

Abstract Submitted
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Upgrade of a Theta Pinch Plasma Source for Energetic Plasma Flow Generation and Fusion-Related Material Interaction Study¹ SOONWOOK JUNG, VIJAY SURLA, DAVID RUZIC, Center for Plasma-Material Interactions, Department of Nuclear, Plasma and radiological Engineering, University of Illinois at Urbana-Champaign — In order to investigate material erosion by exposure to a burst of high density plasma in a laboratory setting, a theta pinch device called the Divertor Erosion and Vapor Shielding eXperiment facility was built at UIUC. It consists of a theta-pinch coil driven by pulse discharge from 32 μF capacitor bank to produce high density plasma. Recent measurements have shown that plasma sustains approximately for 100 μs at each pulse, with $1.0 \pm 0.2(10)21 /\text{m}^3$ plasma density and 12.5 ± 2.5 eV electron temperature. To simulate the extreme condition in magnetic fusion device a higher electron temperature is desired. For this reason, several upgrades have been implemented: (1) the main capacitor bank, for compression and heating was operated in conjunction with RF antenna and a preionization bank. (2) a guide magnetic field was installed to transport the flow minimizing losses in the radial direction and (3) a crow-bar circuit was added to prevent the pinch from ringing and therefore working against the imposed static magnetic field. The results from the upgrades will be presented.

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