

Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Design of an Experiment to Investigate the MHD Response of Liquid Metal to Pulsed Currents and Magnetic Fields¹ DANIEL P. WEBER, COLIN S. ADAMS, Virginia Polytechnic Institute and State University — We present plans for an experimental campaign to examine the MHD response of a liquid metal free surface in scenarios where large-amplitude waves are induced by a nonuniform magnetic field (<40 T) parallel to the free surface. An apparatus has been designed in which electrical energy stored in an LC pulse-forming network (PFN) is passed through coaxial conductors to a wire suspended between a solid electrode and a pool of liquid metal. The PFN is designed to deliver a current pulse of up to 100 kA through suspended wires with radii ranging from 1–3 mm for a duration of roughly 5 μ s. A vacuum power feedthrough transmits the pulse to the suspended wire. The PFN circuit was simulated using LTSpice and design iteration resulted in a waveform with less than 55% predicted load current reversal. The first experiments will be performed with liquid tin due to its low vapor pressure and melting point.

¹This work was supported in part by the Department of Energy’s Advanced Research Projects Agency–Energy through the BETHE program.

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Date submitted: 10 Jul 2020

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