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Thermoelectric-Driven Liquid-Metal Plasma-Facing Structures (TELS) DANIEL ANDRUCZYK, WENYU XU, SOONWOOK JUNG, PETER FIFLIS, DAVIDE CURRELI, DAVID N. RUZIC, Center for Plasma Material Interactions, University of Illinois Urbana-Champaign, Urbana IL, 61801, USA — CPMI is embarking on the development of a new, innovative liquid divertor PFC that can withstand heat fluxes above 15 MWm^{-2}. It will be based on the lithium-metal infused trenches (LIMIT) concept which has been demonstrated at Illinois and HT-7. TELS will extend the work that has been done at CPMI is four ways: 1. Develop, refine and test new geometries for thermoelectrically driven structures 2. Expansion of the Illinois pulsed and continuous systems so that pulsed plasma heat loads impinge on a surface that already has a continuous heat load on it 3. Increase the magnetic field so that a broader range of "fusion type environments" can be studied 4. Include other PFC materials such as tin and tin-lithium eutectics. The importance of testing with a pulsed plasma heat load is clear since magnetic fusion devices surfaces are subject to ELMs, disruptions, start-up and a variety of other plasma incursions and a PFC needs to show that it is robust under these extreme conditions. Plans for building TELS using the flowing lithium experiment (SLiDE), LiMIT and a pulsed-plasma theta pinch (DEVeX) will be presented. Thus heat removal systems can be systematically investigated and prototypes designed for installation on major fusion experiments around the world.

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