

Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

An electrostatic, gyrokinetic-like model for thin layers with large gradients and electrostatic potentials HAROLD WEITZNER, CHOONG-SEOCK CHANG, New York University, FRANK JENKO, Max-Planck Institute for Plasma Physics — Plasma dynamics is studied in a layer whose thickness is of the order of the geometric mean of the ion Larmor radius and the macroscopic scale length. The particle distribution functions and electric and magnetic fields all have the given gradient length. The motion of a single particle in such a state is treated. A magnetic moment adiabatic invariant exists and drift Hamiltonians are constructed. Kinetic equations are then developed, and have some properties of gyrokinetic equations. Charge neutrality, used to determine the electrostatic potential, is replaced by an equivalent condition, with explicit appearance of the potential. The linear stability of a straight, screw pinch is examined. Both stable and unstable special cases are found. Some results recover ion temperature gradient-like modes. However, large magnetic shear improves stability.

Harold Weitzner
New York University

Date submitted: 18 Jul 2007

Electronic form version 1.4