IBEX Observations and Simulations of Energetic Neutral Hydrogen from the Heliosphere

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The heliosphere is a dynamic region of space spanning hundreds to possibly thousands of astronomical units in size, created by the outflow of solar wind plasma and its interaction with the partially-ionized local interstellar medium. The solar and interstellar plasmas are separated by a tangential discontinuity known as the heliopause, but interstellar neutral atoms permeate the boundaries of the heliosphere and interact with the solar wind, generating energetic neutral atoms (ENAs). Hydrogen ENAs are created when relatively energetic protons from the heliospheric plasma charge-exchange with interstellar hydrogen atoms. Due to their large mean free paths, ENAs can propagate large distances before ionizing and can be detected at 1 AU. NASA's Interstellar Boundary Explorer (IBEX) mission is aimed at improving our understanding of the heliospheric interface. Launched in 2008, IBEX continues to measure fluxes of hydrogen ENAs at 1 AU that are created from the solar-interstellar interaction, as well as interstellar neutral atoms that permeate the heliospheric boundary. In this talk I will briefly discuss IBEX observations of ENAs, results from simulating ENA fluxes at 1 AU derived from a three-dimensional MHD-plasma/kinetic-neutral simulation of the heliosphere, and some key properties we have learned about the solar-interstellar interaction.