

DISPERSION RELATION OF ELECTROMAGNETIC ION CYCLOTRON WAVES USING CLUSTER OBSERVATIONS

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Abstract. Multi-point wave observations on Cluster spacecraft are used to infer the dispersion relation of electromagnetic ion cyclotron (EMIC) waves. In this study we use a phase differencing method and observations from STAFF and WHISPER during a well-studied event of 30 March 2002. The phase differencing method requires the knowledge of the direction of the wave vector, which was obtained using minimum variance analysis. Wave vector amplitudes were calculated for a number of frequencies to infer the dispersion relation experimentally. The obtained dispersion relation is largely consistent with the cold plasma dispersion relation. The presented method allows inferring the dispersion relation experimentally. It can be also used in the future to analyse the hot plasma dispersion relation of waves near the local gyrofrequency that can occur under high plasma beta conditions.