

Contribution of pickup ions to the radial profile of the heliosheath

Ken Tsubouchi[1]

[1] The University of Electro-Communications

The heliosheath (HS) is the two-layered region beyond the solar wind termination shock (TS). The inner heliosheath (IHS) is filled with solar wind plasmas, heated and decelerated at the TS, whereas the outer heliosheath (OHS) consists of interstellar medium (both plasmas and neutral atoms). The heliopause is the interface between the IHS and the OHS. The presence of a large amount of pickup ions (PUIs) gives distinct properties to the HS environment. Recent in-situ observations by Voyager 1/2 and measurements of ENA emission from the heliospheric boundary by IBEX have indeed suggested the significance of the PUI dynamics, e.g., its predominance of energy density in the HS. In this study, we have demonstrated numerical simulations using a hybrid code to investigate the consequence of interaction between the solar wind and interstellar plasmas, where PUIs are initially present only in the solar wind. We have confirmed the formation and growth of the TS and HP simultaneously, and identified that the inclusion of PUIs enlarges the radial depth of the IHS. We will further examine the dependence of the HS properties on the density ratio of PUI, the type of the initial PUI velocity distribution, and the magnetic field direction with respect to the TS/HP surfaces.