

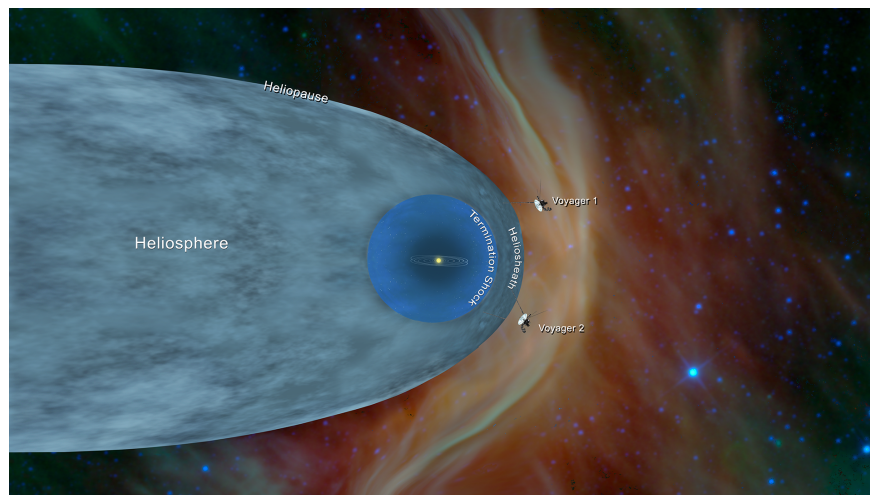
For the first time, NASA successfully built a 3D map of the heliosphere, the 'giant bubble' is protecting the Earth

From the data of the IBEX space telescope, we know how the shield shape protects life.

In 2009, astronomers used NASA's Interstellar Limit Exploration telescope (IBEX) to observe an object in space with a long, curving band structure in the void between the Solar System and distant space. They named this strange object the IBEX Ribbon - IBEX Ribbon.

The ribbon, invisible to both telescopes and the naked eye, is one of the objects that could give us a better idea of the heliosphere, the bubble-like structure made up of the solar wind that wraps around the Solar System.

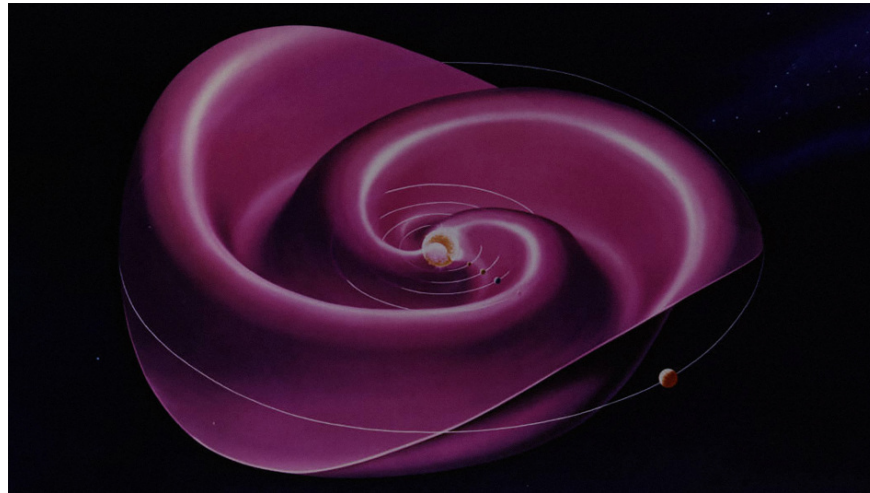
New research published in the journal *Astrophysical Journal* publishes the first computer reconstruction of the IBEX Ribbon, and the newly obtained data will lead to discoveries regarding the Sun's impact on the Earth's planets and nearby celestial bodies.



'Most instruments that detect particles in space will detect the presence of charged particles,' said Daniel Reisenfeld, senior researcher at Los Alamos National Laboratory and lead author of research opinion. However, IBEX is more special than others.

This space telescope can detect energy neutral atoms or ENAs, ions that escape from the Sun, collide with electrons in space, and fall into a neutral state. These atoms are abundant in space, and researchers can use the ENA to image objects in space.

Astronomers have long considered the IBEX Ribbon to be a large band of ENAs glowing in space. Using the IBEX telescope, experts combined ENA data with the transition period of the solar magnetic field (every 11 years) and built a 3D map of the entire heliosphere. According to Professor Reisenfeld, this 'invisible bubble' has been protecting the planets in the System from harmful radiation.



'Our Earth is constantly being bounced off by cosmic rays, galactic rays,' he said. These rays can slightly affect aircraft traveling in the subpolar airspace, especially on routes between Europe, Asia and the Americas. Scientists say that in order to understand the heliosphere of other stars, we must first understand the Sun's heliosphere.

"Science is developing a lot of physical models based on the data obtained from IBEX," said space science professor Nikolai Pogorelov at the University of Alabama, adding that this is not a pilot project. , which will have practical applications.

The map created by Professor Reisenfeld's team is not an exact model of the heliosphere, which is the fulcrum for promoting research related to the Sun. According to scientist Roshanak Hakimzadeh of NASA's heliosphere department, future spacecraft can build on today's success of IBEX to learn more about the Sun's rotation, detect solar storm flares and space weather prediction.

It is unclear whether today's effort to study the Sun will help us understand the nature of the universe, but at least these are important facts that help us predict the evolutionary path of the central star that supports life. exist.

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