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NASA'S IBEX MISSION RELEASES FIRST MAPS OF SOLAR SYSTEM'S EDGE, MAKES UNIQUE DISCOVERY

Mission E/PO Lead Chicago's Adler Planetarium Interprets Exciting Mission Findings for Public

CHICAGO (OCTOBER 15, 2009) – For the first time ever, all-sky maps of our Solar System's boundaries have been created and the first heliospheric results, produced by NASA's Interstellar Boundary Explorer (IBEX), were released in Washington, DC today to the scientific community and public. These maps, which will forever change the way we look at our Galaxy, revealed surprising interactions between our Solar System and interstellar space. The Adler is the IBEX mission's lead Education and Public Outreach partner.

WHAT IS IBEX

IBEX is a NASA Small Explorers Spacecraft with the mission of mapping the boundary between our Solar System and the rest of the Milky Way Galaxy. Currently on a two-year mission, IBEX is orbiting in an elliptical path around the Earth, measuring Energetic Neutral Atoms (ENAs) coming from the edge of the Solar System. Using advanced detector technology, the IBEX team creates maps of interactions between the solar wind flowing outward from our Sun and the interstellar medium, the low-density material between the stars outside of our Solar System. The boundary region where the solar wind and the interstellar medium collide forms a protective bubble around our Solar System called the heliosphere. IBEX will enable researchers to learn more about the outer heliosphere and the charged particles in this region.

MISSION UPDATE

Since its launch last October, IBEX has used two specially-developed ENA detectors to map the heliosphere's global interaction. These energy-resolved maps provide detailed information about this interstellar interaction. ENAs propagate toward Earth from all parts of the boundary and by detecting their directions of arrival, IBEX builds up maps of this invisible region over a broad range of energies every six months.

WHAT THEY FOUND

The first results are summarized in five papers published online today by *Science* magazine. They chronicle the remarkable discovery of a bright, narrow band of ENA emissions that was totally unpredicted by any previous theories or models. The ribbon appears to be shaped by the external magnetic field in the interstellar medium, which imprints our heliosphere in a very strong, but not yet understood way.

"Together, these remarkable observations show just how little we currently understand about the outer reaches of our heliosphere and our place in the Galaxy," said Paul H. Knappenberger Jr., Ph.D., president of the Adler Planetarium. "This discovery is an exciting one for the Adler, the IBEX mission's lead Education and Public Outreach partner. In this role, the Adler is interpreting the mission's findings and results to the general public, helping people understand the process of research – and the surprising results that can occur as a result of science in action."

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Scientists involved with this project created some models of what this boundary might look like based on limited knowledge of this region. However, the new data gathered from IBEX contained a surprise. A completely unexpected feature of the boundary was detected, which can be seen as a prominent ribbon across the 3-D map.

WHAT DOES THIS DATA MEAN AND WHY IS IT IMPORTANT

The heliosphere is like a protective cocoon being inflated in the interstellar medium by the Sun's million miles per hour solar wind. As our Sun orbits the center of the Galaxy every 225 million years, it bobs in and out of the disk of the Galaxy like a horse on a merry-go-round. As it does this, it passes through areas of the interstellar medium that are more and less dense, causing the heliosphere to change in shape and size. Denser areas can compress the heliosphere, while less dense regions allow the bubble to expand. In addition, the strength of the solar wind varies over the Sun's cycle, "breathing" periodically.

"The heliosphere is our home in the Galaxy, and understanding how it protects us as we orbit the center of the Milky Way is important as we plan future space travel beyond Earth," said Lindsay Bartolone, associate director, NASA Forum Programs & IBEX E/PO lead. "Understanding how all of these things affect the heliosphere is important so we can better understand how the heliosphere protects us."

The heliosphere is a crucial layer of protection against dangerous cosmic rays that are harmful to living things. As cosmic rays approach the heliosphere, they are deflected, and the majority of them are not able to pass into the inner Solar System. Fortunately, our Earth's magnetic field is usually able to shield life on Earth from the remaining cosmic rays. However, astronauts on deep space missions cannot bring the Earth's protection with them. A recent surge in cosmic ray intensities has been observed by other NASA missions, making it even more important to better understand the heliosphere's ability to shield us from cosmic rays. We must also consider how the heliosphere will protect us in the distant future or how it did protect us in the past. Understanding the heliosphere and how it protects us is part of understanding our home in the Galaxy.

WHAT COMES NEXT

Scientists are now working to explain why this feature is located where it is and what causes it. Preliminary analysis suggests that this feature is produced by a magnetic field in our part of the Milky Way Galaxy. IBEX produces new maps of the boundary area every six months; so future mappings should better enable us to understand this surprising feature.

LEARN MORE ABOUT IBEX AT THE ADLER

Earlier this year, the Adler debuted a planetarium show about the IBEX mission, along with related educational materials and activities. The show now has an added feature to illustrate this discovery. Other planetaria also run the Adler's IBEX show, and they will be receiving updated maps based on IBEX data to allow those shows to be updated as well.

IMAGES AND WHERE YOU CAN GO TO FIND MORE IBEX INFORMATION

www.adlerplanetarium.org
www.nasa.gov/mission_pages/ibex/allsky_map.html
www.nasa.gov/ibex
www.ibex.swri.edu/

About the IBEX Mission
IBEX is the latest in NASA's series of low-cost, rapidly developed Small Explorers space missions. Southwest Research Institute in San Antonio, TX, leads and developed the mission with a team of national and international partners. NASA's Goddard Space Flight Center in Greenbelt, Md., manages the Explorers Program for NASA's Science Mission Directorate in Washington.

About the Adler Planetarium
The Adler Planetarium – America's First Planetarium – was founded in 1930 by Chicago business leader Max Adler. Following its 75th anniversary, the Adler has begun a transformation into the world's premier space science center, inspiring the next generation of explorers by sharing the personal stories of human space exploration and America's space heroes. The Adler is a recognized leader in science education, with a focus on inspiring young people to pursue careers in science. Learn more at www.adlerplanetarium.org.

Location and Travel Information
The Adler Planetarium is located at 1300 South Lake Shore Drive on the shores of Lake Michigan on Chicago's beautiful Museum Campus. Exit Lake Shore Drive at 18th Drive, continue north on Museum Campus Drive. Then veer right on Solidarity Drive. Parking is available in the lot adjacent to the Adler. Parking lot only accepts cash. Check www.soldierfieldparking.com for information about large Museum Campus events that may impact parking availability. The Adler is serviced daily by CTA #146 bus. Metra Electric and South Shore trains stop at nearby Roosevelt Road station. CTA Red, Green and Orange lines are approximately a one-mile walk from the Museum Campus.

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