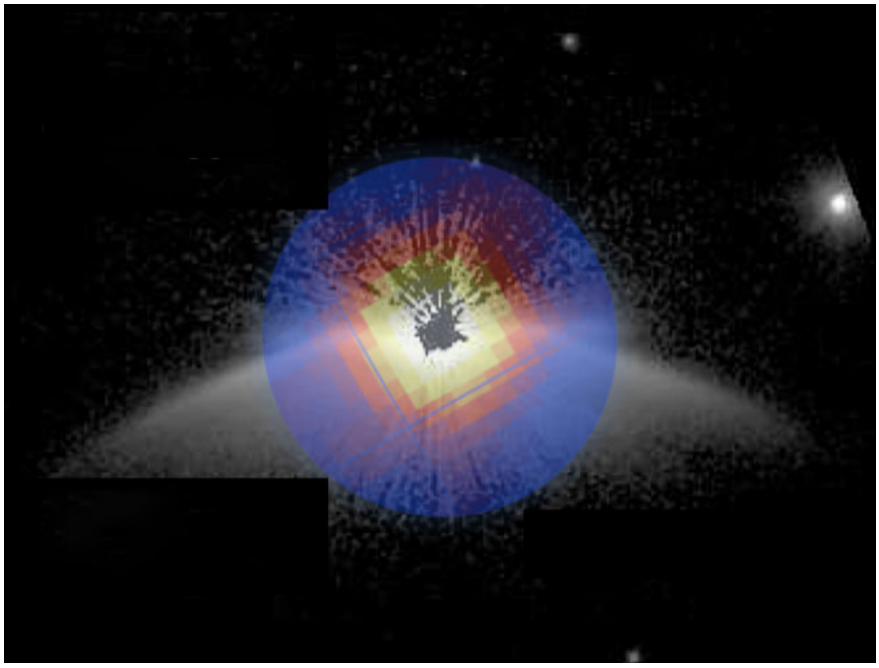
Astronomers discover first celestial sphere around a sun-like star

For the first time in history, astronomers have discovered a celestial sphere around a star that possesses many similar characteristics to the sun.

This bubble of hot gas is blown by a star's stellar wind, creating a continuous stream of charged particles that all stars naturally emit. For our sun, this bubble of hot gas is called the heliosphere, which is filled with solar plasma and extends approximately 20 times the radius of the Sun to the outer edges of the solar system. The heliosphere marks the edge of our solar system and protects the planets from most of the dangerous high-energy cosmic rays that pass through the Milky Way.

In the past, astronomers have observed similar bubbles around hot stars, as well as dying and even newly formed stars — but they were all non-sun-like stars. So this new discovery by a team of astronomers operating the Chandra X-ray Observatory is a huge step forward and is already generating a lot of interest.

Researchers pointed the Chandra X-Ray Observatory at the star, known as HD 61005. The star is nicknamed The Moth because it is surrounded by a backward-swept disk of debris that resembles wings. Astronomers believe the strange shape is due to the star plunging into a dense gas cloud in space at a speed of about 10 kilometers per second.



The Moth is similar in size and mass to the sun, so "it's a relatively typical example to study. However, it's worth noting that this is a star that's only 100 million years old, which is much younger than our 4-billion-year-old sun. Younger stars tend to be more active and emit larger solar winds than older stars. That difference, combined with the star's movement through the interstellar medium, makes scientists think The Moth is a good target to search for and study the celestial sphere.

Observations showed that Moth was surrounded by a halo of X-ray light that extended 100 times farther from the star than the Earth is from the Sun. Scientists said the light was the asthenosphere.

Surprisingly, this bubble is circular rather than wing-shaped. This means that the wind is so strong that it pushes more out of the dense gas cloud than the cloud pushes back, like a thick balloon moving through thin air.

Studying the asthenospheres of other Sun-like stars can tell us what the Sun was like when it was young. In other words, the asthenosphere tells us about the Sun's history.