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Solid-Liquid Lithium Divertor Experiment: SLiDE MICHAEL JAWORSKI, DAVID RUZIC, University of Illinois - Plasma Materials Interaction Group — Liquid lithium has been proposed as a material for the first wall and divertor/limiter of a fusion device. One objection raised against the use of liquid lithium is the high vapor pressure at modest temperature increases. Recent experiments on the CDX-U device show however, that lithium absorbs a surface heat flux of greater than 40 MW/m^2 with negligible evaporation. Observation of a focused electron beam hitting solid lithium in the CDX-U lithium tray saw melting of a large section of the tray. Macroscopic liquid flows were observed which redistributed the incident power. Surface tension effects caused by temperature gradients have been proposed as a mechanism for this convection. These flows were insensitive to MHD effects in fields up to 600G [1]. This paper presents a design of an experiment which will diagnose the flows induced by an intense heat flux onto a lithium pool and measure the maximum heat flux lithium can absorb in an incident magnetic field. A number of diagnostics are considered and evaluated with the goal of being minimally invasive to the induced flows. These results are the first step in the creation of an experimental facility to study the heat transfer capabilities of free-surface liquid lithium at the University of Illinois. [1] Majeski, *et al.*, Final results from the CDX-U lithium program, *Presentation at APS-DPP05*, Denver, Colorado. 2005.

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