Three-dimensional instability of spontaneous fast magnetic reconnection

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Three-dimensional MHD simulations were executed to show a new three-dimensional insitability of the two-dimensional spontaneous fast magnetic reconnection widely studied so far. According to recent numerical studies, it was shown that two-dimensional spontaneous fast magnetic reconnection caused by the current-driven anomalous resistivity can be destbilized by an initial weak perturbation fluctuated along the sheet current direction. In other words, exactly one-dimensional current sheet can be destabilized by an initial weak disturbance in the sheet current direction, resulting in fully three-dimensional spontaneous fast magnetic reconnection which is pulsive and random (stochastic). This study may be applicable for the pulsive downflows observed in solar flares and also the intermittent plasmoid ejections in the geomagneto-tail. In this presentaion, the random and stochastic features of this three-dimensional fast reconnection is shown.