

Abstract Submitted
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Study of Free Surface Flow of Water in an Open Channel K. MCMURTRY, L. BERZAK, H. JI, PPPL — The motivation for this experiment is to study free-surface liquid metal flow in the presence of a magnetic field. In the presence of a free surface, liquid metal flow can be qualitatively different from a closed pipe flow by exciting surface waves. This has direct relevance to the proposed concept of a liquid metal wall as the first layer facing the plasma in a fusion reactor, as well as astrophysical applications such as free-surface MHD physics on the surface of neutron stars. As a first step, a water channel was built that is 90 x 16 x 3 cm in dimension. Water from a 24 L tank flows through a 5 cm ID tube to the channel and then to a collecting basin where it is pumped back to the tank. The height of the tank, as well as the diameter of the tube can be adjusted to achieve desired parameters. In order to study the surface waves, laser light is reflected off the surface of the water onto a translucent sheet and then recorded using a CCD camera. Properties of open channel flow, as well as diagnostic techniques will be discussed in addition to possible mechanisms for the excitation of surface waves. This work is supported through the DOE (DE-AC02-76-CH-03073) and the NUF Research Program.

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