

Research Essay

The Misnomers of Universe, Gravity and Black Holes

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Abstract

Knowledge rides on words. If the names do not correctly represent the knowledge then it is bound to create hurdles in conceptualization, intuition and further enhancement of knowledge. The languages evolved through deep meditations and intelligent thought processes. The words need to be correct to the context and should not be used as if they are part of a trend or fashion.

Keywords: Universe, gravity, mass, Rig Veda, dark matter, dark energy, Big Bang, Galaxy, intergalactic space.

1. Introduction

The language is considered as old as the cosmos. Language is connected to the origin of the cosmos. It is known as Nadbrahma (expansive vibrations of musical notes). If you follow #nasahubble page on Instagram then you can hear the music of the universe. The Hubble telescope can pick up the radio, optical and other frequencies from distant stars and galaxies, and these are given equivalent sound notes and the music is assembled. The frequencies are also like mathematical infinite series and they can be compared to the sound spectrum to make it compatible with human reception. Some of the basic laws of waves whether machinal or electromagnetic or cosmic rays are the same for all. This indicates that the basic intelligent structure of the Cosmos is simple, repetitive and layered.

Speech emanates from Para. Developing in Pashyanti, its two branches grow. In Madhyama it is laden with flowers and in Vaikhari it bears fruit. The order in which it develops is reversed to that rhythm as well. The vowels and consonants have their origin in primordial cosmic sounds. As per Sankhya Philosophy, the ego and the mind originate from nature. When the galaxies form, the communication between conscient beings (higher intelligence) takes place at the highest level 'Para'. Depending on the medium of communication of the Jeeva in various bodies, Prajapati creates the speech from his mind. He gives it to Devas and then to the mortals.

**बृहस्पते प्रथमं वाचो अग्रं यत्प्रैरत नामधेयं दधानाः ।
यदेषां श्रेष्ठं यदरिप्रमासीत्प्रेणा तदेषां निहितं गुहाविः ॥ (ऋ. 10.71.12)**

O lord of Infinite Speech, Brihaspati, the first and original form of eternal speech, which is the integration of name, word, and factual reality, which the sages receive and bear in mind and articulate at the dawn of human creation, lies immanent in the universal mind. It is borne in the best and immaculate minds of the sages who make it manifest from there by divine inspiration in a state of grace.

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2. The Universe and its Origin

The word universe (uni-verse or one verse or a stanza) etymologically refers to one galaxy but today it is being used as a substitute for the word cosmos. The verse may contain many words and words are made of consonants and vowels which may point to different wave strings and fundamental particles of existence. The one verse may, therefore, point to a galaxy and many different verses mean different galaxies. The theory of the Big Bang is the theory of the creation of our galaxy and similar is the process for other galaxies and the cycle of collapse and creation for individual galaxies. The theory of the creation of the cosmos is different, it will entail the history of the formation of five basic dimensions of the universe viz consciousness, time, space, energy, and matter.

The Big Bang Theory is about the evolution of the universe. The idea of Hirayangarbha (Golden Womb) has been referred to in Puranas in many places. The description is also the same. The word universe (uni-verse or one verse or a stanza) etymologically refers to one galaxy but today it is being used as a substitute for the word cosmos. The theory of the Big Bang is the theory of the creation of our galaxy and similar is the process for other galaxies and the cycle of collapse and creation for individual galaxies. The theory of the creation of the cosmos is different, it will entail the history of the formation of five basic dimensions of the universe viz consciousness, time, space, energy, and matter.

The timelines for the Big Bangⁱ are 10-43 seconds in which the Universe took shape in 10-6 seconds, the formation of basic elements happened in 3 seconds, the radiation Era that lasted 10,000 years, and so on.

The interpretation of these timelines by the scientists lacks a perspective when they decide the age of the universe. The primaeval atom from where the big bang happened was containing all the compressed matter in whichever form and therefore had a tremendous amount of gravity. This aspect has not been catered to by scientists. These timelines when applied to such a time system (of a Black Hole) will give nonlinear timelines.

Sagittarius A* is a supermassive black hole (400 million times the mass of the Sun) at the centre of our galaxy. It is 26,000 light-years from the Solar System. Emma Osborne, an astrophysicist at the University of Southampton told an audience at New Scientist Live, “Anything mass will stretch space-time. And the heavier something is, or the more mass it has, the more it will stretch space-time. “If you were to stand just outside the event horizon of Sagittarius A*, and you stood there for one minute, 700 years would pass because time passes so much slower in the gravitational field there than it does on Earth.”

The phenomenon of different speeds of time has also been described in Puranas. The book, ‘Beyond Common Sense’ narrates the story of King Kakudumi and his daughter Revathi visiting the galactic centre. If we apply this kind of nonlinear timeline to the age of the Milky Way, the preset timeline of the universe being 14-18 billion years old would stretch to great lengths. It may come close to 432 billion yearsⁱⁱ.

3. Gravity

Sir Isaac Newton (1643-1727) was an English mathematician and physicist. In 1687, he presented the inverse square law of gravitation in "Philosophiæ Naturalis Principia Mathematica. The legend goes that Newton discovered Gravity when he saw a falling apple while thinking about the forces of nature. He termed it as spooky action at a distance.

The words, sometimes, act as authentications seals and point to the source of knowledge. The word 'gravity' has a similar case. Our word gravity and its more precise derivative gravitation come from the Latin word gravitas, from 'gravis' (heavy), which in turn comes from a still more ancient root word thought to have existed because of numerous cognates in related languages. From 'gwerh' and 'gwrhu' comes the Latin 'gravis' and 'gravitas' meaning 'heavy' 'weighty' 'important' and the Latin 'gravity'ⁱⁱⁱ. The Sanskrit cognate is Gurutva (weighty, venerable), These words have common meanings of heaviness, importance, seriousness, dignity, grimness, etc.

It is believed that the modern, physical sense of a field of attraction did not appear until Newton's time. Indeed, for Galileo, Newton, and scientists up to the beginning of the twentieth century, gravity was no more than an empty name for the phenomenon, a fact that they were well aware of. Newton's law of universal gravitation states the following. $F=G m_1m_2 / r^2$. Whereas

F is proportional to M_1M_2 / r^2 , (directly proportional to both masses and inversely proportional to the square of the distance between them). The proportionality becomes equal by inserting a value, a constant G. Value of G balances the equation with unknown factors which seem to affect the equation. It would not be wise to discard G despite all its theoretical limitations because it's a practical constant. It represents the forces that balance out at a distance. The equation for Gravitational force was a theoretical deduction and Newton only solved the proportionality aspect by inserting G, he did not assign any numerical value to G. The universal constant G was calculated by observation (practical empirical experiments) and not theoretically. The practical values of G vary slightly during different measurements.

5. Ancient References to Gravity

Rishi Kanad (pre-Mahabharata, 4000-6000 BC) propounded Visheshika Sutras (special knowledge or science) about the throwing of an object. He mentions gravity (Gurutva) and its effects in Visheshika Sutras about throwing an object....

गुरुत्वप्रयत्नसंयोगानामुत्क्षेपणम् ॥ १ ॥ १ ॥ २६ ॥

The motion of throwing upwards is due to the conjunction (resultant) of force and gravity.

Falling of that object

संयोगाभावे गुरुत्वात् पतनम् ॥ ५ ॥ १ ॥ ७ ॥

In the absence of conjunction, falling is due to gravity. In the section where he describes forces acting on the launch of an arrow, he explains how the arrow falls.

संस्काराभादे गुरुत्वात् पतनम् ॥ ५। १। १८ ॥

In the absence of the efficacy of previous resultant actions, the arrow falls due to the effect of gravity.

In the section where he describes forces acting on the flow of water, he explains how water falls.

अपां संयोगाभादे गुरुत्वात् पतनम् ॥ ५। २। ३३ ॥

In the absence of conjunction, the water falls due to gravity.

5th-century scholar Aryabhata also mentioned gravitational force. He referred to spherical earth drawing things to it on all sides. He did it poetically by likening the earth to the florets of the spherical Kadamba flower. Brahmagupta, a 7th-century astronomer, was another mathematician who knew about the effects of Gurutva. Brahmagupta postulated correctly that there is an attraction towards the centre of Earth. Brahmagupta did not say anything about the inverse square law. He had not used gravity to predict the orbits of planets.

“[Indian astronomers] used this argument to justify the concept of a self-sustaining spherical earth which did not need to be supported from the 'bottom' by Sesha or elephants or any other cosmological underpinnings, and which also would not be subject to beings falling off the 'bottom' of it,” said Kim Plofker^{iv}, assistant professor of mathematics at Union College in New York, in an email to Scroll^v. Plofker has researched Sanskrit texts, including Aryabhata's work, for the origins of mathematics in India.

The equivalence principle states that two fundamentally different quantities, inertia, and passive gravitational mass, always be exactly proportional to one another.

Inertia comes from the Latin word 'iners' meaning idle, sluggish^{vi} Inertia is one of the primary manifestations of mass, which is a quantitative property of physical systems. Vis Insita- The innate force of matter; another name for vis inertiae. It is that by which a vessel "keeps her way. The word 'vis insita' means an innate force of matter, is a power of resisting by which everybody, as much as in it lies, endeavours to persevere in its present state, whether it be of rest or of moving uniformly forward in a right line.

The word gravity reflected common meanings of heaviness, importance, seriousness, dignity, and grimness whereas mass comes directly from Latin massa meaning "kneaded dough, lump, that which adheres together like dough, "probably from Greek maza "barley cake, lump, mass, ball," which is related to masse in "to knead," from PIE root *mag- "to knead, fashion, fit".^{vii} The modern sense of the word mass in English was extended in the 1580s to "a large quantity, amount, or number". Meaning "bulk" in general is from c. 1600. As "the bulk or greater part of anything" from the 1620s. The strict sense in physics, "quantity of a portion of matter expressed in pounds or grams" is from 1704.

The important fact is that both Gurutva (gravity) and Mahatva (mass) have been described quite well in Vedas and ancient works. The word Mahatva is used most commonly today in a sense of importance. The root word for Mahatva is Mahat. The Cosmos has been created in the principle of Mahat. The order of evolution of the universe according to Sāṅkhya and the evolution of Prakṛti (Nature) in its Vikaras (special attributes). Mahat contains all individual buddhis and all potential matter of the gross universe in its cosmic extent as the first manifest principle (tattva). Mahat in turn produces ahaṁkāra, the ego principle. That is how it comes to meaning as importance and ego of matter as to stay where it wants.

The Anutva is subtle and subtler and Mahatava is gross and grosser. The entire creation is manifested in smaller existence (Bhuta) combined with different permutations and combinations under influence of different forces and making it bigger, stage by stage. At every stage, so combined smaller existence forms bigger existence and so on.

The Gurutva is considered the opposite of the Mahtva. In the traditional sense, it is a quality that makes the mass behave with certain intelligent attributes. Jupiter is known as endowed with high Gurutva and has been granted as Guru of all Devas.

Gurutva may reflect the intelligence (Buddhi) of a heavenly body. Earth is also conscious and follows astronomical laws and maintains balance. The movement of magma, plate tectonics, magnetic field, winds, ocean currents, and cyclic activities of various elements and occurrences indicate that Earth is conscious in a unique way. Recently papers were published showing water has memory, the dunes communicate with Earth other so do the star systems, but we may not know it yet. The interaction of a satellite to a planet system, their effects, and mutual dependence could be some of the intelligent features. The ability of the Moon to affect life on Earth and the stabilization it provides to the Earth's orbit are well known. Io (a satellite of Jupiter) and Jupiter constitute a moon-planet system. Io influences Jupiter by supplying heavy ions to its magnetosphere, which dominates its energy and dynamics. Jupiter influences Io by tidally heating its interior, which in turn drives the volcanic activity on Io. The role of Io and Jupiter in their mutual interaction and the nature of their coupling have been studied by scientists.

Savita- a Controlling Force of the Milky Way. The flow of spacetime has been described as Savita (with special attributes). Savita is the force of universal firmament that has been described in Rig Veda. The difference is spacetime as proposed by Einstien is without any intelligent attributes whereas Savita is with intelligent attributes. This is merely a change of perspective on whether we can call matter having unique intelligence as it can follow Padarth Dharma (properties of matter). This intelligence is not interpretative as in the case of humans but more like passive intelligence as a property of their design as reflected in mathematics and science in their creation and behaviour. Rig Veda 1.35.9

हिरण्यपाणिः सपिता पिचर्षणिरुभे द्यावापृथिवी अंतरीयते ।

अपामीदां बाधते देति सूर्यमभि कृष्णेन रजसा द्यामृणोति ॥

The gold-handed, all-beholding, Savitā is spread between the two regions of heaven and earth, dispels pain brings the sun, and overspreads the sky with control and radiance destroying darkness.

Rig Veda 10.149.1

सपिता यन्त्रैः पृथिणीमरम्णादस्कम्भने सपिता द्यामदंहत् ।

अश्वमिषाधुक्षद्धुनिमन्तरिक्षमतूर्ते बद्धं सपिता समुद्रम् ॥

Savitā has fixed the earth with fetters; Savitā has made the heaven firm in a plural place where there was no support; Savitā has milked the cloud of the firmament bound to the indestructible (ether) like a trembling horse.

It is now evident that it may not be gravity alone that is responsible for making the earth go around the Sun. The ancient scriptures such as the Veda and Vaishesika Sutra of Kanad give an insight into a continuously controlled Cosmos based on Nature's laws and also by intelligent interference of universal force.

In many places, the translation of the word 'Savitur' is referred to Sun but that may not be proper. Savitur and Savita are found in many places in Veda (Knowledge). Savitur also cognates with Sagitur which could be a root word for Sagittarius. The same is also related to sagacious, sage, and also Sagita^{viii}. Sagita means arrow in Latin.

Sagittarius^{ix} is usually depicted as a centaur holding a bow and arrow. The constellation's symbol is ♐ . It represents the archer. It is also associated with Croton, the satyr who kept the company of the Muses on Mount Helicon. Sagittarius is one of the largest southern constellations. Sagittarius is the 15th largest constellation in the sky. It is easy to find because it lies in the centre of the Milky Way and its brightest stars form an asterism known as the Teapot. Sagittarius is known as Dhanu (in the Indian zodiac) and that also represents a bow.

Karl Jansky, considered a father of radio astronomy, discovered in August 1931 that a radio signal was coming from a location in the direction of the constellation of Sagittarius, towards the centre of the Milky Way. The radio source later became known as Sagittarius A^x.

Sagittarius or Savitur is considered the seat of Brahma. This is also the origin point which is described as Hiranyagarbha (golden womb) or golden egg as is in the theory of the Big bang. All radio signals, gravitational waves, and time-base signals (spacetime fabric) are controlled by Sagittarius. Sagittarius is the provider of intelligence as indicated by the most important and powerful hymn of Rigveda known as 'Gayatri Mantra'.

Ushas- a Controlling Force of the Sun. Usha is considered the daughter of the Sun representative of the Dawn, Usha is said to travel in a shining chariot drawn by ruddy horses or cows. Like a beautiful maiden dressed by her mother and covered with jewels. She is young, being born every day; and yet she is old, being immortal, wearing out the lives of successive generations, which disappear one after another, whilst she continues undying. She is young, being born every day; and yet she is old, being immortal, wearing out the lives of successive

generations, which disappear one after another, whilst she continues undying. The souls of the departed are said to go to her and to the sun. Rigveda 6.64.1

उदु शरिय उषसो रोचमाना अस्थुरपां नोर्मयो रुशन्तः |
कर्णोति षिश्वा सुपथा सुगान्यभूदु ष्स्वी दक्षिणामघोनी ||

The radiant Dawns have risen up for glory, in their white splendour like the waves of waters. She makes paths all easy, fair to travel, and, rich, hath shown herself benign and friendly.

It is no wonder that the Sun's rays fly to interact with the Heliosphere- the region surrounding the Sun and the solar system that is filled with the solar magnetic field and the protons and electrons of the solar wind. **The heliosphere acts as a shield that protects the planets from interstellar radiation. This is not just a random protection shield that enables life in the solar system.**

Bhaga- a Controlling Force of the Cosmos. In Hindu philosophy, it is Bhagwan who is the preserver of the cosmos. He runs a show in which he influences his mechanism through other divine beings. The word 'Bhaga' means movement of light. Therefore the Bhagawan is who controls the movement of light and in that essence the one who controls time. In the cosmological sequence of evolution, the unseen energy reaches a state where it becomes forever (in both ways space and time). Control of this energy essentially enables control in the cosmos. The force in between the intergalactic space is Bhaga, in the galaxies, it is Savita, in the solar system it is Usha and on a planet it is Gurutva. Therefore, any being on any planet or anywhere in the cosmos is affected by the result of these forces. The interplay of these forces is the root cause of vacuum energy which is underlying background energy that exists in space throughout the cosmos. Vacuum energy is a special case of zero-point energy that relates to the quantum vacuum.

Though it may appear that the force of 'Bhaga' moving the galaxies would be stronger it otherwise, 'Savita' is stronger than 'Bhaga' and 'Ushas' is stronger than 'Savita', only then they can make the difference within the galaxy and the Solar system respectively.

4. Black Hole or Dark Star

The first real evidence for dark matter came in 1933 when Caltech's Fritz Zwicky^{xi} used the Mount Wilson Observatory to measure the visible mass of a cluster of galaxies and found that it was much too small to prevent the galaxies from escaping the gravitational pull of the cluster. Something else, concluded Zwicky, was acting like glue to hold clusters of galaxies together. He named the substance *Dunkle Materie* in German, or dark matter.

Matter can be invisible only if it does not interact with light in terms of emission, reflection, refraction etc. The photons hold zero mass and anything that holds mass less than zero would not qualify as matter in a classical sense. Dark matter is a substance that is pre-matter.

Only 4.6% of the universe's energy comprises the visible baryonic matter that constitutes stars, planets, and living beings. The rest is thought to be made up of dark energy (68%) and dark matter (27%).

Hydrogen is the most abundant element (73-74%) in the cosmos followed by Helium (23-25%), Oxygen, Carbon, Neon, Iron and Nitrogen. It is the first stable element and acts as fuel for the stars. The stars convert the lighter matter into heavier matter and the remaining matter of the fused nuclei may be responsible for the emission of energy. In 1895, Rowland, studied the intensities of 39 elemental signatures in the solar spectrum. Leaving hydrogen and helium, the rest of the seen matter comprises less than 0.5% of the total cosmos.

The Standard Model of Physics talks about fundamental particles. The nucleus (protons and neutrons) contains almost all the mass of the atom, while the electrons are responsible for the chemical properties of the atom. These are further made up of 6 types of quarks, 6 types of leptons and 5 categories of many different types of Bosons (force interaction particles).

Neutrinos are likely the most abundant particles in the universe and may be more common than photons, the basic unit of light. Neutrinos are a type of leptons, which are also fermions, and together with quarks make up matter. The difference between leptons and quarks is that leptons exist on their own, whereas quarks combine to form baryons. A neutrino is an exponentially small particle with no electrical charge. As other particles traverse galactic and extra-galactic distances, they can become deflected, scattered, or even stopped altogether by matter, gravitational and magnetic fields. Neutrinos can pass through all of these uninhibited, which makes them excellent sources of information from the far reaches of the galaxy.

These subatomic particles are not stable and particles such as leptons and baryons decay by either the strong force or weak force (except for the proton). Neutrons have a mean life of approx 881 seconds. The life of Proton is {16.7 billion yottayears (10^{34} yr)}. The μ and τ muons, as well as their antiparticles, decay by the weak force. Neutrinos (and antineutrinos) do not decay, but a related phenomenon of neutrino oscillations is thought to exist even in vacuums. The electron {66,000 yottayears (6.6×10^{28} yr)} and its antiparticle, the positron, are theoretically stable due to charge conservation. These particles are made up of energy and they come to life depending on wave interaction. These are caused essentially by a collapsed wave function or a quantum excitation of a field or just an entangled vibrating string. Vyasa Muni in his teachings to Rama tells about many types of wave structures as 'Pata' (2D fabric-like cloth) made up of threads (energy channels), 'Ghata' (3 D spherical Structures), and 'Kunda' (hollow wells).

The presence of a black hole can be inferred through its interaction with other matter and with electromagnetic radiation such as visible light. Black holes are considered objects whose gravitational fields are too strong for light to escape. This understanding is bound to change with the correct understanding of the force of gravity. Every formation of the cosmos has a definite objective.

The nucleus of an atom is about 10-15 m in size, this means it is about 10^{-5} (or 1/100,000) of the size of the whole atom. A good comparison of the nucleus to the atom is like an apple where the

nearest electron will be approx. 3 km away. This is what explains the density of the Black holes, that they cannot be made up of normal matter with electrons orbiting around but are made up of solid nuclear particles and their pre-matter forms kept together by the stronger nuclear force.

The pre-matter is a product of the Black Holes as the matter is produced by Stars. The force which may attract and attach photons may be a different kind of fundamental force other than gravity. The Black holes are not holes but essentially Dark stars or black stars.

The Black holes may churn out the fundamental particles such as protons and neutrinos, which after interaction with other particles or wave functions may lead to the creation of the basic element hydrogen. The external accretion disk forming quasars may be the input-output mechanism. The galaxies have originated from their central Black Holes which may act in cycles of expansion and contraction over huge time scales. These black holes also exert forces which are natural but which may also contain intelligent control mechanisms. More about the central black holes of the milky way is discussed in the last section.

5. Dark Energy

The cosmological constant is a homogeneous energy density that causes the expansion of the universe to accelerate. The cosmological constant is the simplest realization of dark energy, which is the more generic name given to the unknown cause of the acceleration of the universe^{xii}. There was a difference in the observed and predicted value. If the value of the constant is different then the cause is referred to as 'Dark Energy'. We know how much dark energy there is because we know how it affects the universe's expansion. It turns out that roughly 68% of the universe is dark energy.^{xiii} **Intergalactic spacetime and spacetime inside a galaxy may have different formatting leading to the difference in values.** This would come into perspective if we consider different space-time fabrics for every galaxy which arises out of the central black hole.

Incidentally, in Hindu philosophy, this energy is depicted as Kali Shakti, the principal goddess, another form of Shiva, and (dark) energy of the Cosmos. For matter to appear, there is a state which is pre-matter and in a similar way for energy to appear there is a state called pre-energy. This state is of energy which is unseen or not capable of being attributed to and therefore known as Dark Energy.

The forces in the Cosmos are resultant of the interplay of energy. These are referred to as 'Bhava' (affinity) and are the result of wave characteristics like coherence, spin or polarity of the wave function which continuously forms and decays and may become a stable structure spanning across the cosmos forever. These Bhava (forces) may have a disposition from the strongest to the weakest. That is integral to the structure of the universe and these forces are applied to similar types of interactive participants. For example, there is a strong nuclear force inside an atom but it doesn't affect other things.

6. Conclusion

Philosophy paves the way for theories and theories combined with mathematics and/or experimental proof pave the way for science. The human mind carries out interactions with nature to understand and evolve. These interactions take place not only through the human sense organs or scientifically extended sensors but also through human perception. Human perception contains higher algorithms for receiving knowledge through the higher languages of Para and Pashyanti. The human mind needs to have correct conceptualisation with correct words for it to have better abstract imaging (pictographic processing by the brain, Pashyanti) of concepts and hence the concepts may be represented by the appropriate and correct words.

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References

ⁱ <http://patrickgrant.com/BBTL.htm>

The Big Bang - 10-43 seconds: The universe begins with a cataclysm that generates space and time, as well as all the matter and energy the universe will ever hold. For an incomprehensibly small fraction of a second, the universe is an infinitely dense, hot fireball. The prevailing theory describes a particular form of energy that can suddenly push out the fabric of space. At 10-35 to 10-33 seconds a runaway process called "Inflation" causes a vast expansion of space filled with this energy. The inflationary period is stopped only when this energy is transformed into matter and energy as we know it.

The Universe Takes Shape - 10-6 seconds, after inflation, one-millionth of a second after the Big Bang, the universe continues to expand but not nearly so quickly. As it expands, it becomes less dense and cools. The most basic forces in nature become distinct. The particles smash together to form protons and neutrons.

Formation of Basic Elements- 3 seconds: Protons and neutrons come together to form the nuclei of simple elements: hydrogen, helium, and lithium. It will take another 300,000 years for electrons to be captured into orbits around these nuclei to form stable atoms.

The Radiation Era- 10,000 years: The first major era in the history of the universe is one in which most of the energy is in the form of radiation -- different wavelengths of light, X rays, radio waves, and ultraviolet rays. This energy is the remnant of the primordial fireball, and as the universe expands, the waves of radiation are stretched and diluted until today, they make up the faint glow of microwaves which bathe the entire universe.

ⁱⁱ Beyond Common sense- dr Satinder Singh Malik (Author) Kindle

Present Kalpa 5.784 Million Years represents restart of life on the Earth, Elapsed time in Present Manvantara 0.3 Million Years or 3,36,000 Years (Modern human origins). These timelines may vary due to faulty interpretation of ancient texts.

ⁱⁱⁱ <https://stanford.io/3KvmumH>

^{iv} <https://iks.iitgn.ac.in/kim-plofker-2020/>

^v <https://scroll.in/article/709070/newton-discovered-gravity-even-if-he-stood>

^{vi} <https://www.etymonline.com/search?q=mass>

^{vii} <https://www.etymonline.com/search?q=mass>

^{viii} Southern constellation; ninth sign of the zodiac, late Old English, from Latin, literally "archer," properly "pertaining to arrows," from sagitta "arrow," which probably is from a pre-Latin Mediterranean language. [https://www.etymonline.com/word/Sagittarius#etymonline v 22603](https://www.etymonline.com/word/Sagittarius#etymonline_v_22603)

sage (adj.) "wise, judicious, prudent," c. 1300 (late 12c. as a surname), from Old French sage "wise, knowledgeable, learned; shrewd, skillful" (11c.), from Gallo-Roman *sabijs, from Vulgar Latin *sapius (also in Hindi- Sadhu) with **-ous** + stem of Latin *sagax* "of quick perception" (see **sagacity**). The sense of "skilled at discovering truths," especially as regards human natures,

^{ix} <https://www.constellation-guide.com/constellation-list/sagittarius-constellation/>

^x https://en.wikipedia.org/wiki/Sagittarius_A*

^{xi} <https://bit.ly/3vQnnRK>

^{xii} http://www.scholarpedia.org/article/Cosmological_constant

^{xiii} <https://science.nasa.gov/astrophysics/focus-areas/what-is-dark-energy>