Geophysical Research Abstracts,
Vol. 11, EGU2009-4081, 2009
EGU General Assembly 2009

Hybrid Simulation of Parallel Electric Field Excitation of by a standing Alfven wave

P. Israelevich (1) and L. Ofman (1,2)

(1) Tel Aviv University, Department of Geophysics and Planetary Sciences, Tel Aviv, Israel (peter@luna.tau.ac.il, +972 3 640-9282), (2) 2 Department of Physics, The Catholic University of America and NASA Goddard Space Flight Center, Greenbelt, USA (ofman@daphne.tau.ac.il)

The results of one-dimensional hybrid simulation of a standing Alfvén wave in low beta plasma are presented. Plasma is accelerated from the anti-nodes toward the nodes of the standing wave with finite amplitude under the action of the magnetic field pressure due to the wave. As a result, a sharp maximum of ion number density (and the corresponding electron pressure) arises near the nodes. The plasma flow is modulated at a doubled frequency of the Alfvén wave thus giving rise to ion-acoustic waves. The effective parallel electric field $\mathrm{E}^* = \mathrm{E} + \frac{1}{ne}\nabla p_e$ appears due to both, electron pressure gradient near the nodes, and electron pressure variations in the acoustic waves. The electric field strength reaches tens of mV/m. This process may account for the observations of strong parallel electric field in the auroral ionosphere by electric double probes.