

# COLLISIONLESS MAGNETIC RECONNECTION: ELECTRON INERTIA VERSUS NONSCALAR THERMAL PRESSURE.

**G. Vekstein and M. Hosseinpour**

*Jodrell Bank Center for Astrophysics, School of Physics and Astronomy,  
The University of Manchester, Manchester M13 9PL, United Kingdom*

Collisionless tearing instability in a sheared force-free magnetic field is considered in the framework of electron magnetohydrodynamics. A rigorous analytical analysis demonstrates that the bulk inertia of electrons is the dominant reconnection mechanism in a sufficiently low- $\beta$  plasma, when the reconnection current sheet width exceeds the electron gyroradius. Otherwise a fluid-like approach fails, and fully kinetic treatment of the problem is required. A recently raised issue of the role of the electron gyroviscous cancellation in collisionless reconnection is also addressed.

recommended)