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Imaging the Global Interaction between the Heliosphere and the Interstellar Medium with IBEX

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The solar wind carves out a large void - the heliosphere - into the surrounding interstellar plasma. Because the sun moves relative to the local interstellar cloud at ≈ 26 km/s an interstellar wind of neutral gas blows through our solar system, and in spite of the large size of the helio-sphere we can probe this flow for He and O near Earth. At a distance of about 100 AU the solar wind slows down to subsonic speed through interaction with the interstellar medium, thus forming the termination shock. Here ions are accelerated efficiently, preferably those created from inflowing interstellar gas and then picked up by the solar wind. Through charge exchange with interstellar gas atoms these accelerated ions form energetic neutral atoms (ENA), which - if re-released towards the Earth - will arrive on a straight trajectory, carrying with them the information about the energy spectra and spatial distribution of the energetic ions at the termination shock. Two highly sensitive ENA cameras on the Interstellar Boundary Explorer (IBEX) will capture the interstellar O flow and take ENA images of the termination shock over the energy range 10 - 6000 eV for the first time. These observations will provide insight into the interaction of the heliosphere with the interstellar medium in the mutual boundary region as well as into the nature of the termination shock and its global structure.