
JOURNAL CLUB

Study of Electron Beam Acceleration and Formation of a Potential Jump Across an Electrostatic Shock

by

Ling-Hsiao Lyu

Institute of Space Science,

National Central University, Chung-Li, Taiwan, R.O.C.

ABSTRACT

Field-aligned nonlinear electrostatic solitary waves have been observed by FAST and POLAR satellites, and possible similar structures have also been observed by Geotail satellite. For observations in the distant tail and near the magnetopause, these structures are considered to be a result of magnetic reconnections. For observations in the auroral zone and in the cusp region, both upward propagating and downward propagating solitary waves have been observed. For upward propagating solitary waves, which are associated with upward moving electron beams, the magnetic reconnection process can no longer provide a satisfactory explanation on their formation. In this talk, I shall introduce a low-noise, non-periodic, easy-to-program, Vlasov simulation code. This code is an ideal tool to study electrons' kinetic processes occurred in a region with non-uniform density distribution along magnetic field line, such as a field-aligned electrostatic shock, or a contact discontinuity. Simulation results on electron beam acceleration and formation of electrostatic potential jump across shock ramp will be presented and discussed. Preliminary results on two-dimensional electromagnetic effects in a field-aligned propagating electrostatic shock will also be discussed.

Friday, October 4
Elvey Bldg. Globe Room
3:45 pm