

R007-P05

ポスター 2 : 11/25 AM1/AM2 (9:00-12:00)

#坪内 健¹⁾

⁽¹⁾ 電気通信大学

Polytropic characteristics around the termination shock

#Ken Tsubouchi¹⁾

⁽¹⁾The University of Electro-Communications

The magnetohydrodynamic description of the behavior of solar wind plasmas primarily assumes a polytropic nature between pressure and density. Proper evaluation of the polytropic index is crucial for understanding the thermodynamic properties of the plasma. Since the solar wind can generally be considered adiabatic as it propagates through space, a polytropic index of $5/3$ is frequently applied, such as in calculating the Rankine-Hugoniot relations for shock waves. However, this is not always evident in observations. In the outer heliosphere, the contribution of pickup ions (PUIs) to energy density becomes dominant, leading to cases where the index deviates from $5/3$. The presence of PUIs significantly affects the thermodynamic properties of the plasma in terms of additional heating due to the excitation of plasma instabilities and energy redistribution at the termination shock. We quantitatively evaluate this influence using a polytropic index derived from hybrid simulations about the termination shock in this study. We aim to verify the unique polytropic characteristics specific to the heliospheric boundary region, where particular attention is paid to its correlation with the PUI density by applying the different indices between the solar wind and PUI, as well as between the upstream and downstream.