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Energetic neutral atom imaging of the magnetospheric cusps and upstream regions

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In this study we describe remote sensing of the magnetospheric cusps and boundaries via neutral atoms as observed by the Interstellar Boundary Explorer (IBEX). The energetic neutral atom (ENA) emission is the result of charge-exchange between hydrogen and oxygen ions and the geocorona. Orbit-to-orbit intensity and energy variations are described in terms of solar wind conditions. Northern and southern cusps are observed simultaneously, so that hemispheric differences are readily observed. The summer hemisphere always appears brighter in ENA emission than the winter hemisphere. Hemispheric differences of ENA emission are also compared with in situ observations and models of magnetic reconnection. In addition, the ENA emission is used to examine the width of the magnetosheath, as well as bow shock structure and acceleration of particles upstream into the foreshock region.