

Abstract Submitted  
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**Producing a Coherent Liquid Lithium Droplet Injector and Developing Future Liquid Metal Injectors**<sup>1</sup> DANIEL O'DEA, DANIEL ANDRUCZYK, ANDREW SHONE, University of Illinois at Urbana-Champaign, CENTER FOR PLASMA MATERIAL INTERACTIONS, UNIVERSITY OF ILLINOIS, URBANA-CHAMPAIGN IL TEAM — Injection of granular lithium pellets, with a diameter under 1mm, into NSTX-U has been shown to effectively pace ELMs by simulating higher frequency lower power ELMs. However, this current granular injector produces randomly spaced and sized droplets which can cause several misses. To this end researchers at University of Illinois (UIUC) are developing a Liquid Lithium Droplet Injector (LLDI,) using a chamber that is on loan from Princeton Plasma Physics Lab, with the aim of producing a coherent stream of liquid metal droplets for injection into fusion devices. Various methods for stimulating coherent breakup have been investigated. These include: using a vibrating rod to stimulate an instability in the capillary jet to stimulate breakup at a set frequency, charging droplets to ensure they do not coalesce and finally looking at JxB injection (instead of gas back pressure) to stimulate droplet break-up. Concurrently to this new injector designs are being explored, with the designs being influenced by the results from the LLDI. These new designs will be tailored for purpose, i.e. different drop sizes, spacing and flow rates, and should offer a safe and reliable solution for liquid metal injection.

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