



## **Electromagnetic waves generated by ion distribution function with velocity space hole**

Andrei M. Sadovski

Space Research Institute (IKI), Moscow, Russian Federation (asadovsk@iki.rssi.ru)

Study of particle dynamics in the Earth's magnetotail has shown that some ions with large pitch angle are preferentially accelerated out of neutral sheet and form beams. As a result a peculiar type of nongyrotropic ion distribution with velocity space hole is formed. The unique feature of such distribution is that the space hole is centered on  $90^\circ$  pitch angle and ion distribution is not symmetrical about magnetic field direction. Ion distributions with empty region in velocity space represent a source of free energy for excitation as plasma waves as electromagnetic waves and may have a pronounced effect on physical processes in the neutral sheet.

The investigation of electromagnetic waves generation and general stability properties of the nongyrotropic ion distributions was performed for different conditions in the neutral sheet. The dependence of the growth rate upon the ion hole parameters and ion and electron temperatures was obtained and the comparison with results obtained for the electrostatic waves is done.