Nonlinear effects associated with the dispersive Alfvén waves and magnetosonic waves in space plasma

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Abstract

This paper presents the model equations governing the nonlinear interaction between magnetosonic wave and dispersive Alfvén wave (DAW) in the low-β plasmas ($\beta \ll m_e / m_i$; known as inertial Alfvén waves) applicable to solar corona and intermediate-β plasmas ($m_e / m_i \ll \beta \ll 1$; known as kinetic Alfvén waves) applicable to solar wind in Earth's magnetosphere. On account of the ponderomotive nonlinearities the model equations of DAW and magnetosonic wave turn out to be a modified Zakharov system of equations (MZSE). Numerical solution of the problem has been obtained when the incident pump DAW is having a small perturbation.