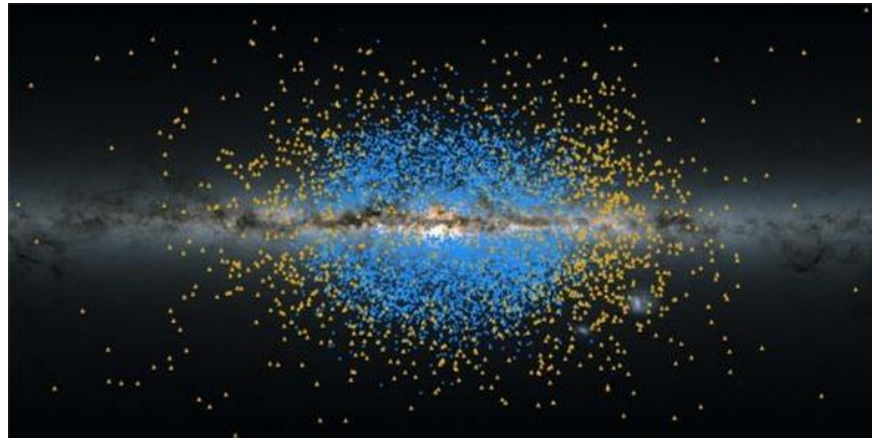


# The galaxy containing Earth has a 'second heart', which is 13 billion years old

The two giant structures Shakti and Shiva may be two of the first 'building blocks' of the Milky Way, the galaxy containing the Earth.

A team of scientists led by Dr. Khyati Malhan and Dr. Hans-Walter Rix from the Max Planck Institute for Astronomy has found two ancient star streams Shakti and Shiva, which served as the original "building blocks" of the galaxy containing Earth. Land.

Scientists used data from the Gaia Sky Mapping Satellite, a powerful space telescope of the European Space Agency (ESA).



According to Sci-News, the two giant star streams are up to 13 billion years old.

And just as the two names were given - Shakti and Shiva are two important gods in Hinduism - over a period of more than 12 billion to 13 billion years ago, they merged into the structure of the early Milky Way and plays a crucial role in helping the galaxy grow rapidly.

Scientists discovered them by chance, unexpectedly. Because the Milky Way has changed significantly since its "inception," finding the original building blocks is almost out of reach.

But despite the passage of time, at the center of the galaxy, two streams of stars still stand out.

"When we visualized the orbits of stars in the region, these two structures stood out from the rest, with a certain chemical composition," Dr. Khyati said.

Dr. Rix further explained that stars belonging to the Shakti and Shiva star lines are so ancient that they lack heavy metal elements - which were only created when the universe was quite old.

They call these two streams of stars - which cluster in the center of the galaxy - the "old and poor heart" of the Milky Way.

According to widely accepted cosmological theories, the early universe consisted of only a few light elements at the top of the periodic table.

The first stars were also made mainly of these elements, so they were extremely poor in metals. But the nuclei of stars themselves are the reactors that help heavier elements to be forged.

At the end of their lives, stars explode and release more heavy elements into the universe. New generations of stars are formed with richer elements and continue to forge new, heavier elements.

It took 13.8 billion years for the universe to be as chemically rich as it is today. So anything so chemically poor, it probably belongs in the early universe.

The discovery of Shakti and Shiva helps scientists further complete the mosaic of the formation of the galaxy containing Earth.

In addition, other previously known pieces that make up the ancient heart of the early Milky Way include Gaia-Sausage-Enceladus, LMS1/Wukong, Arjuna/Sequoia/T'itoi and Pontus.

They are streams of stars, long filaments of gas and dust, generally giant and strange structures compared to what belongs to the modern universe.

All contribute to filling out the family tree and historical pages of the Milky Way, something the Gaia mission has worked hard to build over the past decade.

Max Plack's group's research was published in the scientific journal *Astrophysical Journal*.

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