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Effects of External Driving on Magnetic Reconnection in MRX
N. KOSAR, The Ohio State University, S. DORFMAN, E. LAWRENCE, H. JI, M. YAMADA, J. YOO, C. MYERS, T. THARP, PPPL — In the Magnetic Reconnection Experiment (MRX), two sets of windings, known as flux cores are used to create plasma and force reconnection. One active topic of research is the relationship between the external forcing and the local physics at the reconnection point. The rate at which the flux core current changes is defined as the "drive time" of the experiment. In 2-D simulations of MRX [1] and in previous MRX experiments, it was found that the electric field at the reconnection point scales linearly with the external forcing up to a point, but when the drive is too fast, the scaling saturates. While this scaling may be expressed in dimensionless parameters for the simulation, producing a comparable normalization for the experiment has proved difficult, possibly due to the effect of initial conditions. A new experimental scheme has been designed to produce a range of drives by changing the slope of the current waveform at a single breakpoint, resulting in uniform initial conditions. Results from the new setup will be presented. This work was supported by DOE, NASA, and NSF.

[1] Dorfman, et al, Phys. Plasmas 15, 102107 (2008).

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