

Cross-Tail Instabilities in the Magnetotail Current Sheet II. Nonlinear Simulations

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Identification of microinstability at the neutral sheet is an important key to understand the triggering mechanism of magnetic reconnection. As a result of the linear eigenvalue problem of the cross-field current instability for Harris-type current sheet we have found the new instability mode. To study the non-linear properties of the new instability we do the 2D particle-in-cell simulation. We confirm that the new instability mode can really grow when the electron temperature is much lower than ion temperature and that its growth rate and wavelength is almost consistent with the result of the linear analysis. The new instability does not provide anomalous resistivity by itself. However, we found that the new instability leads the current sheet to the quasi-steady oscillating state.