



Stability of an Alfvén vortex: numerical evidence

O. Alexandrova (1), R. Grappin (2), A. Mangeney (1)

(1) LESIA, Observatoire de Paris, (2) LUTH, Observatoire de Paris
(contact email : olga.alexandrova@obspm.fr)

An Alfvén vortex is a two-dimensional generalization of the non-linear Alfvén wave. In the simplest case, it is a solution of the equations of incompressible ideal magnetohydrodynamics (MHD). We distinguish two types of vortices: monopole and dipole. In the case of the monopole vortex the mean field is zero in the vortex plane and the vortex is stationary in the plasma frame. In the case of the dipolar vortex the mean field is non-zero in the vortex plane and it determines the velocity of the vortex structure. Recent Cluster observations in the magnetosheath show the presence of both types: dipolar and monopolar Alfvén vortices [Alexandrova et al., JGR, 2006]. Here we analyze the dipolar vortex stability via weakly compressible bi-dimensional MHD simulations. Preliminary results show that the vortex propagates keeping its form with a nearly constant speed, which is close to the predicted one. These results imply the stability of the Alfvén vortex in weakly compressible plasma conditions.