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Liquid lithium self-propulsion under applied heat loads MICHAEL JAWORSKI, CHEUK LAU, MADISON MALFA, DAVID URBANSKY, DAVID RUZIC, University of Illinois at Urbana-Champaign, UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN TEAM — Recent experiments have lead to a resurgence in interest in liquid lithium plasma facing components (PFCs). Current plans on NSTX are to implement a Liquid Lithium Divertor (LLD) in the device. This system will utilize a porous metal foam with a thin layer of liquid lithium in contact with the divertor plasma. The liquid-solid system is examined and thermocapillary and thermoelectric magnetohydrodynamics (TEMHD) are deemed important effects. Thermocapillary forces were observed on the CDX-U device redistributing a point source heat load. In NSTX, these forces are expected to create a surface velocity on the order of 7cm/s for a 1mm layer. TEMHD may create additional forces on the liquid metal system. In the case of porous media, the capillary pumping may affect both TEMHD and thermocapillary induced flows. In order to accurately assess the power handling and particle pumping capabilities of liquid lithium PFCs, all these effects will need to be taken into account. The SLiDE apparatus has been designed in order to test thermocapillary and TEMHD flows with an incident heat flux in a laboratory scale environment. An overview of these effects in addition to results of liquid lithium imbibition experiments in a porous metal foam are shown.

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