

Three-Dimensional MHD Simulations of Solar Flares with Plasmoid Ejection

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An influence of a three-dimensional situation on solar flare is an important problem. There are many MHD simulations of the solar flares with magnetic reconnection in 3D. However, the 2D models of flares with plasmoid ejection (filament eruption), such as Chen & Shibata (2000), are almost not examined in 3D.

We performed three-dimensional MHD simulations of solar flares with plasmoid ejection. We extended the 2D model of flare developed by Nishida et al. (2009) to 3D, and compared the results in the case of 2D and 3D.

Numerical results show that a kink instability plays an important role in plasmoid ejection. When the growth rate of the kink instability is low, the result is similar to 2D model. On the other hand, when the kink instability is dominant, the result differs from the 2D model.