Geophysical Research Abstracts,
Vol. 10, EGU2008-A-07178, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-07178
EGU General Assembly 2008

Kelvin-Helmholtz Instability in MHD with FLR Effects and Possible Implications for Venus

U.V. Amerstorfer (1,2), N.V. Erkaev (3), and H.K. Biernat (1,2)

(1) Space Research Institute, Austrian Academy of Sciences, Schmiedlstr. 6, 8042 Graz, Austria, (2) Institute of Physics, University of Graz, Universitaetsplatz 5, 8010 Graz, Austria, (3) Institute of Computational Modelling, Russian Academy of Sciences, 660036 Krasnoyarsk-36, Russia (ute.amerstorfer@oeaw.ac.at)

The Kelvin-Helmholtz instability is studied by solving the magnetohydrodynamic (MHD) equations for a compressible plasma including the effect of the finite Larmor radius (FLR) of the ions, which is incorporated in the gyroviscosity tensor in the equation of motion. A transition layer between two plasmas, across which the plasma properties change, is also included. Growth rates for the transverse case, i.e., the magnetic field is perpendicular to the flow velocity, are presented for different parameter cases. Compared to the growth rates of the ideal MHD case, it is shown that the inclusion of the FLR results in larger or smaller growth rates, depending upon the relative direction of the magnetic field and the velocity shear. Regarding the situation around Venus, this means that the Kelvin-Helmholtz instability exhibits a different behaviour at different sides of the boundary layer (i.e. a dawn-dusk asymmetry is present). Due to this asymmetry, the instability is found to develop more easily on one side and might be able to grow and break, causing a turbulent boudary. Comparing the length scales of the instability with the length scales of plasma clouds, observed by Pioneer Venus Orbiter, it is found that both are of the same order, suggesting a possible connection of the two phenomena.