[구SE-25] Properties of plasmas associated with fluctuations in the upstream of Earth's bow shock

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Various electromagnetic fluctuations are observed in the upstream of Earth's bow shock. Properties of plasmas are important in determining the development of the fluctuations. In this study we analyze the phase space distribution functions of plasmas measured by the Cluster spacecraft to understand how the fluctuations develop. Plasmas in the upstream of Earth's bow shock often consist of multiple components, especially when the fluctuations exist. In addition to the solar wind beams, backstreaming ion beams and diffuse ions are also often observed separately or simultaneously. The solar wind beams are not much perturbed even within the fluctuations. The diffuse ions are more than 10 times hotter than the solar wind beams and the backstreaming beams intermediate between them. The distribution functions of the diffuse and backstreaming ions are anisotropic to the magnetic field. Thus, they may be responsible for the fluctuations associated with temperature anisotropy. We will discuss about the thermalization processes and the relationship between the fluctuations and plasmas.

[구SE-26] Statistical Comparison of ULF wave Power of Magnetic field between the upstream solar wind and the magnetosheath: THEMIS observations

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We statistically examined ULF Pc 3-5 wave power in the regions of undisturbed upstream solar wind, quasi-parallel shock (and foreshock), quasi-perpendicular shock, and the magnetosheath to understand how and to what extent the wave power changes as the solar wind propagates to the magnetosheath. For this study, we used the magnetic field data from the THEMIS spacecraft and Wind (as shifted to the bow shock nose) for May-November in 2008 and 2009. The statistical results show that, in the case of the Pc5 wave power, the sheath power is roughly proportional to the upstream power for both quasi-parallel (and foreshock) and quasi-perpendicular shock regions. Also we identified undisturbed upstream condition from WIND as being well away from foreshock region, and found that the sheath power can be larger for quasi-parallel shock region by a factor of 5-15 than for quasi-perpendicular shock region. In the cases of Pc 3 and Pc4 waves, we found the higher sheath power when associated with the foreshock than with the quasi-perpendicular shock region.