

Abstract Submitted
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3-D Plasma Equilibrium Reconstruction at the HSX Stellarator - Impact of Eddy Currents and Magnetic Islands¹ E. CHLECHOWITZ, HSX Plasma Lab, University of Wisconsin - Madison, A.W. BROOKS, A. ZOLFAGHARI, Princeton Plasma Physics Laboratory, D.T. ANDERSON, HSX Plasma Lab, University of Wisconsin - Madison — Rapid equilibrium reconstruction is critical for understanding the operation and control of fusion devices. A new array of 80 internal magnetic coils was installed at HSX and optimized to reconstruct, using the V3FIT code [1], specific parameters describing the plasma pressure and plasma current profile. The impact of eddy currents inside the vacuum vessel is shown to be responsible for a change in the obtained profiles when the equilibrium reconstruction is performed using a set of 96 external magnetic coils. The SPARK code [2] is used to calculate the eddy currents caused by changes in the plasma current and the main magnetic field. The magnetic field topology of HSX may be varied using auxiliary field coils, and magnetic islands have been generated within the LCFS to test the accuracy of ideal MHD equilibrium reconstructions. Additionally, a moveable limiter can be used to alter the currents inside the plasma edge and in the islands.

[1] J.D. Hanson et al, Nucl. Fusion 49 075031 (2009)

[2] D. W. Weissenburger, PPPL-2494 (1988)

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