# Magnetoacoustic Surface Waves on the Interplanetary Directional Discontinuities

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Theoretical investigation of magnetoacoustic surface waves on the interplanetary directional discon-tinuities (DDs), the plasma and the magnetic structures of which have been clearly delineated by the WIND and the IMP-8 satellites, is undertaken in this paper. The pressure anisotropy of the plasmas on both the sides of the discontinuities have been taken into account. Single fluid, double-polytropic MHD approximation is employed here to arrive at the dispersion relation governing various wave-modes on the discontinuities. The magnetosonic modal structure revealed here by the dispersion relation is found to be somewhat similar to the modal strucutre obtained earlier by using the usual adiabatic MHD approximation except the fact that the nature and the existence of the waves now
depend on the values of the double-polytropic exponents used for the MHD closure.

The properties of the magnetoacoustic waves that are discussed in this paper may be tested in high resolution, multispacecraft observations such as the ones presently undertaken by the cluster mission. Study of such waves on the interplanetary DDs is important as it may help in correctly identifying the DDs as the tangential (TD), rotational (RD) or other types of discontinuities. Such identification may, in turn, shed some light on the nature of structuring of the interplanetarty magnetic field (IMF). Calculations presented in this paper may also help in determining the intrinsic thermodynamic characterisitcs of the plasma around the interplanetary discontinuities.

Keywords : Magnetoacoustic surface waves; Directional discontinuity; IMF; Double-polytropic MHD; Dispersion relation

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