CHARACTERIZATION OF MAGNETIC FLUCTUATIONS AND PLASMA PROPERTIES IN THE MAGNETOSHEATH

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Abstract: In nearly collisionless space plasmas the velocity distribution function usually exhibits a variety of non-thermal features that deviate from thermal equilibrium. These deviations from equilibrium provide a local source for electromagnetic fluctuation emissions, including the commonly observed electron whistler-cyclotron and firehose instabilities at electron scales. The NASA Wind mission is one of the most successful spacecraft that has monitored the solar wind near the Earth during the last 25 years. Since its launch in late 1994, and until now has been used for the scientific community to study space plasma physics in wide variety of works. Among them, studies on the relationship between temperature anisotropy and plasma beta measurements, and magnetic fluctuations, have provided a nice picture of the regulation of the macroscopic properties of the solar wind due to collisionless kinetic micro instabilities, specially at 1AU from the Sun. Similar studies have shown that the situation is similar when considering plasma and magnetic fields observations in the inner magnetosphere and the plasma sheet. Here, considering observations of the Wind spacecraft on orbital segments inside the Earth's Magnetosheath, we explore the same characteristic relation between anisotropy, beta and magnetic fluctuations in the turbulent region between the magnetopause and the solar wind bow shock [1,2]. We hope our results to be useful for the understanding of nearly collisionless plasmas in other space and astrophysical environments.

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References:

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