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Velocity Measurements of Thermoelectric Driven Flowing Liquid Lithium MATTHEW SZOTT, WENYU XU, PETER FIFLIS, IAN HAEHNLEIN, AVEEK KAPAT, KISHOR KALATHIPARAMBIL, DAVID N. RUZIC, CPMI, Department of Nuclear, Plasma, and Radiological Engineering, University of Illinois at Urbana-Champaign, Urbana 61801 — Liquid lithium has garnered additional attention as a PFC due to its several advantages over solid PFCs, including reduced erosion and thermal fatigue, increased heat transfer, higher device lifetime, and enhanced plasma performance due to the establishment of low recycling regimes at the wall. The Lithium Metal Infused Trenches concept (LiMIT) has demonstrated thermoelectric magnetohydrodynamic flow of liquid lithium through horizontal open-faced metal trenches with measured velocities varying from 3.7+/- 0.5 cm/s in the 1.76 T field of HT-7 to 22+/- 3 cm/s in the SLiDE facility at UIUC at 0.059 T. To demonstrate the versatility of the concept, a new LiMIT design using narrower trenches shows steady state, thermoelectric-driven flow at an arbitrary angle from horizontal. Velocity characteristics are measured and discussed. Based on this LiMIT concept, a new limiter design has been developed to be tested on the mid-plane of the EAST plasma. Preliminary modelling suggests lithium flow of 6 cm/s in this device. Additionally, recent testing at the Magnum-PSI facility has given encouraging results, and velocity measurements in relation to magnetic field strength and plasma flux are also presented.

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