding the spacetime fabric is the key to understand this expansion. We have seen that the individual person or the observer location is the start point for the spacetime fabric. We can call this the $t = 0$ for the spacetime fabric.

What is the maximum size of the spacetime fabric? Science tells us that the age of the universe is 13.7 billion years old. This is the big bang moment. Light reaching us from the big bang moment would be the outer edge of the spacetime fabric. Light will take 13.7 billion light years to reach us from this big bang moment. This is the outer edge because there was no universe before the big bang. So, the size of the universe: 13.7 billion light years or 12.9×10^{25} meters. One light year is the amount of distance light travels in one year, which is $= 9.46 \times 10^{15}$ meters

Is this spacetime fabric expanding? Definitely, yes. How much? Let us try and understand this. If you assume the universe is 13.7 billion years old 'right now'. After one second, the age of the universe will be 13.7 billion years + 1 sec. Light must now travel an additional 186,000 miles to reach us, which means the size of the universe has grown by 186,000 miles. After 10 seconds, the size of the universe would increase by $186,000 \times 10 = 1,860,000$ miles. After one year from now, the size of the universe will increase by 1 light year. 1 light year is the distance light travels in one year.

From the above, we can conclude that the rate of expansion of the Universe = 1 light year per year.

If you can imagine the spacetime fabric as an elastic rubber band, starting from the start point $t=0$ (which means you) to the edge of the universe. The observer's side is fixed, it is always $t = 0$;

the other end which is the outer edge of the universe is being pulled outwards. This elastic space time fabric is expanding by 186,000 miles every second. As time flows, the expansion of the spacetime fabric will continue at the speed of light.

It must be understood that only the edge of the universe is expanding at the speed of light, anything in between will not expand at the same speed, it will be proportional to the distance from the observer. Using the rubber band example, if you pull the outer edge by a certain distance, the inner parts will not be stretched by the same amount. The stretching will be more at the outer edges and it will be much less as you move inwards to the other side. This means that the rate of outward expansion of galaxies, stars, etc., would really depend upon how far these galaxies are from the observer. The observer is $t=0$. Stars close by will expand more slowly, as compared to stars which are further away. This is because the space time fabric for the stars nearby will stretch less as compared to the stars which are further away.

Based on our understanding of the stretching of the space time fabric, let us try and calculate the Hubble Constant

- The size of the universe is 13.7 billion light years and it expands by 1 light year every year.
- The object 3.3 million light years away from us, it will expand by $3.3 \times 10^6 / 13.7 \times 10^9 = .240 \times 10^{-3}$ light year per year.
- 1 light year = 9.46×10^{12} Km
- Therefore $.240 \times 10^{-3}$ light year per year = 2.27×10^9 Km per year.
- 1 year = 3.15×10^7 sec
- 2.27×10^9 Km per year = 71 km /sec

The above calculation shows that the Hubble constant is indeed 71 km/sec. We have just proven what has been observed by science. Since the calculation of the Hubble constant is accurate, it only shows that the expansion model explained in this section is correct and accurate.

This expansion model shows that the starting point of space is the observer within you. Since each one of us has their own observer, so each one projects their own universe full of objects. This does mean that the subtle objects come first and these subtle objects in the mind are projected out there as gross objects.

We have just proven in different ways that there is no single universe 'out there'. Each living being creates and projects their own universe. This may not be so easy to digest but this is the only truth. The only universe you know is what you project out there. It is impossible to know the universe other people are seeing. Everything is a projection from the mind. For this projection to work it is only correct that subtle objects come first and this is converted to gross objects out there. So, subtle objects come first and then the gross objects. This definitely shows that what science has been teaching is inaccurate and incorrect.

Let us now get back to our main topic - how does this projection work? We can divide this projection process into two steps

Step 1: Pre-projection activity in the mind

Step 2: Projection of the Mind

Step 1: Pre-projection activity in the mind

It is easy to compare this step to an actual digital projector. Without being too technical, there are two major parts to any projector. One is the light source or bulb and the other is the content which must be projected. The mind also has a similar structure:

- A Bulb of Awareness
- Content which must be projected

Let us discuss these two parts in more detail

Bulb of Awareness

Awareness is the inner most core of any living being. It is like a bulb shining within our inner core. If any object, it could be an image, sound, touch or feeling, comes in the presence of this bulb of Awareness, you will be aware of that experience. Here are some examples of awareness we experience daily.

How do we know the tree is green? Because we are aware of it.

How do we know sugar is sweet? Because we are aware of it.

How do we know we have two legs and two hands? Because we are aware of it.

How do we know the weight of the chair is 20 lbs.? Because we are aware of it.

How do we know the smooth touch of silk? Because we are aware of it.

How do we know we are listening to music? Because we are aware of it.

The common thread to all these questions is Awareness. It would seem Awareness is a prerequisite to observe any object. Without awareness, we would not know any objects which are perceived by the 5 senses organs – eyes, ears, nose, tongue and skin. These objects from the sensory organs must encounter Awareness, then only we can observe the object. For an analogy, think of the sun. When there is no light from the sun, you cannot see anything but in the presence of the light everything becomes visible. In the same way when any form comes in the presence of the light of Awareness, we become aware of the object. If there is no light of Awareness, you will perceive nothing, not even the sun.

Awareness is the most powerful force in the universe. It has the power to connect with a form present in the mind and fill up the object with Awareness. If you analyze Awareness, you will conclude that Awareness is made up of a Subject, Intelligence and Object with the following functions

1. There must be a Subject, who is Aware of the experience. This subject is the knower of the Awareness
2. There must be an Object, which must be experienced. This object is the known part of the Awareness
3. There must be Intelligence by which the subject gets to know the object. This is the knowing part of the Awareness

Knower, Known and Knowing/Intelligence are the 3 powers of Awareness. It must be clear that

- Awareness = Subject + Object + Intelligence
- Power of Awareness = Power of Knower + Power of Knowing + Power of Known

Awareness is made of Subject, Intelligence and Object and it has three different powers - Knower, Knowing and Known. It must be understood that the Subject, Intelligence and Object and the three powers are not something outside in the world but they are within Awareness and make up Awareness. If any one of them is missing, awareness will not work and will be incomplete.

- If there is an object to be observed but there is no subject, there will be no awareness, as there is no one to see the object.
- If there is a subject but no object to see, there will no awareness as the subject has no object to observe
- If there is an object but the subject has no way of knowing what this object is, no awareness will take place. This knowing must have intelligence.

Wherever there is awareness, the Subject, Intelligence and Object must be present with all the three powers.

Our inner core is full, complete and it stands alone. For Awareness to be full and complete, it must be Self-Aware. Self-Awareness means that the 'Awareness is aware of Awareness'. Another way to put this is that 'Self is aware of the Self'. In Self-Awareness, the subject is Awareness and the object is Awareness. Awareness plays the role of subject and object. In other words, both the subject and object are the same. There is one entity only which is non-dual. This complete, self-standing Self Awareness is our inner core. There is no separation between the subject and object – it is one. It is Self-Shining. This Self-Shining Awareness is the Bulb of Awareness and it is our inner core. It is not dependent upon anything else and it generates its own light of Awareness. And it is the Bulb of Awareness.

Vedanta teaches us that our inner core is Atma and this Atma is SatChitAnanda. The Bulb of Awareness which we have discussed here is the same as SatChitAnanda.

Bulb of Awareness = Self Awareness = SatChitAnanda = Atma

Let us now discuss what is the nature of 'SatChitAnanda'.

Sat: Sat means 'Real'. According to Vedanta, for anything to be Sat, it must exist and be present in all the 3 tenses – past, present and future. If you investigate nature, you will not find anything which is Sat. Everything perishes in nature. Awareness or Atma is the only thing which is Sat or Real. It has been there in the past, it is here right now and it will be there in the future. Awareness or Atma is the only thing which is Real and it is, therefore, formless, unchanging and uncreated.

Chit: Chit means 'Awareness'.

Ananda: Your essential nature is Ananda or Bliss. This term can be confusing because we do get momentary bliss in our day to day lives and this is not the Ananda we are talking about. Our inner core is full and complete. Our inner core has no needs or wants, it is, therefore, at complete peace with itself. This peace and completeness is our inner core and this is the Ananda we are talking about.

Self-Awareness is non-dual, homogenous and it has many inherent powers. We will discuss a few of them here which will be useful in our future discussions.

- Formless
- Unchanging
- Infinite Energy source

Formless: Awareness is formless. Because it is formless, Awareness has the 'potential' to take up any form. The possible forms are limitless. If Awareness had some type of form, then possible forms would be limited. For example, if Awareness had a shape of a cube, then this

building block can be combined in different ways to create a limited number of shapes only. It is not possible to create every possible shape. In the same way, if the building block of Awareness was a sphere, the possibility of creating different shapes is limited. Only something which is formless has the potential to create an unlimited number of shapes and sizes. There is no restriction on the possibilities. Awareness is formless and therefore Awareness has the 'potential' to become any object. The possibilities are unlimited.

Unchanging: Awareness is unchanging. It remains the same and it will never change (no change over the 3 tenses). In something which is unchanging, time must be static, and it does not move. Time is an inherent quality within something which is not changing but this time factor is not moving. Because this time factor is not moving, only for this reason some thing is unchanging. If for whatever reason, this 'unchanging' starts 'changing', time will and must 'pop out' from this unchanging entity. If something is changing, it means that what is now, is no longer the same. Since the two events are not the same, the time factor comes into play to connect the two events. It is not incorrect to say that time drives the change between two events. Awareness is unchanging and the only reason it does not change is because the time factor is static.

Infinite Energy Source: Does Self-Awareness or SatChitAnanda have infinite energy? Yes, it does have infinite energy. How can we understand this? Obviously, there is no scientific proof, but we can use logic and correlate with other scientific investigations. To understand this, a good example is to see how the atomic nucleus works. In school we learned that the atomic nucleus is made up of neutrons and protons. Different elements have a different combination of neutrons and protons. Neutrons have a neutral charge, while the protons have a positive charge. We also know that positive charge must repel each other. If they are supposed to repel each other, how come they stick together within the nucleus. The answer is that there is a strong nuclear force which keeps these protons together within this nucleus. This nuclear force binds the protons together. This nuclear force is within the atomic nucleus and is always present in the nucleus. In fact, this nuclear force is the source for the atomic bomb.

This concept can be applied to keep the object and the subject together as one entity within Self-Awareness. We have discussed earlier that in Self Awareness; the subject is same as the object and the object is same as the subject. Logically they must be separate. The subject is 'in here' and the object is 'out there'. Can you imagine the energy required to bring the subject and object as one homogenous entity? To force them to become one entity. To make the subject into an object and the object into a subject. It seems like an impossible task, but it does happen within Self-Awareness. It is not wrong to predict that the energy required to undertake this task is infinite. An infinite amount of energy will be required to keep the subject and object as one unit within Self Awareness. Like the nuclear force is present within the nucleus, Self-

Awareness is a store house for infinite amount of energy to keep the Subject and Object as one homogenous unit. This infinite energy stored in Self-Awareness is the source for the energy in the universe. This energy within Self-Awareness is in 'unmanifest' condition and is in 'potential' form. This energy within Self-Awareness is inactive, it is dormant, but it is present. Vedanta calls this infinite energy stored within our inner core as Maya Shakti. We will shortly see how this energy is activated and how it is used in different ways to power the projection of the universe 'out there'.

Content Which Must be Projected

We have just seen that the Bulb of Awareness or Self-Awareness is the power source for the projection of content. What about the content which must be projected? Vedanta teaches us that there are individual minds and the total of individual minds can be called the cosmic mind. The cosmic mind is the source for content. A good way to understand this is to compare this with Google Maps. I think most of us use Google Maps. Somewhere in the cloud, there is a complete software or code for Google Maps. This software will show the roads for almost every city and country in the world. If I am at a certain location and you are in another location, Google Maps will show the map for that location only.

Cosmic Map is like Google Maps but more extensive, complex, smarter and dynamic.

- Cosmic Map covers the entire universe. It is extremely detailed and covers every inch of the universe. There is no place which is left out. It cannot be more complete. Every tree, every mountain, every planet and every galaxy are covered by the cosmic map.
- Every perspective and view are covered in the cosmic map. If you are flying at 30,000 feet, that view from the window is covered. If you are underwater and look upwards, that view is covered. If you are moving in a train, that view is covered. If you go into space, that view is covered. If you are underground inside a cave, the view is covered. There is nothing which is missing in this cosmic map.
- The cosmic map is not static. It is dynamic. Everything in this universe ages. Every living and nonliving being in this universe ages. As time flows, every object in the universe grows and changes. Also, every object ages differently and for a different duration. The cosmic map reflects this for every object in this ever-changing universe.
- The cosmic map is always up to date. If you cut a tree branch or move a stone or if anyone makes any change to any aspect anywhere in the universe, the cosmic map will reflect those changes instantaneously without delay. The cosmic map is never out of date. It is updated continuously and immediately.
- Object version in the cosmic map keeps changing. The cosmic map is made up of many objects. This may be easier to explain by a simple example. If there is a tree you are seeing, which is 100 feet away. Light will take $0.1 \mu\text{s}$ (10^{-6} seconds) to reach you, so the

tree you are seeing is not a 'now' version of the tree but a $0.1 \mu\text{s}$ younger version of the tree. Now, if you move and see the same tree from 600 feet away. What happens? The tree is further away, light will take $0.60 \mu\text{s}$ to reach you. You are not seeing the same version, you are seeing a different version of the same tree. This will apply to all the objects in the cosmic map. The objects which are closer to you, light will take less time, so you will see a younger version of the object. The objects which are further away, light will take more time to reach you, so you will see an older version of that object. The cosmic map is complex – if you keep moving around, the object version in the cosmic map will keep changing. This aspect is pre-programmed in the cosmic map.

The cosmic mind stores the complete map of the universe. The individual mind covers a subset of the map. This would depend upon what the individual person wants to view. The content within the individual mind is used for the projection.

Step 2: Projection of the Mind

Once the content in the individual mind encounters the Bulb of Awareness, you have magic, you have awareness of the content. This awareness is displayed in the world 'out there'. Vidyanaraya, the great sage from the 14th century in the 6th chapter of Panchadasi has compared the image 'out there' to a painting. If you think about it, this is a perfect analogy. Anything and everything we see out there is like a painting. In fact, the painting 'out there' is superior to the painting that any human being can create. See the variety, see the shades, see the beauty of nature. It is breathtaking.

Vidyanaraya has analyzed the following steps needed to create any painting.

1. You need a canvas for the painting. Vidyanaraya talks about a piece of cloth as the canvas.
2. You need some sort of starch to harden the canvas to make it painting ready.
3. You make a line drawing of the sketch you want to create.
4. You add color to finish the painting.

The projection of the content from the mind follows the same four steps.

Step 1: You need space – the Canvas

Step 2: Harden the Canvas with Energy

Step 3: Create the Subtle Image of the Painting

Step 4: Finish the Projection

Let us discuss each of the steps in more detail to understand how the actual projection is taking place. This discussion is rooted in science so that this does not remain abstract and philosophical.

Step 1: You need space – the Canvas

There is no denying all the ‘painting’ or ‘image’ being projected out there is in space. Space seems to be the canvas for the projection. It is the screen on which the painting is created or projected. We see space everywhere but do not have much of an understanding about the 1) fabric of space and 2) how space is created? Let us try and understand these two aspects:

Fabric of Space: You will be surprised to learn that ‘time’ is the underlying cause of space. Einstein understood this, and he called space as spacetime. When we look at space, we mostly see distances. The tree is 100 feet away, the person standing out there is 300 feet and so on. This perspective does not give a proper understanding about space. We have looked at space in terms of time. We have discussed this subject earlier but would like to return to this again.

If we can see a faraway star, say 5 million light years away, it will take light from that star 5 million years to reach us. Now, we see the sun, the light from the sun takes 8 min to reach us. We look at the moon; light will take 3 seconds to reach us. We look at the plane flying in the sky, at 30,000 feet; light will take about 300 milliseconds to reach us. As the distance of the object being viewed is reduced, the time taken for light to reach us or for us to see it is much smaller. I now look at the tree outside the window; the time taken for light to reach me is 10 microseconds (10^{-6}). I am looking at the computer screen 1 ft away typing this article, light will take about 1 nanosecond (10^{-9}). Space is really based on time; the amount of time light takes to reach us. Objects which are closer, the light will take less time to reach us and objects which are further away, light will take a much longer time to reach us. So, we can see that time is the actual fabric of space. Time is the cause of space. Space is just the result, it is the effect of time. So, space is time based.

Space vs Spacetime: People use space and spacetime interchangeable. This causes confusion. Let us clarify this. When you look at space in terms of distances, it is space. However, when you look at the same space in terms of time, that space is spacetime. Space is ‘out there’ you can see it. Spacetime is not ‘out there’ it within your mind. It is a mental thing, you imagine the sun is 8 min away from you. You imagine objects are so many seconds away from you. All this imagination takes place in the mind only. Spacetime is in the mind first and then this spacetime is converted to space ‘out there’.

Pixels of Spacetime: We know an LCD monitor is made up of pixels. Pixels are picture elements which make up the surface of the monitor screen. In the same way spacetime is also made up of pixels. Since spacetime is time based, the pixels must also be time based. The starting pixel

will be at $t = 0$, which is the start of the spacetime fabric and the value of the time pixel will increase as you move further away on the spacetime fabric. How apart are these pixels in space? Well, based on Planck's Constant, the smallest division of time is 10^{-44} seconds. So, spacetime is not a continuous and a homogenous thing. It is made up of time-based pixels which are 10^{-44} seconds apart. The entire spacetime is made up of pixels which are 10^{-44} seconds apart. The first pixel will be at 10^{-44} seconds, the second pixel will be at 2×10^{-44} seconds away, the third pixel will be at 3×10^{-44} seconds away. This progression will continue till the end of the spacetime fabric.

How is Space Created? Before we discuss this, we have to take a step back and understand Self-Awareness and Ignorance. We have discussed earlier that Self-Awareness is our inner core, it is self-standing, it is non-dual in which subject is object and object is subject. We also discussed that this Self-Awareness is formless, unchanging and it has infinite energy. All these powers are within Self-Awareness. If all this is true, why don't we know this or why don't we experience this. The simple answer is that we are Ignorant. We are ignorant that we are non-dual, we are both the subject and object. Since we are not aware that we are both the subject and the object, this means that the subject and object are no longer one entity, but they are separate. Ignorance separates the subject and object. We then feel this duality with objects 'out there' and the subject 'in here'. This ignorance may seem routine, but it has that power to separate the subject and the object. Ignorance is the only thing which can separate the subject and the object. We saw, it takes an infinite amount of energy to keep the subject and object as non-dual. Despite this, ignorance has the power to separate non-duality to duality of subject 'in here' and object 'out there'. This is the power and strength of ignorance.

We saw earlier that it takes an infinite amount of energy to bind the subject and object as one homogenous non-dual entity. With the separation of subject and object, this infinite energy is now available in the cosmic mind and a limited subset of this energy in the individual minds. The 'Unchanging' Self-Awareness becomes the changing cosmic mind. The formless Self-Awareness becomes the cosmic mind with the potential to take an unlimited number of forms.

Due to ignorance all the powers within Self-Awareness pop out in the mind. We saw earlier that Self-Awareness is unchanging because the time factor within Self-Awareness is stationary and it does not move. Due to Ignorance, when the 'Unchanging' becomes 'Changing', the time factor is now active within the cosmic mind and the individual mind. The clock which creates time is now available within the cosmic and individual mind.

The cosmic mind has infinite energy and the clock from which time flows. The clock we are talking about is unique, this clock has the power to create or generate time. It is not easy to visualize this, but the mind has the power to create time. The individual mind has a limited amount of energy and the clock to run its own activity. The individual mind is always connected

to the cosmic mind and it can draw upon the required amount of energy. So, the individual mind has the energy and the clock to generate time. This power is within each individual mind.

The energy which is available in the mind is pure energy. This energy plays different roles within the mind. It must be understood that this energy is independent of time, it is raw or pure energy which is available in the mind. Let us see what happens when a part of this energy interacts with time in the individual mind. This energy stretches out time so that every second in time is equal to 186,000 miles (speed of light). Just like a rubber band can be stretched outwards, in the same way time can be stretched outwards by this pure energy. With this stretching of time, space is created. One second of time in space becomes 186,000 miles. This is the space we see 'out there'. This space is the canvas which is used for the projection of the painting or image. So, space is created when this pure energy stretches out time.

Science has concluded the presence of dark energy in the universe. They have also concluded that the dark energy is expanding. We know that the universe is expanding and if the universe is expanding, the space must also be expanding. This creation of space and the expansion of the universe needs energy. Science has not fully understood this but the dark energy being discussed by science is the same as the pure energy which is used to stretch time to create space.

Dark Energy (as referred by science) = Pure Energy in Mind

Science knows that the dark energy is present, but it is unable to locate it anywhere in the universe. It is just not possible to find dark energy 'out there'. This is because the dark energy is part of the infinite pure energy and is present in the cosmic/individual mind only. It is not present in space 'out there'. This dark energy is used to stretch time. Time is subtle, you will not find time 'out there'. Time is a mental thing, it is present in the mind only. The stretching of time takes place in the mind only. The dark energy is part of the infinite pure energy which is present in the cosmic/individual mind. There is no denying that the consequence of stretching of the time in the mind is the creation of space out there. Space is gross and is visible 'out there'.

The stretching of time is a personal or individual thing. Every individual mind creates their own space. How can we say that? We have discussed earlier that according to the Einstein theory of relativity, there is a connection between motion and time. If you are stationary and start walking or running, the time clock in your mind slows down. Since your time has slowed down and when this interacts with energy, this energy will stretch your time to create space which is 186,000 miles. But the size of this space will be more compressed than the space when you were stationary. So, every time there is motion (or change of speed of motion) the pace of ticking of time in the clock changes and this in turn changes the size of space. What remains

constant is that the size of the space is still 186,000 miles for every second of time. This means, depending upon the level of motion each living being in this universe will create their own space.

Space is Expanding: Space is directly connected to time. Time is never static. As time moves and grows, this means space also keeps expanding. If we assume 'right now' the universe is 13.7 billions years old. The size of the space will be 13.7 light years. This is amount of time light will take to reach each of us from the outer edge of the universe. If now 1 sec has passed, the age of the universe will be 13.7 years + 1 sec. The size of the space after 1 sec will 13.7 billion light years + 186,000 miles. After 10 seconds, the size of the space will be 13.7 billion light years + 1,860,000 miles. In the same way, the size of space after one year from now will be 13.7 billion light years + 1 light year. So, we can see that the space is expanding, and the outer edge is expanding by 1 light year every year.

Size of Space: Logically space starts with you and ends with the outer edge of the universe, which is 13.7 billion light years away. This may be true, but do we even see the outer edge of the universe. We are sitting inside our house; space will end at the walls. You cannot see beyond the wall, so space must end there. If you go out for a walk, you may see things which are a few hundred meters away, so your space will be a few hundred meters. In the night, when you look at the sky, you will see many stars and your space will cover a long distance. The space will be limited by what you are seeing. We can theoretically say that space covers the full universe right up to the edge of the universe, but space is limited to what you are seeing right now. The size of space will keep varying depending upon what you are seeing.

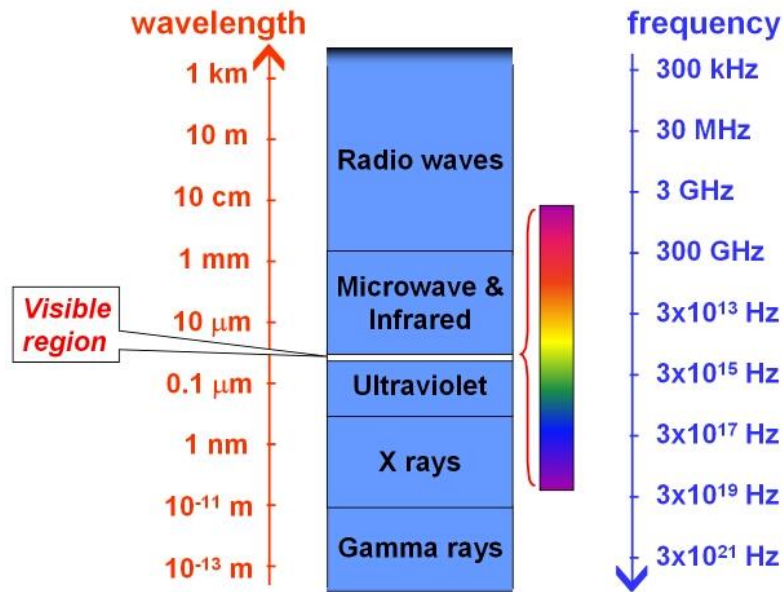
Step 2: Harden the Canvas with Energy

Like starch is used to harden the canvas made up of cloth, energy is used to harden every part of the spacetime fabric. We saw pure energy was released with the separation of the subject and object from Self-Awareness. We just saw that some of this energy was used to stretch time to create space. Another portion of this energy combines with the time pixels to create electromagnetic (EM) waves. How does this happen? We saw earlier that spacetime fabric is made up of time-based pixels which are 10^{-44} seconds apart. This pure energy combines with each time-based pixel in the spacetime fabric to give time-based energy to the pixels. What is time-based energy? Time based energy is nothing but the source of the electromagnetic waves. The moment energy combines with time you get frequencies and wavelengths. In school we learned that EM energy is made up of waves. Frequency and wavelengths are the two key components of the EM wave. Also, frequency is directly related to time.

f (frequency) \times w (wavelength) = c (speed of light)

f (frequency) = $1/t$ (time)

A wide range of frequencies and wavelengths make up the spectrum of the EM energy. The known spectrum starts from Radio waves (300 KHz) to Gamma rays (3×10^{21}) Hz. Each time pixels in the spacetime fabric oscillates in such a manner that it is a combination of all the possible frequencies in the EM spectrum. Each pixel is the source for the complete range of EM frequencies. Since time pixel is available in every part of the spacetime fabric. This means the spectrum of energy also covers the entire spacetime fabric. This EM energy provides the coating for spacetime fabric.



There is a misunderstanding, people think that the space out there is made up of vacuum. That maybe true because there is a lack of particles like hydrogen and other elements. If there are no particles, it does not mean that there is no EM energy. Since each time-based pixel is powered by energy, this EM energy is available at every part of the spacetime fabric. Where ever there are time pixels, this energy is available.

Science has also discovered this, they call this the vacuum energy. It is active and bubbling under the surface of the spacetime fabric. In our discussion, I do not want to leave the impression that the EM energy is something out there. Space is out there, but energy and time is not out there, it is within the mind only. The time-based pixels are not out there but within the mind. Both the time and energy are subtle, it just cannot exist out there. Everything out there is gross, there is no place for subtle elements 'out there'. The vacuum energy is bubbling in the mind, but it is directly connected to the space out there. A good way to understand this is to compare it with holograms we have seen in movies. The energy source for the holograms is within the projector, but the space is created out there. This is the type of relationship time and energy in the mind has with the space out there. Mind is the projector for the space out there and time and energy is within the mind.

Step 3: Create the Subtle Image of the Painting

The line drawing of the painting must come first. In the same way, the subtle image of the painting is created in the mind first. Everything subtle must happen in the mind only. Let us see how this work? We saw earlier that due to Ignorance, there is a separation of object and subject in the non-dual Self Awareness. This separation creates the following 4 components which make up the individual mind.

- Manas (the home of the objects)
- Buddhi (the home of Intelligence)
- Sakshi (the home of the Subject)
- Ahamkara (the home of the self/ego)

The cosmic map which we discussed earlier presents itself in the manas. Please note we are talking about the software code of the cosmic map and not the actual maps like we see on the smartphones. If you are in your home, the software code for that part of the cosmic map will show up in your mind. If you are walking outdoors, the objects around you will be present in the cosmic map and be available in the manas. The manas has no intelligence, it does not know what these objects are. It must be understood that these objects are made up of waveforms and these waveforms are covered by ignorance. Manas passes on this waveform covered with ignorance to the Buddhi for help and decoding. The Buddhi is intelligence, it knows. It has this power of knowing everything. With this power, it removes the layer of ignorance from the waveform to reveal or know the objects. Once this is done, the waveform is no longer covered by ignorance, the intelligence of the Buddhi is superimposed on the revealed waveform. The waveform is now made up of intelligence. Intelligence is the ingredient or substratum of the waveform. Vedanta calls these intelligent waveforms as Vrittis or mental waves. These are intelligent mental waves and it knows what form it must take. They know what they are and do not need any further assistance.

Any scene usually is a total of many individual objects. Each object has its own mental wave or vritti. They superimpose on each other and form a complex vritti representing the scene. Each individual object waveform (or vritti) is made up of intelligence. Since these are mental waves, they must have energy to exist. Without energy, the mental waves cannot function. Each vritti representing an object has a unique energy profile. The total of the individual objects will have a complex energy profile representing the scene.

Placement of Objects on Spacetime: The mental waves made up of intelligence must now be placed appropriately on the spacetime fabric. We have seen earlier that the spacetime fabric is made up of time. Time is subtle and is a mental event. The spacetime fabric is also a mental event. Space is gross and is out there but the spacetime fabric is subtle. The observer within

you is the starting point for space. The mental wave in the Buddhi represents the cosmic map which is being viewed in the mind. Objects closer to you in the cosmic map will be placed closer on the spacetime fabric. Objects which are further away in the cosmic map will be placed further away on the spacetime fabric. In this way, all the objects will be placed appropriately on the spacetime fabric.

Another important issue is that the correct version of the object must be used while placing the object on the spacetime fabric. Light takes some time to reach us, so the objects are always dated and are never the 'now' version. It is always the dated version. If the object is $0.1 \mu\text{s}$ away from you, that version of the object must be used. If a tree next to this object is $0.15 \mu\text{s}$ away, then that version of the tree must be used. There is no denying this is a very complex process of choosing the correct version of the object to be placed at the right location on the spacetime fabric. I guess, the cosmic map is pre-programmed to consider all these complicated issues. All these issues are taken care of in the software of the cosmic map.

Energy and Spacetime: We have just seen that all the objects which are made up of mental waves are placed appropriately on the spacetime fabric. These mental waves are energy waves with intelligence as their ingredient. How do these mental waves interact with the spacetime? Einstein has already answered this question. In his theory of General Relativity, Einstein concluded that when energy or mass is placed on the spacetime fabric, the spacetime fabric curves. It is exactly like a stretched rubber sheet. If you place a ball on this rubber sheet, the weight of the ball will curve the rubber sheet around it. Heavier the ball the greater the curvature. The spacetime fabric behaves in the same way in the presence of energy. The energy from the mental waves will leave an imprint (or curvature) on the spacetime fabric. Wherever there is a concentration of energy, the spacetime fabric will curve. Higher the amount of energy greater the curvature. Lesser the amount of energy smaller the curvature. Even a tiny amount of energy will leave a dent on the spacetime fabric.

This imprint on the spacetime fabric is like the line drawing we make before adding paint to a painting. We saw that the mental waves in the buddhi is made up of intelligence. This intelligence is very much a part of the imprint which is left on the spacetime fabric.

Step 4: Finish the Projection

If you look at any painting, you will notice that the painting is made up of the following two things:

1. Form
2. Content

The trees, people, houses or any other object you see in the painting is the form present in the painting. The paint is the only content of the painting. If you think about it carefully, nothing else is present in the painting other than the paint. There may be different colors but all these colors are still paint only. As another example, when you see a movie, we see so many characters and objects on the screen. All these are different forms in the movie. The content of these forms is nothing but light. Light with different shades and colors is the content of the movies.

We have compared the projection of the world out there with a painting. So, like the painting or the movie, everything in the world out there is made up of form + content only. Let us discuss this further.

Form: In the last section, we discussed that the intelligent mental waves or vrittis makes an imprint on the spacetime fabric. This energy curves the spacetime fabric. We saw, the spacetime fabric in the mind is made up of time pixels. Each time pixel is an outlet for the EM energy. The imprinted mental waves are made of intelligence and it knows what object/s it represents. This knowledgeable imprint of the mental wave interacts with the EM energy. What happens? It sucks out the EM energy stored in the pixels and uses that energy to become the form of the object. The mental wave knows what form it must take, it uses the EM energy and becomes that required form. This form is no longer subtle but it is gross. The gross form of the object is created by the interaction of the mental wave with the EM energy. The placement of this form in space will depend on the location of the mental wave on the spacetime fabric. If this mental wave is $0.1 \mu\text{s}$ away from the start of the spacetime fabric, this form will be located 100 feet from you in space. This is because light will take $0.1 \mu\text{s}$ to travel 100 feet. In the same way, the imprint of all the mental waves will interact with the EM energy and create gross forms and these forms will be located at appropriate distances in space.

Science has discussed this interaction between mental energy waves and EM energy. They call this the Quantum Field Theory (QFT). To put this simply, QFT states that when two energy fields interact with each other, particles are created. This is exactly what is happening over here. The mental energy wave and the EM energy are the two fields, and when they interact the gross form of the object is created.

Content: We have the form of the object, what about the content of the object? What is the content? Science tells us that the content of the objects is made up of sub-atomic particles. The next question – what are the sub-atomic particles made up of? Some people say, it is made up of strings vibrating in 11 dimensions. The next question – what are strings made up of? This can be a never-ending exercise. Also, if you study the sub-atomic particles, you will find that 99.999% is empty space. What is this empty space made up of? It is going to be difficult for science to answer this properly. So, what is the content of the object form?

If you are a student of Vedanta, the answer would be that the content is Awareness. Awareness is the ingredient of every object in the world out there. If you have an experience of objects, you must be aware of that experience. Awareness is the prerequisite of any experience. If there is no Awareness, there can be no experience. The following equation links experience with Awareness.

Experience = Awareness + Form.

We just saw that forms are created by the interaction of mental waves and EM energy. For us to experience these forms, they must be filled up with Awareness. Without Awareness, there cannot be any experience. To experience any object, Awareness must take the exact shape of the form. If the form is a circle, Awareness cannot be a rectangle. Awareness must also be a circle. Therefore, Awareness must take the exact shape of the form. Just like in the painting, the forms in the painting are filled up with paint, in the same way, all the forms 'out there' are filled up with Awareness.

We know Awareness is made up of the following 3 ingredients and 3 powers. The power of the known is the power within Awareness which allows Awareness to become any object. It can take up the shape of any object. We have discussed this in more detail in our post 'Analyzing Awareness'.

Awareness = Subject + Intelligence + Object

Power of Awareness = Power of Knower + Power of Knowing + Power of Known

Going back to the functioning of the mind, we saw that the object covered with ignorance in the manas is passed on to the Buddhi – the home of the intelligence for help. The buddhi with its intelligence decodes and creates the mental wave or vrittis. This mental wave has the object + intelligence - the two ingredients of Awareness. The only thing missing is the subject to complete Awareness. When these mental waves come in the presence of the observer (the subject or sakshi), magic happens – Awareness is created. This Awareness with the power to become any object fills up all the forms.

When Awareness fills up the object form, the painting is completed. This completes the projection of the objects out there. If you think about it carefully, there is no projection. What ever you see 'out there' is the same as what was in the mental waves. There is no addition or subtraction in the content. The only thing that has happened is that the subtle mind has become a gross mind. The subtle content has become gross content. What you see 'out there' is directly related to the content of the subtle mind. So, calling it the gross mind is a good way to understand the world out there. Everything 'out there' is nothing but the gross mind, it is your gross mind. This way, you can feel a direct connection with the world 'out there' by

thinking this is my mind only. You can feel the world out there is part of me and my gross mind. It is an awesome feeling.

It must be understood that the projection we have seen is that of a single frame only. A single frame by itself is static. We want to see continuous motion. To see continuous motion, science tells us that there must be at least 24 frames per second. How many frames are projected by the mind is unknown but there must be at least 25 frames per seconds. The complex process of creating space and gross forms is repeated for every frame. Each frame is different from the previous frame. The content could be different and also each object would have aged a bit between two frames.