LF NONLINEAR WAVES IN A BEAM-PLASMA SYSTEM: APPLICATION TO THE FORESHOCK OF MARS

K. Sauer (1), E. Dubinin (1) and Ch. Mazelle (2)

(1) Max-Planck-Institut für Aeronomie, Katlenburg-Lindau, Germany, (2) CESR-CNRS, Toulouse, France

The excitation of right-hand polarized waves in a cold plasma by an ion beam propagating parallel to ambient magnetic field is a well-known result of linear dispersion theory. In this contribution, stationary nonlinear structures in such a beam-plasma are described by a Hall-MHD model. Soliton-like structures with superimposed spatial oscillations (oscillitons) have been found which arise from the momentum coupling between the main plasma and the beam via the LF electromagnetic field. On the other hand, fast magnetosonic solitons are formed if a hot plasma population is present. The observation of a variety of structures in the foreshock region of Mars is discussed in the view of nonlinear waves which may exist for different plasma configurations.