Functional Implications of the Universal Theory of Relativity

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Abstract: It is interesting to note that in the natural sciences scientists are not interested in the universe as a whole including themselves, but direct their attention to some parts of the universe and make that the object of their studies. It is only with the development of the Universal Theory of Relativity (UTR) by this author that for the first time we have come to a stage where we can examine the universe as a whole. Normally we make relative studies among different parts of the universe. In the UTR, it has become possible to examine the universe as a whole in relation to the preferred frame that surrounds it and has unknown or unlimited properties. . [The Journal of American Science. 2006;2(3):74-84].

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Structure of the Universe

It is interesting to note that in the natural sciences scientists are not interested in the universe as a whole including themselves, but direct their attention to some *parts* of the universe and make that the object of their studies. It is only with the development of the Universal Theory of Relativity (UTR) by this author that for the first time we have come to a stage where we can examine the universe *as a whole*. Normally we make relative studies among different parts of the universe. In the UTR, it has become possible to examine *the universe as a whole in relation to the preferred frame* that surrounds it and has *unknown* or unlimited properties.

There have been several questions that have been baffling physicists throughout the history of science. A great number of solutions have been proposed but none has been fully convincing. Some of these questions are:

1. Why do the planets revolve round the Sun? Why does the gravitational pull of the Sun not make these planets ultimately unite with it? What carries the centrifugal forces that make the planets orbit round the Sun in a specific manner and does not allow them to fall into it?

2. Why do all planets and minor planets revolve around the Sun in slightly ellipsoid orbits in almost the *same plane* and in the *same direction* in which the Sun rotates? And why most of the planets, minor planets, satellites (with few exceptions) spin in the *same direction* in which the Sun rotates?

3. Why does the ring of the Saturn always point in the *same direction* in reference to the fixed stars?

4. Why is the universe uniformly homogenous on a large scale? As Hawking says: *"Why does it look the same at all points in space and in all directions?"*

5. Why is the temperature of the microwave background radiation almost the same?

6. Why does the universe seem to be ever expanding at just above the critical rate? Or what does prevent the universe from collapsing owing to its own gravity?

7. Why was the early universe so hot?

8. How did the universe originate and how would it come to an end?

9. What causes energy-mass equivalence ($E=mc^2$)

10. What causes quasars to have so much energy as they seem to possess?

11. What is the reality of Dark Matter and Dark energy?

12. What is the nature of different forces of nature and how they work?

Let us first analyse the solar system. When we study the revolutionary and rotational motions of the different types of bodies that comprise the solar system, namely the Sun, the Planets, the Minor Planets and Satellites, the following important facts emerge:

1. *All* planetary orbits are *almost* circular and lie in the *same* plane. These orbits tend to be more elliptical in case of some of the planets than the others. Another important feature is that the planets move around the Sun in the *same* direction as the Sun itself rotates.

Except the orbit of Pluto, which has a tilt of 17 degrees, all the planets have a tilt of less than 7 degrees.

2. The satellites also move about the planets in *almost* circular orbits, *mostly* in the *same* plane.

3. The terrestrial planets (Mercury, Venus, Earth and Mars) are relatively small, dense and near the Sun. The giant planets, on the other hand, that include Jupiter, Saturn, Uranus and Neptune, are relatively large, though of low density, and are farther from the Sun.

1. Most of the planets also spin about their own axis in the *same direction* as they rotate about the Sun. The exceptions are Uranus and Venus. The axis of Uranus, nearly in the plane of the elliptic, is tilted over so far that it rotates in a retrograde manner. The Venus rotates extremely slowly in the retrograde fashion.

5. Most of the satellites also revolve in the *same direction*. These include Moon, the Earth's satellites, the two satellites of Mars, about a dozen satellites of Jupiter and 9-10 satellites of Saturn. However, some satellites revolve in the retrograde directions.

6. All the asteroids which number more than 1700 revolve around the Sun in the *same plane* and in the *same direction* as the planets. Most of them move in near circular orbits. But some of them move in elongated orbits.

Now, this is a unique situation. There must be some reason why all the bodies - planets, asteroids, comets and satellites, should orbit the Sun in the *same plane* and why an overwhelming majority of them should spin in the *same direction* in which the Sun rotates. Why did they not occupy orbits in different planes, which could have made their places even safer? Then there would have been lesser chances of their orbits crossing one another. Nebular Hypothesis tries to provide an answer, but the rotation of the whole Uniglobe proposed by this theory provides a more plausible answer. Even if the nebular hypothesis were correct, this we have to find an explanation of *why all the components of the gases that made the solar system would align in a way that would produce a system like what we see today*. The Sun's gravitational pull is almost the same in all the innumerable planes possible having tilts from 0 to 360 degrees. Does this not point to the possibility of some *major external factor* trying to keep them in the same plane and make them revolve and rotate in the same direction? If the Uniglobe *as a whole* is also rotating on its axis, the solar system in its entirety must be moving with a great speed in a particular direction. This motion would *almost* be linear considering the huge size of the universe. It is only natural for the individual revolutions and rotations of the bodies belonging to the solar system to correspond to the direction of the movement of the portion of the Uniglobe in which the solar system exists.

Let us try to understand this with the help of an analogy. Let us suppose, a big stone is thrown in a still water. It will sooner or later sink to the bottom and the path travelled by it will be almost *vertical*. If on the other hand, an object is thrown in a fast moving river, it will also move in the direction in which the river is flowing. This movement will be opposed by the gravitational pull of the Earth, which will try to make it sink down. How long the object takes to settle down on the bottom of the river, and what path it follows, will obviously depend on the *depth* of the water and the *speed* of the river. The greater the depth of the water and the faster the speed of the river, the greater will be the time taken by the object to settle down; the bigger will be the distance it covers after its fall in the river. The path travelled by the stone before touching the bottom would be a part of a circle or an *ellipse*. If several stones are thrown at different points in a fast flowing river, the paths followed by them before touching the ground would all correspond to the direction of the flow of the river. It can also bee seen that an object with greater density will cover lesser distance before settling down than one with smaller density will.

Now, let us suppose, instead of one stone, two stones, one much heavier than the other, mutually connected with a long cord, are thrown together in the river. What path would they follow before settling down at the bottom? The direction of the flow will try to take both of them forward with the same speed but the heavier stone will move slower than the lighter stone. Had they not be connected with a rod, the lighter stone would have left the heavier stone far behind. But being connected with the rod, this cannot leave the company of the heavier stone. The lighter stone will then go down towards the base of the river as if it is moving around the heavier stone. We can also visualise the case of mutually connected stones of varying sizes, one stone greatly heavier than others, in a fast flowing river. But the analogy is not complete because, in the case of a river, the attraction between the Earth and the stones is very large. Had this attraction been zero and the depth of water immensely large and the attraction between stones appreciable, the system would have perhaps been more comparable with the solar system.

In the solar system, the planets are able to move round the Sun because, on the one hand, they are being *pulled* (directly or through the warping effect) by the gravitational pull of the Sun, and on the other hand, they are being kept at a specific distance due to an *opposite pull* generated by the inertia consequent of the high velocity of the zone. Scientists, till now, have believed that the centrifugal force is supplied by distant rotating

bodies. Heisenberg says: *"Since the centrifugal forces had to be considered as due to physical properties of empty space, as had been discussed before, Einstein turned to the hypothesis that the gravitational forces are due to properties of empty space."* He then says*, "The centrifugal forces in a rotating system must be produced by the rotation (relative to the system) of distant masses".* The UTR suggests that the centrifugal forces are the effect of the rotation of the universe as a whole, of which empty space is also a part. Without the rotation of the Uniglobe, centrifugal forces could in fact not have been sustained, as the influence from distant objects will take time to reach the rotating systems. The presence of the rotation in the rotating system is clearly due to the combined effect of the rotation of the universe, and the centripetal force created by the gravitational effects of the larger body on the small body, whatever way they operate. The former tries to carry the rotating body along with it; the latter curves it towards the bigger object. In fact if the centrifugal force would have been provided by the distant masses, the combined effect of the centrifugal force and the centripetal force would have led ultimately to the suspension of the body *in between those distant objects and the massive body,* rather than its rotating around it. Furthermore, with the expansion of the universe, the centrifugal force would have gradually weakened were the universe expanding, as is commonly believed, the attraction by distant bodies, if any, would constantly become weaker. And because the universe is said to be expanding at a rate of about 75000 Kms/Sec, (much more in the distant regions) this weakening of the attraction by the distant bodies would grow at a considerable rate. This means the orbits of the planets must have kept on contracting at a regular rate. Einstein's idea that the planets only follow the nearest body on a curved path, because the space-time is also curved is also not convincing. Describing Einstein's theory of gravitation, Hawking *says "Particles try to follow the nearest line to a straight path in a curved space, but because space time is not flat, they appear to be bent as if by a gravitational field".* This theory could have been better appreciated if the Sun would have been at absolute rest but the Sun is also moving at a considerable speed, about 360 Kms/sec; so the field around the Sun is not continuously constant but is moving around in a particular direction. It can be argued that, in an expanding universe, the curving effect due to Sun on space-time would also have been constantly increasing. Now, if the particle tries to follow the nearest thing, it must constantly be in the know of the position of that thing, which requires regular communication. Suppose the particle tries to follow the nearest object. Had there been no inertia, they would have continued at the same distance between them in a parallel line. Or they could have moved in spherical orbits in a way that the distance between them would have always remained almost the same. But due to inertia (created by the rotation of the universe), the bigger particle cannot move as fast as the smaller particle. In this case, it becomes imperative that the much *smaller particle rotates round the bigger* particle because that alone would maintain the distance between them to within a specific range.

A very interesting fact that further proves the rotation of the Uniglobe is the *direction of the rings of Saturn.* What is important about the position of the ring plane of Saturn is that, viewed from the Earth and the Sun, the tilt of the rings is continually changing. Twice in each Saturnian revolution, on alternate interval of 13 years 9 months and 15 years 9 months, the plane of the rings passes through the Sun. A few months before and after each such occasion, the plane of the ring must pass through the Earth. This is due to the fact the Earth is near the Sun, as viewed from the Saturn. However, what is most interesting about the plane of the rings of the Saturn, from the point of view of this theory, is that it remains in an *almost fixed position with reference to the fixed stars*. What does this prove? As the rings are mostly in gaseous forms and are not firmly fixed to the surface of the Saturn, they try to remain in the *plane of the rotation of the universe*. Had this not been the case, there is no reason why they should have been continually tilting as viewed from the Sun. Their position as viewed from the Sun, should have remained constant but, in reference to the fixed stars, it should have been continually changing.

It is also interesting to note that *the planets nearer to the Sun rotate around it with higher speed than farther ones*. This is usually explained by the argument that in order to avoid falling in the sun, and keep revolving in the orbit, the nearer planet has to increase its speed because it experiences greater pull from the Sun. The question again arises: why should the planet avoid falling in the Sun? Why should it be so conscious of its decision that it increases its speed only to avoid falling? Who tells it to increase this speed? If planets move in the orbits only due to a warped space, not due to the attraction of the Sun, and they simply follow a linear path in a geodesic, as explained by Einstein, then there is no need at all for the closer planets to increase their speed. Whether their speed is slow or fast, they would follow the curved path. This is explained better by the UTR.

As I had discussed earlier that the planets lying closer to the Sun move faster than those lying farther. This is said to be due to the fact that, in order to avoid falling in the Sun, the closer planets have to increase their speed. Einstein's theory of General Relativity argues that the planets seem to be revolving around the Sun only because the space in the vicinity of the objects becomes warped. Planets revolve not due to attraction

by the Sun, but because they just follow the curved path. If this is so, and planets are not attracted by the Sun, why do they have to increase their speed in order not to fall in the Sun. The distance from the Sun should not have any effect on the speed of the revolution of the planets, because they just follow a curved path. If someone argues that the nearer planets revolve faster on account of the greater curvature of path, this would be an erroneous conjecture. The curved path is not like a steep path. The more steep a path is, the greater the speed of the vehicle, because of the increasing proximity to the centre of gravitation. But that is not the case with a curved path. In fact vehicles tend to become slower on a curved path. *The more a path is curved the slower will be the speed of the vehicle*. This is a fact, which we observe daily in our life. The motion of planets is better explained by the UTR. As discussed above, motion is the fundamental property of the universe, and all its constituents and every particle tries to achieve the highest speed possible in the direction of the periphery of the universe, because the universe is rotating as a whole on its axis. Its speed however is hindered by its own mass and the presence of bodies around it. A planet does not want to fall in the earth, because it is trying to achieve the fastest speed possible along with the motion of the universe as a whole. The closeness of the Sun wants to pull it towards it. So the speed relative to Sun will increase but it will not fall in the Sun.

Rotating versus Expanding Universe

The UTR is different from the current theory of Physics in that while the latter is based on the *continuous expansion* of the universe the former is based on the *continuous rotation* of the universe. The concept of the expansion of the universe is based on Hubble's Law, who interpreted the redshift, which is observed in the universe, as the evidence of the expansion of the universe. Hubble said that the velocity of the receding galaxies is directly proportional to the constant H and the distance of galaxy from the earth. His law states that the farther the galaxy the greater is the rate of expansion. The presentation of the UTR will in fact lead to a hot debate between a *rotating* universe and an *expanding* one and its success will ultimately emanate from its better ability to explain events and phenomena. The expanding universe has led to the Big Bang theory. But lots of issues still remain unresolved. Different scientists have different questions in mind that they think still remain unanswered or incompletely answered. For example, some of these have been enumerated as follows in an article, "The Hubble Law" by Dob B. DeYoung**:**

1. "*What is the true value of the Hubble constant?*
2. *Why is the solar neutrino flux less than half its expected value?*
3. *Why has extraterrestrial life not been detected in many other places in space?*
4. *What was the origin of the assumed Big Bang 'kernel' of mass-energy, and why did it 'explode'?*
5. *How did the first stars and galaxies spontaneously form?*
6. *Are there actual planets circling other stars?*
7. *Is the redshift of starlight actually due to universe expansion, or could there be another cause?*
8. *How far away are the quasars, and what actually are they?*
9. *Do galaxies evolve with time?*
10. *Where is the missing mass required by the Big Bang? This is also variously called hidden, dark, cold or exotic matter.*
11. *What is the origin of cosmic radiation?"*

The UTR will explain most of these in a fitting manner in due course of time. Hubble's law will have to be revised. v in the Law would then indicate not the velocity of the galaxy but the velocity of a particular zone of the rotating universe. The velocity measurement will also change. The new gamma factor will have to be taken into account, while calculating the velocity based on the redshift. Moreover, the velocity of our zone (about 420, 000 kms/sec) will be required to calculate the speeds of other zones. In the rotating universe, following considerations will play an important role:

First, there will be *no bar on the speed*; many areas in the universe will be found rotating with thousands of times the speed of the light. The outer zones will be speeding with much greater speed than the inner zones.

Second, *blue shifts* will also be important, as there may be some regions, which may be lying in slower zones than ours. There are many evidences of blue shift. For example, Andromeda galaxy is in our 'nearby' local group of about 30 galaxies. Its light shows a slight blue shift. It is to be seen whether it is due to the gravitational attraction between this galaxy and our galaxy, or it may be due to its lying in a slower zone. With more extensive mapping of the universe in future, predictably the innermost zones may be found containing nothing but Hydrogen, without any stars and

galaxies. The chances of observing blue shifts in substantial numbers may therefore remain scarce.

There is a possibility of reaching the conclusion that the variety of radiation detected from time to time are due to their arising from different zones rotating with different velocities. The greater-frequency-radiation (gamma rays, ultraviolet rays, cosmic rays etc.) may be coming from the slower zones, the higher frequency being due to their having gained in energy while crossing the faster zones. The lower-frequency-waves (Infrared, microwave, radiowave etc.) may be coming from faster zones, as their energy will decrease as they enter the slower zones.

Third, galaxy formation will be seen in the view of *different time-scales*, as the time will show distinct changes from one zone of the universe to others. Some galaxies may in fact be *younger* than ours, and some *older,* relative to our time scales. *Those nearer the axis of the universe will age much faster than do those away from the axis*. The rate of the decay of stars may vary.

Fourth, the energy component of each particle will be greater in zones distant from the axis. The nuclear reactions will therefore take different forms, as greater amount of energy will be produced. Quasars may be such distant objects.

Quasars are very bright centres of some very distant galaxies, where some sort of energetic action is assumed to be occurring. It is thought that the falling of matter into the super-massive black hole can result in very hot regions where huge energies are released, powering the quasar. The visible emission only occurs very near the centre of the galaxy. But huge regions of radio emission, produced by the quasar, can stretch out to large distances outside the galaxy. It is argued that the electrons near the centre of the quasar can be accelerated to speeds *near the speed of light*. In the presence a magnetic field, (which is present in these same regions), the electrons move along helical paths (paths that look like a stretched out slinky). As a result, they emit radio waves, called *synchrotron radiation*, since these waves are observed on Earth when physicists send high-energy electrons around in circles using magnetic fields, in particle accelerators called synchrotrons. It appears that galaxies may act as quasars only during the early stages of their lives.

Quasars have become controversial on account of the *extraordinary redshift* they show. The present day understanding of the quasars shows that (I) they are not necessarily star-like and have complex structures, (2) though many of them are radio sources, all of them are not, and (3) the *high red-shift* is the continuing hallmark of the quasars. Till now, the highest red-shift available is *3.78*. On the basis of the understanding of the Doppler shift, any red-shift *over that of 1.00 means a faster than light-speed* velocity of the source, A value of 2.00 would mean a relative speed of double the light speed. This would clearly mean that they are moving at *much higher speeds than the light*. But again, Einstein's ghost scared the cosmologists who started finding out alternative explanations for this high redshift. Obviously, these attempts have not been convincing. These have led to still bigger complications. The controversy is summed up in "*The Universe of Motion"* by Dewey B. Larson. He says:

"While the high redshift problem was circumvented in conventional astronomical thought by this sleight-of-hand performance with the relativity mathematics, the accompanying distance-energy problem has been more recalcitrant, and has resisted all attempts to resolve it, or to evade it. Reference was made to this problem in……If the quasars are at cosmological distances—that is, the distances corresponding to the redshifts on the assumption that they are ordinary recession redshifts—then the amount of energy that they are emitting is far too great to be explained by any known energy generation process, or even any plausible speculative process. On the other hand, if the energies are reduced to credible levels by assuming that the quasars are less distant, then conventional science has no explanation for the large redshifts…….Obviously something has to give. One or the other of these two limiting assumptions has to be abandoned. Either there are hitherto undiscovered processes that generate vastly more energy than any process now known, or there are hitherto unknown factors that increase the quasar redshifts far beyond the normal recession values."

The UTR will explain this by stressing that none of these two factors need be abandoned. The UTR will lead to the assumption that very distant bodies lying near the periphery of the universe will have much lesser effective age than our galaxy has, despite the fact that they may have been created almost simultaneously. This is because they are speeding with a velocity much greater than that of light and also than that of ours. This will produce high red-shift. The energy content in those galaxies will also be greater for the same amount of matter. This is because, according to this theory, $E=mc^2$ indicates the kinetic energy content of the particles in a particular zone, depending upon its velocity. c here is in fact the speed of the zone. *The matter in the faster zones will therefore have much greater energy content than that in our region*. This may ultimately answer not only the presence of quasars but also their specific nature—their high redshift and excessive energy.

The *Microwave Background Radiation* is uniform heat radiation found everywhere in space. The Big Bang theory states it is *the light from the Big Bang red-shifted to a fantastic extent*. But the UTR has an alternative explanation. This fantastic shift may be due to the *light*

coming from very distant regions of the universe, which are rotating at very *huge rates*. As the light travels to comparatively very small velocity zones, it loses energy giving it the huge shift towards low frequency.

Another source of controversy in recent years has been the source of *gamma rays*. More recent observations indicate that gamma ray sources are not in our galaxy but lie at far distances *outside* our galaxy. This is now argued that they must be coming from high-energy sources or from the merger of two balckholes or two neutron stars, because such enormous amount of energy suggests a gravitational source. The UTR offers another possible alternative, which may be explored. These may be coming from areas in the slower zones and may have gained in energy after having entered the faster zones. Alternatively, they may be coming from faster zones, where the energy-contents of the particle are higher. The first possibility however seems to be more plausible.

One of the most fundamental principles of the modern cosmology is that the universe looks *isotropic*. We can assume that though the universe has a periphery like that of the surface of the earth, we cannot see that periphery or beyond that. The universe will always look the same howsoever distant we see. This is because *the rotation of the universe rotates everything in it* including the light waves. Light waves coming from very distant portions of the universe will rotate before reaching us. It is also possible that light waves coming from distant areas may in fact be the echoing effect of other stars, which we can also see directly.

Let us assume an animal (or an instrument), which can only "see" through sound waves. It is not able to detect light at all. Now, it can only detect the sources of waves only from within the atmosphere of the earth. For it, earth will be *infinitely vast*. It can detect the sound from the same source coming from different directions. Due to the change in the properties of the sound coming from different directions, it can infer it to be coming from different sources. It cannot see the periphery or beyond the periphery of the atmosphere, and would see almost a similar picture on all sides. To detect the objects of the universe, we have or can have only waves, which cannot cross the Periphery of the Universe. Due to the rotating effect, the light waves from a very distant source may curve back after reaching the outermost areas of the universe and then reach the observer on earth. But if the human detectors cannot see beyond the universe, it does not mean that anything does not exist beyond it.

Origin of the Universe

How did the Universe originate and what will its fate be? These are questions that have always and will always haunt the philosophers and scientists. Physicists have been trying to find the answer. Scores of models have been presented. Most of them are based on General theory of Relativity. Despite its successes, the Standard Model has plenty of known problems. In the June 2003 issue of Scientific American, in an article, captioned, "*The Dawn of Physics beyond the Standard Model,"* Gordon Kane has listed ten theoretical problems:

"1. It (the standard model) implies a tremendous concentration of energy, even in the emptiest regions of space. This so-called vacuum energy would have either quickly curled up the universe long ago or expanded it to a much greater size.

2. The expansion of the universe is accelerating, and this cannot be explained by the standard model.

3. There is reason to believe that in the first fraction of a second of the Big Bang, the universe went through a period of extremely rapid expansion called inflation. The fields responsible for inflation cannot be those of the Standard Model.

4. If the universe began as a huge burst of energy, it should have evolved into equal parts of matter and anti-matter. This did not happen. The universe is matter. The Standard Model cannot explain this.

5. About a quarter of the universe is invisible cold dark matter that cannot be particles of the Standard Model.

6. In the Standard Model, interactions with the Higgs field cause particles to have mass. The Standard Model cannot explain the form these interactions must take.

7. Quantum corrections apparently make the Higgs boson mass huge, which would make all particle masses huge, which is obviously not the case.

8. The Standard Model cannot include gravity, because it does not have the same structure as the other three forces.

9. The values of the masses of particles cannot be explained by the Standard Model.

10. There are 3 generations of particles. The Standard Model cannot explain why there is more than 1 generation."

Recently, Quantum mechanics has been used to explain some of the unanswered questions. But almost all the scientists agree that the universe began at the Big Bang. Describing the beginning of the modern theory of the origin of the universe, Hawking says:

"At that time, which we call the Big Bang, the density of the universe and the curvature of space-time would have been infinite. Because mathematicians cannot really handle infinite numbers, this means that the general theory of relativity on which Freedman's solutions are based predicts that there is a point in the universe where the theory itself breaks down. Such a point is an example of what the mathematicians call singularity. In fact, till now, our theories of science are formulated on assumption that space-time is smooth and nearly flat, so they break down at the Big Bang singularity, where the curvature of space-time is infinite. This means that even if there were events before the Big Bang, one could not use them to determine what would happen afterward, because predictability would break down at the Big Bang."

The inflation theory states that the initial expansion was very fast. But scientists have raised several objections to this theory. They have argued that, to expand this fast, objects must have been moving *faster* than the speed of light. This objection has been answered by the argument that although objects in space cannot travel faster than the speed of light, *space* itself can expand this fast, carrying the objects with it. This is a strange argument though. Space is no empty space; it contains various fields and may contain Dark Matter. Secondly, there is no proven mechanism for creating this massive expansion. Einstein's corrective force and a concept called *false vacuum* have been presented to explain the effect. It is argued that, when the Big Bang took place, there was only one type of super-force. As the universe grew, this split into the four forces we have today. The energy released during this split is said to have been responsible for inflation. But the truth remains that this cannot be proved; for until we can perform experiments at *1028°K* there is no way in which to prove the theory as either correct or incorrect. Finally, there is no observational evidence of inflation. The evidence flatly contradicts its claim that the universe is a closed one.

Now, let us try to visualise what would be the picture of the beginning of the universe after the acceptance of the UTR. I have to admit at the outset that I have not yet worked on this aspect in detail, as it will require a substantial time to work out all the details, but certain things are evident:

First, the UTR declares motion as the most fundamental property of the universe. If motion is not there, the matter can have *no property* and there can be *no laws* in force. The theory says that the universe is rotating as a whole (Uniglobe). It is this rotation that has provided all the properties to the matter. So, it would be in the fitness of things to say there was a time *when the universe did not rotate* on its axis. The matter then was spread in a huge space in the form of a *haze*. There was absolutely no movement; the matter did not have any mass acted upon by forces; there were no forces and no form of energy including temperature. Everything, including space was *devoid of property*. Time did not exist. In short, the universe was nothing but an *inanimate ocean of inanimate or dead material,* which may have been the debris of an earlier universe. Thus, while the accepted theories of the origin of the universe visualise the universe as beginning from a singularity having infinities and breakdown of laws, the UTR would visualise the origin of universe *from a huge space filled with inert material, where there was no law in action*. The modern theory is untenable because it is highly *unlikely that laws could have originated from a situation where the laws had broken down*. The origin of laws from an earlier event witnessing the breakdown of all laws of Physics also disturbs the law of causality. *Causality* and *determinism* have been the cornerstones of classical Physics as well as the Theories of Relativity, and was vehemently defended by Einstein and other physicists including the most vociferous opponents of the Copenhagen Interpretation. The truth is that the origin of law from a situation of lawlessness is something that cannot be acceptable. On the other hand, the UTR would visualise the origin of laws not from a situation where there was *lawlessness* but from a situation where there were *no laws in force* yet, because the matter in the universe was not yet in position to understand and follow the laws.

Second, the first step in the origin of the universe would be the beginning of the rotation of the universe on its axis. It will be discussed later how this rotation started. But it is clear that it got underway owing to the supply of energy from *outside* the universe. As soon as the rotation began, the universe would have awakened from the slumber or got revived from death. The material present in the universe started moving, and with the movement the properties and forces started appearing. The material particles started running towards the periphery of the universe where the supply of energy was coming from, and the gravitational attraction and the kinetic energy created by the motion started attracting them towards one another. Every single particle in the universe and space started rotating. Time started to move. So the *beginning of space-time as a functional entity took place not at the Big Bang but at the beginning of the rotation of the Uniglobe.*

Third, with the beginning of the rotation of the universe, the gravitational attraction between the finest components of the haze led to the *coalescing of material*. One of the likely courses of development would be like this: The massive amount of kinetic energy associated with particles would eventually lead to the formation of nuclei. As the mass-energy of the

material in the outer zone will be much greater, the matter from the inner zones will first get attracted towards the outer zones, and a *ring like universe* may develop. Then the attraction between the matter would lead to condensing of the matter at the centre. The structure that formed in the centre would be a *spongy* mass with central region containing hydrogen atoms. The temperature within the condensed mass would continue to rise. As the density increased further, the temperature increased even more. When the matter condensed substantially, the pressure in it became too big to keep it as one single mass. It exploded with a Big Bang, and with the explosion the material ran in all directions towards the periphery with *extremely high* (much much higher than the speed of light), though different, speeds. Soon the materials started concentrating in different areas that gave rise to different components of the universe. The universe continued to rotate and the gravitational forces between the masses led to the development of various *rotating frames*, which we now know as planets, stars, galaxies, clusters, superclusters, Megagalaxy, etc.

Fourth, it has to be studied whether the atomic particles that exist today were created in the pre-bang phase or the post-bang phase. It is more likely that the atomic particles had already formed, and even the elements had appeared in the pre-bang phase. To visualise what happened at what stage, the most important point that has to be noted is that the rotation of the universe would impart different speeds to the different areas. Those near the axis will have smaller speed and those farther away will have a greater speed. Therefore, the energy will be the maximum in the outer zones and will smoothly taper down towards the inner zones. What effect will these differences in energy create would be an important consideration in finding out the sequence of events.

Fifth, it has to be studied what form of radiation would have been produced in the whole process. While the big condensed mass at the centre would be rotating with huge speeds, the rest of the space might have been filled with radiation. Can microwave background radiation be that radiation?

It is clear from the above that Big Bang will be a hugely different event from the Big Bang of the current theory. To differentiate the two we will call the Big Bang in the UTR as the BIG BURST from hereon. The most important distinguishing features between them are as follows:

First, Big Bang started from Singularity having *infinite density, zero size and infinite* temperature. Big burst would be a much *subtler* event starting at a massive density and massive heat. But *neither it would start from a singularity nor start from a state of infinite heat and zero size.*

Second, in standard theories, the space-time is assumed to have *begun* at the Big Bang, but not in the case of the Big Burst of the UTR, which had a phase where time had already begun. In the UTR, Big Burst is not the starting event but an *intermediate* one.

Third, the Big Bang started from a stage where *laws were broken*, but Big Burst would start from a previous event, where there were *laws already existing*. Causality will therefore be better maintained.

Fourth, in the Big Bang, it is hard to imagine how density fluctuations began giving rise to galaxies and stars. The use of quantum mechanics to describe the earliest events is nothing but an attempt destined for failure. The uncertainties of quantum mechanics have been *assumed to be the cause behind density fluctuations on the ground that the universe was of an extremely minute size*, where quantum mechanics could work. This is an absurd idea because quantum mechanics is related not just to the *size* of microscopic structures, but also the *properties* of the subatomic particles. Subatomic particles are not only of extremely mall size but also of a *minute mass*. The universe at the start of the Big Bang, on the other hand, had *infinite mass*. The heat content in the initial phase was *extremely high* compared to that in the atom. Furthermore, there is a *special* relationship between the particles acting within the atom, and between the particles and other atoms surrounding them. Obviously, such relationship was non-existent at the beginning of the universe. The problem of density fluctuations does not arise in the Big Burst, because density fluctuations would have already appeared in the condensed mass, which could in fact have been a *spongy* structure.

Fifthly, The uniform microscopic radiation can also perhaps be better explained in the UTR.

Sixthly, while Big Bang was an explosion, not in, but *of space*, there can be two possibilities in the Big Burst. As the UTR assumes the beginning of the creation of the universe with the beginning of the rotation of the universe, the extraordinary speed of the rotation would cause contraction of space, but the gravitational pull among the particles would cause them to get denser. Obviously, there will be a free space or vacuum (with no matter except the particles of different forces) outside the concentrated mass at the centre. The Big Burst can either be a burst into space, or that *into the space as well as of* it. These possibilities have to be discussed in arriving at the Final Model of the Origin of the Universe.

The vast difference between two theories can therefore be appreciated. In the Big Bang theory, there is no answer to where the infinite mass and energy of the singularity came from, and *what was there prior to the Singularity*. It leads to the compulsion of the continuous creation of space, for the Big Bang was an *expansion of space, which is still continuing, and can*

continue forever. Where from this space is coming, there is no answer. In the Universal Theory of Relativity, the origin of universe would not begin at infinities, but from a position having *absence of any matter with properties*. The need of the Creator is there in both theories, but the *Big Bang starts at an event where there had already been created a huge energy-mass, while the UTR starts with the creation of energy-mass itself***.** The role of God will be discussed later.

Thus it can be seen that the origin of the universe in the UTR has three main stages which are akin to the stages of human development. First stage can be called a *Prenatal or Foetal Stage*. In this stage, the foetus of the universe started to form at the centre of the Universe. Once the foetus got fully developed, began the second stage: the *Natal Stage or the Stage of Delivery, the Big Burst***.** The matter gathered in different areas in several rotating frames of universe, like planets, stars, galaxies, clusters and superclusters. Then started the *Postnatal Stage,* in which the development of the Universe continued with eventually the creation of the complex chemical structures and living beings.

There are many problems at the structural level also, which the standard model of the origin of the universe cannot fully explain. The universe is made up of billion of galaxies, some of which are smaller and some greater than ours is. However, what amazes cosmologists is that most of the universe is devoid of any luminous matter, and is formed of gigantic empty spaces. It is hard to find how these *gigantic voids* were formed and whether these voids are empty. One thought is that the universe may contain just one gigantic void in which large superclusters and clusters are floating. The other possibility is that superclusters form one gigantic chain within one gigantic void so that it is possible to traverse through one chain to the other. The third possibility is that galaxies cluster to form sheets separating vast regions of empty space just as soap filaments and bubbles formed out of them. These structural features are also not easily explainable by the Big Bang models. If the universe started from a highly dense singularity, what caused these voids to appear? At the same time there are structures like Great Wall, which is a gigantic structure of up to at least 100-200 Mpc scales. The truth is that these structures and more generally the formation of galaxies have been puzzling scientists, because it is difficult to imagine these on the basis of the Big Bang models. Let us reproduce here some of these concerns:

> *"My view is that there is something fundamentally wrong in our approach to understanding such large-scale structure—some key piece of the puzzle that we're missing." (Waldrop, M. Mitchell;* Astronomers Go Up Against the Great Wall, Science*, 246:885, 1989)*
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> *"The problem of explaining the existence of galaxies has proved to be one of the thorniest in cosmology. By all rights, they just shouldn't be there, yet there they sit. It's hard to convey the depth of frustration that this simple fact induces among scientists." (Trefil, The Dark Side of the Universe, p. 55)*
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> *"We cannot even show convincingly how galaxies, stars, planets, and life arose in the present universe." (Michael Rowan-Robinson, "Review of the Accidental Universe," New Scientist, Vol. 97, 20 January 1983, p. 18)*
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> *"A completely satisfactory theory of galaxy-formation remains to be formulated." (Joseph Silk, The Big Bang San Francisco: W. H. Freeman and Co., 1980 p. 22)*
>
> *"The theory of the formation of galaxies is one of the great outstanding problems of astrophysics, a problem that today seems far from solution." (Steven Weinberg, The First Three Minutes, New York: Bantam Books, Inc., 1977, p. 68)*
>
> *"Fifty cosmologists attended a conference on galaxy formation. After summarising much observational data, two of the most respected authorities optimistically estimated the probability that any existing theory on galaxy formation is correct is about 1 out of 100. (P. J. E. Peebles and Joseph Silk, "A Cosmic Book,"* Nature*, Vol. 335, 13 October 1988, pp. 601–606)*
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> *"In its simplest form, the Big Bang scenario doesn't look like a good way to make galaxies. It allows too little time for the force of gravity by itself to gather ordinary matter—neutrons, protons and electrons—into the patterns of galaxies seen today. Yet the theory survives for want of a better idea." (Peterson, Seeding the Universe, p. 184)*
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> *"The discovery of the Great Wall of galaxies and the filamentary clumping of galactic matter has greatly surprised traditional astronomers who think that galactic matter should be uniformly distributed—according to their theories, at least. Until these discoveries, almost everyone was betting their house on a*

uniform distribution of galaxies throughout the universe. In fact, the exact opposite has proved to be the case: galaxies, clusters of galaxies, and even superclusters (clusters of clusters) are distributed in gigantic filamentary and sheet-like patterns….

"Cosmologists have tried shoehorning these discoveries into their existing theoretical structures by hypothesising different kinds of dark matter or by asserting that the Big Bang contained irregularities, which resulted in clumping of galaxies and clusters. However, all these attempts to account for the Great Wall and other structures run into other problems. For example, postulating irregularities in the Big Bang fails to explain the observed uniformity of the universe's microwave background radiation…

"Some cosmologists are trying to piece together models containing both cold dark matter, which may explain the stability of galaxies, and hot dark matter (neutrinos), which may explain the larger-scale structures. However, this approach seems inelegant to many theorists, who are uncomfortable hypothesising agents for which there is no observational or experimental evidence." (New Science Paradigms, The Great wall)

We know now that stars group into galaxies. Some 100 billion of galaxies are observable in the universe. They form huge clusters journeying through space. Galactic superclusters may contain thousands of galaxies and may stretch hundreds of millions of light years across. Superclusters are arranged in *filamentary* and sheet-like structures, separated by gigantic voids of apparently empty space. Fifteen or sixteen smaller galaxies along with Milky Way and Andromeda form the Local Group cluster of galaxies. Near Local Group, there is huge Virgo Cluster. These clusters and clusters of clusters are moving. The Milky Way and Andromeda are moving toward each other, the Local Group is moving toward the middle of the Virgo cluster; and the Virgo cluster and a neighbouring supercluster are speeding toward a mysterious destination called *"The Great Attractor"*. Moreover, using shape-finders some scientists have been able to show that for a wide range of model universes, clusters of galaxies align themselves to form one-dimensional filaments. Indeed they predict that *the larger the size of a cluster the more likely it is to be filamentary in nature*. This filamentary nature will also be better explained by the rotation of the Uniglobe. Commenting on these structures and their movement, a report on the web-page of *New Science Paradigms* says:

"These structures and their movements cannot be explained as part of the general expansion of the universe. Conventional astrophysics theorises that they must be guided by gravitational forces. But astronomers have not detected enough matter to account for the tremendous gravitational pull needed to explain the motions of stars in galaxy arms, galaxies and larger structures. For years now, astronomers have been haunted by a sense that the universe is controlled by forces they don't fully understand. Recent observations provide a striking confirmation ….

"Astronomers are up against the wall—the Great Wall of galaxy clusters. The Great Wall is the largest known structure in the universe: a 15 million-light-year thick sheet of galaxies, $500x10^6$ light years long by $200x10^6$ ly wide—and it may extend farther, into areas blocked from observation by the spiral arms of our own galaxy. The Great Wall is about $200\text{-}300x10^6$ ly from earth. It limits vast voids of nearly empty space containing almost no galaxies at all—only some vast, diffuse clouds of hydrogen. ……Both the Great Wall and the adjacent voids are far too large for classical gravity-based astrophysical theories to explain. All theories currently popular among traditional astronomers have great difficulty accounting for such enormous structures. One important observable, the 2.7 degree K cosmic background radiation—which is usually described as the afterglow of the Big Bang—argues for a very smooth, uniform distribution of galaxies. According to conventional astrophysics, the Great Wall is definitely anomalous."

In the UTR, these voids and huge structures will be easier to explain. The big mass formed in the centre after the rotation of the universe began was not a singularity as singularities are banned in this theory. As the big mass in the centre coalesced from a haze of matter due to newly acquired gravitational attraction as the result of the rotation, which was at different speeds in different regions, the *density fluctuations* in the big mass would be obvious. And as the big burst was not just the burst of the space as claimed by the Big Bang, but the burst *in* the space, the formation of voids can be understood. The great filaments and voids can be explained only by the second postulate of the theory that says that the universe *as a whole* (Uniglobe) is rotating on its axis. The presence of great voids with nothing but Hydrogen is an important pointer to the truth of the theory. According to the theory, the regions near the axis will be rotating with very small speeds compared to the outer regions. In these spaces, the energy content of the particles will be greatly lower than in other areas.

The strong nuclear force will therefore be not strong enough to bind the protons among themselves or with neutrons. The hydrogen alone will therefore be formed. With the big burst, the hydrogen may spread in other areas of voids but the greatest concentration should remain in the regions close to the axis.

Fate of the Universe

Physicists have predicted the fate of the universe in different ways. There are many models. In the *Open Universe* theory, the universe will continue to *expand forever*. In the *Closed Universe* theory, the universe will eventually start *contracting* and will again end at the singularity after which another phase of expansion may begin. (There are researchers who claim that this is not inevitable.) In the *Flat Universe* theory, the expansion will just remain at the *critical rate*. In all the theories, the universe will have a deadly end. In the UTR, another possibility looms large on the universe. As soon as the universe stops rotating, all the properties of the matter and space will be met with an *immediate death*. The absence of the force of gravitation would cause the matter to again become like a haze. All the movements will stop *abruptly*. Time will cease to exist. Space will again become dead. There will be *one time death of the universe as a whole,* which can be called the *Final Catastrophe*. In the current theories of the universe, the death of the different portions of the universe will not be simultaneous. There may be a gap of millions of years between the death of different stars. In the UTR, the death of stars or individuals can go on within the universe while the universe as a whole survives, but a time may come when the rotation of the universe as a whole stops, which will cause the death of the universe as a whole. In fact, it can be realised that *in the current theories of the universe, there is no birth or death of the universe* as such and it deals only with *creation and death of the parts* of the universe. Th UTR on the other hand talks of the *birth and the death of the universe as a whole*. As has been described earlier, the stages of the universe are similar to those of human development. First, there was a prenatal stage, then natal and then postnatal. The universe has already grown quite old, and it may die a sudden death anytime.

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