

## **Three-dimensional instability of fast magnetic reconnection process**

Tohru Shimizu

*Ehime university, RCSCE*

**Abstract.** Three-dimensional instability of the spontaneous fast magnetic reconnection was studied in numerical and analytical MHD models. As shown in many previous two-dimensional MHD studies, if the anomalous resistivity is assumed, one-dimensional current sheet is unstable for initial resistive perturbations, leading to the two-dimensional fast magnetic reconnection. In this paper, it is shown that the two-dimensional fast reconnection can be, moreover, unstable for three-dimensional perturbations, resulting in three-dimensional, intermittent, multiple and random fast reconnection. The numerical result is similar to the intermittent downflows often observed in EUV image data of solar flares, where three-dimensional downflow jets associated with fast reconnection process are observed in approximately one-dimensional current sheet located above a large-scale and rapidly growing arcade structure. Also, some comparisons between solar flares and geomagnetotail are reported.