

Cluster observations of equatorial magnetosonic waves with small inter-satellite separation

*Michael A Balikhin¹, Simon N Walker¹

1.University of Sheffield

The Cluster mission conducted the Inner Magnetosphere Campaign to probe the emissions that play key roles in the dynamics of energetic electrons in the outer radiation belt. We present the results of this campaign related to the equatorial magnetosonic waves. The wave and plasma data obtained in the wave generation region enabled the validation of the model for the wave generation.

Simultaneous measurements of these waves by the Cluster 3 and 4 spacecraft have been used to identify, directly from data, their dispersion relation. The equatorial magnetosonic waves possess a discrete spectrum, consisting of emissions at harmonics of proton gyro-frequency. It is shown that the resonance overlap criterion is fulfilled, and therefore the discrete wave spectrum can be approximated by the continuous spectrum within the quasilinear approach. The results of the Cluster Inner Magnetosphere Campaign related to other wave modes are also reviewed

Keywords: equatorial magnetosonic waves, radiation belts, wave-particle interaction