Abstract Submitted
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Study of Disruptive Current Layers in the Magnetic Reconnection Experiment (MRX) S. DORFMAN, H. JI, M. YAMADA, J. YOO, E. OZ, T. THARP, E. LAWRENCE, C. MYERS, J. JARA-ALMONTE, CMSO, PPPL, W. DAUGHTON, V. ROYTERSHTEYN, LANL — One of the key open questions in magnetic reconnection is the nature of the mechanism that governs the reconnection rate in real astrophysical and laboratory systems. Comparisons between fully kinetic 2-D simulations of the Magnetic Reconnection Experiment (MRX) and experimental data indicate that three-dimensional dynamics, such as current layer disruptions recently observed in MRX, may play a key role in resolving an important discrepancy in the reconnection rate and layer width [1,2,3]. These disruptions are often associated with fluctuations in the lower hybrid frequency range and a rapid local reconnection rate. Some discharges also display "O-point" signatures consistent with magnetic island like structures. The present research explores the relationship between the disruptions and fluctuations in the context of the reconnection rate problem. Comparisons with 3-D simulations are ongoing in order to determine what key physics is responsible for the broader current layers observed in the experiment. [1] Y. Ren, et al., Phys. Plasmas 15, 082113 (2008). [2] S. Dorfman, et al., Phys. Plasmas 15, 102107 (2008). [3] V. Roytershteyn, et al., Phys. Plasmas 17, 055706 (2010). Supported by NDSEG, DOE, NASA, and NSF.

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