The expanding universe essay sample

One of the most intellectual and renowned scientist of the world, Albert Einstein, gave his Theory of Gravitation called General Theory of Relativity in the year 1916. This theory is still considered to be an irreplaceable theory and poses challenges while learning. It is no where simplicity, it is to complex. In this theory Einstein had a problem with the static universe, his theory somethings stating that universe a whole would not remain static, gravity should play the role of attracting the things together. But, there was no such evidence and hence to cancel this Einstein had to put cosmological constant in his General Theory of Relativity.

At this time, we didnt even know that there are galaxies out there! What we know was that apart from our sun and planets, there are millions of stars everywhere and many nebula, which were considered as gaseous clouds. Even the best telescopes of the time couldnt reveal that many of the gaseous clouds were infect group of stars galaxies contains million of stars. It is very surprising to me that while formulating General Theory of Relativity, Einstein didnt knew about the structure of the universe.

Although a debate was going on among the scientists that some of the gaseous clouds are composed of stars and they themselves are altogether a separate system, galaxy only was to prove this was to actually see stars in any of the cloud, but, telescopes still were not that powerful.

In the year 1917, Heber Curtis and George Ritchey announced that they have found novae in the Andromedo Spiral (a gaseous cloud). Novae event basically are connected to life cycle of stars, when a star dies, it becomes tremendously bright and stays in that way for many ways. Sometimes they

become so bright that they could be even seen at day time. Such a novae was spotted in the Andromedo Spiral, which directly means that Andromedo Spiral is a system of stars. But it took long to settle the doubt. In 1922, Ernst opik deduces that Andromedo nebula is a spiral Galaxy in its own right. This is does by studying the rotation velocities and the mass to luminosity ratio of the Andromedo Spiral.

At mount Wilson in 1919, the worlds biggest telescope had begin functioning.
It was a 100-inch telescope, which helped letter to resolve several galaxies, which were previously thought to be just gaseous clouds.

The find stroke came in 1925, when Edwin Hubble announced that he has identified Cepheid variable stars in the Andromeda. A Cepheid is a type of stars, which tells us how for it is, hence by knowing the distance of the Cepheid found in Andromedo, it become fairly easy to say that it lay for away from us. This is possible only if it is a separate system of stars, Galaxy.

Suddenly our horizons become root, from just own system of stars a whole get of galaxies, each containing million of stars and of course planets.

Now the astronomers were busy charting the position of the galaxies in every direction and trying to estimate the size of the Universe. While studying the spectra of various galaxies, Edwin Hubble once again caught hold of the most mysterious and important aspect of the galaxies. he noticed that all galaxies were actually moving, and they all were moving in a very unique manner, i. e. away from us. In a sense, Edwin Hubble, made us aware of the fact that the Universe is expanding.

Edwin Hubble noticed that the spectra of all galaxies were shifted towards red. This happens when the source of light is going away and is known red shift. When source is coming near we see a blue shift. This is very important to understand. It is also known as Doppler effect which we usually experience when a train which is very far from us and is blowing its horn posses at high speed, we experience a sudden increase in the frequency of the horn and then the frequencies slowly decreases as the train goes away. Some thing happens in the case of galaxies, while they are omitting light, they are continuously moving away.

Hubble also gave a law stating that more further a galaxy, higher becomes its velocity of receding. The nearer galaxies are receding at low speeds where as the galaxies those are at the fringes of the observable Universe run at the mind-boggling speeds, 2 lakh kilometers per second!

This indicates clearly that the boundary of the observable Universe is expanding much faster than the nearer area.

An astronomer called Vesto Slipher had actually measured large Doppler shifts in the spectra of spirds (gaseous clouds) in the year 1917, of which very few were aware, even Einstein was not aware of it.

Later Einstein said that putting cosmological constant in his General Theory of Relativity was the biggest blunder of his life.

With the advent of expanding Universe, fresh seed for a new theory for the evolution of the Universe where also sown, the big bang theory.

Big Bang theory states that as we see all galaxies receding from each other, but, if we trace back in time, they were all closer to each other and if we continue to go back in time, we come to point were the entire Universe becomes a point, a supper condensed point. Entire Universe stayed in that point, no body knows for how long it stayed, but, some thing triggered and an explosion took place an matter, energy and space ejected out from that condensed point and this went on for billions of years. even today we see the galaxies moving away, because of the Bog Bang that happened some 13. 7 billion years ago. This is also the age of the Universe, as far as our best estimates go.

Big Bang theory is the most accepted one, there are many more theories for the evolution of the Universe. But the Big Bang theory has certain evidences in its support. One is the rate at which the galaxies are moving; this is in accordance with the calculations. Another is the cosmic background radiation; we are receiving a radiation of 2. 7 Kelvin from all directions. Calculations tell us that the temperature of billions of Kelvin would cool to 3 to 5 Kelvin, this is near to 2. 7 Kelvins which was once billions at the time of the Big Bang.

Latest: We will not go in too details but just to make you aware of the fact that now it has been also found that the Universe is not just expanding but there is an accelerated expansion of the Universe. It means that the rate at which expansion is taking place is increasing. This caused a serious problems as it was thought that expansion is gradually slowing down due to the net gravity of the Universe and at some time in future expansion will completely stop and the Universe will start collapsing and a with in few billion years

again will get gathered. But new studies indicate that instead of slowing rate of expansion the rate is increasing! So what is it that wins over the gravitational pull and is pushing the things apart in the Universe? Well we yet do not have concrete answer but scientists are talking about dark matter and dark energy. It is that part which is working behind the accelerated expansion of the Universe. It will be surprising to know that Universe contains more than 90 to 95% of dark matter and energy and only a very little part of normal matter out of these billion of galaxies, each with billions of stars are formed.

What is dark matter is an open Question, but it some how to some extent explains the negative gravitational effect.

Einstein once said, The most incomprehensible thing about the Universe is that it is comprehensible. But knowing where we stand and amount of unreduced puzzles about the Universe we can very well say, All that is comprehensible about the Universe suddenly becomes very small when compared with the incomprehensibleness of the Universe.