Abstract Submitted
for the APR12 Meeting of
The American Physical Society

Global Modeling of Magnetic Reconnection Using Full Particle Simulations VADIM ROYTERSHTEYN, UCSD, HOMA KARIMABADI, UCSD and SciberQuest, Inc — Magnetic reconnection is the dominant mechanism for the solar wind mass and energy entry into the Earth's magnetosphere. In the collisionless plasma it is a complex multi-scale process, driven by macroscopic dynamics, but crucially dependent upon microscopic physics on the electron kinetic scales. Previous theoretical investigations have necessarily focused on either small scales, correctly describing the physics of reconnection in highly idealized small systems (such as Harris current sheets), or on macroscopic evolution without regard for the microphysics of reconnection (e.g., relying on numerical or imposed resistivity in global MHD codes). We present the first results of a simulation study that analyzes reconnection in a self-consistent global model that a) is adequately resolved to describe electron physics of reconnection and b) incorporates several key features of reconnection in the magnetosphere such as the manner in which the system is driven, absence of artificially imposed boundary conditions, presence of self-generated anisotropies and associated fluctuations, flows past the reconnection site, asymmetry of the current sheet, some aspects of the geometry, etc.

Vadim Roytershteyn
UCSD

Date submitted: 11 Jan 2012 Electronic form version 1.4