

7: REVIEWING NOTES :

EXPANDING UNIVERSE: FRIEDMANN'S MODEL

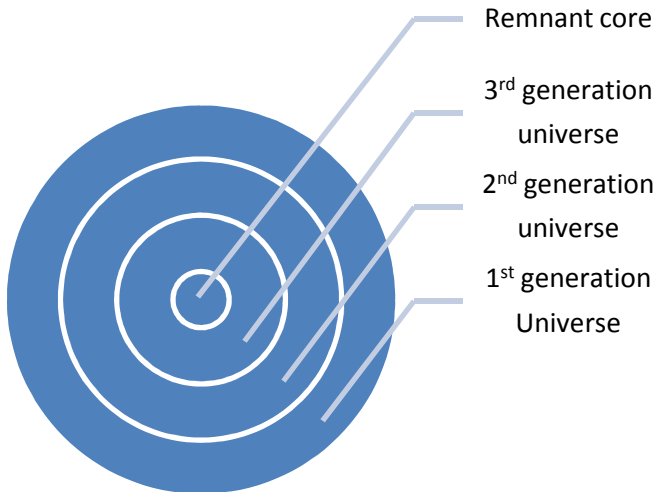
According to the scientific consideration of Friedman's expanding universe, we can suppose at least three kinds of expansions; such as:

(i) **Inflationary expansion**: - This mode of expansion needs a centre point, and the said uniform expansion spreads all around due to occurrence of the big-bang at such centre place of the said primordial hot fire ball or nebula or nucleus. This is rather like a balloon with a number of spots painted on it which is being blowing up steadily. As the balloon expands, the distances between spots are also growing accordingly.

In this case, the universe must have a centre point and should have an unlimited expanding boundary or parameter. But, it raises a problem what condition should survive beyond such parameter. Certainly there should be a blank space of infinite range. And, according to present considerations based on the calculations of mass-density of the universe (i.e.- $P < P_c \sim 5 \times 10^{28} \text{ kg/m}^3$; about ten times less than of the critical mass-density), it would go on expanding forever. It provides that even the universe is having a boundary but it is uncertain and borderless. If so, we can suppose that either the central core of the universe is growing with emptiness, or, that should still constant as the enormously dense solid, as it has considered the mass value of a chunk of one cubic inch of the black hole by equivalent to trillions and trillions of tons. Therefore, is not so clear, what should be with such that remnant nucleus.

Would such the remnant nucleus reproduce a big-bang again to regenerate an another universe (?): as provided in the assumption of the 'Steady State Theory' of the universe of Thomas Gold, Hermann Bond and Fred Hoyle, that, as the galaxies are moving away from the centre, new

galaxies are forming in the core and spreading or following the formers. Please see the figure: 7:1

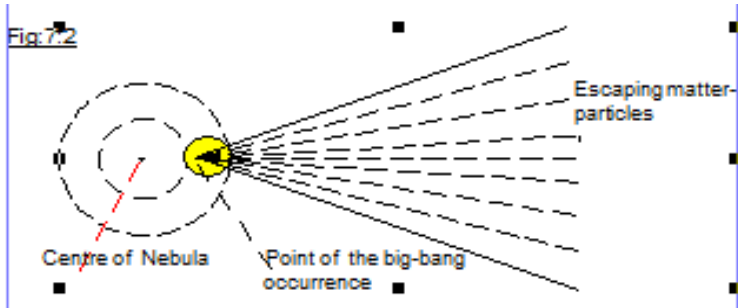


Whenever, in case of emptiness of the centre (core) of the universe, we can consider that there is no any probability of reproduction of galaxies, and as far as the expansion grows, the blank emptiness would also expand accordingly. Thus, eventually all the galaxies or entire universe should escape finally.

Where it is a question of dark-matter's existence in the remnant core, it stands a thoughtful question why those neutrinos (dark-matters) gathered to such that particular region only, is not so clear.

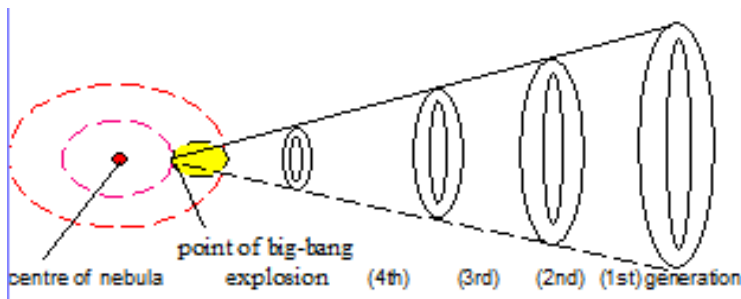
(2) **Partial or Lateral Expansion:** - This mode of expansion needs a particular local or partial beginning point (not at the centre point) in the outer core region of such primordial nucleus, and the expansion should grow conically. Suppose that, if the big-bang occurs at a partial zone and all the affected matters etc. particles are scattered out of the surface of such nebula, as like a focusing torch:

(please see the fig. 7:2):



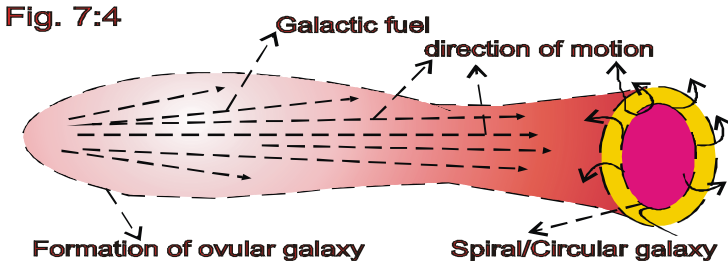
This type of scattering and expanding universe can provide the probability of regular and unlimited generations of galaxies with spiral, circular etc. growth of the universe (but not the spherical), as we see the smoke-rings coming out of the chimney or from any diesel engine or crater-mouth. Please see the figure: 7:3:

(Regular production of galaxies and growing of them in space & time) Fig: 7:3



This type of expansion holds also the probability of unlimited expansion of the ring-shaped or circular etc. galaxies with space and time. It means, as far as the time will pass, the escaping galaxies will expand more and more. Thus the circular shaped galaxies would grow up with

emptiness of blank diameter. But there may be some irregularities that even the circular galaxies are escaping and expanding, some portions of that may get low velocity due to differentiation of their mutual fluctuations. In this way, the lower speedy portion can produce a tail-typed galactic construction, as in the figure: 7:4:-

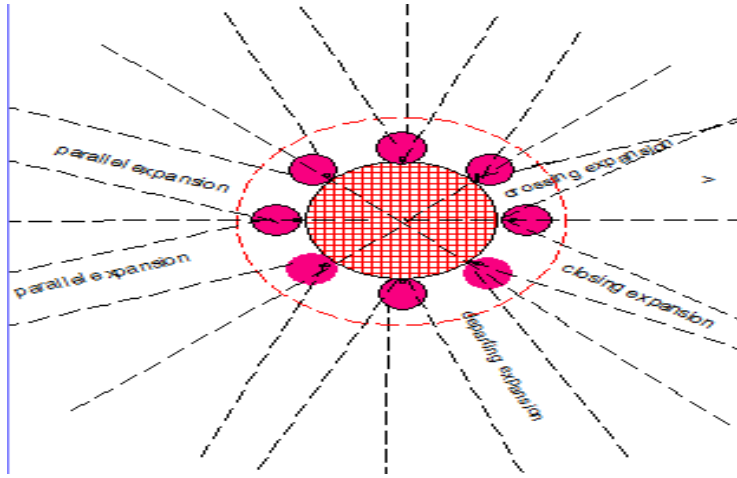


But, this type of expansion also holds a problem why the other part or side of such nebula could not explode?

In this partial mode of expansion, the scattering matter-particles of the primordial nebula should push their mother part back to the related opposite direction obeying the Newton's third law of motion.

(3) Expansion from various parts of the nebula:-

There may be a third kind of expansion, in which, the big-bang occurs at various parts of the core of such nebula, and the matters etc. particles spread out even conically but their paths of expansion can collide further or cross each other in the space. Or, there may be a fair gap between two partial (lateral) expansions in the space. In this mode of expansion, suppose two or more spots of the big-bang occurrence that expel the matters out. If their paths of expansion do cross each other, they can produce a chaotic distribution of matters for a chaotic galaxy or universe. But if their paths are parallel or departing from each other, the intermediate space would remain blank uniformly. And thus, we can suppose either many galaxies or many universes in the infinite space. Please see the figure: 7:5.



In this mode of expansion, if the explosion (regional big-bang) occurs differently, they can push the mother nebula back in different directions according to Newton's third law. And if those explosions occur exactly at the same time, the nebula would get motion of certain resultant direction, or that would stand stilled and that may be converted into a vast black hole. According to assumption of **Stephen Hawking**, such that great black hole should get a final end with a gigantic blast again. Such type of blasting can make emptiness in the centre as assumed before.

In all regards, these modes of expansions imply that at the time of big-bang, the universe was too limited in a primordial nucleus and the rest sky or space was completely blank. It also provides that the space is not an original factor of the universe. Whenever, in fact, the universe can not be separated from the space. These modes of expansions also do not clarify about the remnant core of the nebula what happened with that.

In fact, the infinite universe should not have any boundary and so, no any centre too.

Hot big-bang model from B. H. Time, p-122-127

The generally accepted history of the universe is the

hot big-bang model what implies that it should be described by a Freidman-Model what is a right back to the big-bang. In such model, we find that as the universe expands, any matter or radiation in it gets cooler. It means, when the universe is double in size, it's temperature falls by half. Since, the temperature is simply measure of the average energy of speed of the particles. This cooling of universe would have a major effect on the matter in it. At very high temperature, particles would be moving around so fast that they could escape any attraction towards each other due to nuclear or electromagnetic forces, but as they cooled off, one could expect particles that attract each other to start to clump together. Moreover, even the types of particles that exist in the universe would depend on the temperature. At high enough temperature, particles have so much energy that whenever they collide, many different particle-anti particle pairs would be produced, and also some of those particles would annihilate on hitting their antiparticles, they would be produced more rapidly than they could annihilate. At lower temperature, however, when the colliding particles have less energy, particle-antiparticle pairs would be produced less quickly and the annihilation would become faster than production.

At the big-bang itself, the universe thought to have had zero size, and so, to have been infinitely hot. But, as the universe expanded, the temperature of radiation decreased. One second after the big-bang, it would have fallen to about 10^{10} degrees. This is about thousand times the temperature of the centre of sun. At this time, the universe would have contained mostly of photons, electrons and neutrinos and their antiparticles together with some protons and neutrons. As the universe continued to expand and the temperature to drop, the rate at which the electron-**anti-electron** pairs were being produced in collisions would have fallen bellow the rate at which they were being destroyed by annihilations. So, most of the electrons and

anti-electron would have annihilated with each other to produce more photons, leaving only a few electrons left over. The neutrinos and **antineutrons**, however, would not have annihilated with each other because these particles interact with themselves and with other particles very rarely and very poorly. So, they should still be around today as in the form of “**dark-matters**”, with sufficient gravitational attraction to stop the expansion of the universe and to cause it to collapse again.

About one hundred second after the big-bang, the temperature would have fallen to about 10^9 degrees, the temperature inside the hottest star. At this temperature, protons and neutrons would no longer have sufficient energy to escape the attraction of the strong nuclear force, and would have started to combine together to produce the nuclei of atoms of deuterium (heavy hydrogen). The deuterium nuclei then would have combined with more protons and neutrons to make the helium nuclei which contains two protons and two neutrons, and also some small amount of a couple of heavier elements (such as: lithium and beryllium). The remaining neutrons would have decayed into protons which are the nuclei of ordinary hydrogen (**protium**) atoms.

Within only a few hours of big-bang, the production of helium and other elements would have stopped. And after that, for the next million years or so, the universe would have just continued expanding without anything much happening. Eventually, once the temperature had dropped to a few thousand degrees, and electron and nuclei no longer had enough energy to overcome the electromagnetic attraction between them, they would have started to combine to form the atoms. The universe as a whole would have continued expanding and cooling, but in regions, that were slightly denser than the average, the expansion would have been slowed down by the extra gravitational attraction. This would eventually have stopped

the expansion in some regions and caused them to start to recluse. As they were collapsing, the gravitational pull of matters outside these regions might start them rotating slightly. As the collapsing region got smaller, it would spin faster; just as skaters spinning on ice-spin faster as they draw in their arms. Eventually, when the region got small enough, it would have been spinning fast enough to balance the attraction of gravity. And, in this way, disk like rotating galaxies were born. Other regions, which did not happen to pick up a rotation, would become oval shaped objects called **elliptical galaxies**. In these, the region would stop collapsing because individual parts of the galaxy would be orbiting stably round the centre, but the galaxy would have no overall rotation.

As time went on, the hydrogen and helium gases in the galaxies would break up into smaller clouds that would collapse under their own gravity. As these contracted, and the atoms within them collided with another, the temperature of the gas would increase, until eventually it becomes hot enough to start the fusion reactions. This would convert the hydrogen into helium and the heat given off would rise the temperature and pressure, and so, to stop the clouds from contracting any further. They would remain stable in this state for a long time as the star like our sun, burning the hydrogen into helium and radiating the resulting energies as heat and light.

More massive stars would need to be hotter to balance them against the strong gravitational attraction, making the nuclear fusion reactions proceed so much more rapidly that they would use up their hydrogen in as little as a hundred million years. They would then contract slightly, and as they are heated up further, would start to convert helium into heavier elements like carbon and or oxygen. This, however, would not release much more energy, so, a crisis would occur to produce a neutron star or a black hole like construction. What happens next is not so clear, but it

seems likely that the central region of such star would collapse to a very dense state such as a neutron star or a black hole. The outer region of such the star may sometimes get blown off in a tremendous explosion called a **supernova**, which would outshine all the other stars in it's galaxy. Some of the heavier elements, produced near the end of the star's life, would be flung back into the gas in the galaxy and would provide some of the raw materials for the next generation of stars. Our sun contains about two percent of these heavier elements, because it is a second or **third-generation-star**, formed some five thousand million years ago out of a cloud of rotating gas containing the debris of earlier supernova. Most of the gas in that cloud went to form the sun or got blown away, but a small amount of the heavier elements collected together to form the bodies that now orbit the sun as planets or the earth.

The earth was initially very hot and without an atmosphere. In the course of time, it cooled and acquired an atmosphere from the emission of gases from the rocks (*how formed the rocks, is not clear*). This early atmosphere was not one in which we could have survived. It contained no oxygen, but a lot of other gases which were poisonous to us, such as hydrogen sulphide. There were, however, other primitive forms of lives that could flourish under such conditions. It is thought that they developed in the ocean, possibly as a result of chance combination of atoms into large structure, called the **macromolecules**, which were capable of assembling other atoms in the ocean into similar structures. They would thus have reproduced themselves and multiplied. In some cases, there would be errors in the reproductions. Mostly, those errors would have been such that the new macromolecules could not reproduce itself and eventually would have been destroyed. However, a few of the errors would have produced new macromolecules that were even better at reproducing themselves. They could have therefore had an advantage and would have tended to

replace the original macromolecules. In this way, a process of evolution would have started that led to the development of more and more complicated self-reproducing organisms. The first primitive form of life consumed various materials including hydrogen sulphide and released oxygen. This gradually changed the atmosphere to the composition that it has today and allowed the development of higher forms of life: such as fish, reptiles, mammals and ultimately the human race.

This (above) was the modern considered scientific figure of the entire universe (as it has described in the “Brief History of Time” by St. Stephen Hawking).

Now, reviewing this hot big-bang model of universe, we can find out that if these galaxies would have made up due to regional collapsing of the escaping matter-clouds caused by their own gravitational effects, generally the symmetry of their uniform expansion should be broken down. But, it was not so! Please follow the figure: 7:6: a

In this figure, we find that the gravitational centre of such escaping cloud or galaxy should attract the foregoing matters more weakly than the backwardly following matter-particles. In such condition, the shape of such galaxy ought to be ovalar (fig. 7:6: b), because the following matter-particles (to the central point of gravity) should be highly affected by both the forces of escaping velocity or momentum of its own and the attracting force of the foregoing gravitational centre ($v+g$), whenever, the farther escaping matter-particles should feel the gravitational pull (from backwardly gravitational centre) against their escaping momentum. Therefore, their escaping velocity should be disrupted caused to be either stable or poorly escaping or to be back to the gravitational centre so slowly ($@ v-g$). Similarly, the other nearby particles should get different velocities in different directions (fig.7:6:b).

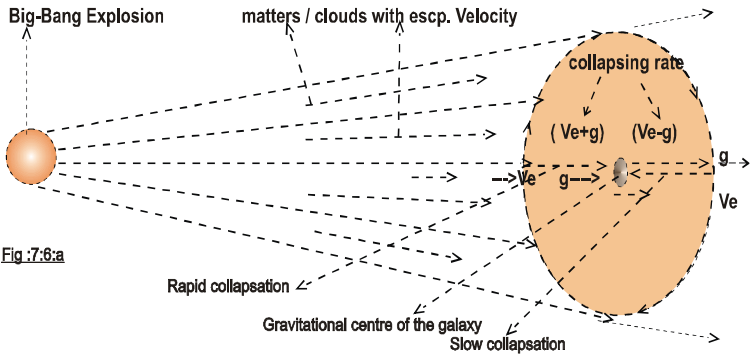


Fig. 7:6:a

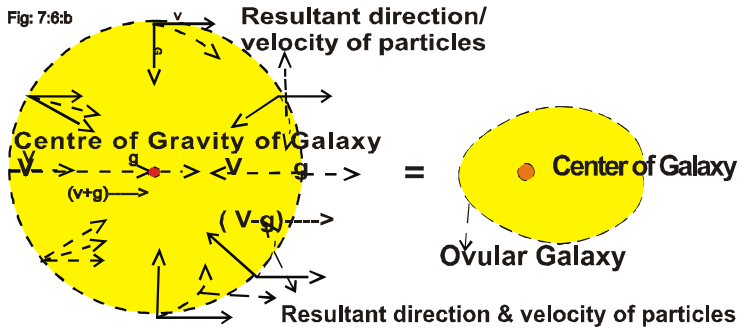


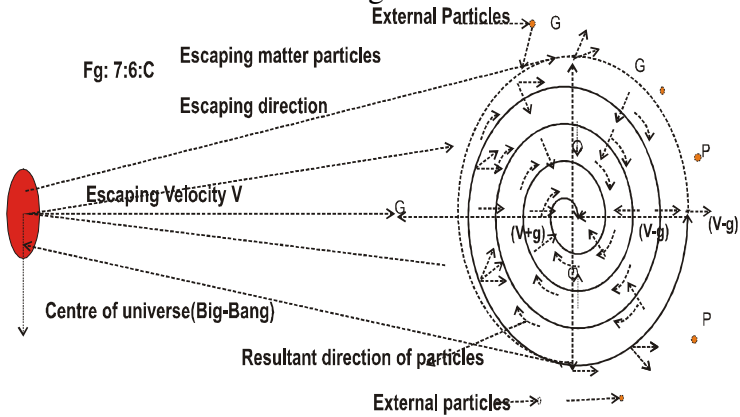
Fig. 7:6:b

In this way, even the contracting matters into the gravitational centre of such galactic cloud can move spirally, but their motions (speed) and moving directions may be of different schedules that they can annihilate each other randomly. According to this, we can assume that the symmetry of the uniform expansion of the universe or of the galaxies ought to be broken down and that should produce a randomly chaotic contraction rather than the uniform expansion. Thus, eventually, such galaxy should collapse.

In this view point, we can provide a theme against the uniform expansion of galaxies, and so, against the big-bang theory too.

And if, the gravitationally contracting matter-particles are affected by the attraction-pull of the external matter-particles (as stated by Stephen Hawking), what can

be the result? Please see the figure: 7: 6: c.



In this figure, we find different moving directions of different particles from different zones which are rotating spirally around the central gravity caused by the attraction of different outlying matter-particles. Thus, this should give a result of chaotic or random collection or collision of matter particles, so a chaotic galaxy too; not the assumed spiral or disk like galaxy, as it has described by Stephen Hawking. We can also assume that the external particles should produce only a very little effect with that's gravitational attractions what is near about negligible in respect to the escaping momentum of the collapsing matter-particles.

Conclusively, before producing or considering any model of the universe, or part of that, under shadow of the hot big-bang and so the expanding model, we should have a notice of the escaping velocity of the matter-particles. In this view point, even the inflationary model of the universe may be so suitable, but it should not provide an uniform colliding of gaseous-clusters to produce the galaxies or stars as it have supposed by our modern astronomers for the protogalaxies or protostars, because all the matter-particles should flow out with escaping velocity directly against the centre of the universe or the big-bang explosion, and so that, their randomly motions seems not so reasonable.

According to the inflationary theory of expanding universe, all matters should have an ever-departing attitude from each other, so that, their collision should occur very rarely and not uniformly.

New Proposal

Except these proposed models, there may be another mode of expansion in which we can suppose that as far as the matter-particles of such big-bang explosion (plasma) decoupled to form the atomic nuclei, their reduced momentum and escaping directions should get a change due to colliding together. While, the backwardly following light-weighted (more speedy force-carrying) particles or waves should enforce (push) them forwardly producing the Compton Effect. Therefore, the matter-particles should recoil to get the spiral motion. This can develop so many spiral jets as like the bellow figure: 7:7

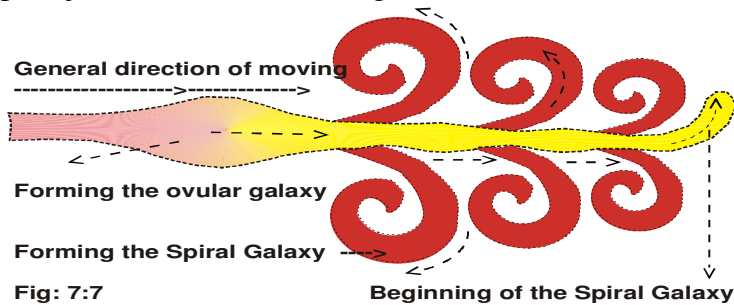


Fig: 7:7
(formation of the ovular and spiral galaxies)

Thus, those **high-energetic matter-particles** would have produced different spiral **galactic zones** systematically and distributed step-wise into the space. Whenever, the intermediate (basic) zones of the galaxies would have developed accordingly as the ovular galaxies. And when the spiral galaxies would have collapsed regionally so sufficiently, and when it reached the sufficient thermal condition, their matter-particles would have clumped to form the referred model of the **protostar** or so on.

[Note: Here, we can also suppose that in such condition

of 10^9 K or so on, the matter-particles should not form a dense-soup in absence of any sufficient strong compressor or any external strong gravitational pull to produce the nuclear or thermonuclear fusion etc. reactions. So that, such kind of spiral galaxies should not contract or collapse in such hyper-energetic condition, because there not seems any sufficient reason of any strong source of gravity in the centre of galaxy.]

In this mode of expansion (fig; 7:7), we can find out that the spiral galactic-matters or bodies are moving round on (near about) their circular paths without having any central attraction. Instead that, each rotating circle should have that's own central point. Thus, all the circular paths of the galactic bodies should make an approximate centre of the galaxy what is nothing, but, only a vacant space where the gross centripetal forces of the spiral bodies are making a hyper-energetic electromagnetic field. In such field, any pertaining matter can consume such electromagnetic energy or property. Consequently, the matters of such centre either can produce a gigantic explosion like a supernova, or, that can produce a scenario of an initial black hole: (the concept of the initial black hole is yet to be come).

Now, if we are really sure that each the galaxy is expanding uniformly, with space and time, we can suppose under the shadow of critical density and the measured density of the universe, that if it is so, it means that the angular momentum of the bodies is so enough rather than the central pull, or, the centrifugal force of such galactic bodies is more stronger than the centripetal force, because the central region of the galaxy has no any strong source of attraction. Possibly, this is why, the galaxy is expanding uniformly. In such condition, the central zone of the **electromagnetic field** of the galaxy should also expand accordingly and that should get liquefied or poor and poor in the space and time. And, in this circumstances, we should not expect any gigantic explosion in the galactic centre except some strong source of radiation (*ref:- Magellanic*

cloud in the centre of galaxy that emits strong radio etc. waves.) what should emit out of that electromagnetic zone caused by falling of some of the nearby matter-particles into that. It provides that there is no any probability of galactic contraction again. Only the local conditions of the black hole can disrupt the expansion of such galaxy, but, that should effect very locally. Because of, even we have so many evidences of a large number of black holes existing in the galaxy what should produce the strong source of contraction of such galaxy, but in fact, such galaxy is still going on expanding uniformly. This implies that such the black holes are not so enough to halt or contract such galaxy. And, until such black hole becomes so strong to halt the expansion, the nearby bodies would have been escaped far away possibly, with their cyclonic motion as the comets, beyond of that's attraction power during that course of time. And eventually, such the black hole should produce itself the concepted gigantic explosion or that should disappear caused to supply the star-fuel etc. into the space.

This mode of expanding universe from the hot big-bang model provides a more suitable way or reason of the galactic (and so the universal expansion). It also provides a clearer concept of uniformly distribution of matters (or bodies) all around as it seems. The reason of spiral galaxies along with the ovular galaxies becomes clearer with this mode of expansion.

To provide a central black hole in the centre of galaxy, we can suppose that the frontier head-part of such galactic jet should consist of maximum matter-particles, so, that should be more dense than that's following chain. So that, the head part should produce the largest model of a protostar, and afterward, that should convert into the largest star. Thus, according to **Chandrasekhar Limit**, that largest star which is positioned near about in the centre of such galaxy, should use up the star-fuel so rapidly and

eventually that should convert into a large black hole respectively.

In this figure, the following other stars what are orbiting or rotating on the same circular paths, should drip into (or collide with) the black hole. And thus, near about all the galactic bodies should also drip into that systematically. This would be the transitional end of such galaxy. What would happen afterward is not so clear. But according to the proposals of Stephen Hawking, such death of galaxy would convert into a galactic black hole, contracting by itself. That black hole should make a universal gravity to haul and reback the other nearby galaxies to drip into that. In this way, a time should come, when the entire galaxies should merge into that black hole to produce a regeneration of a new universe.

But, this assumption of central black hole of the galaxy would run against the expansion theory of the universe. Therefore, it also seems dubious to consider. And; we should find out more.

In spite of, the hot big-bang model seems not so justifiable, because the calculated universal density does not allow any way of contraction of the expanding universe towards a big-crunch. So that, the question, why and how would have formed such the primitive hot nebula, is still unsolved. And, it is really unbelievable fact that entire universe should have any boundary, so that, it should not have any centre to collapse in it. If we suppose that our entire former universe would have had collapsed into a small ball (hot nucleus), then, what was surviving beyond of that nucleus or beyond of the circumference of the former universe? Again, if the galaxies would have formed caused by the gravitational contraction of matters in it, why is it until expanding on? It justifies itself that the contracting phase of the universe seems also not so reliable. This contracting phase may be applicable in making of the stars, planets, black holes etc. stellar bodies.

Again, the hot big-bang model and that's expansion do not clarify how would have formed the heavy elements that we find in the earthen matters.

Next: It has considered that our solar system has made up of the expelled matters caused by a supernova explosion in any former star. In this regard, it has provided that most of the gas-clouds of such explosion either would have formed the sun or, that got blown away, but a small amount of the heavier elements of such explosion (containing mostly H, He, C, Be, & O etc.) collected to form the planetary bodies.

This assumption does not provide any suitable answer how the heavier elements would have collected regionally and that modified into the earthen etc. heavier matters. It is also a bit like question how could those gaseous collections (sun) been able to attract or hault the heavy matters or planets so strongly to orbit around. This assumption also implies that our solar system should orbit around it's mother part, the remnant neutron star or black hole caused by such supernova explosion.

Conclusively, the actual figure of galaxies of ever expanding universe (as it seems) and the provided consequences of their evolution seems inconsistent to each other. And the proposed consideration of making of the planets also not seems so justifiable. Therefore, it needs a more clear concept and diagram of the universe that should provide the suitable solutions of all the relevant problems.

Now, before finding out such a suitable concept, please follow the 'Reviewing Notes' of the previously considered (or evidential) facts.

8: REVIEWING NOTES:

EXPANDING UNIVERSE:

MICROWAVES' BACKGROUND RADIATION

Our modern scientists are very hopeful to the background of the microwaves' radiation that it is coming from the said big-bang what had occurred about 10^{15} billion years ago into the said primordial nucleus and it is still reaching us today as the microwaves. These microwaves are likely to supporting the theme of expansion of the present universe.

Here, it is a bit like question that if such big-bang could have occurred some 10^{15} billion years ago and if our universe or galaxy or solar system or earth would have made from the scattered matters or matter-particles of such big-bang after 10^9 billion years of such occurrence, how fast the escaping rate of our galaxy or solar etc. system that we left those light etc. waves too behind that they arrive us still now? Was (or, is) our escaping velocity too fast to light and micro etc. waves to go across? It implies that, in past, we were escaping against the big-bang centre faster than the speed of light. In this way, the most valuable theory of general relativity ($E=mc^2$) is being violated by itself.

And if, those microwaves are arriving to us uniformly from all directions, how can we detect the actual direction of the centre of the universe? If these microwaves are reaching us reflecting from the stellar bodies from all directions, we should observe them as different spectrum or as different frequencies. But the observational results are of similar strength. Thus the concept of big-bang explosion, and so, of the centre of universe looks dubious.

In fact, if the universe would have started off from the big-bang singularity, and if all the matter-particles of such primordial nebula or nucleus could have thrown off out into the space following the **grand unified theory**, obviously, the force-carrying particles (photon etc. light waves) would have also escaped out during that course of

time along with the matter-particles. And because, the spin '0' particles (photons) are the fastest moving particles of the universe, so, it should escape faster than of the spin 1/2 **matter-particles** just after decoupling of the plasma. In this viewpoint, during this too long duration of escaping and forming of the objective universe, the primary light and radio etc. microwaves emitted out of the big-bang explosion must have been escaped out of the parameter of the objective universe at least out of our galaxy.

If these waves are still reaching us uniformly as the microwaves from all around, it implies that we should be in the centre where all the universal bodies are releasing or reflecting those microwaves for our earth or solar system. Where it is a question of their uniformity, this may be caused by different cosmological intermediate space layers what are evading and spreading all around of the earth and (or) the solar system, through which those micro etc. light or radio waves are being filtered and then reaching us. Due to hindering by those intermediate space-layers, the speeds of light etc. waves are being reduced. Thus, possibly they are producing the red spectrum to the observers on the earth. And, because of the stars or galaxies are too away that their light etc. waves are getting approximately uniformity. This implies that the universe should be identical whichever direction we look.

St. **Henrich Olbers** (a German) had also suggested in 1823 that the light from a distant star would be dimmed by absorption by the intervening of matters. But, our scholars/ experts have valued that the intervening matters would eventually be heated up until that glowed as brightly as the stars. But, this valuation seems not so justifiable in practical. For example, we can see the atmosphere of earth which is continuously filtering the high energetic ultraviolet, infra-red, gamma etc. cosmic rays and protecting the earth from their bad effects. Instead that, the atmosphere is not being enough heated up to be glowed

bright.

In fact, such the intervening matters may be affected by those cosmic-rays from the distant stars according to the law of “**photo-electric-effect**”. In this way, such matters should emit or exert or radiate the waves of photoelectrons or so (probably those are the poor rays), that such the absorbing matters should not be heated up so enough to be glowed bright. On the other hand, due to regular falling of those light etc. rays and absorbing that into the intervening spatial matter-particles, we can assume that such the interaction should produce the “**Compton effect**” and/or the “**threshold energy**” to promote the initial atomic interactions as it have assumed in “chapter -10” for the initial beginning of the universe. This also may be a reason of the abundance of H, H_c in the free space as the star-fuel.

Although the red-shifting **light-spectrum** and microwave’s radiations from the cosmic universe both are likely related to the expanding universe, but it can be taken in another way also. The modern atomic science provides that all the matters and matter-particles of the universe are ever-dynamic and nothing else is static (even the fundamental and the tiniest atomic particles are also having their **ever-dynamic status**). Therefore, in large scale, the universe or part of is also dynamic. In the view of atomic laws, because of the entire universe has composed of the atomic particles, so that, all the matters / objects / stars etc. should undergo with these atomic laws, even all the cosmological etc. events should also obey these laws. And, it is a well known fact that our solar system is constituted as a vast model of atomic structure.

The similar condition can be supposed for the galactic constitution. In this regard, we can assume that our entire solar-system should orbit around the polar star (or any other) just as the **great-bear-constellation**. (Perhaps, this is why, we see the polar star at a distinct direction

always). Similarly, we can admit here that such the polar constellation should follow onward. It means, all the universal bodies are inter-related and they are having their ever-dynamic rotations, because they run into the space-curvature.

Due to this dynamic rotation in the curved space, some galaxies may move farther and some can come closer to us. In case of moving farther, their emitting light or micro etc. waves can result the red-shifting spectrum or **Weak Doppler-effect**, where the closing galaxies can produce the blue-shifting spectrum or **Strong Doppler-effect**. Here, we can suppose that major galaxies are presently moving farther from us, but not from all others (because the earth or the entire solar-family is not insisting into the centre of the universe). On the other hand, we can also suppose that all the arriving light etc. waves from far away are being flittered into the wide range of the intervening cosmic-space, so that, they are producing the uniform identification that we observe them as the **red-spectrum**.

The observational red shifts of the departing or expanding universe can also be taken in an another way that the universe in fact is not expanding but the spatial-bodies / galaxies are circulating with their spatial motions in the curvature of space.

We know that the light emitted from the stars is in fact affected by the strong gravitational field of the emitting star. This may cause to change the initial frequency of the emitting light-waves. So that, we observe them shifting towards the red-end of spectrum of any particular star. Similarly, any other wave like the light-waves can also produce the image of Doppler-effect what we observe as the **microwaves'-radiation** and do consider that the universe is really expanding. But, in the view of (and according to the law of) the strong gravitational effect of stars or galaxies and their emitting light etc. radiations,

it also may have a probability of a steady but dynamic state of the universe what in fact is not expanding.^{24#}

#.ref. *Gravitational red shifts, Mod. Phy. R. Murugesan, S.Chand & Co, N.D. ed. 2001 pg..26*

Again, it has also considered that the universe is expanding uniformly and as fast as the distance between the galaxies is growing ($V \propto D$). In this regard, we can assume (and we know well) that the galaxies are having their spiral motion in the **space-curvature**, as our earth is orbiting the sun, due to what they are existing with the gravitational interactions with the neighbouring bodies or galaxies. In this case, *it can be provided that such the microwaves' radiations or the red-shifting colour spectrum of galaxies or stars are really caused by their spiral orbiting in opposite directions of the earth, or, their rate of orbiting are different in respect to our earth-motion.* It can be clarified well comparing it with the spatial motion of our own galaxy.

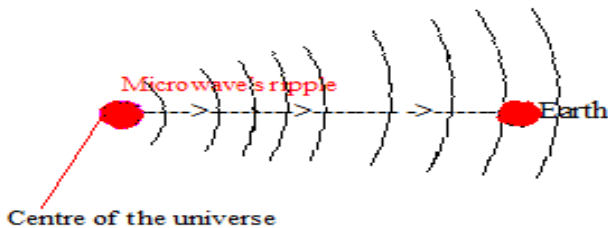
As it has considered or measured that our galaxy is too vast about hundred thousand light years across, and it is rotating slowly. The stars residing in it's spiral arms, orbit around it's centre (galactic) once during several hundred million years. And our sun is just like an average small yellow star besiding near the inner edge of one of that spiral arms. Now, we know that the velocities of different orbits are not equal. On the other hand, we know that the gravitational intensity is reverse proportional to the distance between two or more objects or from the centre point. Therefore, we can consider that, as far the object comes near the centre of galaxy, that's speed, gets faster and faster. In this system, we can suppose that the spiral velocity of our solar-system is more less that of those stars which are more near to the galactic centre, that they are producing the decreasing order of the microwaves' radiation or red-shifting colour-spectrum.

Similarly, the spiral velocity of our solar system is

faster than the farther one, and therefore they are producing the same conditions that we are observing them to be departing from us. According to the general theory of relativity, the **gravitational red-shift** can also cause the illusion of the expanding universe. Therefore, it is hard to confirm what is right: the expansion or the steady but dynamic state of the universe?

Again, if we find the similar strength of the microwaves-ripples approaching us uniformly from all directions of the global earth, how may we be sure about the actual direction of the centre of universe?

There may be a probability that the **microwaves-ripples** of whichever direction will surround the global earth unaltered. As we see the wave-ripples on the water-surface, we find that the wave-ripple spreads or grows unaltered all around, no matter what is obstructing the paths of such ripples. If any matter, laying on the water-surface obstructs the ripples to spread, but the ripples would go across of that unaltered surrounding and over crossing such obstruction. This can be happen with the microwave-ripples only but not with the light rays, because the light -rays travel in straight paths. In this view point, we may not have an actual direction of the centre of universe. Please see the fig: 8:1----->



Therefore, the microwaves' background of radiations seems not likely to be related to the big-bang explosion of the said beginning of the universe.

Chapter :9

REVIEING NOTES:

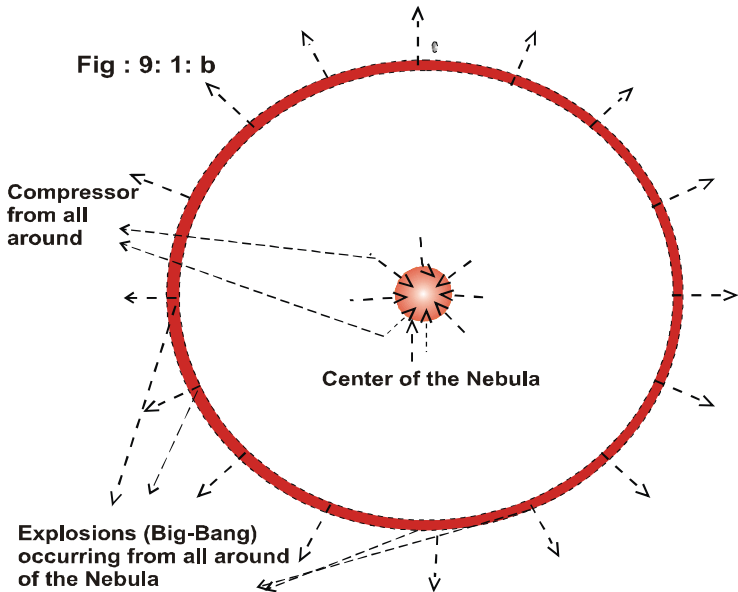
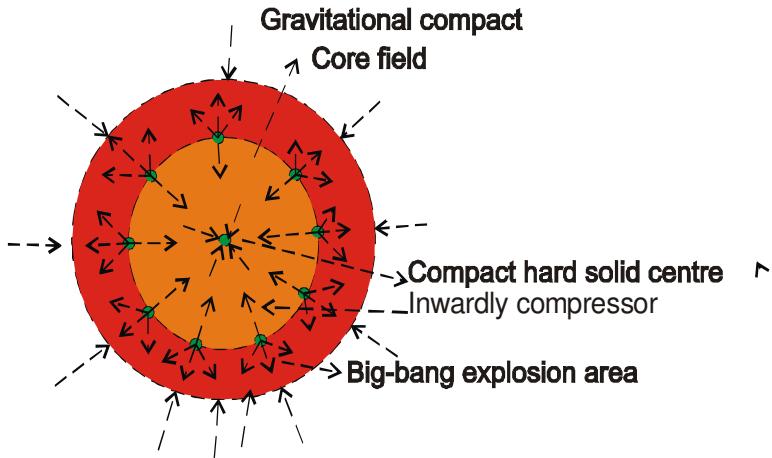
EXPANDING UNIVERSE:

THE BIG-BANG THEORY / BLACK HOLE THEORY

To establish the model of the expanding universe, our noble scientists have considered and proposed the big-bang theory that at the beginning of the universe, there was only a great fire ball (primordial nebula or nucleus). Such nebula burst off with a gigantic explosion (big-bang) and all that's matters threw off out. Further, those expelled matters (plasma of matter-particles) converted into uncountable galaxies by itself. And, due to such explosion (big-bang), the matter-particles escaped too fast to be arrested again by the central gravitational attraction pull of the **primordial nebula**. Thus, therefore, all the galaxies are escaping still now and they should continue forever with the increasing velocity.

1: This theme provides itself that the centre of gravity of such nebula was insisting into infinitely hardest solid form matters and that would not have destructed by such the big-bang explosion. So that, after the explosion, such that centre was attempting to arrest the escaping matter-particles with the gravitational force.

2: This theme also provides that the said big-bang explosion would have occurred at the gaseous core (not in the centre) of the nebula; all around at once and that would have made an inwardly compressor to support the central gravitational pull. This would have made the centre harder and more solid than it was (as we find in the assumption of formation of a neutron star. Please see these figures: 9:1:a-c :-



If we do consider about the primitive nebula, it seems a problem how made that and what was the former condition of the universe just before the big-bang occurrence or before the nebula. Was the space really and absolutely blank? If such nebula was the primitive

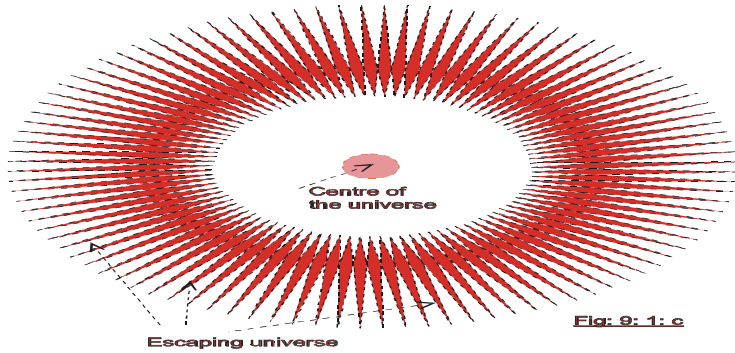
universe, obviously there would have been a limitation or boundary of that. Then, what was surviving beyond of that boundary? Can we think about the universe neglecting the space or sky? However, the space or sky must be the origin of the visible universe what is (or, was) filled with different kinds of elementary waves, such as electrons, photons, protons, neutrinos, or any possible fractions of that if any, etc.

Again, the **Grand Unified Theory (GUT)** provides the imaginary hyper (extremely increased) energy or temperature (10^{15} GeV) in the primordial nebula. How such extremely hyper energy occurred into the nebula to promote the said gigantic big-bang is not so clear yet. Even the quantum mechanics could also not define or confirm about the relation between the gravitational force and the grand unified energy. The **GUT** could also not detect the gravitational force as an **asymptotically free** particle or wave.

According to the classical theory of physics, the gravitational attraction occurs relatively between the pertaining two or more besiding particles or matters that depends on the gross mass value of the interacting matters or particles and distance between them ($G = m_1 m_2 / r^2$). And in the view of **quantum mechanics**, this force occurs between two bodies or matters or particles which are having their spiral motion. Abstractly, the gravitational force or gravity is always interrelated and it has no it's free existence. We know now that the gravitational waves (graviton) are really mass less 'spin 0' particles, so that their speed is equal to the speed of light.

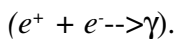
The grand unified theory provides that at a critically extremely high energy-level (10^{15} GeV), all the **force-carrying particles** of the nucleus or nebula behave similarly and they produce different aspects of a single force. But in fact, the **GUE** is unclear yet to the gravitational force. Yet, it could not been calculated or

predicted what would happen with this force-carrying particle (graviton) at this **hyper-energy-level**. Therefore, until this valuable problem is unsolved, the proclamation



of the big-bang theory should not be justified finally.

In fact, the **big-bang theory** is totally imaginary by itself and it is based on some calculations only with the observational views of the nuclear experiments. The GUT assumes that in the rising order of energy or temperature, the electromagnetic and weak-nuclear forces of atoms increase respectively where the strong-nuclear force gets weak and weak. And therefore, at a critically high degree of energy level, all these three forces get equality and produce similar strength. We know that the electromagnetic force keeps both the characters of attraction and repulsion, the weak nuclear force is always repulsive (radiative) and the strong nuclear force has the attractive character only. Thus unifying all these three forces, we get result of neutral or zero character. It means, in such hyper energetic condition when all the three forces will be equal, the characteristic situation should stand stilled or in equilibrium state. It should act then only electromagnetically either in attractive or repulsive way, or should annihilate by itself to produce the **photonic radiation**



But, there seems another probability of nuclear

reaction or incident concerned with the gravitational force. Because, it have not analyzed or unified yet with another forces, so, it is really very hard to say anything about.

With the classical experiments and theories, generally we do find that the matters or molecules get expansion when that is heated up or, is given energy. Certainly, their atomic structure or volume may also expand due to absorption of heat energy. Here, we can suppose that such expansion may make the electromagnetic behaviour of atoms more active. And, it is also a well known fact that this absorption of energy can promote radiation in atoms by exciting the weak nuclear force, as we do observe in the black body radiation. Thirdly, we know that the strong nuclear force is effective to a very short range, so that, due to a very little expansion of radius of nuclei, the strong nuclear force should become less effective than it's initial. It means that the strong nuclear force reduces in rising order of temperature or energy. Again, we know that the gravitational value stands inversely proportional to the distance between the interacting particles or matters, so we can suppose that, in the rising order of temperature, the gravitational strength should also decrease respectively.

Now, unifying all these four forces classically, we find that if they are of similar strength at the critical value of GUT :

$$\text{electromagnetic force } e_m^{(+ \cdot -)} = 0$$

$$\text{weak nuclear force } e_w^{(-)} = -1$$

$$\text{strong nuclear force } e_s^{(+)} = +1$$

$$\text{gravitational force } e_g^{(0)} = 0$$

$$\text{total value} \qquad \qquad \qquad = 0$$

Thus, the characteristic result stands by zero or of equilibrium state. Therefore, either all the matters of GUE should be devoid completely and the nuclear constitution

should be disintegrated, or, the matter-particles (spin $\frac{1}{2}$, hadrons or quarks) should get **asymptotic freedom**.

But again, the GUT implies that at this hyper energy, the spin $\frac{1}{2}$ matter-particles like electrons and quarks would also be essentially the same. In other words, they all would identify similarity and their separate identification would be out of order. In the view of such assumption, it stands a great problem how would the atomic or objective universe have established then.

To solve the above problem, scientifically it has considered the process of thermonuclear fusion reactions in the stars. This thermonuclear reaction occurs into a state of extremely compressed energetic plasma region.

According to modern physics, pg...367....

Thermonuclear reaction

According to scientific considerations, the source of energy in stars is fusion. This suggests that a large amount of energy can be obtained by the nuclear fusion. But it is not easy to fuse the light nuclei into a single nucleus. The main difficulty in the fusion of nuclei is the electric force of repulsion between the positively charged nuclei. The fusion is possible when the kinetic energy of each the nucleus is large enough to overcome the repulsion between them. The fusion reaction can take place only at very high temperature (of the order of 10^7 to 10^9 K) what may make possible to overcome their **mutual columb repulsion** and to get inter into the zone of nuclear attractive forces. Hence, these reactions are called the thermonuclear reactions.

It has considered that a star is able to control the thermonuclear fusion in it's core because of it has too strong self gravity. The thermonuclear reactions in the core of the sun causes high temperature which generates strong outward pressure: this acts against the sun's own gravity preventing it from contracting and holding it in equilibrium state. The equation of stellar structure ; set up by **St.**

A.S.Edington, relates the gravitational force in the star to the progressive changes of pressure from it's centre to outwards, the magnitude of pressure to density and temperature, and the fall of temperature outwards to the flow of energy from the interior to the surface. From these equations, stable models of stars emerge with central temperature high enough to start and sustain the thermonuclear fusion. The key roll, of course, is played by the controlling force of gravity. The large mass of an astronomical system makes gravity the most important factor in determining it's behaviour.

Controlled Thermonuclear Reaction

According to the nuclear science, a large amount of energy is released in a fraction of second in a hydrogen bomb. If the thermonuclear reaction could be controlled to take place more slowly, the energy released can be used for constructive purposes. We know that very high temperature is needed to bring about a nuclear fusion process. The main problem is to produce such a high temperature and to find a container for the gas which can stand at this temperature. At this temperature, the gas becomes highly ionized and it is called '**plasma**'. One of the severe engineering problems is the design of a container in which very hot plasma can be contained under high pressure to initiate a fusion reaction. Since almost any container would melt in the presence of plasma, attempts are being made to contain and control plasmas trapped in a specially shaped magnetic field or magnetic bottle (figure: 9:2). By increasing the field and changing the shape of the field, it is hoped that the plasma in this '**magnetic bottle**' can be raised to the required temperature and pressure for fusion reactions.

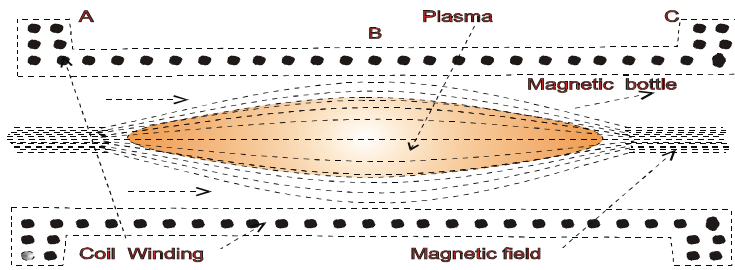


Fig: 9:2

This magnetic bottle is based on the reflection of an ion that moves in a magnetic field “B”, whose lines of force converge. The magnetic force of an ion of velocity “V” is perpendicular to both V and B. So that, the force has a backward component in such a field as well as the inward component, that causes the ion to follow a helical path around the lines of force. If the backward force is powerful enough, the converging field acts as a mirror to reverse the ion’s direction of motion. Thus we can have or form a high density of magnetic field lines which reflect the particles back into the low-field region and is hence known as a **magnetic mirror**. A pair of magnetic mirrors constitutes a magnetic bottle.

To inter-relate the thermonuclear reaction with the gravitational force of the star, it is not so clear how much gravitational magnitude or strength is preserved into the plasma by itself. In the view of the thermonuclear fusion in the star, we can suppose that the required enormous pressure or compressor can be provided by the gravitational pull of the central nucleus of such star which lays outside of such **plasma-zone**, please see the figure 9:3.

According to this figure, the core of a star can be supposed of it’s five sections. The **external core** is constituted of plasma with adequate gravitational pull for the thermonuclear fusion. The second section is lying just below the **external plasma zone** and consisting of even

plasma but due to extra strength of gravitational pull the thermonuclear reactions are seized there. It is the **internal plasma zone**. The third is the **internal seized core** and consisting of gaseous helium nuclei. The fourth section is the **semisolid internal core** made up of either helium or neutron etc. heavy nuclei. And, the fifth section is the **central nucleus** in solid form either of neutron or of heavy nuclei like nickel or iron.

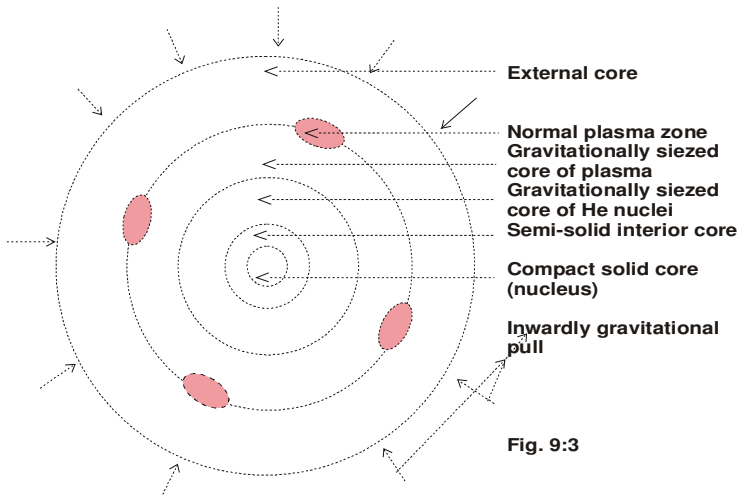


Fig. 9:3

But, if the core including nucleus of the star is filled with gaseous plasma only, what potency of gravitational force would present there in? Probably, the gravitational intensity (magnitude) of such gaseous plasma would not be so enough by itself to overcome the **mutual columb repulsion** of nuclei and to dominate over all the belonging particles and to produce the thermonuclear fusion due to it's gaseous form (according to law of physics $G = m_1 m_2 / r^2$). It means, even the energy and pressure are too high but the mutual and so the integral gravity of the pertaining gaseous particles of the plasma would not be stronger more than of the solid form core. It is also a probable fact that the white dwarf and the neutron

etc. stars are remaining in solid form, not in plasma or gaseous form which mass density is enormously high. Thus, it is violating the law of **critical constant of temperature of thermodynamics**, because of, in this hyper compressed and densed system, the value of intra-nuclear-space or intra-atomic-space gets infinitely zero that it gives the sense of complete solidity.

Looking at the **H.R.Diagram** of the universe, we find a stage of main-sequence of stellar-evolution. This provides that after contracting the protostar when the temperature rises up to the critical standard of thermonuclear reaction, the hydrogen atoms produce the helium nuclei and release huge amount of energy. This fusion reaction makes an outgoing pressure against the central gravity, and thus, there stands a situation of equilibrium, due to what, the further nuclear fusion reactions get an end. It means, such that shining star remains in a stable state during the stage of equilibrium. Whereas, the outgoing fusion pressure also expels the superficial or external matters to flow out against the gravitational pull, into the space. And, the inwardly pressure of fusion supports the gravitational pull to compress the pertaining electrons of the helium nuclei of internal plasma zone to penetrate into the nuclei and to convert them into neutron nuclei. Thus, the central core of the star becomes condensed more and more with the neutron etc. nuclei. This condensation provides or should provide the rising of the gravitational strength consequently that it overcomes to the mutual cumb of repulsion between similarly charged neutron nuclei.

To calculate the **GUE**, it has considered the thermonuclear fusion reactions of hydrogen or neutron nuclei in the core of the star or the **primordial nucleus (nebula)**. This thermonuclear fusion needs an enormous pressure with enormous temperature. This pressure is provided by the strong gravitational pull of the contracting

star or nebula, whereas the temperature rises up due to mutual colliding or shrinking of the gaseous matter etc. particles itself. Now, it is a very reasonable question for the stellar thermonuclear reactions that the central nucleus of star must be enormously dense, and so, enormously compact hard solid, to produce the adequate strong gravitational attraction to the plasma core.

How the core of the gaseous protostar becomes solid, is not so clear. In this regard, we can suppose that, due to strongly collision or striking of the hydrogen gases, the hydrogen atoms divert into electrons and protons and produce gases of protons and electrons separately. It means, the first nuclear reaction would be fission. Due to this process, the releasing energies produce high enough temperature. Further, when the temperature is enough (10^6 to 10^9 K), the ionized gases of electron and proton collide again to form helium nuclei. But, this fusion process runs first in uncontrolled way, so that the star burns its fuel fast. It also may be a probable fact that due to these uncontrolled **fusion reactions**, the star with enough high mass explodes as a mini big-bang or supernova, and expels the external gaseous matters out into the space. Perhaps those matters would have collided further to form the planetarian constructions that orbit around their mother part (sun).

Now, suppose that if those fusion reactions do occur in the outer zone of the core of star, the superficial matters should be thrown off out into the space due to outgoing fusion pressure. And if, the fusion occurs in the centre, that should throw off all the star matters out and, the centre should loss its gravitational strength to bind them again. It means, such that star should be destructed completely into debris's.

Again, if that fusion occurs at the outer zone of the core, that should make a support to the gravitational attraction of the centre with the inwardly fusion pressure,

due to what the related atoms or gases or helium etc. nuclei should be highly compressed to drip into the centre of the star. This will make the centre denser. In this way, due to continued fusion pressure, the central gravity and temperature should increase more and more and would get also solidity due to over compressor. In this way, due to over gravitational pull and over compressor, the thermonuclear fusion reactions should be seized there, and consequently, the centre of the star should step forward towards solidity.

Thus, it seems very possible that the gaseous stars get near about solidity in it's centre in the stage of main-sequence of H.R.Diagram during the nuclear fission and fusions. Further, when the centre gets virtual-solidity, the controlled thermonuclear reaction should take place due to enough extra gravitational pull of the solid like nucleus, due to what the helium nuclei should convert into neutron nuclei.

And, after using it's all nuclear fuel (H_2), when the thermonuclear reactions are stopped, the star core should shrink as to white dwarf or neutron star according to the **Chandrasekhar Limit**. It is a clear and reasonable fact that the temperature of the **white dwarf star** should reduce gradually due to that's low mass. Where in case of a neutron star, the temperature should rise up due to that's greater mass and that's rapidly contraction. It is also a clear evidence that both type of stars should not hold gaseous condition, because of, according to assumption of the **thermonuclear reactions**, theoretically, all the superficial gaseous matters should have thrown off out into the space and the remnant core (nucleus) should get stilled or compact to the enormous density and should convert into white dwarf or neutron star.

Now suppose that the neutron star shrinks more and more, what may be the final result? In such neutron star, at least four conditions should survive, viz: (i) enormous

density, (ii) exclusion principle of repulsion, (iii) excessive heat energy or temperature and (iv) overcoming gravitational strength or gravitational pull.

We know well that the gravity needs always a mutual interaction of matters. So that, as far the massive body losses mass, it's integrated gravitational value should also decrease respectively. Therefore, the gravity of such a white dwarf or neutron star should also have a limitation. We can suppose the enormous density in the core of the star when it has stopped the thermonuclear reactions. Therefore, the collective mass of the dense core should produce the collective enormous gravitational pull in such star. Because of, the external matters have had been thrown out into the space, so, that's gravitational intensity should also not survive into the remnant centre of the star. Thus, only the collective mass of the remnant nucleus (white dwarf or neutron star itself) is reasonable for that's present gravity. (Because of the remnant core is caused by the central gravitational pull along with the fusion pressure, so that the matters in the core are highly compressed and become enormously dense when the gravitational pull overcomes to the force of exclusion principle of repulsion). In this stage, when the neutron nuclei are highly compressed, they compact each other completely and conjointly. In this way, each pair of neutron nuclei should produce the maximum gravitational strength, so that, the composite gravitational strength should provide the highest potential. In this condition, the fusion pressure also supports the gravitational pull that it dominates over the exclusion principle of repulsion of similarly charged neutron etc. nuclei and also over the outgoing thermal pressure of the core.

These type of neutron or white dwarf stars should produce their aspects bigger than the actual volume according to the theme of **gravitational red shift**, please see the figure: 9:4 :

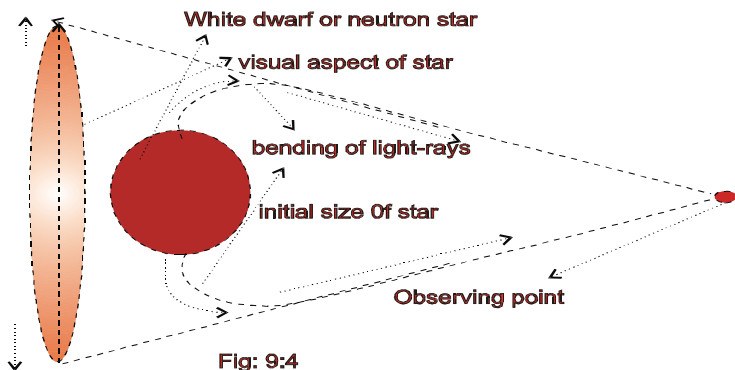


Fig: 9:4

Probably this is why, even the **Cygnus X-1** star is belonging too far from the earth but it is shining so much and producing the biggest image in the night sky.

Further, as far as the fusion pressure becomes normal, what would be the situation? Would be the gravitational pull enough strong alone to dominate over both the outgoing **thermal radiating pressure** and the **exclusion repulsion**? Would the symmetry not be broken down? Because of, after finishing the fusion pressure, the symmetry of equilibrium of such condition should be misbalanced.

Answering the above, we can suppose that, once the neutron etc. nuclei are compact together and produced the maximum gravitational pull will not apart again even the fusion pressure is absent now. Eventually, the outgoing thermal energy would also be radiated accordingly that it will balance the situation. And thus, the white dwarf or neutron stars should stand stilled.

Otherwise, as far as the fusion pressure reduces the integral outgoing thermal energy along with the exclusion repulsing energy should come in action, and so, the star volume should expand respectively. If the **fusion pressure** reduces gradually, the force of repulsion and the radiating

thermal energy can produce some interactions or mild nuclear reactions in the core as like fission of neutron etc. nuclei ($n \rightarrow p^+ + e^- + \bar{\nu}$). But, if the fusion pressure is reduced rapidly, there may be some strong nuclear reactions of destruction. And if, such the incident occurs very suddenly, it may produce any **supernova** like explosion, so that, there may occur a great destruction in such condition into the neutron star that should destruct entire core or nucleus of such star into parts and particles. Now, there should not present any central gravitational condition because all the matters of such star should have been exploded or scattered out all around into the space with extreme velocity. And when the central position of the destructed star becomes vacant or powerless (gravitationally), there should not survive any probability of re-collapsation or re-contraction of that. Therefore, the idea of re-contracting phase of such neutron stars seems not enough reasonable. Whether it is a question of **dark-matters** present into such vacant centre as the remnant, it is unclear yet why and how that should collect into a distinct zone only.

If we suppose the same conditions for the suggested big-bang model of the universe, we can draw a figure of an empty or vacant centre of the entire universe what should grow forever according to **Newton's law of motion**. Theoretically, such centre should no produce a gravitational pull to the escaping universe to be collapsed. In fact, the assumption of the big-bang theory and of the **primordial nebula** may be only the mathematical logic of our honourable scientists rather than the real, because the entire universe should not collapse into a small primordial nebula. Even the **grand unified energy** that appears into such a large neutron etc. star or nebula must not confine the entire universe gravitationally (if the gravity gets rise in such enormous temperature), because of, after the grand or gigantic nuclear blasting into the nebula or in the centre of

such star, the compact gravitational strength should also be destroyed by and the central position should get vacant. If we suppose that in such hyper energetic condition (GUE) all the laws of physics are broken down, it should not be reasonable because if the grand unified theory which is also a physical law is applicable there, then, why the law of gravity and other should not be. We know that the strength of gravity reduces when the matter is heated up, or, as far the matters get away from each other. Therefore, it is a very suitable argument that after the big-bang or neutron star's explosion, the central gravitational strength should be reduced by to provide the matter-particles to escape. It may be possible if such the explosion occurs at the outer region of the core (not into the central nucleus) of such nebula or star. But again, we learnt that such incident occurs not only at the outer zone but also effects the central nucleus, so that the centre should also explode similarly.

Suppose that, if the mass of the contracting star is enough greater than the maximum critical value of the neutron star, what would be the result? According to the scientific consideration, such massive star would contract more rapidly than the neutron star. This contraction would step ahead beyond of the neutron star and that would eventually convert into a **black hole** when that's shrinkage would reach to the approximate radius of 15kms or more less. The contraction would continue inside the black hole because there is no any power in the nature that can halt such contraction.^{25#}

Actually, the theme of black hole is full of **singularities**, because of (according to considerations) all the laws of physics would be broken down in such condition. The concepted black hole exists when a **super-massive** star ($M_{5-10 \text{ SUN}}$) contracts rapidly. Such the star does not convert into a **neutron star** but steps beyond of that. Thus the gravitational strength of the star becomes too strong too escape even the energetic and the fastest moving

light-rays away from the surface of such compact star. Therefore, such star becomes invisible. This condition stands when the star-volume reaches the radius of 15kms or more less, whenever, it's mass stands constant of ($M_{s_{10\text{sun}}}$) and the density increases accordingly.

Here is a common question: what happens with the mass density of such star? It is a reasonable fact that any matter or matter-particle occupies a least mass-volume in the space and that can not be reduced more (as we see in the case of **neutron-degeneracy** into the neutron star), no matter how much pressure is working on or compressing that. Similarly, if any matter of gas etc. is being compressed more and more, in result, even the mass of that would remain constant but that's volume would shrink eventually to a critical standard. And if, the compressor still grows, such critical volume would not reduce more. Similar condition should stand into the atomic structure. And, it is also a fact that matter or energy can not be created or destroyed but transmuted only.

Now, if such matter or massive star shrinks to an unreasonable and unexceptional least volume, how can we be sure of the laws of physics and even of the quantum mechanics? Therefore, the theme of black hole and that's laws or conditions are looking in fact magical or as a **play of God**. But it is an evidential fact that those black holes should exist in the sky, and we do realize them according to the behaviours of the besiding companions who are orbiting those black holes. Whereas the conceptional black hole does not disclose the matter conditions inside that. It is not confirm whether the holes are consisting of gaseous or liquid or solid form. The black hole theory also does not clarify about the thermal condition of that.

According to **B. H. Time (St. Stephen Hawking)**, it has described the inward temperature of the black hole as of 2.7 K above the absolute zero. How it became possible to decrease the enormous energy and temperature is not so

clear. If we suppose that this temperature has declined by so long process of radiation, **it stands a problem because if the light rays could no escape from, how the radiation could so.**

If we suppose that the thermal condition of such contracting black hole rises up unto the critical energy of GUT, what may be the further situation? In such condition, if the gravitational strength of the centre reduces, the GUE can produce a real gigantic explosion like a mini big-bang and that should result a **catastrophic destruction** of all the pertaining matters or plasma that should escape out too speedily all around to form a new generation of a mini galaxy or constellation etc.

However, if we do follow the theory of black hole of St. Hawking who has received a **noble prize** for his work on the black hole, and in which, he has suggested that such a black hole may have an end to zero volume and then may explode tremendously to regenerate some thing like the cosmic world. We can point out that the reason of contracting of such black hole into zero volume and infinite density seems not so justifiable, because of the shrinkage of Hawkins's black hole needs **anti-matters or antiparticles** mostly to be dripped into the **anti-matters or antiparticles** of the black hole from out side (space). Whenever, we know better that there is no any evidence of consisting of antiparticles or anti-matters freely or normally into the cosmic space or cosmic world. Only it could be created by our scientists in too troublesome experimental conditions in a very limited amount.

He also suggested that if two or more black holes come closer and merge in single one that will be equal to the sum of all the merging individuals in all regards. Thus the area and strength of the new black hole would increase (**law of conservation of energy**). This assumption implies that if all the black holes of entire universe do merge into a single one, such largest black hole should cause to contract

the whole universe towards the **big-crunch** to produce such a gigantic big-bang explosion to re-establish the universe again, because of, such the great black hole should attract all the galaxies to drip in.

But again, the situation of the centre of universe would remain constant or continue that it should grow with emptiness just after the big-bang occurrence, as conceived before. There seems only the way of re-contract of the universe started with the **big-bang** that, if the remnant nucleus of the primordial nebula has constituted of the hardest solid matters what may produce a universal gravitational pull to the expanding universe. The theme of **dark-matters** (neutrinos and antineutrinos) in the centre of the universe seems dubious itself because it does no answer why they gathered only towards a particular direction or zone and why should they settle down there? It is also a question how should that convert into enormously compact hard and solid to provide the universal gravitational pull to the escaping universe?

Magellanic Clouds

According to the astronomical observations, it is considered that the central zone of our and of so many other galaxies seems as like emitting too enough radio etc. microwaves that may be caused by a large number of black holes existing in these galactic centres. Moreover, it provides the probability of merging of those black holes into one to produce a single great (galactic) black hole that should eventually cause to contract the entire galaxies and to shrink into the black hole. And finally, according to assumption of St. Hawking, such that black hole should shrink into infinite density and zero volume to produce a gigantic final burst to regenerate the next generation of new galaxies or universes.

If such an evidence of said **Magellanic clouds** really exists, we can take that in another way also. Probably this may be caused by the innumerable and closely (colonial)

gathering of stars and planets or other cosmic bodies which are too away from us that their integrated emissions of the micro etc. waves are producing the cloudily or lustrous faint image to the observers or to the **microwave-detectors**. On the other hand, there may be a wide spreading range of the initial matters or the cosmic particles of the relatively low temperature in the centre of galaxy in which the primitive matters are in cluster form what are running or undergoing to produce the constitution of a super massive protostar like construction due to severely magnetic gravitational field of the closely rotating universal cosmic bodies.

On the other hand, it may also be possible that we are besiding near or at the one end of any ovular galaxy which is in fact a tunnel (or filament) like galaxy and we are observing the last or end of such tunnel where from the waves are appearing us very faint or poor in the form of microwaves. Please see the fig. 11:3

(Note:-A third kind of reasonable probability of such Magellanic Clouds has already been introduced in “the New Proposals” in chapter -7)

Relative Abundance of H₂ & He

And eventually, we can suppose a small collection of cosmic particles in any local region in which even the particles could have collided and formed the hydrogen etc. fundamental or basic atoms but due to poor collection it could not produce the enough situation of a protostar. So, we can assume that it was a poor collection of hydrogen etc. atoms. Actually, it should be the initial fuel of the protostars which could not attain or collect into the star that we do observe them as the abundance of hydrogen in the free space.

Whereto it is a matter of helium abundance, it may be caused by the wastages of the nuclear blasting into the protostars or of the said black holes etc. cosmic bodies or of supernova etc. typed explosions. Mostly, these types of

abundance should be observed in the free space wandering hither and thither. And some times, when these particles / atoms arrive to an orbit of any star or planet, they may be attracted by. In case of falling of such atoms into the atmosphere of earth, they can produce the vision of shooting stars or like of that as we do observe with the **gamma rays-detector**.

Assuring all types of expanding models of the universe, it becomes clear that they all are providing a limitation or boundary of the universe in the infinite space. Here, we can suppose that the space is really infinite. If the universe keeps a parameter in the space (then) what should survive beyond of that? Should there any other universe be? Is our universe a part of any grand universe? Conclusively, the theme of the universe is unlimited, unbordered and infinite, and so, it should no have any limitation or beginning or any central point. Then, how would have it constituted?

In conclusion, the themes of the expanding universe with a back ground history of big-bang explosion and the theory of black hole singularity, both are looking so dubious for the constitution of entire universe because they are not answering for a satisfactory solution of the remaining problems, and, they do not follow the experimental laws of the quantum mechanics and of the other classical theories of physics. They are providing some unknown singularities only. It means, these themes are supporting or likely to attempting to establish the mysterious and magical performance of **God**. Whenever, it is a clear fact that every magical or mysterious performance of God (if any) should also follow some systems even that have not (or could not been) invented by our scientists yet. Except this, both these theories do not explain clearly about the constitution of matters or elements except a very few only, such as: carbon, oxygen, helium, hydrogen, iron etc.

Abstractly, the origin and evolution of the universe is really too mysterious and too hard to solve. One can propose only his / her own idea in this regard but he / she can have no any ultimate claim until his / her concept is not justified by the laws or experiments. One can think over this matter in the shadow of the latest findings related with the scientific laws or evidences only.

May there be an other suitable way for the beginning of the universe?

To find out the suitable answers, we should search out something more. Therefore, let us review again according to our modern physical laws and theories. The fore coming assumptions of the universe (coming next) are based on general theory of relativity and quantum mechanics along with some other physical laws. Such assumptions are not supporting any singularity. The remarkable fact is that the coming concepts are solving not only the formation and evolution of the universal bodies but also giving the suitable answers for all the probable consequences of the planetarian etc. constitutions; mostly of the earth.

Although, there may be some irregularities that our experts may feel the lack of some related mathematical derivations, but eventually they should consider these proposals. Actually, these chapters are too vast to solve by any individual.This author has attempted to propose a rough figure only of the probable consequences of the universe from it's beginning to the present. To define it more, it needs a collective effort of so many related experts and scholars.

BEGINNING OF THE UNIVERSE

The word “singularity” is a challenging verbosity at least in the view of both the modern classical physics and quantum mechanics. But, every incident of the universe should follow any natural or scientific law. Such event or subject that is out of our sense or is until unsolved scientifically and that irritates us excitedly is known as a supernatural or mysterious activity. Scientifically, we can denote that by a **singularity**. But in fact, such that event runs under some laws what should be discovered scientifically to know that better. In fact, the assumption of beginning of the universe with the big-bang theory runs under the **quantum mechanics** which deals with the hyper energetic conditions only. It also provides an optional consequence of plasma state. Whereas the **big-bang** assumption is based on the calculations that is going backward from present to the past, just like a reback playing of a motion-film in which all the phenomenon would act reversely. For example; suppose a glass full of water that placed on the table; and afterward that falls down on the floor and breaks off. If we play that film reversely, we would find how the spread water collects and how the broken pieces of such glass collide together to form that glass as it was before, and then, how the water gets into the glass again; and further, how that glass comes up on the table. Similarly, our scientists assumed to go back of time and space to find out the beginning of the universe. In this assumption all the intermediate phenomenon run with hyper energetic conditions, such as: a shining or burning star. And eventually, their assumptions get a full stop to the primordial hot nucleus (nebula). But, in the shadow of observational evidences of the ever-expanding universe, they could not success to go more back that of the hot primordial nebula or nucleus. Thus, the question remains stilled what was the probable previous condition of that nebula when it was the first starting of the initial universe, or, how made the first primordial nebula and how got it the extremely condition of heat and energy?

Therefore first of all, we should try to solve any mysterious problem under our well-invented or well-established laws of science. If the present laws are looking justifiable enough to solve such problems; why should we not consider them? Otherwise, we should find out a very normal and initial condition of the origin wherefrom the present universe might have existed and evolved systematically.

In this concept, we can find out near about all the mysterious universal or cosmic events which are likely undergoing with the well known physical laws and in some ways quantum mechanics too. Here, it has described two options for the beginning of universe; first is concerned with antiparticle base and the later is related with the very normal conditions of the matter-particles and force-carrying particles only. Now it depends on our noble scientists / experts how would they like this or not.

The concept of the universal events is being started with the basic theme “*What was the deadly initial situation of the universe before it’s beginning, when there was nothing else even a single visible point, and when the sky was totally empty or blank along with normal initial temperature?*”

We learnt before, that the sky that seems blank and transparent is really not so blank or empty. The electromagnetic forces, such as : the gravitational waves, radio etc. microwaves and photon etc. high energetic energy-waves etc. are travelling all over the infinite space as the cosmic rays. The nature of **waves’-world** is very peculiar. In logical science, all the thoughts; characteristic natures and events etc. also do exert some special kind of waves. Even the matters too; either they are living or deadly; do exert some waves of their own kind regularly. As we find

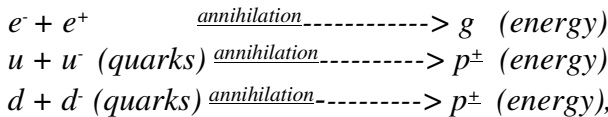
a sugar cube that emits an especial kind of microwaves which attract the ants. Similarly, the emitting microwaves from the soap-bubbles or soap-pieces or oil-drops displace the water surface (layer) to a distinct distance on a wet-floor. This implies that the sky or space is really filled with different kind of waves, and hence, there should no any situation of absolute blankness in the cosmic world.

On the other hand, both the classical and quantum theories also provide the duality of particles. It means, the experimental evidences imply that the fundamental particles do act in some ways like waves too. Hence, it is a well known fact that the entire universe and that's matters have composed of the fundamental micro particles or waves. Therefore, we can conclude that these waves are the basic origin of the universe.

Considering the **wave-theory** of particles, we can suppose that before the beginning of the visible universe, even the entire sky was blank and clear, there would have been different but limited kind of energy-waves surrounding or wandering all over the infinite space (the **matter-particles** are also a kind of energy waves). Probably they were the primitive or **initial cosmic waves**. Now we can suppose at least two options of those particles either they were only in mixed form of particle-antiparticle pairs or virtual matter etc. particles.

(i) Particle-antiparticle pair - interaction

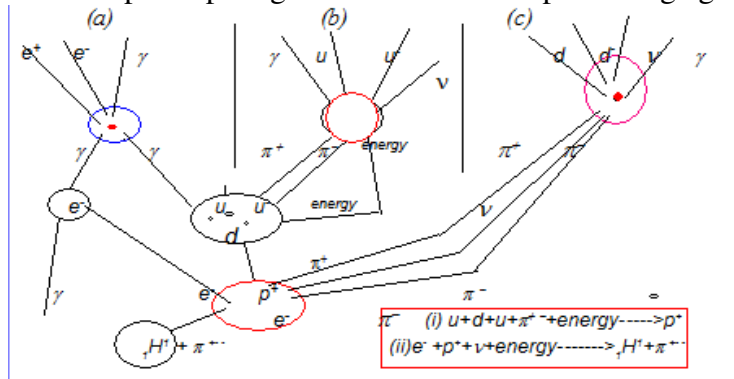
Perhaps, those initial energy waves were in the form of electron, photon, neutrino, quarks (or fraction of that, if any) etc. stable elementary particles along with some of their probable **antiparticles**. Those particles were wandering hither and thither frequently as the waves. But, because the particle-antiparticle pair should no exist long life and they should collide each other earlier and should produce energy. Perhaps then, the initial temperature of the universe (sky) was enough high (but how, it is not so clear). Those particle-antiparticle interactions would have produced as bellow: -



...the g, u, g and their antiparticles do not collide or annihilate normally, so that, they should participate in those interactions as the promoting agents for the further interactions, as such:

Thus, we can suppose that the following consequences would have been occurring during their annihilations (or collisions):

(i) In each annihilation of **particle-antiparticle pairs**, the photon etc. energy waves would have been participating as the activators or promoting agents.



(ii) In each annihilation, the released energy would have been effecting the nearby other matter 1/2 spin particles and irritating them to react with the nearby relevant.

(iii) These type of incidents would have been occurring place to place all over the sky.

(iv) Those conditions would have been producing the electromagnetic fields or electric sparking and resulting some reasonable particles or waves caused to change of temperature and other conditions locally.

(v) Due to those changing, more particle-antiparticle pair-annihilations would have been being occurring accordingly that it were effecting the other waves (matter-particles) to collide with.

(vi) When the quarks would have annihilated with their anti one, even they infused but they released huge amount of energy (p^+ , n , etc.) what would have been involving into the quarks-bonds to confine them producing the gluon etc. reasonable force-carrying particles.

(vii) Thus, the **quark-bonds** (protons and neutrons) would have formed and gathered locally that attracted the nearby electron particles, in influence of **photon-quantum**, to form the first initial nuclei of **hydrogen protium** (${}_1H^1$) or deuterium ${}_1H^2$ atoms.

But according to the predictions of quantum mechanics and modern experimental science, we know that the antiparticles can not exist freely without having their hyper energetic recently background. We also know that both the proton and neutron particles are too strictly bond - form constructions of the quarks and, these quarks can not be disintegrated without applying extremely **cyclotronic energy** or acceleration in hyper thermal condition. Therefore we can suppose that the first initial and pointless universe was having only the free photons, electrons, protons, neutrinos etc. stable matter-particles and force carrying particles. And, there was no any existence of the free anti-particles; even the short living neutron particles too. This assumption also provides that those initial particles were the initial and fundamental (original) form of the universe without bearing any former background of their existence, it means, those were the self-forced and self-existing origin, and that the temperature was enough normal then.

Here, it rises a problem how would have formed the initial atomic universe without having any probability of enough energy what was reasonable to get involvement into the mild atomic interactions. This problem may, or should, be solved according to the following:

(ii) **Real-Particle-Interactions**

“What was the deadly initial situation of the universe before it’s beginning, when there was nothing else even a single visible point, and when the sky was totally empty or blank along with normal initial temperature?”

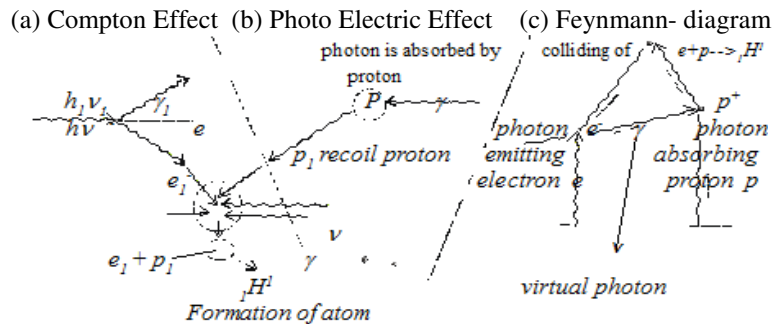
In logical science, all the thoughts, characteristic natures and events etc. also do exert some special kind of waves. Even the matters too, either they are living or deadly; do exert some waves of their own kind regularly.

It is a well known fact that the entire universe and that’s matters have composed of the fundamental micro-particles or waves. Therefore, we can conclude that these waves are the basic origin of the universe.

Therefore to solve the above problem, we can suppose that the present **virtual force carrying particles of photon, neutrino** etc. would have been participating to combine the electrons and protons together to form the initial nuclei of hydrogen protium providing the **threshold energy**. Although now we know that the hydrogen atoms preserve a heavy amount of energy in itself, and so, according to the **law of conservation of energy**, such energy is needed to combine the electron and proton together to form an atom. It means, at the primitive stage of the beginning of universe, such required energy would have occurred and participated into the electron-proton interactions, any how.

To make an atomic interaction between electron and proton in normal low-temperature

condition of the initial stage of the universe, we can suppose that the high energetic packets (quantum) of photon etc. particles would have been colliding unlimitedly with the electrons and protons (**cosmic rays** * ref.. cosmic rays have energy near about 15GeV ; *Modern Physics*, p-373) separately. Thus, the colliding energy of **photon-quantum** would have been producing the **Compton Effect** and **Photo-Electric Effects**, and, giving the energy to both the protons and electrons (matter 1/2 spin particles) it was pursuing them to come closer. In this way, both the spin 1/2 particles were gaining more energy. And when, they come enough close, their electromagnetic effect along with the recently occurred gravitational effect, caused by the spiral motion of both the particles, would have bound them in a closed circuit to form an initial atom of hydrogen or so. During this **closed-circuit-interaction**, the free neutrino particles would have also involved to provide the energy or to produce the nuclear binding force. Please see the bellow figures of fundamental interactions (as described in *Modern Physics*, **R. Murugesan**, pg...765-6):



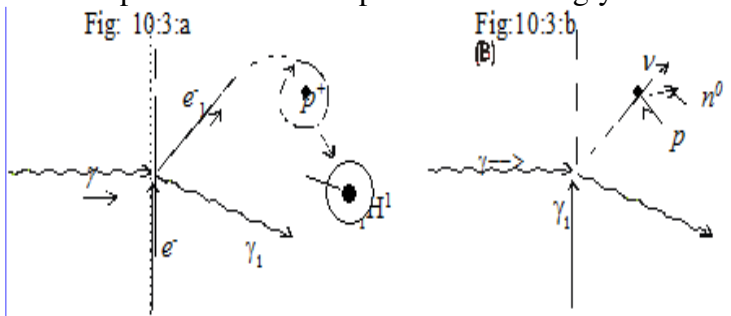
According to the above three diagrams, we can suppose that, due to high energetic character of 15 GeV, the photonic quantum would have participated mostly to provide threshold energy to perform the initial atoms of hydrogen in the initially blank sky. But, according to the law of conservation of energy, we can ask that if an atom of hydrogen consumes much energy, how the photon can provide such energy to these interactions. To give the answer, we can consider the regular collisions of unlimited quantum of photons to such an interaction. Thus, when both of them (electron and proton) conceive sufficient amount of energy and also come together closer and closer till the area of their **electromagnetic field**, the force carrying neutrino may have interference then to bind both of them. And, we know according to the atomic structure, that after binding into the atomic form, their (of the electron, proton etc. components) gross mass value gets reduced which we know as the **electromagnetic field**. Probably, this mass-defect provides the required binding energy of both the spin 1/2 particles. Here, we may have an approximate calculation of the above stated events that we are on a suitable right way of formation of the initial atoms without applying any hyper energetic (big-bang like) background. Where the big-bang concept runs too speedily (probably more faster than the speed of light), this assumption provides slow motion interactions as like the passive interactions of the natural soil decay or natural decaying of metals or matters on the earth.

In this view point, we can assume that the above phenomenon are still occurring in all over the blank space, so that they are producing the hydrogen atoms respectively, no matter what

is the rate of production with the space and time. Perhaps, this is why we are having the observational evidences of relative abundance of H and H_e atoms in the free space.

In this assumption (a: Compton Effect), suppose that the photon quanta collides with an electron and promotes that to recoil towards the neighbouring proton. Thus, if such electron passes through sufficient nearness of the proton, both of them should exert their electromagnetic gravitational attraction to each other that may cause to spiral the electron around the proton. In these phenomena, the occurred gravitational force should also be a cause of the well known fact of the **self-forced ever-dynamic character of electrons**. In other words, when the electron passes through enough nearness of the proton, the electromagnetic pull of proton may cause to attract that due to negative character (charge) of electron and to spiral that around. In this way, the gravitational attraction occurs between both of them. Because of the electron is believed as a self-forced and ever-dynamic particle, so that this movement should cause to orbit the electron around the proton and to form an atom of hydrogen protium. And so, the **centrifugal force** of the orbiting electron should balance that against the **proton-power**. Please see the diagram 10:3:a.

And if, the recoiled electron collides directly with the proton, both particles should be infused to produce a neutron particle accordingly. Please see the fig: 10:3:b.



In this way, we can suppose that at the initial stage of cosmic waves (universe), there would have formed the initial atoms of ${}_1H^1$, ${}_1H^2$ etc. In those processes, the photon waves and some neutrino-quantum would have participated to provide the required **threshold energy**.

On the other hand, according to strength of the cosmic wave-quantum, as it have observed and considered by near about **15 GeV**, we can suppose that this potency of so many quantum of photon would have produced the initial atoms in the primitive stage successfully. Thus, there seems also a probability of production of those atoms still now caused by the present cosmic rays. Perhaps this is why we observe them as the abundance of H^2 and He in the space.

Further consequences are.....

- (viii) In each phase of collisions, the energy-waves would have confined in caused to increase the local temperature.
- (ix) Due to **proton-electron interactions**, the gravitational force would have occurred. Perhaps, it was the initial gravitational condition of the primitive universe.
- (x) Because of, each collision releases energy of photon etc. mostly, so that, there would have occurred even a poor but enough amount of energy to promote those passive interactions to produce the initial atomic condition in the blank universe.
- (xi) Due to those interactions, the local conditions would have also been being changing that collecting the protons, electrons or hydrogen atoms from the space gravitationally and electromagnetically and forming the local gaseous conditions.
- (xii) Due to mutual and gross gravitational interactions and due to colliding or falling of the photons, neutrinos etc. force carrying particles or waves, the gaseous particles or atoms would have gotten spiral motion around the gross gravitational

- centre; as the electron recoils due to *Compton Effect*.
- (xiii) Thus, the gaseous clusters of spiral or rotating matters would have been being rotating like a cyclone and collecting the atomic etc. particles more and more attracting them by both the centripetal and gravitational forces.
 - (xiv) Thus, the mass, volume and density of such cyclonic gaseous clusters would have been being increasing with space and time respectively. And the gross gravitational strength along with the cyclonic motion and that's centripetal force would have also been being rising up.
 - (xv) Perhaps, it was a probable figure of initial **protostar** with a strong gravitational force and enough mass-density. Further, as far as the matters or atomic particles or atoms were collecting, it was increasing accordingly.
 - (xvi) Thus, the circulating atoms or particles were producing the frictional electricity colliding with each other. In this way, perhaps the density, temperature and pressure were rising up.
 - (xvii) When it was enough gravitational strength, enough density and enough pressure along with enough temperature to produce the fission reactions, the colliding hydrogen atoms would have been being destructing by itself as in fission reaction, and thus reproduced the electrons and protons (gases).
 - (xviii) This destruction would have been producing huge amount of energy and temperature also.
 - (xix) Eventually, when the core temperature reached to the critical standard of $10^6 - 7K$, there would have occurred the **thermonuclear fusion reactions**; the actual birth of a shining star.
 - (xx) Possibly, those thermonuclear reactions would have been being controlling by the mutual strong attraction of both the dense gravitational centre and the centripetal force of such protostar (new born star).
 - (xxi) The further incidents, actions or reactions etc. should follow the previously assumed or established concepts or conditions (as before) for the stellar evolutions.

Note:- Because of all the natural creative phenomenon seem likely to run as normally that we don't take any adequate notice of that, as such: the earth-quakes, weather changing, germination of seeds, rainfalls etc. which do not have any hyper or sudden energetic condition, similarly we can assume that the initial beginning of the universe would have started off with the normal conditions. Therefore, the theme of the "real- particles interactions" should be more suitable than the theme of "particle-antiparticle pair- interactions" for the beginning of the universe.

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Number of Pages: 52
Number of Words: 14,327 (approx.)
Number of Characters: 81,666 (approx.)