Abstract Submitted
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Measurements of the Hall Dynamo in MST Plasmas[1] J.C. TRIANA, A.F. ALMAGRI, K.J. MCCOLLAM, J.S. SARFF, J.P. SAUPPE, C.R. SOVINEC, UW-Madison — Fluctuation-induced emfs correlated with tearing mode activity govern the relaxation process in RFP plasmas. Previous radial profile measurements in the edge of MST plasmas ($\frac{r}{a} > 0.8$) revealed a competition of the Hall, $\frac{1}{ne}\langle \tilde{\mathbf{j}} \times \tilde{\mathbf{b}} \rangle_{||}$, and MHD, $\langle \tilde{\mathbf{v}} \times \tilde{\mathbf{b}} \rangle_{||}$, terms in Ohm's law. A robust magnetic probe allows measurements of the Hall-dynamo profile much deeper in the plasma ($\frac{r}{a} > 0.4$) for low current conditions. The mode composition of the dynamo emf is computed using pseudospectral (cross-correlation) analysis with the spectrum measured from a toroidal magnetic array at the plasma surface. Extended MHD simulations with parameters comparable to the experiment have been performed using NIMROD. They predict complex variation of the Hall and MHD dynamo profiles across the plasma radius. Measurements of the Hall-dynamo profile can inform future computational work in addition to directing future experimental measurements of the MHD term.

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