

Big Bang & Co.

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Abstract: For a number of years already I've been absolutely fascinated, no, hypnotized, yes, hypnotized, by the Big Bang theory. What a fantastic theory that is. Have you heard of that one? It's a big one. It's a popular one. It was everywhere and still is as far as I know. Books, articles, documentaries, lectures, TV programs, and much more – it's all there. Oh, how much I wanted to be there, at the beginning, witnessing it all. I wanted to see the Big Bang and whatever happened right after but it was so long ago, well before my time. I bet I am not alone with my dreams and what a dream that is. What really happened back then and there? How much do we really know and how much is a pure speculation?

Keywords: Big Bang theory; Universe; stars; sun; planets; energy; magnetic field; gravitation; Edwin Hubble; Galaxies; Mobius strip; black holes; Doppler; matter; antimatter; Hoyle; Hawking; Perpetuum Mobile; pulsating.

For a number of years already I've been absolutely fascinated, no, hypnotized, yes, hypnotized, by the Big Bang theory. What a fantastic theory that is. Have you heard of that one? It's a big one. It's a popular one. It was everywhere and still is as far as I know. Books, articles, documentaries, lectures, TV programs, and much more – it's all there. Oh, how much I wanted to be there, at the beginning, witnessing it all. I wanted to see the Big Bang and whatever happened right after but it was so long ago, well before my time. I bet I am not alone with my dreams and what a dream that is. What really happened back then and there? How much do we really know and how much is a pure speculation? When exactly was that? Was it 15 or 20 billion years ago? Why? What was there before nothing was there and whatever happened there and then? How many people went nuts trying to figure all that out? How many people went nuts altogether? Why do we have this and why do we have that? What would be there if nothing was there? Did whatever happened happen for the first time or it happened before, time and time again? If it happened before, was it just for a few times or it keeps happening forever? How much is forever? Is our universe 15 billion years old or only this cycle that old? Was there a real beginning or it was there all the time? What time? Time was not there before that something happened. Did someone create all that? Did he go nuts over that? Was there God, aliens or superpowers of the Superman? Was Superman dressed right when he did it? Was it E.T., A.I., CIA or NASA? If aliens were there where did they come from when nothing was there to begin with? Where was this Supreme Being for billions and trillions of years sitting and thinking of what to do when nothing was done yet? Nothing was there and it was quite boring for a superpower with all this super power going to waste. Then, Eureka, a spark of wisdom, of intelligence and the decision were made. He, God, created the universe and fifteen or twenty billion years later us, people, so we could warship him for creating the universe and us, people. Is that how it went? He was supposed to be sharp, the brightest and the oldest guy around, but that was somewhat slow at the least. Maybe he did not know how much time passed? Of course,

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time was not created yet. He created time and everything else when he created everything. Complicated... Maybe, possibly but no, it does not feel right. There is too much to consider and even more is missing. It feels too thin, too light, too fairytale and too superficial but great for a religion. That would be great, no perfect, for a caveman or for the Middle Ages, but today it is somewhat hard to swallow. We know better than that already. That would be pushing and stretching science up to the point of breaking it. It could be even beyond that point already. Of course, that would be the easiest explanation for what may or may not happen back then when or an interesting excuse for the lack of knowledge. "God created the world and everything in it." "God moves in mysterious ways." If we have to come up with excuses for God instead of explanations based on science, the whole God thing does not have legs to stand on or legs are too weak to consider. Creationism creates more questions than gives answers and that is the answer. And, even answers it provides are somewhat questionable at the least. Proof? All proof is based on quite vague and fuzzy assumptions and does not really compute. Was it really there all the time, then? Maybe, but even my wild imagination can't imagine that. What is "all the time" when time was not there yet? Are you telling me that something was there anyway? Time? Matter? Antimatter? Energy? E.T.? A secret government entity? So, what was created back then and there? Is it true that nothing comes from nothing? My tortured brain tells me that there was something else, another mechanism that we overlooked or had not seen up till now. After all, we should be able to get better answers and must keep trying. My mind warps and twists trying to find the way out of my own questions and often from my own answers but still, I want to understand it. And this is when my overworked imagination switches on overdrive reaching beyond the reachable, beyond the obvious, beyond the understood. What a stretch that is. I want to go there wherever that is and attempt figuring it out. Are you with me? So, let's gather what we know and take another crack at all that, and see where it leads us to. Now, please, be gentle with me and don't judge me too harshly. You should understand that I am not a wizard yet and I make mistakes, often. I am still learning with you and as we go. I am still only learning while many of you are wizards already and know it all. I am cautiously glancing outside the box but maybe I am searching outside the box only because I don't know that box well enough? What do you think? Come with me and let's see together.

The Big Bang theory is a very strapping attempt to shed light on what could have happened at the very beginning of our universe or whatever it was back then. Various new discoveries in different scientific fields (astronomy, physics, astrophysics, computer science, life science, biology, telescopes, space exploration, mathematics and more) have presented almost a concrete proof that our universe, as we know it now, actuality had a beginning and a violent one at that. There was a starting point. In short, there was nothing there and, then, there was something and we call it - our universe. How long did it take to go from the state of nothingness to the state of something? Well, time, matter, space and anything else did not exist before that, so, who knows. The universe clock started ticking at the same moment it happened. And, then, was time! So, it did not take any time in our measuring units. Space started to expand with the speed of light, or so, that was born at that time as well and matter was materializing from nowhere. Everything was flying out, colliding, exploding, imploding, boiling, cooling, hissing, knocking electrons out of orbits producing **Baryons, Deuterium, Hadrons, Leptons, Red Shift, Tritium**, time, space, matter, antimatter, magnetic forces, gravity and forces we can't comprehend. Yet! Marvelous! There should've been a deafening noise accompanying all this activity. How loud was it? It was not loud at all. As the matter of fact it was quiet. One could see light growing and brightening with the speed of light and chunks of something flying your way but no sound. It was like in a silent movie. One could see people talk but could not hear the sound. Well, sound waves do not travel in vacuum and there was an absolute vacuum back then. That's for sure. Nothing was there yet. It was before time and everything else, remember. If you tried to work your vacuum cleaner back then and there (just to get the place tidy for the new universe), it would not suck anything in but spit everything out including bolts, nuts and the electrical wires, not counting the dirt. That's how vacuum it was in the beginning of time, space and matter. It was kind of lonely and spooky, I say. Don't you think so? There it was total blackness, absolute vacuum, no time, no light and no sound. Did I mention - no weight? There was nothing there and then. If there was a God living there, like that, he was a strange bird constantly brooding and trying to figure out what to do next. Brrrr... Cold. Lonely.



Universe

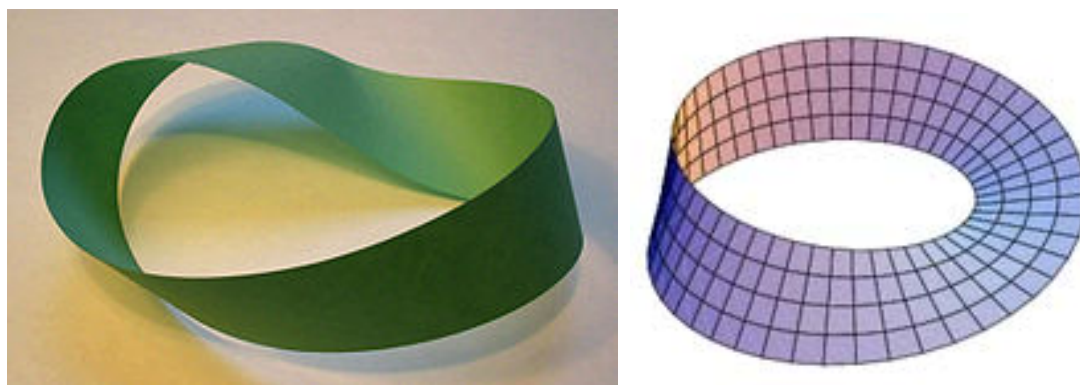
So, the Big Bang theory is the best (so far) available explanation of what maybe or maybe not took place during and right after that memorable moment of the zero time? Well, let me say, it's an excellent theory but the holes there are so large one could drive an aircraft carrier (with all the aircraft and a division of marines with all equipment on deck) through them. Still, there is a lot of substance there as well. There are many things in that theory that feel accurate and they fit right in. I say there is enough meat there to grab on and hang for a while until more newly discovered stuff plugs the holes off. In short, I buy it for now and may keep it for later. The theory that describes universe being there always is just like one huge hole with no matter or antimatter in it. How can you hang on that unless the lack of knowledge hugely supersedes your knowledge and you have no idea that you can't hang there no matter how hard you try? This is tough. What do you mean it was there forever? How long is forever? There had to be the beginning and the end may not be there at all. It could be infinite but only on the "end" part of things. As far as I understand the issue, nothing comes from nothing (did I say that before?). Therefore, we had to have something to get the universe in the state it is. So changes and transformations were there and they changed and transformed something that was there before the changes arrived. So, something was there but not the universe. That should not be too hard to figure out. Did not you say infinity? "Infinity (symbolically represented by ∞) is a concept in mathematics and philosophy that refers to a quantity without bound or end" (Wikipedia Encyclopedia). So infinity is some kind of a loopy thing that never ends but may have a beginning. Does not it mean that the basic conditions of this quantity should not change throughout infinity? If anything changes, even the smallest (infinitely small) possible thing, this quantity would transform in to another quantity and, therefore, the first quantity was not infinite. It had an end and, therefore, everything would have an end or be finite. Does not it mean that everything had a beginning as well? It had to start somewhere. Can we say that the basics in our universe changed, change and will change infinitely. Everything moves, shifts, transforms, converts,

mutates and changes in our universe every fraction of a second so universe is not infinite because each condition has a beginning and an end. Am I right? Correct me, if I am wrong. Please. I'll be happy to learn more. Well, I disagree with this. If we take universe in the whole, in its entire entirety, it could be infinite because it had the beginning but would have no end. But, if we take parts and fractions of the same universe, they are all finite, had the beginning and will have the end. In short, *the infinite universe is a compilation of the limitless finite situations*. This is fun. We got that solved alright, did not we. No, man, this is still all too thin and so fragile. We need more out of the box thinking put in to it. Let's keep going, we may get lucky.

In accordance with the most popular today theory, about 15 (some say 20) billion years ago an astonishing explosion of the finite matter squished into an infinite density under the highly intense pressure and the tremendous temperature started the development of the universe in which we live. In short, that's how the universe was born. This blast of the incredible proportions is widely known as the Big Bang and, as a result of it, universe has become what we know now but is still developing and changing. In accordance to this, at the peak of the occurrence all of the matter and energy of space was concentrated at solitary point. What did exist prior to this event is totally unknown and is a good topic for pure speculation and we do speculate. This is the part where science is intermixed with the science fiction and the fictitious science impregnated with clear assumptions and superstitions where the pure speculation of the loud mouth pseudo science often prevails. Yes, it often happens. It's almost like the global warming issue. We don't know much about it and speculate but money makes the world go around. Points of view may change and do change. In theory, the event of the Big Bang was not a conventional explosion but a unique affair that filled space with particles of the emerging cosmos rushing away from each other but still colliding and growing in size and complicity with the speed of imagination. Space exploded within itself and the outward movement of particles of this embryonic universe kept expanding it to the present dimension and beyond. What a story! Piece by piece atoms took shape reshaping the embryonic state of the universe and molecules quickly followed the suit. Galaxies were not all clumped together but rather rushed in all different directions laying the foundations for new galaxies and the present universe. We can only try to imagine all that but the complete picture would probably be never known. Future universe will look completely different from the present but it is still in the future and we can predict some of it. Present is only a bridge between the past and the future and we are using all means available to us to get there, to see it, to experience it. Unfortunately we can not rush time and get to the future before time. Our universe is constantly changing: expanding, contracting and shape shifting. No matter what the others may say but it was a sensational Big Bang and we are still feeling it with every passing second and every movement of Earth.

The origin of the Big Bang theory can be credited to Edwin Hubble. Hubble made the observation that the universe is continuously expanding. He discovered that a galaxy's velocity is proportional to its distance. In short, galaxies that are twice as far from us, move twice as fast. Galaxies that are 15 (some say 20) billion light years from us move away from us with a speed of light and light from these galaxies could never reach us. We can't see them but they are still there anyway. So, 15 (some still say 20) billion light years became the boundary of the observable universe. That's it. That's the borderline. That's where the horizon and the rainbow are. That's what we dream to see. Once you crossed over you are off the grid. So, in time more and more galaxies would go beyond the boundary and eventually leave the observable universe empty. What a scary thought. But do you think they may come around and enter the observable universe again but from another angle? Given an unlimited time they may complete the circle and come back to us. I'll come back to that a little later, if you don't mind. Another serious significance is that the universe is expanding in every direction. In accordance to many this observation means that it has taken every galaxy the same amount of time to move from a common starting position to its current position. Hm... This is where I get confused. Where to start? Galaxies are not all at the same distance from the point of origin. That means that they moved with different speeds or some of them took longer paths than others. Everything tells us that speeds should be the same. Does it mean that some of galaxies did not take the straight path to the present position but rather curved around? Would that mean that there was not one point of origin? If universe is expanding in all direction and it looks like it does, some galaxies should be moving toward us while some away. If velocity of galaxies is proportional to the distance, then, when these galaxies move close enough to us, their velocity would become zero and they'll stop moving all together (from our point of view). Hm..., again. What happens

then? Why do we measure anything in relation to us? We are not the center of the universe, not that we don't want to be. We would like it very much. If we identified this movement, we could approximate the origin of it. So, why don't we measure velocity from there, the origin? Or, we do? Good. Well, we can't see from there. We are not there and the telescopes would take a very long time to get to that point if they can do it at all. So, we measure everything from the point of observation and then, if we need to, extrapolate it to anywhere. It looks like we may have two different scenarios if the whole theory is correct: speed of the galaxies increases with distance from the point of origin or speed of the galaxies decreases with distance from the point of origin. I like the later scenario somehow. It feels better, stronger and I can relay to it. If speed of galaxies increases with distance, that the universe expansion is infinite. But maybe it's more like a **Möbius strip** or **Möbius band** that has surface confined to only one side while it looks like two sides and only one boundary component. In short, one could travel on this surface infinitely visiting every point of it (on both sides), if wanted, and never running out of the traveling room lengthwise. Length has no boundary there and, therefore, infinite, as we may say. Width... Well, this is a different story. Width has a boundary and, therefore, finite. So, this surface is finite and an infinite all at the same time. Talking about contradiction of terms. Cute.



(Wikipedia, the free encyclopedia - Möbius strip)

What if our universe had no boundaries altogether? You say - impossible. Well, look at the **Möbius** strip. It worked there. What if it was like a balloon arranged in a **Möbius** way and with no boundaries in any directions? Then the celestial bodies could travel infinitely regardless to whether space was infinite or finite. Actually, space would be infinite as the **Möbius** strip. It would have no boundary whatsoever. Galaxies, planets, stars would speed away from us one day and then rush back from another angle billions of years later popping up all over the place. Speed...? Galaxies would be speeding up and slowing down depending on when and how you look at them. Speeds (as we measure them) of galaxies would change with distances, angle of observation and its relation to the speed of the point of observation. Also there could be some other considerations as optical illusions and whatever else cosmos may throw our way and cosmos would not hesitate. All objects in the universe would be a subject to directions changed as a result of collisions, explosions and all other forces combined. Our universe would always evolve and never die. What a wonderful thought. We got it almost solved but a few minor things. What do you think of the black holes, dying stars, cooling planets, energy, matter, antimatter, powerful forces, unknown forces, vacuum, cosmic rays and the chaotic movement of all above and everything else in space? We can argue all these points until cows come home, fat lady sings or the hell freezes over. Choose any of that or all of it together or anything else you prefer but that's the limit of time I personally agree to wait. I'll take whatever you prefer to use as the limiting factor. I am flexible. But, still we do not know much and, even what we know, could be turned around in almost any direction. In short, we don't know more than we know and that leaves our virgin minds open for suggestions.

What do we really know or believe we know on the subject?

- We think, no, we are reasonably certain that the universe had a beginning. The theory that it was

there always does not stick very well providing that we operate within the nature realm we understand. Our universe was not there forever; it had a beginning. But something was there to start and to sustain that beginning. That something was there for a very long time (we can call it forever using the nature realm we understand, but we should not) evolving and maturing for the explosion that started our universe.

- We think, no, we are reasonably certain that galaxies come out flying outward from us with speeds comparative to the distance. This is called "Hubble's Law". Edwin Hubble (1889-1953) discovered this phenomenon in 1929 using the Doppler (Austrian Mathematician, 1803-1853) effect. This study supports the expansion of the universe theory and advocates that the universe was once quite compressed.
- We think, no, we are reasonably certain that, if the universe was at first extremely, exceedingly hot as the Big Bang implies, we should be able to find some traces of that heat. Yes, yes, it cooled over in 15 billion years quite well. But, there should be a trace. There should be a tangible leftover of that heat. All we want is the remnants of what used to be so huge. Sure thing, in 1965, Radio-astronomers Arno Penzias and Robert Wilson discovered a Cosmic Microwave Background radiation (**CMB**) which permeates the apparent universe. This is believed to be the leftover of the tremendous heat which scientists were searching for.
- We think, no, we are reasonably certain that the profusion of the "light elements" **Hydrogen** and **Helium** found in the discernible universe support the Big Bang model of origins. These elements were and still are the building blocks of the universe and most things in it.

Well, do we know anything else for certain? Not really. Even all that above is a big stretch but the brilliant minds are still working there putting pieces of the puzzle together one little morsel at the time. The whole thing holds for now but still we need a few more touches. Let's see what we can do.

What do we think?

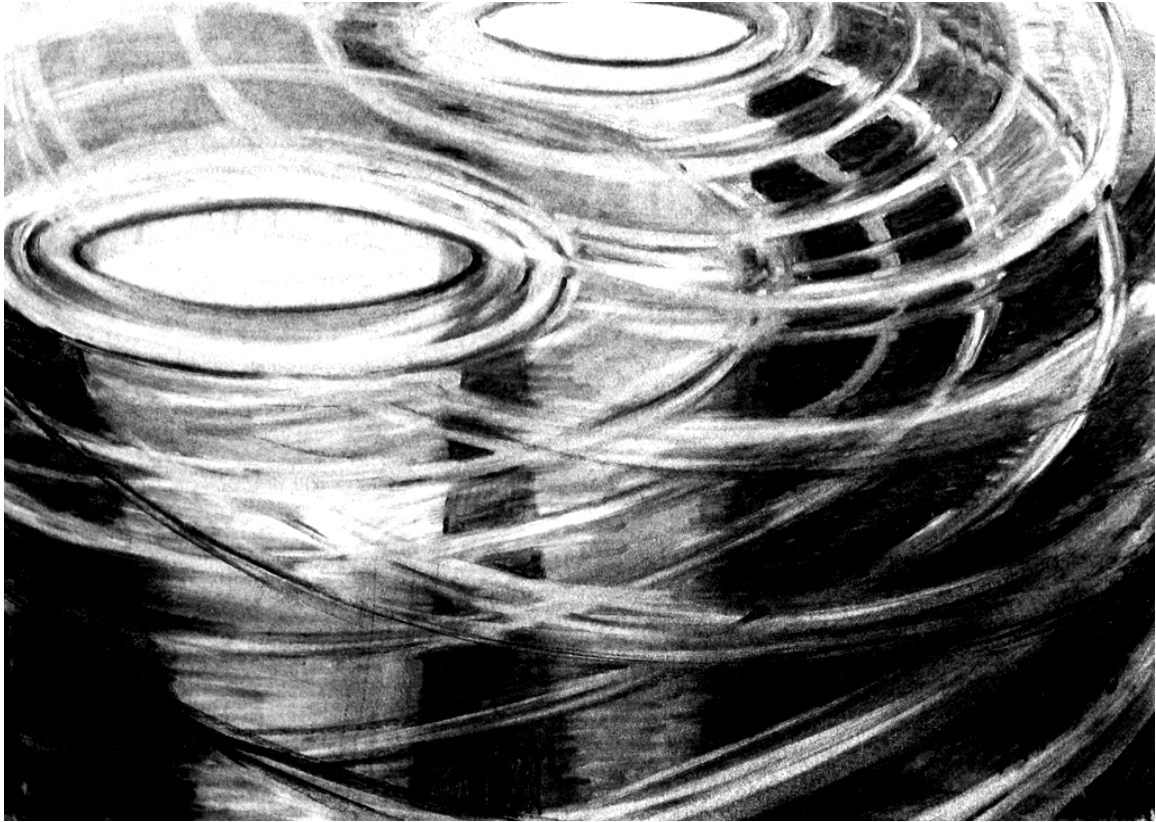
We think that after its first formation, universe, it sounds as if, inflated (the "Big Bang" theory), expanded and then cooled down dramatically, going from infinitely small and exceptionally hot, to the dimension, pressure and temperature of our present. And it keeps going maintaining the expansion and cooling to this day. It may never expand to the limit because there is no limit of space as we know it and it may never cool down to an absolute zero because universe keeps warming up due to different explosions, collisions and the rays. To achieve an absolute zero the system has to be removed from the universe and that is impossible. Any system in the universe is a part of the universe and can't be disengaged and isolated at will. "By international agreement, absolute zero is defined as precisely 0° K on the Kelvin scale and as -273.15° on the Celsius scale. Absolute zero is also an exact equivalent to 0° R on the Rankine scale (same as Kelvin but measured in Fahrenheit intervals) and -459.67° on the Fahrenheit scale." (**Wikipedia, the free encyclopedia – Absolute Zero**). We are surrounded by several hundred billion stars clustered in a galaxy speeding through the cosmos that is inside of the ever expanding universe started as an infinitesimal singularity that emerged out of nowhere for reasons unknown so far. And, there are hundreds of billions of galaxies just like that. This is the Big Bang theory in a nutshell. How do you like it so far? What I really want to know if there was only one infinitesimal singularity and one explosion on the beginning or multiple primary explosions and the secondary explosions as well. Maybe there was only one primary explosion, as described in the Big Bang theory, followed by the scores of secondary, thirdly, fourthly and so on explosions. Maybe there were multiple primary explosions not followed by any other explosions or followed by the scores of secondary, thirdly, fourthly and so on explosions. If we question the origin of the black holes and the chaotic movement of galaxies and stars and everything else there, we may conclude that there were the secondary explosions of the lesser magnitude than the primary one that maybe triggered even more explosions of even lesser power. We see explosions even now and so many of them. Could we call it the Fireworks Effect or simply the Ripple Effect? Could we say that the Fireworks Effect triggered the Ripple Effect and, therefore, we still see explosions that are consequences of impacts of subjects moving in the collision course resulted from the chaotic general movement? *Chaotic* is an operative word there. This is very tempting and may explain a few things. I don't think it's been proved scientifically yet but it

was not proved otherwise either so why not to entertain this notion of multiple explosions while we are trying to prove or disapprove it?



The study of the ripple effect may help us to progress even further. As we all observed on so many occasions (remember your childhood not so long ago?), when you throw a stone in to a pond or throw anything in to any body of water, numerous ripples move concentrically out. If we could mark somehow several spots at the point of origin, we would notice how these marks move outwards while spreading apart. This movement is regulated and choreographed by nature and the forces at play to the point of precision. All marked spots would maintain relatively similar speeds of movement floating on the outward going ripples that expand in diameter for as long as they have the power to do so. The bigger stone thrown there the more powerful results are. Resistance of water and air would rob the ripples of muscle limiting the expansion. If it happened in vacuum, well, it's a different story. In absolute vacuum this movement of ripples and the ripple's diameter expansion would be infinite but absolute vacuum is not obtainable. Cosmos is the closest thing to it but still vacuum there is only partial. So, what do you say, can we experience an infinite expansion of the universe? It does not look like that, does it? If a piece of original matter traveled undisturbed (no influence of any other force), it would progress in straight line and infinitely. But due to all forces (collisions, gravity, the stellar winds, friction, cosmic dust and whatever else is out there) that original piece of matter would not be traveling straight and may eventually lose its driving force altogether. Of course some accidental collisions and the abundance of cosmic forces could keep it going infinitely but then it would not be the original piece of matter. It would become an altered piece and, therefore, a completely new entity. Even the molecular structure of this new body could bury no resemblance with the original piece. So, what happens then? If this piece lost the driving force, would it just stop and stand still? Would the closest biggest gravitation reel it in? That could be the case or one of the cases. That movement could jump-start the driving force this matter

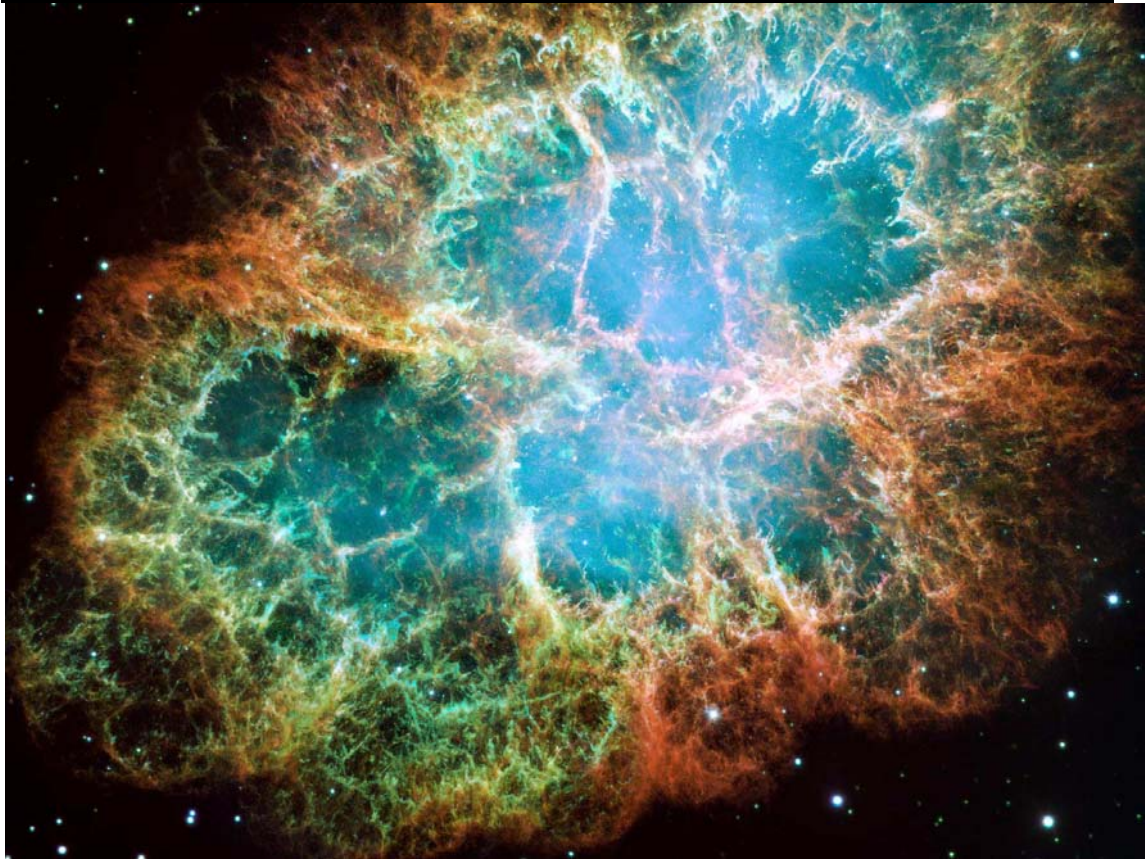
needed to keep moving and let it orbit the bigger matter or it would just keep going speeding toward the unknown. That would depend on that jump start and the driving force it created. But then again, it could just fall in producing a new collision where the bigger matter would benefit in mass and power and the smaller one would get integrated in to the bigger mass or become the cosmic dust. What a mess.



So what do we know now? Is it more than before? We know that vacuum is partial in the space and while the universe may expand infinitely, if the shape of the space is right and loopy, matter may not travel infinitely without becoming another matter at one point or another. And, considering that time in space is infinite, it will happen at some point in that infinite time making matter finite. Odds are too great for that. Some matter may escape that but in very negligible numbers. So, matter travels within the boundaries of forces working in the space regardless to the shape of the universe. Also we should know by now that there was probably not one original explosion but a few and that sparked the chaotic movement of bodies in the space. Pieces of matter from the original explosions followed the ripples going in all different directions and due to the ripple effect often collided with each other starting a new ripple. These collisions are still happening even now, as we speak, and ripples from these collisions are moving through our space in a form of rays, cosmic dust, meteors, asteroids and whatever else is out there. Could that be the cosmic noise we hear as well? Some cosmic bodies grow bigger and bigger until they are huge and some get integrated in to bigger bodies or become the cosmic dust and energy rays. This may and probably will go on infinitely. Can universe stop expanding altogether? Theoretically yes if all driving forces lost all energy and at the same time. In order for that to work everything has to stop. But, if everything stops, the gravitational forces would reel the smaller bodies in, and therefore, jumpstart the whole thing again. So, it looks as the universe expansion is infinite. It does not mean that this expansion is linear. No, there is a clear curvature to the universe. Can we stop gravitation? I don't think so. Gravitation is a result of any mass's internal forces at work and related to magnetic fields. If the object has a mass, it has gravity. To stop gravity we need to lose mass or to create an anti-gravity

force that like gravity but works in the opposite direction. So, you replace one force with another but it is still a force. Some of this could be possible in a distant future, but not universally. Curvatures in the space may do the trick and somehow loop the whole movement around. Matter may follow the **Möbius** pattern but with no boundary all around and, therefore, move infinitely. Does it mean that universe would expand infinitely as well? I guess it does in some way. Universe may stay the same from one end to another and in all directions but objects would move without boundaries. How do you measure the universe? Should we measure it from the point of origin to the point where the universe is right now? Should we measure it from one end to the other? Do we know exactly where the point of origin is or where the end of the universe is? No, we don't. We can only guess and every mistake is measured in the light years. Travel to the end of the universe means traveling forever, infinitely, and not reaching your destination. In short, if a body could reach the end of the universe, universe would be finite, but, if it can't, giving the unlimited time, the universe is infinite. Now finally, if all bodies in the universe theoretically can move infinitely (providing that nothing affected that movement and universe curves in the **Möbius** way), universe can expand infinitely as well.

Here is another interesting issue. Many prominent brains have theorized for decades that universe pulsates. They say that there is a period of expansion followed by a period of contraction that repeat itself time and time again, and we are in the expansion phase right now. Explosion – expansion – cooling – contraction, explosion – expansion – cooling – contraction and so on. That's the pattern and we do not know how long each phase is. Let say universe expands for 20 billion years, would it contract for the same 20 billion years or less or maybe longer? How important that is considering our life span? How would affect the change of phase all around? There are many questions and only few answers. Anyway, that makes sense but did they mean extensions and contractions resulting only from the prime explosion or explosions or all explosions that ever happened. Every explosion would start ripples and these ripples would add energy to some bodies that are moving already making them to move farther and maybe faster. That would work for expansion and I can feel it. Cooling starts almost right away due to expansion. The bigger expansion is the deeper cooling is. Cooling should slow expansion down. At one point cooling would reach the boundary of temperature and contraction would kick in. If we say that there is only one explosion to consider that leads to only one expansion of the right magnitude and then there is only one contraction, I would not be impressed. I can see countless explosions of the large and small scale (a Super Nova explosion and the asteroids collision alike) that cause cosmic ripples leading to expansions and contractions. Some of these blasts are strictly local and some may have a major impact but they all work together and on a cosmic scale. Constant explosions and contraction produce multiple compound ripples that "*pulsate*" our universe. Don't you see it? Don't you feel it? That is the universe winding mechanism that keeps it going expanding, evolving and modifying. That is the dream-like perfect *Perpetuum Mobile* that perpetually (uninterruptedly) produces more energy than it consumes, resulting in a net output of energy for the infinity. It is outside the nature realm but the whole affair is outside the nature realm and it is not because the whole event was truly supernatural but because we don't know nature that well yet. Think, just a few thousand years ago we prayed to sun, rain, animals, a piece of stone or a tree. We believed in gods that looked like elephants, cows, bulls and snakes. Our gods used to live on the tops of mountains because we could not clime that high. We used to sacrifice animals, people, our children, just to please an angry god that would not grant us rain. Just a few hundred years ago we burnt people at the stake for not taking bible literally and for believing that Earth was not flat and was not the center of the universe. We still fight the religious wars that shed a lot of blood and gain no results. People still believe in superstitions but hopefully less then before. Why did we do all that? It looks like we did all that only because many things in life were outside of our realm of nature. The realm of nature we understood at the time. We are still praying to a fairytale but much less and that fairytale is much better defined. Our eyes are opening little by little. Practice makes it perfect. Accumulated knowledge gave us a chance to extend the realm of nature and now there is a bigger realm of nature we understand. It keeps getting bigger, wider and deeper with every passing second. Give it time for the nature realm to expand and evolve even further so we would know and appreciate it better. Many theories would change then and they should because of the basic conditions. All these conditions imposed on us by nature would change with our better understanding of nature. What works in space may not work on Earth but it does not mean we should not try and try again.



Supernova – the stellar explosion.

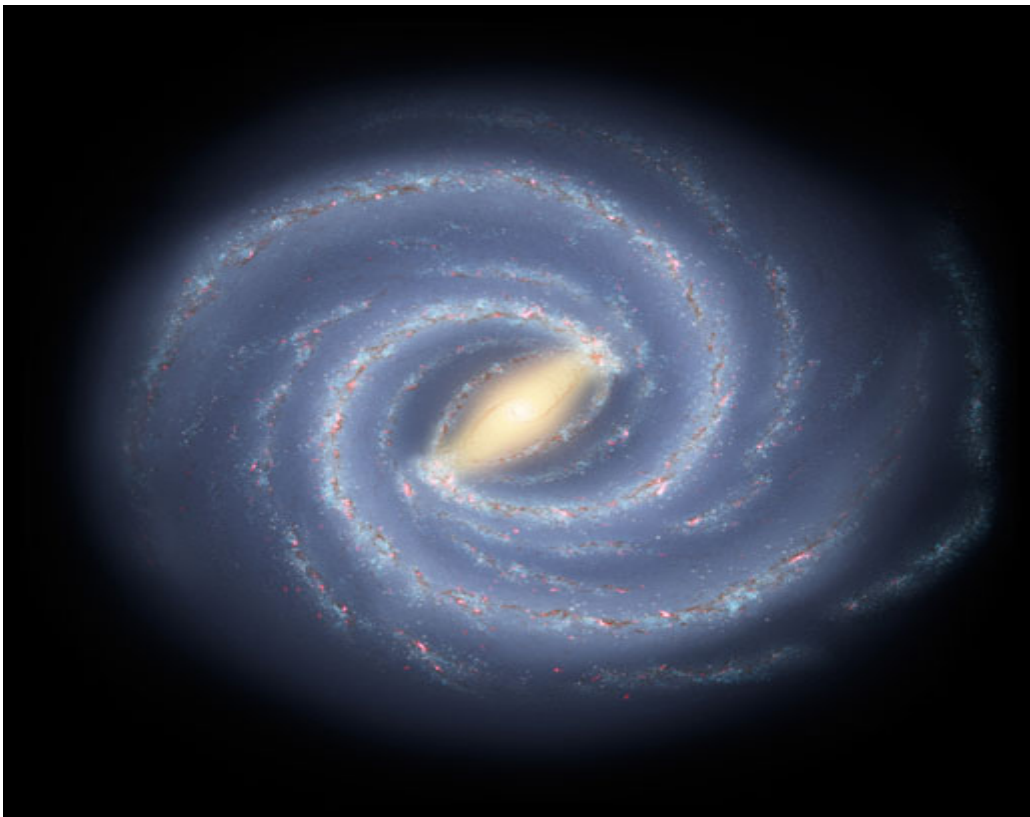
Is the Big Bang Theory the only reasonable explanation of the events that may or may not happened 15 or 20 billion years ago? What about witnesses? Can we take it to the bank or to a court? I am joking of course, but how solid the whole thing really is? What truly keeps it afloat?

I've been wondering if the widely accepted "Big Bang" theory is the only representation consistent with evidences we have and proofs we don't have. The answer is no. There are many ideas and often good ones floating around. I have found that the Big Bang was just the most fashionable one among so many. Well-known Astrophysicist George F. R. Ellis (born August 11, 1939) explains: "*People need to be aware that there is a range of models that could explain the observations.... For instance, I can construct you a spherically symmetrical universe with Earth at its center, and you cannot disprove it based on observations.... You can only exclude it on philosophical grounds. In my view there is absolutely nothing wrong in that. What I want to bring into the open is the fact that we are using philosophical criteria in choosing our models. A lot of cosmology tries to hide that.*" Numerous renowned scientists (Physicist Robert Gentry, Nobel Laureate Dr. Hannes Alfen, Dr. Geoffrey Burbidge, Dr. Halton Arp, and the renowned British astronomer Sir Fred Hoyle) criticized the standard Big Bang theory offering the other possible scenarios. Were they wrong? No, they were right considering the philosophical criteria they applied. One has to find the common ground there first. You need the common denominator in philosophical criteria when you discuss complex issues like that. So, what is a correct answer? Well, I say, anyone you chose. We know so little of the universe that almost everything is a pure speculation but, then, we know a few facts and we can use logic. It seems to me that I just invented another model using a philosophical criteria building this concept. I have to tell you, it worked for me, for my knowledge and for my logic. It may work for you and the rest of the world as well.

Now, what about God one may ask? Is there room for that guy in there? Can we bring him in using

that as philosophical criteria for the model? After so many thousands of years of being an every household item of the most importance, he deserves it. What's was his role in all this?

Any discussion of the Big Bang theory would be incomplete and useless without asking and answering these questions. It happens because **Cosmogony** (the study of the universe origin) is a grey area where science and theology meet and strongly resist to separation. We try but still we can't break them apart. Yet. The gravitational force is too great for that. Our knowledge is not strong enough to prove or disapprove one point of view or another. So, some people believe in creation and some people believe in nature. I am the nature fan so far. What we know that the original creation (of this cycle) was a supernatural event meaning that it took place outside the natural realm. We can not repeat it using the natural realm approach we know and understand. There is no laboratory capable of doing that and we would never be able to generate enough energy to feed and sustain the experiment. We can't even understand what and why happened when it happened. Therefore, if the origin of the universe can exist outside the natural realm is there anything else there outside of what we call the "Natural Realm"? Anything at all? Are there a Creator, a Master Architect, and a Super Power out there? We don't understand it; it's outside the natural realm, but still it could be there. What else had it done lately? What was done before that? We know that this universe had a beginning and a violent one. Does it have an end? Was that Super Power or God the "Prime Cause"? I can't answer that but many people believe in that explanation. They don't have much to hang on but major issue: there was a beginning. Unless we can understand this part and present a strong argument explaining the origins of the universe, Super Power is not going away. To me the theory of God creates much more questions than what we have right now and most of them are on the philosophical level and, therefore, we can speculate. In the conclusion all I can say that the whole issue is balanced only on three stumbling blocks: what, how and why happened 15 or 20 billion years ago?



The Milky Way – our home Galaxy.

GLOSSARY:

Baryons - common particles including photons and neutrinos created at approximately 10^{-33} seconds after the Big Bang.

Deuterium - a heavy isotope of Hydrogen containing one proton and one neutron.

Hadrons - composite particles such as protons and neutrons forming after the temperature drops to 300 MeV.

Leptons - light particles existing with hadrons including electrons, neutrinos and photons.

Red Shift - shift toward the red in the spectrum of light reaching us from the stars in distant galaxies.

Tritium - transitional element between deuterium and the formation of a helium nucleus.

Supernova – the stellar explosion.

Möbius - August Ferdinand Möbius (November 17, 1790 – September 26, 1868) was a German mathematician and theoretical astronomer.

Cosmology - the study of the Universe in its totality, and by extension, humanity's place in it.

Cosmogony – the study of the Universe origin.

INFORMATION

In the visible universe: Number of superclusters = 10 million;
Number of galaxy groups = 25 billion;
Number of large galaxies = 350 billion;
Number of dwarf galaxies = 7 trillion;
Number of stars = 30 billion trillion (3×10^{22}).

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