A team of researchers with members from Princeton University, the University of Texas at San Antonio, the University of Waikato, Los Alamos National Laboratory and the Southwest Research Institute has discovered rippled structures in the part of space at the boundary of the solar system. In their paper published in the journal *Nature Astronomy*, the group describes analyzing data from Voyagers 1 and 2 and also from NASA's Interstellar Boundary Explorer (IBEX), which circles the Earth, to learn more about the nature of space at the boundary of the solar system.

Prior research has shown that, at the edges of the solar system, there is a point at which the solar wind slows to a speed at which sound can travel—it is called the termination shock. Prior research has also shown that there exists a point where the solar wind becomes incapable of pushing back against pressure exerted by interstellar space—it is called the heliopause. Both of the Voyager space probes have pushed through this boundary and into interstellar space. And as they did so, they sent back sensor data. Also, NASA launched IBEX into orbit back in 2009—its purpose is to study the characteristics of the boundaries of the solar system.

By analyzing data from all three sources, the researchers noted a sudden change in pressure exerted by the solar wind in 2014, and used the relatively short time scale of the event to study the shape of the heliopause and termination shock. They were able to measure the energized neutral atoms that came about when the solar wind was colliding with the interstellar wind.

Since some of the atoms managed to escape into interstellar space and others were bounced back into the solar system, the researchers were able to use the data as a form of cosmic echolocation. When modeled, the researchers found that huge ripples were formed in the boundary areas. They also found major shifts in the distance to the
heliopause, suggesting that its shape was not uniform and that it was continually changing for unknown reasons.

The researchers hope to learn more about the boundary of the solar system using data sent back to Earth from a new probe set to launch in 2025—it will be capable of sending back measurements of neutral atom emissions with higher precision.


© 2022 Science X Network