

# Potential structures of electrostatic solitary waves observed in the ion foreshock region

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Electrostatic Solitary waves (ESW) are frequently observed in several regions such as the earth's magnetotail, polar magnetosphere and bow shock transition. They are also observed in the foreshock region. We focus on the observations of ESW by the GEOTAIL spacecraft in the foreshock region. We find several types of ESW in the ion foreshock region. Occurrences of ESW correlate with non-thermal ions reflected by the bow shock. In order to understand the wave features of ESW in the foreshock region, we conducted the statistical analyses based on the GEOTAIL waveform data and perform the analyses of the spatial distribution of ESW. The results show occurrences and amplitudes of ESW are decreases depending on the distance from the bow shock transition. We also found the angle between the magnetic field and the shock normal and Mach number dependence of the occurrence of ESW in the ion foreshock region. In the present paper, we discuss the generation of ESW comparing the observation results in the ion foreshock region.