Abstract Submitted
for the DPP08 Meeting of
The American Physical Society

Velocity Measurements of Free Surface Liquid Metal Flows in a Magnetic Field SCOTT PFEFFER, Univeristy of Michigan, HANTAO JI, MARK NORNBERG, JOHN RHOADS, PPPL — A potential probe diagnostic was developed and calibrated to map the velocity profile of free-surface liquid metal channel flow and quantify the effect an applied magnetic field played in shaping the velocity profile. The setup for this experiment consists of a wide aspect ratio channel sealed from the air, with argon replacing the air in the channel, placed within an electromagnet capable of producing more than a 2000 Gauss field perpendicular to the flow. An alloy of GaInSn, which is liquid at room temperature, is pumped through the channel by a screw pump at a specified rate. The velocity profile is obtained by measuring the voltage across pairs of probes. Various materials were used to determine which probe material would maximize the signal from the voltage induced by the Hall effect and reduce the voltage due to thermoelectric effects. Extensive calibration was then carried out to ensure an accurate velocity measurement. After amplification and filtering this signal gives us a good measurement of the velocity of the liquid metal over the cross-section of a specific probe.

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Date submitted: 18 Jul 2008 Electronic form version 1.4