Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

Investigation of vapor cloud formation and dynamic behavior during plasma strikes similar to fusion disruptions TRAVIS GRAY, VIJAY SURLA, University of Illinois at Urbana-Champaign, DAVID RUZIC, Univeristy of Illinois at Urbana-Champaign, CENTER FOR PLASMA MATERIAL INTERACTIONS, UNIVERSITY OF ILLINOIS TEAM — The Divertor Erosion and Vapor shielding eXperiment (DEVeX) at the University of Illinois at Urbana-Champaign is designed to produce plasmas with densities on the order of 10^{21} m^{-3} with a electron temperature greater than 100 eV. This is accomplished with the rapid discharge of a 64 kJ capacitor bank through a conical shaped θ-pinch coil. This study utilizes a thin lithium film as the target. The expanding lithium vapor cloud is measured with an axial array of calibrated photodiodes. Vapor temperature is deduced from a collisional-radiative model of lithium interactions with energetic ions and electrons from the bombarding plasma and found to be 1-2 eV. The vapor cold is also found to cool adiabatically as it expands into the vacuum chamber after the plasma strike. Furthermore, the thin lithium film reduces the incident energy to the target (compared to a bare, non-lithium coated target) by up to 81%. The result is a significantly cooler target temperature under similar plasma bombardment.

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Date submitted: 20 Jul 2009 Electronic form version 1.4