

Interstellar boundary explorer (IBEX) overview and recent results

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The Interstellar Boundary Explorer (IBEX) has now operated in space for over seven years and returned nearly continuous observations of the Energetic Neutral Atoms (ENAs) with energies from 0.1 to 6 keV, emanating in for the outer heliosphere. Here we review the review IBEXs scientific discoveries that have reshaped our entire understanding of the outer heliosphere and its interaction with the local interstellar medium. IBEX observations have underlined the absolutely critical role of suprathermal ions in dominating the internal pressure and thus plasma processes in the inner heliosheath plasma between the termination shock and heliopause, as well as informing the interaction beyond the heliopause, well out into the local interstellar medium. IBEX provides the only global observations of the particle distributions in the outer heliosphere, and thus is a unique resource for understanding the plasmas in these key regions. Finally, with over half a solar cycle of observations, IBEX has now measured significant time variations in the ENA fluxes from the outer heliosphere and shown that the Ribbon has evolved differently than the globally distributed flux (GDF), suggesting different sources, or at lease sources at different distances. In these observations, ENAs from the GDF have leveled off and even partial recovered, owing to solar wind output flattening and recovery several years prior. The Ribbon exhibits a greater time delay than for the surrounding GDF and has lost its energy-latitudinal ordering, which reflects the breakdown of solar minimum solar wind conditions. Together, the IBEX observations strongly support a secondary ENA source for the Ribbon, which we now adopt as the nominal explanation of the Ribbon. These and other discoveries from IBEX will be summarized in this talk.

[1] McComas et al., ApJ Supp (2017), In press.