2000 Fall Meeting
Search Results

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HR: 10:45h
AN: **SM21B-08**
TI: Four-Field Model for Dispersive Field-Line Resonances in the Collisionless Magnetosphere
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AB: Dispersive field-line resonances (FLRs) are one of the prime examples of magnetosphere-ionosphere coupling. Recently, we have proposed a new theoretical model for FLRs in collisionless magnetospheric plasmas on the basis of reduced four-field equations (GRL, 26, 3281, 1999). This model builds on the foundation of previous two-field models but improves on their predictive capabilities. In particular, due to the coupling of the shear-Alfven mode to the slow mode in the four-field system, it is now possible to account for the low frequencies of FLRs observed by FAST. Furthermore, parallel electric fields can be large in the four-field model without requiring the field-aligned current density to be unrealistically large. We present a rigorous WKB method to determine the location of FLRs and incorporate the method in two-dimensional numerical simulations of the four-field equations in a driven magnetosphere. The effect of Landau damping on the slow mode is included phenomenologically as a nonlocal viscosity in the four-field equations. Despite the presence of Landau damping generally associated with the slow mode, we show that FLRs can indeed be sustained at the observed low frequencies. These results are compared and contrasted with the results of two-field models. The four-field model identifies the crucial role of parallel ion flows, seen in observations, in coupling the shear-Alfven and slow modes. Analytical and numerical results will be presented for slab as well as dipole geometry.
DE: 2736 Magnetosphere/ionosphere interactions

SC: SM
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New Search