

Exploring the solar system galactic frontier from 1 AU

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The region where the expanding solar wind meets the surrounding galactic medium remains poorly explored. Its structure and the physical processes at this solar system galactic frontier are of fundamental importance for understanding the interaction of our star, the Sun, with the galactic medium. Only one and one half years ago Voyager 1 reached the termination shock at 94 AU and entered the slowed down solar wind, probing the frontier region in one point-direction. The sheer size of the essentially asymmetric heliosphere calls for remote techniques to probe its global three-dimensional properties. This presentation describes two experimental approaches for probing the solar system galactic frontier from 1 AU. Imaging in fluxes of energetic neutral atoms (ENAs) will determine the nature of the termination shock and the properties of the solar plasma in the heliospheric sheath. Then, imaging of the heliosphere in extreme ultraviolet (EUV) will map the heliopause and reveal the three-dimensional flow pattern of the solar wind. A NASA mission, Interstellar Boundary Explorer (IBEX), will image the heliosphere in ENA fluxes in 2008. The efforts in EUV mapping of the heliopause presently focus on development of the mission concept and enabling instrumentation.