Global Eigenmodes of Low Frequency Waves in FRCs

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A heating experiment of a Field-Reversed Configuration (FRC) plasma by low frequency waves has been performed in Osaka University [K. Yamanaka *et al.*, Phys. Plasmas **7**, 2755 (2000)]. A fluctuation of the magnetic field propagating through the plasma was observed in the experiment. Also, increase of the plasma energy was observed. In addition, the results showed that the energy of the applied field could be absorbed mainly by the ions. However the mechanism has not been explained.

Solving the linearized single-fluid MHD equations, global eigenmodes of the low frequency waves in FRC plasmas have been obtained in this study. One-dimensional FRC equilibria with peaked, flat, and hollow current profile are used here. The dispersion relation and the global wave fields of the eigenmodes are shown for the azimuthal mode number m = 0 (the same mode number as that for the applied field in the experiment). The results are compared with the results of the heating experiment. The possibility of the ion heating by the transit-time magnetic pumping is discussed.