Abstract Submitted
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A thermo-electric-driven flowing liquid lithium limiter/divertor for magnetic confined fusion D.N. RUZIC, WENYU XU, DAVIDE CURRELI, DANIEL ANDRUCZYK, TRAVIS MUI, University of Illinois at Urbana-Champaign, HT-7 TEAM COLLABORATION — The concept of using a liquid metal, especially liquid lithium, as the plasma facing surface may provide the best path forward toward reactor designs. A liquid PFC can effectively eliminate the erosion and thermal stress problems compared to the solid PFC while transferring heat and prolong the lifetime limit of the PFCs. A liquid lithium surface can also suppress the hydrogen isotopes recycling and getter the impurities in fusion reactor. The Lithium/metal infused trench (LiMIT) concept successfully proved that the thermoelectric effect can induce electric currents inside liquid lithium and an external magnetic field can drive liquid lithium to flow within metallic open trenches. IR camera and thermocouple measurements prove the strong heat transfer ability of this concept. A new flowing lithium system with active control of the temperature gradient inside the lithium trenches and back flow channels has been designed. TEMHD driven liquid lithium run steady state and pulsed for a few seconds of high heat flux ($\sim$15MW/m^2) has been used to investigate the transient reaction of the flowing lithium. A similar tray is scheduled to be tested in HT-7, Hefei, China as a limiter in Sept. 2012. Related movies and analysis will be shown.

Wenyu Xu
University of Illinois at Urbana-Champaign

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