

## A possible scenario for the explosive growth of magnetic reconnection

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Magnetic reconnection is an important process in a variety of space plasma environments, e.g. the solar flare, the magnetospheric substorm, etc. However, the trigger mechanism of magnetic reconnection is still poorly understood. The tearing instability is thought to be an initial state of magnetic reconnection, and there are two possible processes, resistive and collisionless, that provide the necessary dissipation. Which process dominates in a collisionless plasma is a long standing problem, but, both processes fail to explain the explosive feature of the observed fast magnetic reconnection. To address the problem, we carry out a three-dimensional full particle simulation of the tearing instability in an ion scale current sheet, and fast evolution of the magnetic reconnection geometry is observed (within 5 ion gyro-periods). The growth time is much faster than those estimated from the previous theories. The most essential point is that the resistive process in the boundary region and the collisionless process around the neutral sheet are closely coupling through the acceleration of meandering electrons. This coupling process increases the growth rate of the tearing mode. The simulation result suggests a new scenario for the trigger of magnetic reconnection in an ion-scale current sheet.