

Abstract Submitted
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Experimental Study of Free Surface Magnetohydrodynamic Flow

J. RHOADS, E. EDLUND, P. SLOBODA, E. SPENCE, H. JI, PPPL — Free surface MHD flows contain many interesting phenomena due to the interplay between the free boundary condition at the surface and the effects of the external magnetic field. This interaction can produce features distinct from other types of flow. The Liquid Metal Experiment (LMX) is designed to investigate the effects of a strong magnetic field applied orthogonal to the flow direction of an electrically conducting fluid. In order to study heat transfer under these conditions, a resistive heater and an infrared camera have been installed. Changes in the vortex street from the cylindrical heater have been observed as the field is increased. Additionally, the modification of underlying turbulent structures can be tracked using two position-sensitive diodes. This diagnostic records fluctuations of the surface from which the k-spectra can be extracted by using cross-correlation techniques. Lastly, a local velocity diagnostic is under development which should have the capability of mapping the velocity profile as a function of the magnetic field. An overview of the experiment and preliminary results will be presented.

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