

## Study on current generation mechanism in Earth's magnetosphere

Atsushi Iwadachi<sup>1</sup>, Tatsuki Ogino<sup>1\*</sup>

<sup>1</sup>Solar-Terrestrial Environment Laboratory, Nagoya University

A study on perpendicular and parallel current generation mechanism in the magnetosphere is important problems in interaction between the solar wind and earth's magnetosphere-ionosphere. As the solar wind and IMF becomes abnormal conditions, plasma turbulence are strongly excited near boundary layers in the magnetosphere. In the plasma sheet magnetic reconnection occurs in patchy and intermittent manner to produce streamer-like structure. At the magnetopause, more regular vortex train is formed for northward IMF.

Dayside reconnection occurs in patchy and intermittent manner to give seeds of plasma turbulence. As the results, complicated and strong vortex turbulence appears in flank magnetopause. We will demonstrate those phenomena from 3-dimensional visualization method of simulation results to discuss relationship between the currents and vortices in boundary layers. In particularly we will stress relationship among parallel and perpendicular components of vorticity and current, and also compressibility in order to understand the fundamental picture of magnetospheric physics.

**Keywords:** MHD Simulation, current generation mechanism, Vorticity and compressibility, Magnetic Reconnection, Magnetospheric Dynamics, Boundary Layer Instabilities