Abstract Submitted
for the DPP08 Meeting of
The American Physical Society

Driven Magnetic Reconnection in Semi-Collisional Parameter Regimes V. ROYTERSHTEYN, W. DAUGHTON, B.J. ALBRIGHT, K.J. BOWERS, L. YIN, LANL, S. DORFMAN, H. JI, M. YAMADA, PPPL — Recent kinetic simulations of driven magnetic reconnection with boundary conditions relevant to the Magnetic Reconnection eXperiment (MRX) have demonstrated that the electron diffusion layer is significantly thicker in the experiment[1] than in the 2D collisionless simulations.[2] The two leading possibilities to explain this discrepancy are 3D effects such as current aligned instabilities and Coulomb collisions. In order to address both of these possibilities, we have implemented the new MRX relevant boundary conditions[2] within the 3D kinetic simulation code VPIC.[3] Coulomb collisions are treated using a well-known Monte-Carlo technique[4] that models a full collision operator. This approach will allow us to systematically examine the influence of Coulomb collisions and plasma instabilities on the dynamical evolution of the reconnection layer using boundary conditions relevant to the actual experiment. Initial results illustrating the transition between collisionless and semi-collisional regimes are presented.

[1]Ji et al., to appear in *GRL*, 2008
[2]Dorfman *et al.*, submitted to *Physics of Plasmas*, 2008
[3]K. J. Bowers *et al.* Phys. Plasmas, v. **15**, p. 055703, 2008.
[4]T. Takizuka and H. Abe, J. Comput. Phys., v. **25**, p. 205, 1977

Vadim Roytershteyn
LANL

Date submitted: 16 Jul 2008 Electronic form version 1.4