

The Universe Structure.

The Formation of the Universe Structure.

According to the based theory about the formation of the universe: the Big Bang theory, its structure was created in the following way:

The Universe began hot, dense and full of radiation, about 13,8 thousand millions of years ago with the Big Bang.

The light elements are formed during the first three minutes. Due to high temperatures, atoms cannot be formed, only elements called light, like protons, electrons and neutrons; later hydrogen and helium, the simplest elements appear.

As the Universe expands, it gets colder. High temperatures do not allowed hydrogen and helium existence to catch electrons to create heavy and neutral atoms.

Atoms were created after three hundred thousand years, giving space to other elements which compose the universe. First, the simplest ones were created: H, He and Li, in fact 98% of the universe is composed by simple atoms; the rest of the elements have been created during the pass of time.

Gases and stellar dust are formed. The gravity among gases gave place to the union and formation of the first stars.

The gravitational attraction of the objects make the substance gets together and form galaxies and clusters. They are formed after a thousand million years.

The Universe Structure

Edwin Hubble elaborated a new system to classified galaxies, which were ordered according to its content, distance, shape and brightness. In his observations, he proved that the emission of light from the galaxies get away among them in a constant velocity.

Based on that observations, in the year 1929 he formulated the Hubble Law, he could determine the approximately age of the Universe, and also shown that the Universe is in constant expansion.

In the Hubble Law is also outlined the Big Bang theory, as the Universe is in constant expansion since its creation, it had to be a moment along the history in which that expansion has begun.

The Observable Universe

The Observable universe is composed by galaxies and other objects which can be seen from the Earth because the light from the objects had time to reach it.

Galaxies: Galaxies are big clusters of stars, gases and interstellar dust. All the galaxy objects are moved because of the other objects gravity force. In addition, there is a movement that makes everything spin around the centre.

Elliptic galaxies: Some galaxies have a global profile completed with a bright core. These galaxies, called elliptic, contain a population of old stars, mostly a little gas and dust, some new formation stars.

Spiral galaxies: Spiral galaxies are flat discs which contain not only some old stars, also big population of young stars, quite gas and dust, and molecular clouds which are the stars place of birth.

Lenticular galaxies: It is an intermediate galaxy among the elliptic and the spiral one. They have a disc shape and have consumed most of their interstellar substance. They have no spiral arms. It seemed to be in their origins spiral galaxies which have lost their interstellar substance as a cause of gravitational interaction with other galaxies.

Spiral barred galaxy: It is a galaxy which posses in its nucleus a central bar of stars along the itself. The bars are relatively common in a galaxy and they affect the movement of the stars, the interstellar gas and the spiral arms.

Irregular galaxies: Irregular galaxies are stars conglomerations and quite small nebulas, generally without a definite shape. They are frequently much brighter than elliptic galaxies with similar size. This is because they are rich in young bright stars, blue or white, due to the gas and the powder they contain are rich in substance for a star formation.

Dwarf galaxies: A dwarf galaxy is one that is composed by several thousand million of stars. This number might seem to be enormous, but in astronomy terms it is very small. These galaxies are the most common ones in the Universe and they frequently orbit around major galaxies.

Quasar: The quasars are galactic with core extremely energetic. The quantity of radiation emitted darken the light from the rest of the galaxy, only throughout special observation the existence of the rest of the galaxy can be revealed. Although, the quasar's nucleus is

extremely small – the size of the Solar System- it emits 100 more times than a whole galaxy. It is thought that quasars are activated by super massive black holes in the galaxies centre. The power radiation we see comes from swirly substance around the black hole and falling into it.

Galaxy clusters: Galaxy clusters are giant structures from the Universe. The galaxies have much gravity. This makes the attraction between closed galaxies forming cumulus. Our galaxy, The Milky Way, is part of a small cluster called **Local Group**. Inside a cluster, the galaxies spin around each others, frequently they crash. The size and mass of a cluster may vary according to the galaxies they formed, but the distance between one extreme and the other is always many millions of light years.

The clusters are composed besides the galaxies by hot big gas clouds which are in general rest of galaxies that die when they crash among themselves. Most of them are part of the clusters substance rather than visible substance.

Superclusters of galaxies: They are groups of clusters galaxies, they are found in the known Universe.

The superclusters of galaxies are joined by their extremes, and formed enormous chains. The gravity in these super clusters is so big that it slows down the Universe's expansion.

Our Local Group is part of Virgo supercluster.

Walls: They are the last discovered structures, the most antique and biggest in the Universe. They form enormous bands of supercluster galaxies.

The Great Walls of Sloan is a superstructure of galactic proportions, consider today the largest structure of the Universe, it was discovered October 20, 2003 by John Richard Gott, an astrophysics professor from Princeton University; and Mario Juric a Croatian astronomer and their colleagues.

The structure of this wall is composed by a wall of galaxy filaments which measure approximately 1.370 million light years.

Invisible Universe: Dark substance is any substance that is part of the universe which physics and astrophysics are not capable to detect with actual instruments. A fourth of the known Universe is dark substance, although some sources calculate that this can reach 80%.

Dark substance does not emit any light. It does not detach any kind of radiation, that is why we cannot see it, but we know that it exists because it emits such a big gravity which makes big galaxy cumulus move.

The composition of the dark substance is still being a mystery.

Observation:

On Thursday 28th, May we made an observation with a telescope at the Dámaso Antonio Larrañaga highschool observatory. That night we could observe the following:

Omega Centauri globular cluster: it is seeing as a smear full of little dots very different from the photos, this bad quality of the sky is a cause of the light pollution.

Venus: We saw like a little moon but yellow and bright, caused by the proximity to the Sun. Venus is considered the Earth's brother, for its size and distance, whereas, its temperature is much higher due to the greenhouse effect due to carbon dioxide existent in the atmosphere.

Moon: It was seeing as in the photos, like a rock full of craters as a cause of meteorites impact.

Saturn: It can be observed very similar to the images regarding its colour and rings.

The Jewel box: it is an opened stellar cluster situated in the Southern Cross, near beta Centauri, full of different colour stars (yellow, orange, red and white).

SOURCES :

<http://www.astromia.com/universo/estructurauniverso.htm>

<http://danielmarin.naukas.com/2011/05/11/la-mayor-estructura-del-universo/>

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