



The distortion of the ULF wave signal in low Earth orbit

Jiwon Choi¹ and Dong-Hun Lee¹

¹ School of Space Research, Kyung Hee University
e-mail : jw.choi@khu.ac.kr

Transverse ultra-low frequency (ULF) waves are often of one-dimensional nature along the magnetic field lines. When low Earth orbit (LEO) satellites move across these field lines, they should observe different (transverse) wave trains in time from the different magnetic shells. We conduct MHD wave simulations to investigate the phase shear effect that causes such distortion of ULF waves when measured by LEO satellites. We have imbedded various observers (virtual spacecraft) in our model to measure the electric field and magnetic field as they move at different locations. Our results show that the arrival time of compressional component is insensitive to the speed of the observers. By contrast, the waveform and arrival time of transverse component vary significantly depending on the direction and speed of

observers. It is suggested that the signal distortion at the LEO satellite observations can cause serious differences among ground-based and satellite observations.

References

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