Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Development of a Non-Contact, Inductive Depth Sensor for Free-Surface, Liquid-Metal Flows[1] GERRIT BRUHAUG, Idaho State University, EGEMEN KOLEMEN, Princeton Plasma Physics Lab, ADAM FISCHER, Princeton University, MIKE HVASTA, Princeton Plasma Physics Lab — This paper details a non-contact based, inductive depth measurement system that can sit behind a layer of steel and measure the depth of the liquid metal flowing over the steel. Free-surface liquid metal depth measurement is usually done with invasive sensors that impact the flow of the liquid metal, or complex external sensors that require lasers and precise alignment. Neither of these methods is suitable for the extreme environment encountered in the diverter region of a nuclear fusion reactor, where liquid metal open channel flows are being investigated for future use. A sensor was developed that used the inductive coupling of a coil to liquid metal to measure the height of the liquid metal present. The sensor was built and tested experimentally, and modeled with finite element modeling software to further understand the physics involved. Future work will attempt to integrate the sensor into the Liquid Metal eXperiment (LMX) at the Princeton Plasma Physics Laboratory for more refined testing.

[1]This work was made possible by funding from the Department of Energy for the Summer Undergraduate Laboratory Internship (SULI) program. This work is supported by the US DOE Contract No.DE-AC02-09CH11466.

Gerrit Bruhaug
Idaho State University

Date submitted: 19 Jul 2017 Electronic form version 1.4