

Ion Weibel Instability in the Earth Neutral Sheet and Current Disruption Problem

A.M. Sadovski and A.A. Galeev

Space Research Institute, Russian Academy of Science,
Profsoyuznaya St., 84/32, 117810 Moscow, Russia

Among the plasma instabilities driven by a current flowing perpendicular to an ambient magnetic field, the purely growing Ion Weibel instability recently has been extensively studied as the plausible mechanism of current disruption in the Earth's neutral sheet. The role of this instability is to provide anomalous resistivity in order to modify significantly the local current density. In the collisionless plasma such as Earth's neutral sheet the anomalous resistivity is based on the resonant wave-particle interaction. However in the case of Ion Weibel instability the wave-particle interaction is nonresonant and thus cannot provide resistivity. As a result the relaxation of particle velocity distribution described by the quasilinear theory proceeds adiabatically.