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Measurements of Electric Field Fluctuations Using a Capacitive Probe on the MST Reversed Field Pinch MINGSHENG TAN, University of Science and Technology of China, A.F. ALMAGRI, J.S. SARFF, K.J. MCCOLLAM, J.C. TRIANA, UW-Madison, H. LI, University of Science and Technology of China, W.X. DING, UCLA, W. LIU, University of Science and Technology of China — Experimental measurements and extended MHD computation reveal that both flow and current density fluctuations are important for the magnetic relaxation of RFP plasmas via tearing fluctuations. Motivated by these results, we have developed a multi-electrode capacitive probe for radial profile measurements of the electrostatic potential deep in the plasma. The capacitive probe measures the ac plasma potential via electrodes insulated from the plasma using an annular boron nitride dielectric (also the particle shield), provided the secondary emission is sufficiently large (T_e>20 eV). The probe has ten sets of four capacitors with 1.5 cm radial separation. At each radius, four capacitors are arranged on a 1.3 cm square grid. This probe has been inserted up to 15 cm from the wall in 200 kA deuterium plasmas. The fluctuation amplitudes increase during the sawtooth crash and the power spectrum broadens (similar to the behavior of magnetic field fluctuations). The frequency bandwidth allows measurements of the radial coherence and phase of the fluctuations associated with rotating tearing modes up to the Alfvénic range. A next-step goal is measurement of the total dynamo emf, $\left\langle \widetilde{\mathbf{v}}_e \times \widetilde{\mathbf{B}} \right\rangle \approx \left\langle \widetilde{\mathbf{E}} \cdot \widetilde{\mathbf{B}} \right\rangle / B_0$, to complement ongoing measurements of the Hall dynamo emf, $\left\langle \widetilde{\mathbf{J}} \times \widetilde{\mathbf{B}} \right\rangle / ne$, using a deep-insertion magnetic probe. M. Tan is supported by ITER-China Program. Work is supported by US DOE.

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