

THEORIES OF ORIGIN OF THE EARTH

BIG BANG THEORY AND NEBULAR THEORY

Outline

There are many theories which explain the origin of the earth. But today we will be discussing about the two main theories which not only explain the origin of the Earth, but also are related to the origin of the universe. They are the Big Bang theory and the Nebular theory.

Learning Outcome

After going through this module students will be able to understand the theories of origin of the Earth by analysing the Big Bang theory and the Nebular theory, which explains not only the origin of the universe but also the origin of the earth.

The Big Bang theory explains the origin of the universe.

Nearly 13.7 billion years ago. The universe was formed. And it is believed that the universe includes everything from the tiniest particle to the largest particle, and all the galaxies were packed into a single material and they were rushing away from one another at very high speeds in an ever expanding universe. This expanding universe gave rise to two major opposing cosmological theories. The first one credited to the Belgian Abbe Lemaitre, which was built on the simplest model. It conceived a finite point in time when all the matter in the universe was packed into a single gigantic body, which experienced an explosion and there were fragments which were sent flying outward to form the universe as we know it today. This is the evolutionary Big Bang Theory.

In fact, it is believed that the universe is ever expanding. We can understand this with the help of a simple example. Take a balloon and we mark two points on the balloon, A & B. Now you can inflate the balloon and you will realize that as we fill more air into this balloon, these two points will move away from each other. This means that the distance between the two points goes on, increasing as more and more air is filled into the balloon. And this explains that the universe is just like a balloon, wherein things are moving away from each other and the universe is ever expanding.

Up till now, supernova or a star that is being torn apart was considered as the most explosive phenomena in the universe. Now astronomers have a new name for this mind boggling explosion Hypernova. The space is full of clouds, some of which are left over from the Big Bang theory and others are spewed by exploding stars. The dense clouds within the clouds have more gravity and so they attract more dust to it. This then forms a knot, which is so hot and compressed and atomic nuclei starts fusing to become a star. Cosmologists agree that after the Big Bang theory the universe cooled rapidly to allow atomic particles to form into layered chunks of matter, which eventually became stars, galaxies and planets, and thus the Earth and many other planets were also said to be formed.

The second theory that we are going to discuss today is the Nebular theory. It was Immanuel Kant in the year 1755 who first put forth this Nebular theory and later it was modified by La Place in the year 1789. La Place was a French scientist who explained the origin of the earth. He believed that a spherical mass of gas was rotating. It was very extensive and occupied most of the universe. It may be called the Sun. It was rotating at a terrific speed, as a result of which its outer portion began to cool due to radiation. It was obvious that after radiation there was contraction and shrinkage and this accounted for a reduction in the angular velocity. The rotation became more and more rapid. The outer portion, being dense, was unable to keep pace with the inner core and therefore rings were thrown out. These rings continued to rotate in their places around the main nebula. In due course of time, these rings condensed into planets while the remnants continued as the Sun even today. It also threw out one such ring which condensed into the Moon, and therefore we say that the moon is a satellite of the Earth. Similarly, other planets gave rise to their satellites.

Criticisms of the Theory

Every theory when put forth is subject to criticism. The theory of La Place was also criticised on the following points. Firstly, it was criticised because many scientists felt that rings cannot condense into planets.

Secondly, the heavier is the mass, more is the angular velocity. This is what was being maintained by La Place. But it all depends on the size, the spin and the weight. This theory holds greater velocity in the sun, however due to rotation and revolution, the planets have a greater velocity than the Sun. The throwing out of rings has been found impossible.

Thus this theory has been criticised on these grounds.

Conclusion

All these theories basically are assumptions or they are hypothesis postulated by various thinkers, geographers, astronomers who have given favourable, suitable and viable explanations as to what happens naturally on the Earth, in space or in the universe. All these theories are now supported with proofs and evidences as the study of space, planets and their arrangements in the solar system.

Even today continuous research is going on as to what is happening on Earth in the universe and in space. These two theories have been explained in support of the origin of the universe and the Earth.