Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Accessing the new collisionless reconnection regime in laboratory experiment[1] JOSEPH OLSON, JAN EGEDAL, SAMUEL GREESS, JOHN WALLACE, MICHAEL CLARK, CARY FOREST, UW-Madison — The Terrestrial Reconnection Experiment (TREX), the largest dedicated reconnection experiment to date, is currently in operation at the Wisconsin Plasma Astrophysics Laboratory (WiPAL). In its inaugural run, TREX demonstrated its ability to operate in what has traditionally been called the collisionless reconnection regime by observing the out-of-plane magnetic field characteristic of Hall reconnection. Additionally, TREX is projected to access even more collisionless parameters in which electron pressure anisotropy develops, greatly influencing the dynamics of the reconnection process beyond two fluid effects [1]. For example, spacecraft observations [2] and kinetic simulations [3] show that large-scale current layers are driven by this pressure anisotropy. In the last year, TREX has undergone upgrades to its plasma heating, reconnection drive, and diagnostic suite in order to study these features exclusive to truly collisionless reconnection. Preliminary results from the newly optimized experimental runs will be presented.

[1] J. Egedal, et al., *Phys. Plasmas* **20**(6) (2013).

[2] K.-J. Hwang, et al., *J. Geophys. Res. Space Physics* **118** (2013).

[3] A. Le, et al., *J. Plasma Phys.* **81** (2015).

[1]Supported in part by DoE grant DE-SC0010463

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Date submitted: 24 Jul 2015 Electronic form version 1.4