ELECTRON ACOUSTIC DOUBLE LAYERS IN A FOUR COMPONENT MAGNETIZED PLASMA

S. S. GHOSH 1, J. S. Pickett 2, G. S. Lakhina 3

Indian Institute of Geomagnetism, Navi Mumbai India
email: sukti@iigp.iigm.res.in
2. The University of Iowa, Iowa City, IA 52242, USA
email: pickett@uiowa.edu
3. Indian Institute of Geomagnetism, Navi Mumbai India
email: lakhina@iigs.iigm.res.in

Electrostatic solitary waves (ESWs) are large amplitude acoustic-mode or kinetic-scale structures which have been frequently observed in the boundary layers of the magneosphere where large gradients in particle properties often generate beam or acoustic instabilities leading to large amplitude electrostatic fluctuations. Bale et al. [Geophys. Res. Lett., vol. 25**,** pp**.** 2929-2932, (1998)] have shown the presence of electrostatic bipolar structures at the bow shock from the WIND observations. Similar structures have also been observed by the GEOTAIL, and more recently by CLUSTER multi-spacecraft missions, in different regions of magnetosheath and cusp regions [Pickett et al., Adv. Space Res., vol. 41, pp. 1666-1676, doi:10.1016/jasr.2007.06.064., (2008)]. CASSINI has reported ESWs at the bow shock of Saturn and at a crossing of an Interplanetary Shock [Williams, et al., Geophys. Res. Lett., vol. 33**,** L06103, doi:10.1029/2005GL024532, (2006)]. We have previously studied fully nonlinear electron acoustic solitary waves in a magnetized plasma and compared our results with recent CLUSTER observations [Ghosh, et al., J. Geophys. Res., 113, A06218, doi:10.1029/2007JA012768, (2008)]. In the present work, we intend to study the electron acoustic double layer solutions in a multi-component magnetized plasma and to investigate the parametric dependence of such solutions in detail. Our analysis is expected to throw light on acceleration processes at the magnetospheric boundary layers.

magnetosphere, boundary layers, nonlinear solitary waves and double layers

S. S. Ghosh, Indian Institute of Geomagnetism, New panvel (W), Navi Mumbai, India, 410218, tel : 91-22-2748 4148, fax: 91-22-27480762, email: sukti@iigp.iigm.res.in