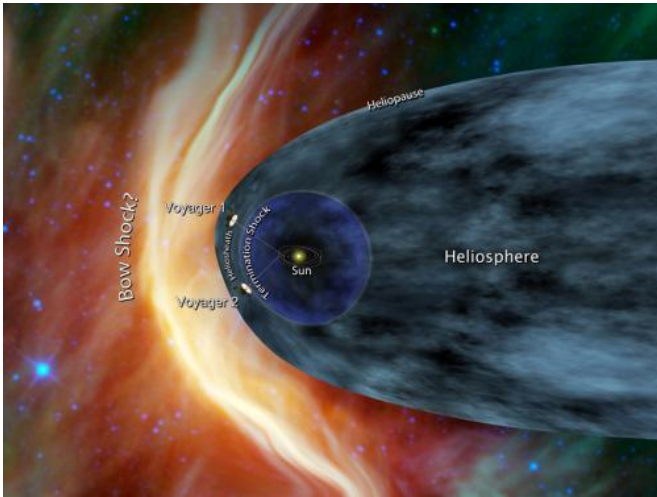


Data from Voyager 1 point to interstellar future

15 June 2012, By DC Agle and Dwayne Brown



This artist's concept shows NASA's two Voyager spacecraft exploring a turbulent region of space known as the heliosheath, the outer shell of the bubble of charged particles around our sun. Credit: NASA/JPL-Caltech

(Phys.org) -- Data from NASA's Voyager 1 spacecraft indicate that the venerable deep-space explorer has encountered a region in space where the intensity of charged particles from beyond our solar system has markedly increased. Voyager scientists looking at this rapid rise draw closer to an inevitable but historic conclusion - that humanity's first emissary to interstellar space is on the edge of our solar system.

"The [laws of physics](#) say that someday Voyager will become the first human-made object to enter [interstellar space](#), but we still do not know exactly when that someday will be," said Ed Stone, Voyager project scientist at the California Institute of Technology in Pasadena. "The latest data indicate that we are clearly in a new region where things are changing more quickly. It is very exciting. We are approaching the solar system's

frontier."

The data making the 16-hour-38 minute, 11.1-billion-mile (17.8-billion-kilometer), journey from Voyager 1 to antennas of NASA's [Deep Space Network](#) on Earth detail the number of charged particles measured by the two High Energy telescopes aboard the 34-year-old spacecraft. These energetic particles were generated when stars in our cosmic neighborhood went supernova.



Artist's concept of NASA's Voyager spacecraft. Credit: NASA/JPL-Caltech

"From January 2009 to January 2012, there had been a gradual increase of about 25 percent in the amount of [galactic cosmic rays](#) Voyager was encountering," said Stone. "More recently, we have seen very rapid escalation in that part of the [energy spectrum](#). Beginning on May 7, the cosmic ray hits have increased five percent in a week and nine percent in a month."

This marked increase is one of a triad of data sets which need to make significant swings of the needle to indicate a new era in space exploration. The second important measure from the spacecraft's two telescopes is the intensity of

energetic particles generated inside the [heliosphere](#), the bubble of charged particles the sun blows around itself. While there has been a slow decline in the measurements of these [energetic particles](#), they have not dropped off precipitously, which could be expected when Voyager breaks through the solar boundary.

The final data set that Voyager scientists believe will reveal a major change is the measurement in the direction of the magnetic field lines surrounding the spacecraft. While Voyager is still within the heliosphere, these field lines run east-west. When it passes into interstellar space, the team expects Voyager will find that the magnetic field lines orient in a more north-south direction. Such analysis will take weeks, and the Voyager team is currently crunching the numbers of its latest data set.

"When the Voyagers launched in 1977, the space age was all of 20 years old," said Stone. "Many of us on the team dreamed of reaching interstellar space, but we really had no way of knowing how long a journey it would be -- or if these two vehicles that we invested so much time and energy in would operate long enough to reach it."

Launched in 1977, Voyager 1 and 2 are in good health. Voyager 2 is more than 9.1 billion miles (14.7 billion kilometers) away from the sun. Both are operating as part of the Voyager Interstellar Mission, an extended mission to explore the [solar system](#) outside the neighborhood of the outer planets and beyond. NASA's Voyagers are the two most distant active representatives of humanity and its desire to explore.

The Voyager spacecraft were built by NASA's Jet Propulsion Laboratory in Pasadena, Calif., which continues to operate both. JPL is a division of the California Institute of Technology. The [Voyager](#) missions are a part of the NASA Heliophysics System Observatory, sponsored by the Heliophysics Division of the Science Mission Directorate in Washington.

Provided by JPL/NASA

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