General Overview of the Big Bang Theory

The cosmology, being the complex study that deals with the structure of the universe, is mostly observed in the light of physics. On the global level, this theory has to do with more specific notions, such as space, galaxies, planets and climatic data, all of which were created with the creation of the universe as the result of the huge number of the subatomic particles. As the science that contrasts all other theories of universe like philosophical, esoteric and religious, it is seen more true from the physical point of view. In terms of Physics, we should investigate the cosmological theory of the universe's early development that led to the formation of the universe in general and, which is called the Big Bang Theory. Fred Hoyle was the first one to name this theory Big Bang.

The physicists state that the gigantic explosion happened approximately ten billion years ago. Generally, the explosion is though to induce the expansion of the universe as well as to spread radiation from the chief fireball. The atomic nucleus that was in a compact universe is seen to be extended with the flow of time. The astronomers believe that there was something before the universe appeared. It is analyzed to appear as three singularities, often mentioned to be the zones of the finite density. Those three respective singularities make our universe be infinitely hot, small and dense. What is more, the astronomers persuade all other scientists that after the Big Bang, the universe turned from the small and cold into huge and usual by temperature, very close to the conditions we got used to live in now.

With the clarification of the Big Bang theory, the scientists actively speculated over the Big Bang models. Basically, it is accepted to speak about two general theoretical grounds and foundations. The first one is the General Theory of Relativity by Albert Einstein that suggested the new mechanism for gravity (Wald, p. 38). Here, the scholar stated that the gravity should not be observed as the gravitation field, but rather as the time and space shift. The second not less fundamental breakthrough was the general cosmological principle. This principle states that the matter is the whole universe in rather isotropic and homogeneous large scales. According to this

theory, the heat after the expansion is considered to have highly uniform temperature over the sky. This speaks about the uniform distribution of gas with the radiation emission.

Development of the Big Bang Theory and Evidences to Support It

This theory has found a lot of supporters who were physicists and astronomers all over the world. First of all, they state that the universe had the beginning as the certain circumstances were needed for the explosion. The size of the universe and its expansion tendency, implying that the universe increases all the time, is reasonable from the point of view of Hubble's Law. According to this law, the galaxies are observed to move with huge speeds in accordance with their proportional distance. In other words, this law is understood as the tight connection between distance to faraway galaxies and the speed they are moving away from us. So, the expansion in this case is observed as the development of the small universe into huge one. Moreover, the universe was observed to be hot, producing much heat. The remnants of this heat were found by Wilson and Penzias who were lucky to discover the cosmic microwave background radiation of temperature about 271°C. Moreover, the contents of Helium and Hydrogen were found in the universe. Heavy Hydrogen was formed by means of neutron and proton combination. The idea of the Big Bang seems to be true due to chemical properties of both light elements, but does not have to do with explosion as many would think, but expansion.

Except for the number of facts and events that make us believe in the Big Bang Theory, we should mention the number of approaches, which analyzed the Big Bang. From the point of view of the Quantum theory, the four fundamental natural forces served as the key elements to the super force that, in fact, caused the expansion (Gribbin, p. 89). To be precise, those were weak nuclear, strong nuclear, gravity and electromagnetic elements. As the result of such powerful force, the photons, positrons and neutrinos were formed together with their particle opposites. The forming process was so long and complicated that the essential part of particles provided the existence of our today's universe. This is observed in details by the Russian scholar Novikov (Novikov, p. 67). He lists the terms "annihilation" and "creation" to denote that the

particle interrelation was seen as the collision of opposites, in our case, the opposition of particles and antiparticles. During the inflationary period, which tends to be the initial forming period of the universe, the size changes were extreme as they were influenced by the speed of light. Today, we consider ourselves lucky to have galaxies around the planets due to the fluctuation in the density distribution, which was normal. If the density was higher, we would never have galaxies, which is reported and clarified by Parker (Parker, p. 218). On this level, we investigate that matter and radiation were inseparable and the number of opposite particles was equal. However, other particle combinations were found. For example, baryons and anti-baryons helped the creation of matter from the energy. On the other hand, the radiation was very dense inside so that the sun lights did not interact with it. With the flow of the gas clouds and the extremely huge temperatures, the photons did not have the energy to support the matter creation. The nucleosynthesis took place as the result of slowing down the protons and neutrons. Moreover, the helium was produced with the help of combination of two protons and neutrons. So, at that moment the universe consisted of approximately twenty-five percent of helium. Later, in half and hour, the electron-positron pairs provided the increase of the photon particles. By means of the lithium production as the result of helium accumulation, the expanded density of the universe was to be achieved by the light. As the radiation was becoming less dense, there was no danger in contact between light and matter with the current density. As the result, some of the matter was transformed to the solid state and, afterwards, fossils. Since that time, depending on the temperatures, the planets and galaxies are continuing to expand.

The Big Bang Theory Scholars and Their Conclusions

We can mention a huge number of scholars from different countries that investigated the Big Bang theory. William Wollaston is generally thought to be the practical founder of the spectroscopy in terms of this theory. He was lucky to notice some dark lines that separated the Sun spectrum. By means of German scholars Kirchhoff and Bunsen it became possible to refine the spectroscope. They were able to heat various elements to incandescence. This way, they

managed to identify those dark lines observed in their study. The similarity between spectrum lines in Star and Sun was very vivid later, when Huggins conducted his researches. This fact generated the higher attention to the celestial bodies in the middle and the end of the nineteenth century. The scholars tried to find the regularities between sound and its wave with the change of the position of the source object. The radial velocity indicators of stars helped the scientists collect data about the whole universe and make the reasonable conclusions. The essential breakthrough in this field was made in the beginning of the twentieth century. Edwin Hubble was successful in exploring the period-luminosity connection. As the result of his study, distances to various stars as well as to first independent galaxies were revealed. For example, he predicted the Andromeda Galaxy to be created nearly 900,000 years ago (Chown, p. 116-118). Hubble tried to use the variable stars as the standard candles. This helped him compare the relative brightness, which later was actively observed by the other scientists and used when determining any distances in general. Moreover, the link between galaxies and their radial velocities was found. He stated that the further the galaxy was from the Earth, the greater the galaxy velocity actually was. He also carried out his researches on the ground of his discoveries. First, he studied the phenomenon that is called “redshift” and then he was able to determine the speed of faraway stars with the help of measuring how their light changed within the course of time. That was the important step in both physics and astronomy.

All in all, we can observe that the above listed astronomers managed to reveal the huge part of truth by proving the fact of the universe expansion. Moreover, physicists paid a great attention to the creation of the universe as well. The most important scholar in our case, Albert Einstein, was famous for his clear explanation of the Physician Universe, saying that the universe was the uniform, static and isotropic distribution of matter. George Gamow observed the universe model as the combination of neutrons, protons and electrons. In 1965 Robert Dicke began to search the fossil remains of the Big Bang. His researches revealed that our today’s universe appeared from much older universe, which had undergone the expansion. The scholar

Hubble explored the redshift-distance connection. By means of any celestial body age, being familiar to him, he managed to reasonably state and conclude the age of the whole universe.

Apart from the scholars, some experiments were conducted at the end of the twentieth century. To be precise, COBE satellite, which was developed by NASA, helped the scientists detect cosmic microwaves, emanating from the universe. Under microwaves we understand the levels of post Big Bang radiation that was presented in the clouds of gas. The satellite indicated that the universe began to cool, which caused some minor fluctuations under the strong influence of the temperature. With the development of just fraction, the matter was becoming more solid.

Except for the experiments, some physics tried to apply functions in trigonometry (Maffei, p. 47). Some of them made efforts calculating the diameter of the Earth and celestial bodies. However, the received data did not help them determine the distance between galaxies. The distance then was tried to be evaluated and estimated in terms of intensity. The dimmer and brighter lights had to be considered in certain relation when compared to the stars. For example, if we see the brighter light, it means that the object is closer to us. On the other hand, the dimmer one means that the object is further.

Though nowadays a lot of approaches, concerning the creation of the universe are known, only the Big Bang Theory is regarded to be clear and accurate, providing much useful evidence. This theory is the most specific as it is directly connected with exact sciences and the number of profound researches. The physical phenomena can be easily explained from the point of view of regularity. Moreover, the conclusions of the astronomers and physicists rarely include discussions and speculations. And this fact speaks about the practical nature of their studies. In general, we should mention that the explanation of the Big Bang Theory helped the scholars analyze and make important conclusions about other physical phenomena, which are linked to the universe as well. The essential breakthroughs were made when exploring the galaxies, stars, sun, planets and other celestial bodies.

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