How singular atom was formed and exploded?

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Abstract

The ancient and modern cosmologies do not address the aspect that how the first particle of the universe was created? The most successful big bang theory, assumes that explosion of singular atom without pointing out how singular atom was created and how it exploded? An attempt has been made to answer above intrigues which are clueless till date. In an innovative way new equation of variation of mass with velocity, $M = M_0 \exp(v^2/2c^2)$, is suggested. According to this equation the mass neither becomes infinity nor imaginary even if velocity of particle is equal or more than c. At lower velocity (say, $v=0.1c$) , this equation gives same results and relativistic variation of mass. Also from Einstein's derivation of $\Delta E = \Delta mc^2$, $\Delta E = Ac^2 \Delta m$ follows (under general conditions of variables) which implies energy emitted can be more or less than $\Delta E = \Delta mc^2$. As far as creation of universe is concerned, it is assumed that universe started its life in empty space from massless   zeroans (waves) moving with infinitely large velocities. Then these zeroans transformed or accumulated to primeval pulse of energy. This pulse of energy of energy changed to nascent mass (superactive). Then a part of this nascent mass changed to various types of energy e.g. heat energy, gravitational energy etc.) according to equation $\Delta E = Ac^2 \Delta m$ which implies more energy is emitted corresponding to small annihilation of mass. Due to extreme conditions of heat and gravitation energy , whole mass of universe compressed to a singular atom .When the magnitude of gravitational energy further increases beyond optimum limits , the repulsion increased and big bang took place. Now onwards the developments of universe are well understood in the existing literature. Thus this theory discuses those aspects of the earliest- earliest universe which are not yet discussed.

1.0 **Introduction**

Hindu Rigveda (2000 BC), Aristotelian universe (350BC) , Bible, Genesis 1:1-31(God created universe) Ptolemaic model of universe (2nd century AD), Static Newtonian universe (1642-1727) , Albert Einstein1917 (static), Big Bang given by Georges Lemaître (1927–29), Steady-state theory (expanding universe) 1948 etc all old perceptions and modern theories believe that universe existed as such. How first particle of universe was created? How universe took present state ? In the existing literature the singular atom is perceived but not stage before this. These perceptions were not discussed in the existing doctrines of understanding of the universe.

The most successful theory of universe the big bang is based upon the fact that universe exploded spontaneously [1] from the state of singularity (Extrapolation of the expansion of the universe backwards in time using general relativity yields an infinite density and temperature at a finite time in the past). But the basic question is untouched –how singularity or singular atom was produced and exploded? In big bang theory, it is assumed that the singular atom exploded (big bang) at time t=0 (time of big bang) , and but the measurement of events started after Planck's time t= 5.39×10^{-44}s. Thus no law of physics was valid between t=0 and 5.39×10^{-44}s (Planck's time), due to extreme conditions of temperature. The physical laws suddenly became valid after time 5.39×10^{-44}s (Planck's time). In calculations of Planck's length (5.39×10^{-44}s $\times 3 \times 10^8 = 1.616199 \times 10^{-35}$ m), the speed of universe was regarded as c (3×10^8m/s), when temperature was 10^{32} K. But the other laws of physics were regarded as invalid. Also time was not defined before big bang i.e. t=0.

Scientists have defined various epochs i.e. The Big Bang: t = 0 s (temperature = ∞ K), The Planck Epoch: 0-10^{-43} s (∞ to10^{32} K) , Grand Unification Epoch: 10^{-43} s - 10^{-36} s (10^{32} to 10^{27}K), Electroweak Epoch: 10^{-32} s-10^{-12} s (10^{27} to 10^{15}K), Quark Epoch: 10^{-12} s - 10^{-6} s (10^{15} to 10^{13}K), Hadron Epoch: 10^{-6} s-1 s (10^{13} to 10^{10}K), Lepton Epoch: 1s-3 min (10^{10} to 10^9 K), Epoch of Nucleosynthesis (3 minutes to 300,000 years) 10^9 K to 3000 K.

Thus temperature of universe in various epochs is measured. In the existing literature the speed of universe or speed of constituents of universe in various epochs is not calculated. The measurement of speed is as important as temperature, as according the special theory of relativity mass varies with velocity. In calculation of Planck's length $(1.616199\times10^{-35}$ m) in the Planck's epoch $\{0\text{-}10^{-43}$ s $(\infty$ to10^{32} K $)\}$ the none of laws of physics was valid but speed of universe was regarded as c (it means c was defined when other laws were undefined!). If v=c, then mass becomes infinity. So there are arbitrary assumptions in the mathematical background, hence same can be critically analyzed. The relativistic variation of mass of universe can be calculated if c is measured. Or we have assumed in various epochs the universe expanded with classical velocity. As temperature of universe is measured in various epochs, the speed of light and relativistic variation in mass can be measured. The mass and velocity are equally significant parameter in understanding the universe.

2.0   Mathematical basis of creation of mass

Inapplicability of E=mc^2 :   E=mc^2 implies that conversion factor between mass and energy is c^2 $(9\times10^{16}$m^2/s$^2)$ which is same for all possible perceivable reactions in universe (burning of a bit of paper, binding energy of nucleus, fission and fusion of atoms, materialisation of gamma ray photon to electron and positron pair and vice versa or any reaction possible in future) and cosmological reactions. Thus E=mc^2 implies that conversion factor in all mass energy inter conversion processes is universally same i.e. c^2 $(9\times10^{16}$m^2/s$^2)$. But it is not confirmed for the most abundant reaction e.g. combustion of wood.

The mass of universe is regarded as 10^{55} kg (estimates vary) and automatically existed, according to existing theories. Then E=mc^2 implies that it would have been created from energy 9×10^{71} J $(\Delta E/c^2 =\Delta m)$. Now next question is how this energy 10^{71} J is created? Such huge energy should not have been created out of nothing. If energy   equal to 10^{71} J is assumed to exist, then energy equal to 0.71J and 10^{71} J can also be assumed to exist. Thus it is not scientific deduction. Realistically the conservation of mass energy does not allow such conversion.

Applicability of Equation ($\Delta E=Ac^2\Delta m$):

While critically analyzing Einstein's September 1905 derivation of   L= mc^2 (from which E=mc^2 is speculated) , the generalized mass energy inter-conversion equation, $\Delta E=Ac^2\Delta m$ also results under general conditions of parameters [2,3]. Here A is conversion factor and its

value depends upon the inherent experimental conditions, thus varies from one form to other. The equation allows creation of mass from infinitesimally small energy, as conversion factor in this case is Ac^2 not c^2 as in Einstein's equation.

It is not logical to assume that certain amount of matter or certain amount of energy cannot be present as such in the universe. It will raise questions how certain mass (x gm, say) or certain amount of energy (y ergs, say) were created arbitrarily in universe [3].

Thus, it is considered that the universe started life in unlimited empty space from the state of cipher. The massless (m=0) 'Zeroans' (like waves or pulses) were earliest constituents of universe in empty space moving in all possible directions. These may be infinitely large in number. It is logical perception. According to equation F=ma=m(v-u)/t , zeroan may move with slow or infinitely large velocities or even stay at rest. Then it is assumed or **postulated** that these zeroans (wave or pulse) changed or accumulated to primeval pulse of energy. Let this energy of the primeval pulse be 10^{-44444} J (or different) equivalent to 2.4×10^{-44445} calorie. This energy, 10^{-44444} J (or less) is easily available in nature (can be speculated to arise from moving numerous zeroans), compared to energy 9×10^{71}J (predicted by $\Delta E = \Delta mc^2$). Thus value of A (depends upon inherent experimental conditions of conversion process) can be calculated as ,

$$\mathbf{A} = \frac{\Delta E}{c^2 \Delta m} \quad = \frac{10^{-44515}}{9} \tag{1}$$

$$\text{or } \Delta m \quad = \frac{\Delta E}{c^2 A} \quad = \frac{10^{-44444} \times 9}{10^{-49515} \times 9 \times 10^{16}} = 10^{55} \text{ kg} \tag{2}$$

Thus all values are consistent. Thus mass of universe (10^{55} kg) is originated from Zeroans. Now corresponding to one zeroan one primeval pulse of energy is created, also one or more zeroans may constitute a primeval pulse of energy . Thus numerous primeval pulses are possible in the universe. This perception is consistent with multiverse.

2.1 The nearest resemblance of zeroans, regarding mass and velocity in the literature.

The zeroans do not possess mass, it may be at rest, and can move with velocity less, equal or more than c. The reason for the perception is to understand the creation of first particle in universe. This perception is also resembles notions in existing physics.

The photons [4] have well defined mass 10^{-18} eV/c^2 i.e. 1.782×10^{-54} kg, estimated by Particle Data Group. The rest mass of photon is regarded as zero (m=0), but it possesses energy E=hv=hc/λ, energy is associated with non-zero mass, when in motion. Likewise zeroans have mass zero (m=0), so they may be postulated to exhibit energy (primeval pulse) when in motion.

The mass of axion is 1.782×10^{-36} kg and that of graviton is zero. The axions were postulated to explain strong CP violation problem [5]. Many experiments are conducted assess mass of axion and different ranges (values) of mass are obtained. In physics, the graviton (m=0) is a hypothetical elementary particle that mediates the force of gravitation in the framework of quantum field theory [11] and new methods are being suggested to detect them..

There are many galaxies visible in telescopes with red shift numbers (indicator of the fact that heavenly bodies recede away or expansion of universe) of 1.4 or higher. According to the existing interpretation, all of these are currently travelling away from us at speeds greater than the speed of light [6]. However mass is never observed infinite. The above equation is applicable for such bodies, as it predicts infinite mass only when v=c.

Tachyons are also particles which move with speed more than that of light [7]. Cherenkov radiations, is electromagnetic radiation emitted when a charged particle passes through a dielectric medium at a speed greater than the phase velocity of light in that medium [8].

During its first three years, the LHC ran at collision energy of 7 to 8 TeV delivering particle collisions to four major experiments[9]. But now energy of particles will be 13-14TeV, it is just possible that in such the experiments or more energetic experiments speed of particles may approach to c (significant variation in mass) equal to c and exceed c.

Particle physicists in china are working on long term plan of 52 km particle collider, so called "Higgs Factory" the machine will operate at energy 250 GeV. In case of anomalous results, the eq.(4) would be applicable which implies definite mass even if speed is equal or more than c [13]

The MINOS+ experiments are being conducted by Fermi Laboratory may lead to some concrete velocity about superluminal velocity. MINOS+ will make a new, more precise measurement of the speed of neutrinos. The experiment will aim to measure the time a neutrino needs to travel from Fermi lab to the Soudan mine in Minnesota with a precision of about 1 nanosecond. The results are accepted within a year [10]. In previous experiments velocity of

neutrino is found more than c, but sensitivity and accuracy of experiments was questioned and results are unaccepted. In some experiments the velocity of particles (neutrinos) was close to c. So the perceptions depend upon technology, are relative.

The eq.(4) i.e. equation $M = M_o \exp(v^2/c^2)$ can explain the motion of above heavenly bodies or particles and serves as mathematical tool, which was not available earlier . Thus whatever may be the speed of heavenly bodies or particles the eq.(4) never predicts mass is infinite or imaginary. At lower velocities (less than 0.1c) this equation gives similar results like relativistic variation of mass. This is first equation of its kind and would be stimulant for theoretician and experimentalists as they have alternative equation if velocity is found equal to c or more than c.

3.0 A new equation for relativistic or non relativistic variation of mass : $M = M_0 \, e^{\frac{v^2}{2c^2}}$

This equation is especially meant for particles or bodies moving with velocity less or equal or more than c, the speed of light. According to this equation mass becomes infinite, if v= ∞. At lower velocities the variation in mass is same as relativistic equation. Let the rate of change of mass with velocity is proportional to existing mass and velocity with which body is moving. Thus

$$\frac{dM}{dv} \; \alpha \; M, \qquad\qquad \frac{dM}{dv} \; \alpha \; v$$

$$\frac{dM}{dv} \; \alpha \; Mv \qquad or \qquad \frac{dM}{M} = Qvdv \qquad\qquad (3)$$

where Q is coefficient of proportionality and depends upon inherent experimental conditions of the process. Let at this stage Q is chosen in one of way as $1/c^2$. Now integrating within limits (mass varies from M_0 to M , and velocity 0 to v). We get

$$M = M_0 \, e^{\frac{v^2}{2c^2}} \qquad\qquad . \qquad\qquad (4)$$

Currently relativistic variation of mass does not permit anybody to move with speed more than that of light .

$$M = \frac{M_0}{\sqrt{1 - \frac{v^2}{c^2}}} \qquad\qquad (5)$$

At lower velocity v (say v= 0.1c), both the eq.(4) and eq.(5) give values of mass as M = $1.00501M_0$ and M = $1.00503M_0$, so there is difference of $2x10^{-3}$. If velocity, v=c then according to eq. (4), M =1.648 M_0 and under this conditions eq.(5) implies M = ∞. This is the main difference between two equations. The advantage of eq.(4) is that it never predicts mass becomes infinity and imaginary , and under lower value of velocity (less than 0.1c) the mass reduces to value that predicted by eq.(5). Eventually eq.(4) becoming more and more relevant.

"This theory postulates that infinitely large number of massless zeroans (wave or pulse),may be moving with infinitely large velocities changed or transformed into pulses of infinitesimally small (may be tending to zero) energies. Then primeval pulse energy materialized to mass along with various types of energy."

3.3 How Primeval Atom is formed?

The process of creation of mass and manifestation of mass into gravitational and other energies can be understood as.

Empty space → Zeroans (waves or pulses)→Primeval Pulse of Energy →Nascent mass (super-active state) →{mass +gravitational energy + other forms of energy}.

There may be infinitely large number of zeroans (waves) moving with infinitely large velocities giving rise to infinitely large energy pulses, thus numerous or infinitely large nascent masses or nascent particles. The mathematical explanation to the phenomena is given by equation, $\Delta E=Ac^2\Delta m$, which implies gigantic energy is released on annihilation of small mass compared to $E=mc^2$. Thus the perception of multiverse is feasible in this theory, as infinitely large number of zeroans and primeval pulses of energy are the primitive constituents of the universe.

Thus, universe started its life in empty space from zeroans. These zeroans (waves) changed to primeval energy pulses. The Primeval Energy Pulses changed to nascent mass or particle (super active mass). This nascent mass further changed to various types of energies including gravitational energy. There may be numerous primeval pulses of this type moving with exceedingly high velocities in all possible directions. Then there may have been increase in magnitude of pulses of energy due to superposition. These pulses of energy moving

with exceedingly-2 large velocity materialized to large number of particles (nascent mass or superactive mass) moving with high velocities. The energy is transformed to mass according to $\Delta E = Ac^2 \Delta m$. It allows creation of significant amount of mass from infinitesimally small or vanishingly small amount of energy. The nascent masses may be formed infinitely large in number; these were in the super active state i.e. a part of mass spontaneously changed to energy. The heat energy so produced is utilized to condense the whole mass and exceptional amount of gravitational energy so produced compressed the mass. These particles collided to form a bigger particle comparatively.

The particles moving in one direction with different velocities collide and due to friction, they developed one type of charge, say negative. The magnitude of the charge increases gradually due to friction i.e. in successive collisions of particles. Similarly, particles moving in opposite directions attained the opposite charge, say positive. This charge also increased gradually. The particles with opposite charges combined thus process of formation or accumulation of charge started in realistic way. Thus in view of it, particles with much smaller charge and mass than that of electron are possible, at present we may not be able to detect them due to limitations of experimental techniques. Consequently electron, proton and thus hydrogen atom is formed, like this other atoms were created. Thus mass and charge exist in continuum and other constituents are formed. The exceptionally small mass so produced changed to gaseous or liquid and solid states in due course of time. The process may have taken place (or started) trillion-trillion years or infinitely large time before, as inter-conversion of mass and energy is continuous process.

4.0 Annihilation of Mass to Gravitational Energy and singular atom

It is experimentally observed in uncontrolled nuclear fission or fusion the light energy, heat energy, sound energy and energy in form of invisible radiations etc. is emitted. It implies that mass changes from one form to the other i.e. heat energy to sound energy or light energy etc. The various forms of energy may co-exist simultaneously. The mass may be regarded as first or primary form of energy; the other energies may be secondary or tertiary forms of energy. Also mass of constituents of nucleus is converted to binding energy. The gravitational energy is also one form of energy, it is regarded as originated from mass when annihilated. Due to gravitational

energy all heavenly bodies attract each other and move in space. From zeroans the primeval pulse of energy is produced which is materialized to nascent mass , the fraction of the nascent mass is converted to various forms of energy as predicted by equation $\Delta E = Ac^2 \Delta m$. Thus formation of mass and gravitational energy both are simultaneous events. The mass and gravitational energies are the most abundant energies in the universe.

Gravitational energy $(U_g)\alpha$ Energy emitted in annihilation of mass (Δm)

Gravitational energy $(U_g) = $ $KAc^2\Delta m$ $= Zc^2\Delta m$ (4.19)

Thus higher the conversion factor K, higher is the gravitational energy produced.

Gravitational energy $(U_g) = KAc^2\Delta m$ $= Zc^2\Delta m$ (4.20)

where Z is conversion coefficient which determines the extent of transformation of energy to gravitational energy when mass Δm is annihilated. It has no units as equation has to be dimensionally consistent and depends upon inherent characteristics of the conversion process. The value of Z depends upon inherent characteristics of the process, like other coefficients in physics. Thus higher the value of Z more gravitational energy will be produced and its value is exceptionally high. Due to increase in gravitational energy other types of energies such as heat, the mass of universe compressed more and more. The generalized equation $\Delta E = Ac^2\Delta m$ permits, tremendous amount of heat and gravitational energy even when infinitesimally small amount of mass is annihilated. Thus mass is compressed to a point.

When nascent masses stuck together and due to inter-conversion of mass (small fraction out of total created) to energy. A part of mass is converted to gravitational energy and other forms of energies. The energy was created in various forms of energy, in form of heat and gravitational energy . As when temperature rises to order of 100 million to 1billion ▫C, fusion of various isotopes of hydrogen and helium takes place. At that time similar or for more energetic reactions than fusion, may have taken place and compressed the mass to form of primeval atom. The value of Z was exceptionally high in this case. Then in molten state the mass of universe is compressed in form of singular atom in due course of time.

The process of inter-conversion of mass continued even when the singular atom was formed. Then explosion of singular atom can be understood, analogous to variation of inter-molecular force (which is both attractive and repulsive).

As long as the size of singular atom is optimum, there is no considerable repulsion between constituents. When the size of the universe (in form of singular atom) is further decreased (due to annihilation of mass to gravitational and heat energy) i.e. distance between various constituents decreased beyond the optimum size. It is due to reason that mass is annihilated in these super energetic reactions, the energy in various forms was created including gravitational energy. The gravitational energy further compresses the singular atom. Thus mass is compressed beyond limits. The repulsion dominates which is beginning of final step towards the Big Bang or explosion of condensed universe. The big bang took place and rest of understanding of the universe is in usual way. Now onwards the developments of universe are well understood in the existing literature. Thus this theory discuses those aspects of the earliest-earliest universe which are not yet discussed. Hence there is contradiction with existing theories.

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