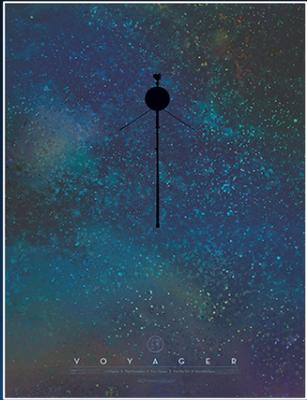


NASA Celebrates Voyager and NASA IBEX Study Reveals New Dynamics of the Heliospheric Boundary

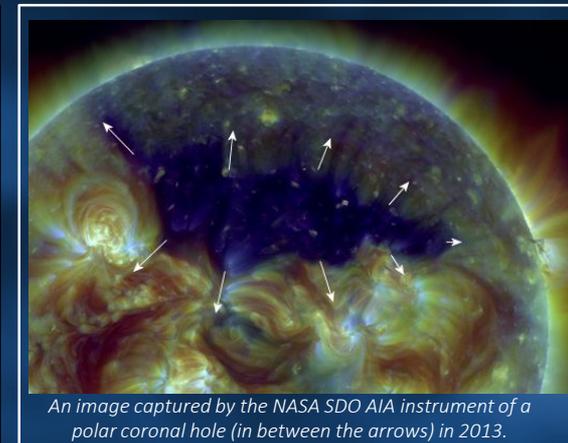


September 5, 2017 marked the **40th anniversary** of the 1977 Voyager 1 spacecraft launch. Voyager 2 was launched on August 20, 1977. Although Voyager 1 was launched a few weeks after Voyager 2, it quickly sped ahead of Voyager 2 in space and today is the farthest spacecraft from Earth at **13 billion miles**. Voyager 2 is the second farthest, with both spacecraft venturing where no human-made object has ever gone: into interstellar space. Voyager 1 is already outside the heliosphere. Voyager 2 is not far behind, approaching the heliopause, *the critical boundary separating the solar wind from interstellar space*.

The NASA Heliophysics Interstellar Boundary Explorer (IBEX) mission, launched in 2008, is the first spacecraft designed to collect data across the entire sky about the heliosphere and the solar system's boundary with interstellar space. A recent analysis of IBEX data has shown how the heliosphere "reacts" to the changes in polar coronal holes, which change in size with the 11-year solar cycle.

A study by a team of scientists led by **Dr. Eric Zirnstein of Princeton University** analyzed IBEX observations of Energetic Neutral Atoms (ENAs) collected between 2009 and 2015 over a range of energies (speeds of ~350 to 900 km/s). The team was able to track the Sun's polar winds as they traveled out to the outer heliosphere, where they interacted with hydrogen atoms, creating ENA's speeding back into the heliosphere towards the Sun.

Analysis of IBEX data reveals it takes the solar wind near the Sun **around two to three years** to travel out to the heliosphere and then back toward the Sun to be seen in the data as ENAs. In turn, the extent of the polar heliosphere expands and shrinks with changes at the Sun. These findings are generally consistent with Voyager observations. IBEX observations also independently confirm previous measurements made by the ESA/NASA SOHO and NASA's SDO missions indicating that the Sun's northern and southern polar coronal holes are evolving *slightly out-of-sync*.



An image captured by the NASA SDO AIA instrument of a polar coronal hole (in between the arrows) in 2013.

On September 5, 2017, Eric Zirnstein elaborated on how the Voyager mission impacted his career in space science as a panelist at an event at **the iconic Smithsonian Air and Space Museum in Washington D.C.** honoring the mission's 40th anniversary. Ed Stone, the Voyager Project Scientist and also a panelist, identified *Voyager's legacy as humanity's most ambitious mission of discovery*. Thomas Zurbuchen, the NASA's Associate Administrator for Science, remarked on how the mission not only changed what we know but also how we think about space. Voyager mission team members and collaborators, as well as others who've led Voyager-inspired careers, spoke at the event.

Even Hollywood celebrity, **William Shatner**, well-known for his role in the legendary Star Trek series, made a virtual guest appearance. From NASA JPL, "Captain Kirk" participated in the transmittal of a message to Voyager 1 chosen by public vote *from a narrowed-down list of over 30,000 tweets* submitted: **"We offer friendship across the stars. You are not alone."** Congratulations to Oliver Jenkins, who wrote that message and congratulations to the many scientists, engineers and explorers who have participated in the evolution of Voyager, **the world's farthest and longest-lived mission**.