



Cluster Observations of Whistler Waves and Associated Non-Maxwellian Velocity Distributions

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Using Cluster spacecraft data, we present simultaneous observations of whistler waves and associated electron velocity distributions from the Earth's plasma sheet during a substorm. The observed whistler waves are right-handed circularly polarized waves propagating quasi-parallel to the ambient magnetic field with frequency $f < f_{ce}$, where f_{ce} is the electron cyclotron frequency. These whistler waves are associated with the density humps and magnetic field depressions and play a significant role in transporting the energy to the ionosphere. The

observations of electron velocity distributions exhibit a flat-top nature at low energies, accompanied by a high-energy tail, suggesting that strong electron heating occurs in the parallel direction. The observed flat-top distributions are fitted by the generalized (r,q) distribution function and the distributions with high energy tails are fitted by the kappa distribution.

References

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