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# 3D structure and dynamics of plasmoids associated with spontaneous fast reconnection process

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3D structure and dynamics of plasmoids generated in spontaneous fast magnetic reconnection are studied by MHD numerical simulations. In solar flares and substorms, the fast magnetic reconnection is considered to play a crucial role. In recent space satellite observations, plasmoids associated with the reconnection process are studied but its structures and dynamics are still unclear. According to our numerical and theoretical studies, 1D current sheet can be destabilized by a 3D perturbation, resulting in intermittent and random 3D fast reconnection via 2D and then 3D instabilities. In this paper, those our results are applied for the plasmoid's characteristics obtained in space satellite observations.

Keywords: magnetic reconnection, three-dimensional, plasmoid, MHD