

Our Milky Way

Gas, dust, dark matter and 100,000,000,000 stars.

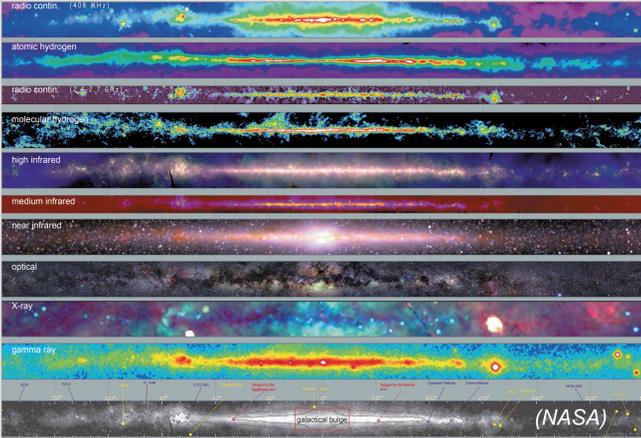


A. Fujii (ESA)

The Milky Way and the Centaurus constellation.

An integral vision

Astronomers are able to take a picture of the disc of our Galaxy in all the wavelengths of the electromagnetic spectrum. The radio waves (top) display the gas, the infrared waves (centre) show us the dust and the gamma rays (bottom) uncover the most violent processes in the Universe. Gaia provides a profound vision in the optical, where stellar light is the main component.



The galactic disc at different wavelengths

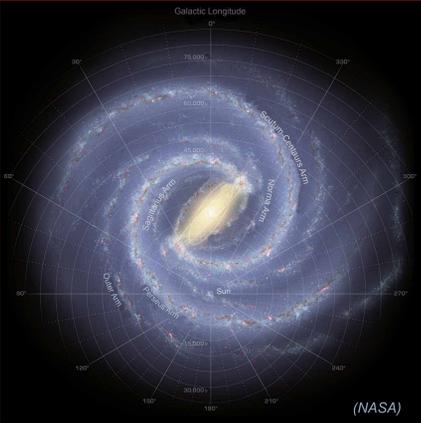
(NASA)

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The rotation of our Galaxy

We still do not know whether the Milky Way has two or four spiral arms and neither do we know exactly how stars react when crossing them. The motion of the stars located thousands of light years from the Sun will help us to unveil how the spiral arms were formed and how they move.

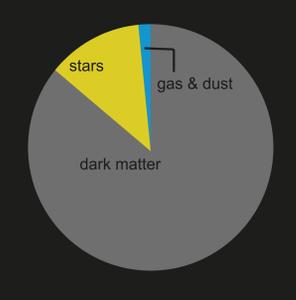


Artist's concept of the disk of our Galaxy.

The Sun is located at about 27,000 light years from the centre of the Galaxy, where a black hole with three million solar masses is located.

Dark matter

With Gaia we can study the distribution of dark matter, the unknown substance that holds galaxies together.



If dark matter does not really exist, we may need to modify the fundamental law of gravity. To observe the motion of the stars is a key for a better understanding of this issue.

Vera Rubin - discoverer of dark matter in galaxies

How do galaxies form?

Gaia will tell us about the age and chemical composition of the stars. This information will help scientists to work out how our Galaxy was formed about 13 billion years ago.

The so-called Millennium Simulation models the dark matter distribution in the Universe, from the Big Bang up to the present day. According to the cosmological models galaxies like ours were formed from condensation processes as illustrated by the figure to the right.

