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Numerical Simulation of nonlinear MHD waves in Solar Atmosphere and Interstellar Molecular Clouds

Takahiro Kudoh[1]

[1] NAOJ

We study nonlinear Alfvén waves propagating in gravitationally stratified gas layers, such as solar atmosphere and self-gravitating molecular clouds, by using 1-dimensional MHD numerical simulations. In both cases, the gas layers are pushed up by the nonlinear Alfvén waves and show oscillations in accordance with the gravity. In this talk, we will review our recent studies of the solar atmosphere and molecular clouds, and discuss the same MHD physics working in both cases.