

## Universe junior

The Earth and the other planets, the stars, the galaxies, the space that surrounds them and the energy they produce are all part of what we call the Universe. If we look out of the window, we can see only a microscopic part of the Universe that is immensely big, and at night, in the sky we see many luminous spots: the stars, that look like this because they are very far from us. In the dark, when the sky is clear, we can see a pale whitish light, the Milky Way, an immense luminous strip that is made up of billions of stars. The Milky Way is a galaxy, and the Sun and the Solar System are a part of it.

Almost all the astronomers believe that between 8 and 16 billions of years ago all matter and energy, including space, were concentrated in a single point. Following a very strong explosion, the **Big Bang**, the basic elements of the universe, hydrogen and helium, were freed and they joined in large masses known as galaxies that still today are separating from one another at incredible speeds. When the stars within the galaxies exploded, heavier elements were formed, such as carbon, which is fundamental for life.

The **galaxies** are immense families of stars spread in the infinite space of the Universe. Each galaxy contains many millions of stars and can be of an irregular, elliptic or spiral shape. The galaxies are infinite and can be grouped in clusters. The Milky Way belongs to a cluster of galaxies called Local Group, together with other 25 galaxies like the Large and Small Magellanic Cloud, observed for the first time precisely by Magellan in 1500. The **Andromeda Galaxy**, the largest of our cluster, is so large that it can also be seen with the naked eye in a very dark sky. The light that comes from Andromeda started its journey in space over 2 million years ago, in other words when the first humans lived on this planet. It is said that the Andromeda Galaxy is at a distance of 2 billion light years from the Earth, which is therefore the time that it takes the light from Andromeda to reach the Earth.

The **Milky Way** is a spiral shaped galaxy, 100000 light years long. Its two main arms are made of dust nebulosae and white and blue luminous stars, while yellow and red stars form its nucleus. The Earth is at the end of one of the arms, 30000 light years from the centre: clouds of dust and gas prevent us from seeing the central area of the galaxy. Some astronomers believe that in the centre of the Milky Way there is an enormous object, perhaps a black hole.

In the universe it is possible to see, even with amateur telescopes, the powerful beams scattered in space. These are the **quasar**, such as 3C-273, which is many billion light years distant from the Earth. The astronomers believe it is a black hole in the centre of a faraway galaxy that consumes all the matter around it. The matter that is sucked into the black hole creates an incredible source of energy and emerges as powerful jets of material that are thrown out of the bright nucleus of the galaxy.