

Abstract Submitted
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Designs of LiMIT as a Limiter in the EAST Tokamak¹ MATTHEW SZOTT, MICHAEL CHRISTENSON, KISHOR KALATHIPARAMBIL, DAVID RUZIC, University of Illinois at Urbana-Champaign — Liquid metal plasma facing components (PFCs) provide a constantly refreshing, self-healing surface that can reduce erosion and thermal stress damage to prolong device lifetime, and additionally decrease edge recycling, reduce impurities, and enhance plasma performance. The Liquid Metal Infused Trench (LiMIT) system, developed at UIUC, has demonstrated thermoelectric magnetohydrodynamic (TEMHD) driven flow of liquid lithium through series of solid trenches. This TEMHD effect drives liquid lithium in fusion systems using the plasma heat flux and the toroidal magnetic field, and the surface tension of the liquid lithium maintains a fresh surface on top of the solid trenches. LiMIT has been successfully tested at UIUC as well as HT-7 and Magnum PSI at heat fluxes up to 3 MW/m². The next step is demonstrating system viability in full-scale fusion-relevant conditions. In collaboration with a team in Hefei, design and testing has begun for a large scale LiMIT system that will act as a limiter in EAST. The designs improve upon previous versions of LiMIT tested at Illinois and incorporate lessons learned from earlier tests of liquid metal PFCs at EAST. Existing infrastructure is used to load and supply lithium to the system, and the LiMIT trenches will help maintain a smooth, fresh surface as well as aid in propelling the lithium out of direct plasma flux to improve heat transfer.

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