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Collisionless reconnection driven bulk heating of electrons on TREX[1] JOSEPH OLSON, JAN EGEDAL, SAMUEL GREESS, JOHN WALLACE, MICHAEL CLARK, CARY FOREST, UW-Madison — The mechanism for particle heating during magnetic reconnection is an open topic in plasma physics research. Addressing this issue is a major concern for theory, observation, and experiment alike. Recently, a new model has been proposed to explain the bulk heating of electrons during collisionless reconnection, predicting that the heating scales inversely with the plasma beta [1]. The new Terrestrial Reconnection Experiment (TREX) aims to examine this energy partition in a laboratory plasma. By reducing the collisionality in the experiment, the upstream electron pressure should become anisotropic due to adiabatic trapping [2], making TREX the first reconnection experiment able to access the necessary parameters to study these plasma dynamics. Preliminary analysis from the TREX magnetic flux probe array will be presented, characterizing the electron diffusion region in for collisionless magnetic reconnection.

[1] A Le, et al., Phys. Rev. Lett. (submitted 2015).

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

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