Abstract Submitted
for the DPP05 Meeting of
The American Physical Society

Nonlocal parallel heat transport and energy confinement in SSPX[1] J.-Y. JI, E.D. HELD, Utah State University, C.R. SOVINEC, University of Wisconsin-Madison — As confinement improves and temperature increases in emerging concept experiments such as the spheromak, transport in the core of the devices becomes increasingly collisionless. Understanding transport in these experiments is one goal of the Plasma Science and Innovation Center. Recently, numerical studies of a set of pulsed, electrostatically-driven discharges in the SSPX experiment were performed using the NIMROD code [2]. The resistive magnetohydrodynamic simulations show good agreement with respect to magnetohydrodynamics and fair agreement with respect to confinement. In this work, a general, parallel heat flux closure, $q_{\|}$, is applied in place of the collisional, Braginskii closure. Because the general form for $q_{\|}$ allows for arbitrary collisionality, it is applicable both in the hot core as well as the collisional edge plasma. In addition, the general, nonlocal $q_{\|}$ correctly assesses parallel heat flow in core regions characterized by magnetic field line chaos. We expect that these features of the general $q_{\|}$ lead to improved agreement between experimentally observed and simulation temperatures.

[1]Research supported by the U.S. DOE under grant Nos. DE-FC02-04ER54798 and DE-FC02-05ER54812.
[2]C. R. Sovinec *et al.*, Phys. Rev. Lett. **94**, 035003 (2005).

J.-Y. Ji
Utah State University

Date submitted: 26 Jul 2005 Electronic form version 1.4