

## **Effects of Dawn-Dusk Magnetic Field in Geomagnetic Tail Reconnection; Results of 3D MHD Simulation**

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The dawn-dusk magnetic field component  $B_y$  in the plasmoid resulting of magnetic reconnections have been observed Geotail satellite[1]. We have studied the effects by  $B_y$  component in the reconnection in geomagnetotail. We'll present the results of computer simulation about them. Our recent simulations apply the spontaneous fast reconnection model to the three-dimensional (3-D) plasmoid dynamics. Previous our original 3-D computational region (the first quadrant)[2] is extended to the second quadrant and axis symmetry boundary conditions are used. Then, various initial values of dawn-dusk magnetic field component  $B_y$  can be possibly assumed.

As a result in all our simulation cases, (1) a large-scale plasmoid evolves, and (2) it propagates down to the geomagnetic tail, (3) slow shocks and finite amplitude intermediate waves simultaneously stand along the resulting plasmoid boundary layer.

We further demonstrated that with the increase of the initial value of  $B_y$ , the scale of the plasmoid in X direction is enlarged and the propagation speed of plasmoid clearly slows down; the magnetic field rotations in the intermediate waves region become more significant.

We also found that in the plasmoid where  $B_z$  (north-south) changes its sign,  $B_y$  also has a considerably big value, which is consistent with the satellite observation result.

We propose that the spontaneous fast reconnection mechanism could be most applicable to substorms.

[1] Mukai et al, JGG, 1996

[2] Ugai and Wang, JGR, 1998