Japan Geoscience Union Meeting 2011
(May 22-27 2011 at Makuhari, Chiba, Japan)

PEM026-17 Room:101 Time:May 25 08:30-08:45

Fluid Modeling of SLAMS

Tohru Hada[1*], Yasuhiro Nariyuki[2], Marty Lee[3]

[1]ESST, Kyushu University, [2]Kochi National College of Technology, [3]University of New Hampshire

The so-called Short Large Amplitude Magnetic Structures (SLAMS) are frequently observed upstream of quasi-parallel part of the earth's bowshock (Schwartz et al., JGR, 1992). Properties of these structures have been studied extensively (e.g., recent Cluster observations by Lucek et al, Annales Geophys., 2004). On the other hand, the mechanism leading to the formation of the SLAMS remains unclear. Since the SLAMS always grow in a region with a gradient in supra-thermal particle pressure, the ion heat flux is likely to be the main energy source for these structures (Giacalone et al., GRL, 1993). In order to clarify the physical picture of the SLAMS, in this presentation we attempt to model their growth and evolution from the fluid point of view. First we propose a nonlinear MHD model including the effect of the ion heat flux after Hammett and Perkins (PRL, 1990). Numerical simulations show that, in the presence of inverse Landau interaction, a series of magnetic pulsations similar to the SLAMS grow rapidly. Details of the model and the results will be presented.

Keywords: foreshock, SLAMS, nonlinear Landau damping, ion heat flux