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Measurements of Linear and Nonlinear Hall Reconnection[1] T.D. THARP, A.F. ALMAGRI, D. CRAIG, G. FIKSEL, A.V. KURITSYN, M.C. MILLER, V.V. MIRNOV, S.C. PRAGER, J.S. SARFF, MST and CMSO at the University of Wisconsin-Madison — Previous measurements in MST have established that two-fluid Hall effects produce a dynamo during sawtooth relaxation events, and therefore two-fluid dynamics are important when evaluating the macroscopic effects of reconnection. This was established by measuring the nonlinear Hall term $(J_1 \times B_1)$ in the axisymmetric (flux-surface averaged) Ohm's Law. Here, we report measurements of terms in the non-axisymmetric Ohm's Law, including the *linear* Hall term, $(J_1 \times B_0 + J_0 \times B_1)$, and other spatially varying quantities. These measurements are a more direct indicator of the role of two-fluid effects on reconnection. Measurements are performed by probes in the vicinity of the reversal surface to measure reconnection associated with modes of poloidal mode number m=0. Results show that the linear Hall term is large compared to $\eta \widetilde{J}_{||}$, indicating the possibility of fast collisionless reconnection. Results are compared to a theoretical interpretation based on two-fluid MHD.

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