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Density Fluctuation Induced Kinetic Dynamo and Tearing Mode Nonlinear Saturation in the MST Reversed Field Pinch WEIXING DING, LIANG LIN, University of California, Los Angeles, J.R. DUFF, University of Wisconsin, Madison, D.L. BROWER, University of California, Los Angeles, J.S. SARFF, University of Wisconsin, Madison — In the MST reversed field pinch (RFP), the evolution of core tearing mode nonlinear evolution is partially determined by the electron current density profile along with nonlinear interactions among multiple tearing modes. Density fluctuations driven by intrinsic magnetic perturbations are usually large, approximately 1%, in RFP plasmas. These density fluctuations can modify the current density profile via the *kinetic dynamo effect*, defined as the correlated product of parallel electron pressure and radial magnetic field fluctuations, which alters the temporal dynamics of tearing modes in MST. A component of the kinetic dynamo originating from the correlated product of density and radial magnetic fluctuations has been measured using a high-speed, low phase noise polarimetry-interferometry diagnostic. Between sawtooth crashes it is found that the measured kinetic dynamo has finite amplitude that generates an anti-dynamo in the plasma core, which would tend to flatten the current density profile. These measurements suggest that density fluctuations passively driven by magnetic fluctuations can actively alter tearing modes via fluctuation-induced current transport. Work supported by US DOE and NSF.

Weixing Ding
University of California, Los Angeles

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